Rochester Community and Technical College

Comprehensive Facilities Plan

Volume 2: Appendix

100% Submittal

January 25, 2024

LHB

701 Washington Avenue North, Suite 200

Minneapolis Minnesota 55401

P: 612.338.2029

Meeting Minutes

- Committee Meeting 1, November 5, 2021
- Committee Meeting 2, December 3, 2021
- Committee Meeting 3, December 10, 2021
- Stakeholder Meeting: Athletics, December 16, 2021
- Stakeholder Meeting: Facilities, December 16, 2021
- Stakeholder Meeting: Student Services, December 16, 2021
- Stakeholder Meeting: Technology, December 17, 2021
- Stakeholder Meeting: Accounting, Business, and Office Administration, January 14, 2021
- Stakeholder Meeting: Communication, Fine Arts, and Audio-Visual Technology, January 18, 2022
- Stakeholder Meeting: Construction and Transportation, January 18, 2022
- Stakeholder Meeting: Public/Community, January 18, 2022
- Stakeholder Meeting: Liberal Arts / Transfer Pathways / STEM, January 19, 2022
- Stakeholder Meeting: Agriculture Science and Natural Resources, January 20, 2022
- Stakeholder Meeting: Behavior, Education and Personal Services, January 20, 2022
- Stakeholder Meeting: Law Enforcement and Public Safety, January 20, 2022
- Stakeholder Meeting: Health and Healthcare Support Services, January 21, 2022
- Stakeholder Meeting: Students, Student Senate, and Student Life, January 27, 2022
- Committee Meeting 4, January 28, 2022
- Committee Meeting 5, February 18, 2022
- Committee Meeting 6, March 15, 2022
- Comprehensive Facilities Plan – Meeting 7, August 26, 2022
- Comprehensive Facilities Plan – Meeting 8, September 16, 2022
- Comprehensive Facilities Plan – Meeting 9, October 7, 2022

Space Utilization Reports

- RCTC Room Utilization Fall 2021
- RCTC Partner Space Utilization Fall 2021

Room Scheduling Policy

The college does not have a scheduling policy specific to academic program space use. The campus room scheduler utilizes EMS reports to identify class size and room capacities to ensure efficient scheduling. An online portal is used to schedule non-academic meetings and events.

Facilities Reports

- Facilities and Infrastructure Detail Report
- 5 Yr Renewal Report
- Current Backlog Report
- Higher Education Asset Preservation and Renewal (HEAPR) Manual Updated March 2021

B3 Reports

- B3 Benchmarking Report

Technology Master Plan

- Master Technology Plan 2021-2025

Academic Master Plan

- RCTC Master Academic Plan 2017 - 2020 Executive Summary
- RCTC Master Academic Plan 2017 - 2020
- Strategic Plan 2024

AQIP Systems Portfolio & Higher Learning Commission Self Study

Refer to Section 1 for information.

Other Partnerships

Refer to Section 1 for Partnership information.

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: NOVEMBER 5, 2021
LOCATION: VIRTUAL MEETING

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Committee Meeting 1

DATE SENT: November 8, 2021

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Shayn Jensson	Facilities Project Manager	Shayn.Jensson@rctc.edu
Mary Dennison	Librarian	Mary.Dennison@rctc.edu
Alicia Zeone	Director of Admissions	alicia.zeone@rctc.edu
Gina Korf	Biology Faculty	Gina.Korf@rctc.edu
Crist Dahl	Lab Technician Art & Design	Crist.Dahl@rctc.edu
Beth Diekmann	Financial Aid Director	Beth.Diekmann@rctc.edu
Michele Pyfferoen	VP Academic Affairs	Michelle.Pyfferoen@rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed	Brenda.Frame@rctc.edu
Michael Sheggeby	Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Sara Phillips	Planner, Architect, Project Manager, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY

CFP Definition

a. Macro-level study
b. Flexible & sustainable: Economically and environmentally sustainable while allowing for campus growth.
c. Academic and other planning is used as the key filter for reviewing the plan.
d. Roadmap for the next step for funding (state, campus, or other).

Comprehensive Planning

a. Focuses on the campus mission; how will the campus transform to respond to the needs of today and tomorrow.
b. Committee Expectations: Consistent attendance helps with addressing all ideas and concerns. Be an ambassador; collect information and present to your colleagues. Don’t be afraid to challenge ideas.

Schedule

a. Next Committee Meeting: December 10.
b. 35% Submittal may shift – covers existing conditions.
c. Goal is to complete the CFP process prior to the end of 2022.
d. Plans are updated typically every 5 to 7 years.

Stakeholder Groups

a. Refer to list in the presentation. Committee to review and may propose other stakeholder meetings.
   i. Add the Technology Group, CTech / PTech
   ii. Could also include WSUR, Rochester Public Schools, City of Rochester, etc. Refer to the Academic Master Plan for other possible groups.
b. Possibility to send a campus wide survey or conduct campus wide forums to receive feedback.

Planning Trends to Track

a. *Learning Communities* that support collaboration between amongst students and faculty. Lounge support spaces and other 'soft' spaces.
b. *Full spectrum learning environment*
c. *Third "Places"* are a public home.
d. *Multicultural Communities:* Recognize individual backgrounds and make a community welcoming for all.
e. *Efficient use of resources:* More renovations before consideration of new buildings
f. *Virtual Services & Learning:* What programs can move fully online? What programs require a physical space?

Review of Previous 2018 Plan

a. Site Phasing Plan:
   i. High level site plan.
b. Top Projects were noted.
   i. Memorial & Plaza Halls Demo / Addition / Renovations: complete.
   ii. Heintz Center B-wing Renovation – Predesign 2022 Funding Request
      1) Presentation to the legislature to be uploaded to Teams.
      2) Project name has changed, but the impacted area is roughly the same.
   iii. Student Services – some progress; college funded.
   iv. Student Union: Predesign started, but not completed; did not move forward as student support wasn't sufficient. Difficult to fund student unions/centers in a two-year institution.
   v. Others not yet started: Theater and Art Hall Renovation; Center for Student Success and Teaching Excellence

Reactions to the previous Plan:

a. Current priorities: Centralize student services. Explore shifting library space to make room for a learning center. Reassess remote tutoring vs. in person with the pandemic impacts.
b. Online classes that are using simulations require upgraded technology and different space requirements. (Health and Vet Tech).
c. GRAUC – Greater Rochester Advocates for Universities & Colleges: Pursuing federal funding for a simulation center (located off-campus). Partnered with U of M Rochester, Mayo Clinic and others.
d. Tier 2 classrooms added as part of the Memorial Hall project are available for both in person and remote instruction. Seemingly high utilization.
e. Comprehensive one-stop Welcome Center has been a great improvement. Would like to see this expand to advising, physical / mental health services, and other student services.
f. The Bookstore is planning on moving to the Atrium near the Welcome Center.
g. Cafeteria and Corner Café does not satisfy the need for a "snack bar." Some libraries have added cafes and carts. Staffing challenges for the current food service vendor were noted. If food service were centralized, where should it be?
h. Fine Arts: Music hall currently not inviting. Issues with the piano rooms. Theater seats are uncomfortable. Issues with art classes not being able to space out students in room 201. Fine Arts renovations are still needed, but it was noted that these projects can be difficult to fund given the Legislature's tendency to fund Career and Technical Education programs.
i. Directional Access: Buildings are currently being renumbered and renamed.
j. Third Floor Science & Technology: Still needs renovation for instructional spaces.
k. Continued focus on Wi-Fi, cell coverage, etc. This is a constraint in the One-Stop Center.

Next Steps

a. Review information from the Teams channel. Focus on existing conditions and space use/utilization.
b. Fine tune stakeholder meetings
c. Submit 35% Draft – reassess submittal date at the December 10th meeting.

Communication

a. Committee may send questions to Shayn to compile and send to LHB.
b. Minutes: LHB to post to the Teams Channel.
c. Send a request to Katrina Maass if you don't have access to the Teams Channel.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: Committee Meeting 1 Presentation
c: LHB File No. 210539

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Comprehensive Facilities Plan

Committee Meeting 1
November 5, 2021

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

LHB

Agenda

– Introductions & Roles	10 Minutes
– CFP Definition & Process	5 Minutes
– Schedule	5 Minutes
– Planning Trends to Track	10 Minutes
– Review of Previous Plan	15 minutes
– Next Steps	5 Minutes
	55 Minutes

Introductions & Roles

LHB Partners

– Sara Phillips, AIA | Planner | Architect | Project Manager
– Laura Heck, CDT | Project Assistant
– Nikki Schlepp, PLA | Senior Landscape Architect
– Nathan Wriedt, PE, RCDD | Electrical / Technology
– Ryan Thorson, PE | Mechanical Engineer

RCTC

– Steve Schmall, VP of Finance and Facilities
– Shayn Jensson, Facilities Project Manager
– Jon Krusmark, Information Tech Specialist
– Alicia Zeone, Director of Admissions
– Michael Sheggeby, Director of Sports Facilities
– Michelle Pyfferoen, VP Academic Affairs
– Jean Musgjerd, Health/Phy Ed/Athletics Faculty
– Gina Korf, Biology Faculty
– Steve Higgins, Director of ITS and Departments IT and TSC
– Brenda Frame, Dean of Liberal Arts/Gen Ed
– Beth Diekmann, Financial Aid Director
– Mary Dennison, Librarian
– Crist Dahl, Lab Technician Art & Design
– Students (to be determined)

CFP Definition

A ***macro-level*** study that establishes a ***flexible and sustainable framework*** for campus growth, renewal, and enhancement that best supports the Academic Master Plan and ***student success***.

The plan creates a road map for facility improvements and is a required step for securing State funding.

Comprehensive Planning at RCTC

Support the Mission of the College

Mission: Rochester Community and Technical College provides accessible, affordable, quality learning opportunities to serve a diverse and growing community.

Expectations

- Consistent attendance
- Plan Ambassadors
- Champions of the College
- Challenge Ideas

Schedule

September 2021
30 Information Request Distributed

October 2021
8 Kick-off Meeting with Minnesota State
22 Meeting with President

November 2021
5 Kick-off Meeting with CFP Committee
Stakeholder Meetings

December 2021
10 Meeting with CFP Committee
15 35% Completion for Review*

January 2022
Meeting with CFP Committee
Receive Comments

February 2022
Meeting with CFP Committee
Meeting with President
Campus Engagement

March 2022
15 65% Completion for Review*

April 2022
Receive 65% Comments

May 2022
Meeting with CFP Committee
Meeting with President

June 2022
Meeting with CFP Committee

July 2022
95% Completion for Review*

September 2022
Meeting with CFP Committee
Presentation to the System Office (tentative)

October 2022
Submit 100% Document*

Stakeholder Groups

Meet with students, academic pathways, facilities, community members and others.

Potential Groups

- Accounting, Business, and Office Administration
- Agriculture Science and Natural Resources
- Behavior, Education and Personal Services
- Communication, Fine Arts, and Audio-Visual Technology
- Construction, Technology, and Transportation
- Health and Healthcare Support Services
- Law Enforcement and Public Safety
- Liberal Arts
- STEM
- Transfer Pathways
- College Administration
- Athletics
- Students, Student Senate, and Student Life
- Student Services
- Facilities Staff, including groundskeeping and maintenance
- Community Leaders / Members

Planning Trends to Track

Learning Communities

Concept championed by George Kuh, PhD creating supportive environments within the college that foster seamless transfer of learning between like-minded students and faculty.

Full-Spectrum Learning Environments

Accommodate Lecture, Collaborative, Seminar, Active, and Focused Learning Styles often in same classroom.

Third 'Places'

Concept developed by Ray Oldenberg (Urban Sociologist) designating 'non-threatening places' in the public sphere that provide opportunities to observe and participate in the public ritual in an environment with the rules clearly understood. Third Place is intended to mime the private safe haven of home or 'First Place'.

Planning Trends to Track

Multi-Cultural Communities

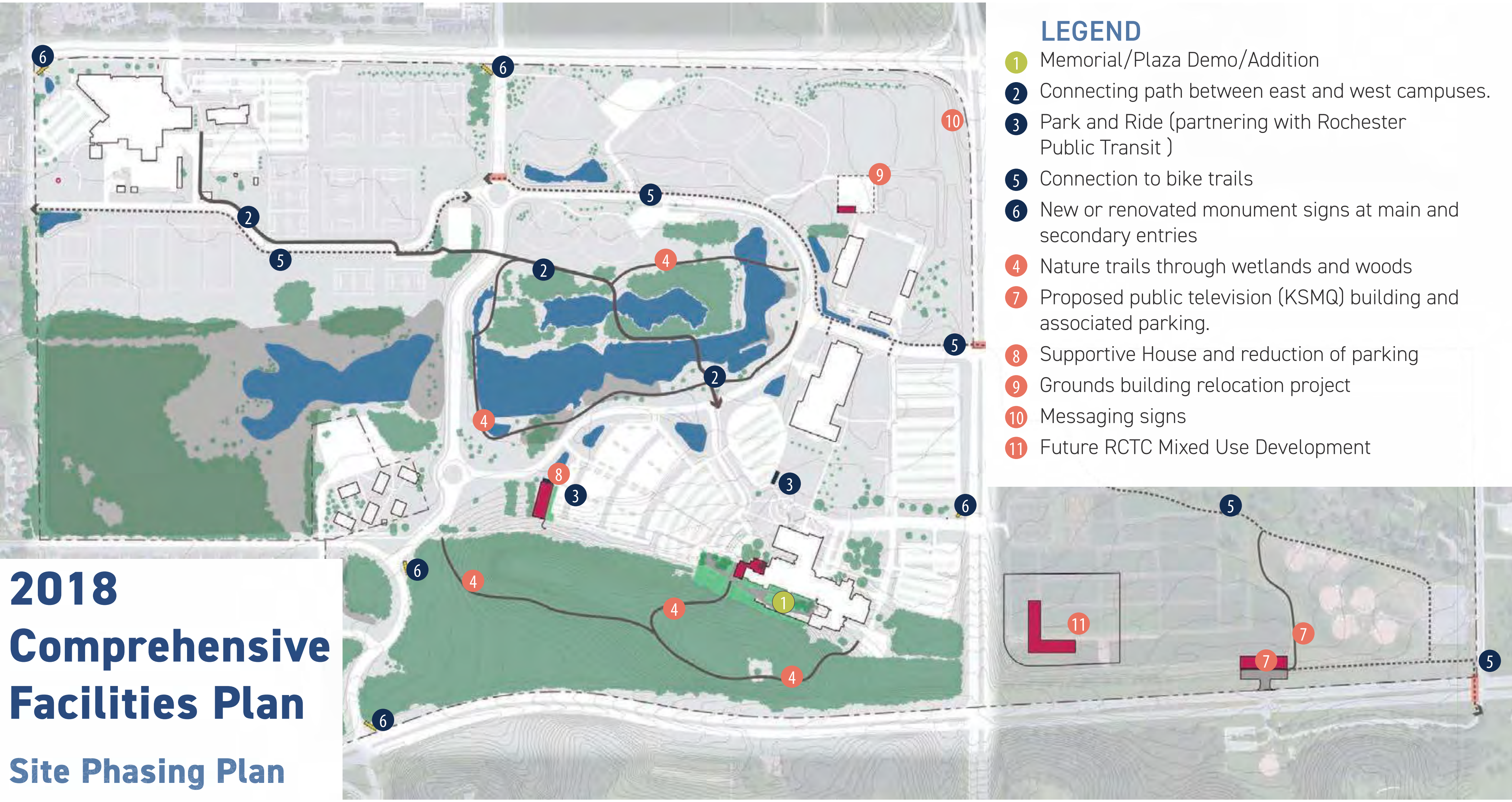
Awareness that one culture's signs and symbols are not necessarily perceived by other cultures in the same manner.

Efficient Use of Resources

Less building of new space, more renovations and full building demolition.

Virtual Services and Learning

How will the current pandemic impact long-term needs for office space and general purpose classrooms and the delivery of student services?



2018 Comprehensive Facilities Plan

Site Phasing Plan

2018 Comprehensive Facilities Plan

Top Projects

Memorial & Plaza Halls Demo / Addition / Renovations

– Complete

Heintz Center B-Wing Renovation

– Predesign Complete

– 2022 Funding Request

Center for Student Success and Teaching Excellence

– Not Started

Student Services Renovations

– Making Progress (self-funded)

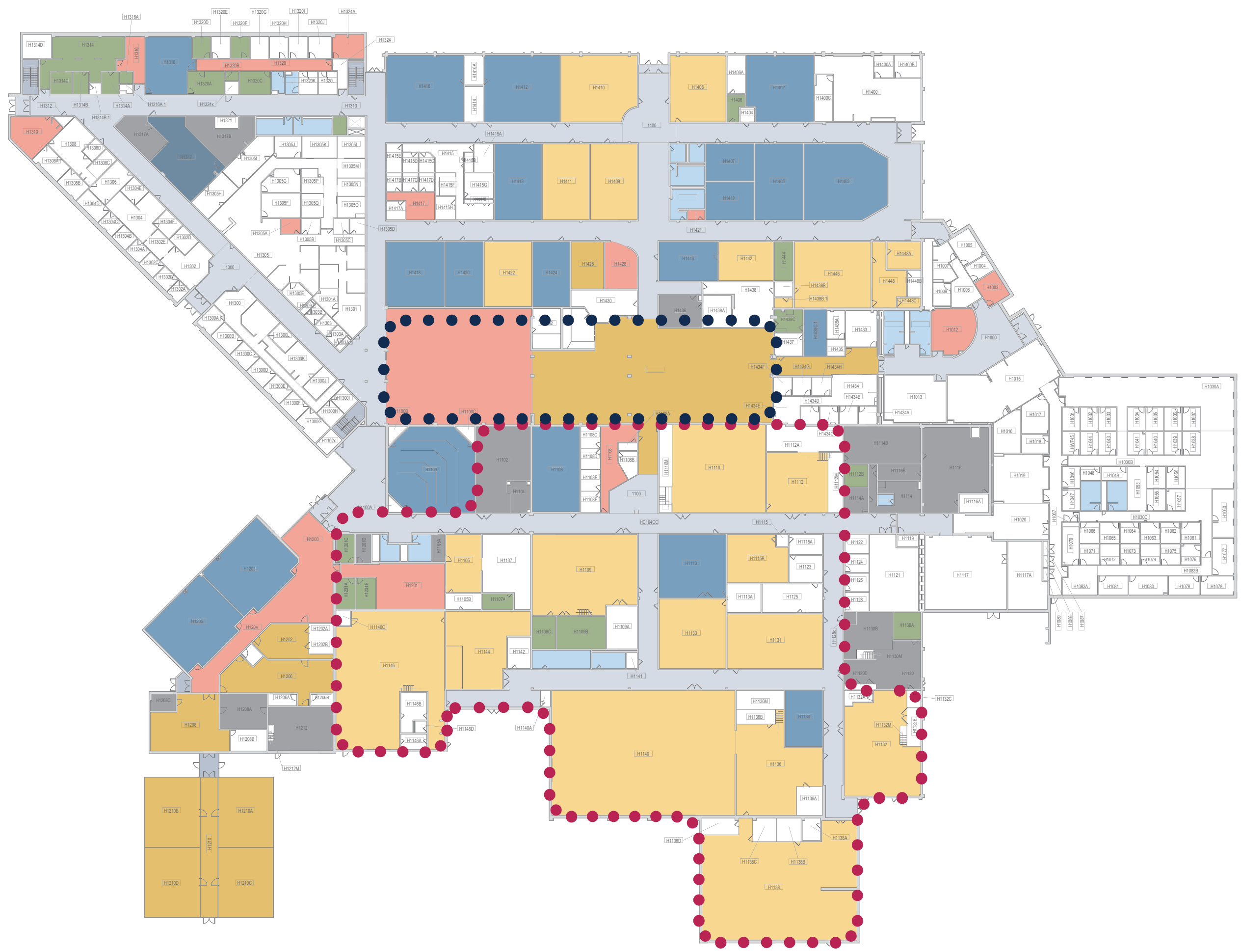
Theater and Art Hall Renovation

– Not Started

Student Union

– Predesign Started; Not Completed

2018 Comprehensive Facilities Plan



Heintz Center B-Wing Renovation

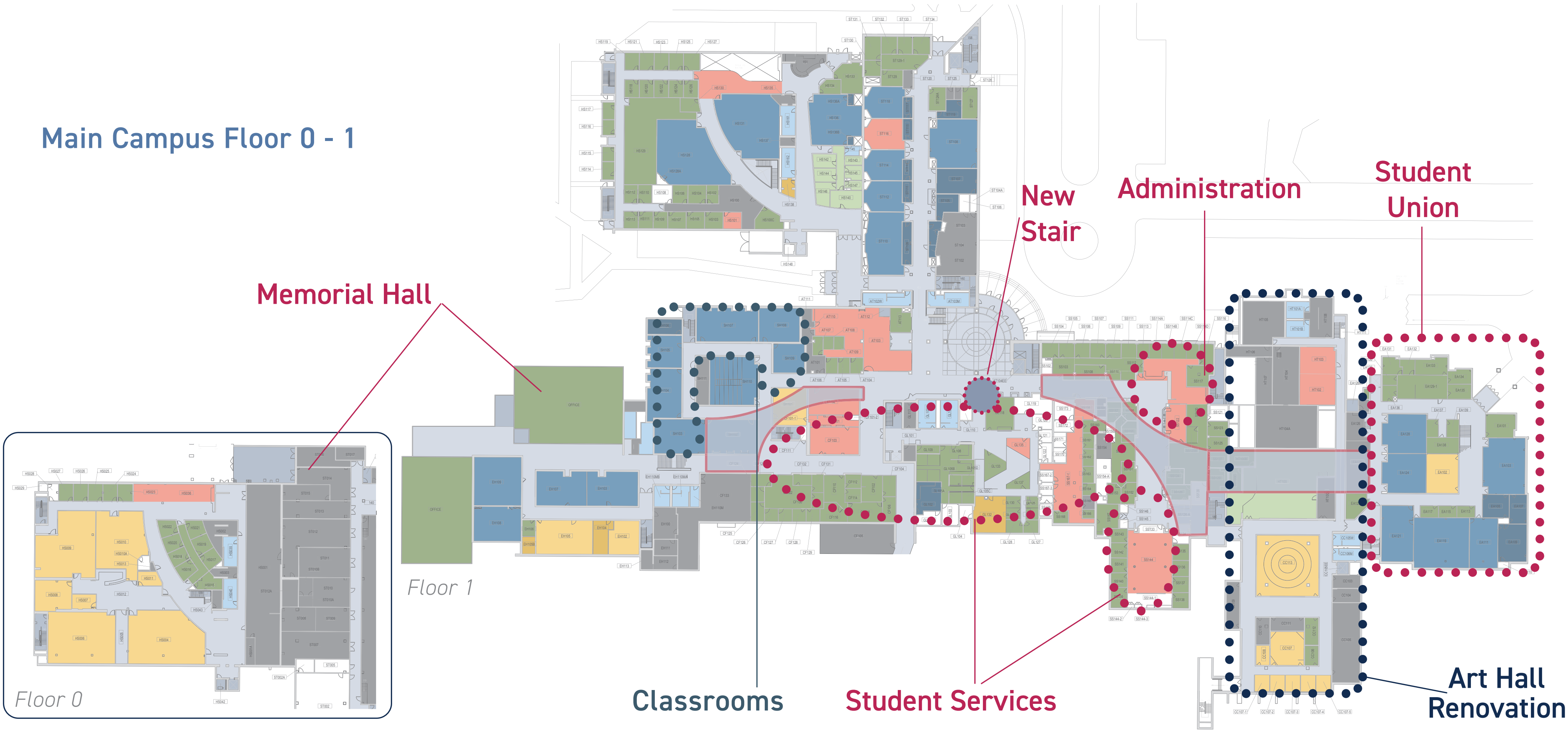
– Maker space
– Simulation center
– Business/industry partnerships

Heintz Center Student Services / Support Renovations

– Reconfigured Commons

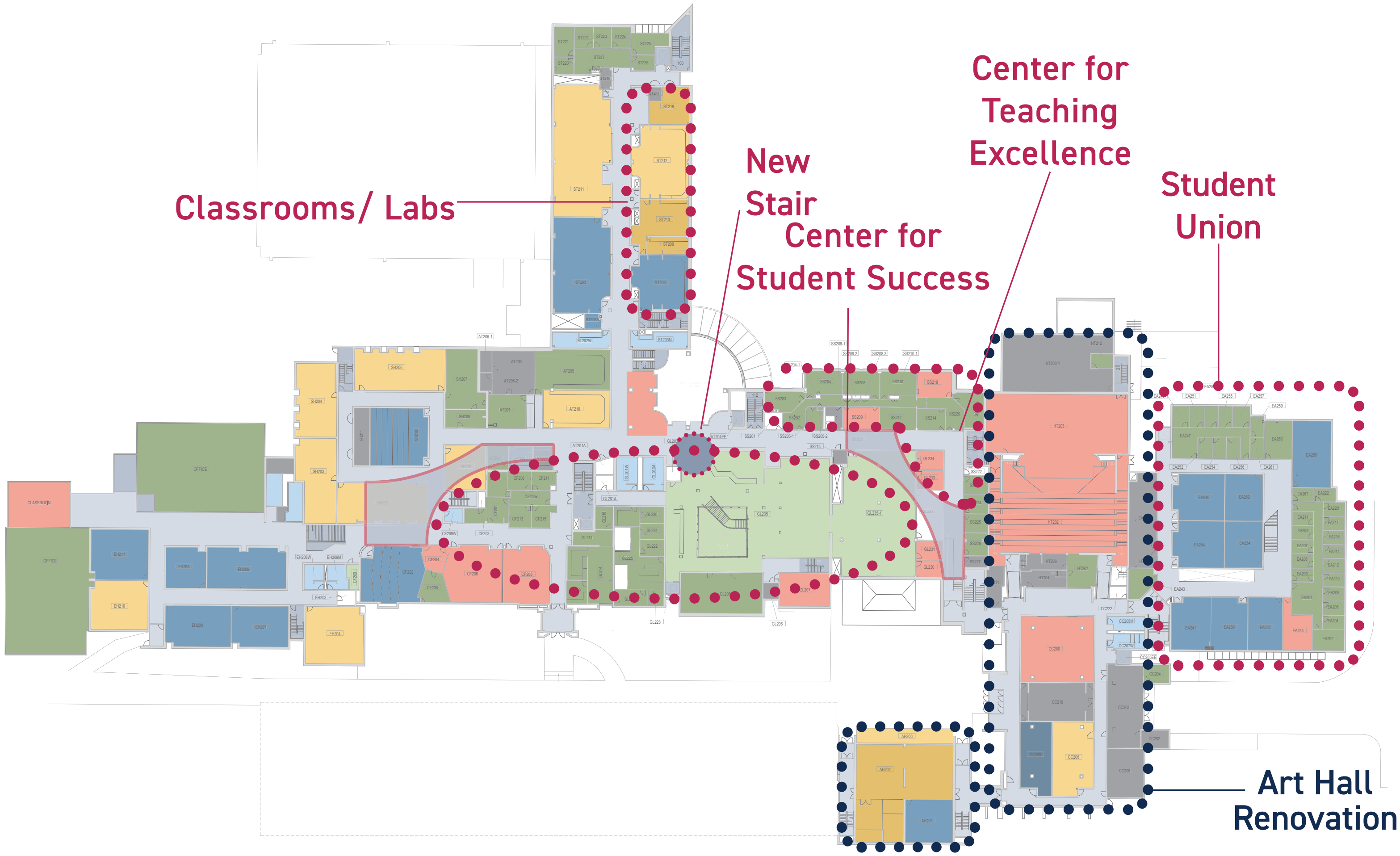
2018 Comprehensive Facilities Plan

Main Campus Floor 0 - 1



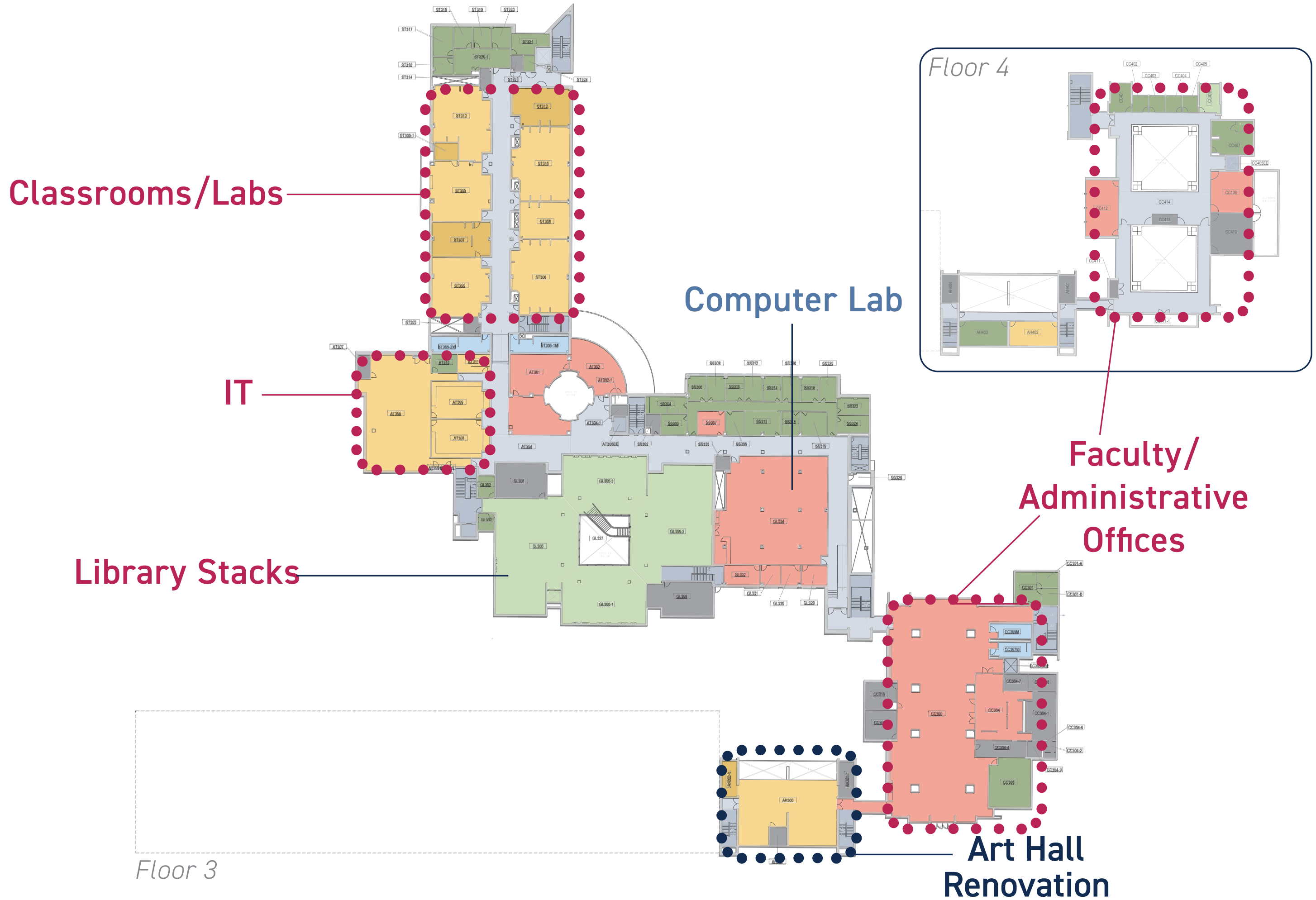
2018 Comprehensive Facilities Plan

Main Campus Floor 2



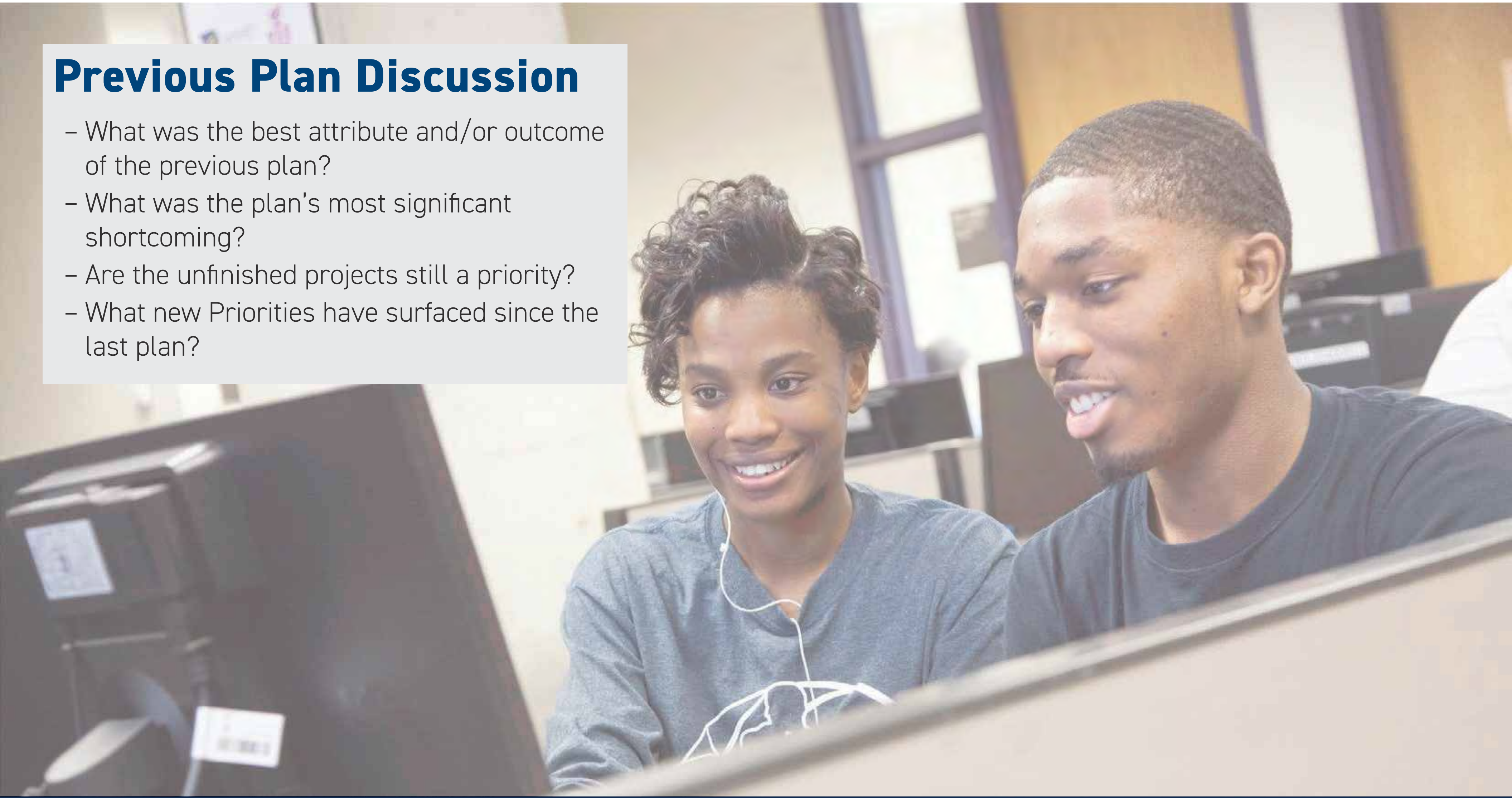
2018 Comprehensive Facilities Plan

Main Campus Floors 3-4



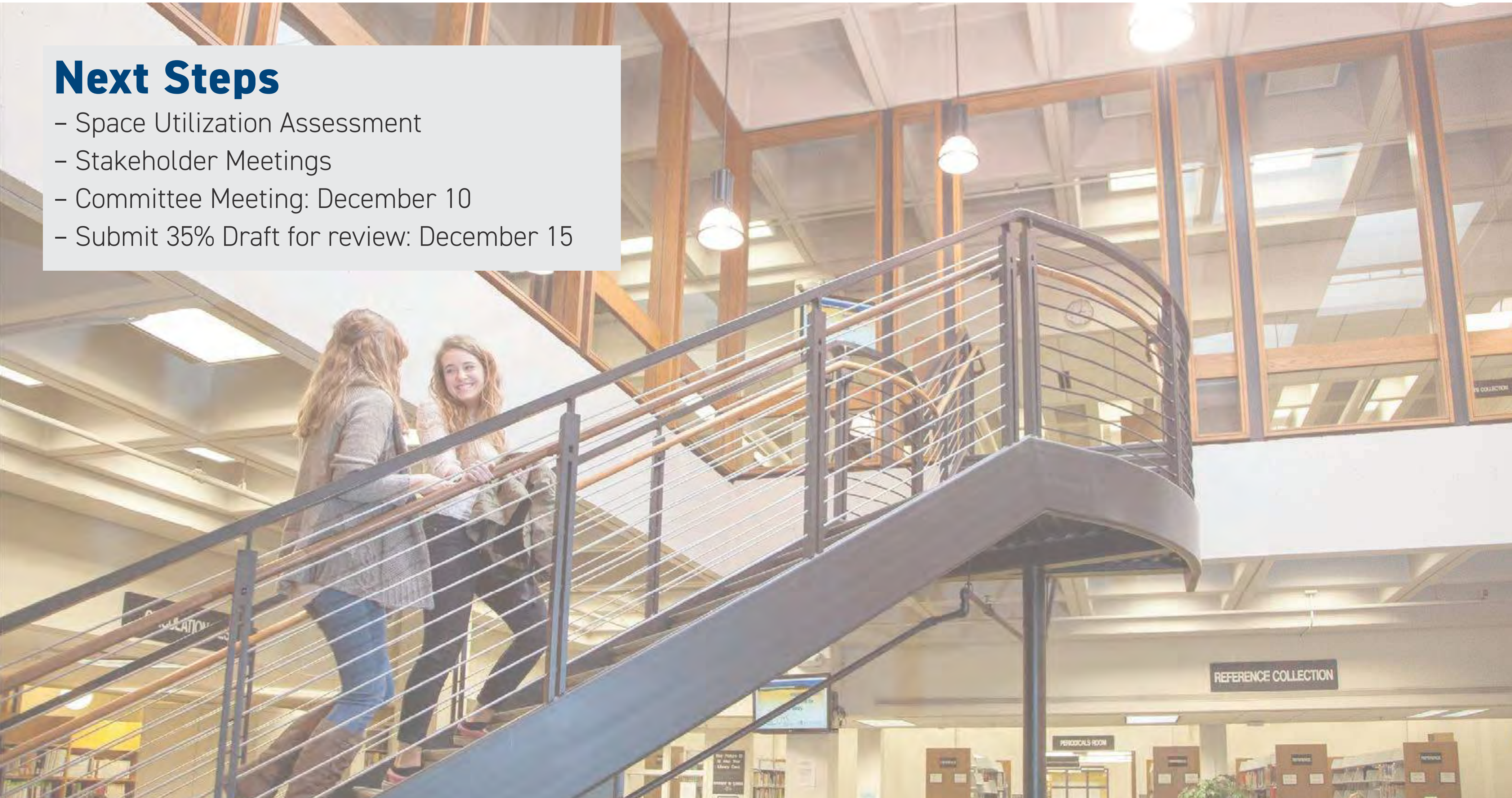
Previous Plan Discussion

- What was the best attribute and/or outcome of the previous plan?
- What was the plan's most significant shortcoming?
- Are the unfinished projects still a priority?
- What new Priorities have surfaced since the last plan?



Next Steps

– Space Utilization Assessment
– Stakeholder Meetings
– Committee Meeting: December 10
– Submit 35% Draft for review: December 15



Thank You!

Committee Meeting 1
November 5, 2021

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: DECEMBER 3, 2021
LOCATION: VIRTUAL MEETING

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Committee Meeting 2

DATE SENT: December 7, 2021

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Shayn Jensson	Facilities Project Manager	Shayn.Jensson@rctc.edu
Mary Dennison	Librarian	Mary.Dennison@rctc.edu
Alicia Zeone	Director of Admissions	alicia.zeone@rctc.edu
Gina Korf	Biology Faculty	Gina.Korf@rctc.edu
Crist Dahl	Lab Technician Art & Design	Crist.Dahl@rctc.edu
Beth Diekmann	Financial Aid Director	Beth.Diekmann@rctc.edu
Michele Pyfferoen	VP Academic Affairs	Michelle.Pyfferoen@rctc.edu
Michael Sheggeby	Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Jean Musgjerd	Health / Phys Ed / Athletics Faculty	Jean.Musgjerd@rctc.edu
Jenny Rosas	Student Government Member	jennifer.rosasiglesias@my.rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed, Academic Affairs	Brenda.Frame@rctc.edu
Jon Krusmark	Projects/Events Department Director	Jon.Krusmark@rctc.edu
Alicia O'Neill	Architectural Designer	alicia.oneill@lhbcorp.com
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After introductions, attendees discussed the following in relation to the Comprehensive Facilities Plan next steps. There we no follow-up items noted from the last meeting.

1. Stakeholder Groups: Meet with students, faculty, staff, community members, etc.
   a. The stakeholder list was revised from the last meeting.
   b. Community Leaders & Members: Likely to include Rochester Parks & Rec.
   c. Schedule: Some meetings may be scheduled in December (i.e. Facilities, Maintenance & Technology), others in January (Students, Student Senate & Student Life). LHB to coordinate with RCTC to begin scheduling.
2. Campus Survey:
   a. The options for sending a survey were reviewed. Surveys with a likert scale are the quickest for respondents.
   b. Could be launched or introduced on staff development day.
   c. It was decided to start generating questions. A final direction will be discussed at next week's meeting.
3. Heintz Center Renovation:
   a. Renovates a large portion of the Heintz Center; primarily the 1100 and 1300 suites.
   b. On Minnesota State's list for Bonding in 2022. Will be listed as a Priority One project in the Comprehensive Facilities Plan, at least for submissions prior to the end of the legislative session.

    c. Moves student support to the forefront. Renovates CTE spaces. Includes more collaboration space. Places the trade programs on display. Updates technology in instructional spaces.
    d. Lab Changes: Generally, labs will be updated with current technology. (ie. Automotive may remove welding space to include electrical component space).
    e. Additional instructional space previously included in the plan, but was later removed from the scope.
4. Other areas needing renovation: 2300 Suite Dental & Surge Tech; some spaces in 1100 not included in the predesign; old lecture style classrooms;
    a. Prioritize hands on tech program spaces.
    b. Natural light is desired in the building. Skylights and/or light monitors are included in the predesign. Some are replacements.
5. Areas that do not require renovation:
    a. 1300 Suite: Community Health lease
    b. 1000 Suite: Recently renovated.
6. Schedule
    a. 35% submission to move to December 22nd
        i. Stakeholder meeting information to be listed as forthcoming for those that are scheduled after this date.
        ii. Post the 35% draft to Teams. Any committee comments will be incorporated into the 65% draft.
7. Next Steps
    a. Space Utilization Assessment
    b. December 10: Site Discussion
    c. Stakeholder Meetings
    d. 35% Draft. This can be submitted concurrently to both RCTC and Minnesota State.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: Committee Meeting 2 Presentation
c: LHB File No. 210539

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Comprehensive Facilities Plan

Committee Meeting 2
December 3, 2021

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

LHB

Agenda

– Welcome and Introductions	5 Minutes
– Follow-up from Last Meeting	10 Minutes
– Stakeholder Meetings Update	5 Minutes
– Campus Survey Discussion	10 Minutes
– Review of Heintz Predesign	15 minutes
– Schedule Review	5 Minutes
– Next Steps	5 Minutes
	55 Minutes

Introductions

New Participants?

Follow-up from Last Meeting

Feedback or Thoughts?

Corrections from the Minutes

– Next meeting date was incorrect

– Other corrections?

Stakeholder Groups

Meet with students, academic pathways, facilities, community members and others.

Revised Groups

- Accounting, Business, and Office Administration
- Agriculture Science and Natural Resources
- Behavior, Education and Personal Services
- Communication, Fine Arts, and Audio-Visual Technology
- Construction, Technology, and Transportation
- Health and Healthcare Support Services
- Law Enforcement and Public Safety
- Liberal Arts / Transfer Pathways / STEM
- Athletics
- Students, Student Senate, and Student Life
- Student Services / College Administration
- Facilities Staff / Maintenance / Technology
- Community Leaders / Members
- C-Tech / P-Tech / Rochester Public Schools

Timing of Meetings

- December or January Preferred?

Campus Survey

Audience: Students, Faculty, and/or Staff

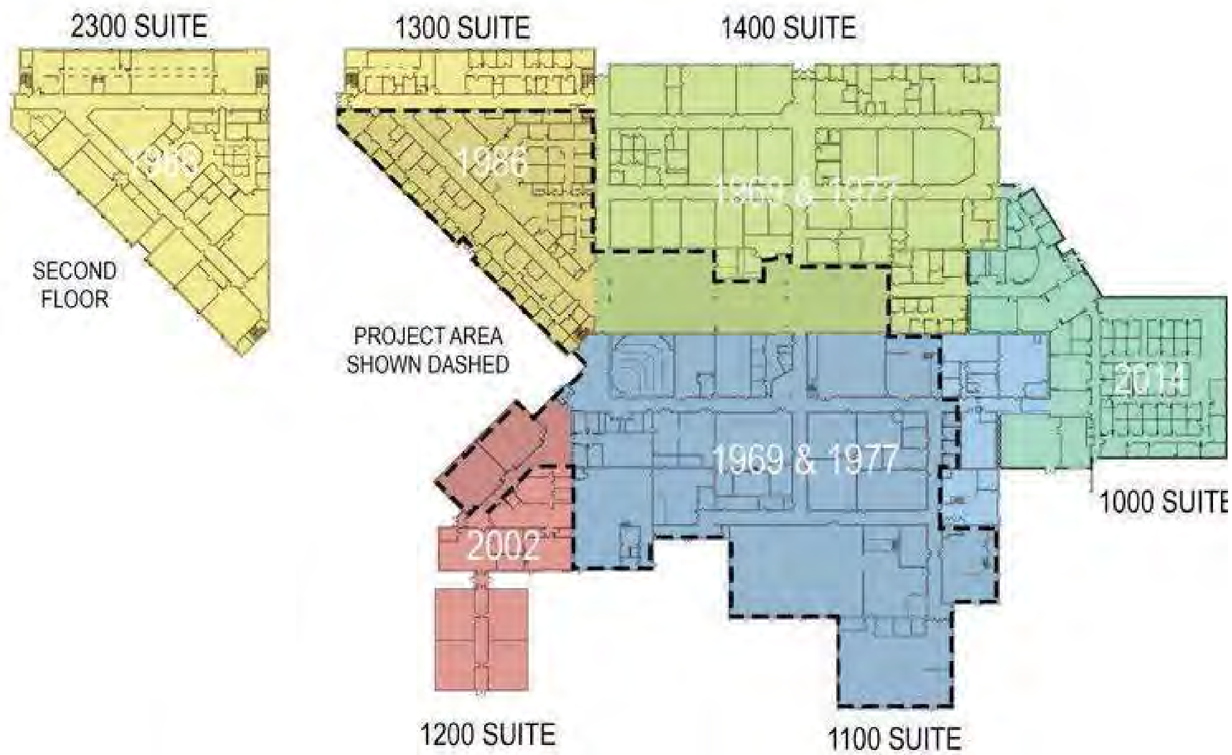
Options:

- Open Questions, “What are your three favorite places on RCTC’s campus”
- Likert Scale Ratings, “Do the general purpose classrooms at RCTC support student success” (Strongly Disagree, Disagree, Undecided, Agree, Strongly Agree, No Opinion)
- Hybrid of both options

- Survey conducted by RCTC or LHB (Survey Monkey)?
- December or January?

Heintz Center Renovation

Re-Imagining Education for a Diverse Workforce



Graphic by HGA

Heintz Center Renovation

Re-Imagining Education for a Diverse Workforce

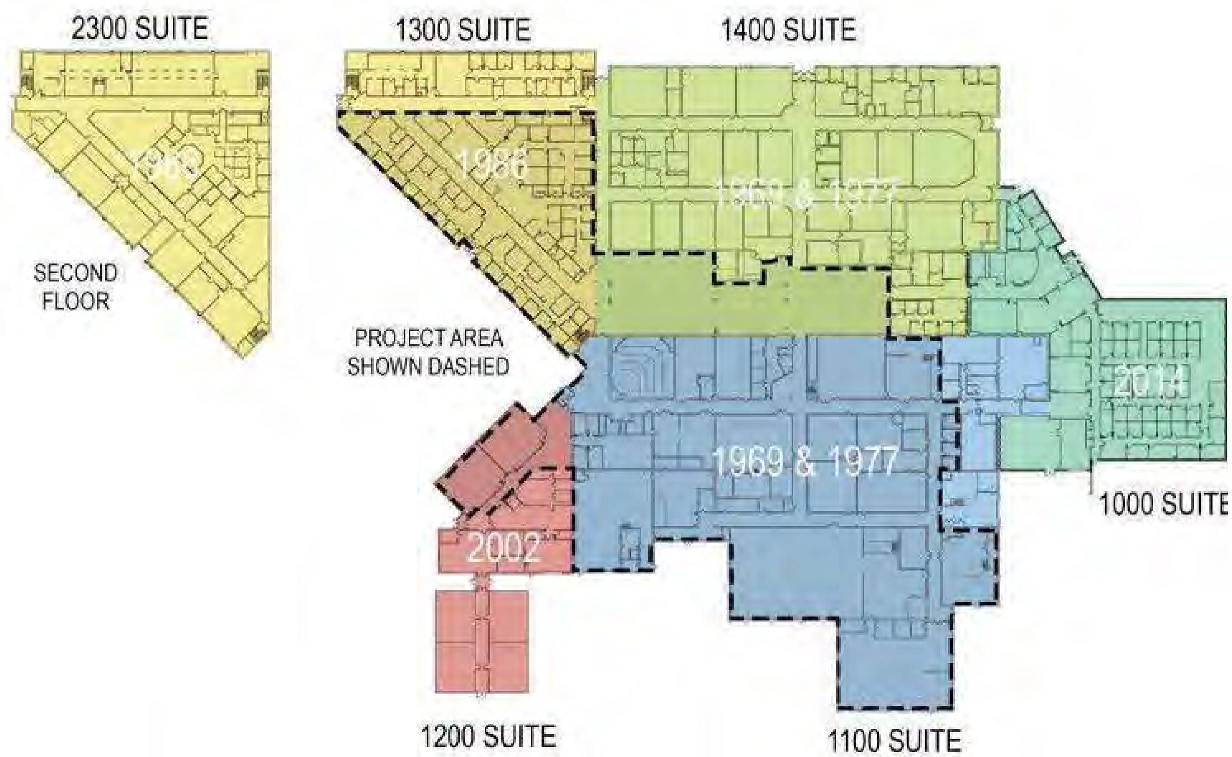
DEPARTMENT LEGEND

- AUTOMOTIVE
- BUILDING SUPPORT
- BWE
- CAD
- CARPENTRY
- CO-LAB
- ELEC/COMM
- FACILITIES
- FAST
- GEN OFFICES
- LAW ENFORCEMENT
- RCTC FOUNDATION
- SHARED EDUCATIONAL
- STUDENT SUCCESS CENTER
- WELDING

Graphic by HGA

Heintz Center Renovation

Re-Imagining Education for a Diverse Workforce



Graphic by HGA

Schedule

September 2021
30 Information Request Distributed

October 2021
8 Kick-off Meeting with Minnesota State
22 Meeting with President

November 2021
5 Kick-off Meeting with CFP Committee

December 2021
3 Meeting with CFP Committee
10 Meeting with CFP Committee
15 35% Completion for Review*

January 2022
Stakeholder Meetings?
Meeting with CFP Committee
Receive Comments

February 2022
Meeting with CFP Committee
Meeting with President
Campus Engagement

March 2022
15 65% Completion for Review*

April 2022
Receive 65% Comments

May 2022
Meeting with CFP Committee
Meeting with President

June 2022
Meeting with CFP Committee

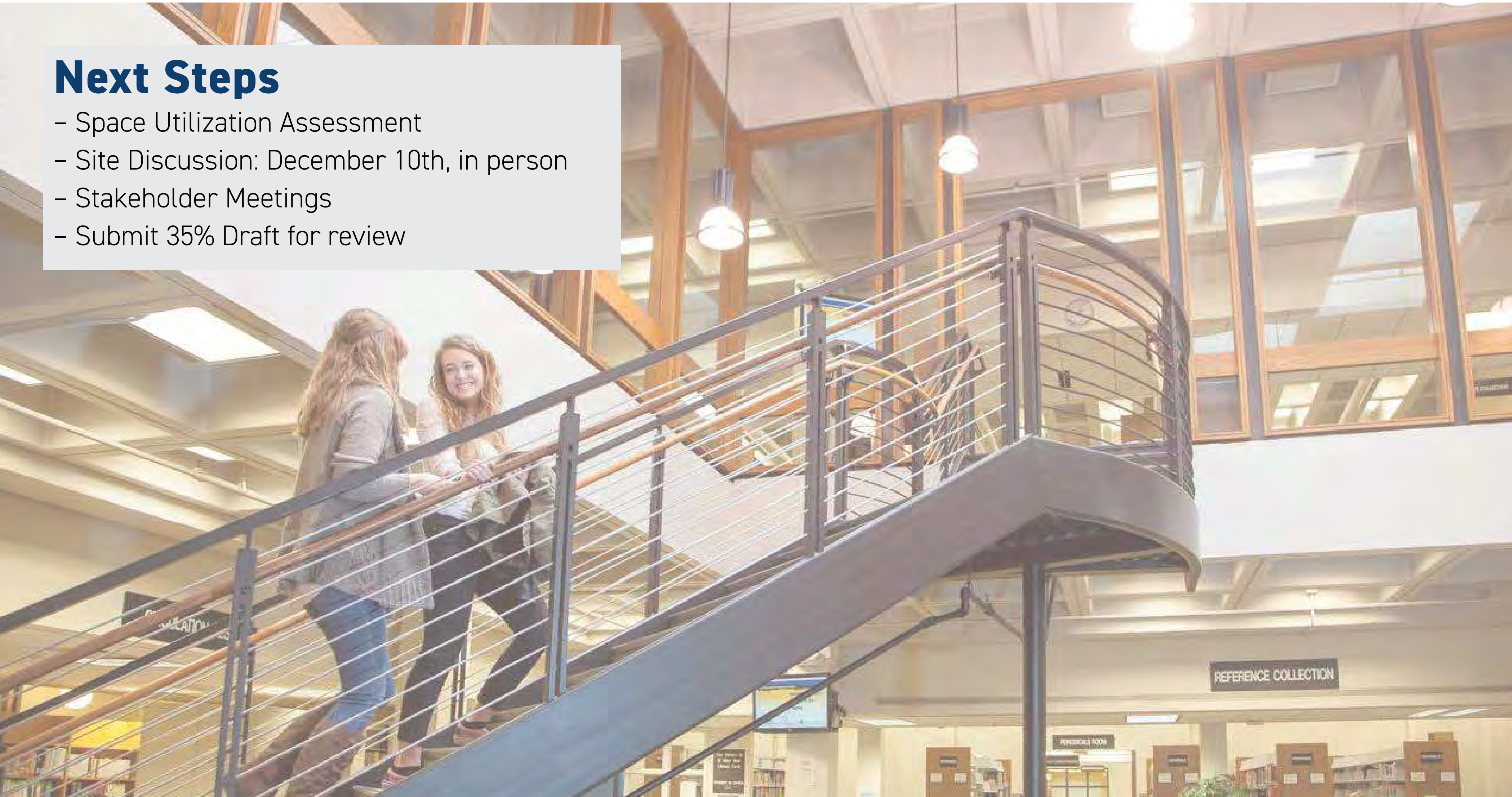
July 2022
95% Completion for Review*

September 2022
Meeting with CFP Committee
Presentation to the System Office (tentative)

October 2022
Submit 100% Document*

Next Steps

- Space Utilization Assessment
- Site Discussion: December 10th, in person
- Stakeholder Meetings
- Submit 35% Draft for review



Thank You!

Committee Meeting 2
December 3, 2021

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: DECEMBER 10, 2021
LOCATION: VIRTUAL MEETING

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Committee Meeting 3

DATE SENT: December 14, 2021

PRESENT:

Name	Title / Organization	Email
Shayn Jensson	Facilities Project Manager	Shayn.Jensson@rctc.edu
Mary Dennison	Librarian	Mary.Dennison@rctc.edu
Alicia Zeone	Director of Admissions	alicia.zeone@rctc.edu
Gina Korf	Biology Faculty	Gina.Korf@rctc.edu
Crist Dahl	Lab Technician Art & Design	Crist.Dahl@rctc.edu
Beth Diekmann	Financial Aid Director	Beth.Diekmann@rctc.edu
Michele Pyfferoen	VP Academic Affairs	Michelle.Pyfferoen@rctc.edu
Michael Sheggeby	Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Jean Musgjerd	Health / Phys Ed / Athletics Faculty	Jean.Musgjerd@rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed, Academic Affairs	Brenda.Frame@rctc.edu
Jon Krusmark	Projects/Events Department Director	Jon.Krusmark@rctc.edu
Nikki Schlepp	Landscape Architect, LHB	Nikki.schlepp@lhbcorp.com
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY

Attendees discussed the following in relation to the Comprehensive Facilities Plan. There were no items noted for follow-up from the last meeting.

1. Stakeholder Meetings Update
   a. Stakeholder groups have been identified. Three meetings are scheduled for December. The remaining will be scheduled in January.
2. Campus Survey Discussion
   a. The following are open for feedback and discussion prior to launching a survey. These were not reviewed at the meeting to allow for additional time on the site discussion:
   b. Open Questions:
      i. What are the three aspects of the campus (inside or outside spaces) that are most successful in meeting
      ii. your needs?
      iii. What are the three aspects of the campus (inside or outside spaces) that need the most improvement?
      iv. What is your favorite interior space at RCTC, and why?
      v. What is your favorite outside space at RCTC, and why?
      vi. Is there anything else you'd like to share about the buildings and grounds of RCTC?

c. Likert Scale
   i. I feel the general purpose classrooms of RCTC support today's needs
   ii. I feel the instructional labs of RCTC support today's needs
   iii. If I have a break between classes, there are comfortable places to spend time
   iv. Imagine you are new to campus and respond to this question: It is easy to find the room or department that I'm looking for
   v. I look forward to spending time on campus
   vi. Is there anything else you'd like to share about the buildings and grounds of RCTC? (Open Question)

3. Site Discussion:
   a. In evaluating existing conditions for the site, accessibility, wayfinding, access to natural resources, etc, are considered during the CFP process.
   b. What is working well?
      i. The redesign of the atrium front entrance has created a more welcoming place and additional parking spaces.
      ii. Roundabouts on campus have helped traffic flow.
      iii. North of the theater near the oaks is a nice place to hang out.
      iv. Smart Garden at the Heintz Campus is a nice gathering space.
      v. Caves in the wooded area south of campus are an interesting place to explore, but doing so is discouraged for safety reasons.
      vi. Students gather on the patio near the bridge on nice days.
      vii. Amphitheater is used for classes from time to time on nice days. Increased use during the pandemic.
      viii. Students gather east of the quad in the spring.
      ix. Open space near athletics is well liked
      x. Walking and jogging classes use city paths for instructional use
   c. What has held us back?
      i. Students are walking on the road between off campus housing and the Sports Center. The bike path does not extend far enough.
      ii. West parking is used as a park & ride which has increased traffic.
      iii. East parking lot off of 30th Ave: visibility while exiting the staff lot is limited due to student parking configuration and circulation.
      iv. Pedestrians are frequently crossing the access road.
      v. Unpaved city lot is a maintenance issue. Snow piles are full of gravel. The surface is uneven.
      vi. Areas near the ponds are marshy in certain times of year.
      vii. Vehicular circulation near amphitheater leads to a dead end. Loading dock at this location. Folks frequently enter this area with their cars by accident.
   d. What could we do differently?
      i. Make the campus more aesthetically pleasing with plantings.
      ii. The woods and caves south of campus present a safety issue. A walking path to the cave could help. A local group is interested in helping with developing mountain biking trails here.
      iii. Add lighting and Wi-Fi accessibility in pedestrian areas that are further out from the parking lot.
      iv. Add shade trees to the west of the quad for late afternoon activities.
      v. Add outdoor space adjacent to the cafeteria (on floor 3, but somewhat accessible on grade). A deck has been discussed in the past.
      vi. Add more informal accessible seating in locations where students gather:
         1) near rain garden and wooded area south of the student lot
         2) east of the quad
         3) near Heintz Center
         4) Make sure some seating is still ADA accessible
      vii. Better ADA improvements and connections in and near parking areas.
      viii. Add more sidewalks along roads.
      ix. Change design of entry circulation to deter people from entering the loading dock area by mistake.
      x. Discuss maintenance of site improvements that occurred based on student projects. How will these be handled in the future? Funding of maintenance for Heintz gardens or student projects unknown.

4. Beyond Campus Borders
    a. Consider connections to parks and trails and other natural resources in future planning.
    b. Parks & Rec completed a bike path project near the corner of 13th and 30th to 15th. Used for walking and jogging classes at RCTC.
5. Schedule Review & Next Steps:
    a. 35% submittal for review is targeted for December 22nd. Issues with space utilization data may delay this submittal depending on when the data is received.
    b. Schedule remaining stakeholder meetings
    c. Establish meetings for the Spring semester

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: Committee Meeting 3 Presentation
c: LHB File No. 210539

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Comprehensive Facilities Plan

Committee Meeting 3
December 10, 2021

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

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Agenda

– Follow-up from Last Meeting	2 Minutes
– Stakeholder Meetings Update	2 Minutes
– Campus Survey Discussion	5 Minutes
– Site Discussion	45 minutes
– Next Steps	5 Minutes
	60 Minutes

Follow-up from Last Meeting

Feedback or Thoughts?

Corrections from the Minutes?

Stakeholder Groups

Meet with students, academic pathways, facilities, community members and others.

Revised Groups from Last Meeting

- Accounting, Business, and Office Administration
- Agriculture Science and Natural Resources
- Behavior, Education and Personal Services
- Communication, Fine Arts, and Audio-Visual Technology
- Construction, Technology, and Transportation
- Health and Healthcare Support Services
- Law Enforcement and Public Safety
- Liberal Arts / Transfer Pathways / STEM
- **Athletics**
- Students, Student Senate, and Student Life
- **Student Services / College Administration**
- **Facilities Staff / Maintenance / Technology**
- Community Leaders / Members
- C-Tech / P-Tech / Rochester Public Schools

Campus Survey

Audience: Students, Faculty, and/or Staff

Open Questions:

- What are the three aspects of the campus (inside or outside spaces) that are most successful in meeting your needs?
- What are the three aspects of the campus (inside or outside spaces) that need the most improvement?
- What is your favorite interior space at RCTC, and why?
- What is your favorite outside space at RCTC, and why?
- Is there anything else you'd like to share about the buildings and grounds of RCTC?

Likert Scale:

- I feel the general purpose classrooms of RCTC support today's needs
- I feel the instructional labs of RCTC support today's needs
- If I have a break between classes, there are comfortable places to spend time
- Imagine you are new to campus and respond to this question: It is easy to find the room or department that I'm looking for
- I look forward to spending time on campus
- Is there anything else you'd like to share about the buildings and grounds of RCTC? (Open Question)

Site Discussion

The Comprehensive Facilities Plan not only looks at the uses of campus buildings, but also the surrounding property

Related to exterior spaces on RCTC's campus:

– What is working well?

– What has held us back?

– What could we do differently?

– What should we do next?

Graphic by HGA

Schedule

September 2021
30 Information Request Distributed

October 2021
8 Kick-off Meeting with Minnesota State
22 Meeting with President

November 2021
5 Kick-off Meeting with CFP Committee

December 2021
3 Meeting with CFP Committee
10 Meeting with CFP Committee
16-17 Stakeholder Meetings
22 35% Completion for Review*

January 2022
Stakeholder Meetings
Meeting with CFP Committee
Receive Comments

February 2022
Meeting with CFP Committee
Meeting with President
Campus Engagement

March 2022
15 65% Completion for Review*

April 2022
Receive 65% Comments

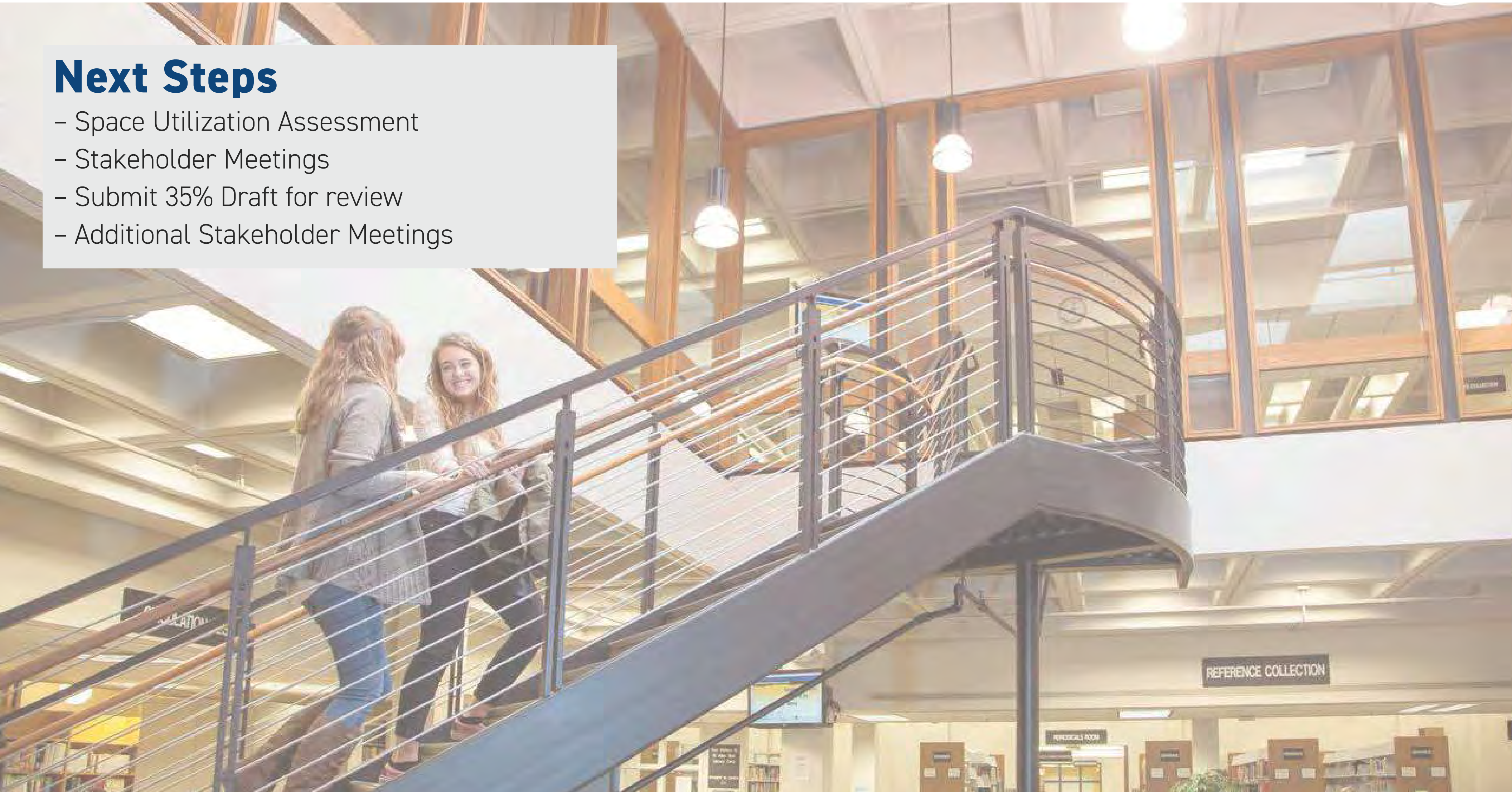
May 2022
Meeting with CFP Committee
Meeting with President

June 2022
Meeting with CFP Committee

July 2022
95% Completion for Review*

September 2022
Meeting with CFP Committee
Presentation to the System Office (tentative)

October 2022
Submit 100% Document*



Next Steps
- Space Utilization Assessment
- Stakeholder Meetings
- Submit 35% Draft for review
- Additional Stakeholder Meetings

Thank You!

Committee Meeting 3
December 10, 2021

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: December 16, 2021
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Athletics

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Mike Lester	Athletic Director	Mike.Lester@rctc.edu
Jean Musgjerd	Health/Phy Ed/Athletics Faculty	Jean.Musgjerd@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. Overall one of the best higher ed athletic facilities in the state.
2. Student Life: Not as centrally located as desired, but still a great space.
3. Partnerships support the facilities that RCTC has, including athletics.

Stadium & Dome

1. Joint Venture: Shared space with RCTC. Priority given to those that use the space the most. RCTC and all other parties pay for their time.
2. There are changing rooms here, but no showers. Must use the Sports Center for traveling teams.

Sports Center:

1. Fieldhouse is a joint facility: 6am-5pm RCTC Space for classes and practice. After 5pm the City and other organizations have priority. It is also a rentable space.
2. Concessions: Upstairs and downstairs. The upstairs space has not been used in some time. Not user friendly and facilities limit what can be served. Currently used as storage by concessions. Proposed to be used as an adjunct faculty area. Other interests: Bookstore and Student Life has shown interest in using the upstairs concession space.
3. Changing Rooms: RCTC does not use these on a regular basis. Mostly public use.
4. Recent Changes: Reconfigured fitness center and moved the cardio area upstairs. Not ideal for classes, but has improved flow and use of equipment. Loss of previous aerobic area takes away a quiet space for students to gather.
5. All American Room: Upper-Level conference room that overlooks the fieldhouse. Used by some students for attending classes via Zoom.
6. Sports Center Student Support and Gathering Spaces: Conference Room sometimes used for study. 3 computer labs available. Athletes familiar with the space tend to stay in the building. Others return to the Main building.
7. Public Events: Not enough seating available.

8. Academic Amenities: Most coaches facilitate a study group 2 – 3 times per week. There isn't enough space for multiple groups at once. Tend to use the Learning Center instead. Only two spaces available in the Sports Center: Classroom and All-American Room.
9. Faculty offices are "tight". Some need to share. Per contract, there are required office hours, however moving to a virtual environment, the current campus office space may change. Dependent on student needs. Some discussions require privacy.
10. Open Gym Program: 10am – 2pm in the Sports Center: On hold due to the pandemic. Previously well attended. Casual pickup games for students.
11. Lockers: Users must provide their own lock for daily use only. Tried a key system, but they were often lost.
12. Original plan had a drop-off location on the east side. Desired by the community. During elections and other community events, the campus provides golf carts.

Outdoor Spaces

1. Fields used by RCTC need updates to bring equity between each field.
2. Softball field has concessions, restrooms and a large dugout. Baseball does not have these amenities.
3. Some fields have lights while others do not.
4. Partnerships with the City support the sports facilities along with their improvements.

Available Spaces and Future Planning

1. Old bookstore space.
2. Former Student Service space
3. E-Sports: Priority from the student government. Will start as a club through student life. Working with technology to review startup costs.
4. CPR Classes: In the old part of Endicott (now Memorial) on main campus. Down to 4 classes (decreasing enrollment). This space could be used by other classes to improve utilization.
5. Intramural Sports: Currently not offered. Noted that scheduling was difficult and student interest in the types of activities has changed. Not having access to the old gym has affected scheduling. Found that other institutions are retiring their intramural programs as well.
6. A group has formed for a city-wide athletics facility plan.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: December 16, 2021
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Facilities

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Josh Whalen	General Repair Worker	Joshua.Whalen@rctc.edu
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Scott McCullough	Director of Campus Safety & Security	Scott.Mccullough@rctc.edu
Shayn Jensson	Project Manager	Shayn.Jensson@rctc.edu
Wylie Johannessen	Electrician	Wylie.Johannessen@rctc.edu
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Alicia O'Neill	Architectural Designer, LHB	Alicia.oneill@lhbcorp.com

MEETING SUMMARY

After introductions and a summary of the CFP process, the following was discussed.

1. What are areas that need improvement?
    a. Storage
        i. Carpet, paint, etc.
        ii. Nooks and crannies are becoming storage spaces, hazardous material concerns
        iii. IT department and facilities both have big needs and this causes conflicts at storage spaces
    b. Air handling systems/HVAC
        i. Currently: VAV control upgrades, fans and controls upgrades (more main campus than Heintz), cleaning air handlers to provide better office control
        ii. Smaller issues that can be addressed with campus dollars or seek other funding sources? Both.
        iii. Heintz center has negative pressure from rooftop air handling units that were taken off
            1) Steam from county heats the building
            2) Backup is 1983 boiler that is no longer safe to run – flame and pilot won't stay lit on the boiler without bringing in fresh air – need to find out how to heat the air or replace the boiler to bring it into the building – upgrades needed
            3) Main campus and sports facilities are off of district steam, Heintz is on district steam – If Heintz center is to go off steam the boiler situation will need to be corrected
    c. Door replacement
        i. Covid dollars being used to adjust exterior and interior door hardware, hardware needs to be standardized for security and safety reasons

    ii. Sports center and Heintz need work too, but overall are in good condition
d. Security
    i. Burglar alarms (Heintz is good, main campus is outdated)
        1) older systems are not reliable – should be able to access alarm info on mobile device instead of having to travel to building and more specifically the particular part of the building
    ii. Motion sensors – aging hardware, some have been replaced
    iii. Modern features desired to enhance response time and quality of service
    iv. Cameras – extensive camera programs on campus, many newer cameras
        1) infrastructure behind cameras can be lacking, reliability concerns
        2) very large numbers of archaic cameras replaced over the summer – improved coverage and quality
e. Skylights
    i. Need to be replaced – leak and are brittle, do not provide adequate lighting
    ii. Roof around skylight close to replacement list? Lower was replaced in 2008/2008. Upper roof needs to be replaced but is not high priority
f. Dental Lab exhaust issue
    i. Mixing acrylic for dentures – smell transfers throughout building, many complaints have been received
    ii. Classroom needs proper exhaust for this process – undersized exhaust system currently
g. Air compressors –
    i. Current compressors are from 1989/1990, 3 total – 2 are antique and 1 is down
    ii. Some of the need is academic related, some facilities related
h. Piping
    i. Outdated, some patching is being done for many leaks and breaks
    ii. Mostly in the main campus
i. Electrical load around campus
    i. Heintz center electrical server is outdated
    ii. Some panel upgrades in 2012 – was not an all-inclusive upgrade, more about immediate problem areas
j. Backup resources
    i. Ongoing concern – technology is always taking a bigger load
    ii. Not as high of a priority but needs to be on the radar
k. Lighting
    i. Old technology, inefficient – needs repeated fixing and should be replaced
    ii. LED lighting desired – some areas have been updated, but should be a campus standard
    iii. Lighting controls
        1) outdoor - controls are dated and not user friendly, difficult to repair
        2) Indoor – many switches and occupancy sensors, not in too bad of shape
    iv. Exterior lighting
        1) Dark spots, safety concerns – dock at Heintz center for example
        2) Upgrades needed
        3) Light pollution issue
        4) People are not living 24/7 on campus, focus can be people getting out to their cars rather than lighting throughout
    v. Lighting standard desired – many incorrect bulbs being used, standard color temperature
l. Classroom Furniture
    i. Many sections of the building have outdated furniture and need refreshing
    ii. Faculty desires flexible furniture
m. Floor finishes
    i. Omission of materials is the most sustainable option, but can have acoustic issues
    ii. Maintenance needs to be considered
    iii. Surplus of carpet is being stored on campus, but there is limited storage and it may get forgotten about – more storage
    iv. Changing from carpet to hard floor doubles custodian's work – needs to be considered/discussed
n. Chillers at Sports Center
    i. One will be replaced soon before next cooling season

   o. Exterior Issues
      i. Tuckpointing work needs to be done, etc.- Large list to be considered
2. Final Thoughts
   a. 35% draft to be submitted next week
   b. One of series of meetings – some will be held next semester in January
   c. Then committee will start talking about proposed projects – we will regather for this next semester
   d. If you have any other thoughts or ideas, please send to Katrina

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: December 16, 2021
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Student Services

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Shayn Jensson	Project Manager	Shayn.Jensson@rctc.edu
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Brenda Kincannon	Brenda Kincannon	Brenda.Kincannon@rctc.edu
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Melanie Callister	College Registrar	Melanie.Callister@rctc.edu
Jason Bonde	SSS Director/Womens BB Coach	Jason.Bonde@rctc.edu
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Alicia O'Neill	Architectural Designer, LHB	Alicia.oneill@lhbcorp.com

MEETING SUMMARY

After introductions and a summary of the CFP process, the following was discussed.

1. Areas that need improvement throughout campus
   a. Not enough private testing space
      i. Students that need accommodations for their classes use the spaces, along with some placement testing
      ii. Testing rooms have been added over the years, but there is not enough space to add any more
      iii. Students need to be sent from main campus to Heintz to utilize those rooms
      iv. 9 testing rooms currently at main campus – at least 5-6 more rooms needed to adequately serve the students
      v. 4 testing rooms at Heintz – demand will go up for more rooms, some are being used for storage
      vi. Where would testing centers be ideally located? One testing center with larger testing areas needed, but not sure where this would be best placed
      vii. Adjacencies are important here – i.e. Welcome center
   b. Business Office
      i. Main Campus location
      ii. Cashier is across the hall – adjacencies need to be looked at
   c. Library
      i. Students use group study rooms heavily throughout entire semester

        ii. These rooms are busy and often reserved - more needed to serve students

d. Student Life
    i. Lack of storage
    ii. Events held at both campuses – ideally there would be storage at both, with food storage being separate from other items
    iii. More and larger gathering places for student events and natural student gathering
    iv. Students have expressed desire for lockers to store things during the day
    v. Where is student life best located? Students don't naturally walk through this space to get to classes often, would ideally be more central and visible
    vi. Very large space
e. Registrar
    i. Separate offices are working well for now
f. Health Services
    i. More emphasis now on mental health services, some spaces dedicated to this would be great
    ii. Self care – mental health classes, quiet spaces
    iii. Facilities are adequate in general (pre-covid), but they are not built to have quarantine rooms for isolation
g. Student Services
    i. Feels as though the area is not a high priority even though there are things to be done
    ii. Ventilation is not great, but is improving with ongoing adjustments
    iii. Carpet needs updating (from around 2003)
    iv. Little improvements can go a long way – needs an overall refresh
    v. Walls need painting
    vi. Furniture needs refreshing – currently is not a welcoming environment
    vii. Finishes are not cohesive and do not flow well like other campuses
h. Lighting
    i. Daylight or LEDs would be appreciated
    ii. Feels dark and unsafe in many areas - unwelcoming
    iii. Standardizing lighting is on the radar for facilities
i. Conference Spaces
    i. Classes are often using the meeting rooms, more are needed to bring in larger outside groups
    ii. Could we repurpose larger areas into meeting rooms of 8+ people?
    iii. Heintz needs more as well
    iv. These spaces are often rented out (pre-covid) and it would be nice to have a space dedicated to this rather than competing with classes
    v. Some of the larger meeting spaces are being used to meet social distance requirements for classes
j. Prospective student / first time campus visitors
    i. New students on campus – desire to accelerate wayfinding project currently underway, making signage updates
    ii. Location of the Heintz center food pantry is hard to find
        1. Many students don't know it exists
        2. Feels like a closet
        3. Space at least twice as big and more central is needed
k. Outside Spaces
    i. Needs general cleaning up – grass isn't inviting, it isn't aesthetically pleasing
    ii. Not enough maintenance staff for upkeep
    iii. Staff members have taken it upon themselves to weed areas
    iv. Better overall landscaping
    v. New plaza area
        1. Very nice, but isn't visible from the building for students
        2. Takes effort and navigation to get to

3. Transitional spaces could be used to encourage students to move students towards this space

l. Door at student services is open to prevent pipes from freezing
    i. Heating and cooling issues need to be addressed
m. Atrium
    i. Not inviting or pleasing
    ii. Furnishing improvements have helped get students to spend more time here
    iii. Openness of the atrium is great – but there is often too much clutter, hard to slow down in this space, students may be missing posted signs and opportunities because they are just passing through
    iv. Very cold
    v. Is it possible to open some other spaces up for a student area?
    vi. What is our goal for the function of the atrium?
        1. Students are usually here waiting for rides
        2. Students often study at the second floor of the atrium – seating, tables
        3. Space has evolved over time - students have congregated in the atrium in the past, but became crowded and noisy – tried to direct students to other gathering places instead
        4. Want it to be welcoming, but not too cluttered with gathering
n. Potential coffee shop next to the bookstore
    i. Place for conversation
    ii. More reasons to stop and stay rather than just pass through
    iii. Many students don't know about the out of the way café – could be moved to a more central location

2. What's next? Final thoughts
    a. Submission of 35% draft next week to capture existing conditions
    b. Stakeholder meetings are difficult to schedule at this time, so many will happen in January at the new semester
    c. Stakeholder feedback will be presented to CFP committee meeting to decide what projects to prioritize

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: December 17, 2021
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Technology

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
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Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Mir Qader	Chief Information Officer	Mirwais.Qader@rctc.edu
Feras Al-Kaisi	Automations Systems Engineer	Feras.Al-Kaisi@rctc.edu
Jon Krusmark	Projects/Events Department Director	Jon.Krusmark@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. Open Computer Labs:
   a. Less utilization than in the past. Not seeing a need to reduce footprint. Depends on academic delivery model.
   b. Considering a laptop program in the future, which might affect the footprint of computer labs.
   c. Technology Master Plan has identified the need for more charging stations.
   d. Mankato is currently using a phone booth style pod for attending classes virtually and studying. RCTC tried a similar style with plexiglass partitions.
   e. Need student feedback on the “lab of the future.” Could include modular flexible furniture to model newer K-12 environments.

2. Laptop / Tablet Carts
   a. Requests for laptop carts may be a response to hybrid learning.
   b. Many of the carts contain iPads.
   c. Need storage and a plan for updates.
   d. Carts plug into the wall for charging all devices.

3. Furniture and Study Spaces:
   a. Individualized Study Space: MH building 2nd floor furniture includes seating area with screening for privacy. Individualized Study Space is currently limited.
   b. Collaboration Study Space: MH 1st floor includes booth style seating with screening.
   c. Open Study Space: ST 2nd floor: High-top chairs and tables are exposed to hallway traffic.

4. Main Campus vs. Heintz needs:
    a. Considering a fiber path between the two buildings. Existing does not support current needs.
    b. Individualized Study Space furniture may be needed at Heintz.
    c. Power conditioning study for both buildings would be a benefit. Power spikes and brownouts have been a persistent issue during inclement weather.

5. Communications Closets:
    a. Most closets are dedicated, however some are not up to standards.
    b. Some closets are accessed through other spaces (i.e. art storage). There are a few that are located within general storage.
    c. Communications Closet standard has been defined along with a phased upgrade approach.

6. Simulation Technologies:
    a. Demand for more sim labs on the premises.
    b. Expanded sim labs may require additional conduits and switches. Dedicated spaces would need to be identified.

7. Classroom Technology:
    a. Classroom design reference model developed in response to the pandemic. Definitions are by tier.
    b. Focus is on ease of use by faculty.
    c. Working on standardizing classroom technology.

8. WiFi and Bluetooth
    a. Bluetooth beaconing on WiFi access points would be helpful in the future for security (active shooter scenarios) and health (social distancing). https://www.mist.com/bluetooth-le-and-beacons/
    b. Expand outdoor WiFi to have the same level of service as indoors. “Green” areas currently do not have strong WiFi.

9. Security:
    a. Improved access control needed.
    b. Need for security cameras in some areas.
    c. Active Shooter: Evaluate circulation for exiting. Evaluate visibility into the spaces.
    d. LED lights in the hallways that lead people in the right direction during a fire or tornado would be beneficial.

10. Data Centers
    a. Improved HVAC and HVAC control is needed.
    b. Updated UPS systems.
    c. Primary data center is on the second floor of Main Campus. Secondary is in the Heintz Building.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 14, 2021
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Accounting, Business, and Office Administration

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Paula Theisen	Accounting/Business/Supervisory Leadership	Paula.Theisen@rctc.edu
Jessie Martinez	Economics Faculty	Jessie.Martinez@rctc.edu
Dennis Lawler	Economics Adjunct Faculty	Dennis.Lawler@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

Classrooms
1. Setup:
   a. Mainly lecture style at RCTC which isn't as ideal for small group work.
   b. Other campuses successfully utilize a horseshoe layout for better collaboration and small group work.
   c. Need more flexibility with classroom layouts.
   d. Explore a "stand up" classroom to support networking.
   e. "High Tech" classrooms: Technology is not dependable. There are too many screens which can cause sensory overload. Whiteboards are still necessary for these rooms.

2. Ideal Teaching Environments
   a. U-shaped seating.
   b. Spaces that support visual learning and student interaction.
   c. Classrooms that support lecture and collaboration in one session.

Ideas and Needs
1. Outside Facility for teambuilding activities:
   a. Ropes courses and other outdoor activities to promote team building and problem solving.
   b. Promote student engagement, staff engagement, and use by outside partners.

2. Multipurpose Room:
   a. Spaces that support mindfulness and meditation.
   b. Relaxation Rooms
   c. Some examples of a virtual implementation (i.e. use of displays); Pine Island high school is a good example.
   d. Open Flexible Spaces
   e. Location on main campus similar to the one in the Rec Center would be useful.

3. Alternative Energy Sources:
    a. PV: Two concepts being explored are a solar field across County 22 in the previous crop field or solar arrays above a parking lot.
    b. Windmill: Not enough wind at RCTC to make this viable.

4. Student Support Spaces
    a. Need a place to store items for the day.
    b. Incorporate more ways to make the students feel at home.

5. Previous bookstore area is open for discussion. Some have proposed e-sports. Could also work as a multi-purpose room.

6. Third Floor Monitor for exciting and fun content.

Challenges

1. Outdoors
    a. Amphitheater Underutilized. More classes could be taught in this location.
    b. Garden area is a good start.

2. Recently Updated and Constructed Spaces
    a. There is a perception that these spaces are not being used. Memorial and Endicott.
    b. Library Spaces: How to use this space as more content is migrated to virtual.

3. Cafeteria
    a. Missed opportunity for a social space. This could be on the first floor to be more welcoming.
    b. Need more spaces where students, faculty and staff could interact. Located in a central space.

4. Site:
    a. Two campuses are not well linked. It is a short walk, however it isn't convenient. Some don't recognize the fields as belonging to RCTC.
    b. Bike racks are needed to promote riding to campus.
    c. Chargers for EV vehicles needed.
    d. East entrance loading dock is an eyesore.

5. Atrium: too "sterile". First space that people navigate to. At times it is too much of a focal point, creating disruption. Possibly need to address acoustics.

6. Art Gallery: Outdated space.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 18, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Communication, Fine Arts, and Audio-Visual Technology

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Anthony Rostvold	Art + Design Faculty	Anthony.rostvold@rctc.edu
Suzanne Szucs	Art + Design Faculty	Suzanne.Szucs@rctc.edu
Gerald Casper	Speech/Theater Faculty/Director	Gerald.casper@rctc.edu
Guy Hamernik	Multi Media Producer	Guy.Hamernik@rctc.edu
Jake Griggs	Associate Dean of Liberal Arts	Jacob.griggs@rctc.edu
Karin Wright	Communication Studies Faculty	Karin.wright@rctc.edu
Matt Hafar	Music Faculty	Matt.hafar@rctc.edu
Simon Huelsbeck	Art + Design Faculty	Simon.Huelsbeck@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. 3D design
    a. Limited in 3D design capabilities – no sculpture studio like other schools
    b. There is a 3D requirement for the Fine Arts degree and the only option is ceramics
2. 2D classroom – AH201
    a. Designed for 15 students – 26 students crammed into the room
    b. No ventilation
    c. Need to go through ceramics classroom to get into the classroom – can't schedule 2D and ceramics at the same time to avoid disrupting class
    d. using as a multifunctional room currently – no other type of space that can be used for these activities
    e. also using as a storage space
3. Where is a logical place for new space for the 3D classrooms/space?
    a. Fairly large space required
    b. May need to merge classrooms to make a studio with proper space
    c. Ventilation and safety requirements
    d. Plaster, wax, wood, casting
4. Theater
    a. Aesthetically outdated – feels elementary
    b. Configuration of the spaces is a positive
    c. Outdated electronic equipment – it will be a large expense to bring it up to standard
        i. No sound problems noticeable

        ii. Dimmers are nearing the end of their life expectancy
    d. Need a black box space – smaller space for different theatrical events
        i. can be rented out, can better share between departments and outside groups wanting to use the space
        ii. When theater space is being used, theater is hindered as there is no large space to temporarily hold class
    e. Ability to seat 80-100 people
    f. Accessibility needs upgrading and a proper analyzing
    g. Gallery is directly opposite of theater with no doors
        i. needs to be secure, quiet, and more professional
        ii. Large sliding glass doors would be great.
5. Music
    a. There is a new flexible classroom that has been a great upgrade
    b. CC113 - Floor in choir and band room has built in risers with large ramps to make them accessible, but the ramps take up a huge amount of usable space
        i. Could we fill in entire floor to be level to create a more flexible and accessible space?
    c. Five self-standing practice rooms
        i. Not soundproof
        ii. Poor lighting and ventilation
        iii. Possibly asbestos
        iv. Not very inviting
        v. Newer models for standalone practice rooms would be better
    d. Music room upgrade has been great and is adequate
6. Possibility for a new makerspace – larger space with opportunity for collaboration
    a. 2D class could move here
    b. Other departments can use this space
    c. Floors that can get dirty
    d. Storage space for supplies
    e. Could solve other departmental issue of needing an active space
    f. Sculpture and robotics could collaborate
    g. More collaborative situations would come up involving multiple disciplines and departments
7. Cell phone reception is inadequate throughout building
    a. DAS system was approved and will improve signal throughout campus
8. Space between theater and gallery entrance needs a proper greeting spot
    a. Outdated, not professional, overdue for an upgrade
    b. East hall entry way – you naturally go to theater and gallery space and it becomes a good secondary entrance, so first impressions are important
9. Exterior doors into Health Science building
    a. Door is often wide open
    b. Closure mechanism often breaks
10. Permanent collection storage has been moved
    a. Some pieces have been damaged
    b. Ongoing storage space issue
    c. Large stretches of the college with institutional white walls – why is there not art here?
    d. Poor to no lighting in many places
11. Student experience and student success
    a. Desire for study spaces in all the department areas dedicated for students
    b. Students need to be able to plug in laptop and take classes virtually
    c. Students should want to stay on campus and learn, but they need the tools to do so
    d. Hangout, collaborate, take an online class, etc.
12. Flexible classroom furniture and more flexible spaces
    a. Inanimate lecture-type setup hinders the ability to conduct group actives
    b. Equipment and items are immovable – technology podiums

13. Signage and wayfinding
    a. Students are often lost and do not know which building they are in
    b. First day / visitor experience can be difficult
14. East Hall entry exterior
    a. Overall experience could be improved drastically
15. New Courtyard
    a. Underutilized, but wonderful space
    b. Student services schedule events here
    c. Accessibility is again an issue – no convenient ramp near the stairs
    d. Paint is coming off roof on art building exterior – needs a refresh
16. Connecting east and west parking lots
17. Accessibility in general
    a. Accessibility overhaul
    b. More than just Band-Aids in certain areas, but a true overhaul and a 21st century look
18. Heat and lack thereof in the theater area
    a. Students keep coats on
19. Final Thoughts
    a. We have submitted 35% document
    b. This conversation and other stakeholder meetings will be included in the 65% document in March
    c. Feedback from RCTC and system office will go towards final document
    d. Send any further comments to Katrina Maass and she will compile and send to LHB

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 18, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Construction and Transportation

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Matt Bissonette	Interim Dean of Career and Technical Education	Matt.Bissonette@rctc.edu
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Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. Heintz Center Bonding Project
    a. Covers Heintz common areas, law enforcement, other programs
2. Automotive Program
    a. Moving into realm of alternative energy – flex fuel, hybrid, and electric vehicles
    b. Need the technology, equipment, and space to accommodate these new technologies
    c. There is a welding area in the automotive lab, but it is not necessarily needed and could be repurposed
    d. State of the art facility would attract people to the program
3. Welding
    a. Welding recently gained some space – lab space is adequate for now
    b. Remodeling some of the space
    c. Storage is not adequate – no dedicated welding storage space
    d. Much of the material is donated and materials are often bought for the whole semester, therefore take up a large amount of space
4. CAD program
    a. RCTC is in the process of redesigning entire program
    b. Shop equipment may be taken out to create additional space, but then this creates departments with spread out spaces that are disconnected from one another
5. What do students say about the Heintz center?
    a. These students don't have a lot of free time at Heintz center – many are in lab all day
    b. Prioritizing lab space would be more beneficial than lounge space
    c. Some work/lounge areas would be helpful, but are not crucial
    d. North side of the building was updated in the last 20 years – 1100 wing feels like a high school with the lockers. There are better ways of accommodating students' storage needs without creating this high school look and feel
    e. Access to student services
        i. Students need access to financial aid and advisors – a small, one-stop center at Heintz instead of having to travel to the main campus

ii. Students are not often excited about having to travel from Heintz to main campus
    1. Just far enough away that you'll have to drive over, so it does feel like you're going to a completely different campus
    2. Feels unfamiliar

iii. These students tend to be hands-on learners

6. Wayfinding
    a. Main entrance with a welcome center would be nice
    b. Five different entrances and five different parking lots – no way to predict how students will enter
    c. First-day students and visitors have issues wayfinding
    d. No designated entry point as there are so many different places to park
7. Aesthetics
    a. More interest and appeal needed
    b. Feels institutional, needs refreshing
    c. Does not look inviting
    d. It is important for recruiting purposes – both student and parents
    e. Making programs more visible to the public
8. Exterior grounds
    a. South lot has several garages and auto cars kept out here – these programs need storage space to coordinate this equipment storage
9. Southwest corner of building
    a. Used to house horticulture, large greenhouse here – this program has been suspended, so what do we do with that space?
    b. Smart Garden
    c. What will the future of this look like without the horticulture program?
    d. Law enforcement could move here to have a more unified hub for their program – short term vs. long term?
10. Food service
    a. Larger offering would be nice – but would students support a larger offering?
    b. May students pack their own lunches
    c. Freshen up the aesthetics
    d. Cooking is done on site for breakfast and lunch
11. Final thoughts
    a. Proposed projects will be included in the 65% document after stakeholder feedback
    b. Send any other thoughts to Katrina Maass and they will be forwarded to LHB

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 18, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Public/Community

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Julie Nigon	Executive Director, Greater Rochester Advocates for Universities & Colleges	executivedirector@grauc.org
Jakki Trihey	Area Manager, Workforce Development, Inc.	jtrihey@wdimn.org
Captain Aaron Penning	Interim Captain and Patrol, Rochester Police Department	
James Goblirsch	Assistant Vice President for Facilities Management, Winona State University	James.Goblirsch@winona.edu
Jane Foote	Program Director for Nursing Midwest Academic Affairs, Mayo Clinic Rochester	foote.jane@mayo.edu
Jess Anderson	Workforce Development Program Manager, Mayo Clinic Rochester	Anderson.Jessica5@mayo.edu
Kari Kolling Anderson	P-TECH School Leader/Assistant Principal, Rochester Public Schools	kakolling-an@rochester.k12.mn.us
Kristi Ziegler	Student and Campus Services Administrator, Winona State University Rochester	kziegler@winona.edu
Mike Nigbur	Parks and Forestry Division Head, Rochester Parks & Recreation	mnigbur@rochestermn.gov
Molly Kroulik-Bigelow	Director of Rochester Partnerships, St. Mary's University of Minnesota	mbigelow@smumn.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. Parks and Recreation agreement to use site features
   a. Benefits to using campus grounds for community
   b. Different partners from Parks side chiming in on their wants for RCTC – Parks and rec acts as a middleman in between RCTC and community – Who should be managing this?
   c. Longevity would be nice to have – current lease agreement on baseball, softball, and football fields is a 1-year term, makes planning challenging if RCTC decides to change up the agreement
2. Heintz Center
   a. Small setting and easier to navigate
   b. Great for parking and access for members who are not a member of RCTC community
   c. RCTC staff is helpful in getting what is needed for meetings – i.e., technology staff making sure everything is working and in place

    d. Challenge with HVAC regulation throughout building
3. Minnesota state system and legal contracts – Winona State
    a. Partnership is difficult due to these factors
    b. Continuing negotiation happens between three parties which can be difficult
    c. Winona State Rochester campus is highly dependent on the RCTC campus
    d. Rhythm and nature of students and faculty is different – 4-year program vs. 2-year program
    e. Improving functionality of facilities in RCTC – no formal agreement for Winona State to invest capital dollars into RCTC
    f. Longevity with lease agreements desired
4. Partnership relationship
    a. Making changes is difficult – administrative organizational issues
    b. Faculty works well together at the ground level
    c. More continuous footprint for Winona state- staff and students benefit from being near each other
    d. Winona state has been moved around since last CFP plan
5. East Hall health problems
    a. Mold – Winona State moved out of this space due to health issues
6. RCTC nursing programs and Mayo partnership
    a. Pipeline between RCTC and Mayo for jobs or continuing education
    b. Better simulation environments needed
        i. Very essential for nursing programs
        ii. Simulation center space is very highly utilized
        iii. There is a coalition including many schools and businesses working to expand simulation space overall – possibly downtown Rochester
    c. Programs are growing quickly – requires rapid thinking on how to get these students a good experience on the campus
    d. Space and facilities need a look – C-TECH and P-TECH are growing rapidly and will need accommodations
7. P-TECH
    a. international program to get students college experience by the time they graduate high school or with an additional two years – aimed at students who may not have access to traditional college opportunities
    b. Exposure to college courses in general and skills they would be utilizing in careers
    c. Quickly realizing hands-on lab space is needed for students to access - as high schoolers they do not get priority for using these spaces
8. Winona state is taking a hard look at their Rochester footprint in their own master plan
9. CFP and Sustainability
    a. MN state guidelines are being followed, with the systems being reviewed for opportunities.
    b. A utility master plan is not being completed as part of RCTC's CFP
10. Final Thoughts
    a. 35% initial draft has been submitted
    b. 65% is the next step and will look at proposed projects
    c. 95% will be later this summer
    d. Send additional comments to Katrina Maass and she will forward to LHB

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 19, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Stakeholder Meeting: Liberal Arts / Transfer Pathways / STEM

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Dan Froelich	Math Faculty	Daniel.froelich@rctc.edu
Ruth Casper	Psychology Faculty	Ruth.casper@rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed Academic Affairs	Brenda.frame@rctc.edu
Chad Israelson	History/Social Science Faculty	Chad.israelson@rctc.edu
Jake Griggs	Associate Dean of Liberal Arts	Jacob.griggs@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. Classrooms
    a. Classes of up to 42 people crammed into new classrooms – pandemic has made this less noticeable, but going forward this will be important
    b. These classrooms have flexible chairs, but tables do not have wheels
    c. Room size is adequate, but the furniture doesn't provide enough for students – i.e. table sizes
    d. Some classrooms have flexible tables and chairs – SH107 was recently updated
        i. Flexible furniture allows for more active activities
    e. Faculty have some opportunity to move classrooms if desired, but cannot always be accommodated
2. Thoughts on virtual courses vs. in-person courses
    a. Many students still want to be face to face – they enjoy it and get more out of it
    b. Many programs will likely offer more online courses after the pandemic than before the pandemic
    c. Generally, faculty prefer to be in class with the students
3. Transfer Pathways
    a. Social science transfer pathways are relatively new – little to no feedback yet from students
    b. Largely content-based concerns, not facilities-based
    c. May need more computer and server space as computer science and similar degrees grow
        i. Computer lab is not conducive to teaching – not all students are able to see the projector screens
4. Academic support spaces
    a. College is migrating to having a central service hub – like the library, bookstore, etc.
    b. Student services feels disconnected right now
    c. Each area has need for study space with outlets where students can plug in and take online classes
5. New spaces
    a. Faculty feel thankful – actual spaces are adequate
    b. Improvements relate more to technology and furniture

   c. New memorial hall – how are these spaces working?
      i. Students use conference room and lounge spaces often
      ii. Students can find faculty more easily if they need to
      iii. Some students feel intimidated and that they are not supposed to be in this area – how can this look more accessible and welcoming?
      iv. Some student lounge furniture is placed where it conflicts with staff privacy needs – some computer screens are visible, conversations can be overheard
      v. Small conference rooms are useful
      vi. Face to face interaction between staff is down due to the organization of office pods and pandemic
6. Exterior spaces
   a. Where old memorial hall was torn down has potential
      i. Bleachers used to be stored out here and could be used for class outdoors
   b. Geese are a large problem
   c. Unoccupied areas next to campus – field, forest
      i. Could make identifiable walking paths for students and staff through these areas
      ii. This would be great for mental health
      iii. No well-known walking route on campus for this type of activity
   d. Amphitheater has been used to teach classes when available
7. Brick exteriors
   a. Desire to better see in and out of the buildings – more natural light and engagement
   b. Newer buildings with more natural light are great
8. Greenspace near the fieldhouse and in front of the atrium
   a. Could have more seating
   b. Seems like a wasted space and could be better utilized for congregation liked a campus quad
   c. Committee to coordinate outdoor events would be nice because spaces are often underutilized
9. Sustainable energy
   a. Many students look for a socially responsible environment when choosing a college
   b. Could there be room for wind/solar on the grounds? This could add potential degree programs as well
   c. Benefit campus financially
10. Dining options on campus
   a. Needs an upgrade, more opportunities throughout the campus
   b. If you wanted to leave campus to get food, there are not a lot of opportunities
11. Unoccupied space
   a. Offices on third floor
   b. There is adequate space on campus to grow but space use is not efficient
12. Final Thoughts
   a. Send additional thoughts to Katrina Maass – will be forwarded to LHB
   b. CFP Committee will soon begin talking about proposed projects based on feedback

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 20, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Agriculture Science and Natural Resources

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Cory Rubin	Biology Faculty	Cory.Rubin@rctc.edu
Kim Rowley	Veterinary Faculty	Kimberly.Rowley@rctc.edu
Robin Fruth-Dugstad	Biology Faculty	Robin.Fruth-Dugstad@rctc.edu
Matt Bissonette	Interim Dean of Career and Technical Education	Matt.Bissonette@rctc.edu
Jennifer Rubin	Biology & Environmental Science Faculty	Jennifer.Rubin@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

Needs and Improvements
1. Develop year-round outdoor learning spaces:
   a. Wetlands: Floating boardwalk; nature trails for access for instructional purposes (ponding, water, quality, research, etc.)
   b. Pond improvements needed: dredging and draining. Safety improvements near the water. Silt buildup is an issue at the edge.
   c. Woodlands: Slowly restoring this area. Could be professionally restored with funding (i.e. buckthorn removal, pathways).

2. Outdoor seating areas:
   a. One seating area closer to the water; smaller than the amphitheater to accommodate smaller classes.
   b. Benches along the existing trails.

3. Dedicated Conservation Areas:
   a. Mow less. Keep some of the areas natural.
   b. Wildlife: Need a safe corridor for painted turtle circulation. Reducing curbs could be part of the solution.
   c. Signage or kiosks with information about natural areas, gardens, etc.

4. Smart Garden: Maintain this as a green space for Heintz Center regardless of Horticulture being on hold.
   a. Prairie garden is a great example of natural prairie.
   b. Host to salamanders, turtles, frogs, ducks and geese.
   c. Gardens are maintained by faculty and one other staff person.

5. Veterinary Program:
    a. Storage for large equipment. Some equipment is used seasonally. Storing in the classrooms is not the most secure.
    b. Anatomy, Radiology and Clean lab: Existing sinks are not sufficient in number or size for clean up at the end of class or water use during lab time.
    c. Barn for large animals on campus. Currently students travel up to an hour, eight times per semester, to other locations to work with large animals.

6. Biology Labs on Main Campus:
    a. Seating sits too low. Ergonomic concerns expressed by students.
    b. Sinks in the middle of the workspace is a barrier. Not enough space for laptops, equipment, and writing utensils.
    c. ST305: Microbiology
    d. ST309: shared biology lab for ecology, zoology, human biology and general biology.

7. Horticulture Space:
    a. No current plans expressed for this space. Could be utilized by Science Faculty.
    b. Predesign project does not affect this space.

8. Alternative Energy
    a. Support alternative energy initiatives. Possible use for instruction as well.
    b. Wind turbines are not as feasible, however solar is a good option. There is some planning in motion.

9. Overall: Aesthetic upgrades of current spaces are needed.

10. Heintz & Main
    a. Need a better connection between campuses. Sidewalks, bike sharing programs.
    b. Interactive elements along paths between campuses.
    c. Difficult to fill courses at the Heintz center. Might be able to fill courses at this building if science were to move.

Other Comments:
1. The mountain biking group has plans to develop trails in the woods. Currently awaiting funding.
2. Site improvements tend to be college funded unless tied to a bonded project with an academic or student success need.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 20, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Behavior, Education and Personal Services

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Wayne Finseth	Faculty/Program Leader, Alcohol and Drug Counseling	Wayne.Finseth@rctc.edu
Cassie Dennison	Early Childhood Education	Casandra.Dennison@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. **Current Areas Used**
   a. Classrooms at Heintz Center
   b. Off campus experiential learning at multiple places. Requires extra documentation.
   c. Early Childhood Education area is well placed. Current mock room is not a full simulation without children present.

2. **Needs**
   a. Space for a sim lab or virtual reality system. An established sim lab program for behavioral health and early child education does not yet exist.
   b. Ground level space and outdoor space for early childhood education where students, faculty, and the community could bring their children. Would provide hands on experience for students without having to go off site.
      i. RCTC previously had a space. Challenged with low participation rates. Many students did not use it for their practicum. Would need a different approach if reinstated.
      ii. Could use the Reggio approach, which is not widely used in Minnesota yet. Teachers learn alongside the children. More naturalistic learning environment where children can explore.
   c. Center for Teaching Experience: More resources aimed at how we teach today.
   d. More unified multipurpose learning space.
      i. Potential for more collaboration across programs.
   e. Need more spaces where realistic demonstrations can be set up (i.e. clinic setup).
   f. Space for continuing education: possibly accommodate up to 60 students.
   g. More windows at Heintz.
   h. Workout rooms that are not dedicated to classes and programs. Holistic wellness approach.

3. Challenges

a. Technology in the classroom is better, but needs an improved interface.
b. The Covid pandemic has presented unique issues, however childcare is an essential service.
c. Significant shift to hybrid learning.

4. Other Comments

a. Heintz does not seem to align with main campus "look".
b. Walking paths on campus would be nice
c. Develop outdoor spaces for breaks during longer 8-hour classes.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 20, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Law Enforcement and Public Safety

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Matt Bisonette	Interim Dean of Career and Technical Education	Matt.Bissonette@rctc.edu
Randy R. Mohawk	Law Enforcement Faculty	Randy.Mohawk@rctc.edu
Vincent Scheckel	Law Enforcement Faculty	Vincent.Scheckel@rctc.edu
Ken Wickelgren	Law Enforcement	Ken.Wickelgren@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. **Areas Used**
   a. Parking lot is used for training activities such as traffic stops. Not ideal during soccer games and other busy times.
   b. Offsite areas are used for building searches and active shooter scenarios. Using abandoned buildings at times. Changes from year to year as buildings are torn down.
   c. Regional training center for firearms training. Can be an expensive option for travel and booking the space.
   d. Heintz Center for lectures and lab programs.
   e. Workout routines are run in hallways in the cold months. Sports Center is not used due to scheduling challenges as well as limited time to travel to the Sports Center and back again for class. Sports Center is also not ideal for class and labs.
   f. Small auditorium in horticulture wing is use for skills lectures.
   g. Some areas are shared with other programs, which is acceptable as long as sufficient storage is provided.

2. **Needs**
   a. Storage:
      i. An external garage would be ideal. Armory is currently used for vests, traffic stop signs, cones, impact bags, mats, etc.
      ii. Vehicle storage to keep vehicles secured and properly maintained.
      iii. Lab equipment storage adjacent to each lab.
   b. Training House: Previously had funds allocated, however there wasn't land available.
   c. Pole Building for building searches, and other scenarios. Land availability is an issue.
   d. Track and workout area.
   e. All training, classes, and labs in one area to limit off site needs and wasted time.
   f. One lecture classroom for 60 students. Smaller lab rooms for castings, fingerprinting, etc. Could continue to use small auditorium for lectures.

g. Up to six lab rooms. This is the number of labs that would be needed at one time.
h. Access to a "mini one-stop" at the Heintz Center.
i. Culturally appropriate facilities.

3. Challenges

a. Low enrollment due to current public view of law enforcement.
b. Clear expectations on the job make it difficult for training. Once expectations are defined, Law Enforcement programs may see sudden increased enrollment.
c. Curriculum:
    i. State System Office: Need comply with standards.
    ii. Minnesota P.O.S.T. Board: Need to comply with these standards to remain certified. Requirements have not changed recently, thus curriculum and space needs have not changed.
    iii. Standardization of the skills aspect is difficult to define.
d. Off Site: All off site training requires loading and transport of equipment for each training session.

4. Current Heintz Center Remodel Predesign

a. Meets current needs of the program.
b. Does not provide workout space or space to support tactical training.
c. Some spaces will be vacated and could be repurposed as part of another project.
d. If the plan is not approved, or if a consolidated space is needed, the Horticulture wing could be a temporary move.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 21, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Health and Healthcare Support Services

DATE SENT: January 27, 2022

PRESENT:

Name	Title / Organization	Email
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Susan Jansen	Associate Dean of Nursing	Susan.Jansen@rctc.edu
Tawny Amos	Clinical Lab Assistant, Nursing	Tawny.Amos@rctc.edu
Nikkilynn Rud	Dental Assistant Faculty	Nikkilynn.Rud@rctc.edu
Kristin Janssen	Office and Administrative Specialist	Kristin.Janssen@rctc.edu
Jason Jadin	Interim Dean of Sciences and Health Professions	Jason.Jadin@rctc.edu
Heidi Feldman	Academic Affairs Support Staff-Nursing	Heidi.Feldman@rctc.edu
Cherie Fritz	Dental Hygiene Program Director	Cherie.Fritz@rctc.edu
Alex Catevenis	Intensive Care Paramedic, Faculty	Alexander.Catevenis@rctc.edu
Eileen Zirbel	Surgical Technology	Eileen.Zirbel@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

1. **Challenges:**
   a. Covid has presented challenges with social distancing. The labs are tight in regular times.
   b. Winona State University shares space at RCTC's campus.
   c. Pressure to address how to double enrollment in nursing to meet demand. If enrollment is doubled, more space or a change in scheduling may be needed.
      i. Currently the National Guard is staffing understaffed healthcare facilities in Minnesota.
   d. Health Force MN is working with Minnesota State and the Governor to guide how to bridge the gap.
      i. 488 out of the 1,000 person goal have been trained thus far.
   e. Staffing is an issue in the Dental Hygiene industry similar to nursing. 16 students are accepted each year into the program. 70 qualified last year. Not enough space to meet enrollment demand. This has been an ongoing issue for the past 5 years.
   f. Dental assisting is experiencing the same challenges as Dental Hygiene. 24 students max.

2. Collaborations:
   a. Dental Hygiene is collaborating with Winona State graduate nursing students working with patients on preventative health.
   b. Dental Hygiene is collaborating with the federally funded clinic as well.

3. Current Space

a. Nursing simulation equipment is excellent. Could be offered to the community for continuing ed.
b. Current cohort is large, but some classes have moved online and hybrid.
c. Dental Hygiene clinic is full. Dental Hygiene and Dental Assisting do not have a sim lab so the clinic is used which is causing wear and tear on equipment. (Heintz Building).
d. EMS, EMC, EMT and Paramedic Program: Works with Mayo Clinic for simulations in the field. EMT program at CTECH may not have the same opportunities.
e. 2nd floor space: Space was reviewed for a new sim lab.
f. Surgical Technology: Next Accreditation visit may be virtual. Some concern about the space being too small for 24 students. Lab is only used for 12 weeks in the fall. Classroom is used on Fridays.
g. Heintz Center public computers are lacking. The computer lab is scheduled for nearly the full day.
h. Second Floor does not have a place for students to sit. Many students are sitting on the floor in hallways and attending online classes on their phones due to lack of public computers.
i. Commons area hosts presentations at times making it awkward for students to use during meal times.
j. Students at Heintz tend not to travel to the main campus to use the computer labs. Need an equitable distribution of resources.
k. Lockers in the hallway have a high school feel.
l. Technology:
    i. iPad cart is checked out by faculty and used for testing in person.
    ii. There are checkout computers on main campus, but not at Heintz.

4. Other Spaces:

a. Pond near four-way stop has been abandoned.
b. Areas of the horticulture gardens including near the Main Entrance need to be tended.

5. Needs and Ideas:

a. Sim Lab for Dental Hygiene and Dental Assisting at Heintz Center adjacent to the clinic. Could be on the 2nd floor space at 2306A and B. Obtaining quotes.
b. More space for Dental Hygiene and Dental Assisting to accept more students into the program.
c. Interdisciplinary simulation center could benefit multiple programs (dental hygiene, dental assisting, radiology, nursing, etc.).
d. Surgical Technology Lab Upgrades to meet new accreditation guidelines. The guidelines exist however they are not detailed for existing spaces.
e. Space on the second floor for students to sit, eat lunch, or work on an assignment.
f. Mobile simulation labs shared by the schools under Minnesota State.
g. Some form of connection between the Main Building and Sports Center (tunnel, skyway, etc).
h. One Health Sciences Building with sim labs.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: January 27, 2022
LOCATION: Virtual Meeting

TO: Comprehensive Facilities Plan Committee

FROM: Laura Heck

RE: Stakeholder Meeting: Students, Student Senate, and Student Life

DATE SENT: January 28, 2022

PRESENT:

Name	Title / Organization	Email
Kodi Hoscheit	Student Engagement Specialist	kodi.hoscheit@rctc.edu
Megan Ross	Student Life Coordinator	megan.ross@rctc.edu
Jade Robertson-Longfellow	Student, Business Program	
Casey Trusty	Student Senator, Environmental Science	
Danika	Student, Dental Hygiene	
Tim Galvin	Student, Liberal Arts	
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Laura Heck	Project Coordinator, LHB	laura.heck@lhbcorp.com

MEETING SUMMARY
After brief introductions and an overview of the Comprehensive Facilities Plan process, the following was discussed.

Needs and Ideas
1. Lockers needed for students at the Main Building.
2. Quiet Spaces:
    a. Areas for students to relax.
    b. Meditation room in the library is not always ideal. Limited availability. Some are not tolerant of others' beliefs and practices, causing conflict at times.
    c. Study spaces located throughout; not just the Library. Mixture of lounge chair and table & chair setups.
    d. Sound dampening furniture / booths.
3. Honor Society and other clubs need a gathering space outside of student senate. Compassion club would benefit from a private space.
4. Student Senate could use more space.
5. Veteran's space: Could evaluate for a smaller space based on use.
6. Student Life: "Maze-like" hallways are a barrier to find this office. Better located near the Atrium or the east doors. Previous financial aid office or old bookstore are also possibilities. Bookstore would support Student Life and Hive Supply in one space.
7. Hive Supply (food shelf): Current Main Building and Heintz Center locations are hard to find. Need a storage closet and more space for both. Will need more space once an industrial fridge and freezer are installed.
8. Heintz Center:
    a. Outdoor activities are challenging at this location. Not enough outdoor seating.
    b. Clubs at Heintz often use existing labs or classrooms.
    c. Need for lounge space on the second floor for students.
    d. Student Life space for meeting with students.

9. Better signage needed in general. Digital signage could help with wayfinding.
10. Mobile a la carte food service in the Atrium or Memorial Hall for those of who ride the bus to campus. Would be a draw for those that ride the bus to campus or don't usually visit the Cafeteria.
11. Pool House: Some interest in a pool or hot tub open to students and an organized sports team.
12. Heintz and Main Connection: Improve this trail connection. How can this be made easier, especially for those that carry heavy bags? Trolley, scooters, etc.

Other Comments

1. Cafeteria:
    a. Often used for studying between meals.
    b. Used for some larger activities especially since it allows for social distancing.
    c. Location is near East Hall; other side of campus from where most students enter. Many students don't know it exists due to its location.
    d. Food Service: Wednesdays can be very busy around lunch time. Other times are not busy. Not currently a draw to Student Life. Mainly used by faculty and staff. Many students bring packed lunches or visit the Hive Supply.
2. Learning Center: If the Learning Center were moved to the Library, this space could be used for study rooms or for club meetings.
3. Intramural Sports: Put on pause at the start of the pandemic. The individual organizing this group is no longer with RCTC. It was noted that there is a lot of focus on the Yellow Jackets, which takes away the opportunity for other students to participate in sports.
4. Fitness Programs: Not currently offered. Students aren't allowed to use the weight room when it is not monitored. Reserved for the Yellow Jackets otherwise. Some confusion about which fitness rooms are open to students.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: None.
c: LHB File No. 210539

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: JANUARY 28, 2022
LOCATION: VIRTUAL MEETING

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Committee Meeting 4

DATE SENT: February 8, 2022

PRESENT:

Name	Title / Organization	Email
Shayn Jensson	Facilities Project Manager	Shayn.Jensson@rctc.edu
Mary Dennison	Librarian	Mary.Dennison@rctc.edu
Alicia Zeone	Director of Admissions	alicia.zeone@rctc.edu
Gina Korf	Biology Faculty	Gina.Korf@rctc.edu
Crist Dahl	Lab Technician Art & Design	Crist.Dahl@rctc.edu
Beth Diekmann	Financial Aid Director	Beth.Diekmann@rctc.edu
Michele Pyfferoen	VP Academic Affairs	Michelle.Pyfferoen@rctc.edu
Michael Sheggeby	Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed, Academic Affairs	Brenda.Frame@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Architectural Designer, LHB	Alicia.oneill@lhbcorp.com

MEETING SUMMARY
Attendees discussed the following in relation to the Comprehensive Facilities Plan.

1. Feedback on the 35% submittal
    a. Comments received from RCTC and MN State
    b. Campus comments on text edits, photo, and space use corrections
    c. MN State comments about space use and utilization inconsistencies
2. Survey / Campus Engagement
    a. What is the right approach for this feedback?
    b. Faculty was thankful their opinion was being considered during stakeholder meetings
    c. Benefit of a survey is faculty and students get to share their opinions, although amount of response is often limited
    d. RCTC Leadership will be asked their opinion on a survey since some people are "surveyed-out"
3. Space Utilization
    a. Can inform projects down the line; low utilization may signify a classroom is not the right size, has poor technology, or has other issues (HVAC, acoustics, etc)
    b. Minnesota State uses a 32-hour marker, so 32 hours a week means 100% utilization. Other systems use 40+ hours as the goal
    c. Labs tend to be more specialized, and it's acknowledged that they may have lower utilizations. Classrooms can be of more general use for multiple programs.
    d. Data from Fall 2021 – reflects some pandemic impact

e. White areas of the diagrams may be misleading – add white box to key to note that those spaces don't have data available
f. If there are any rooms that you do not see reflected correctly, please let LHB know.

4. Stakeholder Group Meetings
   a. Meetings held to date
      i. Athletics
         1) Partnership agreements – scheduling can be challenging
         2) Athletes tend to stay at the Sports Center – should there be other amenities provided here?
      ii. Facilities Staff / Maintenance
         1) Storage issues
         2) HVAC upgrades needed
         3) Interior and exterior lighting upgrades needed
      iii. Student Services
         1) Private testing space desired
         2) More centralized location
         3) Mental health focus increasing
         4) Atrium is not inviting
         5) General refresh desired for areas not in the One Stop
      iv. Technology
         1) Computer labs are underutilized currently, may be a pandemic impact
         2) Weather can cause power spikes and brownouts
         3) Additional simulation labs will require more infrastructure
      v. Accounting, Business, and Office Administration
         1) Flexible classroom furniture desired
         2) Relaxation or meditation rooms
         3) Alternative energy sources
         4) Daily storage needs for students
         5) Atrium is loud and sterile
      vi. Communication, Fine Arts, and Audio
         1) 3D studio space, maker space
         2) Theater updates
         3) New black box theater is desired
         4) Art gallery security
         5) Better music practice rooms
         6) Student study areas (all departments)
      vii. Community Leaders / Partners
         1) Lease agreement challenging
         2) Partnership agreement challenging
         3) More continuous WSU footprint desired
         4) C-Tech and P-Tech growing
      viii. Construction and Transportation
         1) Will be impacted by 2022 bonding project (if funding is received)
         2) Automotive industry is changing – more technology will be needed for electric vehicle instruction
         3) Welding needs storage
         4) Student services needed at Heintz
         5) Student storage needed for backbacks
         6) More food service offerings may be useful, but some questioned the demand
      ix. Liberal Arts / Transfer Pathways / STEM
         1) New MH classrooms need different furniture that is more moveable
         2) Student services feels disconnected
         3) Additional study areas with power needed
         4) Students feel intimidated to enter office space
         5) Use of outdoor areas

- x. Law Enforcement and Public Safety
    1) Unsure of future direction of educational requirements
    2) Rotating use of community spaces for skills training is challenging
    3) Workout area needed in Heintz – Sports Center is too far
    4) External garage
- xi. Behavior, Education, and Personal Services
    1) Childcare on site would benefit the program and students
    2) Reggio approach to Early Ed area
    3) Simulation area
    4) Continuing education space needed
    5) Workout rooms
- xii. Agriculture Science and Natural Resources
    1) Year-round learning space desired
    2) Outdoor seating
    3) Conservation areas – access to wetland for sample gathering
    4) Vet program needs more storage
    5) Better connection between Heintz and Main Building
- xiii. Health and Healthcare Support Services
    1) Programs are full, labs are crowded
    2) Pressure to increase nursing enrollment
    3) More simulation spaces
    4) Student support services and student lounge spaces needed at Heintz
    5) Better connection between Heintz and Main Building
- xiv. Student, Student Senate, and Student Life
    1) Additional quiet spaces
    2) Club meeting rooms
    3) Challenge to find Student Life and Hive Supply
    4) Better wayfinding in general – signage is in the process of being updated
    5) Cafeteria can be busy, but only on certain days during lunch
    6) Workout space for non-athletes

b. Areas that may be opportunities for projects
- i. First floor – Main Building
    1) First blue circle may be turned into a student lounge space – it has been vacated
        a) Has not been designed. Somewhere to sit in between classes and with place to plug in computers.
    2) Former bookstore – no use has been identified for this space yet
        a) Art department 3D studio or makerspace
        b) Student life location
        c) Blackbox location
    3) Simulation space
        a) Varies between department, very different needs
    4) AT102 and CF103
        a) Lounge space?
- ii. Second floor – Main Building
    1) Improve theater? Black box theater? Additional studio?
        a) No clear front entrance to the theater
    2) Floors 3 and 4 – Main Building
        a) Learning center potentially moving into library space
        b) Quiet spaces in corridor
        c) Computer lab utilization
            i) Students are using mobile devices more often
        d) Request for individual Zoom areas
            i) 7 current stations: usage has dropped off, disposable headsets are provided
            ii) Rooms off Library computer lab used heavily

e) Food Service – how often is it being used?
   i) Other campuses are using more of a café / coffee shop model
   ii) How do on campus activity affect food service?
f) Moving Student Life?
   i) What do we do with vacated space?

iii. Heintz Center
   1) Horticulture program will no longer be offered – frees up space
   2) Opportunity to change classroom to study lounge or other student support space
   3) Adding more student services at Heintz so students don't need to travel to Main Campus
      a) Zoom meetings instead of in-person?

iv. Regional Sports Center
   1) Facility is relatively new
   2) Concessions acts as a storage room

c. Next meeting: February 18th
   i. Please send any afterthoughts to Katrina Maass and she will forward to LHB

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: Committee Meeting 4 Presentation
c: LHB File No. 210539

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Comprehensive Facilities Plan

Committee Meeting 4
January 28, 2022

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

LHB

Agenda

– Feedback on the 35% submittal	5 Minutes
– Survey/Campus Engagement Discussion	10 Minutes
– Space Utilization	15 Minutes
– Summary of Stakeholder Meetings	30 minutes
– Potential Areas to Address	15 Minutes
– Next Steps	5 Minutes
	80 Minutes

Feedback on the 35% Submission

- Comments received from RCTC and MN State
- Campus comments included text edits, photo and space use corrections.
- MN State comments asked about frequency of bus service, some space use / utilization inconsistencies

Survey / Campus Engagement

Audience: Students, Faculty, and/or Staff

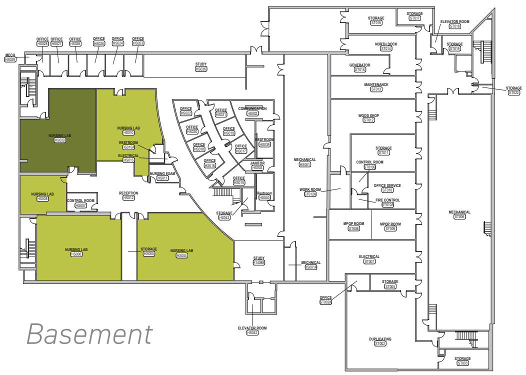
Open Questions:

- What are the three aspects of the campus (inside or outside spaces) that are most successful in meeting your needs?
- What are the three aspects of the campus (inside or outside spaces) that need the most improvement?
- What is your favorite interior space at RCTC, and why?
- What is your favorite outside space at RCTC, and why?
- Is there anything else you'd like to share about the buildings and grounds of RCTC?

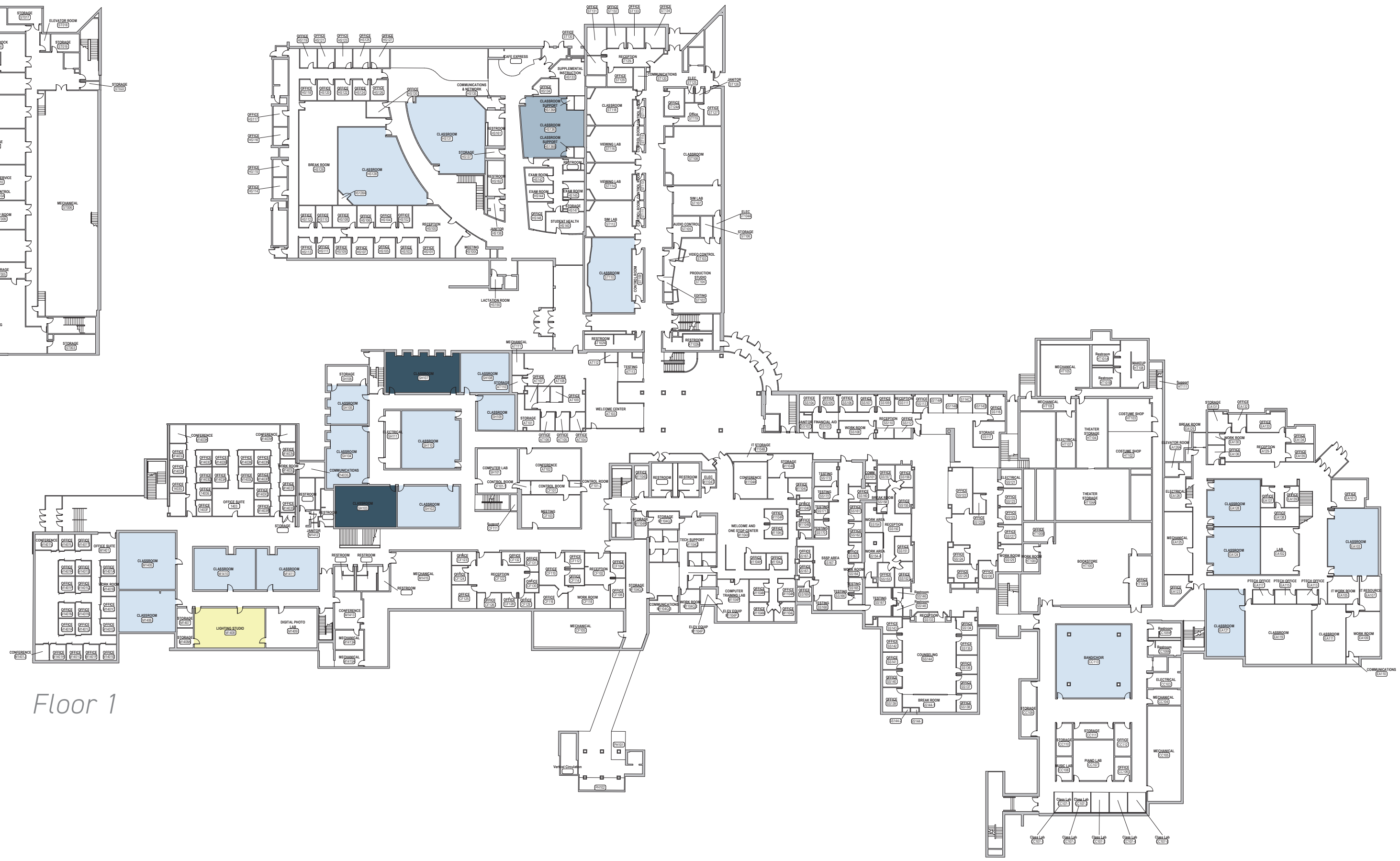
Likert Scale:

- I feel the general purpose classrooms of RCTC support today's needs
- I feel the instructional labs of RCTC support today's needs
- If I have a break between classes, there are comfortable places to spend time
- Imagine you are new to campus and respond to this question: It is easy to find the room or department that I'm looking for
- I look forward to spending time on campus
- Is there anything else you'd like to share about the buildings and grounds of RCTC? (Open Question)

Space Utilization - Main Building



Basement



Floor 1

Space Utilization

Lab	Classroom	
		100+
		85-99%
		60-84%
		0-59%

Note: percent based on a 32 hour week using Fall 2021 data

Space Utilization - Main Building

Space Utilization

Lab	Classroom	
		100+
		85-99%
		60-84%
		0-59%

Note: percent based on a 32 hour week using Fall 2021 data

Main Building - Floor 2

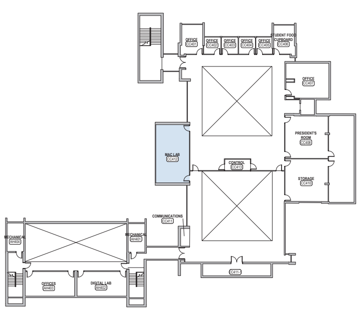
Space Utilization - Main Building

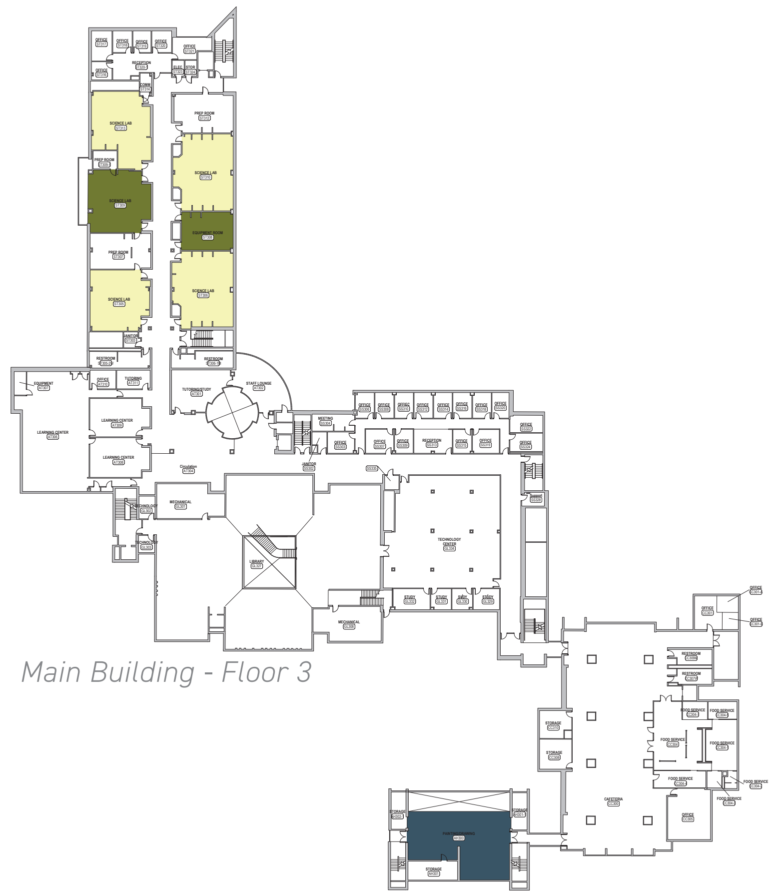
Space Utilization

Lab	Classroom	
		100+
		85-99%
		60-84%
		0-59%

Note: percent based on a 32 hour week using Fall 2021 data

Main Building - Floor 4





Main Building - Floor 3

Space Utilization - Heintz Building

Floor 2

Floor 1

Space Utilization

Lab	Classroom	
		100+
		85-99%
		60-84%
		0-59%

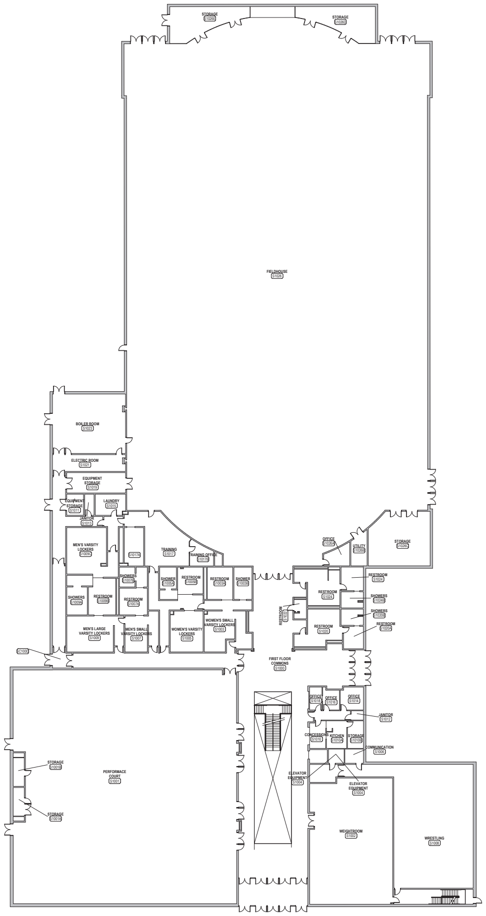
Note: percent based on a 32 hour week using Fall 2021 data

Space Utilization - Regional Sports Center

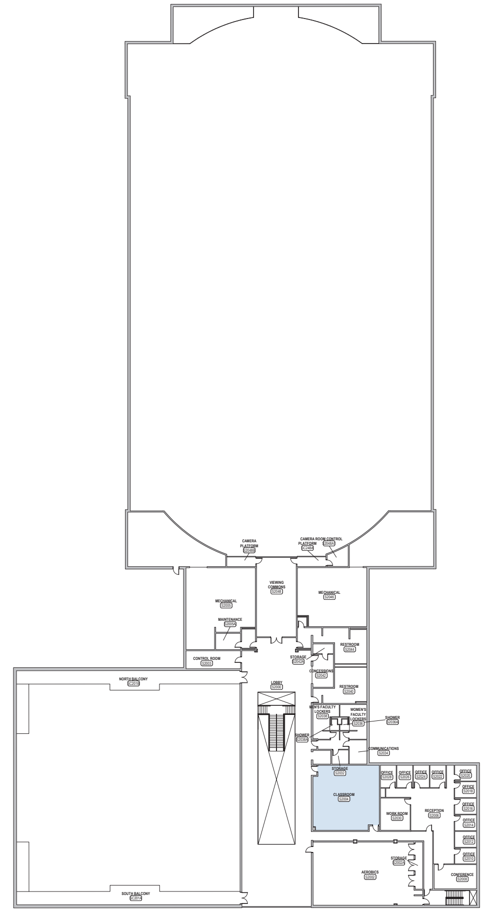
Space Utilization

Lab	Classroom	
		100+
		85-99%
		60-84%
		0-59%

Note: percent based on a 32 hour week using Fall 2021 data



Floor 1



Floor 2

Stakeholder Group Meetings

Meetings held to date:

- Athletics
- Facilities Staff / Maintenance
- Student Services
- Technology
- Accounting, Business, and Office Administration
- Communication, Fine Arts, and Audio-Visual Technology
- Community Leaders / Partners
- Construction and Transportation
- Liberal Arts / Transfer Pathways / STEM
- Law Enforcement and Public Safety
- Behavior, Education and Personal Services
- Agriculture Science and Natural Resources
- Health and Healthcare Support Services
- Students, Student Senate, and Student Life

Stakeholder Group Meetings

Athletics

- Acknowledged as one of the best athletic facilities in the MN State system
- Use agreements can be challenging for after-hours use by RCTC (Fieldhouse)
- All-American Room - Currently used for Zoom classes, study area
- Athletes tend to stay in the Sports Center beyond practices
- Outdoor fields - concern for equitable amenities (lighting, concessions, restrooms) between softball and baseball
- Intramural Sports versus E-Sports
- City-wide athletics facility plan

Stakeholder Group Meetings

Facilities Staff / Maintenance

- Proper storage is a concern
- Heinz Center is on district steam, with backup heat provided by a 1983 boiler
- HVAC updates/upgrades are needed (VAVs, controls, fans)
- Skylight replacement is needed (2022 Bonding)
- Updates needed to alarm system (Main Building), air compressors, piping (Main Building)
- Interior and exterior lighting updates are needed (LEDs)

Stakeholder Group Meetings

Student Services

- Private testing space is needed (accommodation testing mostly, some placement testing)
- Student Life location (Main Building, not centralized)
- Increasing focus on mental health and impacts to Health Services
- General refresh needed for some areas (Student Services)
- Heintz Food Pantry: too small, hard to find
- Exterior spaces need improvement, acknowledgment of staffing issues
- Atrium is cold, not inviting, multi-function space

Stakeholder Group Meetings

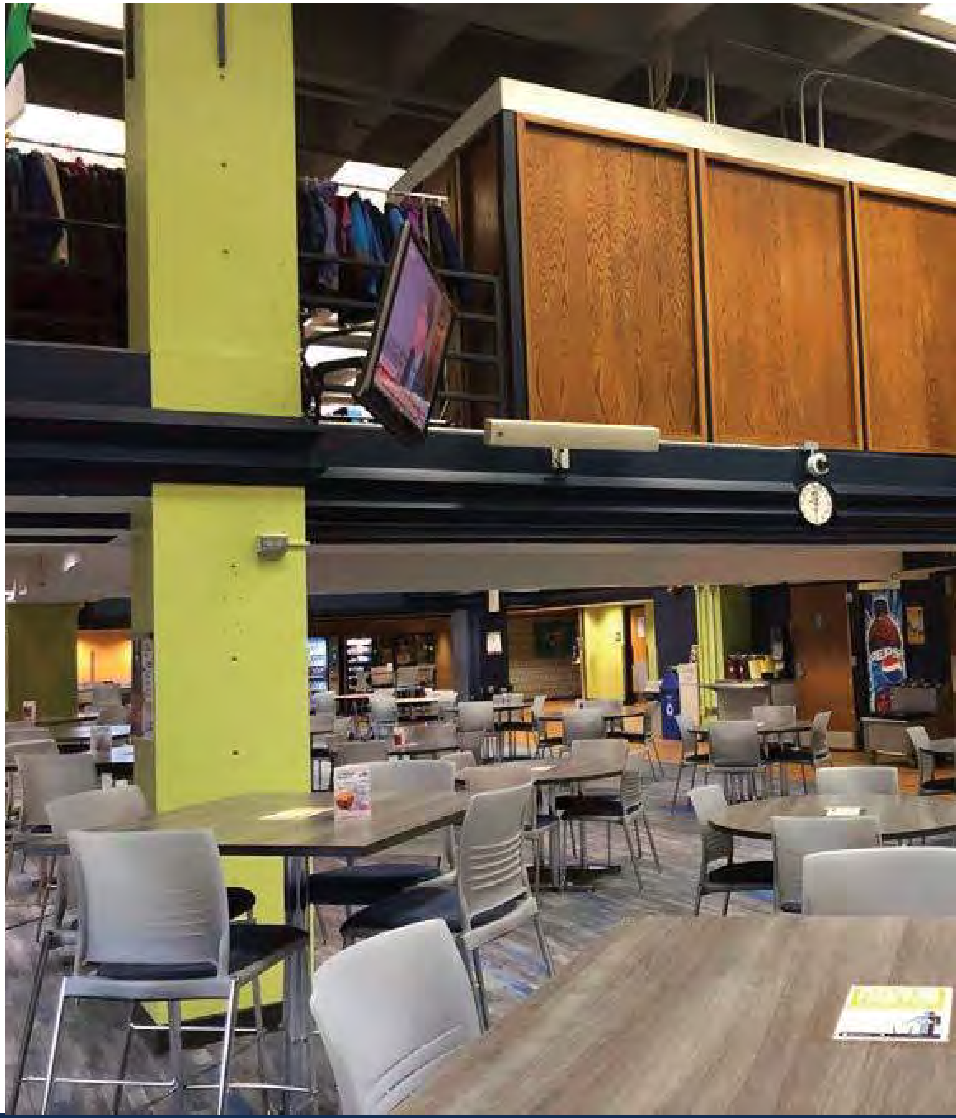
Technology

- Computer labs are less utilized than in the past, but size reductions would depend on academic delivery model
- A laptop program and an improved fiber path between the two campuses is being considered
- Power spikes and brownouts have occurred during inclement weather; A power conditioning study may be needed
- Additional sim labs would have impacts for technology / systems (conduits, switches, etc)
- Working to standardize classroom technology
- Improved access control, additional cameras in some areas, LED emergency lighting

Stakeholder Group Meetings

Accounting, Business, and Office Administration

- More flexible furniture in classrooms (movable) to support student interactions
- Separate spaces to promote team building, networking, problem solving (ropes course, stand-up tables, etc).
- Relaxation or meditation rooms to promote mental health
- Alternative energy sources should be added to campus (wind, solar)
- Daily storage for student's coats, books, etc.
- Cafeteria could be moved to promote more use.
- Atrium is both "sterile" and at times too loud



Stakeholder Group Meetings

Communication, Fine Arts, and Audio-Visual Technology

- Fine Art lacks a 3D studio space and existing art labs are overcrowded with poor HVAC
- Theater needs updating, both for aesthetics and electronic equipment (dimmers) and a better defined entry
- A black box theater is desired for different types of theatrical events (80-100 person capacity)
- Security is a concern for the art gallery (no doors)
- Older music practice rooms should be replaced with newer models (better lighting, acoustics, ventilation)
- A shared maker space could promote collaboration (robotics, sculpture)
- More study areas for students in all department areas

Stakeholder Group Meetings

Community Leaders / Partners

- Longevity of lease agreements would be beneficial, both for athletics and academic partners
- Heintz Center is liked for Workforce Development because it's easy to navigate and smaller than the Main Building. RCTC technology staff is very helpful
- Partnership Agreements are challenging. No formal agreement for WSU to invest capital dollars into RCTC
- A more continuous footprint for WSU is desired on RCTC's campus. This is being studied as part of Winona State's CFP
- C-Tech and P-Tech are growing rapidly and may need more space
- The laddering approach from C-Tech/P-Tech, RCTC, and WSU is appreciated, with the faculty working well together

Stakeholder Group Meetings

Construction and Transportation

- Programs will be impacted by the 2022 Bonding project if funding is received
- Automotive program is moving towards non-combustion engines, but needs new equipment, space to accommodate expanding instruction
- Welding needs storage to handle donated materials large enough for a full semester of instruction
- Students in these programs tend to not use lounge areas as they are in labs all day.
- Student storage needs should be accommodated without looking like a high school (lockers)
- Students need a small "one stop" at Heintz for financial aid / advisors
- More food service offerings would be nice, but might not be used

Stakeholder Group Meetings

Liberal Arts / Transfer Pathways / STEM

- Some concern about new MH classrooms (42 students, table not movable in some rooms, technology) but the spaces themselves are generally liked
- Faculty see benefits to both in-person classes, but see online remaining an option post-pandemic
- Student services feel disconnected
- Additional study areas are needed, with power for charging devices, taking online courses
- Student areas within faculty offices suites - some students feel intimidated to enter, others use them. Some concern from faculty about privacy
- Capture outdoor areas for use - walking paths, outdoor classes
- Addition of wind/solar on campus could bring in students; academic program opportunities?

Stakeholder Group Meetings

Law Enforcement and Public Safety

- Enrollment is down and the program is currently unsure of future direction (public views, changes in job expectations, P.O.S.T. board requirements)
- Rotating use of community spaces for skills training is challenging - changes yearly
- Traveling to other locations for skills is not ideal, loss of instruction time
- Workout area is needed in Heintz for program needs. Sports Center is too far and scheduling is problematic
- External garage is desired for equipment, vehicles
- Rotation of classroom instruction / labs is challenging. (Multiple labs/classes held concurrently with student rotating through)

Stakeholder Group Meetings

Behavior, Education and Personal Services

- Early Childhood Education is challenged by not having a facility that accommodates children on site
- Having a child care facility on site could benefit student-parents, faculty, and students of the program.
- Designing the Early Childhood Education area from a Reggio approach could be a draw (naturalistic learning)
- Simulation area for teaching Behavioral Health, both in terms of technology and clinic space set-up
- Space is needed for continuing education, potentially up to 60 students
- Need workout rooms that are not dedicated to classes and programs - would provide a holistic wellness approach

Stakeholder Group Meetings

Agriculture Science and Natural Resources

- Year-round outdoor learning spaces should be developed (wetlands, nature trails, woodland restoration)
- More outdoor seating areas are needed
- Introduce dedicated conservation areas (less mowing, support wildlife, educational opportunities)
- SMART garden should remain, regardless of the status of Horticulture
- Veterinary Program spaces need additional sinks, storage for large equipment. Ideal would be a barn for large animals
- Biology labs furniture should be replaced (too low, ergonomic complaints from students)
- Support alternative energy
- Need a better connection between Heintz and the Main Building

Stakeholder Group Meetings

Health and Healthcare Support Services

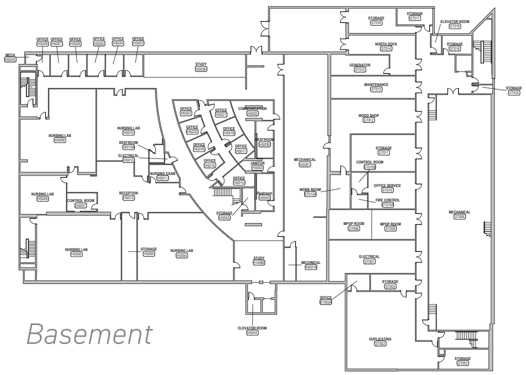
- Nursing, Dental Hygiene, and Dental Assisting programs are full, with students turned away each semester
- The nursing program is feeling pressure to increase enrollment due to nursing shortages. Concern for staffing/space
- Additional, or new, simulation spaces would help instruction.
- Labs are crowded, with the situation negatively impacted by the pandemic (social distancing)
- More computers are needed at Heintz to support students between classes
- Student support services and additional seating areas are needed at Heintz
- A better connection between Heintz and the Main Building are needed

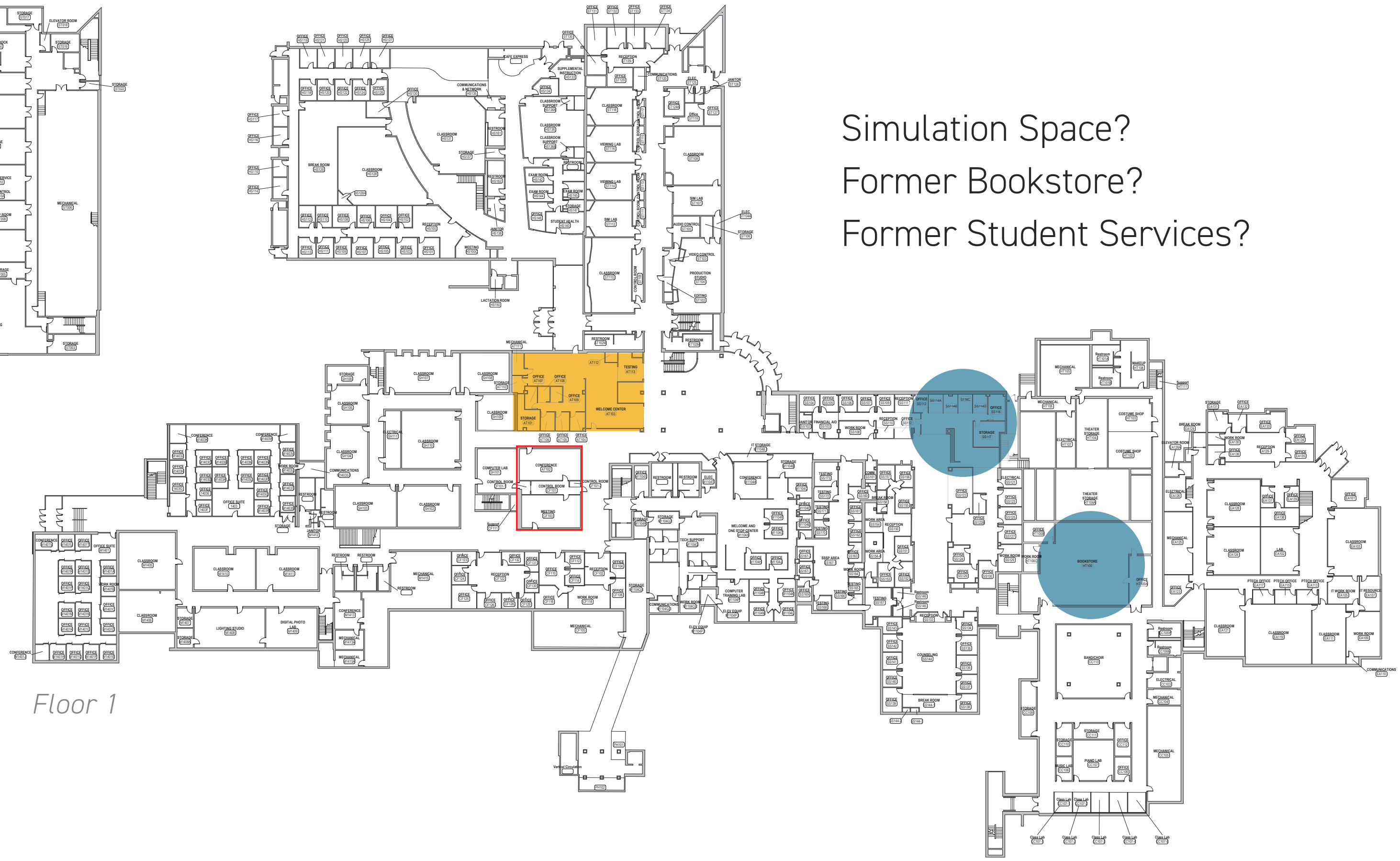
Stakeholder Group Meetings

Students, Student Senate, and Student Life

- Additional quiet spaces (study, meditation, prayer)
- Meeting rooms for clubs needed. Dedicated and/or shared Audience: Students, Faculty, and/or Staff
- Difficult to find Student Life. Move to area with greater visibility (East Hall or near Atrium)
- Larger Hive Supply at both Heintz and Main Building
- Student Life spaces (meeting room, office) are needed for some clubs at Heintz
- Better wayfinding signage. Digital / Smart signage?
- Cafeteria: Busy on certain days at the lunch rush. Add mobile cart to bring food to students?
- Add athletic / workout space for non-athletes, possibly a pool / hot tub

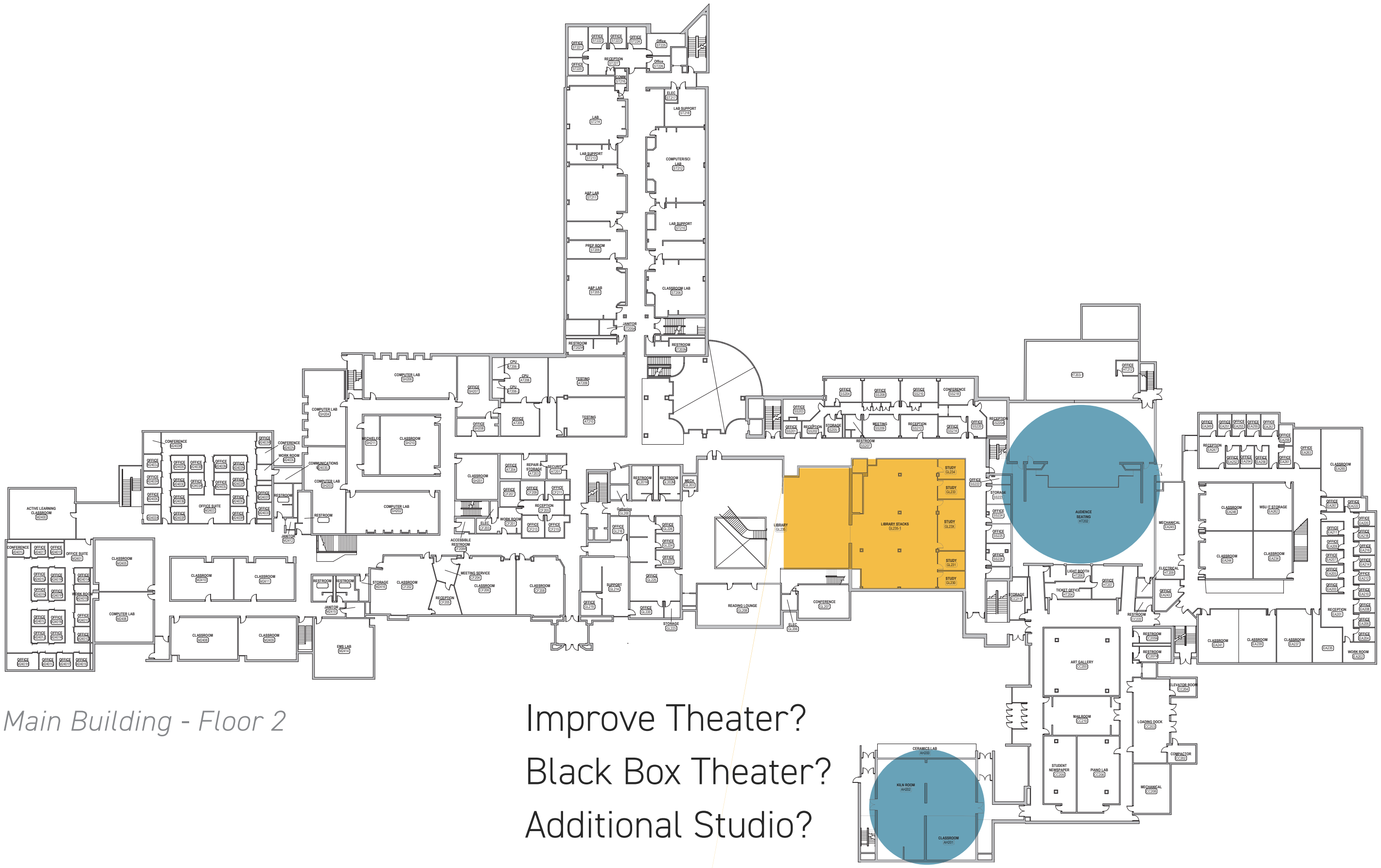
Main Building





Simulation Space?
Former Bookstore?
Former Student Services?

Main Building



Main Building - Floor 2

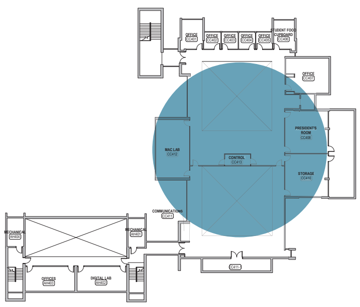
Improve Theater?

Black Box Theater?

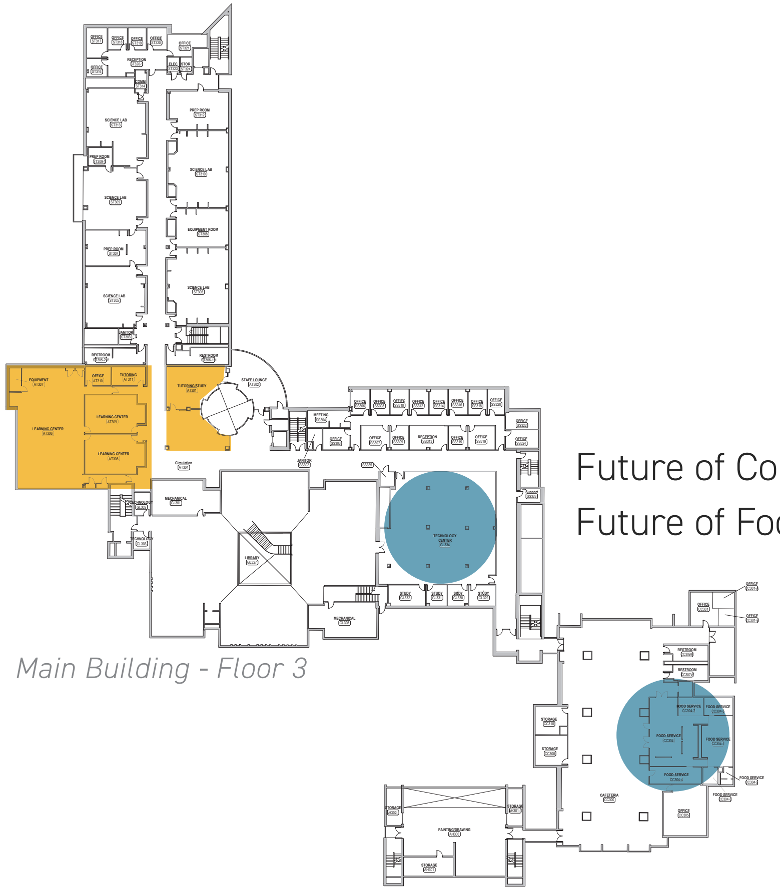
Additional Studio?

Main Building

Main Building - Floor 4



Move Student Life?



Main Building - Floor 3

Future of Computer Lab?

Future of Food Service?

Heintz Building

Study Lounge?

Floor 2

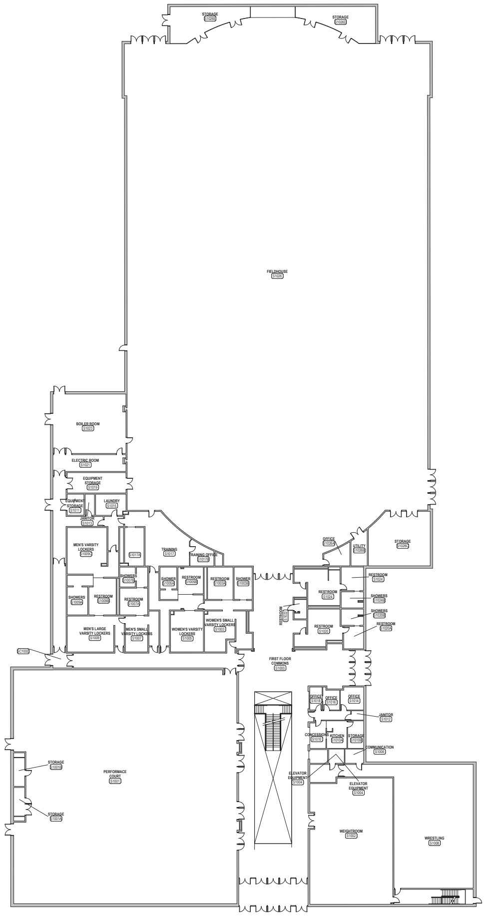
Former Dental Clinic?

Simulation?

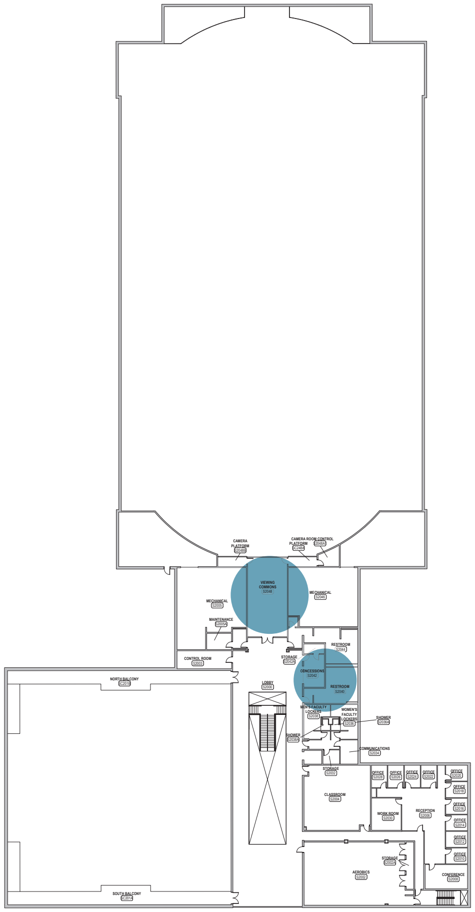
Horticulture?

Floor 1

Regional Sports Center



Floor 1



Floor 2

e-Sports?

Concessions?

Schedule

September 2021

30 Information Request Distributed

October 2021

8 Kick-off Meeting with Minnesota State

22 Meeting with President

November 2021

5 Kick-off Meeting with CFP Committee

December 2021

3 Meeting with CFP Committee

10 Meeting with CFP Committee

16-17 Stakeholder Meetings

22 35% Completion for Review

January 2022

Stakeholder Meetings

Receive Comments

28 Meeting with CFP Committee

February 2022

18 Meeting with CFP Committee

Meeting with President

Campus Engagement

March 2022

15 65% Completion for Review

April 2022

Receive 65% Comments

May 2022

Meeting with CFP Committee

Meeting with President

June 2022

Meeting with CFP Committee

July 2022

95% Completion for Review*

September 2022

Meeting with CFP Committee

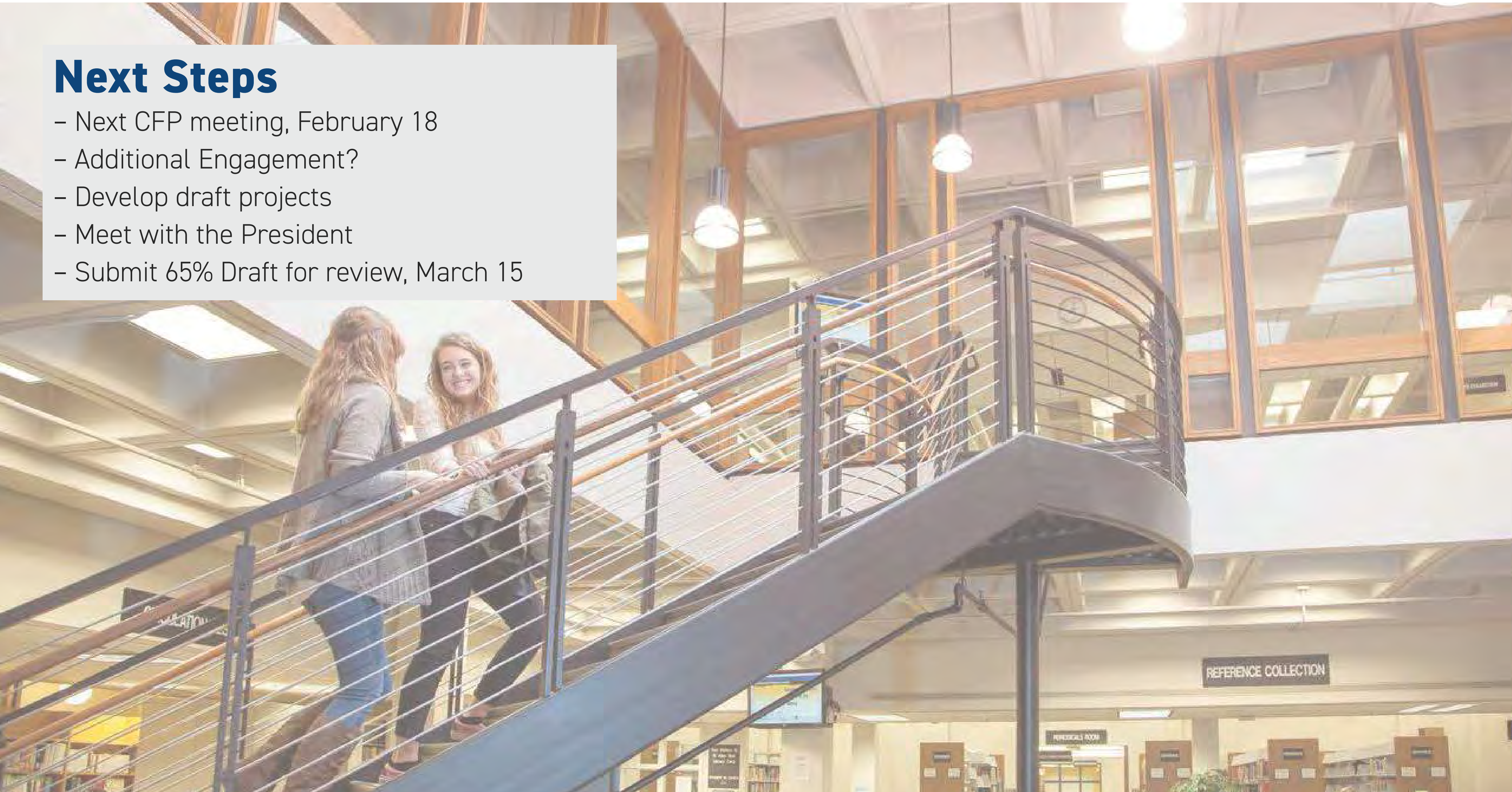
Presentation to the System Office (tentative)

October 2022

Submit 100% Document*

Next Steps

- Next CFP meeting, February 18
- Additional Engagement?
- Develop draft projects
- Meet with the President
- Submit 65% Draft for review, March 15



Thank You!

Committee Meeting 4
January 28, 2022

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

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ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
COMPREHENSIVE FACILITIES PLAN

Meeting Minutes

MEETING DATE: MARCH 15, 2022
LOCATION: VIRTUAL MEETING

TO: Comprehensive Facilities Plan Committee

FROM: Alicia O'Neill

RE: Committee Meeting 6

DATE SENT: March 21, 2022

PRESENT:

Name	Title / Organization	Email
Shayn Jensson	Facilities Project Manager	Shayn.Jensson@rctc.edu
Jean Musgjerd	Health/Phy Ed/Athletic Faculty	Jean.Musgjerd@rctc.edu
Mary Dennison	Librarian	Mary.Dennison@rctc.edu
Alicia Zeone	Director of Admissions	alicia.zeone@rctc.edu
Michele Pyfferoen	VP Academic Affairs	Michelle.Pyfferoen@rctc.edu
Michael Sheggeby	Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Brenda Frame	Dean of Liberal Arts/Gen Ed, Academic Affairs	Brenda.Frame@rctc.edu
Steve Higgins	Director of ITS and Departments IT and TSC	Steve.Higgins@rctc.edu
Steve Schmall	VP of Finance and Facilities	Steve.Schmall@rctc.edu
Sara Phillips	Planner, Architect, LHB	sara.phillips@lhbcorp.com
Alicia O'Neill	Architectural Designer, LHB	Alicia.oneill@lhbcorp.com

MEETING SUMMARY
Attendees discussed the following in relation to the Comprehensive Facilities Plan.

1. Student Survey
    a. Identify primary location (Heintz, Main Building)
    b. See attached presentation for survey questions
    c. Anonymity will likely allow for more accurate responses
    d. How long have surveys been in the past? When do responses start to taper off? Duration to be determined.

2. Faculty / Staff Survey
    a. Identify primary location (Heintz, Main Building)
    b. See attached presentation for survey questions

3. Building Project Concepts
    a. Continue to improve space utilization
    b. Support Academic Pathways
    c. Promote connections outside the classroom
        i. Reinforce RCTC as a place of belonging and inclusion
    d. Variety of projects (location, scale, funding)

4. Building Concept Feedback from previous meeting
    a. Concern for separating Student Life offices from gathering spaces

- b. Concern for downsizing gathering space in College Center
    - i. Look at College Center holistically
- c. Science labs are outdated
- d. Foodservice style and/or location needs attention

5. Heintz Building (Capital Project)
    - a. First two projects in the CFP:
        - i. Project 1: Reimagining Education for a Diverse Workforce (Design) 2022
        - ii. Project 2: Reimagining Education for a Diverse Workforce (Construction) 2024
    - b. Can scope be expanded into the Horticulture area?
        - i. This can happen as part of the predesign verification process if the project receives funding or as part of a revised predesign if it doesn't.

6. Heintz Building (College Funded or Capital Projects)
    - a. Second floor student lounge
    - b. Additional dental hygiene / dental assistant labs
    - c. Dental simulation, demolish greenhouse
    - d. Student Services flex space

7. Main Building Approach – Reconsiderations after the last meeting
    - a. Reviewed feedback from last meeting
    - b. Revisited previous CFP
    - c. Fundability
        - i. Arts and theater are difficult to fund through the legislature at this moment
            1. The longer this is identified in the CFP, the stronger the argument will be
        - ii. Science and technical labs are easier to fund
        - iii. Student services falls in the middle
        - iv. Student life and improvements to food service are typically revenue or campus funded projects.
    - d. Big picture view of what is needed.

8. Main Building Analysis
    - a. Science is 29 years old
    - b. Student services has unaddressed areas and the space does not feel cohesive
    - c. Arts / College Center
        - i. Outdated
    - d. East Hall
        - i. Feels underutilized and needs activation
        - ii. PTECH has moved into this location, which has helped.
    - e. Is there an initial priority to focus on?
        - i. Science programs continue to grow, but facilities remain outdated
        - ii. Art area and Theater is used for more than just art – used for events, is outdated
            1. Used to be a large community experience and it has lost this attribute
            2. Foodservice, bookstore, theater, art gallery – Area feels discombobulated and is without a main purpose – "identity crisis"
            3. Art and College Center used to be the hub in the 70s and has since lost this spark.
            4. If students don't run into this area by chance, they often don't know what amenities are offered here
        - iii. Building is behind on technology capabilities for nursing and science programs
        - iv. Maintenance replacement for both Arts and Science for efficiency
        - v. Student Services Area
            1. If this area is enhanced, it will act as a connection between arts and science areas – Entire building will act as a web
            2. Pandemic has opened eyes to what services students need outside the classroom

3. Students are not being served the way RCTC wants to be able to serve students

vi. How is information communicated to students?
1. Wayfinding needs improvement
2. Students often to not know of all the services RCTC has to offer

9. Main Building (College Funded or Capital Projects)
   a. Floor 1
      i. Renovate science areas
      ii. Student Services
         1. Better circulation path will provide more cohesion
         2. Student lounge space node
         3. Sight lines outdoors can help orientation
      iii. Arts Renovations
         1. Former bookstore becomes a new wayfinding node to feel like you are arriving at a space instead of just passing through
            - Way to showcase arts on the main circulation path
      iv. Partial Renovation of East Hall – Move marketing, reduce classrooms, lounge area, zoom, Hive supply
   b. Floor 2
      i. Renovate science
      ii. Arts renovations
      iii. Partial renovation in East Hall – move mail room, reduce classrooms
         1. Moving mail room will free up space for art. Suggested location was East Hall.
         2. Idea from Attendees: move mailroom to old duplicating space near other loading dock. Some expressed concern about the Incline of drive makes access difficult, especially during the winter
   c. Floor 3
      i. Renovate science
      ii. College Center renovations
         1. Gathering space
         2. Food service remains here, but upgrades needed
         3. Activate this area
      iii. What are the opportunities for the event space in College Center?
         1. Currently not enough traffic to maintain the current cafeteria style of foodservice
            - Grab and go is more popular
            - Is this an opportunity for sponsorship?
            - Before pandemic, foodservice would make about $20,000/year – mostly concessions at sports center, but this money would be put back into maintenance of foodservice areas and equipment
         2. Gathering / Event space
            - Pre pandemic, it was used often by students – concerts, games, fashion shows, individual clubs/groups occupied this space
            - Demolition of previous Plaza and Memorial Halls removed some of the circulation through this space
            - Enforces the importance of driving students to this space
            - Large capacity may be needed - some events can have 100-200 people
   d. Floor 4
      i. Doubling down on student life space

10. Next steps:
    a. Launch survey
    b. Submit 65% draft – March 22
    c. Receive 65% comments – April
    d. CFP committee meeting – May. LHB to reach out to Katrina to schedule a meeting in April.

11. Learning Commons Study
    a. Learning Center moves into Library
        i. Second floor is the active space
        ii. Third floor becomes quiet space

12. Student Life Diagram
    a. Student Life staff provided a plan for the former bookstore space to be reused as a game room
    b. Location in bookstore is not ideal (too small, adjacent to academic areas), but the need for a game room style space is reinforced
        i. Could be located in the College Center to drive people here
    c. Important to limit disruptions to other programs

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Att: Committee Meeting 6 Presentation
c: LHB File No. 210539

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Comprehensive Facilities Plan

Committee Meeting 6
March 15, 2022

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

LHB

Agenda

– Survey Questions	10 Minutes
– Revisit Building Projects	40 Minutes
– Next Steps	5 Minutes
	55 Minutes

Student Survey

- Identify your primary location (Heintz Center, Main Building)
- Please answer the following questions in relationship to your primary location:
  - It is easy to find my way around the building
  - There is adequate student study and lounge space
  - The classrooms and labs that I have been in support learning
  - I have good access to student services (advising, financial aid, technology services, academic support, etc)
  - Based on the classrooms, labs, and other built spaces, I would recommend attending RCTC to a friend
  - I enjoy spending time outside at RCTC
  - I feel safe walking outside in the evening at RCTC
  - If available, I would use a bike or scooter sharing program to travel between areas of RCTC's campus
- Other Feedback?

Faculty/Staff Survey

- Identify your primary location (Heintz Center, Main Building)
- Please answer the following questions in relationship to your primary location:
  - The spaces within the building align with my needs as a faculty or staff member at RCTC
  - There is adequate space to meet with other faculty and/or staff
  - There is adequate space to meet with students
  - As a faculty member, the instructional spaces available to me align with my preferred teaching methodologies
  - I believe the grounds of RCTC reflect a quality institution
  - I feel safe walking outside in the evening at RCTC
- Other Feedback?

Building Project Concepts

– Continue to improve space utilization (classrooms, overall)

– Support Academic Pathways

– Promote connections outside the classroom

– Variety of projects (location, scale, funding)

Building Concept Feedback

- Concern for separating Student Life offices from gathering space
- Concern for downsizing gathering space in College Center
- Look at College Center holistically
- Science upgrades needed
- What is the right location for food service?

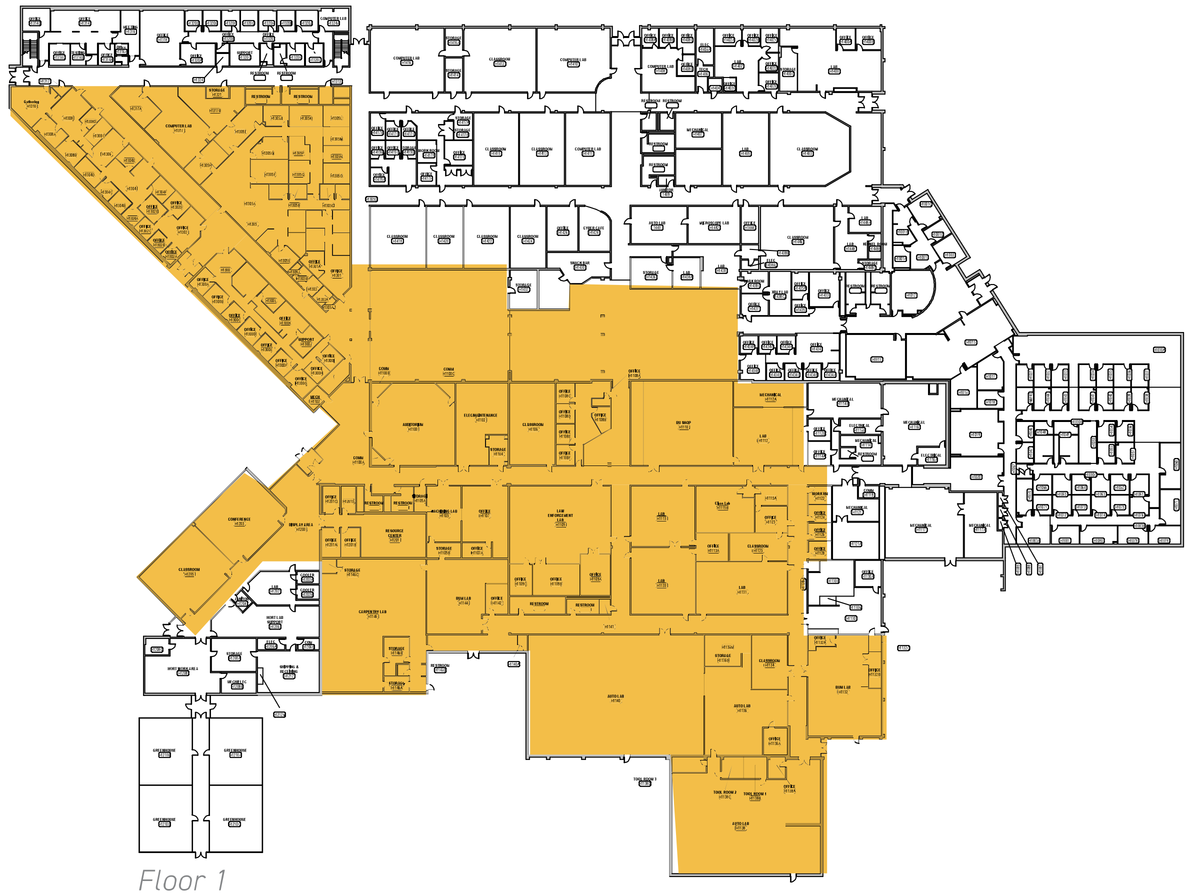
Heintz Building (Capital Project)

Project 1:

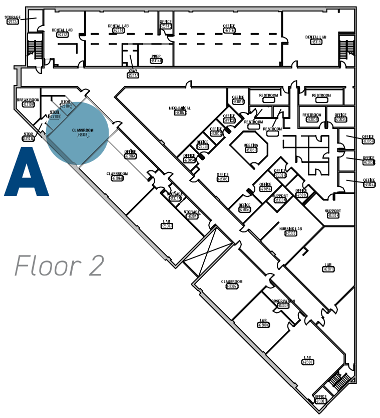
Reimagining Education for a Diverse Workforce (Design) - 2022

Project 2:

Reimagining Education for a Diverse Workforce (Construction) - 2024



Heintz Building (College Funded or Capital Projects)



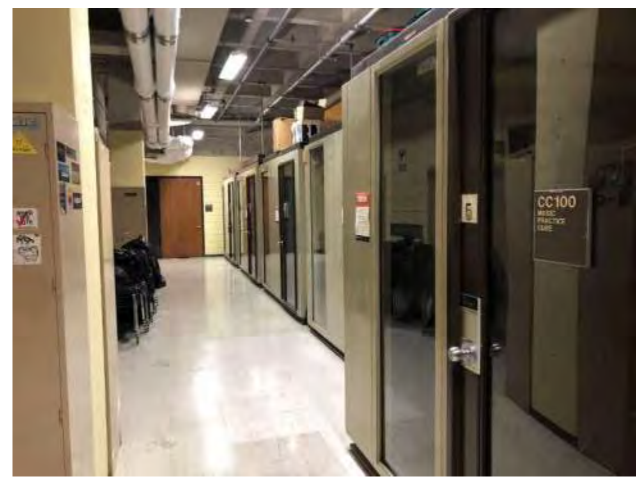
Floor 2

Floor 1

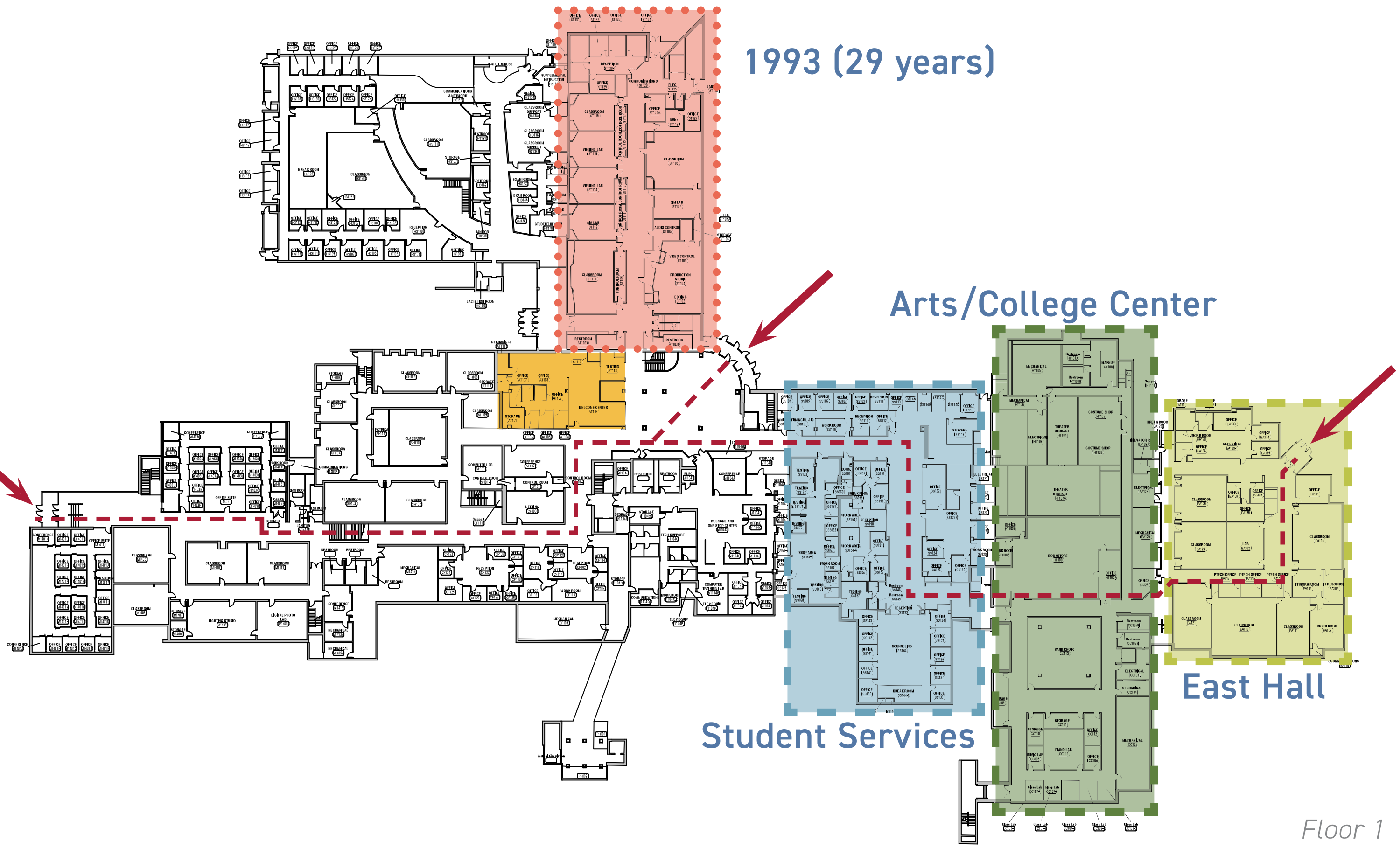
- Second Floor Student Lounge (A)
- Additional Dental Hygiene / Dental Assistant labs (B)
- Dental Simulation*, Demo Greenhouse (C)
- Student Services Flex Space (D)

Main Building

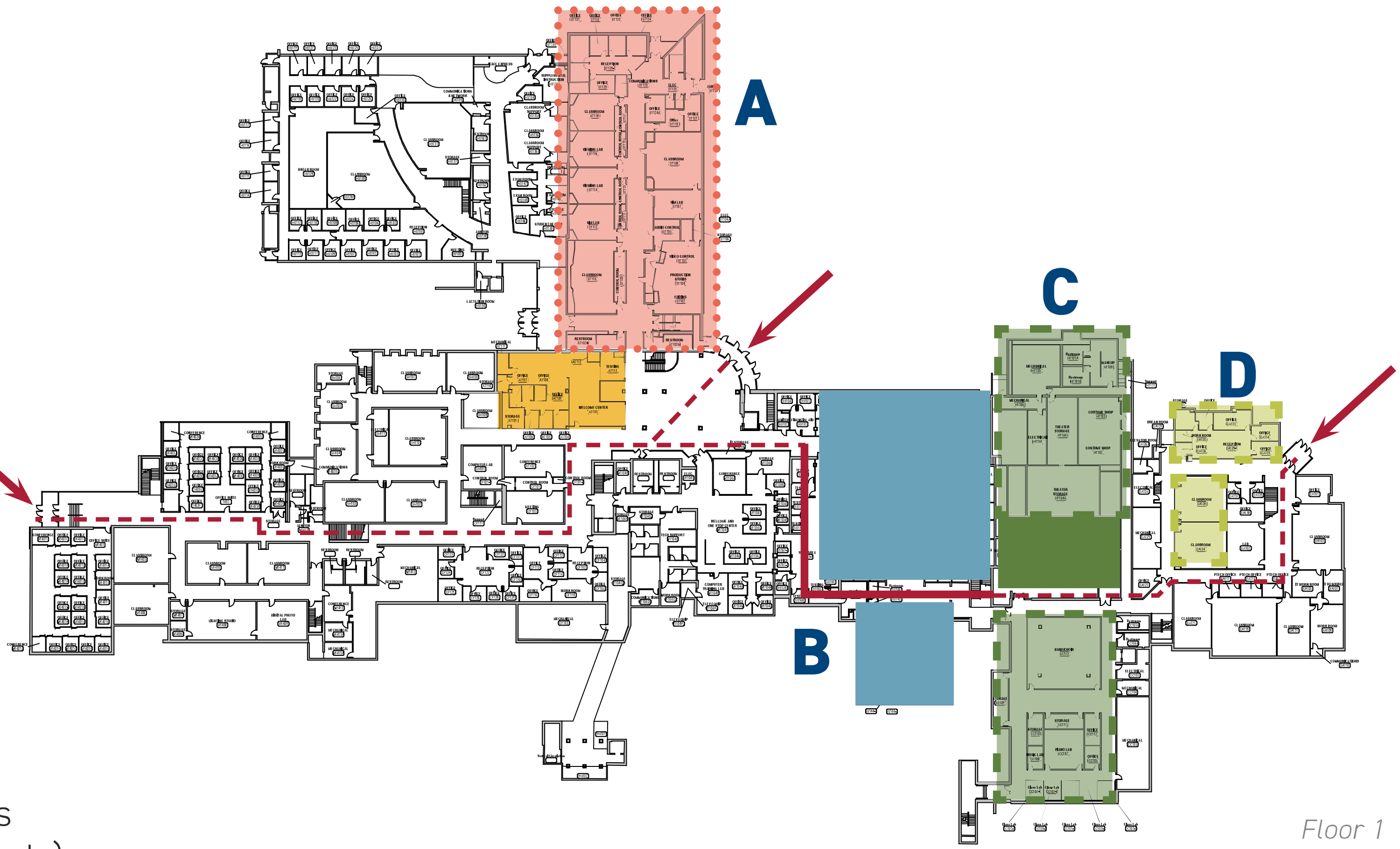
- Reviewed Feedback from Last Meeting
- Revisited the prior CFP
- Big Picture - What makes sense?
- Fundability



Main Building

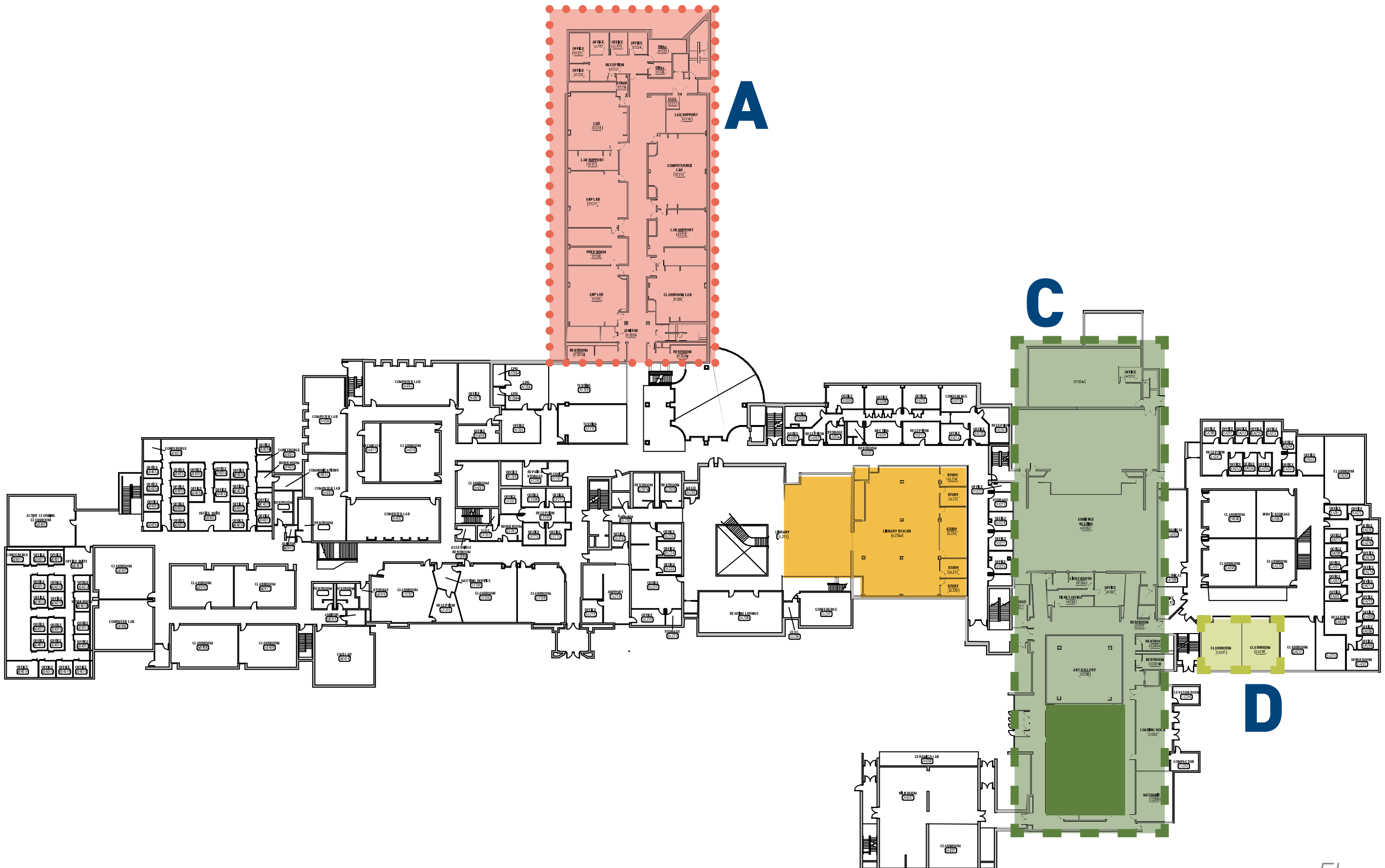


Main Building (College Funded or Capital Projects)



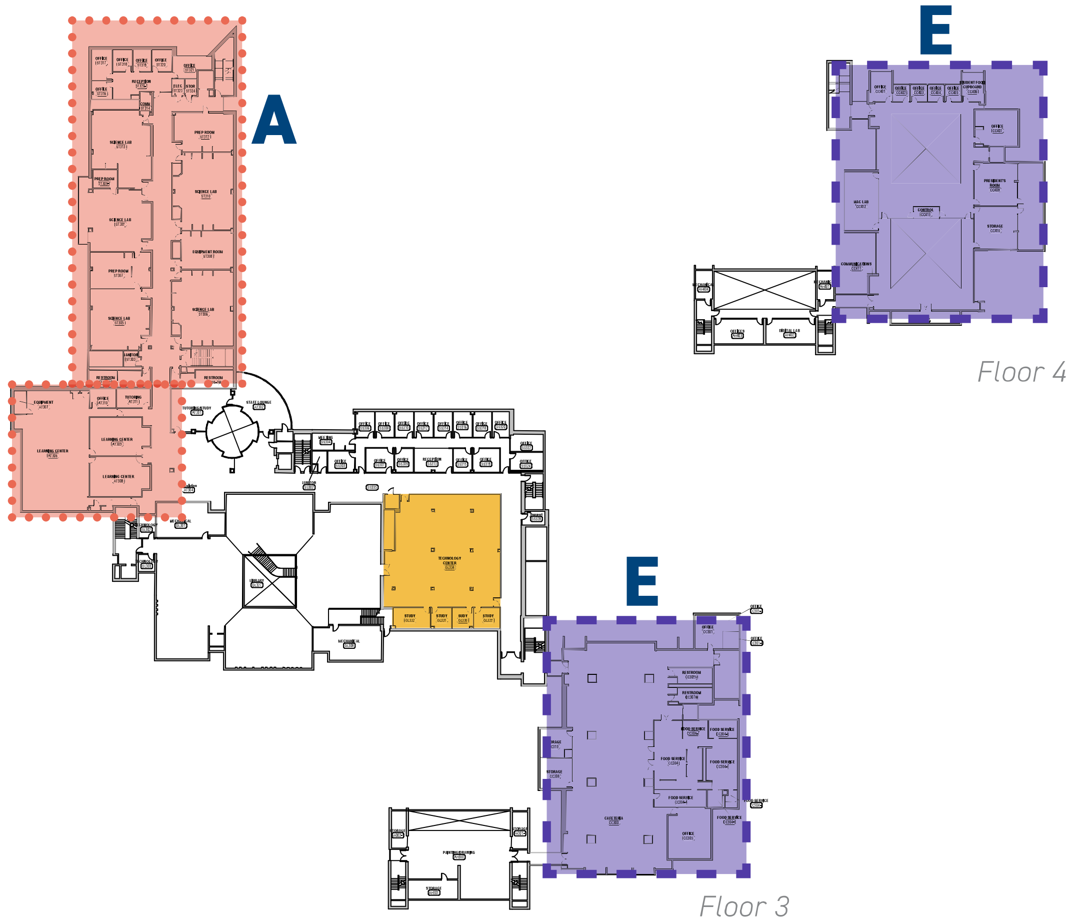
- Renovate Science (A)
- Student Services - Part II (B)
- Arts Renovations (C)
- Partial Renovation (D) - Move marketing, reduce classrooms (Lounge Area, Zoom, Hive Supply)

Main Building (College Funded or Capital Projects)



- Renovate Science (A)
- Arts Renovations (C)
- Partial Renovation (D) - Move mail room, reduce classrooms

Main Building (College Funded or Capital Projects)



- Renovate Science (A)
- College Center Renovations (E)

Schedule

September 2021
30 Information Request Distributed

October 2021
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22 Meeting with President

November 2021
5 Kick-off Meeting with CFP Committee

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22 35% Completion for Review

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Meeting with President

June 2022
Meeting with CFP Committee

July 2022
95% Completion for Review*

September 2022
Meeting with CFP Committee
Presentation to the System Office (tentative)

October 2022
Submit 100% Document*

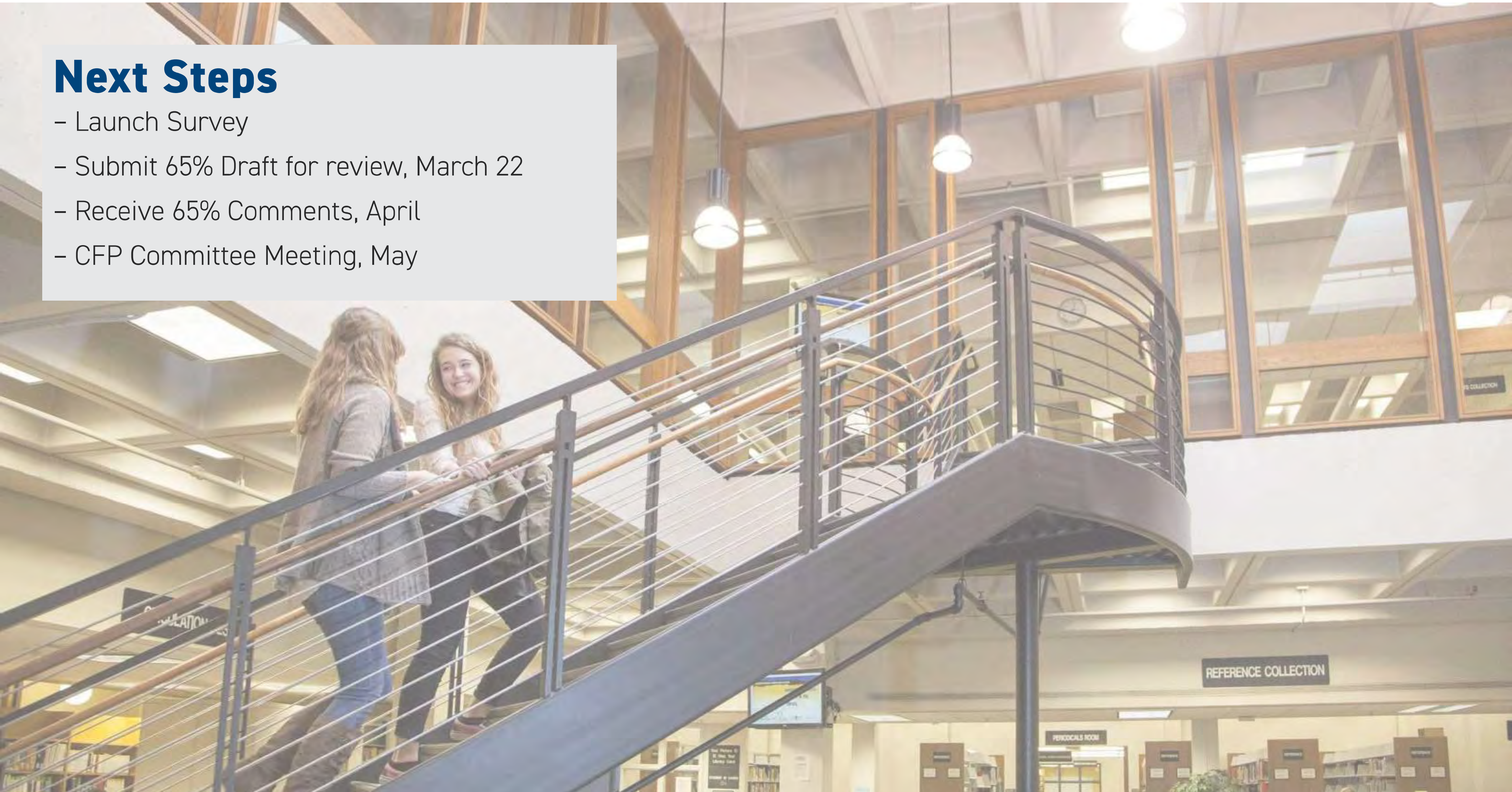
Next Steps

– Launch Survey

– Submit 65% Draft for review, March 22

– Receive 65% Comments, April

– CFP Committee Meeting, May



Thank You!

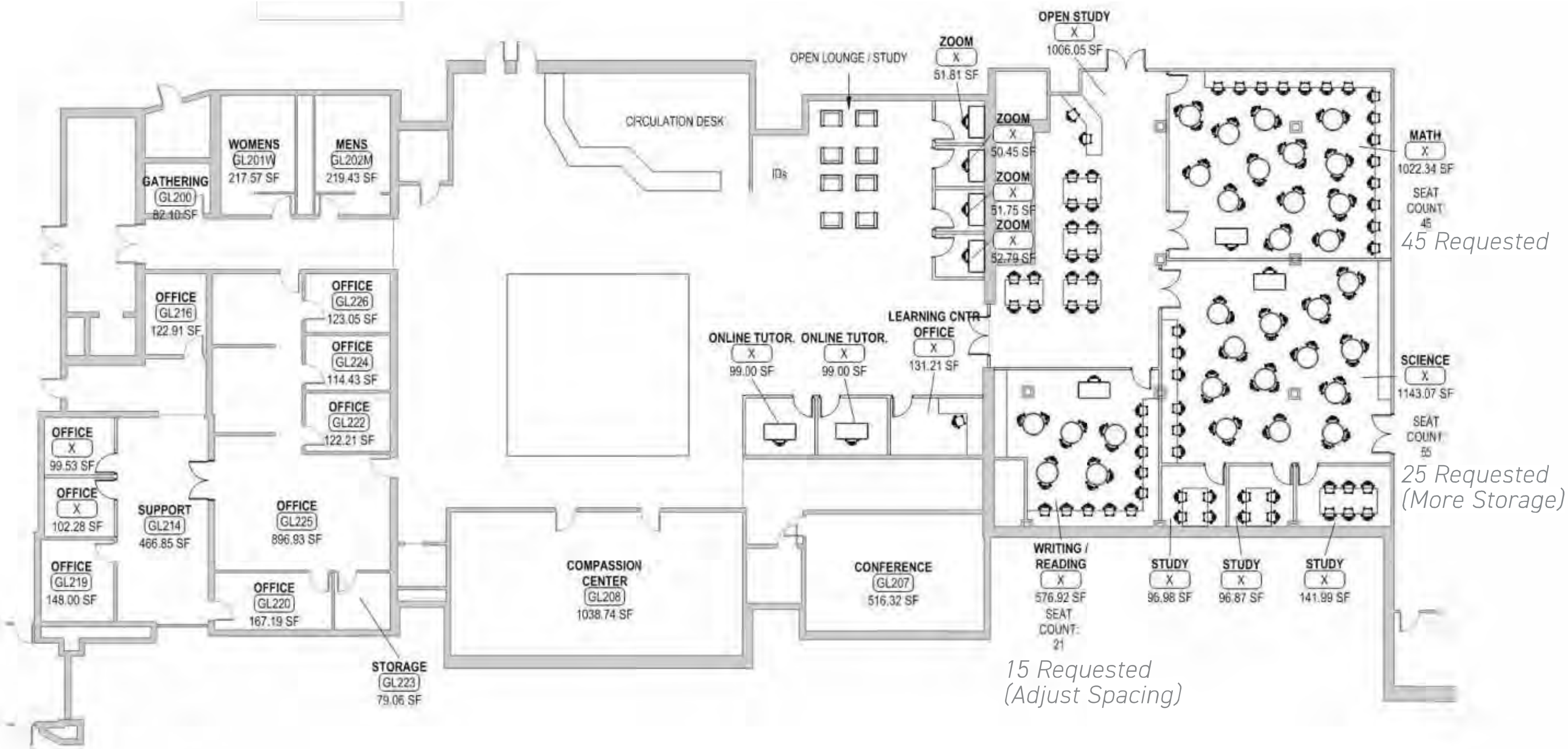
Committee Meeting 4
February 18, 2022

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

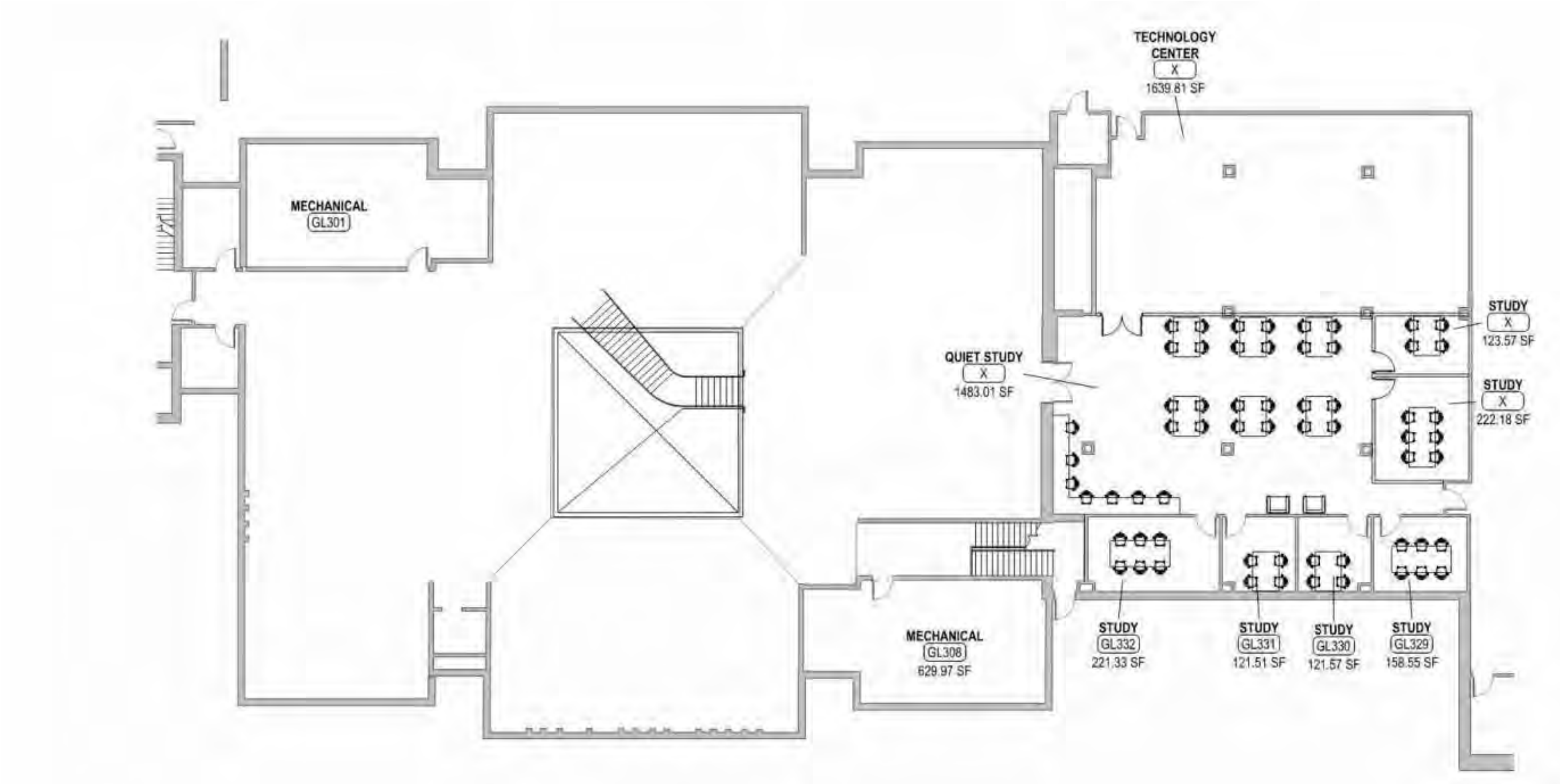
LHB

Student Life: Game Room (former Bookstore)

Learning Commons: Update



Learning Commons: Update



MEETING MINUTES

Comprehensive Facilities Plan

Rochester Community and Technical College

Friday, August 26, 2002, CF206/208

To:	Steve Schmall		
From:	Sara Phillips		
Re:	Comprehensive Facilities Plan – Meeting 7		
Present:	**NAME**	**ORGANIZATION / ROLE**	**EMAIL**
	Steve Schmall	RCTC, VP of Finance and Facilities	Steve.Schmall@rctc.edu
	Shayne Jensson	RCTC, Facilities Project Manager	Shayn.Jensson@rctc.edu
	Michele Pyfferoen	RCTC, VP of Academic Affairs	Michelle.Pyfferoen@rctc.edu
	Jean Musgjerd	RCTC, Health, Phy Ed, Athletics	Jean.Musgjerd@rctc.edu
	Alicia Zeone	RCTC, Director of Admissions	Alicia.Zeone@rctc.edu
	Michael Sheggeby	RCTC, Director of Sports Facilities	Michael.Sheggeby@rctc.edu
	Sara Phillips	LHB, Architect	Sara.Phillips@lhbcorp.com

Meeting Summary

1. A general overview of the 65% submission was presented with the following comments heard:
   a. In addition to the strategies for building development shared during the meeting, other ideas shared included:
      i. Expand on PTech relationship. Promote partnerships and engagement with K-12 feeder schools to expand healthcare and tech based careers
      ii. Support collaboration with adult basic education (ABE) and Workforce Center
      iii. The recently completed intake survey indicated interest in expanded mental health services and financial aid
   b. It was noted that no bonding bill in 2022 has shifted the direction of the top priority project.
   c. The Fall enrollment data may be a sign of future trends. There is more activity on campus, but students also tended to enroll later (near the start of the semester)
2. The comments from the System Office (Michelle Gerner) were reviewed. Key questions involved the Master Academic Plan and the future mix of in-person/online/hybrid classes.
3. The campus has begun work on a predesign for 2024 funding. It will be a small project (under $15 mil) and have a smaller scope than the 2022 predesign.
4. Other projects should be considered for inclusion in the Comprehensive Facilities Plan including:
   a. Simulation: Technology to teach skills as finding clinic time (nursing professions, for example) is challenging. Simulation also allows for greater flexibility in scheduling.
   b. Solar repair could be a growth area that could be tied to the FAST program.
   c. Dental expansion and electrical vehicle servicing were also mentioned.
5. It was noted that the goal is to complete the CFP before the end of the calendar year. It was noted that a meeting with RCTC Leadership is scheduled for September 23 to review the potential projects. Any suggested changes will be reviewed with the committee at the October meeting.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Attachments: Committee Meeting 7 Presentation

c: LHB Project No. 210539

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Comprehensive Facilities Plan

Committee Meeting 7
August 26, 2022

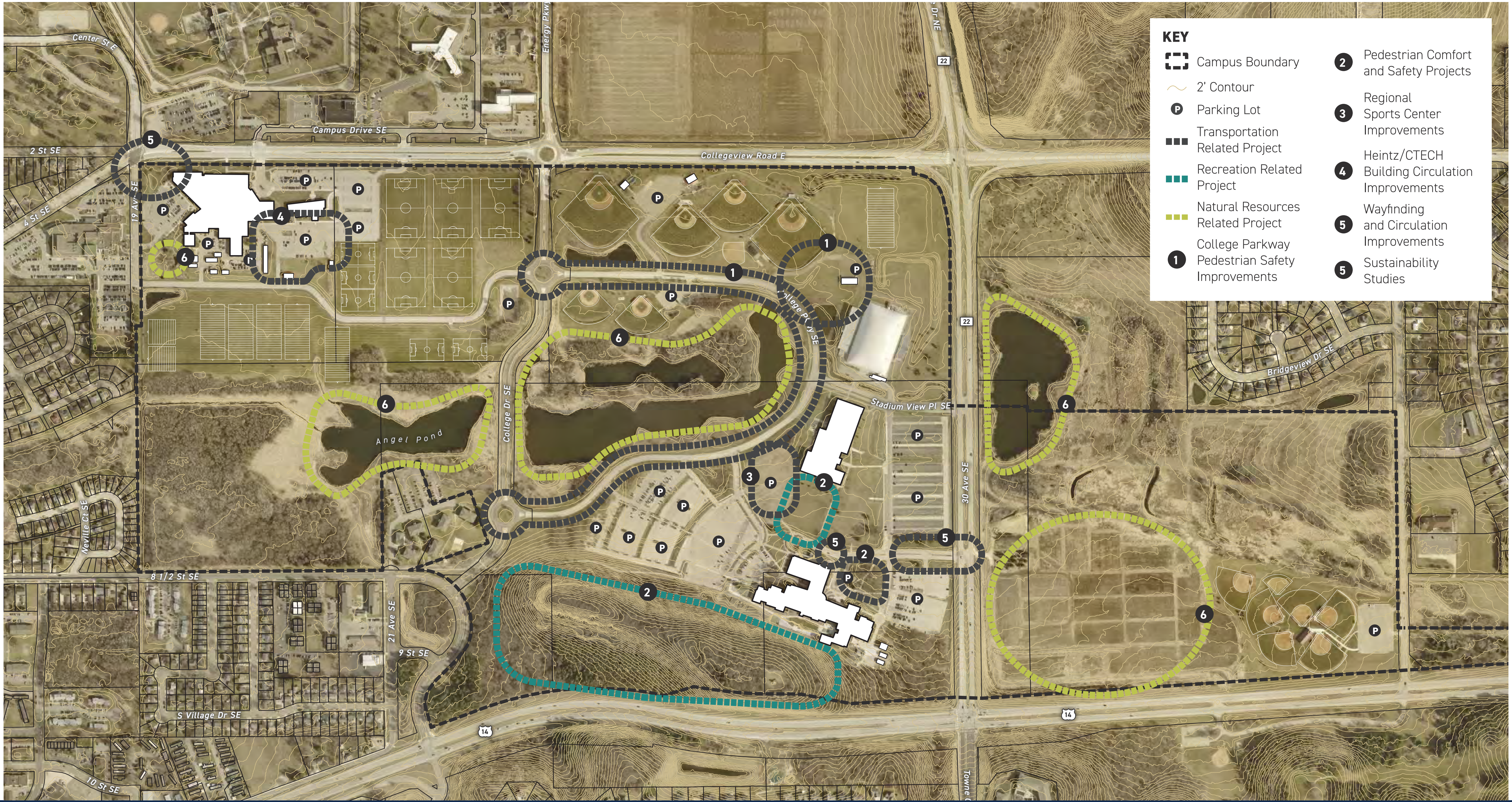
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

LHB

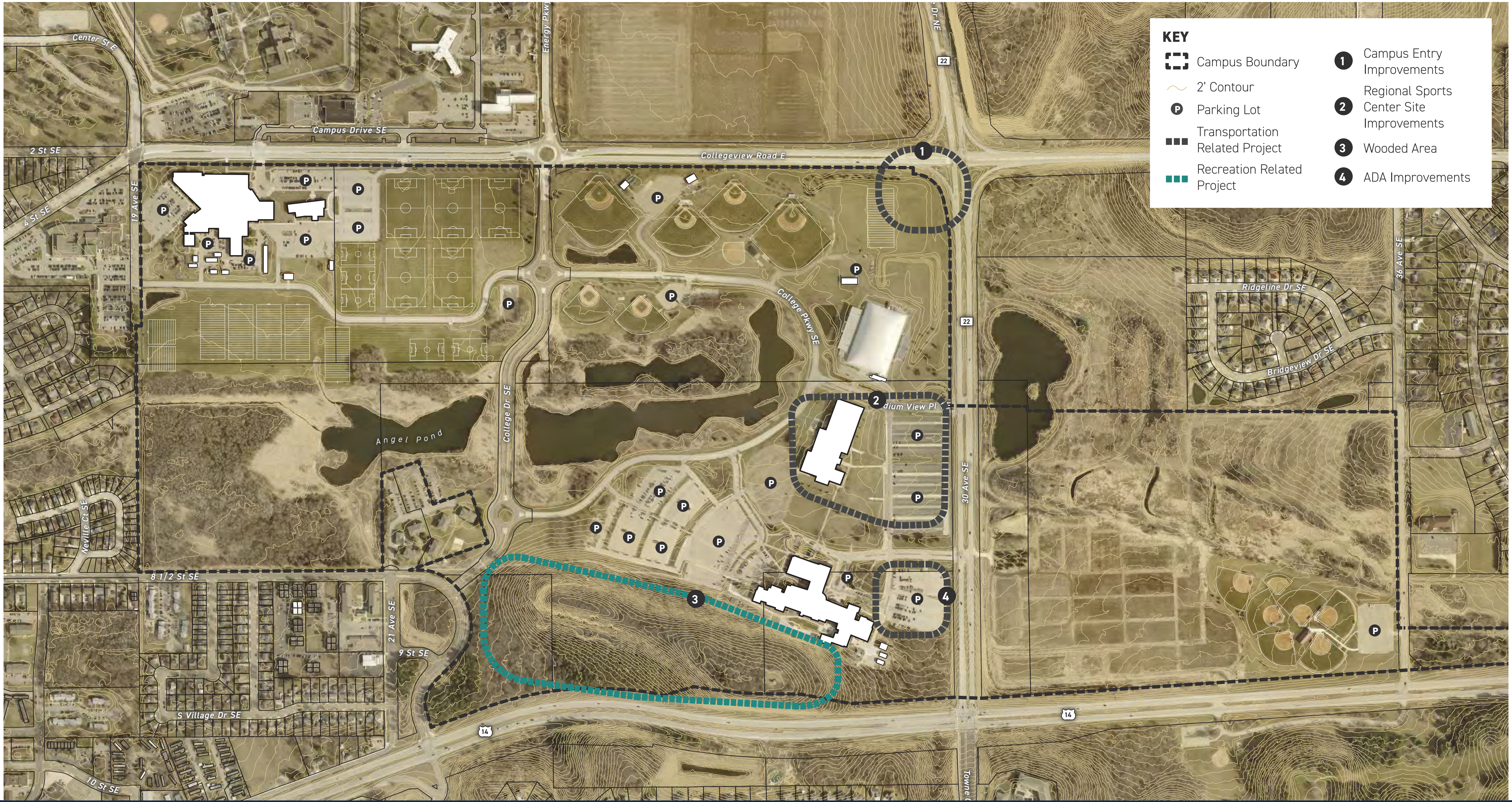
Agenda

- Review Submission
- Feedback from MN State
- 2024 Predesign: Update
- Discussion on Priorities
- Next Steps

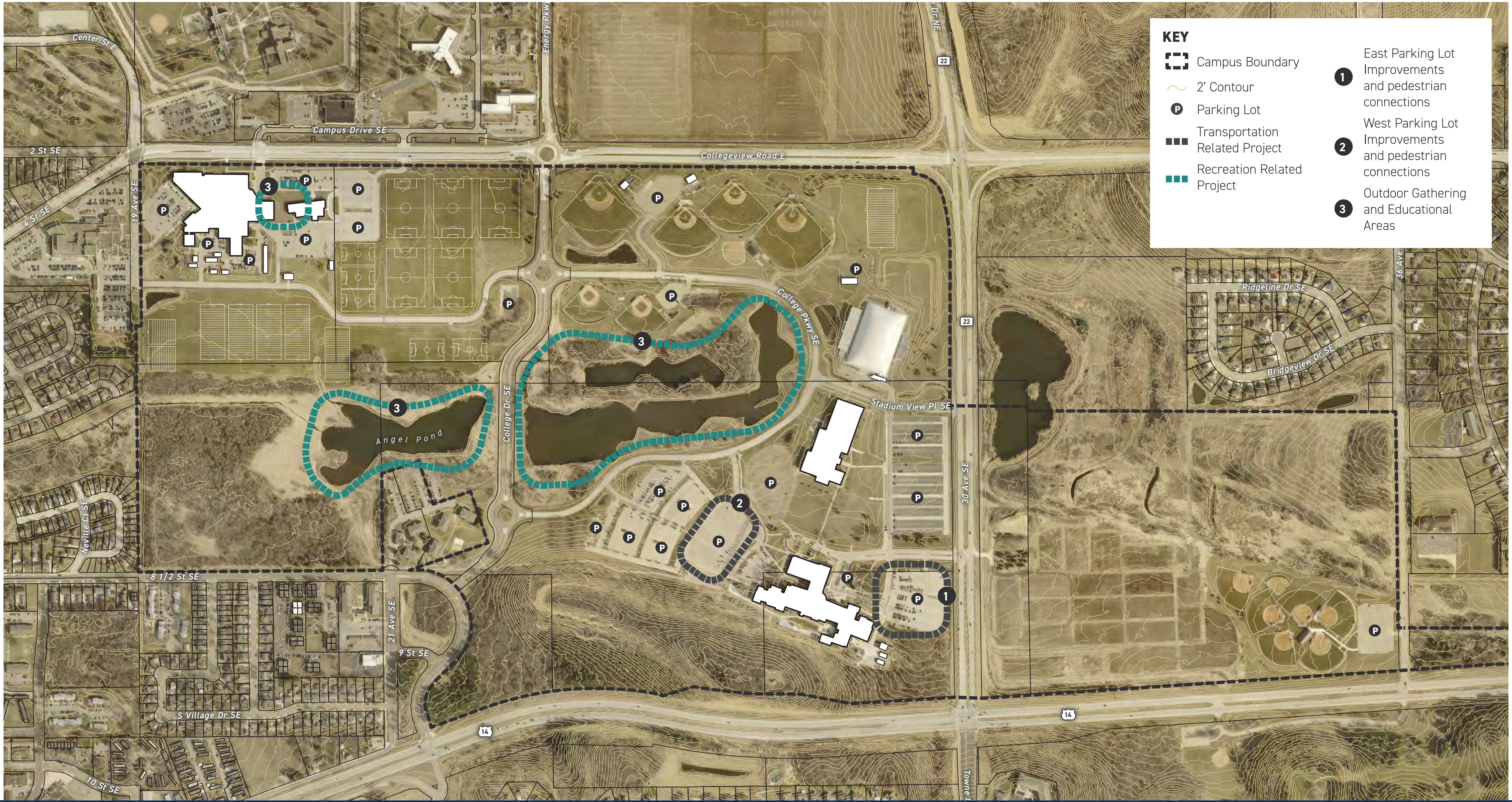
Site Development - Short-Term



Site Development - Mid-Term



Site Development - Long-Term



Strategies for Building Development

– Support Academic Pathways

– Promote Connections Outside the Classroom

– Improve Space Utilization

– Expand Access to Academic Support and Student Services

– Continue to Address Wayfinding Challenges

Heintz Center: Short-Term

- AUTOMOTIVE
- BUILDING SUPPORT
- BWE
- CAD
- CARPENTRY
- CO-LAB
- ELEC/COMM
- FACILITIES
- FAST
- GEN OFFICES
- LAW ENFORCEMENT
- RCTC FOUNDATION
- SHARED EDUCATIONAL
- STUDENT SUCCESS CENTER
- WELDING

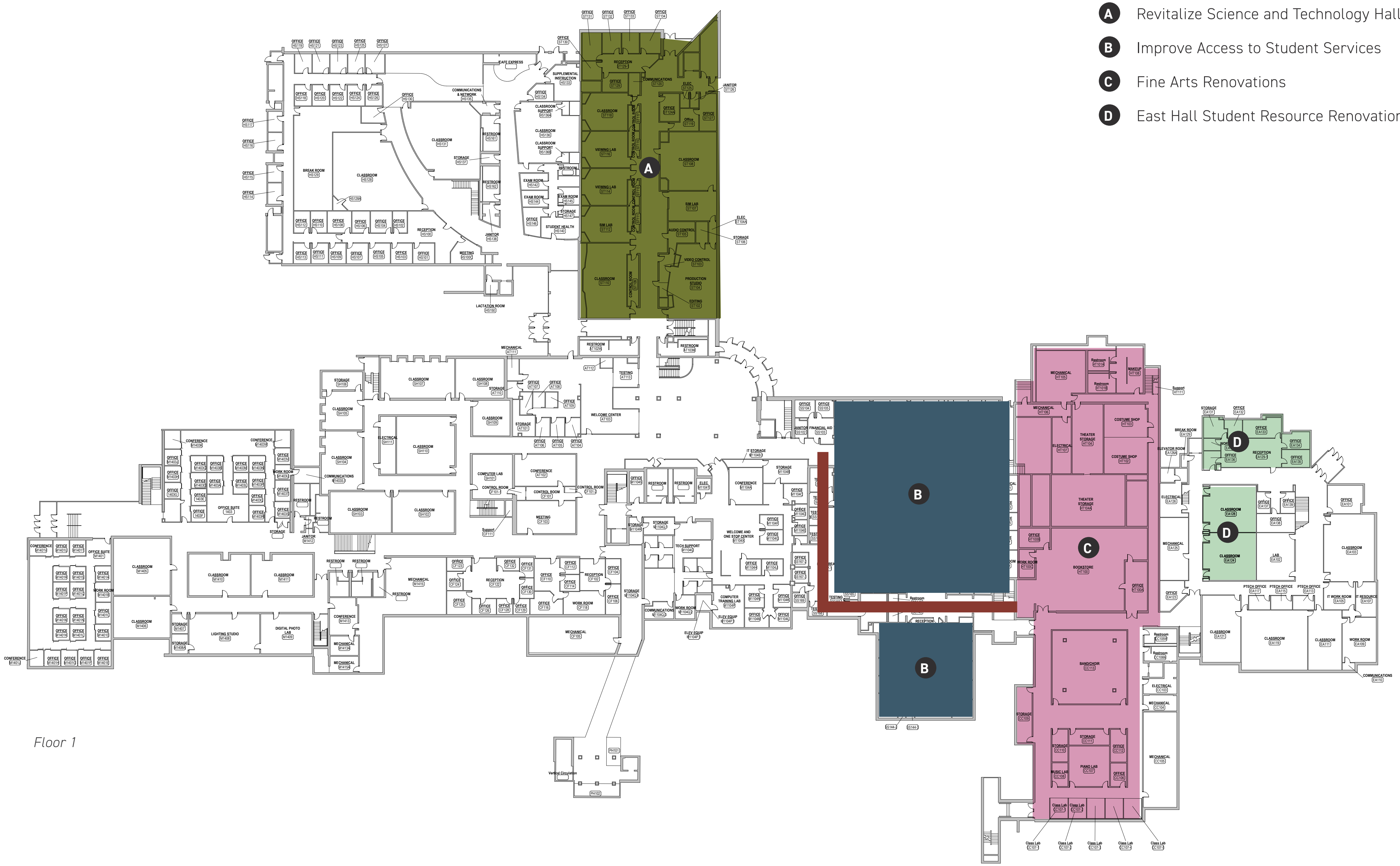
Conceptual floor plan from the 2021 predesign, first floor Heintz Center

2022: NO BONDING BILL

Heintz Center: Additional Projects

2022: NO BONDING BILL

Main Building: Mid- to Long-Term



KEY

- **A** Revitalize Science and Technology Hall
- **B** Improve Access to Student Services
- **C** Fine Arts Renovations
- **D** East Hall Student Resource Renovation

Main Building: Mid- to Long-Term

KEY

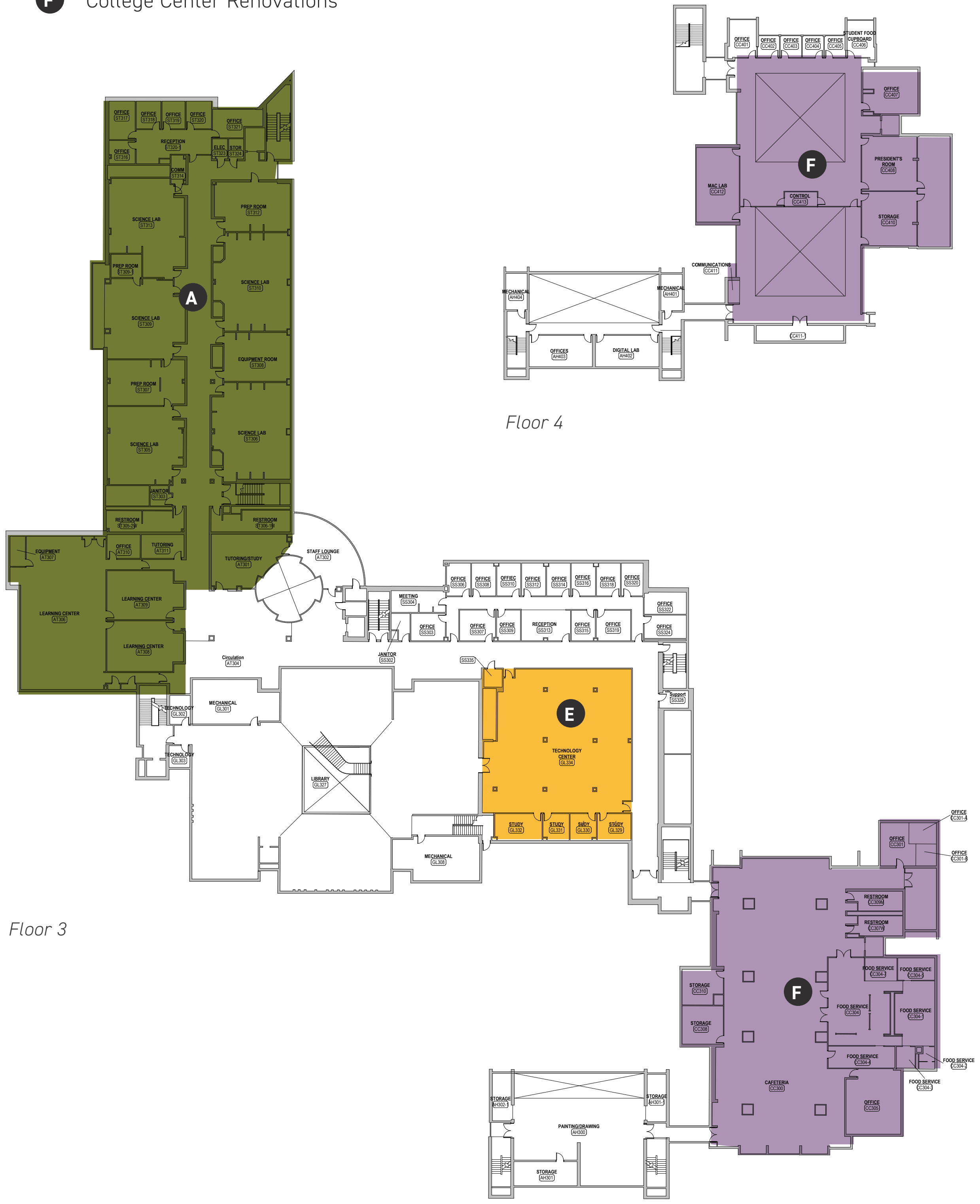
- **A** Renovate Science and Technology Hall
- **C** Fine Arts Renovations
- **D** East Hall Student Resource Renovation
- **E** Learning Commons

Floor 2

Main Building: Mid- to Long-Term

KEY

- A Renovate Science and Technology Hall
- E Learning Commons
- F College Center Renovations



Feedback from Minnesota State

- Proposed projects are generally modest in scale; easier to fund
- Good to see all strategies for increasing sustainability
- Good to see more outdoor amenities and improved safety across a large campus
- Is a new Master Academic Plan in the works?
- What does RCTC anticipate as its mix of in-person/online/hybrid classes, going forward?
  - Some campuses planning on as much as 60% online; a significant impact on facilities needs

2024 Predesign: Renovation to Support Equity in Industry and Public Safety

NOTE: Stakeholder Meetings Pending

Overall Conceptual Floor Plan

PROJECT DESCRIPTION

Conceptual Floor Plan Diagram

- Commons
- Facility and Service Technology (FAST)
- Faculty Offices
- Law Enforcement and Public Safety
- Welding Technology
- Toilets, Building Support
- Collaboration Space

2024 Predesign:
Renovation to Support Equity in Industry and Public Safety

Partial Enlarged Conceptual Floor Plan

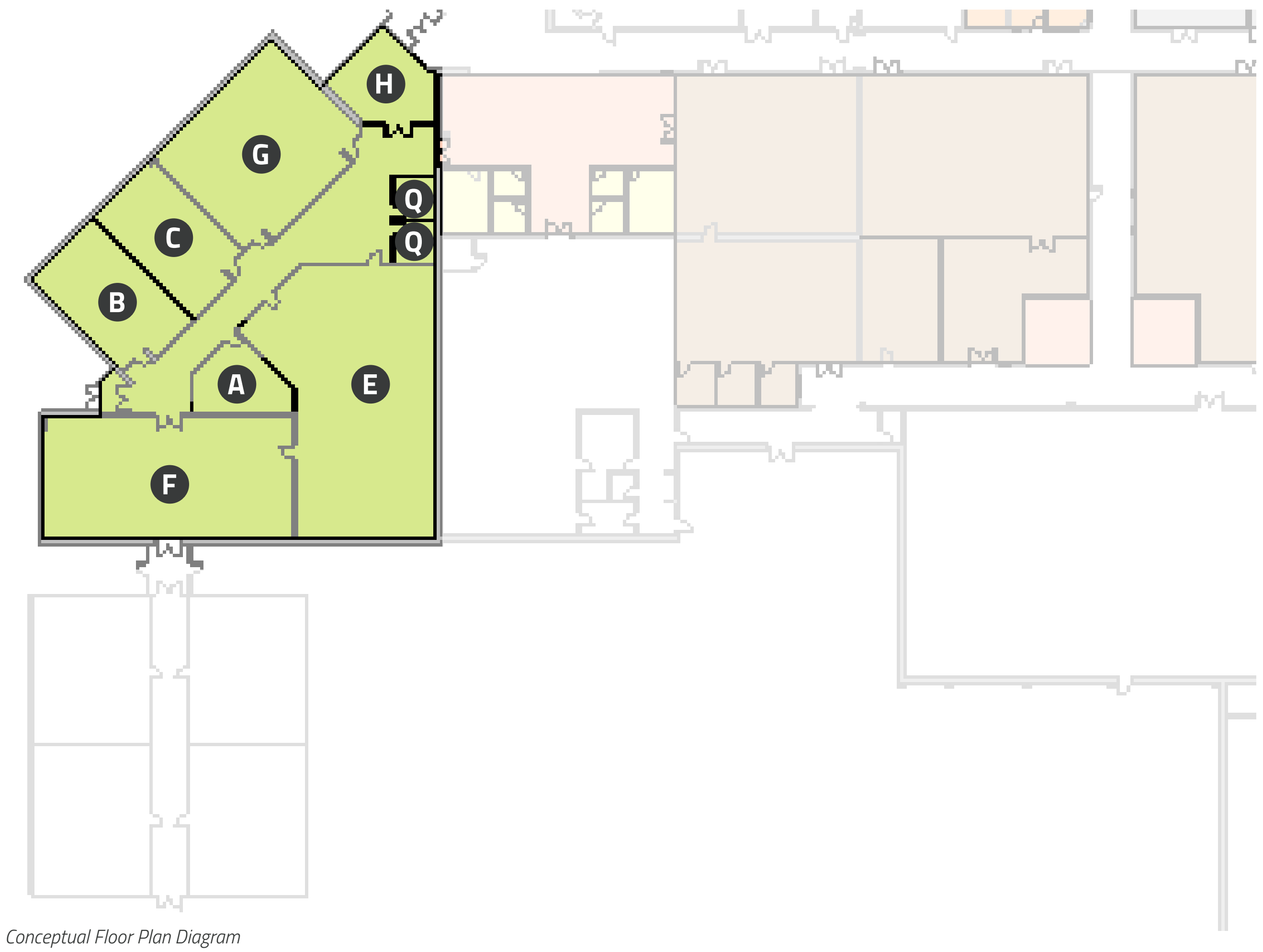
Conceptual Floor Plan Diagram

Key

- **A** Armory
- **B** Finger Printing Lab
- **C** Clean Lab
- **D** Open Area
- **E** Active Lab
- **F** SIM Room/ Driving Simulator
- **G** Classroom
- **H** Storage
- **I** Law Enforcement Faculty Office
- **J** Boiler Storage
- **K** Boiler Lab
- **L** B/P/P Lab
- **M** B/P/P Storage
- **N** Furnace Shop
- **O** Refrigeration Lab
- **P** Welding
- **Q** Office
- **R** Commons
- **S** Toilet Room
- **T** Collaboration Space
- **U** CAD Lab/ Support
- **V** Prototype Lab
- **W** Laser Cutter

2024 Predesign: Renovation to Support Equity in Industry and Public Safety

Partial Enlarged Conceptual Floor Plan



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- O Refrigeration Lab
- P Welding
- Q Office
- R Update Finishes in Commons
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- T Collaboration Space
- U CAD Lab/ Support
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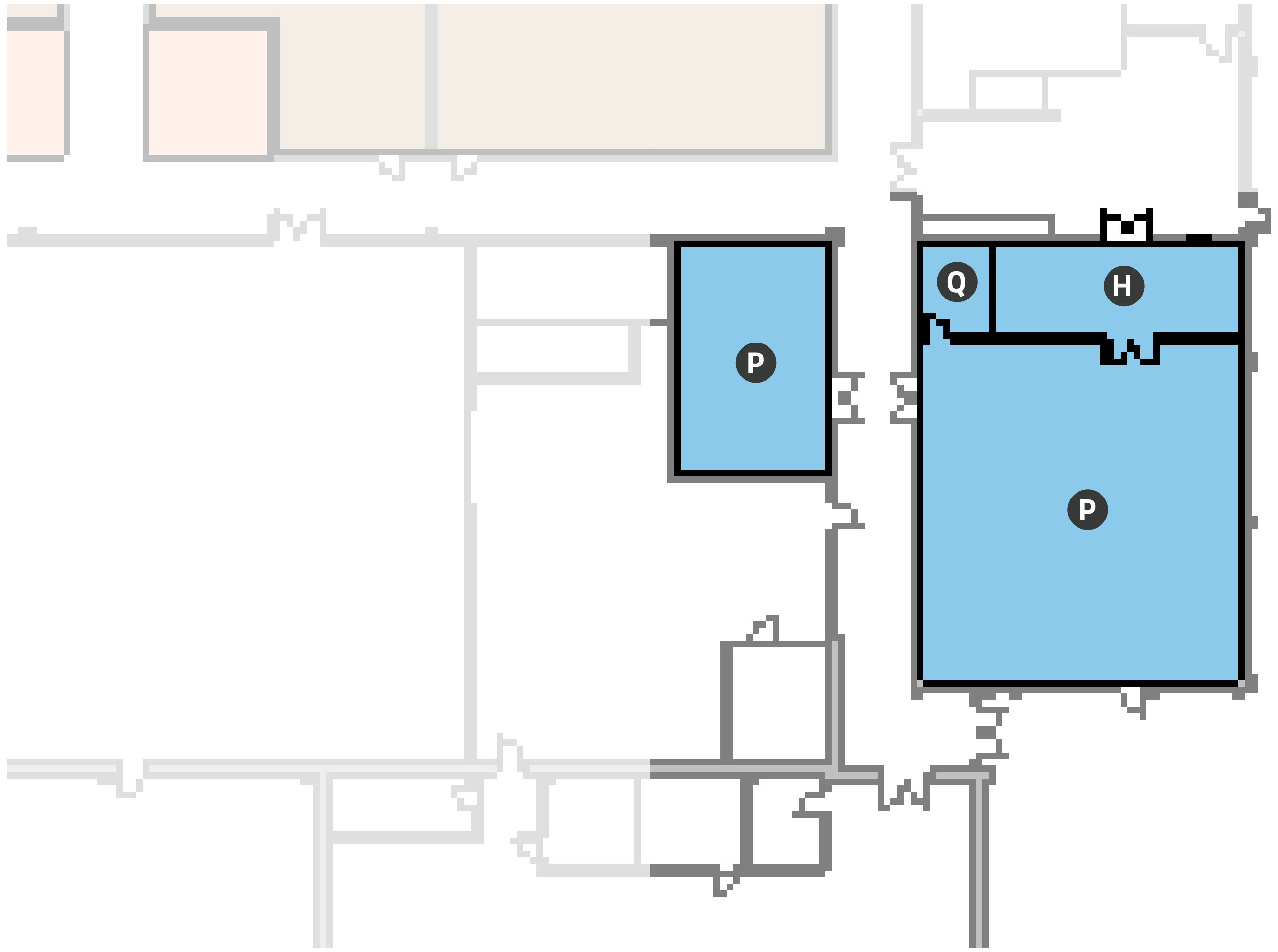
2024 Predesign:
Renovation to Support Equity in Industry and Public Safety



Conceptual Floor Plan Diagram

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Priority for Other Projects?

- Revitalize Science and Technology Hall
- Improve Access to Student Services
- Fine Arts Renovations
- East Hall Student Resource Renovation
- Learning Commons
- College Center Renovations

Schedule

September 2021

30 Information Request Distributed

October 2021

8 Kick-off Meeting with Minnesota State

22 Meeting with President

November 2021

5 Kick-off Meeting with CFP Committee

December 2021

3 Meeting with CFP Committee

10 Meeting with CFP Committee

16-17 Stakeholder Meetings

22 35% Completion for Review

January 2022

Stakeholder Meetings

Receive Comments

28 Meeting with CFP Committee

February 2022

18 Meeting with CFP Committee

March 2022

15 Meeting with CFP Committee

23 65% Completion for Campus Review

June 2022

2 65% Submittal to Minnesota State

Receive 65% Comments

August 2022

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23 Meeting with RCTC Leadership

October 2022

7 Meeting with CFP Committee

95% Submission

November 2022

Presentation to the System Office (tentative)*

December 2022

Submit 100% Document*

Thank You!

MEETING MINUTES

Comprehensive Facilities Plan
Rochester Community and Technical College

Friday, September 16, 2022, Virtual

To: Michele Pyfferoen and Shayn Jensson
From: Laura Heck
Re: Comprehensive Facilities Plan – Meeting 8

Present:

NAME	ORGANIZATION / ROLE	EMAIL
Steve Schmall	RCTC, VP of Finance and Facilities	Steve.Schmall@rctc.edu
Shayn Jensson	RCTC, Facilities Project Manager	Shayn.Jensson@rctc.edu
Michele Pyfferoen	RCTC, VP of Academic Affairs	Michelle.Pyfferoen@rctc.edu
Gina Korf	RCTC, Biology Faculty	Gina.Korf@rctc.edu
Brenda Frame	RCTC, Dean of Liberal Arts / Gen Ed Academic Affairs	Brenda.Frame@rctc.edu
Mary Dennison	RCTC, Librarian	Mary.Dennison@rctc.edu
Michael Sheggeby	RCTC, Director of Sports Facilities	Michael.Sheggeby@rctc.edu
Alicia Zeone	RCTC, Director of Admissions	Alicia.Zeone@rctc.edu
Sara Phillips	LHB, Architect	Sara.Phillips@lhbcorp.com
Laura Heck	LHB, Project Coordinator	Laura.Heck@lhbcorp.com

Meeting Summary

1. Strategies for Building Development will be modified based on feedback at the last meeting to include:
    a. Responding to lessons from the pandemic. Allow time to evaluate benefits of in person vs. virtual instruction and alter the physical environment in response. Determine long-term needs for hybrid learning environments.
    b. Expand on simulated learning environments across multiple programs, including healthcare and other CTE programs.
2. The proposed Campus Funded projects were reviewed.
    a. College Center Renovations (Main Campus). Could be a revenue funded project. Note in CFP as either.
    b. Dental Instruction Lab Expansion (Heintz Center): Could be wrapped into a GO Bond project. Based on enrollment and waiting list, what makes sense?
        i. Leverage current equipment, campus dollars and donor funded.
3. HEAPR projects were reviewed.
    a. Current proposed HEAPR projects that have not yet received funding are currently listed.
    b. Skylight Replacement: originally in the 2020 predesign scope. Moved to potential HEAPR request.
    c. 37 other projects are on a larger HEAPR list that the campus is tracking. Shayn to send this list to LHB to include in the Appendix.
4. Capital Bonding Projects: Need to be ranked for the 95% submission.
    a. **Project 1: Heintz Center: Predesign is underway.**
        i. In relation to the current predesign, the automotive space recently received equipment updates for the electric vehicle bay. Include automotive area in predesign for remaining needs. The campus will forward data to support.

b. **Proposed Project 2: Revitalize Science and Technology Hall**
    i. Update equipment and technology, provide collaborative learning focused on hands-on instruction, and include a simulation space for Health & Healthcare support.
    ii. Language will be added to clarify that the need for a simulation space should be evaluated in the predesign stage based on the community effort for a shared facility
c. **Proposed 3: Improve access to Student Services**
    i. Reconfigure first floor of Student Services, address underutilized space, improve organization of services and address wayfinding.
d. **Proposed 4: Fine Arts Renovation**
    i. Highlight creative fields and connections to science, technology, engineering and math.
    ii. Would address both levels of Fine Arts.
    iii. It was noted that funding for Arts is challenging in today's political climate.
e. **Proposed 5: Simulation Center**
    i. Simulation center that crosses multiple academic pathways; workforce, welding, automotive, dental assisting, early childhood education, etc.
    ii. Proposed location in the Heintz Center.
    iii. Feedback:
        1) Accessibility: proposed location offers accessibility for students and workforce
        2) Need to be mindful of the current proposal for a regional simulation center for health professions. Current proposal seems to be more industry driven.
        3) Location: May be better located on main campus with a healthcare focus. It was clarified that this would project would focus on programs other than healthcare.
        4) Simulation could be an opportunity to start new programs while identifying future space needs.
        5) Simulation Rooms: 3,000 SF. A predesign would determine open space vs. multiple spaces. Online vs. in person will be determined based on needs and current technology at the time of the project.
        6) What is the extent and scope of use of simulations in the technical programs?

5. Priority Feedback
    a. Timing: Priority 1: 2022 Predesign; 2024 Funding; Facility opens in 2026. GO Bond projects tend to be spaced over 6 years at a minimum.
    b. Concern over Priority 2 Science & Tech Hall not being soon enough to address immediate and future needs. Maintenance and campus funded updates are possible. HEAPR projects are also possible.
        i. One classroom retrofit (campus dollars) can be accomplished in roughly 1 year. A project such as overall hood replacements takes more time.
        ii. It was questioned if there is another strategy for incremental updates. It was noted that the campus could fund improvements in select classrooms / labs.
        iii. Room enlargements are needed for updated lab tables. Scope of the project is more than a whole room, and less than a whole floor.
    c. Heintz Center as Priority 1 is based on a commitment to being a community and technical college.
    d. Attendees did not request any changes to the order of the projects as presented.

6. Next Steps
   a. LHB is meeting with RCTC leadership on Friday, September 23.
   b. One more committee meeting in October to report back on any concerns or changes from leadership. Any concerns from the committee can be addressed at that time as well.
   c. Presentation to the System office tentative for November. Katrina is working on coordinating this. It may occur on campus.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Attachments: Committee Meeting 8 Presentation

c: LHB Project No. 210539

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Comprehensive Facilities Plan

Committee Meeting 8
September 16, 2022

Rochester Community and Technical College

LHB

Agenda

– Revisions from Last Meeting

– Information Needed

– Next Steps

Strategies for Building Development

- Support Academic Pathways
- Promote Connections Outside the Classroom
- Improve Space Utilization
- Expand Access to Academic Support and Student Services
- Continue to Address Wayfinding Challenges
- Provide Areas to Foster Relationships with Academic Partners
  - Support relationships with RPS, Workforce Center, ABE, etc
  - Result: Exposure to higher education and support future enrollment in RCTC programs
- Respond to Lessons from the Pandemic
  - Evaluate benefits to students for virtual versus in-person classes, responding appropriately with facility improvements
  - Determine long-term need for additional support spaces (mental health services) and hybrid learning environments

Proposed Campus Funded Projects

Smaller projects that may not align with funding priorities of the Legislature or that can't wait for the GO Bonding process

- Learning Commons (Main Campus)
- College Center Renovations (Main Campus)
- Student Services Flex Space (Heintz Center)
- Student Collaboration Area (Heintz Center)
- East Hall Student Resource Renovation (Main Campus)
- Interior Wayfinding and Signage Improvements (Main Campus)

- Dental Instruction Lab Expansion (Heintz Center)

Proposed HEAPR Projects

Asset Preservation projects such as reroofing, HVAC improvements, code upgrades, fire protection, etc. A predesign is required to better define the project scope

- Coffman Hall Roof Replacement (Main Campus)
- HVAC Improvements, Phase III (Heintz Center)
- Chiller Plant Upgrades and Extension (Main Campus)
- Skylight Replacement (Heintz Center)

Proposed Capital Bonding Projects

Larger renovations, additions, or new construction focused on academic or student support spaces. Projects need to be ranked in the 95% submission

Heintz Center: Priority 1 (predesign underway)

Key

- Commons
- Facility and Service Technology (FAST)
- Faculty Offices
- Law Enforcement and Public Safety
- Welding Technology
- Toilets, Building Support
- Collaboration Space

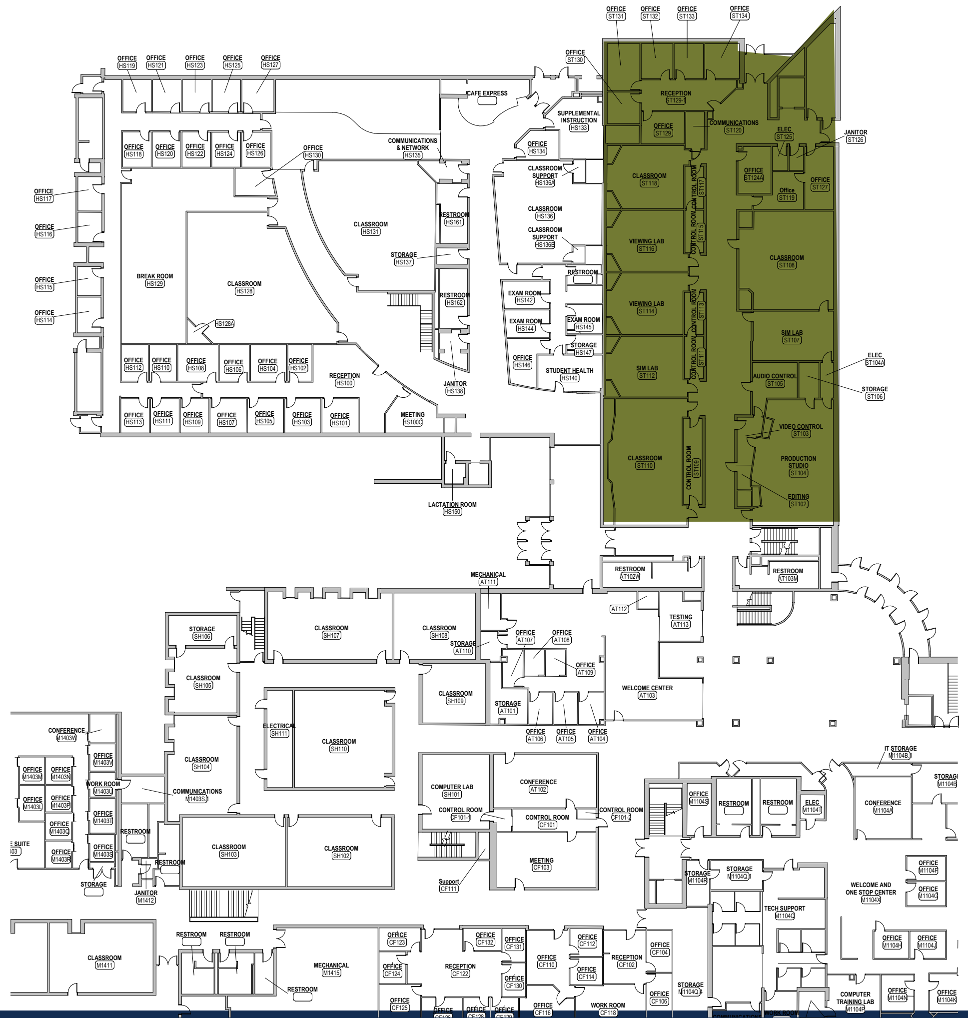
Revitalize Science and Technology Hall: Priority 2

Renovate the existing building to address:

– Updated equipment and technology for STEM programs

– Provide collaborative learning focused on hands-on instruction

– Simulation space for Health and Healthcare Support Services



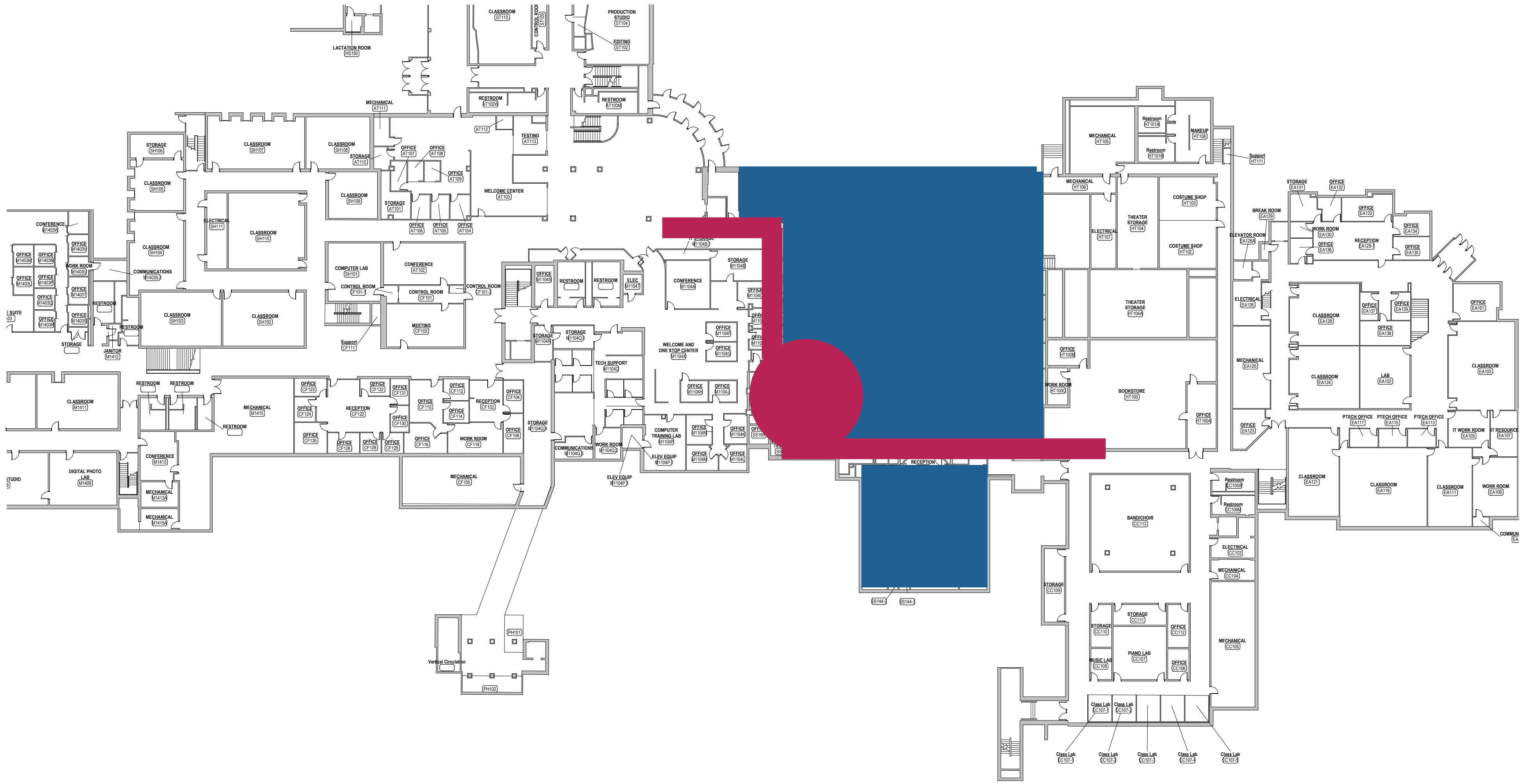
Improve Access to Student Services: Priority 3

Reconfigure the first floor of Student Services

– Address underutilized space

– Improve organization of services (staff efficiencies, easy of use by students)

– Address wayfinding issues

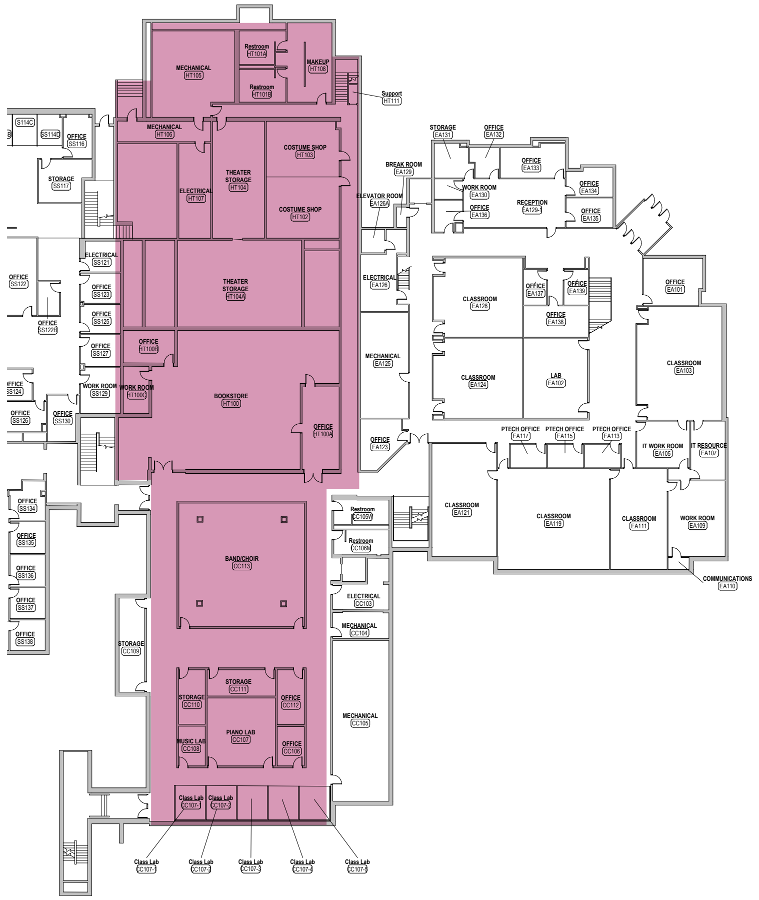


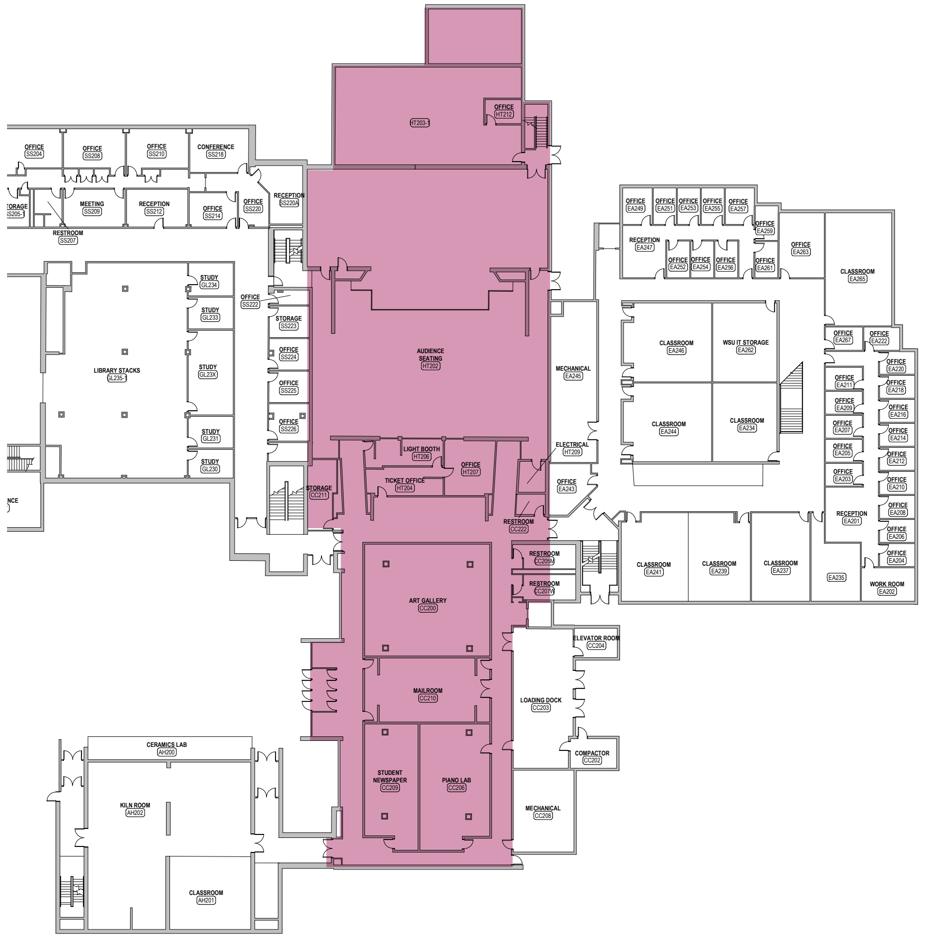
Fine Arts Renovation: Priority 4

Modernize Fine Arts Spaces to Support STEAM instruction

– Highlight creative fields and connections to science, technology, engineering and math fields

– Renovate the theater to support use for performances, instruction, and special events





Simulation Center: Priority 5

Floor 2

Floor 1

Create a Center for Simulation that crosses multiple Academic Pathways

– Effective use of State resources by sharing the facility

– Could allow for program expansion (first step)

– Place in underutilized space

Priority Feedback?

Information Needed

- Summary of timing of next Academic Master Plan
- Academic Information
  - Curriculum and instructional goals
  - Proposed academic program development and closures
  - Online learning enrollment/potential growth
  - Individual department plans
- Financial
  - Financial sustainability initiatives and efforts
  - Capital Campaign initiatives

Schedule

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95% Submission

November 2022
Presentation to the System Office (tentative)*

December 2022
Submit 100% Document*

Thank You!

MEETING MINUTES

Comprehensive Facilities Plan
Rochester Community and Technical College

Friday, October 7, 2022, Virtual

To: Michele Pyfferoen and Shayn Jensson
From: Laura Heck
Re: Comprehensive Facilities Plan – Meeting 9
Present:

NAME	ORGANIZATION / ROLE	EMAIL
Shayn Jensson	RCTC, Facilities Project Manager	Shayn.Jensson@rctc.edu
Michele Pyfferoen	RCTC, VP of Academic Affairs	Michelle.Pyfferoen@rctc.edu
Brenda Frame	RCTC, Dean of Liberal Arts / Gen Ed Academic Affairs	Brenda.Frame@rctc.edu
Alicia Zeone	RCTC, Director of Admissions	Alicia.Zeone@rctc.edu
Sara Phillips	LHB, Architect	Sara.Phillips@lhbcorp.com
Laura Heck	LHB, Project Coordinator	Laura.Heck@lhbcorp.com

Meeting Summary

1. The group discussed project priorities and information related to the current predesign.
2. It was noted that S. Schmall will be unavailable for an unknown length of time. S. Jensson and K. Maass should remain copied on all emails.
3. Leadership Meeting Recap:
   a. Reflect additional campus funded projects:
      i. ST305, ST309 and support areas
      ii. Former Student Services area
      iii. Additional Testing Rooms (disability services)
   b. Expand partnership areas (i.e. PTech)
4. Heintz Center:
   a. Short Term:
      i. Current predesign reinforced as Priority 1.
         1) Some shifting occurred and automotive was added.
      ii. Other college funded and HEAPR projects lists.
      iii. Need to add testing spaces (college funded)
   b. Long Term:
      i. Heintz Center: CTE Simulation Center could be changed to “STEM”.

5. Main
   a. Short Term
      i. College funded Student Services renovation takes care of current need.
      ii. Need to add testing spaces (college funded)
   b. Mid Term Projects:
      i. East Hall Renovation: Could expand PTech or programs that support improved enrollment. College or Other funding. Could become a larger project in the future.
   c. Long Term Projects:
      i. Main Campus: Fine Arts Renovation focusing on the lower level.
6. Next Steps:
   a. Information Needed: Financial info could wait until the 100% document if needed.
   b. 95% Submission: Target for October
   c. Presentation to the System Office: Target for November.
   d. Goal is to submit the 100% document by the end of the year.

This constitutes my understanding of items discussed and decisions reached. If there are any omissions or discrepancies, please notify the author in writing.

Attachments: Committee Meeting 9 Presentation

c: LHB Project No. 210539

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Comprehensive Facilities Plan

Committee Meeting 9
October 7, 2022

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

LHB

Agenda

- Leadership Recap
- Short Term Projects
- Mid Term Projects
- Long Term Projects
- Next Steps

Recap of Leadership Feedback

- Reflect additional Campus Funded projects
  - ST 305, ST 309, and support areas
  - Former Student Services Area
  - Additional Testing Rooms (Disability Services)
- Vagueness of future projects is helpful
- Expand partnership areas (PTech, for example)

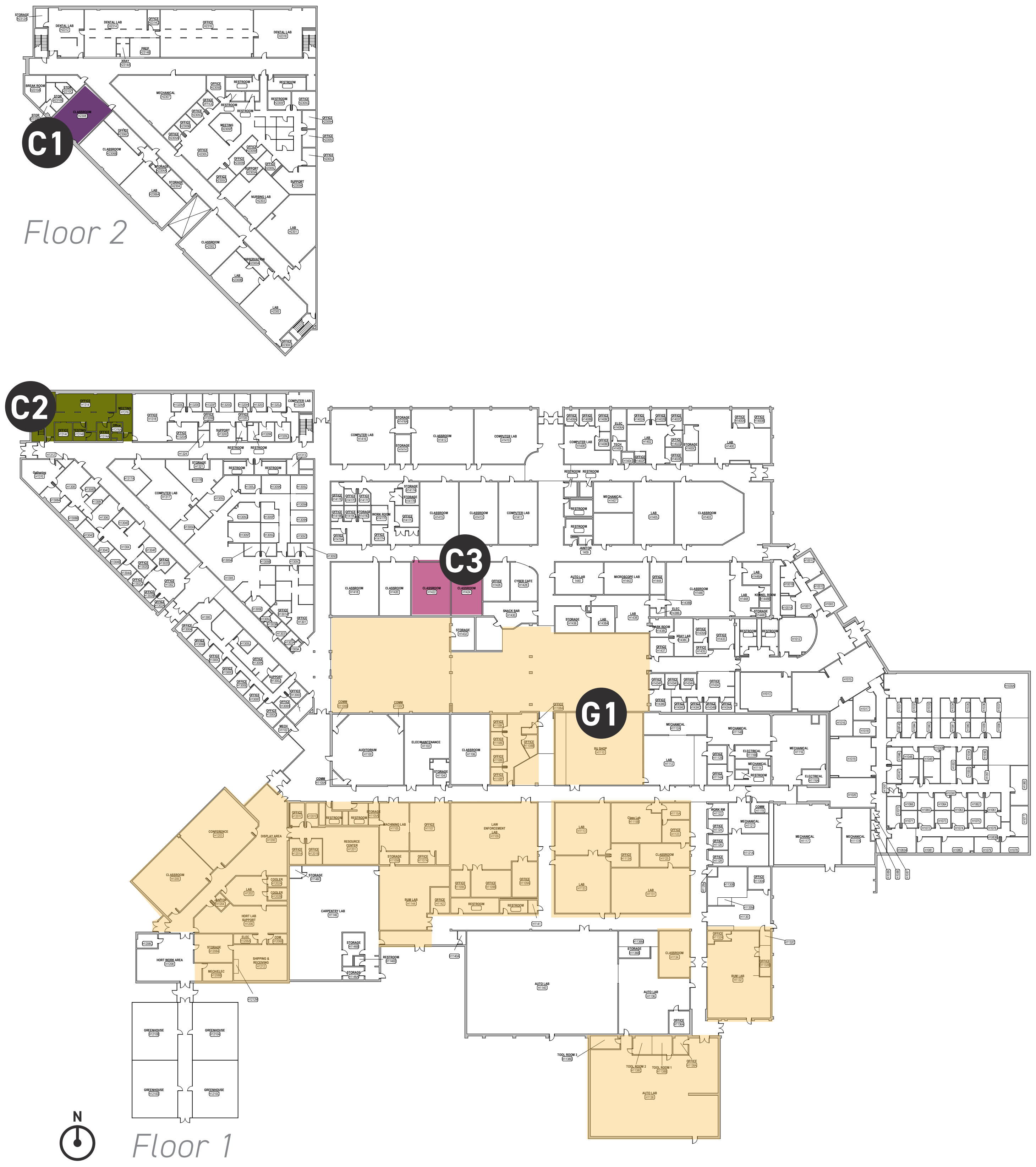
Heintz Center Short Term Projects

G1 Renovation to Support Equity in Industry and Public Safety (Capital) - Predesign Underway

C1 Student Collaboration Area (College)
C2 Dental Instructional Lab Expansion (College)
C3 Student Services Flex Space (College)

Not pictured

H3 HVAC Improvements Phase III (HEAPR)
H4 Skylight Replacement (HEAPR)



Priority 1: Renovation to Support Equity in Industry and Public Safety

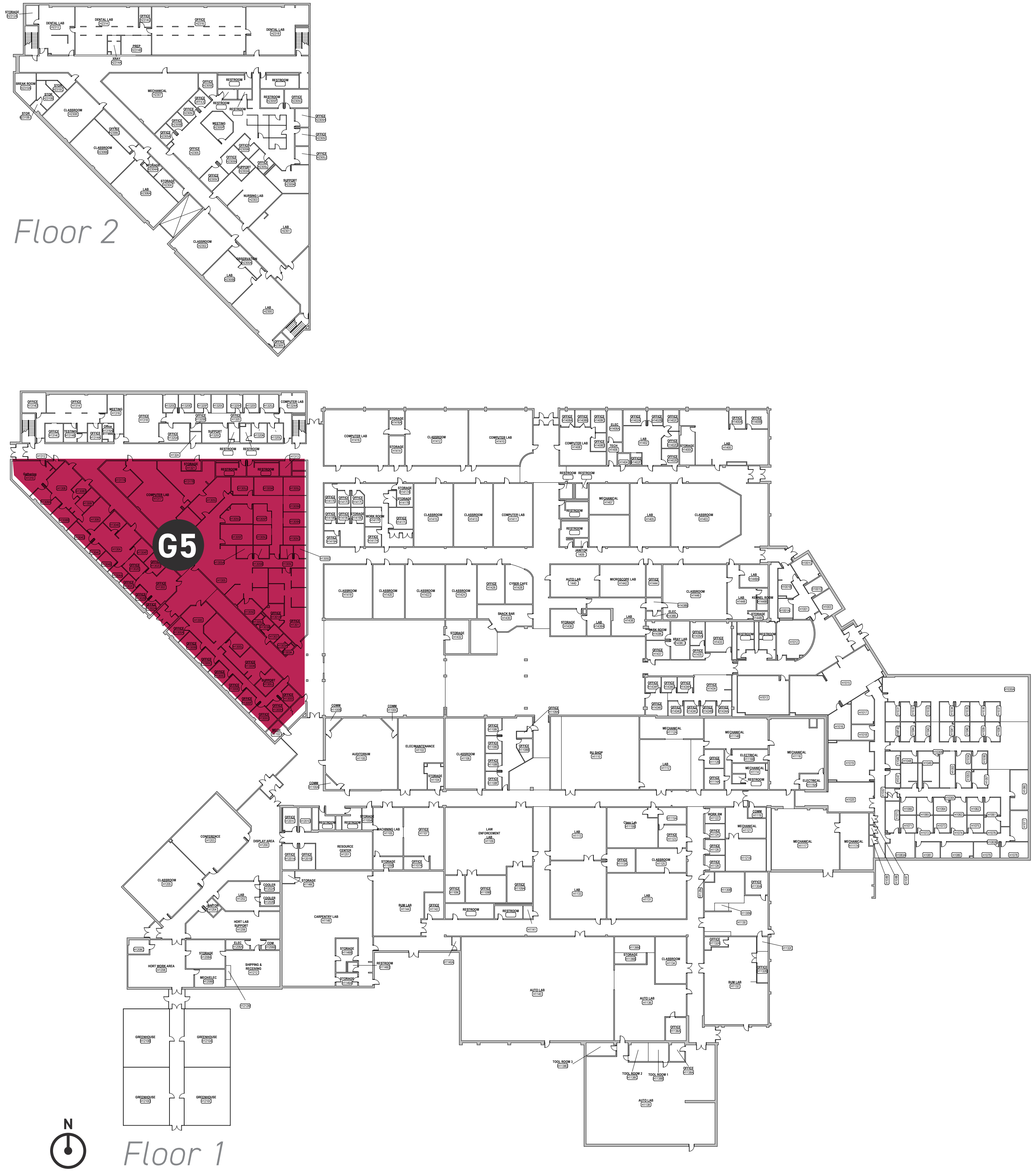
Heintz Center Predesign for 2024

Key

- Commons
- Facility and Service Technology (FAST)
- Faculty Offices
- Law Enforcement and Public Safety
- Welding Technology
- Automotive
- Toilets, Building Support
- Collaboration Space

Heintz Center Long Term Projects

G5 CTE Simulation Center (Potential location)



Main Campus Short Term Projects

C4 Renovate Former Student Services

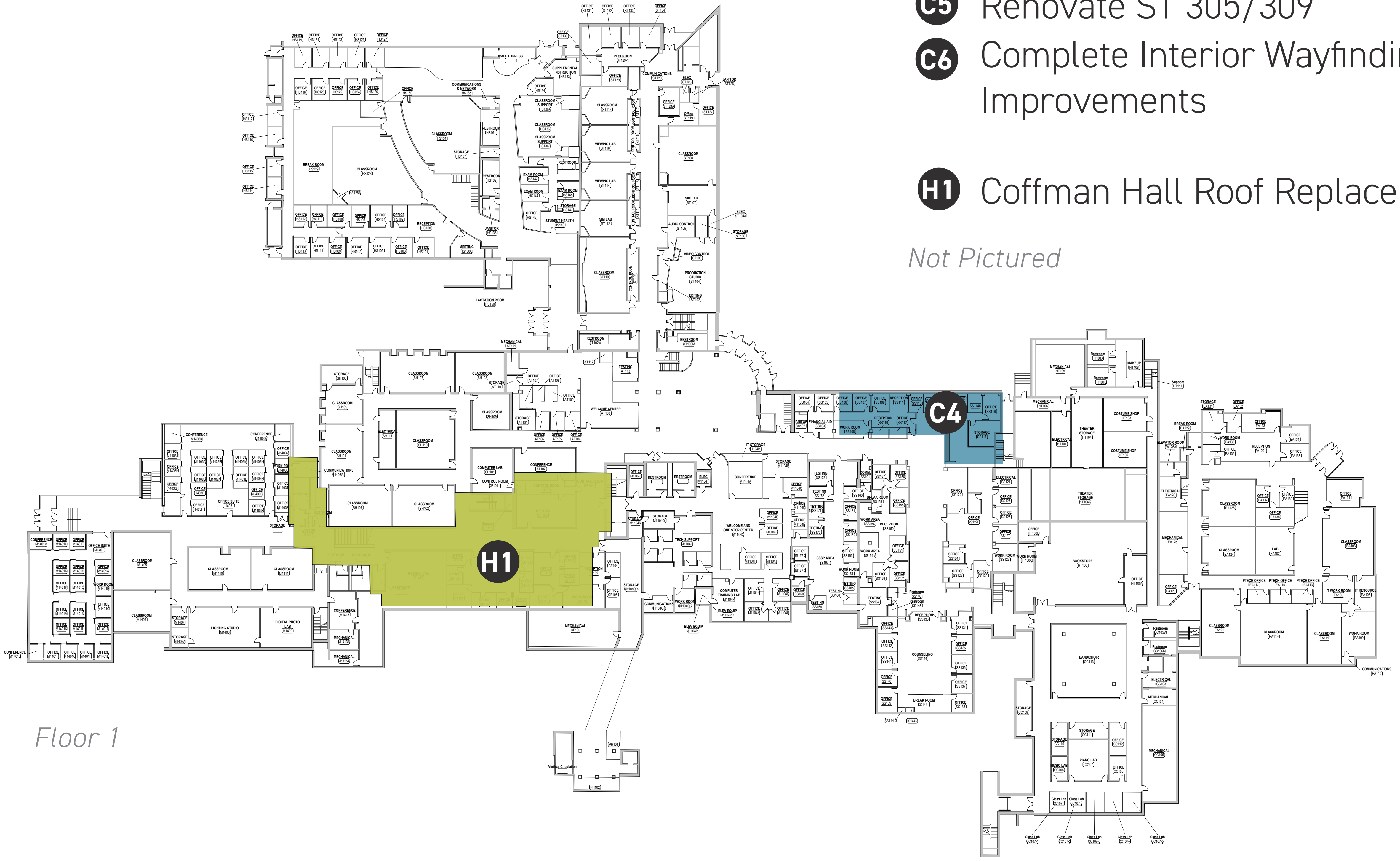
Not Pictured

C5 Renovate ST 305/309

C6 Complete Interior Wayfinding and Signage Improvements

H1 Coffman Hall Roof Replacement (HEAPR)

Not Pictured



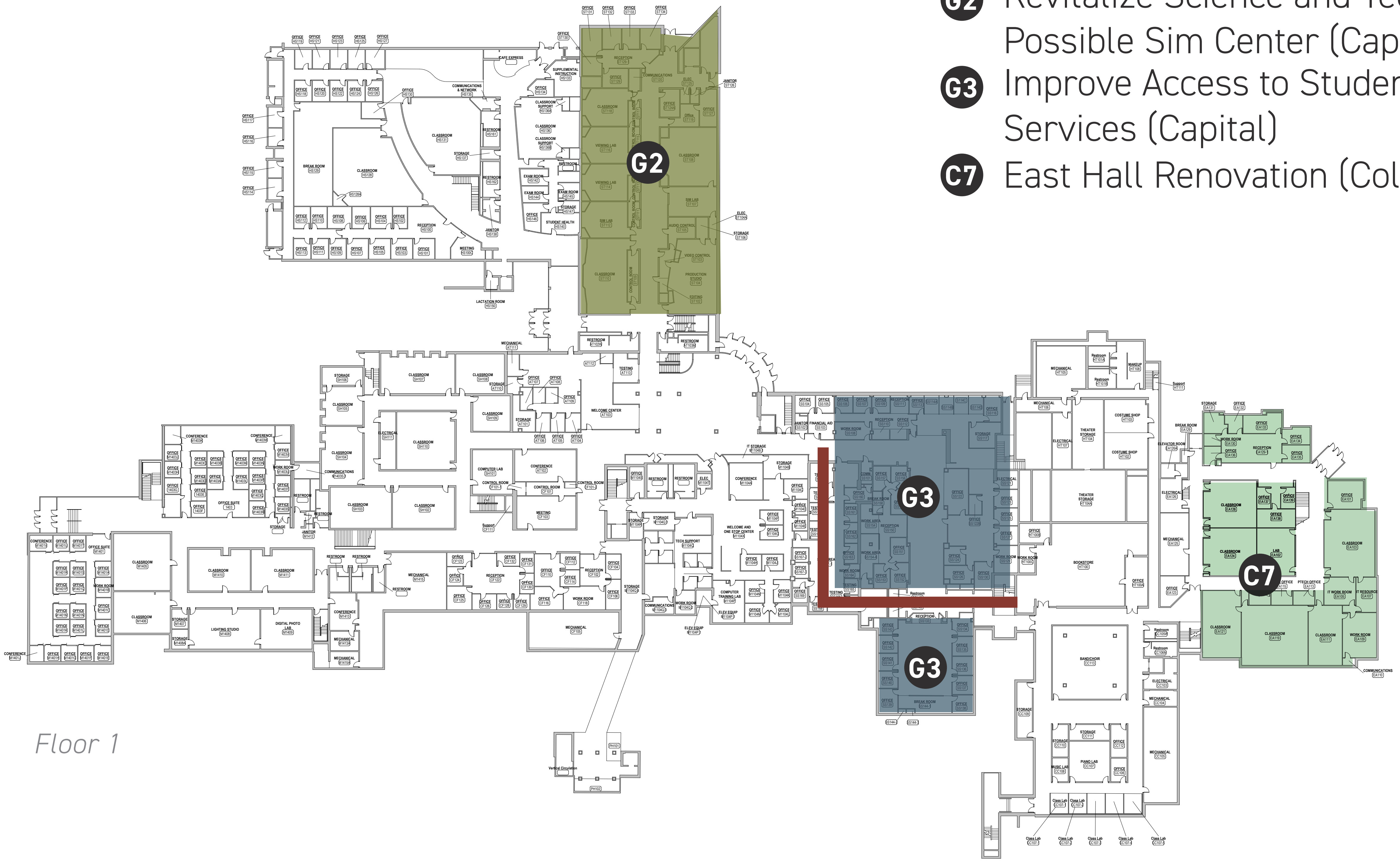
Floor 1

Main Campus Mid Term Projects

G2 Revitalize Science and Technology Hall / Possible Sim Center (Capital)

G3 Improve Access to Student Services (Capital)

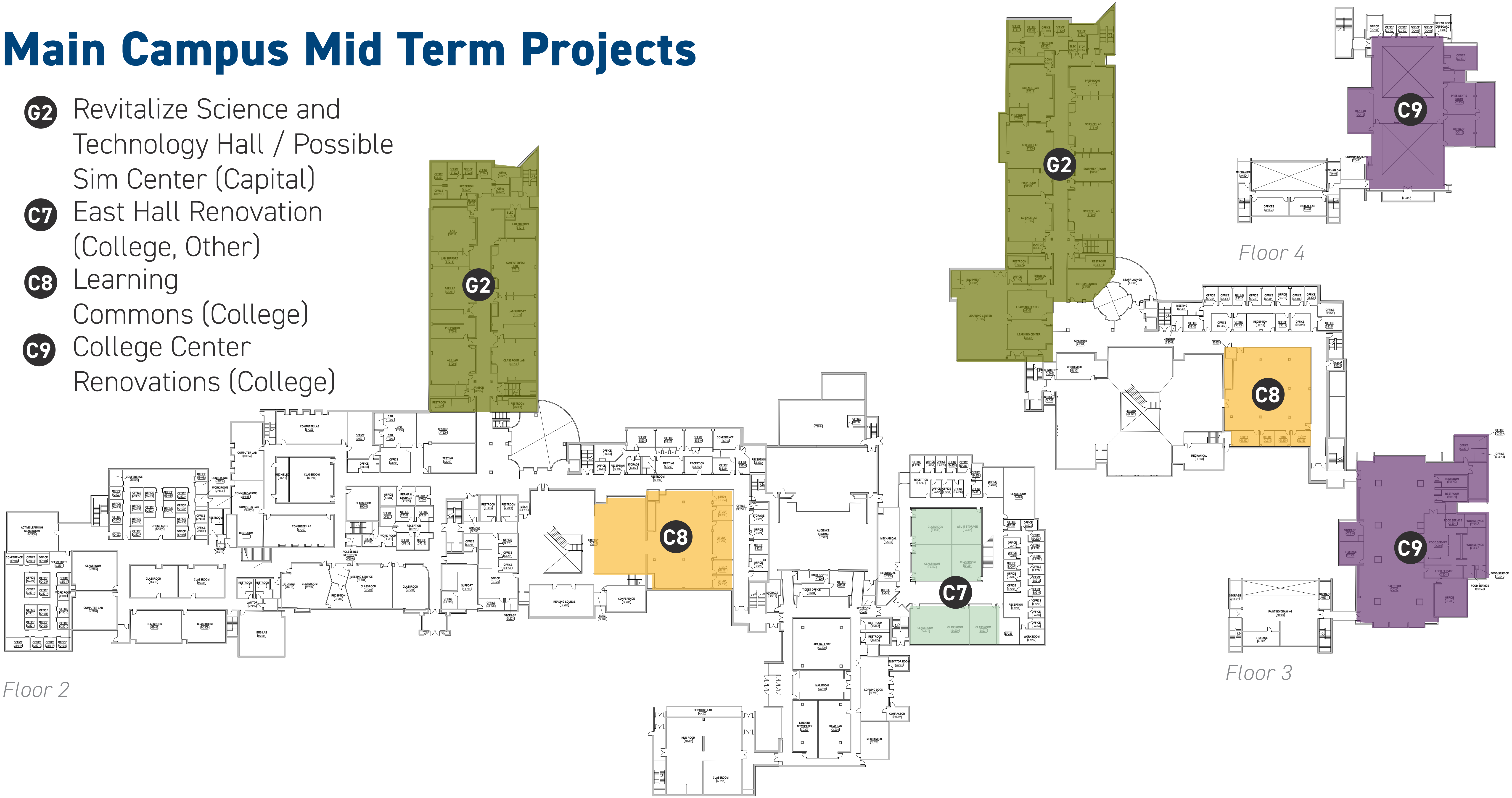
C7 East Hall Renovation (College, Other)



Floor 1

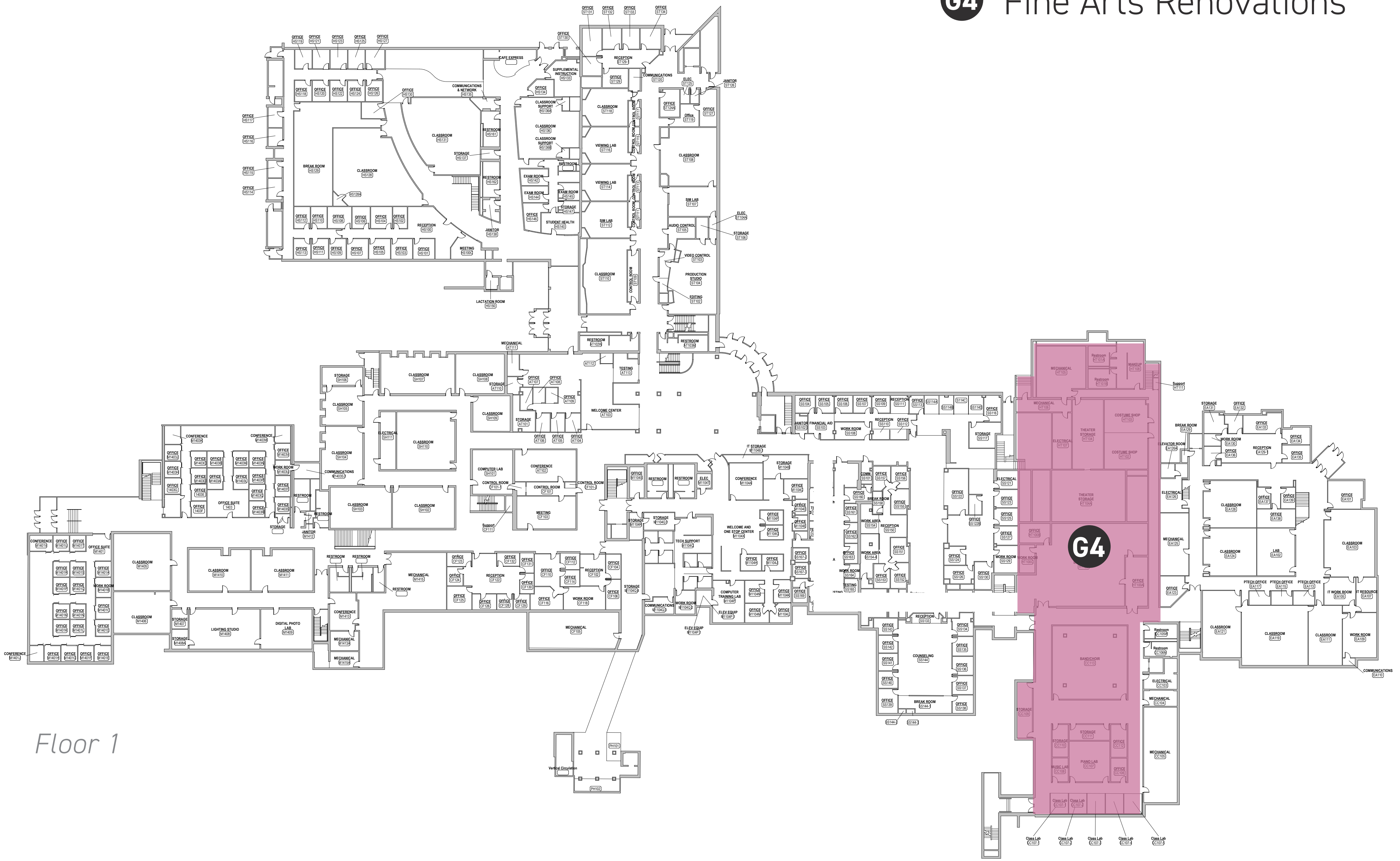
Main Campus Mid Term Projects

- **G2** Revitalize Science and Technology Hall / Possible Sim Center (Capital)
- **C7** East Hall Renovation (College, Other)
- **C8** Learning Commons (College)
- **C9** College Center Renovations (College)



Main Campus Long Term Projects

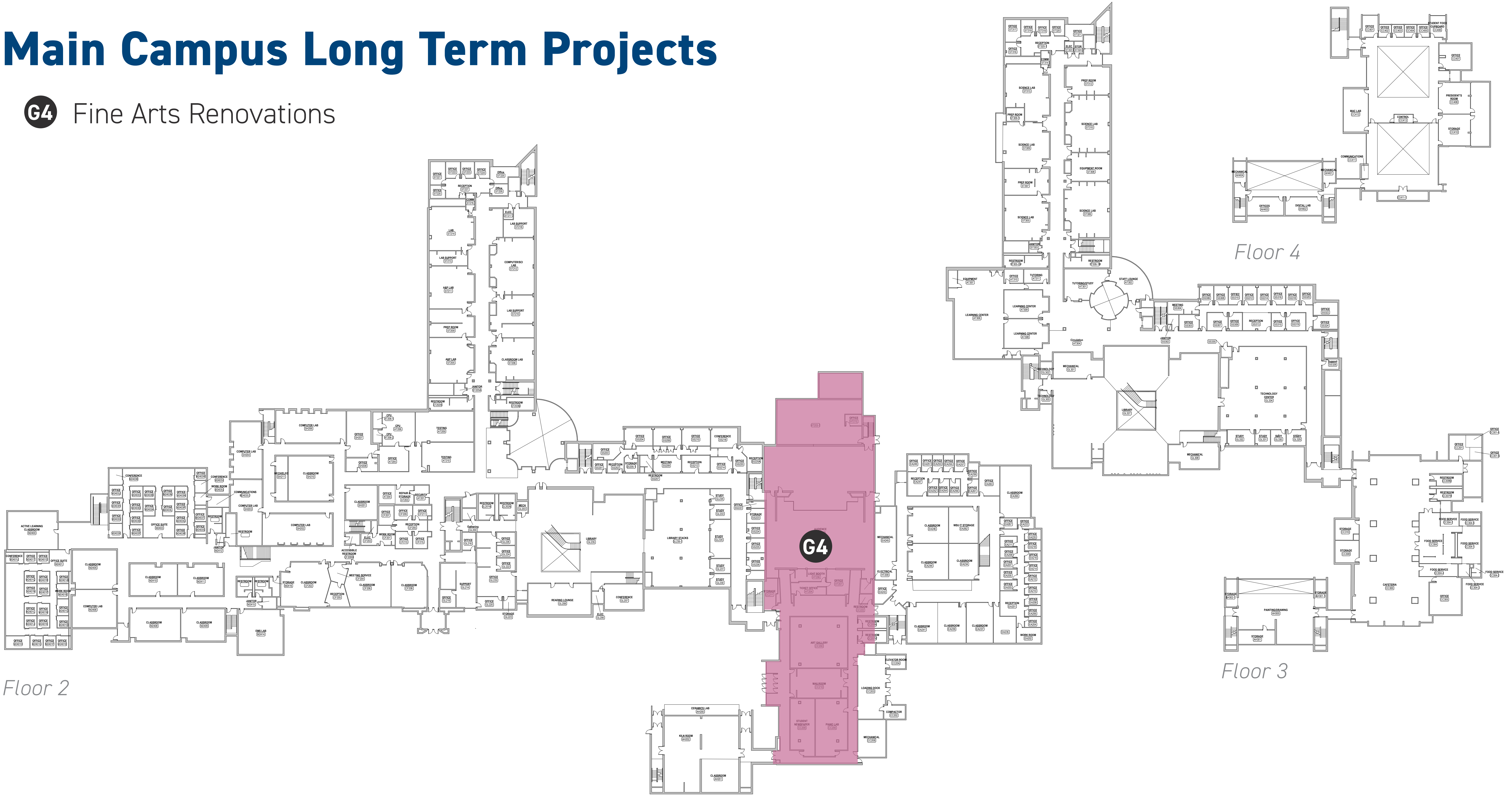
G4 Fine Arts Renovations



Floor 1

Main Campus Long Term Projects

G4 Fine Arts Renovations



Information Needed

- Financial
  - Financial sustainability initiatives and efforts
  - Capital Campaign initiatives

Schedule

September 2021
30 Information Request Distributed

October 2021
8 Kick-off Meeting with Minnesota State
22 Meeting with President

November 2021
5 Kick-off Meeting with CFP Committee

December 2021
3 Meeting with CFP Committee
10 Meeting with CFP Committee
16-17 Stakeholder Meetings
22 35% Completion for Review

January 2022
Stakeholder Meetings
Receive Comments
28 Meeting with CFP Committee

February 2022
18 Meeting with CFP Committee

March 2022
15 Meeting with CFP Committee
23 65% Completion for Campus Review

June 2022
2 65% Submittal to Minnesota State
Receive 65% Comments

August 2022
26 Meeting with CFP Committee

September 2022
16 Meeting with CFP Committee
23 Meeting with RCTC Leadership

October 2022
7 Meeting with CFP Committee
95% Submission

November 2022
Presentation to the System Office (tentative)*

December 2022
Submit 100% Document*

Thank You!

Proposed Campus Funded Projects

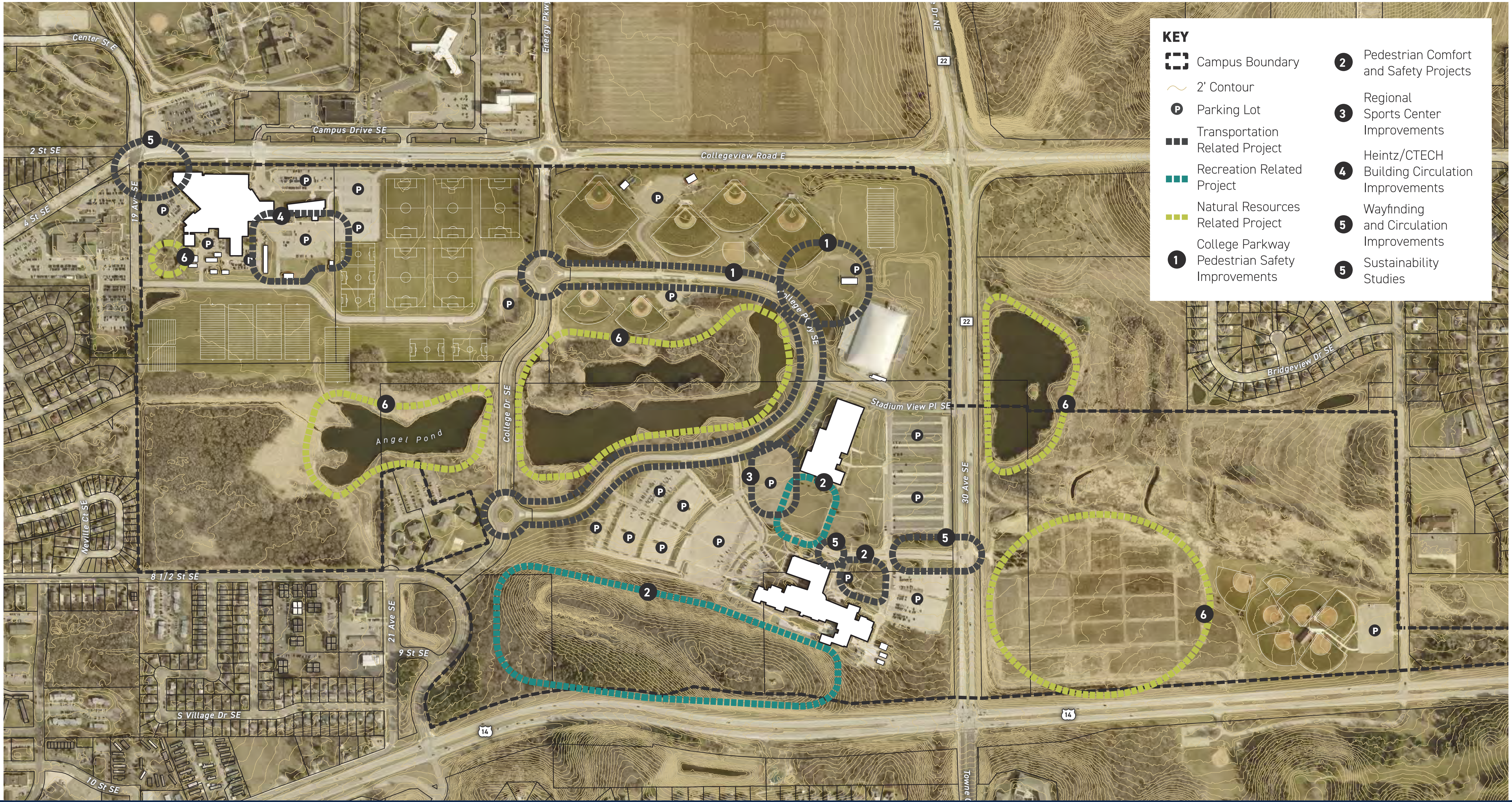
Smaller projects that may not align with funding priorities of the Legislature or that can't wait for the GO Bonding process

- Learning Commons (Main Campus)
- College Center Renovations (Main Campus)
- Student Services Flex Space (Heintz Center)
- Student Collaboration Area (Heintz Center)
- East Hall Student Resource Renovation (Main Campus)
- Interior Wayfinding and Signage Improvements (Main Campus)
- Dental Instruction Lab Expansion (Heintz Center)

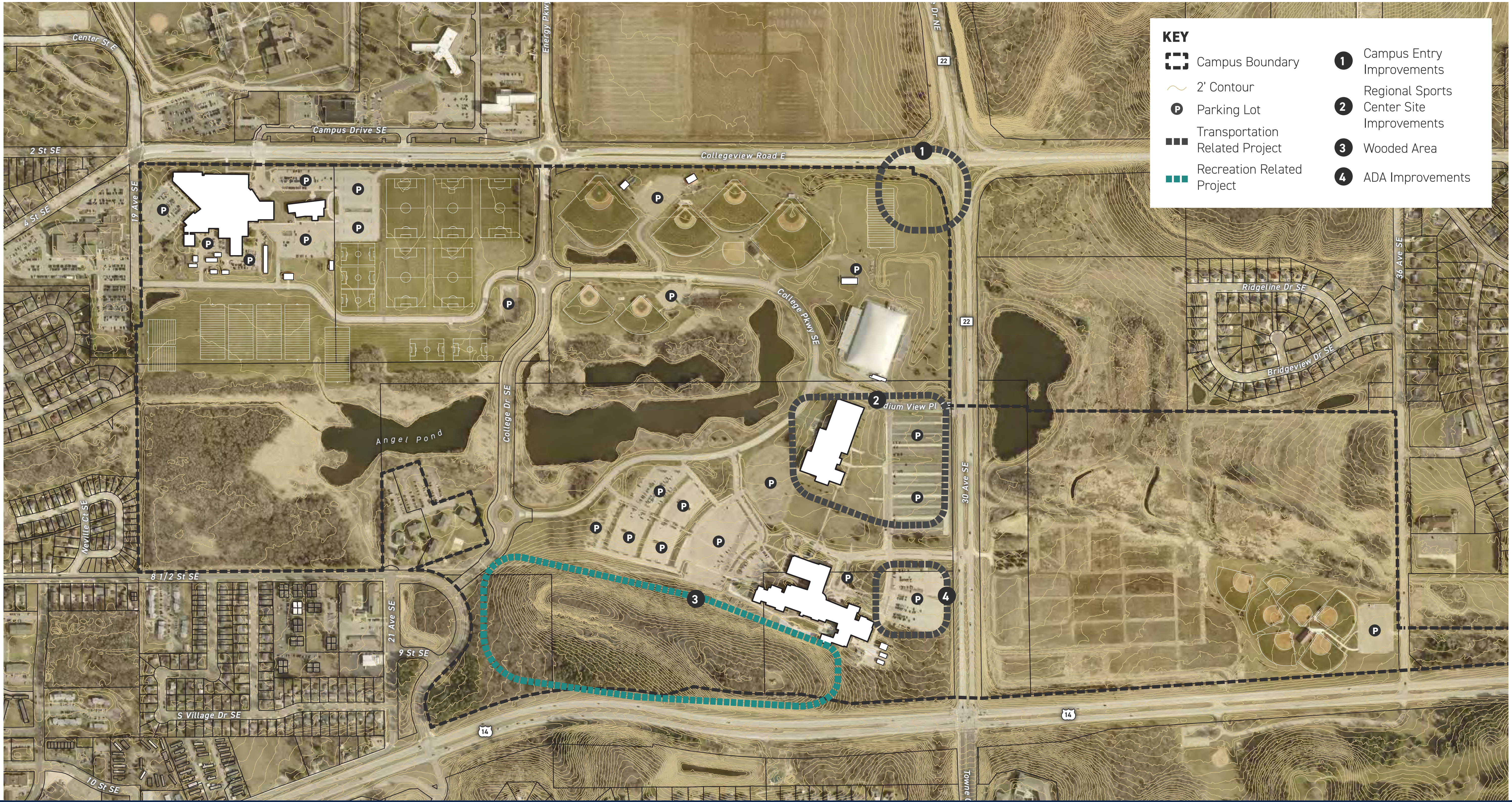
Strategies for Building Development

- Support Academic Pathways
- Promote Connections Outside the Classroom
- Improve Space Utilization
- Expand Access to Academic Support and Student Services
- Continue to Address Wayfinding Challenges
- Provide Areas to Foster Relationships with Academic Partners
- Respond to Lessons from the Pandemic

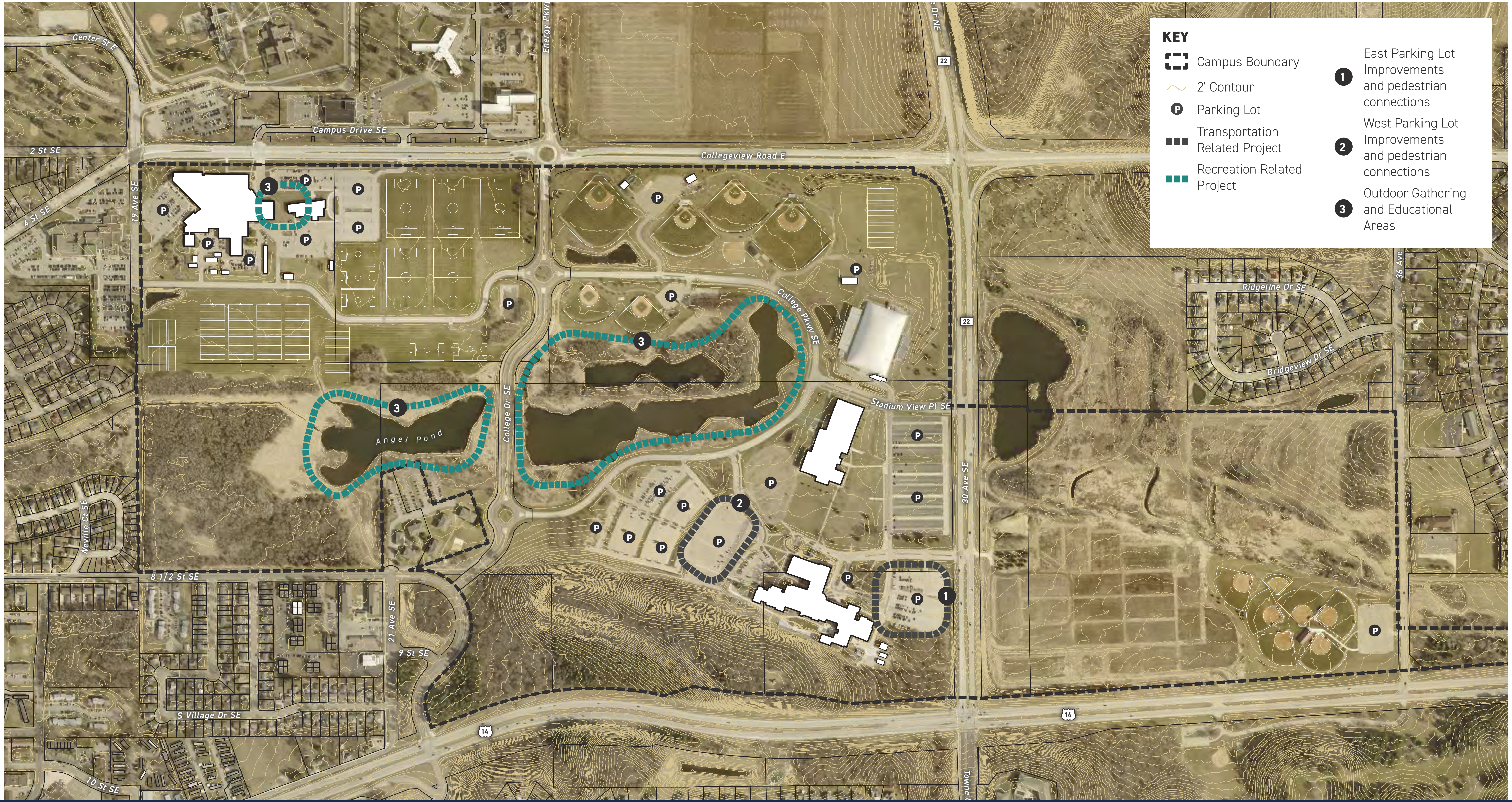
Site Development - Short-Term



Site Development - Mid-Term



Site Development - Long-Term



RCTC Room Utilization Fall 2021

Building Code	Room Code	Group Summary	Room Type	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Average Total	Utilization
AH	200 Ceramics Lab	RCTC	Class Laboratory - 210		1.833333333	1.833333333	1.833333333	1.833333333			7.333333333	22.9%
AH	300 Painting/Drawing	RCTC	Classroom Facilities - 110		2.232323232	2.20952381	2.232323232	15	15	15	51.67417027	161.5%
AT	210 COMP LAB	RCTC	Testing	4	1.6875	1.964285714	2.271428571	2.270833333	2.428571429	9.5	24.12261905	75.4%
CC	206 PIANO LAB/LESSON	RCTC	Class Laboratory - 210		0.833333333		0.833333333				1.666666667	5.2%
CC	412	RCTC	Class Laboratory - 210		1.888888889	1.833333333	1.333333333	1.833333333			6.888888889	21.5%
CC	113 BAND ROOM	RCTC	Classroom Facilities - 110		0.674479167	1.25	0.833333333	1.25			4.0078125	12.5%
CF	202 Coffman	RCTC	Classroom Facilities - 110		1.035714286	2.326923077	1.25	2.944444444	0.833333333		8.39041514	26.2%
CF	202 Coffman WSU	RCTC	Classroom Facilities - 110			1					1	3.1%
CF	206/208 Coffman	RCTC	Classroom Facilities - 110	9.6	6.909090909	4.875	4.638888889	5.066666667	4.583333333	7	42.6729798	133.4%
EA	103	RCTC	Classroom Facilities - 110		1.010964912	1.986842105	1.124183007	1.222222222	4.375	3	12.71921225	39.7%
EA	121	RCTC	Classroom Facilities - 110		0.858156028	1.766666667	0.999031008	1.666666667	1.285714286		6.576234655	20.6%
EA	124	RCTC	Classroom Facilities - 110		1.25	1.347222222	1.618055556	1.25	2		7.465277778	23.3%
EA	128	RCTC	Classroom Facilities - 110		1.041666667	0.972222222	1.175213675	0.972222222	1.071428571		5.232753358	16.4%
EA	234	RCTC	Classroom Facilities - 110		7.5	6	1.8125	2	3.5		20.8125	65.0%
EA	237	RCTC	Classroom Facilities - 110		1.149659864	2	0.916666667	1			5.066326531	15.8%
EA	241	RCTC	Classroom Facilities - 110		1.041666667	1.108974359	1.037760417	1.111111111	6		10.29951255	32.2%
EA	244	RCTC	Classroom Facilities - 110		0.916666667	1.142361111	1.053497942		0.833333333		3.945859053	12.3%
EA	246	RCTC	Classroom Facilities - 110		0.972222222	1.001515152	1.14619883	0.972222222			4.092158426	12.8%
EA	265	RCTC	Classroom Facilities - 110		0.833333333	1.291666667	1.105691057	1.3	0.833333333		5.36402439	16.8%
EH	M1405	RCTC	Classroom Facilities - 110		0.862745098	1.322033898	1.383333333	1.143410853			4.711523182	14.7%
EH	M1406	RCTC	Classroom Facilities - 110		0.833333333	1.007751938	0.833333333	0.99537037			3.669788975	11.5%
EH	M1408	RCTC	Class Laboratory - 210			2.62254902					2.62254902	8.2%
EH	M1410	RCTC	Classroom Facilities - 110		1.317204301	1.357371795	1.317204301	1.305555556	0.833333333		6.130669286	19.2%
EH	M1411	RCTC	Classroom Facilities - 110		1.3125	1.5	0.833333333	1.5	0.90625		6.052083333	18.9%
EH	M2405	RCTC	Classroom Facilities - 110		1.0625	1.3125	1.069230769	1.25			4.694230769	14.7%
EH	M2406	RCTC	Class Laboratory - 210		0.836734694	1.333333333	0.833333333	1.333333333	0.836956522		5.173691216	16.2%
EH	M2408	RCTC	Classroom Facilities - 110		0.972222222	1.666666667	0.972222222	3.75	0.970588235		8.331699346	26.0%
EH	M2409	RCTC	Classroom Facilities - 110		1.166666667	1.318965517	1.166666667	1.25	1.166666667		6.068965517	19.0%
EH	M2410	RCTC	Classroom Facilities - 110		0.833333333	0.972222222	0.867647059	0.972222222			3.645424837	11.4%
EH	M2411	RCTC	Classroom Facilities - 110		0.972222222	0.972222222	0.972222222	0.972222222	0.833333333		4.722222222	14.8%
EH	M2414	RCTC	Class Laboratory - 210		1.009803922	3.833333333	1.009803922	4.229166667	3.833333333	3.833333333	17.74877451	55.5%
H?	099/124 H Commons	RCTC	Classroom Facilities - 110		11	2.25	2.833333333	4.03125		9	29.11458333	91.0%
H1	H1106	RCTC	Classroom Facilities - 110		1.333333333	0.833333333	1.796296296	1			4.962962963	15.5%
H1	H1109	RCTC	Class Laboratory - 210		0.833333333	0.833333333	0.833333333	0.833333333			3.333333333	10.4%
H1	H1110	RCTC	Class Laboratory - 210		8.428571429	2.505208333	2.511111111	4.3125			17.75739087	55.5%
H1	H1112	RCTC	Class Laboratory - 210		2.511111111	2.520833333	2.083333333				7.115277778	22.2%
H1	H1113	RCTC	Class Laboratory - 210		1.638888889	1.833333333	1.638888889	1.833333333			6.944444444	21.7%
H1	H1131	RCTC	Classroom Facilities - 110		1.466666667	1.25	1.083333333	1.25	1.083333333		6.133333333	19.2%
H1	H1133	RCTC	Class Laboratory - 210		1.444444444	1.555555556	1.444444444	1.555555556			6	18.8%
H1	H1403	RCTC	Classroom Facilities - 110		4.666666667	2.666666667	2.631313131	1.822916667	2.666666667	8	22.4542298	70.2%
H1	H1405	RCTC	Class Laboratory - 210		8.5	4.5	3.97979798	7.764705882	4	8	36.74450386	114.8%
H1	H1412 BUM ONLY	RCTC	Classroom Facilities - 110		1.833333333	2.513333333	1.833333333	2.46969697			8.64969697	27.0%
H1	H1413	RCTC	Classroom Facilities - 110		2.5	3		3.666666667			9.166666667	28.6%
H1	H1415	RCTC	Classroom Facilities - 110					5			5	15.6%
H1	H1416 BUM ONLY	RCTC	Classroom Facilities - 110		1.783333333	0.833333333	2.133333333	0.833333333			5.583333333	17.4%
H1	H1418	RCTC	Classroom Facilities - 110		0.946078431	0.9375	0.833333333	0.983050847	1	8	12.69996261	39.7%
H1	H1420	RCTC	Classroom Facilities - 110		2.5	3.833333333	4	3	2.333333333	8	23.66666667	74.0%
H1	H1422	RCTC	Classroom Facilities - 110			1.666666667		1.5		8	11.16666667	34.9%
H1	H1424	RCTC	Classroom Facilities - 110		3	1.295698925	1.634920635	1.813333333	1.90625	8	17.65020289	55.2%

RCTC Room Utilization Fall 2021

Building Code	Room Code	Group Summary	Room Type	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Average Total	Utilization
H1	H1438	RCTC	Class Laboratory - 210		1.833333333		1.833333333	1.833333333	1.833333333		7.333333333	22.9%
H1	H1440	RCTC	Class Laboratory - 210			5	2.019607843	1.266666667	1.833333333	8.5	18.61960784	58.2%
H1	H1442	RCTC	Class Laboratory - 210			1.833333333				9	10.83333333	33.9%
H1	H1446	RCTC	Classroom Facilities - 110		1.833333333		1.333333333	1.5	0.833333333		5.5	17.2%
H2	H1100	RCTC	Classroom Facilities - 110		1.5	1	4	5		9	20.5	64.1%
H2	H1144	RCTC	Class Laboratory - 210			1.333333333	1.333333333	1.166666667	1.166666667		5	15.6%
H3	H1132	RCTC	Class Laboratory - 210				3.333333333	3.404761905	3.366666667		10.1047619	31.6%
H3	H1134	RCTC	Classroom Facilities - 110			2.25	1.833333333	1.833333333	1.833333333		7.75	24.2%
H3	H1138	RCTC	Class Laboratory - 210		2.333333333	2.333333333	2.333333333	3.833333333	3.833333333		14.66666667	45.8%
H3	H1140	RCTC	Class Laboratory - 210		3.833333333	1.833333333	3.833333333	3.833333333	4		17.33333333	54.2%
H4	H1146	RCTC	Class Laboratory - 210		5.833333333	2.333333333	2.333333333	2.333333333			12.83333333	40.1%
H4	H2301	RCTC	Class Laboratory - 210			5.5	1.852941176				7.352941176	23.0%
H4	H2302	RCTC	Classroom Facilities - 110		1.916666667	2	2.214285714	2.571428571			8.702380952	27.2%
H4	H2306B	RCTC	Classroom Facilities - 110		1.833333333	0.5	1.833333333	1.833333333			6	18.8%
H4	H2308	RCTC	Classroom Facilities - 110		0.979166667	1.296568627	1.527777778	1.983333333			5.786846405	18.1%
H4	H2312/14/18	RCTC	Class Laboratory - 210		4.5	4.5	3.416666667	2.222222222	3.833333333		18.47222222	57.7%
H4	H2318	RCTC	Class Laboratory - 210			1.333333333	3	3			7.333333333	22.9%
H5	H1205	RCTC	Classroom Facilities - 110		4	1.833333333	4				9.833333333	30.7%
HS	002	RCTC	Class Laboratory - 210		1.5	1.5	4	5			12	37.5%
HS	004	RCTC	Class Laboratory - 210		5.892857143	8.529411765	5	3.875	5.214285714		28.51155462	89.1%
HS	006	RCTC	Class Laboratory - 210		6	6	5	5.727272727	6.041666667		28.76893939	89.9%
HS	008	RCTC	Class Laboratory - 210		7.416666667	7.3125	5.333333333	5.555555556	6.055555556		31.67361111	99.0%
HS	009	RCTC	Class Laboratory - 210	5	5.675	8.529411765	6.5	4.861111111	6.636363636		37.20188651	116.3%
HS	010	RCTC	Class Laboratory - 210	5	5.0625	5.444444444	4.95	4.75	5.3		30.50694444	95.3%
HS	128	RCTC	Classroom Facilities - 110		1.536723164	2.367117117	1.653439153	1.804597701	1		8.361877136	26.1%
HS	131	RCTC	Classroom Facilities - 110		1.623655914	3.313131313	2.666666667	1.771929825	1.875		11.25038372	35.2%
HS	136	RCTC	Classroom Facilities - 110		5.357843137	3.75	5.529411765	2.381944444	3.136363636		20.15556298	63.0%
HT	202 Hill Theater	RCTC	Classroom Facilities - 110	8	3.390740741	3.075581395	3.574652778	3.330882353	3.175	8	32.54685727	101.7%
MHL	M2400	RCTC	Classroom Facilities - 110		0.857142857	0.845833333	0.911764706	1.215686275	2.5		6.330427171	19.8%
SC	S2004	RCTC	Classroom Facilities - 110	1.333333333	1.25	1.112612613	0.975694444	1.102150538	1.032608696	1.545454545	8.351854169	26.1%
SH	102	RCTC	Classroom Facilities - 110		1.419047619	0.975490196	1.383838384	0.833333333	0.833333333		5.445042866	17.0%
SH	103	RCTC	Classroom Facilities - 110		14	14	13.5	14.125	14.15384615	8.357142857	78.13598901	244.2%
SH	104	RCTC	Classroom Facilities - 110		3.75	2	1.366666667	1.375	0.911764706		9.403431373	29.4%
SH	105	RCTC	Classroom Facilities - 110		0.833333333	0.972222222	1.005128205	0.972222222	1.5		5.282905983	16.5%
SH	107	RCTC	Classroom Facilities - 110		14	13.2	13.93333333	14.03846154	11.75	8.357142857	75.27893773	235.2%
SH	108	RCTC	Classroom Facilities - 110		1.666666667	1.262626263	1.775510204	1.222222222			5.927025356	18.5%
SH	109	RCTC	Classroom Facilities - 110		1	1.105263158	1.117647059	1			4.222910217	13.2%
SH	110	RCTC	Classroom Facilities - 110		0.833333333	0.849358974	0.932153392	1.166666667	0.833333333		4.6148457	14.4%
SH	202	RCTC	Class Laboratory - 210			1.842592593	1.833333333	1.913580247			5.589506173	17.5%
SH	203	RCTC	Class Laboratory - 210		1.416666667	2.6		2.125	2		8.141666667	25.4%
SH	204	RCTC	Class Laboratory - 210	1.25	1.441666667	1.229468599	1.333333333	1.089869281	1.456521739	1.25	9.050859619	28.3%
SH	206	RCTC	Class Laboratory - 210		1.888888889	1.59929078	2.023333333	1.379432624	2.678571429		9.569517055	29.9%
SH	210	RCTC	Classroom Facilities - 110		1.235897436	0.882075472	1.200803213	0.955729167	0.833333333		5.10783862	16.0%
ST	110	RCTC	Classroom Facilities - 110		7	4	4				15	46.9%
ST	205	RCTC	Class Laboratory - 210		1.833333333	1.833333333	1.833333333	1.833333333			7.333333333	22.9%
ST	206	RCTC	Class Laboratory - 210		1.833333333	1.333333333	1.333333333	1.833333333	0.833333333		7.166666667	22.4%
ST	211	RCTC	Class Laboratory - 210		2.490196078	2.429487179	1.833333333	1.833333333	1.833333333		10.41968326	32.6%
ST	212	RCTC	Class Laboratory - 210		1.833333333	0.833333333	2.833333333	1.333333333	1.833333333		8.666666667	27.1%
ST	305	RCTC	Class Laboratory - 210		1.833333333	1.833333333	0.875	1.833333333	1.833333333		8.208333333	25.7%

RCTC Room Utilization Fall 2021

Building Code	Room Code	Group Summary	Room Type	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Average Total	Utilization
ST	306	RCTC	Class Laboratory - 210		1.833333333	1.833333333	1.833333333	1.833333333	1.833333333		9.166666667	28.6%
ST	308	RCTC	Class Laboratory - 210		14.5	14.5	14.5	14.5	14.5	8	80.5	251.6%
ST	309	RCTC	Class Laboratory - 210		14.5	14.5	14.5	14.5	14.5	8	80.5	251.6%
ST	310	RCTC	Class Laboratory - 210		2.833333333		2.833333333	2.833333333			8.5	26.6%
ST	313	RCTC	Class Laboratory - 210				1.833333333	2.833333333			4.666666667	14.6%
Total			**103**		**269.1686859**	**262.231437**	**247.4828643**	**270.4184066**	**203.7316403**	**165.3430736**	**1452.559441**	**44.1%**

RCTC Partner Space Utilization Fall 2021

Building Code	Room Code	Group	Room Type	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total	Utilization
CF	206/208 Coffman	Other	Classroom Facilities - 110				1.50	5.00	1.00	3.00	10.50	32.8%
EA	103	Other	Classroom Facilities - 110		3.83	3.75	3.33	4.00		4.50	19.42	60.7%
EA	237	Other	Classroom Facilities - 110							1.00	1.00	3.1%
H	099/124 H Commons	Other	Classroom Facilities - 110						4.00	9.00	13.00	40.6%
H	H1100	Other	Classroom Facilities - 110					4.00			4.00	12.5%
H	H1106	Other	Classroom Facilities - 110		2.25				5.00		7.25	22.7%
H	H1131	Other	Classroom Facilities - 110		2.50		2.50		2.50		7.50	23.4%
H	H1413	Other	Classroom Facilities - 110					5.00			5.00	15.6%
MHL	M2400	Other	Classroom Facilities - 110		3.00						3.00	9.4%
EA	111	Rochester Public Schools	Classroom F	8.7	14.7	14.7	14.7	14.8	14.8	9.0	91.16	284.9%
EA	119	Rochester Public Schools	Classroom F	8.7	14.7	14.7	14.7	14.8	14.8	9.0	91.16	284.9%
CC	113 BAND ROOM	WSU	Classroom Facilities - 110			1.833333333					1.83	5.7%
CF	202 Coffman	WSU	Classroom Facilities - 110			2			2		4.00	12.5%
CF	206/208 Coffman	WSU	Classroom Facilities - 110		1.0833333	2			0.75		3.83	12.0%
CF	206/208 WSU	WSU	Classroom Facilities - 110		2.3333333			1.83333	5.5	7.5	17.17	53.6%
EA	103	WSU	Classroom Facilities - 110		2.3333333			1.83333			4.17	13.0%
EA	103 WSU	WSU	Classroom Facilities - 110		2.3333333	3		2.06667			7.40	23.1%
EA	121 WSU	WSU	Classroom Facilities - 110			3					3.00	9.4%
EA	124	WSU	Classroom Facilities - 110			3					3.00	9.4%
EA	124 WSU	WSU	Classroom Facilities - 110			1.446078431		1.33333			2.78	8.7%
EA	234	WSU	Classroom Facilities - 110		1						1.00	3.1%
EA	234 WSU	WSU	Classroom Facilities - 110		2	1.5					3.50	10.9%
EA	237 WSU	WSU	Classroom Facilities - 110			2					2.00	6.2%
EA	241	WSU	Classroom Facilities - 110		1.8333333		1.833333333		9		12.67	39.6%
EA	265 WSU	WSU	Classroom Facilities - 110		3						3.00	9.4%
EA	234 WSU	WSU	Classroom Facilities - 110		4						4	12.5%
EA	241 WSU	WSU	Classroom Facilities - 110						1.25		1.25	3.9%
EH	M2411 WSU	WSU	Classroom Facilities - 110				1				1	3.1%
EH	M2408	WSU	Classroom Facilities - 110			3.5					3.50	10.9%
H	099/124 H Commons	WSU	Classroom Facilities - 110			5	-8				-3.00	-9.4%
H	H1100	WSU	Classroom Facilities - 110		2.8333333						2.83	8.9%
H	H1100 WSU	WSU	Classroom Facilities - 110		1.4388889	3.5	3.5	1.82051	3.83333333		14.09	44.0%
H	H1106	WSU	Classroom Facilities - 110				3.333333333	1.83333			5.17	16.1%
H	H1106 [WSU]	WSU	Classroom Facilities - 110				3.333333333	3			6.33	19.8%
H	H1403	WSU	Classroom Facilities - 110					5			5.00	15.6%
H	H1420	WSU	Classroom Facilities - 110				3.5				3.50	10.9%
H	H1422	WSU	Classroom Facilities - 110		1.83		1.83				3.666666667	11.5%
H1	H1106 [WSU]	WSU	Classroom Facilities - 110			1		2.375			3.375	10.5%
H2	H1100 WSU	WSU	Classroom Facilities - 110					1			1	3.1%
HS	004	WSU	Class Laboratory - 210				8.00	6.40	10.00		24.4	76.3%
HS	006	WSU	Class Laboratory - 210				8.00	8.00	10.00		26	81.3%
HS	009	WSU	Class Laboratory - 210				8.00				8	25.0%
HS	010	WSU	Class Laboratory - 210				8.00				8	25.0%
HS	128	WSU	Classroom Facilities - 110		1.83						1.833333333	5.7%

RCTC Partner Space Utilization Fall 2021

Building Code	Room Code	Group	Room Type	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total	Utilization
HS	131	WSU	Classroom Facilities - 110		2.50			1.75			4.25	13.3%
HS	136	WSU	Classroom Facilities - 110				1.00				1	3.1%
HS	128 WSU	WSU	Classroom Facilities - 110		1.00	2.00	2.17	1.00	1.00		7.166666667	22.4%
HS	128 WSU	WSU	Classroom Facilities - 110		1.83			0.83	1.30		3.971264368	12.4%
HS	131 WSU	WSU	Classroom F	1	1.50		1.00				3.5	10.9%
HS	131 WSU	WSU	Classroom Facilities - 110		2.50	1.00	1.50	1.42	1.00		7.416666667	23.2%
HS	136 WSU	WSU	Classroom Facilities - 110		2.00	4.00		2.50			8.5	26.6%
HS	136 WSU	WSU	Classroom Facilities - 110		3.00	1.10		2.50			6.6	20.6%
HT	202 Hill Theater	WSU	Classroom Facilities - 110						2.00		2	6.3%
SC	S2004	WSU	Classroom Facilities - 110					3.00			3	9.4%
SH	101	WSU	Classroom Facilities - 110				1.33				1.333333333	4.2%
SH	101 WSU	WSU	Classroom Facilities - 110		1.33		1.33				2.666666667	8.3%
SH	102	WSU	Classroom Facilities - 110			3.42		1.83			5.25	16.4%
SH	102 WSU	WSU	Classroom Facilities - 110		2.00	1.83	1.83	1.83			7.5	23.4%
SH	104	WSU	Classroom Facilities - 110		1.50	2.33					3.833333333	12.0%
SH	104 WSU	WSU	Classroom Facilities - 110			2.33					2.333333333	7.3%
SH	105	WSU	Classroom Facilities - 110					1.00			1	3.1%
SH	107	WSU	Classroom Facilities - 110			2.00					2	6.3%
SH	107 WSU	WSU	Classroom Facilities - 110			1.83		1.83			3.666666667	11.5%
SH	109	WSU	Classroom Facilities - 110		2.00						2	6.2%
SH	110	WSU	Classroom Facilities - 110		2.17	3.00		1.83			7	21.9%
SH	110 WSU	WSU	Classroom Facilities - 110					1.83			1.833333333	5.7%
SH	210	WSU	Classroom Facilities - 110		1.83			2.00			3.833333333	12.0%
SH	210 WSU	WSU	Classroom Facilities - 110		1.83						1.833333333	5.7%
ST	107	WSU	Class Laboratory - 210		7.42	5.56	6.92	8.00			27.88888889	87.2%
ST	108	WSU	Classroom Facilities - 110					1.33			1.333333333	4.2%
ST	108 WSU	WSU	Classroom Facilities - 110		3.60	8.22	7.60	5.56	7.17		32.14384921	100.4%
ST	110	WSU	Classroom Facilities - 110				2.00	2.50	8.17		12.66666667	39.6%
ST	110 WSU	WSU	Classroom Facilities - 110		3.30	3.50	3.79	5.50	2.00		18.09411765	56.5%
ST	112	WSU	Classroom Facilities - 110		2.00				4.00		6	18.8%
ST	112 WSU	WSU	Classroom Facilities - 110		4.54	4.00	6.92	8.00			23.45833333	73.3%
ST	114 WSU	WSU	Classroom Facilities - 110		7.42	6.33	9.00	6.68	7.17		36.6	114.4%
ST	116	WSU	Classroom Facilities - 110					8.00			8	25.0%
ST	116 WSU	WSU	Classroom Facilities - 110		5.19		9.00	6.50			20.69047619	64.7%
ST	118	WSU	Classroom Facilities - 110					0.75	9.00		9.75	30.5%
ST	118 WSU	WSU	Classroom Facilities - 110		2.0694444	2.863636364	1.842105263	2.82639	3		12.60	39.4%
			80								**745.00**	**29.1%**

Minnesota State

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Art Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0972**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,597,884	**FCI:**	0.40
RI Cost:	1,806,956	**RI:**	0.46
Total Requirements Cost:	1,806,956		
Current Replacement Value:	3,951,966	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	9,586SF		
Use	Academic	**Construction Type**	
Floors	3	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1972	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	3123470	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.9
MinnState Longitude:	W 092-25-20.9	**General Fund %**:	100
MinnState Appraisal Value (2019):	3929000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	2- Due within 2 Years of Inspection	Jun 30, 2020	790,488
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	110,287
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	124,992
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	87,311
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	312,481
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	25,274
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	147,050
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2024	45,953
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	87,311
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	75,809
Total						**1,806,956**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922560	3,951,966
Subtotal	**3,951,966**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**3,951,966**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Atrium**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1593**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	984,375	**FCI:**	0.07
RI Cost:	2,592,503	**RI:**	0.19
Total Requirements Cost:	2,592,504		
Current Replacement Value:	13,837,240	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	33,564SF		
Use	Administration	**Construction Type**	
Floors	3	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1993	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	10774640	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-50.5
MinnState Longitude:	W 092-25-21.0	**General Fund %**:	100
MinnState Appraisal Value (2019):	11887000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost	LHB NOTEs
a.5. Roofing - Built-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	831,522	Completed in Summer 2021
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	386,156	
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	514,874	
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	152,853	
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	103,779	
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	176,988	
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	160,898	
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	265,434	
Total						**2,592,504**	1,760,982

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922778	13,837,240
Subtotal	**13,837,240**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**13,837,240**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Career and Technical Education Center**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C2016**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	302,365	**RI:**	0.04
Total Requirements Cost:	302,365		
Current Replacement Value:	8,260,369	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	19,117SF		
Use		**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	2130 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2016	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-01-14.4
MinnState Longitude:	W 092-26-04.6	**Lease %**:	100
MinnState Appraisal Value (2019):	7284000	**MinnState Contents Value (2019)**:	0
Other %:	100		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
I.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	302,365
Total						**302,365**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923075	8,260,369
Subtotal	**8,260,369**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**8,260,369**

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Central Chiller Plant**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C2420**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	0	**RI:**	0.00
Total Requirements Cost:			
Current Replacement Value:	3,788,628	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	2,250SF		
Use	Physical Plant	**Construction Type**	IBC - Type II B
Floors	1	**Historical Category**	
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	UNITED STATES OF AMERICA
Year Constructed	2020	**Zip/Postal Code**	55949
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	Apr 24, 2020
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	Yes
Basement:	No	**Elevator Penthouse**:	No
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	0	**MinnState Contents Value (2019)**:	0

Requirements

No data available.

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257900901	3,788,628
Subtotal	**3,788,628**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**3,788,628**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Coffman Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0268**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	3,100,237	**FCI:**	0.39
RI Cost:	3,465,709	**RI:**	0.44
Total Requirements Cost:	3,465,706		
Current Replacement Value:	7,888,854	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	18,686SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1968	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	6296605	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.9
MinnState Longitude:	W 092-25-23.6	**General Fund %**:	100
MinnState Appraisal Value (2019):	7021000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	973,808
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	214,983
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	94,234
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	177,361
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	177,361
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	609,120
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	28,888
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jan 1, 2020	278,118
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	257,980
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2029	98,534
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	89,576
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	170,195
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	295,548
Total						**3,465,706**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922278	7,888,854
Subtotal	**7,888,854**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**7,888,854**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**College Center**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0872**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	4,171,316	**FCI:**	0.23
RI Cost:	6,016,129	**RI:**	0.33
Total Requirements Cost:	6,016,131		
Current Replacement Value:	17,993,307	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	42,620SF		
Use	Academic	**Construction Type**	
Floors	4	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1972	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	14290956	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.8
MinnState Longitude:	W 092-25-17.5	**General Fund %**:	100
MinnState Appraisal Value (2019):	15462000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	553,078
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	490,345
d.1. HVAC - Equipment - 1972 Air Handlers Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	806,005
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	809,070
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	1,389,312
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	43,927
g.1. Plumbing Fixtures - 1972 2nd Fl Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	55,062
g.2. Plumbing Rough-in - 1972 Original Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	523,035
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	224,742
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	204,311
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	310,552
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	606,692
Total						**6,016,131**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922497	17,993,307
Subtotal	**17,993,307**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**17,993,307**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**East Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1386**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,732,581	**FCI:**	0.12
RI Cost:	3,251,638	**RI:**	0.23
Total Requirements Cost:	3,251,639		
Current Replacement Value:	14,293,745	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	33,857SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1986	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	11353082	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.8
MinnState Longitude:	W 092-25-17.5	**General Fund %**:	100
MinnState Appraisal Value (2019):	11515000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	389,527
c.1. Elevators Renewal	Yes	D10 - Conveying	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	146,072
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2021	256,114
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2021	597,599
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	642,719
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	34,895
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	178,533
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	162,303
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	308,375
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	535,502
Total						**3,251,639**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922700	14,293,745
Subtotal	**14,293,745**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**14,293,745**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Endicott Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0368**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	556,363	**FCI:**	0.07
RI Cost:	1,523,012	**RI:**	0.19
Total Requirements Cost:	1,523,011		
Current Replacement Value:	8,139,206	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	19,279SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1968	**Zip/Postal Code**	55904
Year Renovated	2019	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	6337751	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-50.5
MinnState Longitude:	W 092-25-21.0	**General Fund %**:	100
MinnState Appraisal Value (2019):	7185000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	221,806
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	365,980
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	158,961
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	101,661
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	101,661
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	92,419
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	175,596
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	289,681
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	15,246
Total						**1,523,011**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922325	8,139,206
Subtotal	**8,139,206**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**8,139,206**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Goddard Library**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0168**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,668,212	**FCI:**	0.11
RI Cost:	3,365,482	**RI:**	0.21
Total Requirements Cost:	3,365,482		
Current Replacement Value:	15,866,817	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	38,487SF		
Use	Library	**Construction Type**	
Floors	3	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1968	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	12540935	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	Yes
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-51.2
MinnState Longitude:	W 092-25-20.3	**General Fund %**:	100
MinnState Appraisal Value (2019):	14466000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	908,081
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	442,795
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	350,546
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	317,336
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2029	202,948
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	184,498
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	350,546
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2025	608,732
Total						**3,365,482**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922216	15,866,817
Subtotal	**15,866,817**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**15,866,817**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Grounds Storage Garage**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C2119**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	15,604	**RI:**	0.02
Total Requirements Cost:	15,604		
Current Replacement Value:	978,976	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	4,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2019	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	Bentz Thompson Reitow
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	941243	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	926376	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Fire Alarm System Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jan 1, 2029	15,604
Total						**15,604**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257936280	978,976
Subtotal	**978,976**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**978,976**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Health Science Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0570**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	648,479	**FCI:**	0.04
RI Cost:	2,008,692	**RI:**	0.12
Total Requirements Cost:	2,008,693		
Current Replacement Value:	16,902,837	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	41,000SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2007	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	13162308	**B3 Guidelines Apply**:	Yes
Basement:	Yes	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-52.5
MinnState Longitude:	W 092-25-24.4	**General Fund %**:	100
MinnState Appraisal Value (2019):	12459000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	239,909
c.1. Elevators Renewal	Yes	D10 - Conveying	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	176,890
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	373,435
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	196,545
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	373,435
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	648,479
Total						**2,008,693**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922435	16,902,837
Subtotal	**16,902,837**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**16,902,837**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center 76 Rem. & Add. (H1100 Suite)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0276**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	301,336	**FCI:**	0.05
RI Cost:	1,388,523	**RI:**	0.24
Total Requirements Cost:	1,388,524		
Current Replacement Value:	5,771,701	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	14,000SF		
Use	Academic	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1976	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**Addition**:	x
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	BASIC
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Latitude:	N 44-01-12.3	**MinnState Longitude**:	W 092-26-10.3
General Fund %:	100	**MinnState Appraisal Value (2019)**:	5006000
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	214,761
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	127,514
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	456,367
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	86,576
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	214,761
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	67,113
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	221,432
Total						**1,388,524**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923216	5,771,701
Subtotal	**5,771,701**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**5,771,701**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center Diesel Truck. (H1100 Suite)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0379**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	148,450	**FCI:**	0.12
RI Cost:	238,155	**RI:**	0.19
Total Requirements Cost:	238,155		
Current Replacement Value:	1,270,158	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	8,280SF		
Use	Academic	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1979	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SIMPLE	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	1201913	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	95,262
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	31,754
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2029	47,631
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	9,526
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2029	18,259
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	11,908
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	15,877
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	7,938
Total						**238,155**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923263	1,270,158
Subtotal	**1,270,158**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**1,270,158**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center Horticulture (H1200 Suite)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1302**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	673,851	**FCI:**	0.06
RI Cost:	3,451,204	**RI:**	0.30
Total Requirements Cost:	3,451,202		
Current Replacement Value:	11,390,000	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	19,800SF		
Use	Academic	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2002	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	COMPLEX	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-01-13.8
MinnState Longitude:	W 092-26-14.4	**General Fund %**:	100
MinnState Appraisal Value (2019):	8727000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	233,585
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	227,800
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	360,683
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	616,958
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	275,258
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	94,917
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	1,328,833
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	313,168
Total						**3,451,202**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923560	11,390,000
Subtotal	**11,390,000**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**11,390,000**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center Main Bldg (H1100 & H1400 Suites)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0169**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	2,583,997	**FCI:**	0.08
RI Cost:	5,681,569	**RI:**	0.17
Total Requirements Cost:	5,681,568		
Current Replacement Value:	33,028,822	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	78,234SF		
Use	Academic	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1969	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**Addition**:	275T0276, 275T0886, 148C1714
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	BASIC
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Latitude:	N 44-01-16.2	**MinnState Longitude**:	W 092-26-11.8
General Fund %:	100	**MinnState Appraisal Value (2019)**:	28801000
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	900,086
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	742,571
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	742,571
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	483,796
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	1,200,115
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	375,036
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	1,237,393
Total						**5,681,568**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923154	33,028,822
Subtotal	**33,028,822**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**33,028,822**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center Phase I Add. (H1300 Suite)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0886**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	3,940,192	**FCI:**	0.13
RI Cost:	7,772,131	**RI:**	0.26
Total Requirements Cost:	7,772,132		
Current Replacement Value:	30,246,682	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	70,000SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	1926 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1986	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**Addition**:	x
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	BASIC
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Latitude:	N 44-01-14.8	**MinnState Longitude**:	W 092-26-15.4
General Fund %:	100	**MinnState Appraisal Value (2019)**:	26474000
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Built-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	44,965
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	805,354
c.1. Elevators Renewal	Yes	D10 - Conveying	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	302,008
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2021	2,210,696
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	2,020,095
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	577,170
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	369,120
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	335,564
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	1,107,160
Total						**7,772,132**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923341	30,246,682
Subtotal	**30,246,682**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**30,246,682**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Heintz Center Workforce Add. (H1000 Suite)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1714**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	1,822,883	**RI:**	0.20
Total Requirements Cost:	1,822,883		
Current Replacement Value:	9,292,179	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	22,010SF		
Use	Administration	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	2070 COLLEGE VIEW ROAD EAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2014	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	TKDA
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	7515461	**B3 Guidelines Apply**:	Yes
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-01-15.1
MinnState Longitude:	W 092-26-09.3	**General Fund %**:	15
Lease %:	85	**MinnState Appraisal Value (2019)**:	7889000
MinnState Contents Value (2019):	0	**Other %**:	85

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.4. Roofing - MnSCU Standard Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2025	1,474,760
I.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2029	348,123
Total						**1,822,883**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922888	9,292,179
Subtotal	**9,292,179**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**9,292,179**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Hill Theater**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1174**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,007,794	**FCI:**	0.12
RI Cost:	2,491,121	**RI:**	0.31
Total Requirements Cost:	2,491,122		
Current Replacement Value:	8,134,140	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	19,267SF		
Use	Performing Arts	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1974	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	6429289	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.8
MinnState Longitude:	W 092-25-17.5	**General Fund %**:	100
MinnState Appraisal Value (2019):	7690000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	221,668
d.1. HVAC - 1974 Air Handlers Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	340,075
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	365,752
e.1. HVAC - Distribution Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2024	628,059
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	39,715
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	101,598
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2024	295,557
i.1. Fire Protection Systems Renewal	Yes	D40 - Fire Protection	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	101,598
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	92,362
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jan 1, 2019	213,316
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jan 1, 2019	60,948
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	30,474
Total						**2,491,122**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922653	8,134,140
Subtotal	**8,134,140**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**8,134,140**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Memorial Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C2320**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	0	**RI:**	0.00
Total Requirements Cost:			
Current Replacement Value:	5,796,670	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	21,202SF		
Use	Academic	**Construction Type**	IBC - Type II B
Floors	2	**Historical Category**	
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2020	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	Bentz Thompson Reitow
Ownership	Owned	**Commission Date**	Jan 20, 2020
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	0	**MinnState Contents Value (2019)**:	0

Requirements

No data available.

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257900870	5,796,670
Subtotal	**5,796,670**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**5,796,670**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Rochester Regional Sports Center**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1202**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	5,147,462	**FCI:**	0.10
RI Cost:	11,002,248	**RI:**	0.22
Total Requirements Cost:	11,002,249		
Current Replacement Value:	49,786,039	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	115,220SF		
Use	Sports Facility - Field House	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2002	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	38767147	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-57.4
MinnState Longitude:	W 092-25-21.5	**MinnState Appraisal Value (2019)**:	44984000
MinnState Contents Value (2019):	0	**Other %**:	100

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	1,325,612
c.1. Elevators Renewal	Yes	D10 - Conveying	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	497,105
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	3,325,077
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	2,375,055
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2032	607,572
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	1,049,443
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	1,822,385
Total						**11,002,249**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923466	49,786,039
Subtotal	**49,786,039**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**49,786,039**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Rochester Regional Stadium Dome**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1203**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name

Currency: USD

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	1,940,519	**RI:**	0.63
Total Requirements Cost:	1,940,519		
Current Replacement Value:	3,104,830	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	88,000SF		
Use	Sports Facility - Dome	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2008	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	Design/Build - Knutson/HGA
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	1492292	**Addition**:	148C1815, 275T2011
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	SIMPLE
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Appraisal Value (2019):	2938009	**MinnState Contents Value (2019)**:	0
Other %:	100		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.2. Building Exteriors (Soft) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	1,349,926
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	337,482
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	168,741
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	84,370
Total						**1,940,519**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923497	3,104,830
Subtotal	**3,104,830**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**3,104,830**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Rochester Regional Stadium Entry Building**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1815**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	32,709	**RI:**	0.04
Total Requirements Cost:	32,709		
Current Replacement Value:	852,563	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	2,068SF		
Use	Sports Facility - Stadium	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2015	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	TKDA
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	673719	**Addition**:	x
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	BASIC
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Appraisal Value (2019):	806755	**MinnState Contents Value (2019)**:	0
Other %:	100		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
I.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2030	32,709
Total						**32,709**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922935	852,563
Subtotal	**852,563**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**852,563**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Rochester Regional Stadium Garage (air-lock)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T2011**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	6,053	**RI:**	0.02
Total Requirements Cost:	6,053		
Current Replacement Value:	273,973	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	563SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2008	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	Design/Build - Knutson/HGA
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	95507	**Addition**:	x
B3 Guidelines Apply:	No	**Basement**:	No
Elevator Penthouse:	No	**Model Type**:	BASIC
Mothball %:	0	**Off Campus (Owned)**:	No
MinnState Appraisal Value (2019):	259252	**MinnState Contents Value (2019)**:	0
Other %:	100		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	6,053
Total						**6,053**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923654	273,973
Subtotal	**273,973**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**273,973**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Rochester Regional Stadium Support Building**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1915**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	103,361	**RI:**	0.04
Total Requirements Cost:	103,361		
Current Replacement Value:	2,694,147	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	6,535SF		
Use	Sports Facility - Stadium	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2015	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	TKDA
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	2128949	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Appraisal Value (2019)**:	2549392
MinnState Contents Value (2019):	0	**Other %**:	100

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
I.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2030	103,361
Total						**103,361**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922982	2,694,147
Subtotal	**2,694,147**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**2,694,147**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Science & Technology Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1693**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,101,109	**FCI:**	0.03
RI Cost:	6,514,174	**RI:**	0.19
Total Requirements Cost:	6,514,173		
Current Replacement Value:	34,971,998	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	58,004SF		
Use	Academic	**Construction Type**	
Floors	4	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1993	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	27232162	**B3 Guidelines Apply**:	No
Basement:	Yes	**Elevator Penthouse**:	No
Model Type:	COMPLEX	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-51.0
MinnState Longitude:	W 092-25-19.1	**General Fund %**:	100
MinnState Appraisal Value (2019):	26455000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	667,339
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	2,382,400
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	1,101,109
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	361,475
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	806,368
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	278,058
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	917,424
Total						**6,514,173**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922841	34,971,998
Subtotal	**34,971,998**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**34,971,998**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Singley Hall**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C0468**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	1,458,294	**FCI:**	0.17
RI Cost:	1,670,676	**RI:**	0.19
Total Requirements Cost:	1,670,676		
Current Replacement Value:	8,697,541	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	21,097SF		
Use	Academic	**Construction Type**	
Floors	2	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1968	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	6772399	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-48.9
MinnState Longitude:	W 092-25-23.6	**General Fund %**:	100
MinnState Appraisal Value (2019):	7501000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	242,722
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	192,155
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	173,951
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	111,248
g.2. Plumbing Rough-in Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	323,629
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	101,134
k.1. Built-in Equipment Renewal	Yes	E - Equipment and Furnishings	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	192,155
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	333,682
Total						**1,670,676**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922372	8,697,541
Subtotal	**8,697,541**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**8,697,541**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 01 - Main Campus East (south)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0101**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	47,938	**RI:**	0.20
Total Requirements Cost:	47,938		
Current Replacement Value:	239,689	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2001	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	67453	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	226810	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
m.1. All Renewal - SMALL Renewal	Yes	F10 - Special Construction	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	47,938
Total						**47,938**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923091	239,689
Subtotal	**239,689**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**239,689**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 02 - Main Campus East (north)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0201**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	47,938	**RI:**	0.20
Total Requirements Cost:	47,938		
Current Replacement Value:	239,689	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	851 30th Avenue SE	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2001	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	67453	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	226810	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
m.1. All Renewal - SMALL Renewal	Yes	F10 - Special Construction	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2026	47,938
Total						**47,938**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923169	239,689
Subtotal	**239,689**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**239,689**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 04 - Heintz (brown - south)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0782**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	27,137	**FCI:**	0.18
RI Cost:	27,137	**RI:**	0.18
Total Requirements Cost:	27,137		
Current Replacement Value:	153,401	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1997	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	37971	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SIMPLE	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	145158	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	11,797
b.2. Building Exteriors (Soft) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	15,340
Total						**27,137**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923294	153,401
Subtotal	**153,401**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**153,401**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 05 - Heintz (brown - north)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T0990**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	27,137	**RI:**	0.18
Total Requirements Cost:	27,137		
Current Replacement Value:	153,401	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1998	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	28977	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SIMPLE	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	145158	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	11,797
b.2. Building Exteriors (Soft) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	15,340
Total						**27,137**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923372	153,401
Subtotal	**153,401**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**153,401**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 06 - Youth Baseball**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1094**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	41,418	**FCI:**	0.20
RI Cost:	41,418	**RI:**	0.20
Total Requirements Cost:	41,418		
Current Replacement Value:	207,091	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	864SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	2591 College Pkwy SE	**City**	ROCHESTER
Address 2	Rocheser Regional Youth Baseball Complex	**State/Province/Region**	-
Year Constructed	1994	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	28977	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
Lease %:	100	**MinnState Appraisal Value (2019)**:	195964
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
m.1. All Renewal - SMALL Renewal	Yes	F10 - Special Construction	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2019	41,418
Total						**41,418**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923388	207,091
Subtotal	**207,091**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**207,091**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 07 - Youth Football**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1195**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	46,020	**FCI:**	0.20
RI Cost:	46,020	**RI:**	0.20
Total Requirements Cost:	46,020		
Current Replacement Value:	230,101	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	960SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	Rochester Regional Youth Football Complex	**State/Province/Region**	-
Year Constructed	1995	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
Lease %:	100	**MinnState Appraisal Value (2019)**:	217737
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
m.1. All Renewal - SMALL Renewal	Yes	F10 - Special Construction	Lifecycle	2- Due within 2 Years of Inspection	Jun 30, 2020	46,020
Total						**46,020**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923419	230,101
Subtotal	**230,101**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**230,101**

MINNESOTA STATE

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 08 - Heintz (large)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1700**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	62,587	**FCI:**	0.10
RI Cost:	110,720	**RI:**	0.18
Total Requirements Cost:	110,720		
Current Replacement Value:	625,875	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	4,080SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2002	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	28977	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SIMPLE	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	592246	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
a.5. Roofing - Builit-up, Membrane, Cedar Renewal	Yes	B30 - Roofing	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2027	48,133
b.2. Building Exteriors (Soft) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2022	62,587
Total						**110,720**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923591	625,875
Subtotal	**625,875**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**625,875**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 09 - Heintz (grounds)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1506**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	47,938	**RI:**	0.20
Total Requirements Cost:	47,938		
Current Replacement Value:	239,689	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2006	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	226810	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
m.1. All Renewal - SMALL Renewal	Yes	F10 - Special Construction	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	47,938
Total						**47,938**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922732	239,689
Subtotal	**239,689**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**239,689**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 10 - Youth Soccer**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T2008**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	16,299	**RI:**	0.11
Total Requirements Cost:	16,299		
Current Replacement Value:	153,401	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	1,000SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	2150 College View Road E	**City**	ROCHESTER
Address 2	Faud Monsour Soccer Complex	**State/Province/Region**	-
Year Constructed	2008	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SIMPLE	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
Lease %:	100	**MinnState Appraisal Value (2019)**:	145158
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.2. Building Exteriors (Soft) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	15,340
I.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	959
Total						**16,299**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923622	153,401
Subtotal	**153,401**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**153,401**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 11 - Heintz (grounds)**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26275T1309**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	0	**RI:**	0.00
Total Requirements Cost:			
Current Replacement Value:	119,844	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	500SF		
Use	Storage	**Construction Type**	
Floors	1	**Historical Category**	None
Address 1	1926 College View Road E	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	2009	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	SMALL	**Mothball %**:	0
Off Campus (Owned):	No	**General Fund %**:	100
MinnState Appraisal Value (2019):	113405	**MinnState Contents Value (2019)**:	0

Requirements

No data available.

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257923575	119,844
Subtotal	**119,844**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**119,844**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Storage Building 12 - Youth Fastpitch Softball**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26257T2218**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	0	**FCI:**	0.00
RI Cost:	73,898	**RI:**	0.11
Total Requirements Cost:	73,898		
Current Replacement Value:	678,141	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	2,080SF		
Use	Storage	**Construction Type**	IBC - Type V B
Floors	1	**Historical Category**	
Address 1	Hwy. 14 E	**City**	ROCHESTER
Address 2	Rochester Regional Youth Fast Pitch Softball Complex	**State/Province/Region**	-
Year Constructed	2018	**Zip/Postal Code**	55904
Year Renovated	-	**Architect**	Widseth Smith Nolting
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	0	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Off Campus (Owned):	No	**General Fund %**:	100
Lease %:	100	**MinnState Appraisal Value (2019)**:	0
MinnState Contents Value (2019):	0		

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
e.1. HVAC - Gas Fired Renewal	Yes	D3050 - Terminal and Package Units	Lifecycle	3- Due within 5 Years of Inspection	Apr 27, 2031	73,898
Total						**73,898**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257900838	678,141
Subtotal	**678,141**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**678,141**

Facilities and Infrastructure Detail Report

By Facilities and Infrastructure Name

Colleges or Universities	**Rochester Community and Technical College**	**Facilities and Infrastructure**	**Student Services**
Campus	**Rochester Community and Technical College - Facilities**	**Facilities and Infrastructure Number**	**E26148C1073**

Facilities and Infrastructure are ordered byFacilities and Infrastructure Name **Currency: USD**

Statistics

FCI Cost:	206,892	**FCI:**	0.01
RI Cost:	2,695,998	**RI:**	0.14
Total Requirements Cost:	2,695,998		
Current Replacement Value:	18,729,168	**Date of most Recent Assessment:**	May 28, 2021
Type	Building		
Area	45,430SF		
Use	Administration	**Construction Type**	
Floors	3	**Historical Category**	None
Address 1	851 30TH AVENUE SOUTHEAST	**City**	ROCHESTER
Address 2	-	**State/Province/Region**	-
Year Constructed	1973	**Zip/Postal Code**	55904
Year Renovated	1993	**Architect**	-
Ownership	Owned	**Commission Date**	-
		Decommission Date	-
Insured Value:	14584477	**B3 Guidelines Apply**:	No
Basement:	No	**Elevator Penthouse**:	No
Model Type:	BASIC	**Mothball %**:	0
Off Campus (Owned):	No	**MinnState Latitude**:	N 44-00-51.2
MinnState Longitude:	W 092-25-20.4	**General Fund %**:	100
MinnState Appraisal Value (2019):	15739000	**MinnState Contents Value (2019)**:	0

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
b.1. Building Exteriors (Hard) Renewal	Yes	B20 - Exterior Enclosure	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	522,674
d.1. HVAC - Equipment Renewal	Yes	D30 - HVAC	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2028	696,899
d.2. HVAC - Controls Renewal	Yes	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 30, 2018	206,892
f.1. Electrical Equipment Renewal	Yes	D50 - Electrical	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	93,646
g.1. Plumbing Fixtures Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2023	239,559
j.1. Fire Detection Systems Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2031	217,781
l.2. Interior Finishes Renewal	Yes	C30 - Interior Finishes	Lifecycle	3- Due within 5 Years of Inspection	Jun 30, 2024	718,547
Total						**2,695,998**

Replacement Value Based on System Cost with Overheads

Worksheet Costs

Name	Cost
CRONAN_1618257922607	18,729,168
Subtotal	**18,729,168**

Overhead Costs

Description	Cost
	0
Total Replacement Value Based on Worksheet Cost with Overheads	**18,729,168**

MINNESOTA STATE

5 Yr Renewal Report

By Category

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Art Hall-E26148C0972

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	3- Due within 5 Years of Inspection	Plumbing System	2022	Jun 30, 2022		Open	g.2. Plumbing Rough-in	147,050
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	87,311
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	3- Due within 5 Years of Inspection	HVAC System	2022	Jun 30, 2022		Open	e.1. HVAC - Distribution	312,481
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2028	Jun 30, 2028		Open	l.2. Interior Finishes	75,809
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2024	Jun 30, 2024		Open	j.1. Fire Detection Systems	45,953
									Lifecycle	**668,604**
									Art Hall-E26148C0972	**668,604**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Atrium-E26148C1593

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	160,898
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2023	Jun 30, 2023		Open	b.1. Building Exteriors (Hard)	386,156
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	3- Due within 5 Years of Inspection	Electrical System	2023	Jun 30, 2023		Open	f.1. Electrical Equipment	103,779
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2023	Jun 30, 2023		Open	g.1. Plumbing Fixtures	176,988
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	265,434
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.1. HVAC - Equipment	514,874
									Lifecycle	**1,608,129**
									Atrium-E26148C1593	**1,608,129**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Career and Technical Education Center-E26148C2016

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2031	Jun 30, 2031		Open	I.2. Interior Finishes	302,365
									Lifecycle	**302,365**
									Career and Technical Education Center-E26148C2016	**302,365**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Central Chiller Plant-E26148C2420

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Coffman Hall-E26148C0268

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2031	Jun 30, 2031		Open	d.2. HVAC - Controls	177,361
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2020	Jan 1, 2020		Open	g.1. Plumbing Fixtures	278,118
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	89,576
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2029	Jun 30, 2029		Open	i.1. Fire Protection Systems	98,534
									Lifecycle	**643,589**
									Coffman Hall-E26148C0268	**643,589**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: College Center-E26148C0872

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	g.2. Plumbing Rough-in - 1972 Original Renewal	D2020 - Domestic Water Distribution	3- Due within 5 Years of Inspection	Plumbing System	2022	Jun 30, 2022		Open	g.2. Plumbing Rough-in - 1972 Original	523,035
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	606,692
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	809,070
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	204,311
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	3- Due within 5 Years of Inspection	HVAC System	2022	Jun 30, 2022		Open	e.1. HVAC - Distribution	1,389,312
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2032	Jun 30, 2032		Open	i.1. Fire Protection Systems	224,742
									Lifecycle	**3,757,162**
									College Center-E26148C0872	**3,757,162**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: East Hall-E26148C1386

Reporting Currency : USD
Prime System :All
Requirement Priority : 3- Due within 5 Years of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	642,719
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2021	Jun 30, 2021		Open	d.1. HVAC - Equipment	256,114
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2026	Jun 30, 2026		Open	i.1. Fire Protection Systems	178,533
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	162,303
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2021	Jun 30, 2021		Open	d.1. HVAC - Equipment	597,599
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	535,502
									Lifecycle	**2,372,770**
									East Hall-E26148C1386	**2,372,770**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Endicott Hall-E26148C0368

Reporting Currency : USD
Prime System :All
Requirement Priority : 3- Due within 5 Years of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	15,246
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2028	Jun 30, 2028		Open	l.2. Interior Finishes	289,681
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2032	Jun 30, 2032		Open	i.1. Fire Protection Systems	101,661
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	365,980
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2028	Jun 30, 2028		Open	g.1. Plumbing Fixtures	101,661
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	92,419
									Lifecycle	**966,648**
									Endicott Hall-E26148C0368	**966,648**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Goddard Library-E26148C0168

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2023	Jun 30, 2023		Open	d.2. HVAC - Controls	350,546
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	184,498
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2029	Jun 30, 2029		Open	i.1. Fire Protection Systems	202,948
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2025	Jun 30, 2025		Open	l.2. Interior Finishes	608,732
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	3- Due within 5 Years of Inspection	Equipment and Furnishings	2028	Jun 30, 2028		Open	k.1. Built-in Equipment	350,546
									Lifecycle	**1,697,270**
									Goddard Library-E26148C0168	**1,697,270**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Grounds Storage Garage-E26148C2119

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	Fire Alarm System Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2029	Jan 1, 2029		Open	Fire Alarm System	15,604
									Lifecycle	**15,604**
									Grounds Storage Garage-E26148C2119	**15,604**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Health Science Hall-E26148C0570

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	c.1. Elevators Renewal	D10 - Conveying	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2032	Jun 30, 2032		Open	c.1. Elevators	176,890
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	3- Due within 5 Years of Inspection	Equipment and Furnishings	2032	Jun 30, 2032		Open	k.1. Built-in Equipment	373,435
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2032	Jun 30, 2032		Open	a.5. Roofing - Builit-up, Membrane, Cedar	239,909
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2027	Jun 30, 2027		Open	j.1. Fire Detection Systems	196,545
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2022	Jun 30, 2022		Open	l.2. Interior Finishes	648,479
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2027	Jun 30, 2027		Open	d.2. HVAC - Controls	373,435
									Lifecycle	**2,008,693**
									Health Science Hall-E26148C0570	**2,008,693**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center 76 Rem. & Add. (H1100 Suite)-E26275T0276

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	3- Due within 5 Years of Inspection	HVAC System	2026	Jun 30, 2026		Open	e.1. HVAC - Distribution	456,367
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	3- Due within 5 Years of Inspection	Plumbing System	2026	Jun 30, 2026		Open	g.2. Plumbing Rough-in	214,761
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	j.1. Fire Detection Systems	67,113
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	127,514
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	221,432
									Lifecycle	**1,087,187**
									Heintz Center 76 Rem. & Add. (H1100 Suite)-E26275T0276	**1,087,187**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Diesel Truck. (H1100 Suite)-E26275T0379

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	7,938
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	j.1. Fire Detection Systems	15,877
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	3- Due within 5 Years of Inspection	Plumbing System	2029	Jun 30, 2029		Open	g.2. Plumbing Rough-in	18,259
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	3- Due within 5 Years of Inspection	HVAC System	2029	Jun 30, 2029		Open	e.1. HVAC - Distribution	47,631
									Lifecycle	**89,705**
									Heintz Center Diesel Truck. (H1100 Suite)-E26275T0379	**89,705**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Horticulture (H1200 Suite)-E26275T1302

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	j.1. Fire Detection Systems	94,917
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2032	Jun 30, 2032		Open	b.1. Building Exteriors (Hard)	227,800
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2032	Jun 30, 2032		Open	g.1. Plumbing Fixtures	275,258
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2022	Jun 30, 2022		Open	d.2. HVAC - Controls	360,683
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2027	Jun 30, 2027		Open	a.5. Roofing - Builit-up, Membrane, Cedar	233,585
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	3- Due within 5 Years of Inspection	Equipment and Furnishings	2027	Jun 30, 2027		Open	k.1. Built-in Equipment	1,328,833
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	f.1. Electrical Equipment	616,958
									Lifecycle	**3,138,034**
									Heintz Center Horticulture (H1200 Suite)-E26275T1302	**3,138,034**

MINNESOTA STATE

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Main Bldg (H1100 & H1400 Suites)-E26275T0169

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	j.1. Fire Detection Systems	375,036
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	742,571
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	1,237,393
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	742,571
									Lifecycle	**3,097,571**
									Heintz Center Main Bldg (H1100 & H1400 Suites)-E26275T0169	**3,097,571**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Phase I Add. (H1300 Suite)-E26275T0886

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2026	Jun 30, 2026		Open	i.1. Fire Protection Systems	369,120
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	j.1. Fire Detection Systems	335,564
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	2,020,095
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2021	Jun 30, 2021		Open	d.1. HVAC - Equipment	2,210,696
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	1,107,160
									Lifecycle	**6,042,635**
									Heintz Center Phase I Add. (H1300 Suite)-E26275T0886	**6,042,635**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Workforce Add. (H1000 Suite)-E26148C1714

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2029	Jun 30, 2029		Open	I.2. Interior Finishes	348,123
Lifecycle	a.4. Roofing - MnSCU Standard Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2025	Jun 30, 2025		Open	a.4. Roofing - MnSCU Standard	1,474,760
									Lifecycle	**1,822,883**
									Heintz Center Workforce Add. (H1000 Suite)-E26148C1714	**1,822,883**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Hill Theater-E26148C1174

Reporting Currency : USD
Prime System :All
Requirement Priority : 3- Due within 5 Years of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	3- Due within 5 Years of Inspection	HVAC System	2024	Jun 30, 2024		Open	e.1. HVAC - Distribution	628,059
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	365,752
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	3- Due within 5 Years of Inspection	Plumbing System	2024	Jun 30, 2024		Open	g.2. Plumbing Rough-in	295,557
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2019	Jan 1, 2019		Open	l.2. Interior Finishes	213,316
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2019	Jan 1, 2019		Open	l.2. Interior Finishes	60,948
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	92,362
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	3- Due within 5 Years of Inspection	Fire Protection	2032	Jun 30, 2032		Open	i.1. Fire Protection Systems	101,598
									Lifecycle	**1,757,592**
									Hill Theater-E26148C1174	**1,757,592**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Memorial Hall-E26148C2320

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Sports Center-E26275T1202

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2022	Jun 30, 2022		Open	d.2. HVAC - Controls	3,325,077
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	3- Due within 5 Years of Inspection	Electrical System	2032	Jun 30, 2032		Open	f.1. Electrical Equipment	2,375,055
Lifecycle	c.1. Elevators Renewal	D10 - Conveying	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2027	Jun 30, 2027		Open	c.1. Elevators	497,105
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2032	Jun 30, 2032		Open	g.1. Plumbing Fixtures	607,572
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	3- Due within 5 Years of Inspection	Equipment and Furnishings	2027	Jun 30, 2027		Open	k.1. Built-in Equipment	1,049,443
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2032	Jun 30, 2032		Open	b.1. Building Exteriors (Hard)	1,325,612
									Lifecycle	**9,179,864**
									Rochester Regional Sports Center-E26275T1202	**9,179,864**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Dome-E26275T1203

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.2. Building Exteriors (Soft) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2028	Jun 30, 2028		Open	b.2. Building Exteriors (Soft)	1,349,926
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2028	Jun 30, 2028		Open	j.1. Fire Detection Systems	168,741
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	337,482
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	84,370
									Lifecycle	**1,940,519**
									Rochester Regional Stadium Dome-E26275T1203	**1,940,519**

MINNESOTA STATE

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Entry Building-E26148C1815

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2030	Jun 30, 2030		Open	I.2. Interior Finishes	32,709
									Lifecycle	**32,709**
									Rochester Regional Stadium Entry Building-E26148C1815	**32,709**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Garage (air-lock)-E26275T2011

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.2. HVAC - Controls	6,053
									Lifecycle	**6,053**
									Rochester Regional Stadium Garage (air-lock)-E26275T2011	**6,053**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Support Building-E26148C1915

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2030	Jun 30, 2030		Open	I.2. Interior Finishes	103,361
									Lifecycle	**103,361**
									Rochester Regional Stadium Support Building-E26148C1915	**103,361**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Science & Technology Hall-E26148C1693

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2023	Jun 30, 2023		Open	g.1. Plumbing Fixtures	806,368
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2023	Jun 30, 2023		Open	b.1. Building Exteriors (Hard)	667,339
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	3- Due within 5 Years of Inspection	Electrical System	2023	Jun 30, 2023		Open	f.1. Electrical Equipment	361,475
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.1. HVAC - Equipment	2,382,400
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	l.2. Interior Finishes	917,424
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	278,058
									Lifecycle	**5,413,064**
									Science & Technology Hall-E26148C1693	**5,413,064**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Singley Hall-E26148C0468

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2028	Jun 30, 2028		Open	g.1. Plumbing Fixtures	111,248
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	101,134
									Lifecycle	**212,382**
									Singley Hall-E26148C0468	**212,382**

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Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 01 - Main Campus East (south)-E26275T0101

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	m.1. All Renewal - SMALL Renewal	F10 - Special Construction	3- Due within 5 Years of Inspection	Special Construction	2026	Jun 30, 2026		Open	m.1. All Renewal - SMALL	47,938
									Lifecycle	**47,938**
									Storage Building 01 - Main Campus East (south)-E26275T0101	**47,938**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 02 - Main Campus East (north)-E26275T0201

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	m.1. All Renewal - SMALL Renewal	F10 - Special Construction	3- Due within 5 Years of Inspection	Special Construction	2026	Jun 30, 2026		Open	m.1. All Renewal - SMALL	47,938
									Lifecycle	**47,938**
						Storage Building 02 - Main Campus East (north)-E26275T0201				**47,938**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 04 - Heintz (brown - south)-E26275T0782

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2022	Jun 30, 2022		Open	a.5. Roofing - Builit-up, Membrane, Cedar	11,797
									Lifecycle	**11,797**
									Storage Building 04 - Heintz (brown - south)-E26275T0782	**11,797**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 05 - Heintz (brown - north)-E26275T0990

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.2. Building Exteriors (Soft) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2023	Jun 30, 2023		Open	b.2. Building Exteriors (Soft)	15,340
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2023	Jun 30, 2023		Open	a.5. Roofing - Builit-up, Membrane, Cedar	11,797
									Lifecycle	**27,137**
									Storage Building 05 - Heintz (brown - north)-E26275T0990	**27,137**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 06 - Youth Baseball-E26275T1094

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 07 - Youth Football-E26275T1195

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 08 - Heintz (large)-E26275T1700

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.2. Building Exteriors (Soft) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2022	Jun 30, 2022		Open	b.2. Building Exteriors (Soft)	62,587
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	3- Due within 5 Years of Inspection	Exterior Enclosure	2027	Jun 30, 2027		Open	a.5. Roofing - Builit-up, Membrane, Cedar	48,133
									Lifecycle	**110,720**
									Storage Building 08 - Heintz (large)-E26275T1700	**110,720**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 09 - Heintz (grounds)-E26148C1506

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	m.1. All Renewal - SMALL Renewal	F10 - Special Construction	3- Due within 5 Years of Inspection	Special Construction	2031	Jun 30, 2031		Open	m.1. All Renewal - SMALL	47,938
									Lifecycle	**47,938**
									Storage Building 09 - Heintz (grounds)-E26148C1506	**47,938**

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Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 10 - Youth Soccer-E26275T2008

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.2. Building Exteriors (Soft) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2028	Jun 30, 2028		Open	b.2. Building Exteriors (Soft)	15,340
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2023	Jun 30, 2023		Open	I.2. Interior Finishes	959
									Lifecycle	**16,299**
									Storage Building 10 - Youth Soccer-E26275T2008	**16,299**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 11 - Heintz (grounds)-E26275T1309

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 12 - Youth Fastpitch Softball-E26257T2218

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	e.1. HVAC - Gas Fired Renewal	D3050 - Terminal and Package Units	3- Due within 5 Years of Inspection	HVAC System	2031	Apr 27, 2031		Open	e.1. HVAC - Gas Fired	73,898
									Lifecycle	**73,898**
									Storage Building 12 - Youth Fastpitch Softball-E26257T221ɛ	**73,898**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Student Services-E26148C1073

Reporting Currency : USD
Prime System :All
Requirement Priority : **3- Due within 5 Years of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	j.1. Fire Detection Systems Renewal	D5037 - Fire Alarm Systems	3- Due within 5 Years of Inspection	Electrical System	2031	Jun 30, 2031		Open	j.1. Fire Detection Systems	217,781
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	3- Due within 5 Years of Inspection	Electrical System	2023	Jun 30, 2023		Open	f.1. Electrical Equipment	93,646
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	3- Due within 5 Years of Inspection	Plumbing System	2023	Jun 30, 2023		Open	g.1. Plumbing Fixtures	239,559
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	3- Due within 5 Years of Inspection	Exterior Enclosure	2023	Jun 30, 2023		Open	b.1. Building Exteriors (Hard)	522,674
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	3- Due within 5 Years of Inspection	HVAC System	2028	Jun 30, 2028		Open	d.1. HVAC - Equipment	696,899
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	3- Due within 5 Years of Inspection	Interior Construction and Conveyance	2024	Jun 30, 2024		Open	l.2. Interior Finishes	718,547
									Lifecycle	**2,489,106**
									Student Services-E26148C1073	**2,489,106**

Rochester Community and Technical College - Facilities	**50,837,164**
Rochester Community and Technical College	**50,837,164**
Summary	**50,837,164**

Current Backlog Report

By Category

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Art Hall-E26148C0972

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	1- Due within 1 Year of Inspection	Plumbing System	2018	Jun 30, 2018		Open	g.1. Plumbing Fixtures	25,274
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	110,287
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	87,311
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.1. HVAC - Equipment	124,992
									Lifecycle	**347,864**
									Art Hall-E26148C0972	**347,864**

MINNESOTA STATE

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Atrium-E26148C1593

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	1- Due within 1 Year of Inspection	Exterior Enclosure	2019	Jun 30, 2019		Open	a.5. Roofing - Builit-up, Membrane, Cedar	831,522
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.2. HVAC - Controls	152,853
									Lifecycle	**984,375**
									Atrium-E26148C1593	**984,375**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Career and Technical Education Center-E26148C2016

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Central Chiller Plant-E26148C2420

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Coffman Hall-E26148C0268

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.1. HVAC - Equipment	94,234
Lifecycle	e.1. HVAC - Distribution Renewal	D3040 - Distribution Systems	1- Due within 1 Year of Inspection	HVAC System	2019	Jun 30, 2019		Open	e.1. HVAC - Distribution	609,120
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	170,195
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	I.2. Interior Finishes	295,548
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	214,983
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	1- Due within 1 Year of Inspection	Plumbing System	2018	Jun 30, 2018		Open	g.2. Plumbing Rough-in	257,980
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	a.5. Roofing - Builit-up, Membrane, Cedar	973,808
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.2. HVAC - Controls	177,361
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	28,888
									Lifecycle	**2,822,117**
									Coffman Hall-E26148C0268	**2,822,117**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: College Center-E26148C0872

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.1. HVAC - Equipment - 1972 Air Handlers Renewal	D30 - HVAC	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.1. HVAC - Equipment - 1972 Air Handlers	806,005
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	310,552
Lifecycle	g.1. Plumbing Fixtures - 1972 2nd Fl Renewal	D2010 - Plumbing Fixtures	1- Due within 1 Year of Inspection	Plumbing System	2018	Jun 30, 2018		Open	g.1. Plumbing Fixtures - 1972 2nd Fl	55,062
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	490,345
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	43,927
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	a.5. Roofing - Builit-up, Membrane, Cedar	553,078
									Lifecycle	**2,258,969**
									College Center-E26148C0872	**2,258,969**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: East Hall-E26148C1386

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	389,527
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	308,375
Lifecycle	c.1. Elevators Renewal	D10 - Conveying	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	c.1. Elevators	146,072
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	34,895
									Lifecycle	**878,869**
									East Hall-E26148C1386	**878,869**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Endicott Hall-E26148C0368

Reporting Currency : USD
Prime System :All
Requirement Priority : 1- Due within 1 Year of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	158,961
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	221,806
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	175,596
									Lifecycle	**556,363**
									Endicott Hall-E26148C0368	**556,363**

MINNESOTA STATE

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Goddard Library-E26148C0168

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	a.5. Roofing - Builit-up, Membrane, Cedar	908,081
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	317,336
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	442,795
									Lifecycle	**1,668,212**
									Goddard Library-E26148C0168	**1,668,212**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Grounds Storage Garage-E26148C2119

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Health Science Hall-E26148C0570

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center 76 Rem. & Add. (H1100 Suite)-E26275T0276

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	86,576
Lifecycle	d.1. HVAC - Equipment Renewal	D30 - HVAC	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.1. HVAC - Equipment	214,761
									Lifecycle	**301,337**
									Heintz Center 76 Rem. & Add. (H1100 Suite)-E26275T0276	**301,337**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Diesel Truck. (H1100 Suite)-E26275T0379

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	9,526
Lifecycle	i.1. Fire Protection Systems Renewal	D40 - Fire Protection	1- Due within 1 Year of Inspection	Fire Protection	2019	Jun 30, 2019		Open	i.1. Fire Protection Systems	11,908
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	95,262
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2019	Jun 30, 2019		Open	d.2. HVAC - Controls	31,754
									Lifecycle	**148,450**
									Heintz Center Diesel Truck. (H1100 Suite)-E26275T0379	**148,450**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Horticulture (H1200 Suite)-E26275T1302

Reporting Currency : USD
Prime System :All
Requirement Priority : 1- Due within 1 Year of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	I.2. Interior Finishes	313,168
									Lifecycle	**313,168**
									Heintz Center Horticulture (H1200 Suite)-E26275T1302	**313,168**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Main Bldg (H1100 & H1400 Suites)-E26275T0169

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	483,796
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	1- Due within 1 Year of Inspection	Plumbing System	2019	Jun 30, 2019		Open	g.2. Plumbing Rough-in	1,200,115
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	900,086
									Lifecycle	**2,583,997**
									Heintz Center Main Bldg (H1100 & H1400 Suites)-E26275T0169	**2,583,997**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Phase I Add. (H1300 Suite)-E26275T0886

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	805,354
Lifecycle	a.5. Roofing - Builit-up, Membrane, Cedar Renewal	B30 - Roofing	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	a.5. Roofing - Builit-up, Membrane, Cedar	44,965
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	577,170
Lifecycle	c.1. Elevators Renewal	D10 - Conveying	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	c.1. Elevators	302,008
									Lifecycle	**1,729,497**
									Heintz Center Phase I Add. (H1300 Suite)-E26275T0886	**1,729,497**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Heintz Center Workforce Add. (H1000 Suite)-E26148C1714

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

MINNESOTA STATE

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Hill Theater-E26148C1174

Reporting Currency : USD
Prime System :All
Requirement Priority : 1- Due within 1 Year of Inspection
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	39,715
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	l.2. Interior Finishes	30,474
Lifecycle	g.1. Plumbing Fixtures Renewal	D2010 - Plumbing Fixtures	1- Due within 1 Year of Inspection	Plumbing System	2018	Jun 30, 2018		Open	g.1. Plumbing Fixtures	101,598
Lifecycle	d.1. HVAC - 1974 Air Handlers Renewal	D30 - HVAC	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.1. HVAC - 1974 Air Handlers	340,075
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	221,668
									Lifecycle	**733,530**
									Hill Theater-E26148C1174	**733,530**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Memorial Hall-E26148C2320

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Sports Center-E26275T1202

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	I.2. Interior Finishes Renewal	C30 - Interior Finishes	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	I.2. Interior Finishes	1,822,385
									Lifecycle	**1,822,385**
									Rochester Regional Sports Center-E26275T1202	**1,822,385**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Dome-E26275T1203

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Entry Building-E26148C1815

Reporting Currency : USD
Prime System :All
Requirement Priority : 1- Due within 1 Year of Inspection
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Garage (air-lock)-E26275T2011

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Rochester Regional Stadium Support Building-E26148C1915

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Science & Technology Hall-E26148C1693

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.2. HVAC - Controls	1,101,109
									Lifecycle	**1,101,109**
									Science & Technology Hall-E26148C1693	**1,101,109**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Singley Hall-E26148C0468

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	k.1. Built-in Equipment Renewal	E - Equipment and Furnishings	1- Due within 1 Year of Inspection	Equipment and Furnishings	2018	Jun 30, 2018		Open	k.1. Built-in Equipment	192,155
Lifecycle	l.2. Interior Finishes Renewal	C30 - Interior Finishes	1- Due within 1 Year of Inspection	Interior Construction and Conveyance	2018	Jun 30, 2018		Open	l.2. Interior Finishes	333,682
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.2. HVAC - Controls	192,155
Lifecycle	g.2. Plumbing Rough-in Renewal	D2020 - Domestic Water Distribution	1- Due within 1 Year of Inspection	Plumbing System	2018	Jun 30, 2018		Open	g.2. Plumbing Rough-in	323,629
Lifecycle	f.1. Electrical Equipment Renewal	D50 - Electrical	1- Due within 1 Year of Inspection	Electrical System	2018	Jun 30, 2018		Open	f.1. Electrical Equipment	173,951
Lifecycle	b.1. Building Exteriors (Hard) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.1. Building Exteriors (Hard)	242,722
									Lifecycle	**1,458,294**
									Singley Hall-E26148C0468	**1,458,294**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 01 - Main Campus East (south)-E26275T0101

Reporting Currency : USD
Prime System :All
Requirement Priority : 1- Due within 1 Year of Inspection
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 02 - Main Campus East (north)-E26275T0201

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 04 - Heintz (brown - south)-E26275T0782
Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	b.2. Building Exteriors (Soft) Renewal	B20 - Exterior Enclosure	1- Due within 1 Year of Inspection	Exterior Enclosure	2018	Jun 30, 2018		Open	b.2. Building Exteriors (Soft)	15,340
									Lifecycle	**15,340**
									Storage Building 04 - Heintz (brown - south)-E26275T0782	**15,340**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 05 - Heintz (brown - north)-E26275T0990

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 06 - Youth Baseball-E26275T1094

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	m.1. All Renewal - SMALL Renewal	F10 - Special Construction	1- Due within 1 Year of Inspection	Special Construction	2019	Jun 30, 2019		Open	m.1. All Renewal - SMALL	41,418
									Lifecycle	**41,418**
									Storage Building 06 - Youth Baseball-E26275T1094	**41,418**

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 07 - Youth Football-E26275T1195

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 08 - Heintz (large)-E26275T1700

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 09 - Heintz (grounds)-E26148C1506

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 10 - Youth Soccer-E26275T2008

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 11 - Heintz (grounds)-E26275T1309

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Storage Building 12 - Youth Fastpitch Softball-E26257T2218

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All
No Data Available

Requirement List Report
By Category

Colleges or Universities Name: Rochester Community and Technical College

Campus Name: Rochester Community and Technical College - Facilities

Facilities and Infrastructure Name: Student Services-E26148C1073

Reporting Currency : USD
Prime System :All
Requirement Priority : **1- Due within 1 Year of Inspection**
Requirement Category : All
Requirements Included: All

Category	Requirement Name	Prime System	Priority	System Group	Action Year	Action Date	Finish Date	Status	Linked System	Requirement Cost
Lifecycle	d.2. HVAC - Controls Renewal	D3060 - Controls and Instrumentation	1- Due within 1 Year of Inspection	HVAC System	2018	Jun 30, 2018		Open	d.2. HVAC - Controls	206,892
									Lifecycle	**206,892**
									Student Services-E26148C1073	**206,892**
								Rochester Community and Technical College - Facilities	**19,972,186**	
								Rochester Community and Technical College	**19,972,186**	
								Summary	**19,972,186**	

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

Higher Education Asset Preservation and Renewal (HEAPR) Manual

TKDA Project No. 15460.001
December 2020
Updated: March 2021

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

TABLE OF CONTENTS

Note: See individual project sheets where roofing reports were superseded.

PART 1 – PROJECT SUMMARY

EXECUTIVE SUMMARY STATEMENT

This Higher Education Asset Preservation and Renewal (HEAPR) Manual provides a general overview of deferred maintenance initiatives and initial budget forecasting. The manual provides a general outline of work anticipated for the site parking, grounds and utilities; building envelope and interiors; building fire sprinkler, plumbing, HVAC, electrical, communications and life safety infrastructure. The HEAPR manual is not intended to be a detailed conditions assessment. The manual will be utilized to identify, track and prioritize HEAPR projects, and as a reference tool for future Studies, Master Planning Updates, Predesigns and Design Documents.

The following pages contain individual project sheets with the general classification of all work for each building and priority projects for the campus. Please note that the old Memorial Hall and Plaza Halls were undergoing a “rightsizing” initiative with major demolition and reconstruction occurring during the period this report was being prepared. Work in these areas is not included in this manual.

PROJECT SUMMARY LIST

PROJECT STATUS KEY

R/C - Report or Conceptual Planning **PD** - Predesign **SD** - Schematic Design **DD** - Design Development **CD** - Construction Documents

PRIORITY NO.	BUILDING or COMPLEX	PROJECT SCOPE	BUDGET ESTIMATE	PROJECT STATUS/COMMENTS
01	Main Campus Building	Science and Technology Hall and Atrium Roof Area Replacement	$1,043,000	**CD's** completed. 2021 construction scheduled.
02	Main Campus Building	Main Campus Bldg. Exterior Envelope Repairs	$1,378,000	**PD** completed. 2020 bonding request.
03	Main Campus Building	Main Campus Bldg. Exterior Window and Door Replacement	$1,291,000	**PD** completed. 2020 bonding request.
04	Main Campus Building	Coffman Hall Roof Replacement	$858,000	Updated cost estimate provided Nov. 2020 by Roofspec Inc.
05	Heintz Center	Roof Replacement, 1976 Addition (includes minor repairs to other areas)	$1,433,600	**PD** completed 2011, Inspec Inc. Last inspection by Roofspec Inc. Dec. 2019. Add 27% cost escalation to mid-year 2020.
06	Heintz Center	Exterior Envelope Repairs	$360,500	**DD** completed 2012, Kane & Johnson Architects Inc. Add 24% cost escalation to mid-year 2020.
07	Sports Facilities	Rochester Regional Sports Center Water Heater Replacement	$225,000	TKDA cost estimate from 2014. Added 18% cost escalation to mid-year 2020.
08	Main Campus Building	Student Services Roof Replacement	$859,000	**SD** Report completed Oct. 2020 by Roofspec Inc.
09	Main Campus Building	Goddard Library Roof Replacement	$1,250,000	**SD** Report completed Oct. 2020 by Roofspec Inc.
10	Main Campus Building	College Center Roof Replacement	$1,316,000	**SD** Report completed Oct. 2020 by Roofspec Inc.
11	Main Campus Building	Art Hall Roof Replacement	$602,000	**SD** Report completed Oct. 2020 by Roofspec Inc.
12	Main Campus Building	Phase II Central Chiller Plant Upgrades and System Extension to Science and Technology Bldg.	$1,392,500	**R/C** completed 2012, Stanley Consultants. Add 24% cost escalation to mid-year 2020.

PRIORITY NO.	BUILDING or COMPLEX	PROJECT SCOPE	BUDGET ESTIMATE	PROJECT STATUS/COMMENTS
13	Main Campus Building	Phase I and II Domestic Water Piping Replacement	$837,800	TKDA cost estimate from 2014. Added 18% cost escalation to mid-year 2020.
14	Main Campus Building	Phase III and IV Domestic Water Piping Replacement	$790,600	TKDA cost estimate from 2014. Added 18% cost escalation to mid-year 2020.
15	Main Campus Building	College Center Second Floor Toilet Room Renovations and Accessibility Upgrades	$300,000	
16	Heintz Center	Lighting Upgrades	$108,700	
17	Sports Facilities	Rochester Regional Sports Center Fieldhouse Floor Replacement	$456,900	Updated Feb. 2018 cost estimate furnished by RCTC. Added 12% cost escalation to February 2021.
18	Main Campus Building	Art Hall AHU Replacement and Heating System Conversion	$590,000	Air Handler & Controls est. @ $120.0K. Conversion work est. @ $470.0K
19	Main Campus Building	College Center AHU Replacement and Heating System Conversion	$1,746,000	Air Handler & Controls est. @ $365.8K. Conversion work est. @ $1.382 MM.
20	Sports Facilities	Phase III Central Chilled Plant Upgrades and System Extension to Rochester Regional Sports Center	$1,382,600	**R/C** completed 2012, Stanley Consultants. Add 24% cost escalation to mid-year 2020.
21	Main Campus Building	East Hall Entrance Vestibule Remodel and Small Addition	$320,000	

PART 2 – INDIVIDUAL PROJECT SHEETS

MAIN CAMPUS BUILDING

HEAPR MANUAL
Main Campus Building Exterior Envelope Repairs

Req. No.: 02

Institution	Rochester Community and Technical College
Campus/Building	Main Campus Building
Project Location	Rochester, MN

Date: December 2020

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$1,378,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,378,000	**Total**	

General Description of Existing Conditions and All Work

Exterior Envelope: Exterior bricks are falling from the building, chips break off, faces of brick are spalled off, mortar is missing, control joins need to be resealed. PVC flashing was brittle and has disintegrated in critical locations. Interior walls may need fixing at leaks. Paint at walls being modified will require lead testing.

Project Title – Main Campus Building Exterior Envelope Repairs

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,378,000	**Main Campus Building Exterior Envelope Repairs**
$	
$	
$1,378,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Exterior structure damage, hazard to students, migration of water and moisture vapor cause substructure and interior water damage. Loss of flashing in particular causes water migration into walls, above windows and doors, and has potential to cause mold.

This project will reduce the Main Campus Building FCI from 0.09 to 0.08.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Consultant Cost Estimate

2 Consultant Documents

KANE AND JOHNSON ARCHITECTS, INC.
460 Highway 63 North • Suite 100 • Rochester, MN • 55906
07/ 288-1839 • Fax 507/ 288-1830 • email info@kjarchitects.com

Project Construction Cost Estimate for:

Rochester Community & Technical College: 2012 Exterior Repairs @ UCR Main Campus

Architect's #2012-204

Work Scope (MASONRY TUCKPOINT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Masonry Tuckpointing	4012	$8	SF	12000	$96,000.00	based on common running bond
TOTAL COST					$96,000.00	

Work Scope (MASONRY RE-BUILD, TWF, WEEP SYSTEM and OTHER FLASHINGS)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Selective Demolition	4910	$11	VLF	1750	$18,375.00	replace 5-brick for thru-wall
Debris Disposal	2200	$70	TON	20	$1,400.00	
4x2x8 Brick	4211	$18	SF	9000	$162,000.00	based on common running bond
Weep System	7600	$9	LF	300	$2,700.00	
Thru Wall Flashing	7600	$90	LF	300	$27,000.00	
TOTAL COST					$211,480.00	

Work Scope (CAULKING REPLACEMENT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Caulking Demolition	7900	$2	LF	30000	$63,000.00	
Caulking Replacement	7900	$3	LF	30000	$90,000.00	
TOTAL COST					$153,000.00	

Work Scope (NEW METAL WINDOW SILL)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Debris Disposal	2200	$70	TON	3	$210.00	
Brick Demolition		$4	SF	750	$3,000.00	
Water Proofing		$3	SF	750	$1,875.00	
Flashing Repair		$15	LF	160	$2,400.00	
Window Repair		$12	SF	200	$2,400.00	
Metal Wall Panel and Girt Framing		$25	SF	750	$18,750.00	
TOTAL COST					$28,635.00	

Work Scope (LINTEL REPLACEMENT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Demolition		$9	SF	800	$6,800.00	
Shoring Support Systems		$23	LF	800	$18,400.00	
Replacement Lintels		$15	LF	800	$12,000.00	
TOTAL COST					$37,200.00	

Work Scope (CONCRETE CRACK REPAIR)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Surface Preparation		$7	SF	600	$4,200.00	
Epoxy Injection		$25	LF	300	$7,500.00	
Joint Routing and Soft Joint		$9	LF	1200	$10,800.00	
TOTAL COST					$22,500.00	

Work Scope (PAINTING)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Surface Preparation		$3	SF	1500	$4,500.00	
Paint Steel Frames & Lintels		$6	SF	1500	$9,000.00	
TOTAL COST					$13,500.00	

Total Work Scope Cost Basis

Masonry Tuckpoint	$96,000.00
Masonry Rebuild - TWF,WS & F	$211,480.00
Caulking Replacement	$153,000.00
New Metal Window Sill	$28,635.00
Lintel Replacement	$37,200.00
Conctete Crack Repair	$22,500.00
Painting	$13,500.00
TOTAL COST	$562,315.00

Contractor Cost Basis

Mobilization ON & OFF SITE					$28,115.75	Based on 5% of Scope Total
General Project Conditions					$28,115.75	Based on 5% of Scope Total
Overhead & Profit					$56,231.50	Based on 10% of Scope Total
Insurance					$8,434.73	Based on 1.5% of Scope Total
Bonding					$8,434.73	Based on 1.5% of Scope Total
Equipment Rental		$700	WEEK	32	$22,400.00	Lift/Reach per 32-weeks
Scaffolding	1500	$84	CSF	800	$66,800.00	Rented installed/teardown
Swing Staging (24' section per month)	1540	$1,350	EA	10	$13,500.00	Rented installed/teardown
Fencing	1560	$5	LF	1500	$7,575.00	Rented installed/teardown, 6'
TOTAL COST					$239,607.45	

Total Cost This Project

Total Work Scope Cost Basis		$562,315.00
Contractor Cost Basis		$239,607.45
Architect/Engineer Cost Basis		NIC
10% Contingency		$56,231.50
Escalation Factor	(use 3% for prior year estimate)	NIC
Location Factor	(use 12.2% for Minneapolis)	NIC
		$858,153.95 **TOTAL**

Issue Date: 4-17-2012

HEAPR MANUAL
Main Campus Building Exterior Window and Door Replacement

Req. No.: 03

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$1,291,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,291,000	**Total**	

General Description of Existing Conditions and All Work

There are a number of failing conditions around the complex that require immediate attention and repair. Water and air intrusion into that building is beginning to cause mold. Stopping the cause of the mold issue is important because East Hall is interconnected with the entire Main Campus complex and the sooner this is addressed, the better the prevention of spreading of the mold to the larger complex.

Plaza and Memorial Halls omitted from workscope. Project Submitted for 2020 HEAPR bonding.

Project Title – Main Campus Building Exterior Window and Door Replacement

Priority Project(s) and General Work Description:

$1,291,000	**Main Campus** - Exterior Window and Door Replacement
$	
$	
$1,291,000	**Total**

Explain how the priority project above will reduce the backlog of Deferred Maintenance identified for your Campus:

Continued air infiltration leading to higher energy costs. Continued water infiltration that can lead to continued mold and potential water damage to building skin and interior finishes.

This project will reduce the Coffman Center Main Campus FCI from 0.09 to 0.07.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Cost Estimates

AREA #1 – SCIENCE & TECHNOLOGY HALL – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
4	Replace broken hinges at Door 16	2	$480	$ 480
EAST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
5,8	Bio Lab Window Box Projection – investigation of leaks	4	$20,000	$ 20 ,000
WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
8	Repair and reseal glazing gaskets at windows next to Door 24 along grade level window units	5	$ 500	$ 500
10	Door 24 - Replace sweeps, weatherstrip doors	5	$1,,000	$ 1,000
Area #1 Sub-Total:	Current Cost Index			**$ 21,980**

AREA #2 – HEALTH SCIENCES – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Quantity**	**Unit Price**	**Total Price**
5,7	Repair dissimilar metal corrosion, thresholds, and reseal at Doors 17A & 17B	3	$1,100	$ 1,100
Area #2 Sub-Total:	Current Cost Index			**$ 1,100**

AREA #3 – SINGLEY HALL – PRIORITY ONE COST ESTIMATE: None.

AREA #4 – ENDICOTT HALL – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace broken window above Door 27	8	N/A	(Already addressed by Owner)
WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
10	Door 26 A & B - Replace doors and sidelight (5'x7')	8	$ 11,450	$ 11,450
10	Door 27 - Replace door and sidelight	8	$5,140	$ 5,140
10	Door 28 - Replace door and sidelight	9	$5,140	$ 5,140
Area #4 Sub-Total:	Current Cost Index			**$ 21,730**

AREA #5 – COFFMAN CENTER – PRIORITY ONE COST ESTIMATE:

SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
8,13	Reglaze and reseal entire curtainwall systems at all horizontal curtainwall mullion lites and replace fogged glass lites at 4 locations	10 & 12	$23,200	$ 23,200
3	Door 29 Vestibule - Replace side windows and add sill curbs	11	$19,200	$ 19,200
ROOF SKYLIGHT:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
1	Re-capseal glazing joints and reseal entire skylight base (400 lf)	Main Roof 2 & 3	$2,000	$ 2,000
Area #5 Sub-Total:	Current Cost Index			**$ 44,400**

AREA #6 – GODDARD LIBRARY – PRIORITY ONE COST ESTIMATE:

ROOF:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
12	Door R5 - Clean, prep, and paint	Main Roof 3	$ 1,000	$ 1,000
Area #6 Sub-Total:	Current Cost Index			**$ 1,000**

AREA #7 – ADMINISTRATION / STUDENT SERVICES – PRIORITY ONE COST ESTIMATE: None.

AREA #8 – COLLEGE CENTER – PRIORITY ONE COST ESTIMATE:

WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
10	Reglaze fogged lite at grade level by Door 33	14 & 15	$2,100	$ 2,100
NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
10	Reglaze fogged lite at roof level, at link to Area #7		$3,200	$ 3,200
SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
12	Refinish fixed window frames on each side of Door 43	25	$ 2,000	$ 2,000
Area #8 Sub-Total:	Current Cost Index			**$ 7,300**

AREA #9 – ART HALL – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
10	Replace Door 34 and sidelights	15	$10,000	$ 10,000
10	Replace Door 35 and sidelights	15	$10,000	$ 10,000
12	Refinish and paint interior steel sill framing at link	24	$ 1,500	$ 1,500
Area #9 Sub-Total:	Current Cost Index			**$ 21,500**

REMOVED FROM SCOPE

AREA #10 – PLAZA HALL – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace fixed window at grade (8'x7') with triple glazing and new curtainwall framing	17	$ 3,640	$ 3,640
12	Refinish and paint interior steel sill framing at both links windows to Art Hall and to Memorial Hall	18	$ 3,600	$ 3,600
SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
12	Refinish and paint interior steel sill framing at both links windows to Art Hall and to Memorial Hall	18	$ 3,600	$ 3,600
12	Refinish and paint exterior steel framing at South Elevation windows only	22	$ 8,000	$ 8,000
Area #10 Sub-Total:	Current Cost Index			**$ 18,840**

REMOVED FROM SCOPE

AREA #11 – MEMORIAL HALL – PRIORITY ONE COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace upper row of fixed windows (22'x4') with triple glazing in new curtainwall framing	21	$ 11,440	$ 11,440
10,11	Doors 37 & 38 and sidelights – Replace entirely with triple glazed sidelights (dual glazed door lites)	19	$ 13,520	$ 13,520
10,11	Door 39 and sidelight – Paint and refinish frames	19	$ 80	$ 80
SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
4,12	Door 42 and sidelights – Refinish and paint frames; new hinges and threshold	23	$ 3,300	$ 3,300
WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace fixed window at 3RD Floor above Door R10 (8'x7') with triple glazing in new curtainwall framing	20	$ 4,680	$ 4,680
Area #11 Sub-Total:	Current Cost Index			**$ 33,020**

AREA #12 – MEMORIAL LECTURE HALL – PRIORITY ONE COST ESTIMATE: None.

AREA #13 – EAST HALL – PRIORITY ONE COST ESTIMATE:

Repair Tag #	Description/Solution	Report Page Reference	Unit Price	Total Price
NORTH ELEVATION:				
11	Replace horizontal ribbon curtainwall glazing and perfect primary seals; replace similar fixed windows	27 & 28	$ 45,500	$ 45,500
SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
14	Replace Kalwall skylight entirely and install proper brick masonry thru-wall flashing above	26	$ 52,500	$ 42,400
11	Replace horizontal ribbon curtainwall glazing and perfect primary seals; replace similar fixed windows	27 & 28	$ 15,600	$ 15,600
EAST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace horizontal ribbon curtainwall glazing and perfect primary seals; replace similar fixed windows	27 & 28	$ 59,800	$ 59,800
11	Brick masonry allowance over entire building to access curtainwall repairs	27 thru 29	$ 75,000	$ 75,000
12	Door #6 - Refurbish entry hardware hinges, screws, and bases of mullions for corrosion	28	$ 15,000	$ 15,000
Area #13 Sub-Total:	Current Cost Index			**$ 253,300**

AREA #14 – HILL THEATER – PRIORITY ONE COST ESTIMATE:

EAST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace Door 8	30	$ 5,000	$ 5,000
11	Replace Overhead Door 10	30	$15,000	$ 15,000
Area #14 Sub-Total:	Current Cost Index			**$ 20,000**

AREA #15 – ADMISSIONS / RECORDS / CASHIER (SS-1) – PRIORITY ONE COST ESTIMATE:

ROOF:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
1	Re-capseal all glazing joints, and reseal perimeter base (600 lf)	Main Roof 5	$ 4,000	$ 4,000
1	Special access scaffold over skylight on roof deck	Main Roof 5	$4,000	$ 4,000
Area #15 Sub-Total:	Current Cost Index			**$ 8,000**

PRIORITY ONE TOTAL CONSTRUCTION COST ESTIMATE – MAIN CAMPUS

Area #1 -		$ 21,980
Area #2 -		$ 1,100
Area #3 -		0
Area #4 -		$ 21,730
Area #5 -		$ 44,400
Area #6 -		$ 1,000
Area #7 -		0
Area #8 -		$ 7,300
Area #9 -		$ 21,500
Area #10 -		$ 18,840
Area #11 -		$ 33,020
Area #12 -		0
Area #13 -		$ 253,300
Area #14 -		$ 20,000
Area #15 -		$ 8,000
	All Building Entities Sub-Total:	**$ 452,170**
	Demolition – General (10%):	$ 45,217
	Access Labor Time for Small Project Scope Sizes (20%):	$ 99,477
	Contingency (10%):	$ 59,686
	Bond (0.6%):	$ 3,939
	Builders Risk (1%):	$ 6,605
	Building Permits (2%):	$ 13,342
	Sub-Total:	**$ 680,436**
	Overhead & Profit (20%):	$ 136,087
	General Conditions (5%):	$ 40,826
	2013 Estimated Construction Cost Estimate:	**$ 857,349**

Note: Priority Two cost estimates are totalled in 2016 dollars with a 4% per year inflation factor included on the original base 2013 cost estimates. Because Priority Two estimates project out 3 to 10 years, any work considered after 2016 would have to have additional inflation factors applied.

AREA #1 – SCIENCE & TECHNOLOGY HALL – PRIORITY TWO COST ESTIMATE: None.

AREA #2 – HEALTH SCIENCES – PRIORITY TWO COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
5	Replace rusty screws at Doors 19 & 20	3 & 4	$ 400	$ 400
Area #2 Sub-Total:	Current Cost Index			**$ 400**
Area #2 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 450**

AREA #3 – SINGLEY HALL – PRIORITY TWO COST ESTIMATE:

WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
5	Door 25 – Replace door and sidelight entirely	7	$ 4,300	$ 4,300
Area #3 Sub-Total:	Current Cost Index			**$ 4,300**
Area #3 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 4,837**

AREA #4 – ENDICOTT HALL – PRIORITY TWO COST ESTIMATE: None.

AREA #5 – COFFMAN CENTER – PRIORITY TWO COST ESTIMATE:

ROOF:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
14	Replace Kalwall skylight entirely (28'x15')	Main Roof 2,3	$ 33,280	$ 33,280
Area #5 Sub-Total:	Current Cost Index			**$ 33,280**
Area #5 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 37,436**

AREA #6 – GODDARD LIBRARY – PRIORITY TWO COST ESTIMATE:

ROOF:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace pair of slotted windows entirely	Main Roof 4	$ 4,375	$ 4,375
--	Install masonry sill curbs for pair of slotted windows	Main Roof 4	$ 4,000	$ 4,000
11	Replace single punched window entirely	Main Roof 4	$ 2,400	$ 2,400
--	Install masonry sill curbs for single punched window	Main Roof 4	$ 2,000	$ 2,000
Area #6 Sub-Total:	Current Cost Index			**$ 12,775**
Area #6 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 14,370**

AREA #7 – ADMINISTRATION / STUDENT SERVICES – PRIORITY TWO COST ESTIMATE:

SOUTH ELEVATION:				
Repair Tag #	Description/Solution	Report Page Reference	Unit Price	Total Price
10	Door 31 – Reseal perimeter framing	12	$ 80	$ 80
Area #7 Sub-Total:	Current Cost Index			**$ 80**
Area #7 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 90**

AREA #8 – COLLEGE CENTER – PRIORITY TWO COST ESTIMATE:

WEST ELEVATION:				
Repair Tag #	Description/Solution	Report Page Reference	Unit Price	Total Price
10	Door 33 – Replace Doors A, B, C, D entirely	14	$26,400	$ 26,400
SOUTH ELEVATION:				
Repair Tag #	Description/Solution	Report Page Reference	Unit Price	Total Price
10	Door 32 – Replace entirely	13	$ 9,000	$ 9,000
Area #8 Sub-Total:	Current Cost Index			**$ 35,400**
Area #8 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 39,820**

AREA #9 – ART HALL – PRIORITY TWO COST ESTIMATE:

SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
10	Replace curtainwall at link to College Center entirely	25	$19,600	$ 19,600
Area #9 Sub-Total:	Current Cost Index			**$ 19,600**
Area #9 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 22,047**

AREA #10 – PLAZA HALL – PRIORITY TWO COST ESTIMATE: None.

REMOVED FROM SCOPE

AREA #11 – MEMORIAL HALL – PRIORITY TWO COST ESTIMATE:

NORTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace entire elevation of fixed windows, and also provide precast sills at grade level fixed windows	20	$ 65,000	$ 65,000
11	Replace sill masonry and provide precast sills at grade level fixed windows	20	$ 15,000	$ 15,000
10	Doors 36A & 36B - Replace entire door system	18	$ 7,600	$ 7,600
11	Replace fixed window between Doors 36A & 36B – 4 ea fixed lites (16'x7') total	18	$ 11,200	$ 11,200
SOUTH ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace entire elevation of fixed windows	21	$ 70,000	$ 70,000
10	Replace entire roof access door and sidelight	-	$ 4,300	$ 4,300
WEST ELEVATION:				
Repair Tag #	**Description/Solution**	**Report Page Reference**	**Unit Price**	**Total Price**
11	Replace fixed window at 3RD Floor above Door R10 (8'x7')	20	$ 3,600	$ 3,600
Area #11 Sub-Total:	Current Cost Index			**$ 176,700**
Area #11 Sub-Total:	(With 4% per year applied to start in 2016 for the Priority Two 3 to 10 year period)			**$ 198,764**

AREA #12 – MEMORIAL LECTURE HALL – PRIORITY TWO COST ESTIMATE: None.

AREA #13 – EAST HALL – PRIORITY TWO COST ESTIMATE: None.

AREA #14 – HILL THEATER – PRIORITY TWO COST ESTIMATE: None.

AREA #15 – ADMISSIONS / RECORDS / CASHIER (SS-1) – PRIORITY TWO COST ESTIMATE: None.

PRIORITY TWO TOTAL CONSTRUCTION COST ESTIMATE – MAIN CAMPUS

Area #1 -		0
Area #2 -		$ 450
Area #3 -		$ 4,837
Area #4 -		0
Area #5 -		$ 37,436
Area #6 -		$ 14,370
Area #7 -		$ 90
Area #8 -		$ 39,820
Area #9 -		$ 22,047
Area #10 -		0
Area #11 -		$ 198,764
Area #12 -		0
Area #13 -		0
Area #14 -		0
Area #15 -		0
	All Building Entities Sub-Total:	**$ 317,814**
	Demolition – General (10%):	$ 31,781
	Access Labor Time for Small Project Scope Sizes (20%):	$ 69,919
	Contingency (10%):	$ 41,951
	Bond (0.6%):	$ 2,769
	Builders Risk (1%):	$ 4,642
	Building Permits (2%):	$ 9,378
	Sub-Total:	**$ 478,254**
	Overhead & Profit (20%):	$ 95,651
	General Conditions (5%):	$ 28,695
	2016 Estimated Construction Cost Estimate:	**$ 602,600**

HEAPR MANUAL
Coffman Hall Roof Replacement

Req. No.: 01

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by “classification of work”)*

$858,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$858,000	**Total**	

General Description of Existing Conditions and All Work

Roof is already past its useful life expectancy. Extensive leakage is causing class disruption and severe damage to infrastructure. Utility costs can be improved with better insulation. May need ceiling repair if not replaced.

1. The existing concrete deck has a structural slope of approximately 1/8 inch per foot; therefore, a fully-tapered insulation system will not be required.
2. The mechanical units and sleeper curbs will be raised to accommodate the necessary base flashing heights for the support curbs. All associated mechanical and electrical lines will require modification. This work will require the services of mechanical and electrical consultants.
3. The existing drains will be replaced with new, and new overflow drain will be provided. This work will require the services of a mechanical consultant.
4. A new OSHA-approved access ladder will be installed for access to the upper roof areas. This work will require the services of a structural consultant.
5. The existing recessed windows will be cut off in order to accommodate necessary base flashing height. This will require the services of a window consultant.
6. The brick on the wall at the east end of this roof is beginning to show signs of deterioration. Possible sources of moisture will be systematically eliminated to prevent further damage to the wall. The roof edge above on the north reroofing section will be evaluated and repaired, if necessary, as the first step. The brick face will be cleaned and monitored to see if the efflorescence returns. If repairing the upper roof edge does not eliminate the problem, the services of a masonry consultant will be required to address the wall problems.
7. MnState standards require the skylight be removed and deck replacement provided. Further discussions with MnState and the campus will be necessary if the campus wants to replace them with new. If the skylight is replaced, the walls will be covered with plywood, underlayments, and standing seam sheet metal panels. The skylights are only considered to have a 20-year life expectancy.
8. The existing sheet metal panels at the skylight penthouse walls will be removed, cut off, and reinstalled or replaced to provide the necessary base flashing heights.

Project Title - Coffman Hall Roof Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$858,000	**Coffman Center Roof Replacement**
$	
$	
$858,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Damaged classrooms, ceilings falling down, roof structures damaged. Ongoing expensive repairs. Excessive utility costs.

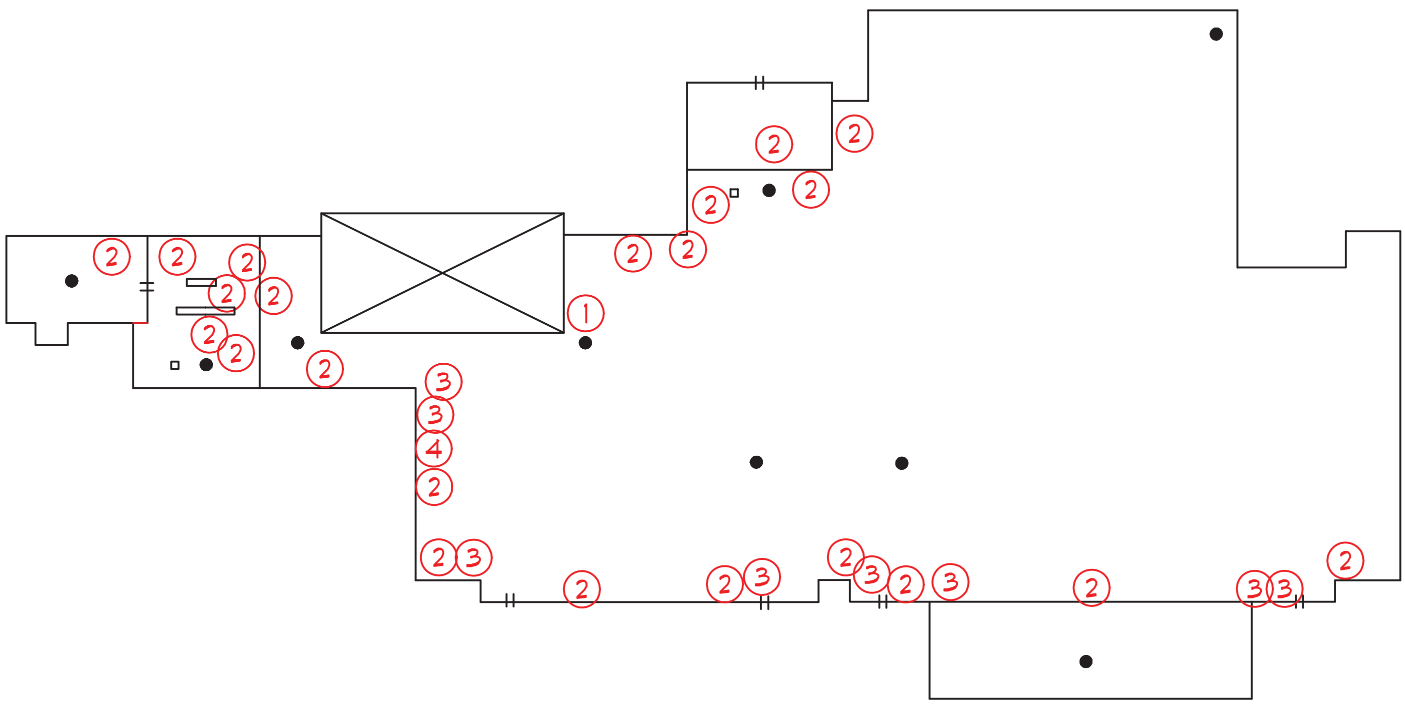
This project will reduce Coffman Center FCI from 0.33 to 0.17.

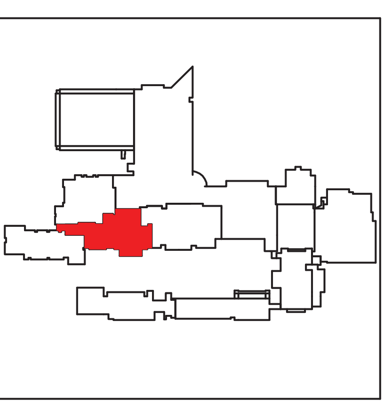
Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Roof Aerial Photo
2 Roof Plan
3 Roof Report - Roof Spec, Inc.
4 Campus Roof Plan - InSpec

Singley Hall
Coffman
Atrium
Map
Traffic
20 ft
5 m
Imagery ©2012 Google, Map data ©2012 Google -
Edit in Google Map Maker
Report a problem

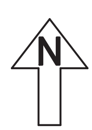
COFFMAN CENTER
CF

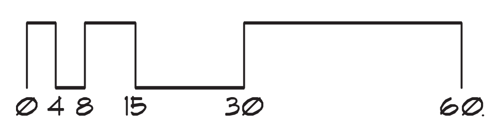




SYMBOLS KEY

ROOF CURB
ROOF DRAIN
VENT STACK
SCUPPER
SKYLIGHT
DEFECT-REPAIR





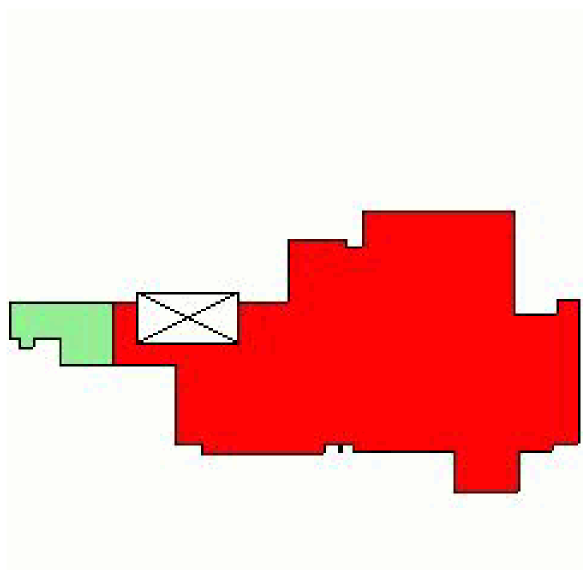
Full Facility Roof Report

Prepared for:

CC-Coffman Center

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-Coffman Center

Last Inspection Date : Sep 10, 2019

Facility: CC-Coffman Center

Contact Name:

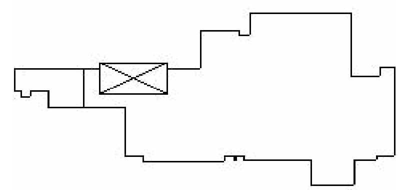
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

Type of building: Academic

Type of Neighborhood:



Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
CF1	2020	Replacement	No	Capital	Moderate	$787,000

Emergency repairs should be performed as needed to maintain a watertight condition until replacement takes place.

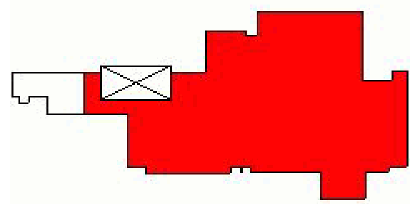
The budget cost is based on the 2011 predesign report. Recommend updating the predesign report.

$787,000

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
CF1	2020	Replacement	No	Capital	Moderate	$787,000
						$787,000

Roof Name:	E26148C0268
Roof Size:	10,000 sq. ft.
Est. replacement Cost:	$787,000.00
Existing System Type:	(EPDM-B) Ballasted Ethylene-Propylene-Diene-Monomer
Year Installed:	1988
Assessed Service Life Remaining (Years) :	0
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	The estimated replacement cost is based on the 2011 predesign report. Recommend updating the predesign report.



Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	20	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Base flashing slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:

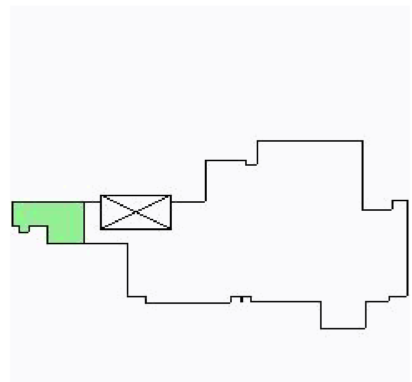
Defect Type	Severity	Quantity	Unit
Defect #02	Repair	6	Ea.

ID #2 OBSERVED: 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Open flashing joint

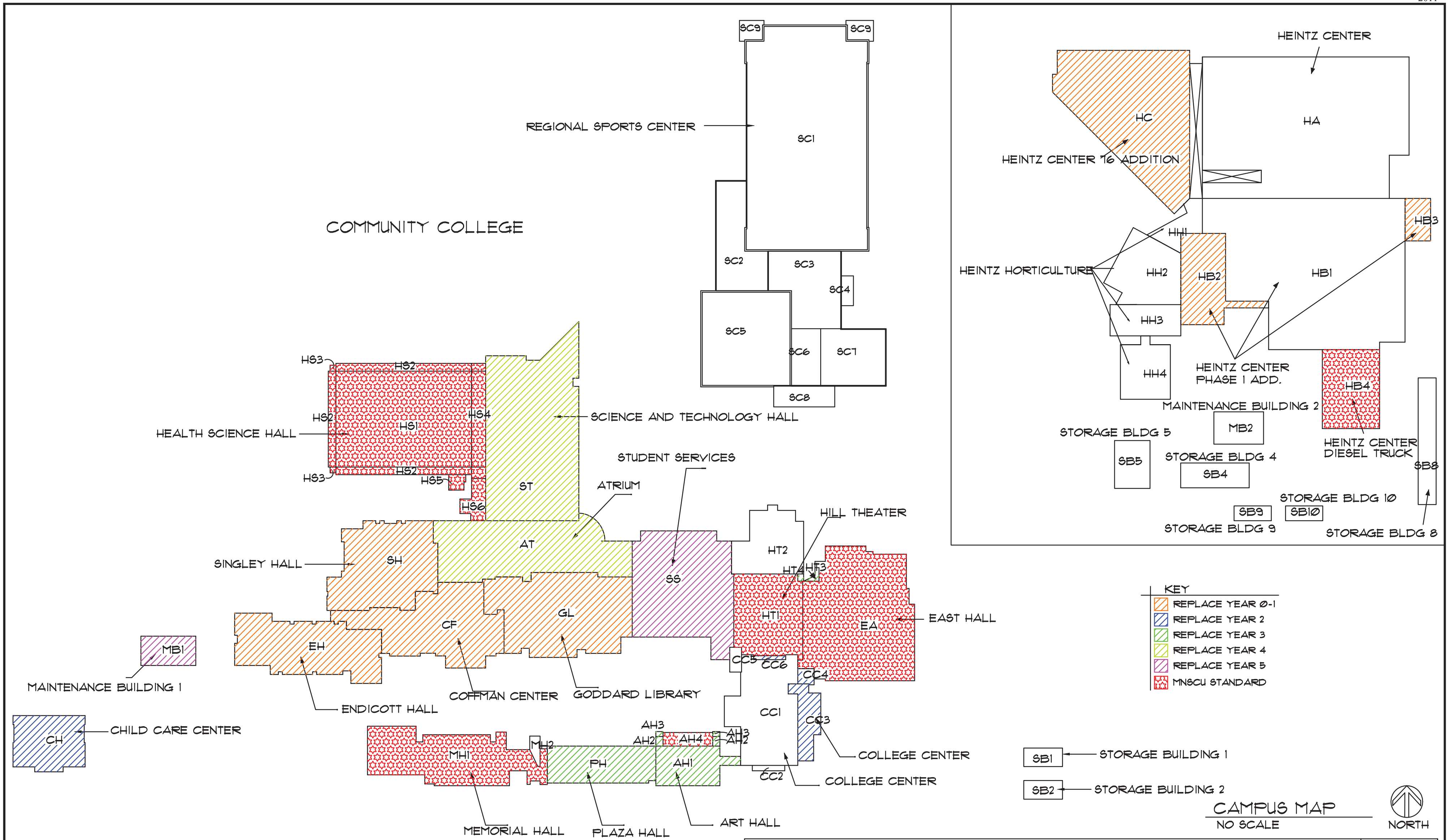
REPAIR: Install new EPDM over open flashing joints.

COMMENTS:



Roof Name:	E26148C0268
Roof Size:	550 sq. ft.
Est. replacement Cost:	$8,250.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2012
Assessed Service Life Remaining (Years) :	33
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

2011



ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

ROCHESTER, MN

INSPEC
5801 Duluth Street
Minneapolis, MN 55422
Ph. 763-546-3434

HEAPR MANUAL
Student Services Roof Replacement

Req. No.: 08

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$859,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$859,000	**Total**	

General Description of Existing Conditions and All Work

Roofs replaced in 1992 are at their useful life expectancy. Leaks disrupt classes and lead to infrastructure damage. Utility costs can be improved with better insulation.

1. The existing concrete deck has little or no structural slope; therefore, a fully-tapered insulation system will be required.
2. The existing parapets and control joints will be raised to accommodate the necessary base flashings heights required to meet current MnState standards.
3. The walls appear to be cavity wall construction; therefore, new double through-wall flashing will be required to provide a weather-tight condition and accommodate the 12-inch minimum base flashing height as required to meet current MnState standards. This work will require the services of a masonry consultant.
4. MnState standards require that skylights be removed and deck replacement provided. Further discussions can be held between campus facility personnel and MnState regarding the option to maintain or replace the skylights with new. The skylights would only be considered to have a 20-year life expectancy. If the skylights are maintained or replaced, this work will require the services of a window consultant.
5. The existing drains and leaders will be replaced with a larger size or additional drains added to meet current code requirements. Also, overflow drains and/or scuppers will be provided. This work will require the services of a mechanical consultant.
6. The existing mechanical curbs will be raised to accommodate the necessary base flashing height. All associated mechanical/electrical/gas modifications will be incorporated. Mechanical units will be relocated as necessary to provide a symmetrical and unobstructed drainage layout. This work will require the services of mechanical and electrical consultants.
7. The obsolete capped curbs, vent stacks, and sleeper curbs will be removed and deck replacement provided where necessary. This work will require the services of a structural consultant.
8. A new OSHA-approved access ladder will be installed in order to meet current code requirements. This work will require the services of a structural consultant.
9. This roof area is several stories above grade and has very limited access.

Project Title - Student Services Roof Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$859,000	**Atrium and Student Services Roof Replacement**.
$	
$	
$859,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Damaged classrooms, offices, interior finishes, roof structures. Ongoing expensive repairs. Excessive utility costs.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 SD Report - Roof Spec, Inc.

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

Roof Spec Inc.

2400 Prior Avenue North
St. Paul, MN 55113
(651) 639-0644
(651) 639-1828 (fax)
800-494-4085
www.roofspec.com

PROJECT: Rochester Community and Technical College
Student Services Building

DATE: October 30, 2020

RSI PROJECT #: 20-13152-02

REPORTED TO: Rochester Community and Technical College
851 30th Avenue SE
Rochester, MN 55904

Attn: Shayn Jensson, Facilities Project Manager
Justin Pliska, MN State System Office

FINAL SCHEMATIC DESIGN REPORT

Table of Contents: **Page**

Project Scope

General:

The project scope consists of the roof replacement of approximately 11,908 sq. ft. of existing ballasted EPDM from all roof sections of the Student Services Building. It will also include the replacement of the existing drain bowls and raising/modifying the existing rooftop equipment to accommodate the new insulation thickness. The project will also include new OSHA approved safety railings at the perimeter, new OSHA approved access ladder for the penthouse, new through wall flashings at the masonry transitions and modifying the insulated wall panels at the penthouse transitions.

Existing Roof System:

The existing roof system for the main roof area consists of a ballasted EPDM membrane over tapered ridged insulation varying from 4”-6” over a concrete roof deck. The roof system for the penthouse consists of a ballasted EPDM membrane installed over tapered insulation ranging in thickness from 4”-6”, ½” gypsum board and a metal roof deck.

New Roof System:

The new roof system for the main roof area will consist of completely removing the existing roof insulation to the surface of the concrete deck. The surface of the concrete deck will then be primed prior to installing a 2-ply asphalt vapor retarder. Three layers of 2” polyisocyanurate insulation will be installed over the structural sloped portions of the roof area prior to installing a 1” perlite insulation cover board and 4-ply gravel surface built-up roof system, all in hot asphalt. Additionally, ¼” per ft. tapered insulation saddles will be installed between the roof drains. The existing roof drains will be replaced with new cast iron drains and strainers. The roof system will have a minimum R-value of 35 throughout the entire roof area.

The new roof system for the penthouse roof will consist of removing the existing roof system to the surface of the existing gypsum thermal barrier. The ½” perlite insulation will then be installed and mechanically attached through the existing gypsum to the steel deck. A new 2-ply vapor retarder will then be installed prior to installing 1/8” per ft. tapered insulation, a 1” perlite insulation cover board and 4-ply gravel surfaced built-up roof surface, all in hot asphalt. The existing roof drains will be replaced with cast iron drains and strainers and the new roof system will have a minimum R-value of 35.

Design Considerations

1. Staging for the project will take place in the parking lot adjacent to the northwestern corner of the roof section. Staging will be fenced in during construction and the contractor will protect all existing conditions. It may be necessary to close the main entrance during construction and/or provide a protected alternate entry. The proposed staging area locations are indicated on the attached Schematic Design drawings.

2. The existing roof drains are in poor condition and will be replaced. MN State Roof Design Standards require 4-way unobstructed slope to drain. To meet this requirement, it will be necessary to install ¼” per ft. tapered insulation saddles between the existing roof drains. To meet this requirement, it will also be necessary to relocate and/or add roof drains at the penthouse roof section.

3. Insufficient height is present at the support curbs for the various rooftop equipment. The curbs for the mechanical equipment located on the roof will be modified and extended to allow for a 12” minimum flashing height above the completed roof system.

4. RCTC will identify on the SD Roof Plan any obsolete roof penetrations or equipment that can be removed.

5. Insufficient flashing height is present at the base of the parapet due to the existing aluminum rail. Options were reviewed during design that include modifying/cutting the bottom portion of the aluminum rail and/or increasing the roof flashing height on the interior and sloping the coping to the exterior. It was determined that a prefinished metal cap will be installed that slopes to the exterior with a 2” exposure. (Refer to photograph #1).

6. Cavity wall construction is present at isolated roof-to-wall locations. The weeps for the through wall flashing are too low to allow for proper installation of the new roof system. At these locations, a MN State compliant through wall flashing will be installed. (Refer to photograph #2).

7. The roof is currently accessed via door at the eastern edge of the penthouse. This door is located in close proximity to the perimeter of the roof. Roof design will incorporate a new OSHA approved perimeter railing adjacent to the roof door. A new OSHA approved access ladder will be provided to access the penthouse roof. (Refer to photograph #3).

Photograph #1

Photograph #2

Photograph #3

Photograph #4

Photograph 5

8. At the roof access door, it does not appear that sufficient flashing height is present to allow for the installation of the new roof system. This door will be modified and reinstalled and/or completely replaced as part of the roof replacement project. (Refer to photograph #4).

9. Insufficient flashing height is present at the roof-to-wall transition to the penthouse. It will be necessary to cut the existing metal panels to allow for the installation of the new roof system. (Refer to photograph #5).

10. The new roof system is based on the existing 1/8" per ft. structural slope to internal roof drains. The structural review of the existing building has confirmed that the structure is capable of supporting the new roof system and there are no issues with instability due to ponding in relation to the 1/8" per ft. drainage. Refer to the attached structural report provided by BKBM Engineers.

11. The roof was evaluated for the potential installation of future solar panels. There are portions of the roof that are relatively open and with minimal traffic that would be suitable to the installation of solar panels. However, while taking into consideration the existing design load for the building (30 lbs. per ft.) and any additional drift loads, minimal if any structural capacity is available for the installation of new solar panels.

12. Depending on the construction schedule, portions of the building may be occupied during construction. The primary disruptions for building occupants will be noise from the new roof installation and fumes from the asphalt. Asphalt fumes will be controlled during the project by using a fume recovery system at the tanker. Additionally, shutting down air intakes will be closely coordinated with the campus during construction.

Opinion of Probable Construction Costs

Roofing	$550,000
Sheet Metal / Wall Panels	$50,000
Mechanical, Electrical and Plumbing	$50,000
Masonry	$30,000
10% Contingency	$74,000
Subtotal:	$754,000
Design	$45,000
Inspection Testing	$60,000
Total:	$859,000

Estimated Schedule

- To Be Determined

Comments

Attached please find the Schematic Design Drawings. Please review and provide comments at your earliest convenience. If you should have any questions or require further information, please contact our office. Thank you.

Respectfully,
ROOF SPEC, INC.

Tim Pekron, RRC
Senior Consultant

TP/jrn

HEAPR MANUAL
Goddard Library Roof Replacement

Req. No.: 09

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$1,250,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,250,000	**Total**	

General Description of Existing Conditions and All Work

Roof is already past its useful life expectancy and displays ponding. Extensive leakage is causing class disruption and severe damage to infrastructure. Utility costs can be improved with better insulation. May need ceiling repair if not replaced.

1. The existing concrete deck has little or no structural slope; therefore, a fully-tapered insulation system will be required.
2. The existing drains and leaders will be replaced with a larger size and/or additional drains added to meet current code requirements. Also, overflow drains and/or scuppers will be provided. This work will require the services of a mechanical consultant.
3. The existing mechanical curbs, heat stacks, sleeper curbs and vent stacks will be raised to accommodate the necessary base flashing height. All associated mechanical/electrical/gas modifications will be incorporated. Mechanical units will be relocated as necessary to provide a symmetrical and unobstructed drainage layout. This work will require the services of mechanical and electrical consultants.
4. All obsolete capped curbs, vent stacks, pipe penetrations, and sleeper curbs will be removed and deck replacement provided where necessary.
5. MnState standards require that skylights be removed and deck replacement provided. Further discussions can be held between campus facility personnel and MnState regarding the option to maintain or replace the skylights with new. The skylights would only be considered to have a 20-year life expectancy. If the skylights are maintained or replaced, this work will require the services of a window consultant. In addition, if skylights are maintained, skylight curbs will be raised to accommodate the necessary base flashing height.
6. The existing parapets and control joints will be raised to accommodate the necessary base flashing heights required to meet current MnState standards.
7. Louver and door sills will be raised to accommodate the necessary base flashing height required to meet current MnState standards. Existing louvers and door will be modified or new louvers and door installed to fit the new openings. This work will require the services of mechanical and door consultants.
8. New OSHA-approved roof ladders will be installed to provide access to adjoining upper and lower roof areas. These ladders will be designed and built to also meet current state and local codes. This work will require the services of a structural consultant.
9. Asbestos-containing materials may be present in the existing two-ply vapor retarder. During the final design phase for the reroofing project, samples of the vapor retarder will be submitted to a hazardous materials consultant. Should the results come back positive, the asbestos-containing materials will be abated by a hazardous materials contractor.
10. Existing satellite dishes/antennas (five large) are considered obsolete and will be removed.

Project Title - Goddard Library Roof Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,250,000	**Goddard Library Roof Replacement**
$	
$	
$1,250,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Potential for damaged library rooms and contents stored within them, roof structures damaged. Ongoing expensive repairs. Excessive utility costs.

Project will reduce Goddard Library FCI from 0.11 to 0.04.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 SD Report - Roof Spec, Inc.

Roof
Spec
Inc.

2400 Prior Avenue North
St. Paul, MN 55113
(651) 639-0644
(651) 639-1828 (fax)
800-494-4085
www.roofspec.com

PROJECT: Rochester Community and Technical College
Goddard Library

DATE: October 30, 2020

RSI PROJECT #: 20-13152-02

REPORTED TO: Rochester Community and Technical College
851 30th Avenue SE
Rochester, MN 55904

Attn: Shayn Jensson, Facilities Project Manager
Justin Pliska, MN State System Office

FINAL SCHEMATIC DESIGN REPORT

Table of Contents: **Page**

Project Scope

General:

The project scope consists of the roof replacement of approximately 11,900 sq. ft. of existing ballasted EPDM from all roof sections of the Goddard Library. It will also include the replacement of the existing drain bowls and raising/modifying the existing rooftop equipment to accommodate the new insulation thickness. The project will also include replacement of the existing skylights, new through wall flashings at the masonry transitions and new roof access ladders.

Existing Roof System:

The existing roof system consists of a ballasted EPDM membrane over 1 ½" of extruded polystyrene insulation, 2 layers of 2" foam glass insulation mopped in place, an asphalt vapor retarder and a concrete roof deck. Drainage is accomplished via roof drains located in the center of each roof section. There is no secondary or overflow drainage present on the roof.

New Roof System:

The new roof system will consist of completely removing the existing roof membrane and insulation to the surface of the concrete deck. The concrete deck will then be primed prior to installing a new 2-ply asphalt vapor retarder. Tapered polyisocyanurate insulation will be installed prior to installing a 1" perlite insulation cover board and 4-ply gravel surface built-up roof, all in hot asphalt. The existing roof drains will be replaced with new cast iron drains and strainers. It will also be necessary to install new overflow scuppers and/or new overflow roof drains within each roof section. The roof system will have a minimum R-value of 35 throughout the entire roof area.

Design Considerations

1. Staging for the project is limited. Due to the recent courtyard renovations, there is no viable staging area along the southern edge of the roof. It will be necessary to stage the project adjacent to the main entry and construct a walkway over the Atrium Roof. Staging will be fenced in during construction. The contractor will protect all existing conditions. It may be necessary to close the main entrance during construction and/or provide a protected alternate entry. The proposed staging area locations are indicated on the attached Schematic Design Drawings.

2. The existing roof drains are in poor condition and will be replaced. New tapered insulation will be installed to meet the MN State requirement of four-way unobstructed slope to drain. No overflow drainage is currently present. Where possible, overflow scuppers will be installed adjacent to the primary roof drain, however, it will also be necessary to add new overflow roof drains.

3. Insufficient height is present at the support curbs for the rooftop equipment. The curbs for any mechanical equipment located on the roof will be modified and extended to allow for a 12" minimum flashing height above the completed roof system.

4. There are multiple large satellite dishes located on the roof area and penthouses. It was verified with RCTC that these antennas are obsolete and they will be removed as part of the roofing project. (Refer to photograph #1).

Photograph #1

5. There is equipment and/or sensors mounted to the parapet of the penthouse roof. RCTC will verify if any of this is obsolete and this equipment will be removed as part of the roof replacement project. Any equipment to remain will be properly mounted to the exterior of the wall and not penetrate the new sheet metal coping. (Refer to photograph #2).

Photograph #2

6. The roof is currently accessed via a roof access door through the penthouse. A new access ladder will be installed to provide roof access to the penthouse.

7. There are two wall mounted AC units adjacent to the penthouse access door. New support curbs will be provided for these units and a new safety railing installed adjacent to the perimeter. (Refer to photograph #3).

8. The roof access door through the penthouse is currently recessed into the wall. RCTC has stated that snow accumulates in this area in the winter making the door difficult to open. Further investigation will be performed as to the possibility of extending this door outward to be flush with the adjacent penthouse wall and enclosing this area. (Refer to photograph #4).

Photograph #3

Photograph #4

9. The concrete penthouse walls will be clad in new prefinished metal wall panels. Additionally, it will be necessary to remove and modify the existing louvers and duct work to allow for the installation of the new roof system. (Refer to photograph #5).

10. There are plastic dome skylights located in the center of the roof section. RCTC has stated that they value the natural light provided by the skylights and would like some form for skylight to remain. Design will include modifying the existing skylight curbing and reusing the skylight openings to allow for the installation of a MN State approved translucent skylight panel system. (Refer to photograph #6).

Photograph #5

Photograph #6

11. The roof was evaluated for potential installation of future solar panels. However, while taking into consideration the existing design load for the building and any additional drift loads, minimal if any additional structural capacity is available for the installation of new solar panels.

12. Depending on the construction schedule, a portion of the building may be occupied during construction. The primary disruption for building occupants will be noise from the new roof installation and fumes from the asphalt. Asphalt fumes will be controlled during the project by using a fume recover system at the tanker. Additionally shutting down air intakes will be closely coordinated with the campus during construction.

13. The existing roof system is based on installing 1/8” per ft. tapered insulation to provide slope to the internal roof drains. The structural review of the existing building has confirmed that the structure is capable of supporting a new roof system and that there are no issues with instability due to ponding in relation to the 1/8” per ft. drainage. Refer to the attached structural report provided by BKBM Engineers.

Opinion of Probable Construction Costs

Roofing	$580,000
Sheet Metal / Wall Panels	$50,000
Mechanical, Electrical and Plumbing	$130,000
Masonry	$40,000
Skylight	$200,000
10% Contingency	$100,000
Subtotal:	$1,100,000
Design	$70,000
Inspection Testing	$80,000
Total:	$1,250,000

Estimated Schedule

- To Be Determined

Comments

Attached please find the Schematic Design Drawings. Please review and provide comments at your earliest convenience. If you should have any questions or require further information, please contact our office. Thank you.

Respectfully,
ROOF SPEC, INC.

Tim Pekron, RRC
Senior Consultant

TP/jrn

HEAPR MANUAL
College Center Roof Replacement

Req. No.: 10

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$1,316,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,316,000	**Total**	

General Description of Existing Conditions and All Work

Roof is already past its useful life expectancy and displays ponding. Extensive leakage is causing class disruption and severe damage to infrastructure. Utility costs can be improved with better insulation. May need ceiling repair if not replaced.

1. The existing concrete deck has little or no structural slope; therefore, a fully-tapered insulation system will be required.
2. The existing drains and leaders will be replaced with a larger size and/or additional drains added to meet current code requirements. Also, overflow drains and/or scuppers will be provided. This work will require the services of a mechanical consultant.
3. The existing mechanical curbs, heat stacks, sleeper curbs and vent stacks will be raised to accommodate the necessary base flashing height. All associated mechanical/electrical/gas modifications will be incorporated. Mechanical units will be relocated as necessary to provide a symmetrical and unobstructed drainage layout. This work will require the services of mechanical and electrical consultants.
4. All obsolete capped curbs, vent stacks, pipe penetrations, and sleeper curbs will be removed and deck replacement provided where necessary.
5. The existing parapets and control joints will be raised to accommodate the necessary base flashing heights required to meet current MnState standards.
6. Louver and door sills will be raised to accommodate the necessary base flashing height required to meet current MnState standards. Existing louvers and door will be modified or new louvers and door installed to fit the new openings. This work will require the services of mechanical and door consultants.
7. New OSHA-approved roof ladders will be installed to provide access to adjoining upper and lower roof areas. These ladders will be designed and built to also meet current state and local codes. This work will require the services of a structural consultant.
8. Asbestos-containing materials may be present in the existing two-ply vapor retarder. During the final design phase for the reroofing project, samples of the vapor retarder will be submitted to a hazardous materials consultant. Should the results come back positive, the asbestos-containing materials will be abated by a hazardous materials contractor.

Project Title – College Center Roof Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,316,000	**College Center Roof Replacement**
$	
$	
$1,316,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Potential for damaged library rooms and contents stored within them, roof structures damaged. Ongoing expensive repairs. Excessive utility costs.

Project will reduce College Center FCI from 0.11 to 0.04.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 SD Report - Roof Spec, Inc.

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

Roof Spec Inc.

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St. Paul, MN 55113
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(651) 639-1828 (fax)
800-494-4085
www.roofspec.com

PROJECT: Rochester Community and Technical College
College Center

DATE: October 30, 2020

RSI PROJECT #: 20-13152-02

REPORTED TO: Rochester Community and Technical College
851 30th Avenue SE
Rochester, MN 55904

Attn: Shayn Jensson, Facilities Project Manager
Justin Pliska, MN State System Office

FINAL SCHEMATIC DESIGN REPORT

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Project Scope

General:

The project scope consists of the replacement of approximately 12,000 sq. ft. of existing built-up, fully-adhered EPDM and standing seam sheet metal from all roof sections of the College Center Building. It will also include the replacement of the existing drain bowls and raising/modifying the existing rooftop equipment to accommodate the new insulation thickness. Any obsolete penetrations will be removed from the roof. The project will also include the installation of new access ladders and new through wall flashings at masonry transitions, window replacement and modifying and/or replacing existing roof access doors.

Existing Roof System:

The existing roof system for the main roof area (Areas A and B) consists of a gravel surface built-up roof over tapered ridged insulation varying from 5” to 8” in thickness and a concrete roof deck. With the exception of Roof Area M, the remaining roof areas consist of a fully-adhered EPDM membrane over 3 ½” of ridged insulation and a concrete roof deck. No slope was present in the EPDM roof areas. The standing seam metal roof system is present over Roof Area M. Drainage for all low slope roof areas is accomplished by internal roof drains with adjacent overflow scuppers.

New Roof System:

The new roof system for the low slope roof sections will consist of completely removing the existing roof and insulation to the surface of the concrete deck. The surface of the concrete deck will then be primed prior to installing a 2-ply asphalt vapor retarder. A 1/8” per ft. tapered insulation will then be installed prior to installing 1” perlite insulation cover board and a 4-ply gravel surface built-up roof system, all in hot asphalt. The existing roof drains will be replaced with new cast iron drains and strainers and relocated as necessary to provide 4-way unobstructed slope to drain. The new roof system will have a minimum R-value of 35 throughout the entire roof area. The existing standing seam metal will be completely removed to the surface of the concrete deck. A self-adhering vapor retarder will then be installed prior to installing 3 layers of 2” polyisocyanurate insulation and a prefinished metal panel system with a roll form seam. The standing seam metal roof area will also have a minimum R-value of 35.

Design Considerations

1. Staging for the project will take place in the parking lot adjacent to Roof Section I and in the landscaping on the southern perimeter of the building adjacent to Area L. Staging will be fenced in during construction and the contractor will protect all existing conditions. It will be necessary to repair and restore landscaping adjacent to the building upon completion of the project. The proposed staging area locations are indicated on the attached Schematic Design Drawings.

2. The existing roof drains are in poor condition and will be replaced. Additionally, the roof drains at several locations are embedded in the wall. It will be necessary to relocate these drains away from the wall to properly flash the roof drain. (Refer to photograph #1).

Photograph #1

3. The existing roof drainage system is undersized to meet current Plumbing Code, the relocation of the through wall drains will necessitate the upgrading of the internal rain water system to meet current Plumbing Code.

4. Insufficient flashing height is present at the support curbs for the various rooftop equipment. The curbs for the mechanical equipment located on the roof will be modified and extended to allow for a minimum 12" flashing height above the completed roof system.

Photograph #2

5. The standing seam metal roof area at the northern perimeter of the building is in poor condition and will be replaced with new standing seam sheet metal. (Refer to photograph #2).

6. Multiple roof levels currently exist within the facility that do not have roof access. The current design includes adding roof access to most penthouse roof sections. Several of these roof sections are relatively small with minimal or no rooftop equipment. An additional review will be conducted with the facility and the possibility of a design variance to eliminate some of these ladders will be considered in the future.

7. Masonry cavity wall construction consists at multiple roof-to-wall transitions. Roof replacement will include the installation of a new MN State compliant through wall flashing at all roof-to-wall transitions.

Photograph #3

8. At isolated locations, roof access doors and rooftop equipment is located within close proximity to the perimeter. Within these areas, new perimeter safety railings will be installed. Where minimal equipment is present, RCTC may also consider safety tie off points in lieu of railings. (Refer to photograph #3).

9. There is minimal or no roof slope present in the current design. The new roof system is based on installing 1/8" per ft. tapered insulation sloped internal roof drains. The structural review of the existing building has confirmed that the structure is capable of supporting the new roof system and that there are no issued with instability due to ponding in relation to the 1/8" per ft. drainage. Refer to the attached structural report provided by BKBM Engineers.

10. The roof was evaluated for the potential installation of future solar panels. There is a section of the roof that is relatively open with minimal rooftop traffic that will be suitable to installing solar panels. However, taking into consideration the design load of the building minimal structural capacity is available for the installation of new solar panels.

Photograph #4

11. Insufficient flashing height is present at the window adjacent to the roof access door R3. Additionally, the downspout draining from the upper roof area is routed around this window. As part of the design, this window will be replaced and the sill modified to provide MN State complaint flashing height. It may also be necessary to modify and/or replace the roof access door at this location. The downspout draining from the upper roof will be rerouted to the lower roof area. (Refer to photograph #4).

12. At isolated locations there are antennas and equipment secured to the perimeter of the roof. It will be verified with RCTC whether this equipment is still in use and all obsolete equipment will be removed. (Refer to photograph #5).

Photograph #5

13. At Roof Section I, patio pavers were installed over the EPDM membrane. It will need to be evaluated with RCTC the amount of use this patio area receives and if intended for public use, a plaza type roof/waterproofing assembly may be designed. Insufficient flashing height is currently present at the existing window locations and these windows will need to be replaced/modified to provide sufficient height above the completed roof system. (Refer to photographs #6 and #7).

Photograph #6

Photograph 7

14. Depending on the construction schedule the portion of the building may be occupied during construction. The primary disruption for building occupants will be noise from the roof installation and fumes from the asphalt. Asphalt fumes will be controlled during the project by using a fume recovery system at the tanker. Additionally, shutting down of air intakes will be closely coordinated with the campus during construction.

Opinion of Probable Construction Costs

Roofing / Waterproofing	$600,000
Sheet Metal / Wall Panels	$50,000
Roof Access Ladders/Railing	$60,000
Mechanical, Electrical and Plumbing	$220,000
Masonry	$40,000
Windows	$100,000
10% Contingency	$106,000
Subtotal:	$1,176,000
Design	$60,000
Inspection Testing	$80,000
Total:	$1,316,000

Estimated Schedule

- To Be Determined

Comments

Attached please find the Schematic Design Drawings. Please review and provide comments at your earliest convenience. If you should have any questions or require further information, please contact our office. Thank you.

Respectfully,
ROOF SPEC, INC.

Tim Pekron, RRC
Senior Consultant

TP/jrn

HEAPR MANUAL
Art Hall Roof Replacement

Req. No.: 11

Date: December 2020

Institution	Rochester Community and Technical College
Campus/Building	Main Campus Building
Project Location	Rochester, MN

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$602,000	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$602,000	**Total**	

General Description of Existing Conditions and All Work

Roof is already past its useful life expectancy and displays ponding. Extensive leakage is causing class disruption and severe damage to infrastructure. Utility costs can be improved with better insulation. May need ceiling repair if not replaced.

1. The existing concrete deck has little or no structural slope; therefore, a fully-tapered insulation system will be required.
2. The existing drains and leaders will be replaced with a larger size and/or additional drains added to meet current code requirements. Also, overflow drains and/or scuppers will be provided. This work will require the services of a mechanical consultant.
3. The existing mechanical curbs, heat stacks, sleeper curbs and vent stacks will be raised to accommodate the necessary base flashing height. All associated mechanical/electrical/gas modifications will be incorporated. Mechanical units will be relocated as necessary to provide a symmetrical and unobstructed drainage layout. This work will require the services of mechanical and electrical consultants.
4. All obsolete capped curbs, vent stacks, pipe penetrations, and sleeper curbs will be removed and deck replacement provided where necessary.
5. The existing parapets and control joints will be raised to accommodate the necessary base flashing heights required to meet current MnState standards.
6. The two small standing metal seam portions of the roof are in poor condition and should be replaced with new.
7. Asbestos-containing materials may be present in the existing two-ply vapor retarder. During the final design phase for the reroofing project, samples of the vapor retarder will be submitted to a hazardous materials consultant. Should the results come back positive, the asbestos-containing materials will be abated by a hazardous materials contractor.

Project Title – Art Hall Roof Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$602,000	**Art Hall Roof Replacement**
$	
$	
$602,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Potential for damaged library rooms and contents stored within them, roof structures damaged. Ongoing expensive repairs. Excessive utility costs.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 SD Report - Roof Spec, Inc.

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

Roof Spec Inc.

2400 Prior Avenue North
St. Paul, MN 55113
(651) 639-0644
(651) 639-1828 (fax)
800-494-4085
www.roofspec.com

PROJECT: Rochester Community and Technical College
Art Hall

DATE: October 30, 2020

RSI PROJECT #: 20-13152-02

REPORTED TO: Rochester Community and Technical College
851 30th Avenue SE
Rochester, MN 55904

Attn: Shayn Jensson, Facilities Project Manager
Justin Pliska, MN State System Office

FINAL SCHEMATIC DESIGN REPORT

Table of Contents: **Page**

Project Scope

General:

The project scope consists of the replacement of approximately 3,650 sq. ft. of existing ballasted EPDM roof sections of the Art Hall. It will also include the replacement of the existing drain bowls and raising/modifying the existing rooftop equipment to accommodate the new insulation thickness. Two small standing seam sheet metal roofs located along the northern perimeter of the building will also be replaced with new standing seam sheet metal.

Existing Roof System:

The existing roof system consists of a ballasted EPDM membrane over 1½" of wood fiber insulation, 2½" isocyanurate insulation and an asphalt vapor retarder mopped to the surface of the concrete deck. Drainage is accomplished via internal roof drains and/or perimeter scuppers and downspouts. Secondary drainage is provided via overflow scuppers adjacent to the primary drains.

New Roof System:

The new roof system will consist of completely removing the existing roof membrane and insulation to the surface of the concrete deck. The concrete deck will then be primed prior to installing a 2-ply asphalt vapor retarder. A 1/8" per ft. tapered polyisocyanurate insulation system will be installed prior to installing a 1" perlite insulation cover board and 4-ply gravel surface built-up roof system all in hot asphalt. The existing roof drains will be replaced with new cast iron drains and strainers and relocated as necessary to facilitate proper drainage. The roof system will have a minimum R-value of 35 throughout the entire roof area.

At the standing seam roof areas, the existing standing seam metal will be completely removed to the surface of the concert deck. A self-adhering vapor retarder will then be installed prior to installing 3 layers of 2" polyisocyanurate insulation and a prefinished metal panel system with a roll formed seamed. The standing seam metal roof areas will also have a minimum R-value of 35.

Design Considerations

1. Staging for the project will take place on the landscaping adjacent to the southern perimeter of the roof section. Staging will be fenced in during construction and the contractor will protect all existing conditions. It will be necessary to repair and restore the landscaping adjacent to the building upon completion of the project. The proposed staging area location is indicated on the attached Schematic Design Drawings.

2. The existing roof drains are in poor condition and will be replaced. Additionally the roof drains over the main roof area are embedded in the wall. It will be necessary to relocate these drains away from the wall to properly flash the roof drain. (Refer to photograph #1).

3. The existing roof drainage is undersized to meet current plumbing code. The relocation of the through wall drains will necessitate the upgrading of the internal rain water leader system to meet current plumbing code.

Photograph #1

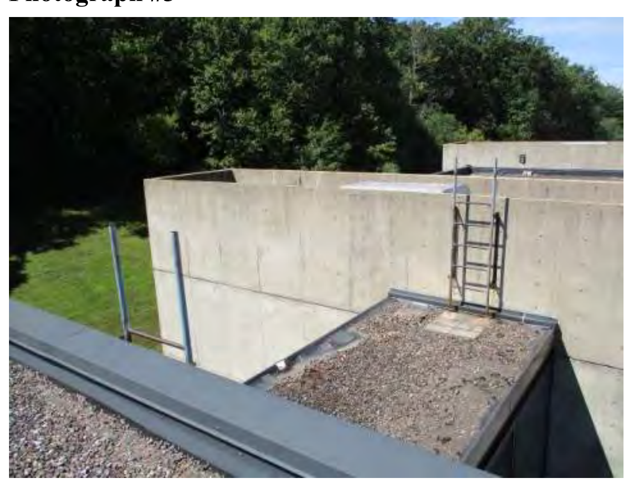
4. Insufficient height is present at the support curbs for the rooftop equipment. The curbs for the mechanical equipment located on the roof will be modified and extended to allow a minimum of 12” flashing height above the completed roof system. (Refer to photograph #2).

5. The standing seam metal roof areas at the northern perimeter of the building are in poor condition and will be replaced with new standing seam sheet metal. (Refer to photograph #3).

Photograph #2

Photograph #3

6. The roof top is currently accessed through the penthouse door on the adjacent College Center Roof Section. Multiple ladders are then required over the connecting link to access the Art Hall Roof Area. These ladders will be replaced with new access ladders and new safety railing provided at the perimeter of the Link Roof Section. (Refer to photograph #4).



Photograph #4

7. There is no roof slope present in the current design. The new roof system is based on installing 1/8” per ft. slope to the internal roof drains. The structural review of the existing building has confirmed that the structure is capable of supporting the new roof system and that there are no issues with instability due to ponding in relation to the 1/8” per ft. drainage. Refer to the attached structural report provided by BKBM Engineers.

8. The roof was evaluated for the potential installation of future solar panels. There is a section of the roof that is relatively open with minimal rooftop traffic that would be suitable to installing solar panels. Based on the structural review provided by BKBM there is some structural capacity available for potential future solar panel installation.

9. Depending on the construction schedule a portion of the building may be occupied during construction. The primary disruption for building occupants with be noise from the roof installation and fumes from the asphalt. Asphalt fumes will be controlled during the project by using a fume recover system at the tanker. Additionally, shutting down of air intakes will be closely coordinated with the campus during construction.

Opinion of Probable Construction Costs

Roofing	$250,000
Sheet Metal / Wall Panels	$80,000
Mechanical, Electrical and Plumbing	$100,000
Railings/Ladders	$40,000
10% Contingency	$47,000
Subtotal:	$517,000
Design	$45,000
Inspection Testing	$40,000
Total:	$602,000

Estimated Schedule

- To Be Determined

Comments

Attached please find the Schematic Design Drawings. Please review and provide comments at your earliest convenience. If you should have any questions or require further information, please contact our office. Thank you.

Respectfully,
ROOF SPEC, INC.

Tim Pekron, RRC
Senior Consultant

TP/jrn

HEAPR MANUAL
Phase II Central Chiller Plant Upgrades & System Extension to Science & Technology Building

Req. No.: 12

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Sports Facilities	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$1,392,500	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,392,500	**Total**	

General Description of Existing Conditions and All Work

Phase II of the project includes expansion of the Central Chiller Plant system capacity. Work includes a new 500 ton chiller and cooling tower; pumps; and buried distribution legs to the Science and Technology Building and related interior piping work.

Original 2012 Study estimate for Phase 2 increased 24% to mid-year 2020.

Project Title – Phase II Central Chiller Plant Upgrades & System Extension to Science & Technology Building

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,392,500	
$	
$	
$1,392,500	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Will reduce the Campus FCI from 0.09 to 0.03.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 2012 Draft Chilled Water Study - Stanley Consultants, Inc.

2 Cost Information | Appendix D of Study - Stanley Consultants, Inc.

Chilled Water Study

Rochester Community and Technical College
Rochester, Minnesota

Draft
December 17, 2012

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Chilled Water Study

Rochester Community and Technical College
Rochester, Minnesota

Draft
December 17, 2012

I hereby certify that this plan, specification, or report was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: ____________________ Typed or Printed Name: ____________________

Date: ____________________ Reg. No.: ____________________

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Executive Summary

WILL BE PROVIDED WITH FINAL SUBMITTAL

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FIGURES

APPENDICES

Section 1

Introduction

Introduction

Rochester Community and Technical College (RCTC) has requested Stanley Consultants, Inc. to perform a study of the chilled water systems at the main campus. Some of these systems are nearing the end of their useful life and will need to be replaced soon. The following is a list of the existing chillers serving the main campus that would be consolidated into a central chilled water plant. The list is also summarized in the appendices with the model numbers and GPMs.

Existing Conditions

The existing conditions of the chilled water systems were documented during site visits to the college in 2008 and 2012. The existing chillers range in age from 1967 to 2006. A summary of the existing chillers is included in Appendix A.

Main Building – West

The West portion of the main building (Coffman Hall, Endicott Hall, Singley Hall Goddard Library, and Memorial Hall) is served by a 200- ton Trane water cooled Centrifugal chiller located in Room CF 133. This unit cools the majority of the spaces on the west side of the main campus. These spaces include classrooms, labs, and admin spaces. The pumps are constant volume and all the valves in the system are 3-way valves. The chiller is rated at 0.862 kW/Ton with a 56 degree F entering water temperature and a 44 degree F leaving water temperature. The chiller was installed in 1967 and uses R-11 refrigerant. The cooling tower is located outside on grade to the southwest of the building. The cooling tower is a Marley Model # AV 245132 A1. Per the 2011 ASHRAE Handbook HVAC Applications Chapter 37 Table 4 (Included in Appendix A) The estimated service life for a centrifugal chiller is approximately 25 years, and the estimated service life of a cooling tower is approximately 20 years. Based on these values this chiller and cooling tower have exceeded their recommended service life.

Main Building – East

The East portion of the main building (College Center, Student Services, Art Hall, and Plaza Hall) is served by a 125-ton Carrier water cooled Centrifugal chiller located in Room CC 105. This unit cools the majority of the spaces on the east side of the main campus including classrooms, labs, and admin spaces. The pumps are constant volume and all the valves in the system are 3-way valves. The cooling tower is located to the southeast of the building. The cooling tower is a Baltimore Aircoil Company Model # 15227. The chiller was installed in 1970 and uses R-11 refrigerant. Based on the estimated service life values from ASHRAE this chiller and cooling tower have exceeded their recommended service life.

Hill Theater

Hill Theater is served by three direct expansion (DX) Carrier air-cooled units. These units were installed in 1971, total 82.5 tons, and use R-22 refrigerant. These units are located on the north side of the building, are enclosed by a fence, and serve the theater area and supporting offices. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units is approximately 20 years. Based on this value these units have passed their expected service life. These units could be retrofitted with chilled water coils and added to the proposed chilled water system.

East Hall (Winona State University Addition)

East Hall is served by a 93-ton McQuay air-cooled chiller located outside of the east side of the main building. This unit cools classrooms, labs, and admin spaces. This chiller was installed in 1986 and uses R-22 refrigerant. The chiller is rated at 1.25 KW/ton. It has constant speed distribution pumps and the system has all 3-way valves. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units (Similar to an air cooled chiller) is approximately 20 years. Based on the estimated service life values from ASHRAE this chiller has exceeded its recommended service life.

Singley Hall

The second floor of Coffman Hall (CF) is served by a 20-ton McQuay air-cooled chiller located on the roof of Singley Hall. This unit cools classrooms and offices. This chiller was installed in 1989 and uses R-22 refrigerant. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units (Similar to an air cooled chiller) is approximately 20 years. Based on the estimated service life values from ASHRAE this chiller has exceeded its recommended service life.

Science and Technology

Science and Technology is served by two York water cooled screw chillers located in Mechanical Room ST 006. These units are 206 tons each and serve the ITV, classroom, offices, and computer labs in this building. The cooling towers are located on the roof. The distribution pumps are 20 HP with 80 feet of head, constant volume and there are 3-way valves in the system. These chillers were installed in 1992 and are using R-22 refrigerant. These chillers have not yet meet their expected service life, but will need to be replaced in the near future. Although these units do not need to be replaced at this time, their capacity will be included in the size of the proposed chiller plant so the loads they serve can be connected in the future when replacement is needed.

Sports Complex

Two Carrier air-cooled chillers are located outside of the Sports Complex. These units were installed in 2000. Each unit is 240 tons and both units serve the entire Sports Complex consisting of a gym, workout areas, and offices. These units have an entering water temperature of 54 degrees F and a leaving water temperature of 44 degrees F. There are two pumps that each are 25 HP with 60 feet of head and have a variable frequency drive (VFD) and there are 2-way and 3-way valves in the system. Based on ASHRAE Data These chillers will pass their expected service life in 2026. Although the chillers have 14 years of expected service and are a great distance from the main campus, they will be included in the proposed chilled water plant, due to current and ongoing compressor failures.

Health Sciences

There is a York water cooled screw chiller located in Mechanical Room ST 006. This unit is 34 tons and serves the entire Heath Science addition, including office, classroom, and lab space. The cooling tower is located on the roof and the pump has a VFD with 2-way and 3-way valves in the system. This chiller was installed in 2006 and uses R-22 refrigerant. This chiller will pass its expected service life in 2029. Although this chiller should perform adequately and will not need to be replaced, it will be included in the overall size of the central chilled water plant to allow for this area of campus to be connected in the future.

Electrical

The College currently has a project that is funded and currently under contract to redo the existing campus medium voltage distribution. This study will be prepared as if this work is complete. The work is expected to be complete in June of 2013.

The main campus is served by Rochester Public Utilities (RPU) via an overhead 13.8kV line routed along the south side of the main campus building. The overhead RPU line has two 13.8kV electrical service connections. One is located outside of College Center and the second is located outside of Coffman Hall directly next to Memorial Hall. The medium voltage service is looped between these two electrical utility connections with specific building services coming from this loop. See Drawing E1 in Appendix F for the existing 13.8kV distribution one-line drawing.

The existing chillers throughout the UCR are service locally by the nearest building service. Chillers are currently served by the Coffman electrical service, College Center electrical service, Science & Technology electrical service in the main building. The chillers at the Sports Center are served by its electrical service.

Load Analysis

Existing Loads

Existing drawings and site data was reviewed to determine the existing building loads that would be served by the proposed chilled water system. The chiller located in Coffman hall serves what is considered the Main-Building West (Coffman hall, Endicott Hall, Singley Hall Goddard Library, and Memorial Hall). The chiller located in College Center basement serves what is considered the Main building East (College Center, Student Services, Art Hall, and Plaza Hall) Table 1-1 summaries the chilled water loads by each area of the building.

Table 1-1 Existing Chilled Water Loads

Area	Tons
Main Building -West	200
Main Building -East	125
Hill Theater	83
East Hall (WSU)	93
Coffman Hall (2nd Floor)	20
Science and Technology	412
Sports complex	480
Health Sciences	34
Total	1447

Source: Stanley Consultants

Future Loads

The Master plan for the college includes planning in the long term for additional academic spaces. The present master plan indicates these buildings would be located between the UCR and the Regional Sports Center. There are also plans for renovations of some of the existing spaces in the UCR. At the time of this study the requirements for these remodels and additions have not been finalized and will not be included in the loads for the initial plant sizing. Provisions will be made in sizing of piping and equipment to allow for future expansion of the central plant to accommodate these additions.

Distribution System Temperature Difference (ΔT)

The existing chillers operate at a ΔT of between 10°F and 15°F with an average of around 12°F. Most of the systems appear to be sized for 42–44°F chilled water temperature. The proposed chilled water plant will be based on a design condition of 42°F chilled water supply temperature and a 12°F ΔT.

Section 2

Chilled Water System Considerations

General

This section describes some of the available technologies and strategies that could be used as part of the central plant. It also discusses common items to all of the study options.

Available Chiller Technologies

Several different types of chiller technologies are reviewed in this study. The following section gives a brief description of each type of technology and lists pros and cons for each.

Absorption Chillers

Absorption chillers utilize an absorber and generator in place of a compressor to produce chilled water. In the absorber high temperature, low pressure saturated refrigerant (usually water) combines with a liquid absorbent (typically a lithium bromide solution). This liquid mixture is then pumped to a generator where thermal energy (steam in this case) is used to heat the mixture and vaporize the refrigerant. The refrigerant vapor is than directed to the condenser where is cooled and condensed. Once cooled, the refrigerant vapor is passed through an orifice to reduce the pressure. This pressure reduction flashes some of the refrigerant and cools the remaining refrigerant to the temperature corresponding to the evaporator pressure. In the evaporator, the liquid refrigerant is boiled off by the chilled water return and becomes a gas. The refrigerant gas is directed to the absorber and the process begins again.

Absorption chillers can be either single effect or double effect. Double effect machines utilize two generators and are typically more efficient, but require a higher pressure steam than single effect machines. Efficiency for absorption chillers is listed as coefficient of performance (COP). Coefficient of performance is defined as the cooling load in BTU/hr divided by the energy input In BTU/Hr. Efficiency for an absorption chiller is relatively constant regardless of load or condenser water temperature.

In addition to the steam required to generate cooling, the electrical requirements for the condenser pumps and cooling towers is higher for absorption chillers as the condenser water flow is higher. This cost does not include the cost of treatment chemicals and make up water in generating steam.

- **Pros:**
  - Can utilize steam as energy source.
  - Low noise levels.
  - Fewer rotating parts within chiller.
- **Cons:**
  - Leaving water temperature limited to 42 F.
  - Larger physical size than other types of chillers.
  - Lower efficiency than Centrifugal machines.
  - Higher capital cost.
  - Higher operating cost.
  - Larger cooling tower required.
  - More maintenance required to ensure proper cooling fluid chemistry in system.

Centrifugal Chillers

Centrifugal chillers utilize a centrifugal compressor driven by an electric motor to produce chilled water. The compressor compresses refrigerant vapor and directs it to the condenser where it is cooled and condensed into a liquid. A metering device reduces the pressure of the refrigerant and in the process reduces the temperature. The Refrigerant is converted from a liquid to a gas in the evaporator and the process begins again. Efficiency for centrifugal chillers is typically listed in kw/ton. The efficiency changes based on load and condenser water temperature.

- **Pros:**
  - Lower operating cost.
  - Lower capital cost.
  - Can provide chilled water down to 39 F leaving water temperature.
  - Potentially lower maintenance costs.
  - May have smaller footprint.
  - Smaller cooling tower.
  - Smaller condenser pumps.

- **Cons:**
  - Does not use steam as energy source.
  - High noise levels.

Magnetic Bearing Centrifugal Chillers.

Magnetic bearing centrifugal chillers are similar to traditional centrifugal chillers with two main differences. The first difference is the unit does not use traditional bearings, but uses magnetic levitation technology for the compressor rotating components. This improves chiller efficiency slightly. The second difference is the unit includes a variable frequency drive for the compressor. This enables the much better efficiency at part loads compared to a traditional chiller. The full load efficiency is roughly the same as for a traditional centrifugal chiller.

- **Pros:**
  - Better part load efficiency than other types of chillers.
  - Less noise than traditional centrifugal.
  - Small footprint.
  - Potentially lower maintenance costs.
  - Lower operating costs.
  - Can provide chilled water down to 39 F leaving water temperature.
  - Small cooling tower.
- **Cons:**
  - Does not use steam as energy source.
  - Higher capital cost than traditional centrifugal.
  - Electrical power quality important.

Additional Plant Enhancements

Central plant performance can be enhanced by addition of thermal storage and free cooling systems. These systems are described in detail below.

Thermal Storage

Thermal storage is the storage of chilled water or ice to act as a chiller. The main goal of thermal storage is to offset either demand energy costs or potentially capital costs for a new chiller. Thermal storage is operated in three basic modes; Load leveling, and load shifting.

In Load leveling operation the storage tank acts as a chiller during the peak portion of the day to offset the capital cost of installing chillers. To accomplish this chillers typically operate at full capacity all day. When load exceeds chiller capacity thermal energy system discharges, when the load is below the chiller capacity the thermal energy system is recharged. This mode of operation minimizes chiller capacity and thermal system size.

In load shifting the entire on peak cooling load is handled by the thermal storage system. Chillers operate at off peak conditions to charge the system. This mode of operation has the highest chiller costs and thermal storage costs.

In demand limiting operation the thermal storage system is used to reduce the demand energy costs of operating chillers during the peak chilled water load. To accomplish this chillers are operated at off peak times to charge the thermal storage tank and then during the on-peak times the chillers are operated at reduced load and the thermal storage tank is discharged. Demand savings and equipment costs are higher than load leveling, and lower than load shifting.

Two types of systems exist: sensible change systems and phase change systems. Sensible change systems utilize water as the storage fluid, where phase change systems storage energy in ice.

Sensible Change Systems. Sensible change systems are classified as into two types of systems Stratified chilled water storage systems and density depressed chilled water storage systems. Both systems consist of a large tank to store water. The stratified system uses only chilled water and relies a thermocline between the hot chilled water return and cool chilled water supply of the hot and cold liquid to separate the water available for the cooling load from the water that needs to be cooled. Density depressed systems are similar but use an additive to the chilled water to allow the water to be stored below the freezing point.

- **Pros:**
  - Uses standard chillers.
  - Efficient operation of chillers.
  - Economical for most system especially larger systems.
  - Reliable and simple.
- **Cons:**
  - Low energy density.
  - Potential space constraints.
  - Most economical (smaller tank size) at high system temperature difference.

Phase Change Systems. Phase change systems use ice as the thermal storage medium. Ice storage systems require chillers to operate using glycol as the chilled water temperature needed to produce ice is below the freezing point of water. Different types of ice systems are available both all the systems have similar operation and efficiencies

- **Pros:**
  - Capable of high discharge rate.
  - Separate production and storage.
  - Allows for cold air distribution.
- **Cons:**
  - Complex system.
  - High chiller cost.
  - Chiller efficiency is reduced to create cooler charging temperature.
  - Requires glycol in chilled water loop or dedicated chiller.

Free Cooling

Free cooling is the use of a heat exchanger on the chilled water system to make cooled water directly from condenser water without the use of mechanical refrigeration. Typically used in cold weather climates where internal cooling loads exist year round. This allows for relative low cost production of chilled water when the cooling tower can produce low temperature water. If installed in series with the chillers can be used to precool the chilled water and reduce the load on the chiller.

Heat Transfer Fluid

The heat transfer fluid for central chilled water plants is the fluid that is distributed throughout the distribution system to the end users. Typically, this fluid consists of either treated water or a glycol solution.

Treated Water. Treated water, consisting of water from the local water utility with rust, microbial, and scale inhibitors is commonly used as the heat transfer medium in central plants. Treated water is less costly than glycol systems and has a specific heat of 1 btu/lb-°F. The disadvantage of treated water is the freezing point of water is above the ambient temperatures expected to be seen during the winter months. To protect coils from freezing, additional controls (face and bypass dampers, coil pump, heat exchanger to glycol fluid, etc.) are required. Freezing is typically not an issue in the distribution system or the chiller at the central plant.

Glycol Solution. Glycol solutions consisting of either a 40–50% glycol and water mixture is used as the heat transfer medium in central plants. Glycol solutions are more costly than treated water. The specific heat of glycol solutions range from 0.80 btu/lb-°F–0.93 btu/lb-°F. This lower specific heat requires larger heat transfer areas at coils and at chillers. Glycol solutions typically do not need any special controls or provisions to prevent freezing as the percentages are selected to prevent freezing. Glycol solutions have freezing points ranging from -8°F to -29°F.

Energy Savings

There are multiple ways that energy will be saved by the implementation of the proposed chilled water plant. One will be from the installation of higher efficiency equipment versus the lower efficiency older equipment currently is use. Another will be from the optimization of the chillers. This will occur because the chiller use will be able to better match the current load; and therefore, will get a better difference in supply and return chilled water temperature. There will also be less energy used by the pumps because they will have VFDs and there will be 2-way valves in the system. This will reduce the amount of required pumping power during non-peak time periods.

Climate Commitment

Through our work with other higher education clients, we have become familiar with the American College and University Presidents Climate Commitment. We understand RCTC's President, Donald Supalla, has signed on to this commitment. This commitment means that RCTC will be developing short-term and long-term action items in an effort to make the campus more climate neutral. Therefore, the motivation to act on a project such as a central chilled water plant has probably never been greater. A central chilled water plant will reduce RCTC's greenhouse gas emissions on several levels: reduction in the type and quantity of refrigerants on campus (prevent/minimize leakages); elimination of ozone depleting HCFC refrigerants on campus (R-11 has been phased out and R-22 also will be phased out of production by 2030); and a significant reduction in electrical energy usage (purchased power from RPU's primarily coal-fired plant).

Section 3

Study Options

General

The majority of the chilled water system equipment serving the Main Campus building has surpassed the expected service life. Other equipment is nearing the end or the service life or is experiencing maintenance issue. In the near future RCTC will be required to replace components of four chilled water systems and three DX systems. This study investigates adding a single central plant to campus in lieu of replacing individual equipment.

Planning Criteria

To develop the study options several items were discussed with RCTC staff and the following planning criteria were identified.

- Sufficient chilled water capacity shall be provided to serve the entire UCR building and the Sports Complex. Total plant capacity after completion will be 1500 tons.
- The plant will be completed in three phases. Each phase will install a nominal 500-ton chiller and associated equipment. The phases are based on age of installed equipment and replacing the oldest equipment as part of phase 1. The phase 1 chiller may operate above its rated conditions for short periods of time as the chillers identified in phase 1 total 546 tons. The phases will include the following :
    - Phase 1 will replace the chillers located in Main Hall East, Main Hall West, East Hall, and Singley Hall. Hill Theater DX equipment will be replaced as part of phase 1 and connected to the chilled water system. This phase will include the chiller building and chiller building piping and valves for phase 2 and phase3.
    - Phase 2 will replace the chillers located in Science and Technology
    - Phase 3 will replace the chillers at the Sports Complex.

- The plant location will be to the southeast of the UCR building. In the spot presently occupied by the storage garages
- Plant will include space for storage for campus building maintenance and work area for maintenance staff.
- The existing DX equipment serving Hill Theater will be replaced with chilled water systems. Costs for this replacement are included in the distribution system costs.
- At locations of existing chillers and pumps existing pump will be replaced and a decoupler loop added to install a primary secondary chilled water system. Coils served by new building pumps will have 3-way valves replaced with 2-way valves. Secondary chilled water pumps serving building coils will be provided with VFDs.

Chilled Water Plant Options

Option 1 – Constant Speed Centrifugal Chiller

Option 1 consists of creating a new chilled water plant to serve the UCR, and Sports Center. This plant will utilize traditional constant speed, water-cooled, centrifugal compressor, electric chillers with primary pumps located at the central plant. Cooling towers will be on grade adjacent to the plant building.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.
- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase.

Option 2 – Magnetic Bearing Variable Speed Centrifugal Chiller

Option 2 is the same as option 1, but utilizes magnetic bearing centrifugal compressor, electrical chillers with variable speed drives.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.

- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower(Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase.

Option 3 – Double Effect Steam Absorption Chiller

Option 3 consists of a single chilled water plant to serve the UCR and Sports Center. This plant will utilize absorption chillers with primary pumps located in the central plant. Steam from the "Green Pipes" project will be utilized as an energy source for the absorption chillers. Cooling towers will be on grade adjacent to the plant building.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.
- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower(Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added as part of this phase.

Distribution System Options

Two options are available for connecting the proposed chilled water plant to the existing loads. Options are evaluated on a capital cost basis only and are not included in the economic analysis for the proposed central plant.

Option A – Interior Distribution System

This option routes the majority of the distribution system through the existing building. Piping will be routed from the proposed central plant to the College Center Mechanical room (CC105) via direct buried piping. From this point the distribution system will be routed throughout the building to connect to the existing loads. To serve the sports complex direct buried piping will be routed from the Science and Technology Addition.

Option B – Exterior Distribution System

This option routes the majority of the distribution system outside the building in a direct buried piping system.

Costs are included in both options to upgrade control valves (replace 3 way valves with 2 way valves) replace building pumps, and to replace the existing DX equipment serving the Hill Theater.

Electrical Service to the New Chiller Plant

Regardless of the Option above, the new chiller plant will require a separate RPU electrical service transformer and service meter. Because RCTC has gone forward with changing the campus electrical distribution system to a 'loop' arrangement, the new chiller plant can be added to the existing distribution loop without any power disruption to other facilities.

The nearest RPU owned junction cabinet does not have a spare circuit connection available and therefore a new junction cabinet will be required to serve the new chiller plant transformer. During construction, the College will be required to install all medium voltage conduits, transformer pad, and prepare the junction cabinet base. RPU typically provides the medium voltage conductors, terminations, junction cabinet, and transformer.

The transformer will be an outdoor, pad-mount, oil-filled transformer provided by RPU. The expected transformer size will likely be between 1000kVA and 1500kVA and should be determined based on the actual design loads once this project progresses to that stage. If the absorber chiller option is chosen, the transformer and service size will be much smaller. See Drawing E2 in Appendix F for electrical service connection to the new chiller plant. The photos below represent a typical RPU junction cabinet and transformer that will be located outside the chiller plant.

Typical RPU Junction Cabinet
Figure 3-1

Typical RPU Transformer
Figure 3-2

The RPU transformer will serve a new building switchboard. The switchboard will contain a main service breaker along with breakers for each chiller and building panelboards. The main electrical gear will be located along dedicated wall space in the chiller equipment room for the purposes of this study. All proposed new chiller plant equipment, including chillers, cooling towers, thermal storage, and the garage spaces will be served from this new service. The existing switchboard should be provided with an electrical power meter that has a communication protocol to speak with the building automation system. The switchboard should also have a transient voltage surge protection device. The photo below represents a typical building electrical service switchboard that would be located in the chiller plant.

Typical Building Switchboard
Figure 3-3

Section 4

Cost Estimates and Life Cycle Cost Analysis

Opinions of Probable Construction Cost Estimate

Probable construction cost estimates were developed for a conceptual level with equipment vendor quotes used for chillers and cooling towers and industry data used for other costs. As these estimates are conceptual in nature 30% was added to each cost for undeveloped design details. Contractor overhead was included as 15% and Contractor Profit were included as 10%. The costs also include 15% to cover administration and engineering costs.

The costs estimates are based on Current costs at the time of the study. The cost estimates are conceptual in nature and based on the information available at the time of the estimate without a complete detailed design and equipment selections. The final costs will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, project schedule and other variable factors. Therefore the final project costs may vary somewhat from the estimates presented.

Table 4-1 shows the summary of opinion of probable construction costs for the three central plant options included in this study. Copies of the opinion of probable cost estimates are included in Appendix D. This table shows the costs associated for each option. Each option is divided into three phases and shows costs for each phase and the total for all three phases. All costs are based on 2012 dollars.

Table 4-1 Summary of Opinion of Probable Costs Central Plant

Option	Phase 1	Phase 2	Phase 3	Total
Option 1 – Constant Speed Centrifugal Chillers	$6,810,000	$600,000	$600,000	$8,010,000
Option 2 – Magnetic Bearing Centrifugal Chillers	$6,920,000	$710,000	$71,000	$8,340,000
Option 3 – Double Effect Steam Absorption Chillers	$7,800,000	$1,030,000	$1,030,000	$9,860,000

Source: Stanley Consultants 2012

Table 4-2 shows the summary of opinion of probable construction costs for the two distribution options that are included in this study.

Table 4-2 Summary of Opinion of Probable Costs Distribution System

Option	Phase 1	Phase 2	Phase3	Total
Option A – Interior Distribution System	$1,178,000	$365,000	$365,000	$1,751,000
Option B – Exterior Distribution System	$584,000	$48,000	$48,000	$829,000

Source: Stanley Consultants 2012

Electrical Rebates

The electrical utility, Rochester Public Utilities (RPU), offers for efficiency improvements on water chillers. Based on the information provided by the manufacturers, the chillers would qualify for rebates as outlined in Table 4-3.

Table 4-3 Summary of Chiller Rebates

Option	Chiller Rebate
Option 1 – Constant Speed Centrifugal Chillers	$34,575
Option 2 – Magnetic Bearing Centrifugal Chillers	$120,675

Additional rebates for motors and VFD for pumps may be available, but since these are the same for all three options have not been included in the analysis.

Life Cycle Cost Analysis

For each of the central plant options detailed in Section 3 of this study, capital costs, electrical costs, and steam costs are compared. These items are the major cost drivers of the central plant. The difference in operational and maintenance costs between the three options is a small percentage of the Energy costs and has not been included in this analysis.

Energy Costs

The energy costs for each option were calculated using the Peak anticipated load and Bin weather data for Minneapolis, Minnesota. A computer program was used to determine the operating costs for each option. The electrical costs are based on RPU Large General Service Rate Schedule. This rate schedule is included in Appendix C. Steam costs are based on rates from the Olmstead Waste-to-Energy Facility. The present steam rate is $17.64 per 1,000 pounds of steam.

Present Value Analysis

The present Value analysis has been performed using a discount rate of 4% and a discount rate of 8%. Costs were discounted to 2012 dollars and the total 25-year present value was compared for three options.

The following table summarizes the present value costs with a 4% discount rate.

Table 4-4 Total 25-Year Present Value Cost Comparison 4% Discount Rate

Option	Total 25-Year Present Value
Option 1 Constant Speed Centrifugal Chillers	$16,829,609
Option 2 Magnetic Bearing Centrifugal Chillers	$16,573,690
Option 3 Double Effect Steam Absorption Chillers	$23,886,953

The following table summarizes the present value costs with a 8% discount rate.

Table 4-5 Total 25-Year Present Value Cost Comparison 8% Discount Rate

Option	Total 25-Year Present Value
Option 1 Constant Speed Centrifugal Chillers	$13,997,290
Option 2 Magnetic Bearing Centrifugal Chillers	$13,917,772
Option 3 Double Effect Steam Absorption Chillers	$16,751,456

Section 5

Conclusions and Recommendations

Conclusions

Based on the review of existing data and life cycle cost analysis the following conclusions are provided

- Free cooling at central plant will provide low cost chilled water for areas with year round cooling.
- The present utility rate does not allow for an on-peak and off peak energy rate and does not provide any benefit for a thermal storage system utilized for load shifting or demand limiting.
- Thermal storage could be used to offset capital costs for installation of a chiller at the central plant.
- Distribution system efficiency could be improved if existing chilled water coils are replaced with new coils sized for higher system ΔT and design chilled water temperature.
- Capital costs for Option 3 (absorption chillers) are the highest.
- Capital costs for Option 1 (Constant Speed Centrifugal Chillers) are the lowest.
- Energy costs for Option 3 (Absorption chillers) are the highest.
- Energy costs for Option 2 (Magnetic Bearing Centrifugal Chillers) are the lowest.
- Life cycle costs are lowest for Option 2 at both discount rates when utility rebate for chillers is included.
- The difference in life cycle costs at an 8% discount rate between Option 1 and Option 2 is negligible.

Recommendations

Based on the life cycle costs, capital costs and other factors addressed in this study the following recommendations are offered for replacing the existing chillers serving the RCTC campus:.

- Design replacement cooling system for system temperature difference (DT) of 14°F or higher. (May required coils in air handling units to be designed for a higher DT than fan coil units or other terminal devices on the chilled water system.)
- Use treated water in chilled water distribution system. Where freeze protection is required, install small glycol system or other freeze protection controls.
- Provide free cooling as part of the central plant.
- Route the Distribution system as shown in Option B –Exterior Distribution System.
- Replace chillers as they exceed the useful life. As noted in the study, Coffman Hall, chiller, College Center chiller, East Hall, and Singley Hall chiller have all exceeded their useful life. Additionally, chillers serving the Science and Technology area will exceed their useful life within the next five years. Chillers serving the sports complex are expected to reach the end of their useful life in the next five to ten years.
- Replace existing chillers in phases as outlined in Option 2 – Magnetic Bearing Centrifugal Chillers.

Appendix A

Photos and Existing Equipment Information

Existing Chiller in CF133
Figure A-1

Existing Chiller in CF133
Figure A-2

Existing Chillers in Mechanical Room ST006
Figure A-3

Distance from Main Campus to Sports Complex and Location for Underground Pipe
Figure A-4

View from Parking Lot to
Proposed Southeast Chiller Plant Location
Figure A-5

Existing Chillers										
Building	**Rm #**	**Tons**	**Manuf**	**Model #**	**Date Installed**	**GPM**	**Pipe Size**	**GPM/ton**	**Series #**	**Notes**
CF	133	225	Trane	PCV-2C-C1-D2	1967	450	6"	2.00	8589	
CC	105	125	Carrier	19DH2142CD	1970	312.5		2.50		
Theater	Outside	13	Carrier	38AD014600	1971	31.25		2.50	499360	
Theater	Outside	30	Carrier	38AD034600	1971	75		2.50	J496679	
Theater	Outside	40	Carrier	38AD044600	1971	100		2.50	J495501	
WSU	Outside	93	McQuay	ALR145C	1986	232.5	4"	2.50	5RJ0705200	
SH	Roof	20	McQuay	ALP032C	1989	50		2.50	STL0506700	
ST	Room 006	200	York	YCCH163L0110YB	1992	320	10"	1.60		Chiller #1
ST	Room 006	200	York	YCCH163L0124YB	1992	320	10"	1.60		Chiller #2
SC	Outside	240	Carrier	30GTR255B—620AH	2000	520	8"	2.17	0301F57383	Chiller #2
SC	Outside	240	Carrier	30GTR255B—620AH	2000	520	8"	2.17	0301F57399	Chiller #1
ST	Room 006	34	York	YCWS0120SC46ZAADB	2006	85		2.50	RNRM017050	Chiller #3
	Total	1459.5				3016.25		2.07		

If not connecting Sports Complex	
Ton of cooling	980

T3-6847

THE TRANE COMPANY.

AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT
LA CROSSE, WISCONSIN

DATE SHIPPED	BILL OF LADING NO.	INVOICE DATE	ORDER & INVOICE NO.
			T3-0847

TERMS-30 DAYS NET	F. O. B.	NO. INVOICE CONFI.
NET 30	LAX FRT. ALLD.	1

MARK PACKAGES
P.O. 2447
ROCHESTER JUNIOR COLLEGE

ORDER DATE	CUSTOMERS ORDER NO.	Customers Account No.
	2447	T3-44-4825-0

SHIP VIA: PREPAID TRUCK CALL TRAFFIC FOR ROUTING — COLLECT / PREPAID

SOLD TO:
KIRCKOF PLUMBING AND HEATING
P.O. BOX 198
ROCHESTER, MINNESOTA 8589

SHIP TO:
KIRCKOF PLUMBING AND HEATING
C/O NEW ROCHESTER JUNIOR COLLEGE
ROCHESTER, MINNESOTA

SHIP WITH

PRODUCT CODE CTV 47

CENTRAVAC

TAG: WATER CHILLER — Approval Dwg 04513-7102 — Serial No.

JOB AND PLACE: NEW ROCHESTER STATE JUNIOR COLLEGE, ROCHESTER — ENGINEERING NO. — PRICING

UNIT ITEM	QUAN.	MODEL	Load Limit Relay Setting	Evap. LTC Setting	Impeller
A	1	PCV-2C	436	34	29.5

Dwg 04514-5000 — Comp Motor Dwg E4513-2019

DESIGN:
- COMP. DWG. EXT.
- EVAP. DWG. EXT.
- COND. DWG. EXT.
- IMPELLER (PCV ONLY) EXT. C-1 D-2
- WATER CONN. (PCV ONLY) EXT. K-2

MOTOR:
- COMPRESSOR 267 AMP 480 Volts 3600 RPM LA(POLX 54590) 70550281
- OIL PUMP 1/4 HP 480 Volts 1800 RPM CENT. E48YT 70550008
- PURGE UNIT 1/4 HP 115/60/1 1800 RPM

CAPACITY:
DESIGN CAPACITY 225 TONS REQUIRING ...... BHP 194 KW
AUXILIARY CHILLED WATER REQUIREMENT 4 GPM

	ENTERING WATER	LEAVING WATER	PRESSURE DROP	GPM	FOULING FACTOR	PIPING CONN.
EVAP.	56 °F	44°F	16 FT.	450	.0005	LH 2 PASS
COND.	85 °F	94.6	12 FT.	675	.0005	LH 2 PASS;

SPECIAL — ACCESSORIES & SPECIAL FEATURES

ITEM	QUAN.	DESCRIPTION	
B	1	MCDONNELL-MILLER E-2 FLOW SWITCH 13040034	
C	1	CONTROL TRANSFORMER, 2 KVA, 480 PRIMARY, 120 SECONDARY	13085400
D	1	JOHNSON SERVICE T-900 TEMPERATURE CONTROLLER DIRECT ACTING, GRADUAL ACTION, STYLE B NO. 4 BULB 15 FOOT CAPILLARY, DIAL RANGE, -10 F., TO 125 F WITH WELL	13171800
E	1	VARIABLE RATIO CURRENT TRANSFORMER RATIO 3 DD-B 82850-678	13080014

[redacted]

AWE/CK

PAPERWORK ENTERED	SHIPMENT WANTED		SPECS. OK	FTD. TRANS.
180	☐ OR SOONER ☐ NOT BEFORE ☐ HOLD UNTIL DATE CONFIRMED	☐ HOLD FOR APPROVAL ___ PRINTS REQUIRED ☐ APPROVAL NOT REQ'D		

BUILDING	NEW/EXIST.	OWNER	CUSTOMER	JOB RD.	CREDIT OK	TAX OR PERMIT NUMBER	TAX CODE	AMOUNT	SALES ORDER NUMBER
							021		T 3- 0 8 4 7

OFFICE-SALES MEN & RATE	ROCHESTER 65% STONE	TWIN CITIES 35% O'BRIEN

SHEET 1 OF 2

BILLING — NO.
- ☐ SOLD SUP P
- ☐ PAY TACH S
- ☐ LIST PRICE 475-85 19631

13- SPECIFICATIONS 2275

1368 JUN 30 1967

30-524-1(166)

Appendix B

Data Sheets for Proposed Equipment

OPTION 1

YORK
A JOHNSON CONTROLS COMPANY

YK MAXE CHILLER PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model No.	Net Capacity (tons)	Power	Refrigerant
Plant 2 - Case 2-CS	**3**	**YKECEQQ7-EPGS**	**500**	**460/3/60**	**R-134A**

Unit Data	Evaporator	Condenser
EWT (°F):	56.00	85.00
LWT (°F):	42.00	94.29
Flow Rate (gpm):	854	1500
Pressure Drop (ft):	15.0	22.6
Fluid Type (%):	WATER	WATER
Circuit No. of Passes:	2	2
Fouling Factor (ft² °F hr / Btu):	0.00010	0.00025
Tube No. / Description:	373 - 0.035" Turbo-ESP Copper (3/4")	262 - 0.035" CSL Enhanced Copper
Design Working Pressure (psig):	150	150
Entering Water Nozzle @ Location:	2	12
Leaving Water Nozzle @ Location:	3	13
Water Box Weight, ea (lb)(2):	429	391
Cover Plate Weight , ea (lb):	500	349
Return Head Weight (lb):	176	144
Water Weight (lb):	1340	1264
Water Volume(gal):	161	152

Performance Data		Electrical Data		Other	
KW:	295	FLA:	420	Operating Wt. (lb):	23757
KW/Ton:	0.590	LRA:	3111	Per Isolator (lb):	5939
NPLV (1):	0.507	Inrush Amps:	1399	Refrigerant Wt. (lb):	1033
Gear Code:	WU	Min Circuit Amp. (Amps):	525	Oil Charge (gal):	10
Shaft HP:	378	Max Fuse/Breaker:	800	Motor Wt. (lb):	1881
OptiSound Cntrl:	YES	Oil Pump Volts:	460/3/60	Compressor Wt. (lb):	3500
Isolation Valves:	YES	Oil Pump FLA:	3.60	Starter Wt. (lb):	200
Oil Cooler Type:	Standard			Ship Wt (lb):	21153
Condenser Inlet:	Standard				
		Type Starter: Solid State Starter			

Notes:

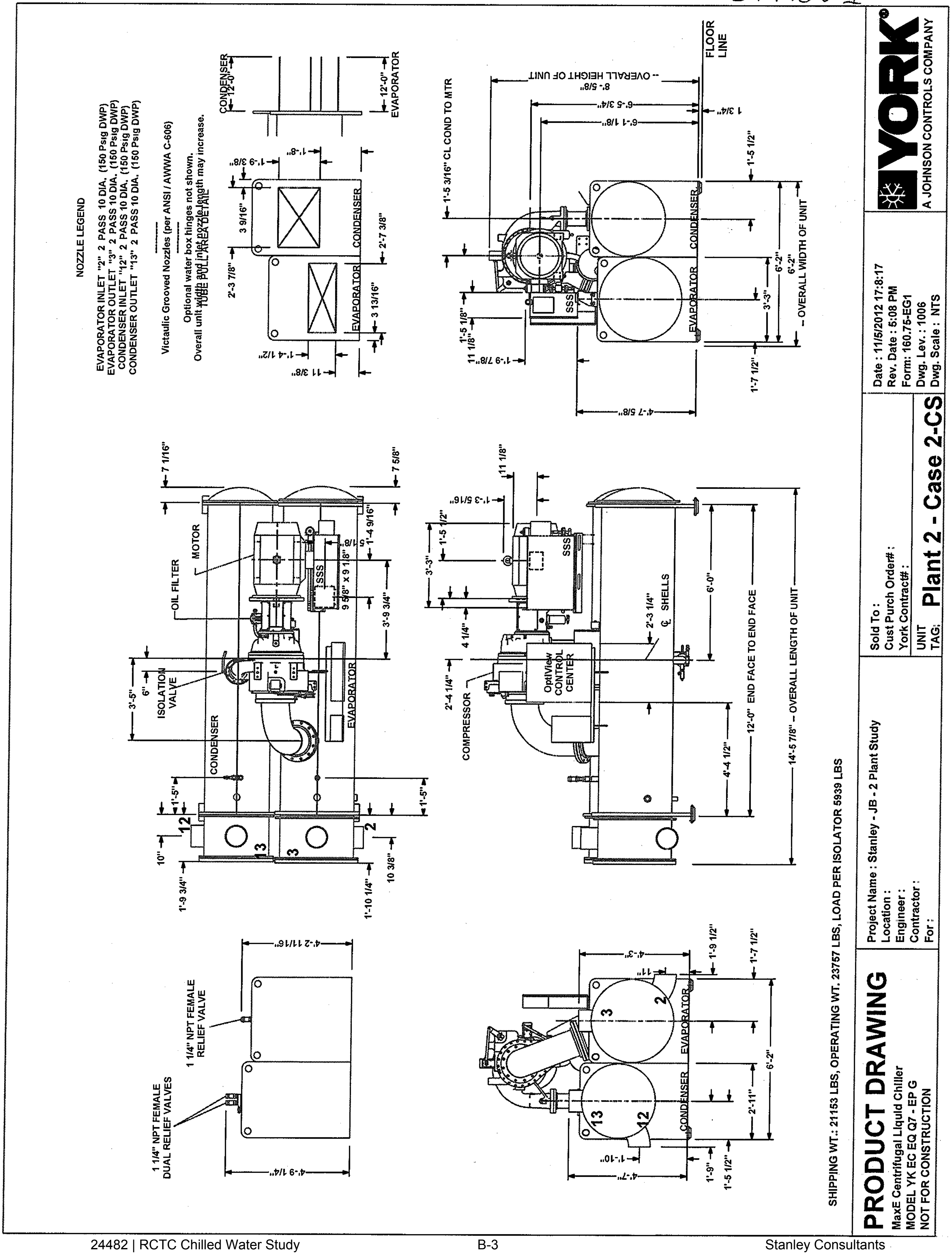
(1) Chiller NPLV value calculated to AHRI Standard 550/590 equation.
(2) Not including cover plate on marine water boxes.

Project Name: Stanley - JB - 2 Plant Study
Printed: 11/5/2012 at 17:08
Unit Folder: PLANT-2C

v1_126.idd

York Contract No.:
Plant 2 - Case 2-CS Performance
Page 1 of 1

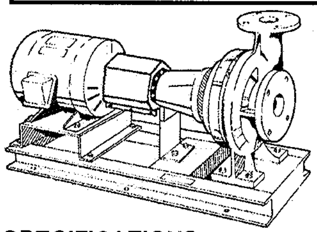
OPTION 1


NOZZLE LEGEND
EVAPORATOR INLET "2" 2 PASS 10 DIA. (150 Psig DWP)
EVAPORATOR OUTLET "3" 2 PASS 10 DIA. (150 Psig DWP)
CONDENSER INLET "12" 2 PASS 10 DIA. (150 Psig DWP)
CONDENSER OUTLET "13" 2 PASS 10 DIA. (150 Psig DWP)
Victaulic Grooved Nozzles (per ANSI / AWWA C-606)
Optional water box hinges not shown.
Overall unit width and inlet nozzle length may increase.
TUBE PULL AREA DETAIL
CONDENSER
EVAPORATOR
FLOOR LINE
OVERALL HEIGHT OF UNIT
OVERALL WIDTH OF UNIT
1'-5 3/16" CL COND TO MTR
MOTOR
OIL FILTER
ISOLATION VALVE
COMPRESSOR
OptiView CONTROL CENTER
℄ SHELLS
12'-0" END FACE TO END FACE
14'-5 7/8" – OVERALL LENGTH OF UNIT
1 1/4" NPT FEMALE RELIEF VALVE
1 1/4" NPT FEMALE DUAL RELIEF VALVES
SHIPPING WT.: 21153 LBS, OPERATING WT. 23757 LBS, LOAD PER ISOLATOR 5939 LBS
PRODUCT DRAWING
MaxE Centrifugal Liquid Chiller
MODEL YK EC EQ Q7 - EP G
NOT FOR CONSTRUCTION
Project Name : Stanley - JB - 2 Plant Study
Location :
Engineer :
Contractor :
For :
Sold To :
Cust Purch Order# :
York Contract# :
UNIT TAG: Plant 2 - Case 2-CS
Date : 11/5/2012 17:8:17
Rev. Date : 5:08 PM
Form: 160.75-EG1
Dwg. Lev. : 1006
Dwg. Scale : NTS
YORK
A JOHNSON CONTROLS COMPANY

Bell & Gossett
a xylem brand

SUBMITTAL
B-229.3F

JOB: RCTC CHILLER STUDY	REPRESENTATIVE:	
OPTION 1		
CHILLED WATER PUMP		
UNIT TAG:	ORDER NO.	DATE: 12/13/2012
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS
FLOW 1000 HEAD 130
HP 50 00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

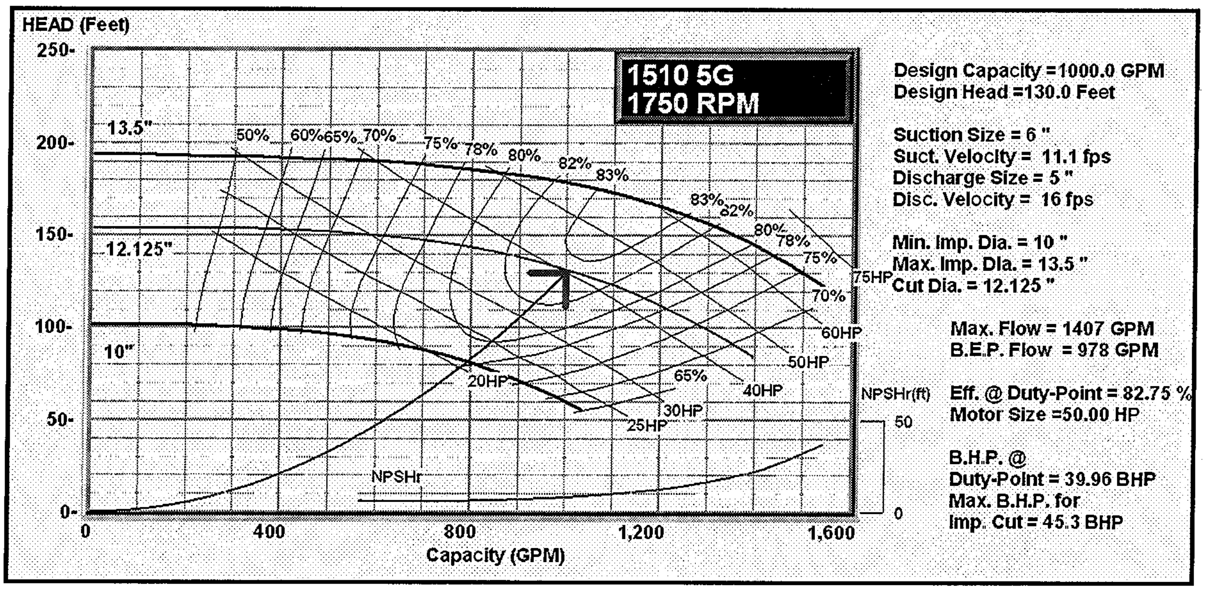
Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION
☐ BRONZE FITTED ☐ ALL IRON

FEATURES
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE
☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

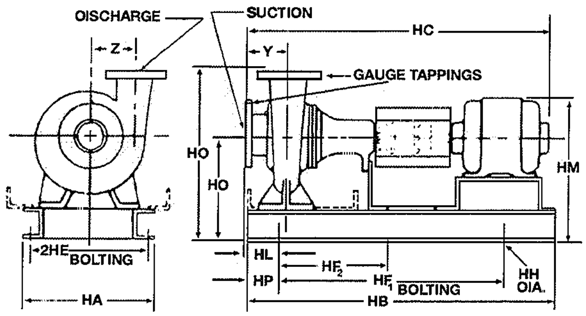
TYPE OF SEAL
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal

B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: **125# ANSI - STANDARD**
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm) **STANDARD SEAL 1510, 1510-F**

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

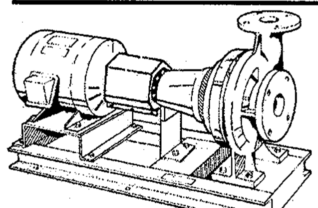
Dimensions are subject to change. Not to be used for construction purposes unless certified.

Bell & Gossett
a xylem brand

SUBMITTAL

B-225.7D

JOB: RCTC CHILLER STUDY	REPRESENTATIVE:	
OPTION 1		
CONDENSER WATER PUMP		
UNIT TAG:	ORDER NO.	DATE: 11/8/2012
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW	1500	HEAD	50
HP	30.00	RPM	1770
VOLTS	460		
CYCLE	60	PHASE	3
ENCLOSURE	ODP		
APPROX. WEIGHT	855		
SPECIALS			

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

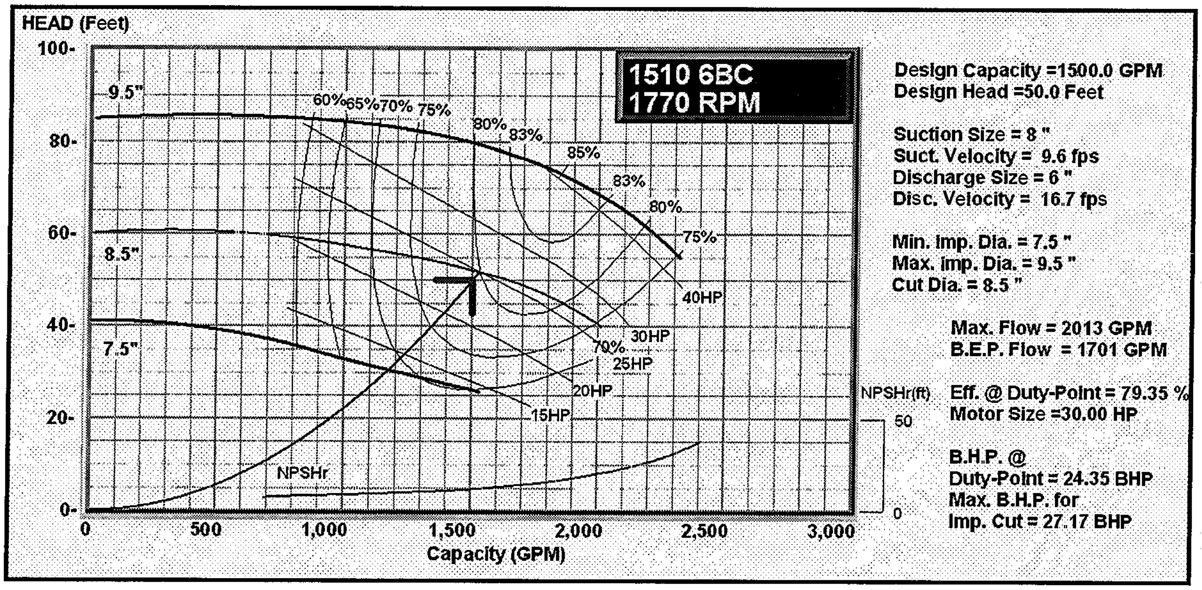
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

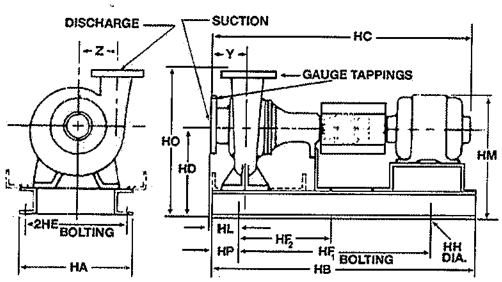
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal

B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 1

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 10:05:12 AM

Job Information

Stanley Consultants
1 cell 1500 GPM 95-85-78

Selected By

DPT Mechanical
10202 Douglas Avenue
Urbandale, IA 50322
jbeeghly@dptmechanical.com

Jason Beeghly
Tel 515-471-1902
Fax 515-727-0778

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	40.00 BHp
Model	NC8405TAN1	Fan Motor Output per cell	40.00 BHp
Cells	1	Fan Motor Output total	40.00 BHp
CTI Certified	Yes	Air Flow per cell	137600 cfm
Fan	9.000 ft, 6 Blades	Air Flow total	137600 cfm
Fan Speed	433 rpm, 12243 fpm	Static Lift	12.338 ft
Fans per cell	1	Distribution Head Loss	0.000 ft
		ASHRAE 90.1 Performance	46.9 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 77 dBA (Single Cell), 40.000 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07093 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03071
Approach	7.00 °F	Wet-Bulb Temp. Out	89.54 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	15 gpm
Relative Humidity	50.0 %	Total Heat Rejection	7473700 Btu/h
Capacity	103.0 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	8640 lb	8640 lb
Heaviest Section	8640 lb	
Max Operating Weight	20650 lb	20650 lb
Width	19.920 ft	19.920 ft
Length	9.900 ft	9.900 ft
Height	11.996 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	7.552 ft
50 % Open Wall	5.908 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8405_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	18.0	15.0	12.0	9.0	7.5	6.0	4.5
Ambient Temperature °F	-17.12	-6.95	3.22	13.39	18.47	23.56	28.64

CENTRIFUGAL CHILLER TECHNICAL DATA SHEET

OPTION 2

500T– Tech Data

Job Name:	**MN Project**
Date:	**10/30/2012**
Version:	**08.02**
Submitted By:	**Jake J Vorac**

Unit Description:

McQuay Model Number:	WME0500SSM2R/E3012-CE-2**/C2612-DNYY-2*****/R134-BAAAPAB
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)

Chiller Data:

Unit:	Compressor Type / Quantity - Size:	Centrifugal / 1 - 0500
	Capacity (ton):	496.2
	Capacity Control:	VFD / Inlet guide vanes
	Refrigerant:	R134a
	Refrigerant Charge (lb):	1,067
	Oil Cooler Type:	None
	ASHRAE 90.1 Compliancy:	'04, '07 & '10
	LEED EA Credit 4:	Pass
Evaporator:	Flow (gpm):	857.1
	LWT (°F):	42.0
	Number of Passes:	2
	Fouling Factor (°F.ft².h/Btu):	0.00010
	Tube Material:	Cu
	Tube Wall Thickness (in):	0.025
	Percentage of Water:	100
	Minimum Flow (gpm): (*see note 3*)	268.1
Condenser:	Flow (gpm):	1,500.0
	EWT (°F):	85.0
	Number of Passes:	2
	Fouling Factor (°F.ft².h/Btu):	0.00025
	Tube Material:	Cu
	Tube Wall Thickness (in):	0.028
	Percentage of Water:	100
Motor/Starter:	Starter Type:	VFD/UM
	Unit Voltage (V/Hz/Ph):	460/60/3
	Approval Listing:	ETL, ETLc
	RLA per Compressor (A): (*see note 4*)	402
	LRA per Compressor (A):	442
	Enclosure Type:	NEMA 1 gasketed
	Starter Location:	Unit mounted
	Control Circuit Transformer:	Included
	Power Connection:	Single point
	Power Factor:	0.91
	MCA (A) / MOCP (A): (*see note 4*)	505/706
	Motor Protection:	Standard
	Line Reactors:	Yes
	Ground Fault:	None
	Short Circuit Current Rating:	35 kA
	EMI Filter:	None
	Circuit Breaker:	35 KAIC with door mounted handle
	Harmonic Distortion:	Standard
	Transformer Type:	N/A
	Power Meter:	None

Design Performance rated at AHRI Condenser Relief:

								Evaporator		Condenser	
Capacity (ton)	Input (kW)	Performance (kW/ton)	RLA (A)	NPLV (kW/ton)	75% Load (kW/ton)	50% Load (kW/ton)	25 % Load (kW/ton)	PD (ft H_2O)	EWT (°F)	PD (ft H_2O)	LWT (°F)
496.2	291.2	0.587	402	0.343	0.429	0.290	0.327	17.8	55.9	33.0	94.3

Performance Points rated at AHRI Condenser Relief:

CENTRIFUGAL CHILLER TECHNICAL DATA SHEET

Point #	%Load Request	Capacity (ton)	Input Power (kW)	Performance (kW/ton)	RLA (A)	Evaporator Flow (gpm)	Evaporator EWT (°F)	Evaporator LWT (°F)	Evaporator PD (ft H_2O)	Condenser Flow (gpm)	Condenser EWT (°F)	Condenser LWT (°F)	Condenser PD (ft H_2O)
1	100.0	496.2	291.2	0.587	402	857.1	55.9	42.0	17.8	1,500.0	85.0	94.3	33.0
2	90.0	446.6	232.3	0.520	329	857.1	54.5	42.0	17.9	1,500.0	81.0	89.2	33.6
3	80.0	397.0	182.2	0.459	262	857.1	53.1	42.0	17.9	1,500.0	77.0	84.2	34.1
4	70.0	347.3	137.9	0.397	207	857.1	51.7	42.0	17.9	1,500.0	73.0	79.2	34.7
5	60.0	297.7	101.7	0.342	160	857.1	50.3	42.0	18.0	1,500.0	69.0	74.3	35.3
6	50.0	248.1	71.9	0.290	116	857.1	48.9	42.0	18.0	1,500.0	65.0	69.3	35.9
7	40.0	198.5	58.6	0.295	96	857.1	47.6	42.0	18.1	1,500.0	65.0	68.5	36.0
8	30.0	148.9	46.6	0.313	77	857.1	46.2	42.0	18.1	1,500.0	65.0	67.6	36.1
9	20.0	99.2	40.6	0.409	69	857.1	44.8	42.0	18.1	1,500.0	65.0	66.8	36.1
10	10.0	49.6	27.9	0.563	49	857.1	43.4	42.0	18.2	1,500.0	65.0	66.0	36.2

Sound Pressure:

63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Overall (dBA)
41.0	59.0	68.0	73.0	74.0	72.0	84.0	72.0	86.3
							75% Load	80.6
							50% Load	79.6
							25% Load	81.4

Sound Pressure (with Sound Insulation) (dB) measured in accordance with ANSI/AHRI Standard 575-2008 (A-weighted)

Service Points rated at AHRI Condenser Relief:

Point #	Refrig. Charge (lb)	LRAD (A)	PD Capacity (lb)	Superheat (Δ °F)	Subcooling (Δ °F)	Evaporator Temp (°F)	Evaporator Pressure (psig)	Evaporator Velocity (ft/s)	Condenser Temp (°F)	Condenser Pressure (psig)	Condenser Velocity (ft/s)
1	1,067	442	1,869	1.0	8.7	40.7	35.8	6.7	96.5	117.0	9.9
2	1,067	442	1,869	1.0	7.9	40.8	35.9	6.7	91.2	106.7	9.9
3	1,067	442	1,869	1.0	7.1	41.0	36.0	6.7	86.0	97.1	9.9
4	1,067	442	1,869	1.0	6.3	41.1	36.1	6.7	80.8	88.1	9.9
5	1,067	442	1,869	1.0	5.6	41.2	36.2	6.7	75.7	79.8	9.9
6	1,067	442	1,869	1.0	4.7	41.3	36.4	6.7	70.5	71.9	9.9
7	1,067	442	1,869	1.0	3.9	41.5	36.5	6.7	69.5	70.3	9.9
8	1,067	442	1,869	1.0	3.1	41.6	36.6	6.7	68.4	68.8	9.9
9	1,067	442	1,869	1.0	2.2	41.7	36.8	6.7	67.3	67.3	9.9
10	1,067	442	1,869	1.0	1.2	41.9	36.9	6.7	66.2	65.7	9.9

Certification:

Notes:

1. Above RLA, MCA and MOCP values are per Compressor and are for input amps.
2. Performance kW values are total kW, unless noted otherwise.
3. Minimum flow is based upon standard condenser water relief and not increased lift due to constant condenser water temperature.
4. The field wiring must be sized in accordance with the MCA and not the RLA as some selections may be below the minimum required protection.
5. Motor overload settings determined by motor amps. Refer to unit nameplate for proper settings.
6. The USGBC bases it's LEED EA credit 4 calculations for Enhanced Refrigerant Management on the default values for a water cooled centrifugal chiller with a 25-year life, 10% end of life loss and 2% annual leak rate. The gross ARI cooling capacity for the unit is at least 343 tons, and the refrigerant charge is 1067 lbs
7. The LEED result above considers the chiller only. When applying this information for credit or prerequisite compliance the entire building must be considered.

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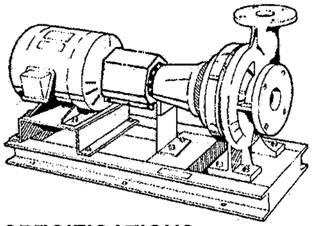
SUBMITTAL
B-229.3F

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 2		
CHILLED WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 12/13/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS
FLOW 1000 HEAD 135
HP 50 00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

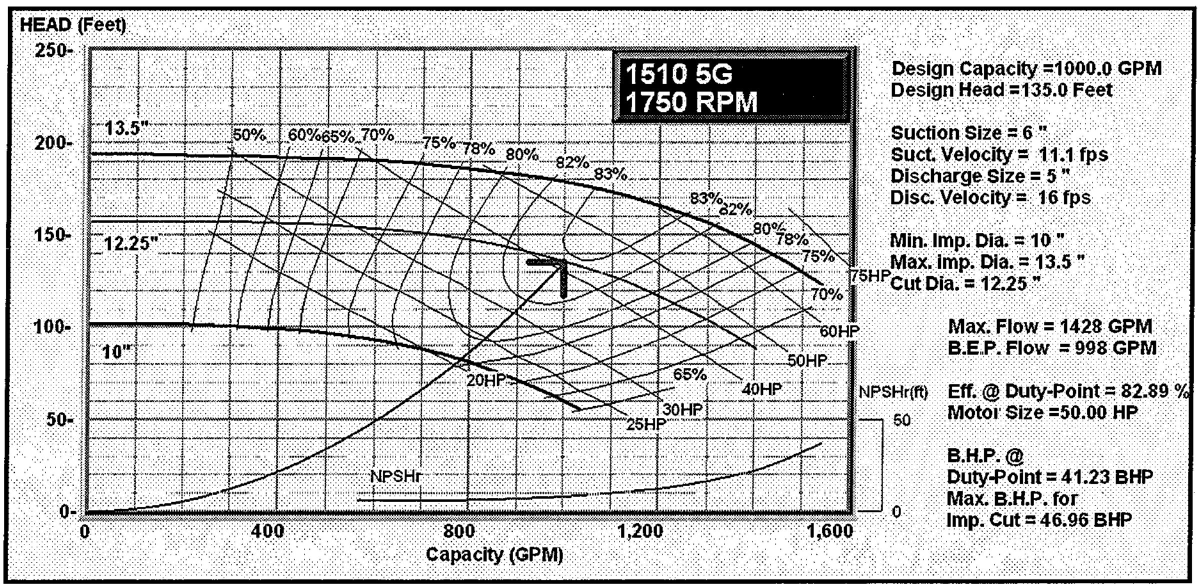
Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION
☐ BRONZE FITTED ☐ ALL IRON

FEATURES
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE
☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

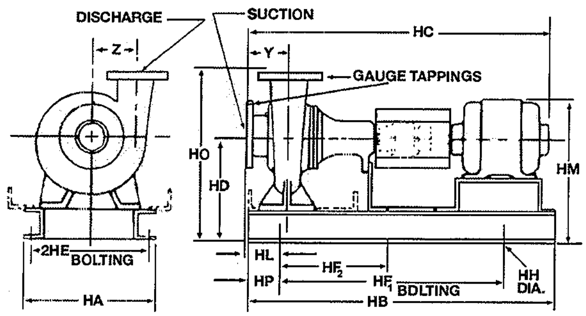
TYPE OF SEAL
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal

B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: 125# ANSI - STANDARD; 250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

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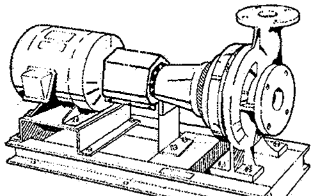
SUBMITTAL

B-225.7D

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 2		
CONDENSER WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 11/8/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW 1500 HEAD 60
HP 40.00 RPM 1770
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 995
SPECIALS

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

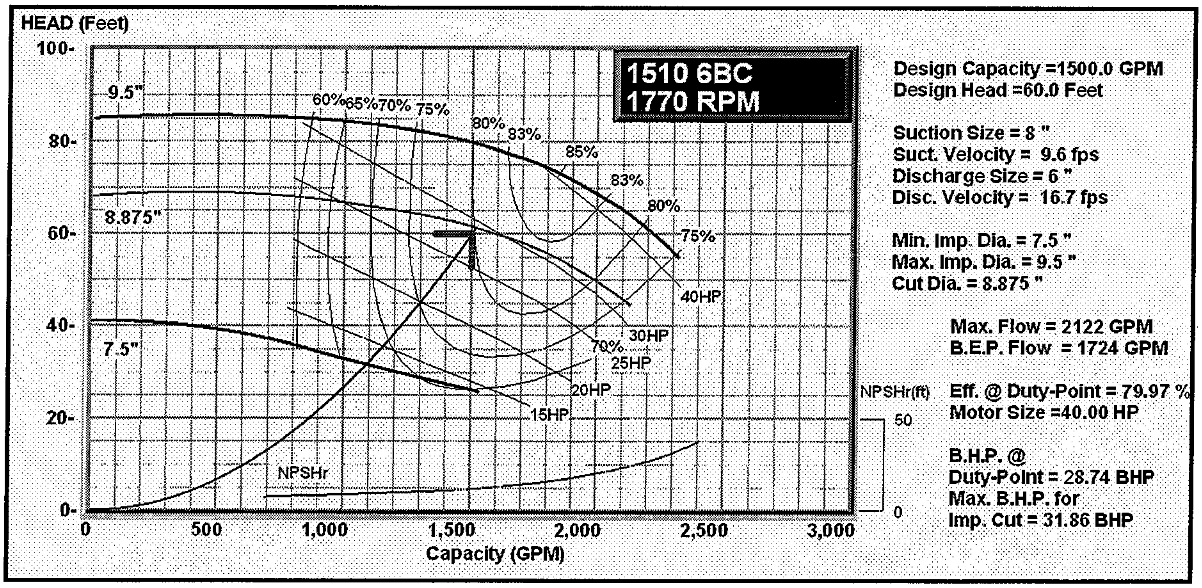
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

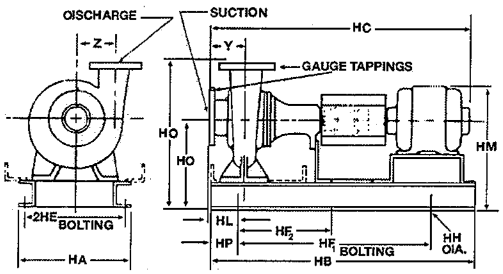
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal

B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 2

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 10:05:12 AM

Job Information

Stanley Consultants
1 cell 1500 GPM 95-85-78

Selected By

DPT Mechanical
10202 Douglas Avenue
Urbandale, IA 50322
jbeeghly@dptmechanical.com

Jason Beeghly
Tel 515-471-1902
Fax 515-727-0778

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	40.00 BHp
Model	NC8405TAN1	Fan Motor Output per cell	40.00 BHp
Cells	1	Fan Motor Output total	40.00 BHp
CTI Certified	Yes	Air Flow per cell	137600 cfm
Fan	9.000 ft, 6 Blades	Air Flow total	137600 cfm
Fan Speed	433 rpm, 12243 fpm	Static Lift	12.338 ft
Fans per cell	1	Distribution Head Loss	0.000 ft
		ASHRAE 90.1 Performance	46.9 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 77 dBA (Single Cell), 40.000 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07093 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03071
Approach	7.00 °F	Wet-Bulb Temp. Out	89.54 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	15 gpm
Relative Humidity	50.0 %	Total Heat Rejection	7473700 Btu/h
Capacity	103.0 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	8640 lb	8640 lb
Heaviest Section	8640 lb	
Max Operating Weight	20650 lb	20650 lb
Width	19.920 ft	19.920 ft
Length	9.900 ft	9.900 ft
Height	11.996 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	7.552 ft
50 % Open Wall	5.908 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8405_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	18.0	15.0	12.0	9.0	7.5	6.0	4.5
Ambient Temperature °F	-17.12	-6.95	3.22	13.39	18.47	23.56	28.64

OPTION 3

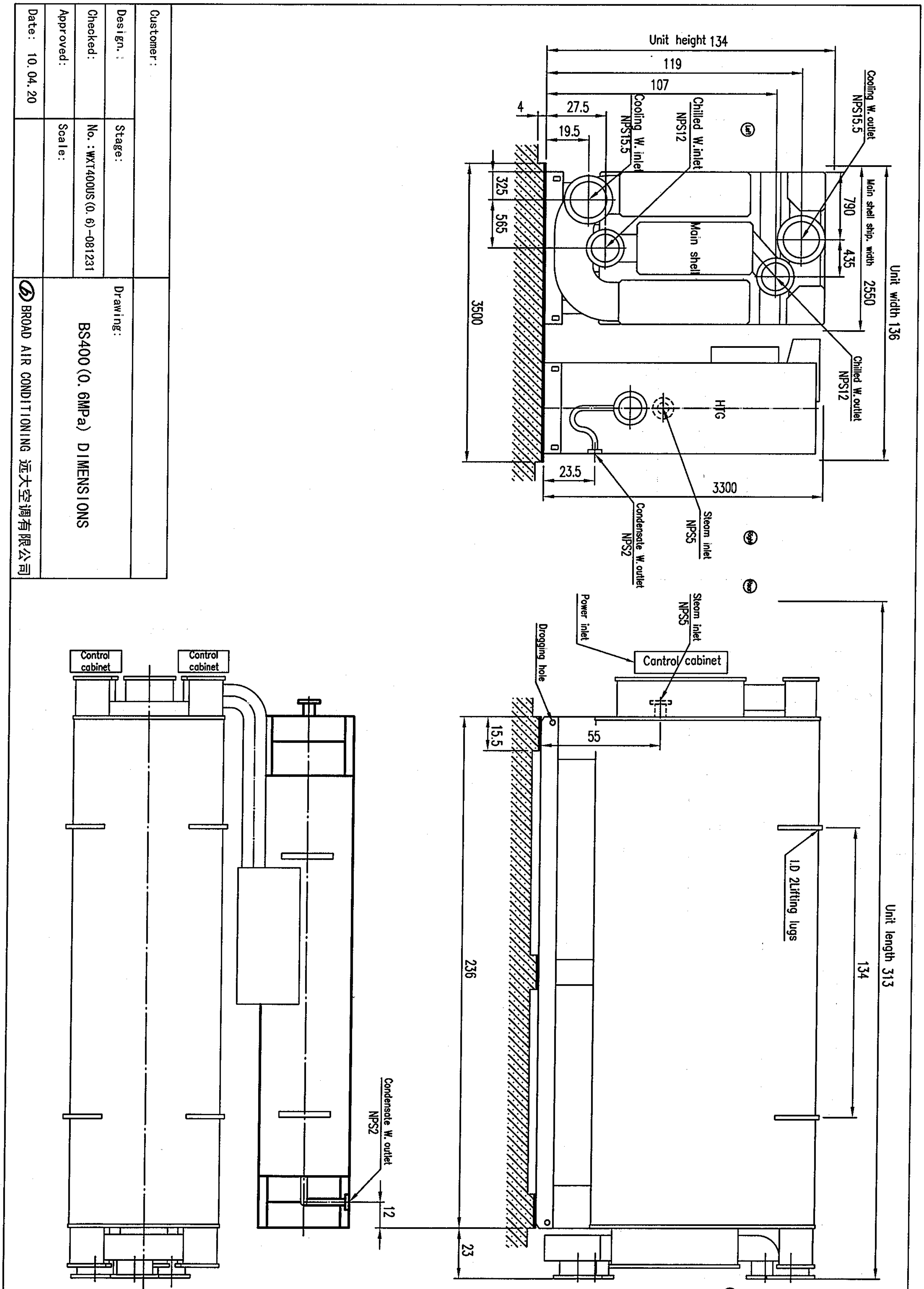
Chiller Performance Data

Our Reference No.:
Date: Nov. 2nd, 2012

Project Name:
Chiller Model: BS400

		Customer's Request	BROAD Proposition
Model			**BS151X0.34-37.8/29.4-5.6/13.3-B3-400**
Quantity			1
Cooling capacity	RT	500	500
Cooling capacity	kW		1759
Cooling capacity	10^4kcal/h		151
Chilled water			
Chilled W. outlet temp.	°F	42	42
Chilled W. inlet temp.	°F	56	56
Flowrate	GPM		863
Working pressure	psig		116
Pressure drop	ftH2O		25
Fouling factor	hr ft2 °F/Btu		0.0001
Cooling water			
Cooling W. outlet temp.	°F	85	85
Cooling W. inlet temp.	°F	100	100
Flowrate	GPM		1409
Working pressure	psig		116
Pressure drop	ftH2O		35
Fouling factor	hr ft2 °F/Btu		0.00025
Steam source			
Steam pressure	psig	50	50
Flowrate	lb/s		4,063
Others			
Power			460V/60Hz/3P/4wire
Chiller Power Consumption	kW		13.2
Rated COP For Exhaust Heat Source	COP		1.28
Unit ship. Wt.	klbs		49
Operation wt.	klbs		105

This selection is based on information provided by inquirer, reference only, product specifications subject to change.


Customer:
Design.:
Stage:
Checked:
No.: WXT400US(0.6)-081231
Approved:
Scale:
Date: 10.04.20
Drawing:
BS400(0.6MPa) DIMENSIONS
BROAD AIR CONDITIONING 远大空调有限公司
Unit height 134
119
107
27.5
19.5
4
Cooling W. inlet NPS15.5
Chilled W. inlet NPS12
Cooling W. outlet NPS15.5
Main shell
Main shell ship. width
790
435
2550
Unit width 136
Chilled W. outlet NPS12
HTG
325
565
3500
23.5
3300
Steam inlet NPS5
Condensate W. outlet NPS2
Power inlet
Steam inlet NPS5
Control cabinet
Dragging hole
15.5
55
I.D 2Lifting lugs
134
Unit length 313
236
23
12
Condensate W. outlet NPS2
Control cabinet
Control cabinet

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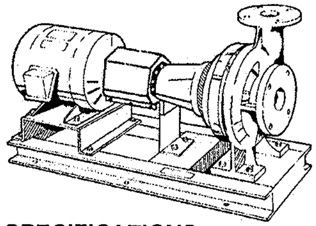
SUBMITTAL

B-229.3F

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 3		
CHILLED WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 12/13/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS
FLOW 1000 HEAD 140
HP 50.00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

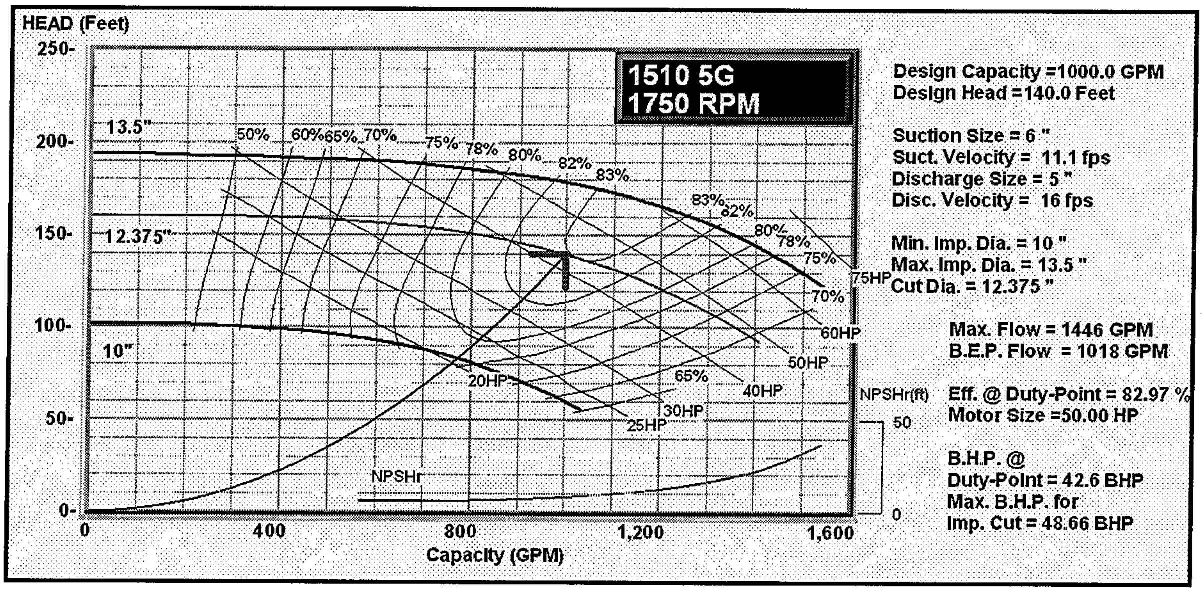
Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION
☐ BRONZE FITTED ☐ ALL IRON

FEATURES
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE
☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

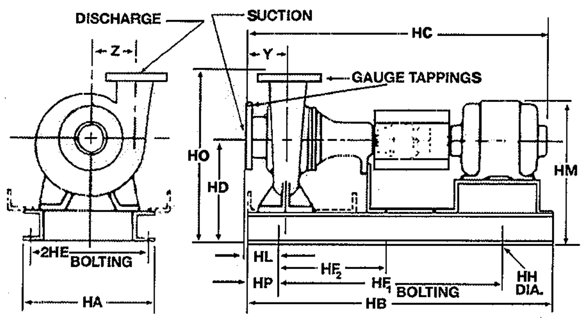
TYPE OF SEAL
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal

B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: **125# ANSI - STANDARD**
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

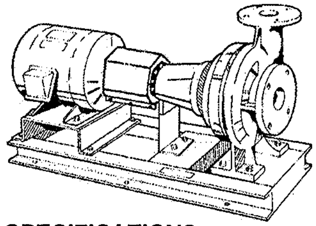
Dimensions are subject to change. Not to be used for construction purposes unless certified.

Bell & Gossett
a xylem brand

SUBMITTAL

B-225.7D

JOB: RCTC CHILLER STUDY	REPRESENTATIVE:	
OPTION 3		
CONDENSER WATER PUMP		
UNIT TAG:	ORDER NO.	DATE: 11/8/2012
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW	1500	HEAD	60
HP	40 00	RPM	1770
VOLTS	460		
CYCLE	60	PHASE	3
ENCLOSURE	ODP		
APPROX WEIGHT	995		
SPECIALS			

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

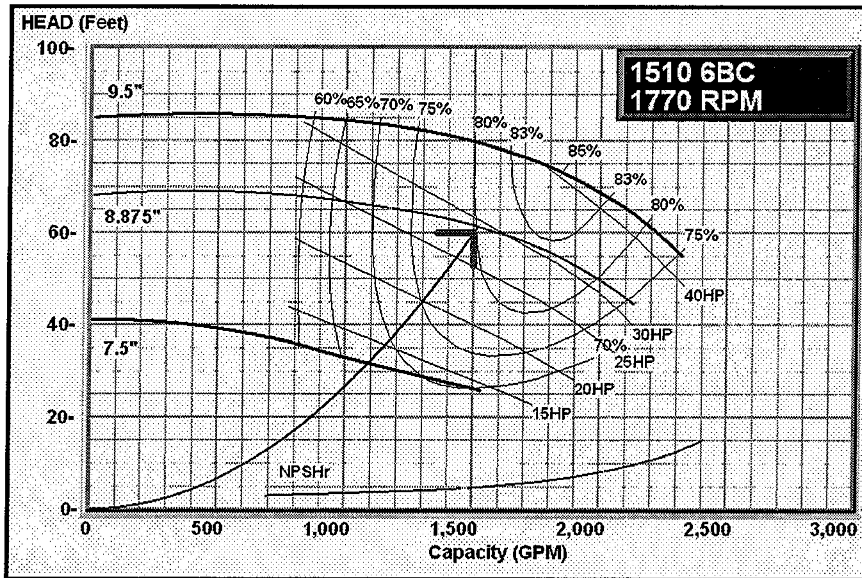
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Design Capacity =1500.0 GPM
Design Head =60.0 Feet

Suction Size = 8 "
Suct. Velocity = 9.6 fps
Discharge Size = 6 "
Disc. Velocity = 16.7 fps

Min. Imp. Dia. = 7.5 "
Max. Imp. Dia. = 9.5 "
Cut Dia. = 8.875 "

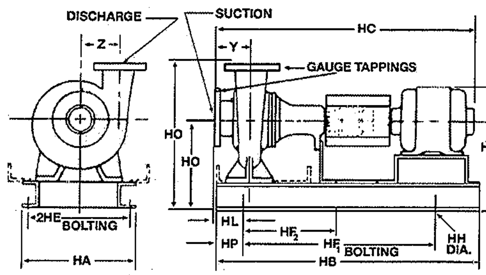
Max. Flow = 2122 GPM
B.E.P. Flow = 1724 GPM

Eff. @ Duty-Point = 79.97 %
Motor Size =40.00 HP

B.H.P. @ Duty-Point = 28.74 BHP
Max. B.H.P. for Imp. Cut = 31.86 BHP

Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm) **STANDARD SEAL 1510, 1510-F**

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 3

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 2:43:54 PM

Job Information

Selected By

Bovenkamp Jon
225 Iowa Ave. Tel (563) 264-6490
Muscatine, IA 52761
bovenkampjon@stanleygroup.com

SPX Cooling Technologies Contact

The RS Stover
3809 S. Center St. Tel 641-753-5557
Marshalltown, Iowa 50158 Fax 641-752-7977
dan.hampton@rsstover.com

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	50.00 BHp
Model	NC8409UAN1	Fan Motor Output per cell	49.62 BHp
Cells	1	Fan Motor Output total	49.62 BHp
CTI Certified	Yes	Air Flow per cell	196600 cfm
Fan	12.00 ft, 6 Blades	Air Flow total	196600 cfm
Fan Speed	273 rpm, 10292 fpm	Static Lift	12.34 ft
Fans per cell	1	Distribution Head Loss	0.00 ft
		ASHRAE 90.1 Performance	52.5 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 81 dBA (Single Cell), 5.00 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	100.00 °F	Air Density Out	0.07085 lb/ft³
Range	15.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03124
Approach	7.00 °F	Wet-Bulb Temp. Out	90.06 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	23 gpm
Relative Humidity	50.0 %	Total Heat Rejection	11205000 Btu/h
Capacity	116.5 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	13120 lb	13120 lb
Heaviest Section	13120 lb	
Max Operating Weight	32010 lb	32010 lb
Width	22.42 ft	22.42 ft
Length	13.90 ft	13.90 ft
Height	12.02 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	8.40 ft
50 % Open Wall	6.37 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8409_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	30.0	24.0	18.0	15.0	12.0	9.0	7.5
Ambient Temperature °F	-21.50	-8.40	4.71	11.26	17.81	24.36	27.64

Appendix C

Utility Information

LARGE GENERAL SERVICE

AVAILABILITY:

At all locations for loads where the measured demand is at least 1,000 kW or more for three or more billing periods in a given calendar year, but less than 10,000 kW, and where facilities of adequate capacity and suitable voltage are adjacent to the premises to be served. For loads where the service desired by the customer is not adjacent to the premises to be served, additional contract arrangements may be required prior to service being furnished.

APPLICATION:

To commercial, industrial, and governmental customers with all service taken at one point and measured through one meter. Also applicable to temporary service in accordance with RPU's published Electric Service Rules and Regulations. Not applicable to standby service.

CHARACTER OF SERVICE:

Three phase, 60 Hertz, alternating current at any one of the standard secondary service voltages as described in RPU's published Electric Service Rules and Regulations.

RATE:

Demand Charge:	$16.463 per kW
Energy Charge:	5.261¢ per kWh

POWER SUPPLY ADJUSTMENT:

Bills computed under this rate schedule are subject to adjustment in accordance with the Power Supply Adjustment (PSA).

POWER FACTOR ADJUSTMENT:

The customer agrees to maintain an average power factor of 0.95 or greater for the billing period and to prevent a leading power factor. If the customer's average power factor is less than 0.95 for the billing period, the billing demand will be determined by multiplying the measured demand by 0.95 and dividing the results by the customer's average power factor. The average power factor is defined to be the quotient obtained by dividing the kWh used during the month by the square root of the sum of the squares of the kWh used and the lagging reactive kilovoltampere-hours supplied during the same period. The customer's average power factor will be determined by means of permanently installed meters.

PRIMARY METER DISCOUNT:

Customers approved for metering at 13.8 kV will receive a discount of 1.25% on base rate charges for measured demand and energy.

TRANSFORMER OWNERSHIP CREDIT:

Customers owning transformers will receive a credit of $.20 per kW on each month's measured demand.

LARGE GENERAL SERVICE (Cont.)

DETERMINATION OF DEMAND:

Measured demand is defined as the maximum rate at which energy is used for any period of fifteen consecutive minutes during the billing period. The billing demand shall be the greater of the measured demand for the billing period adjusted for power factor, or 75% of the maximum measured demand for the most current June - September billing periods adjusted for power factor. Billing periods may not coincide with calendar months.

MINIMUM BILL:

The minimum bill shall not be less than the billing demand, as provided above, whether or not energy is used.

PAYMENT:

Payments are due on or before the due date.

CONDITIONS OF DELIVERY:

1. Service furnished under this rate schedule is subject to applicable provisions of RPU's published Electric Service Rules and Regulations.
2. Unless authorized by separate written agreement, standby electric generating equipment installed by the customer shall not be interconnected or operated in parallel with the RPU system. Customer shall own, install, operate, and maintain electrical interlocking equipment, which will prevent parallel operation, and such equipment shall be approved by RPU prior to installation.
3. RPU shall not be liable for any damage or loss sustained by customer resulting from interruptions, deficiencies, or imperfections of service provided under this rate.
4. Energy furnished under this rate shall not be resold.
5. A separate electric service agreement may be required for service under this rate schedule.

Approved by Rochester Public Utility Board: December 12, 2008
Effective Date: January 1, 2009

CONSERVE & $AVE®

COMMERCIAL COOLING EQUIPMENT REBATE APPLICATION

1. CUSTOMER INFORMATION (please print)

Account Name | Doing Business As (if different from Account Name)

Installation Address | City | State | Zip Code

Mailing Address (if different from above) (rebate check will be mailed here) | City | State | Zip Code

Account Number

❑ **Send us a rebate check.** ❑ **Apply rebate to our account.**

Type of Business: ❑ Church ❑ Government ❑ Grocery ❑ Health ❑ Industrial ❑ Lodging ❑ Multi-family ❑ Office ❑ Restaurant ❑ Retail ❑ School ❑ Other__________

How did you hear about CONSERVE & SAVE®? ❑ Billboard ❑ Chamber of Commerce ❑ Contractor ❑ Newspaper ❑ Radio ❑ Retailer/Vendor ❑ TV ❑ Utility Mailing ❑ Utility Newsletter ❑ Utility Representative ❑ Utility Web Site ❑ Other__________

2. CONTACT INFORMATION (please print)/CUSTOMER SIGNATURE

ATTENTION: ALL INVOICES OR RECEIPTS AND ALL SPECIFICATION SHEETS MUST BE INCLUDED WITH YOUR FULLY-COMPLETED AND SIGNED APPLICATION OR APPLICATION WILL BE RETURNED.

Contact Name (rebate check will be mailed to contact) | ( ) Daytime Phone Number

Email

I certify that all the information in the application (including any associated worksheets) is correct to the best of my knowledge. I have read and agree to the Terms and Conditions on the back of this application booklet. I understand that if any equipment in conjunction with this application is ordered, purchased, or installed before approval from The Utility is received, the proposed project may not qualify for a rebate.

Customer's Signature | Date

❑ **Check here if you DO NOT give us permission to use your business name in advertising our CONSERVE & SAVE® programs.**

3. CONTRACTOR/VENDOR INFORMATION (please print)

Company Name

Address | City | State | Zip Code

Contact Name | ( ) Daytime Phone Number

Email

TEAMING UP TO SAVE YOU MONEY

AUSTIN UTILITIES
OWATONNA PUBLIC UTILITIES
rpu® we pledge, we deliver
CONSERVE & $AVE®

OFFICE USE ONLY Date Received________

Pre-Inspected? ❑ YES ❑ NO Date________ Initials________

Post-Inspected? ❑ YES ❑ NO Date________ Initials________

TOTAL REBATE AMOUNT $

4. REBATE INFORMATION – ROOFTOP, PACKAGED, AND CONDENSING A/C UNITS

Project Type: ☐ **RETROFIT** ☐ **NEW CONSTRUCTION**

EXISTING SYSTEM (if applicable)			NEW SYSTEM										REBATE					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Unit Size (Tons)	Existing SEER* or EER*	Qty.	Unit Code (Table 1)	Manufacturer Name	Model Number	Unit Size (Tons)	AHRI Ref Number	Minimum Efficiency (Table 1)	Actual SEER* or EER*	Qty.	Annual Hours of Operation (Table 2)	Equipment Cost	Base Rebate $/Ton (Table 1)	Base Rebate (G x K x N)	Eligible Efficiency Bonus (J – I)	Bonus Rebate** $/Ton (Table 1)	Bonus Rebate (P x Q) x (G x K) x 10	Total Rebate (O + R)
1.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
2.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
3.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
4.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
5.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
6.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$

TOTAL $

TABLE 1 – QUALIFYING EFFICIENCIES AND REBATE SCHEDULE

Unit Code	Qualifying Equipment	Minimum Efficiency	Base Rebate $/Ton	Efficiency Bonus Rebate** $/Ton
UT–1	Less than or equal to 65,000 BTU/hour	14.0 SEER*	$75	$5
UT–2	65,001 – 134,999 BTU/hour	10.8 EER*	$75	$5
UT–3	135,000 – 239,999 BTU/hour	10.7 EER*	$75	$5
UT–4	240,000 – 759,999 BTU/hour	10.2 EER*	$75	$5
UT–5	760,000 BTU/hour and greater	9.6 EER*	$75	$5
PTAC	Packaged Terminal A/C Units (all sizes)	10.8 EER*	$75	$5
PTHP	Packaged Terminal Heat Pump Units (all sizes)	10.6 EER*	$75	$5

TABLE 2 – GUIDELINES FOR COOLING HOURS

Business Type	Estimated Hours
Education – Community College	632
Education – Secondary School	384
Education – University	828
Health/Medical – Clinic	756
Health/Medical – Hospital	1,408
Lodging	1,193
Office	902
Retail	867

***In Columns B and J, please enter Existing and Actual SEER or EER value, respectively, and then check SEER or EER.**
SEER=Seasonal Energy Efficiency Rating; EER=Energy Efficiency Rating

**Efficiency Bonus Rebate provides an additional incentive for each .1 SEER/EER above the Minimum Efficiency.

Note: Qualifying unitary A/C units must have been rated in accordance with the most recent version of AHRI Standard 210/240 if under 65,000 BTU/hour and AHRI 340/360 if above 65,000 BTU/hour, and have nameplate data stamped with the SEER/EER. If equipment is larger than the AHRI Standard certification process, it must be listed as a standard combination in manufacturer's literature. **A copy of the manufacturer's applicable unit rating must accompany this application.** The AHRI directory and standards are located at www.ahridirectory.org.

5. REBATE INFORMATION -- CENTRAL CHILLERS

Project Type: ❑ **RETROFIT** ❑ **NEW CONSTRUCTION**

	EXISTING SYSTEM (if applicable)				NEW SYSTEM										REBATE						
	A Unit Code (Table 3)	B Unit Size (Tons)	C Existing kW/Ton	D Qty.	E Unit Code (Table 3)	F Manufacturer Name	G Model Number	H Size (Tons)	I Full Load Eff. (Table 3)	J Rated Full Load Eff.	K IPLV Eff. (Table 3)	L Rated IPLV Eff.	M Qty.	N Annual Hours of Operation (Table 4)	O Equipment Cost	P Base Rebate $/Ton (Table 3)	Q Base Rebate (H x M x P)	R Eligible Efficiency Bonus (K – L)	S Bonus Rebate* $/Ton (Table 3)	T Water Cooled Bonus Rebate (R x S) x (H x M) x 100	U Air Cooled Bonus Rebate (R x S) x (H x M) x 10	V Total Rebate (Q+T) or (Q+U)
1.															$	$	$		$	$	$	$
2.															$	$	$		$	$	$	$
3.															$	$	$		$	$	$	$
4.															$	$	$		$	$	$	$
5.															$	$	$		$	$	$	$
6.															$	$	$		$	$	$	$

TOTAL $

TABLE 3 – QUALIFYING EFFICIENCIES AND REBATE SCHEDULE

Unit Code	Qualifying Equipment (Water or Air Cooled)	Full-Load Efficiency	IPLV Efficiency	Base Rebate $/Ton	Efficiency Bonus* Rebate ($/Ton)
C–1	Water-Cooled Screw/Scroll Chiller – Less than 150 Tons	0.74 kW per Ton	0.63 kW per Ton	$15	$3.50/IPLV
C–2	Water-Cooled Screw/Scroll Chiller – 150 to 299 Tons	0.67 kW per Ton	0.58 kW per Ton	$15	$3.50/IPLV
C–3	Water-Cooled Screw/Scroll Chiller – 300 Tons and Greater	0.59 kW per Ton	0.52 kW per Ton	$15	$3.50/IPLV
C–4	Water-Cooled Centrifugal Chiller – Less than 150 Tons	0.69 kW per Ton	0.65 kW per Ton	$15	$3.50/IPLV
C–5	Water-Cooled Centrifugal Chiller – 150 to 299 Tons	0.62 kW per Ton	0.58 kW per Ton	$15	$3.50/IPLV
C–6	Water-Cooled Centrifugal Chiller – 300 Tons and Greater	0.56 kW per Ton	0.53 kW per Ton	$15	$3.50/IPLV
C–7	Air-Cooled Chiller (all types)	9.7 EER	12.0 EER	$8	$2.25/IPLV

* Efficiency Bonus Rebate provides additional incentive for each .01 kW per Ton below the Minimum IPLV Efficiency (water-cooled chillers), or for each 0.1 EER above the minimum IPLV efficiency (air-cooled chillers).

IPLV – Integrated Part Load Value; EER – Energy Efficiency Rating

Note: Qualifying chillers must meet both full load and IPLV minimum efficiency requirements shown in Table 3 above to be eligible and have kW per Ton ratings stamped on the nameplate. **Documentation is required.** This can be a printout from the AHRI directory (www.ahridirectory.org) or if the chiller has not been tested by AHRI, manufacturer documentation must show the rated capacity (tons), and the IPLV efficiency and full-load efficiency at AHRI standard 550/590 rating conditions.

The motors and/or variable speed drives in chiller units are not independently eligible for additional rebates offered under the Commercial Motor and Variable Speed Drive Rebate Program.

TABLE 4 – GUIDELINES FOR COOLING HOURS

Business Type	Estimated Hours
Education – Community College	632
Education – Secondary School	384
Education – University	828
Health/Medical – Clinic	756
Health/Medical – Hospital	1,408
Lodging	1,193
Office	902
Retail	867

6. TERMS AND CONDITIONS

1. **ELIGIBILITY**
Rebates are available to non-residential electric customers of Austin Utilities, Owatonna Public Utilities, and Rochester Public Utilities (herein referred to as The Utility). All products must be in use in facilities in The Utility service territory.

2. **APPLICATION**
Program is offered January 1 through December 31 of the respective calendar year. **Due to limited funding, this rebate offer can be changed or withdrawn at any time without notice and is available on a first-come, first-serve basis.** The entire rebate application must be read and filled out completely or application will be returned.

3. **INSPECTION AND VERIFICATION**
The Utility reserves the right to inspect the customer's facility through on-site visits before and after new equipment installation to verify rebate eligibility.

4. **INSTALLATION AND REBATE AMOUNTS**
Qualifying energy-efficient equipment installed and operational within six (6) months of the date of purchase are eligible for rebate. Additional time may be granted subject to The Utility's pre-approval. In no case will the rebate paid by The Utility exceed the purchase price of the equipment. The maximum rebate amount is $100,000 per customer location per technology per year. The Utility can, at its sole discretion, increase rebate amounts.

5. **INVOICE AND PAYMENT**
Following inspection and verification (see #3) and completed installation, the customer must notify The Utility and submit original invoices specifying the quantity and price of all materials purchased, the date ordered, installation costs, and applicable taxes. Additionally, SEER/EER (Rooftop, Packaged, and Condensing A/C Units) certification data or manufacturer's kW per Ton (Central Chillers) is required to be submitted with invoices. After satisfactory review of the application and invoices, a rebate check or bill credit will be issued to the customer. Please allow 6-10 weeks from the date of application submission for delivery of rebate check or bill credit.

6. **EQUIPMENT ELIGIBILITY REQUIREMENTS**
Eligible high-efficiency cooling equipment must be new and meet or exceed The Utility's minimum efficiency requirements as identified in Tables 1 and 3 according to its respective characteristics. Eligible high-efficiency cooling units must replace units of lesser efficiencies and of equivalent or greater capacity (Tons or Btu's/hour) to qualify for a rebate.

   Rooftop, Packaged, and Condensing A/C Units: Qualifying unitary A/C units must have been rated in accordance with the most recent version of AHRI Standard 210/240 if under 65,000 BTU/hour and AHRI 340/360 if above 65,000 BTU/hour, and have nameplate data stamped with the SEER/EER. If equipment is larger than the AHRI Standard certification process, it must be listed as a standard combination in manufacturer's literature. A copy of the manufacturer's applicable unit rating must accompany this application. The AHRI directory and standards are located at www.ahridirectory.org.

   Central Chillers: Qualifying chillers must meet the efficiency requirements shown in Table 3 to be eligible and have kW per Ton ratings stamped on the nameplate. Documentation is required. This can be a printout from the AHRI directory (www.ahridirectory.org) or if the chiller has not been tested by AHRI, manufacturer documentation must show the rated capacity (tons), and the IPLV efficiency and the full-load efficiency at AHRI standard 550/590 rating conditions:
   - 44° F leaving chilled water temperature
   - 85° F entering condenser water temperature (for water cooled chillers)
   - 95° F entering condenser air temperature (for air cooled chillers)

7. **TAX INFORMATION**
The Utility will not be responsible for any tax liability imposed as a result of the rebate payment(s). Customers are advised to consult their tax advisors for details.

8. **DISCLAIMER**
The Utility does not guarantee that the implementation of energy-efficient measures or use of the equipment purchased or installed pursuant to this program will result in energy or cost savings. The Utility makes no warranties, expressed or implied, with respect to any equipment purchased or installed including, but not limited to, any warrant of merchantability or fitness for purpose. In no event shall The Utility be liable for any incidental or consequential damages. Customers are solely responsible for the proper disposal of existing equipment. Consult the Minnesota Pollution Control Agency (MPCA) office for details at (800) 657-3864.

9. **ENDORSEMENT**
The Utility does not endorse any particular vendor, manufacturer, product, or system in promoting this rebate program. Listing a vendor or product does not constitute an endorsement, nor does it imply that unlisted vendors or products are deficient or defective in any way.

10. **PRIVACY**
Information contained in this rebate application may be shared with the Minnesota Department of Commerce and our co-op partners and also may be used in our advertising efforts with your permission as granted in Section 2 of this rebate application.

RETURN COMPLETED APPLICATION AND REQUIRED DOCUMENTATION TO YOUR UTILITY PROVIDER:

Austin Utilities	Owatonna Public Utilities	Rochester Public Utilities
Attn: Rebate Processing	Attn: Rebate Processing	Attn: Rebate Processing
400 - 4th Street NE	P.O. Box 800	4000 East River Road NE
Austin, MN 55912	Owatonna, MN 55060	Rochester, MN 55906-2813
(507) 433-8886	(507) 451-2480	(507) 280-1500
(507) 433-5045 fax	(507) 451-4940 fax	(507) 280-1542 fax
www.austinutilities.com	www.owatonnautilities.com	www.rpu.org

PLEASE PRINT ON RECYCLED PAPER

COUNTY OF Olmsted

8/15/2012

OWEF - Solid Waste Division
2122 Campus Dr. SE
Rochester MN, 55904

Customer: 2370
ROCHESTER COMMUNITY COLLE
851 30TH AVENUE SE
ROCHESTER, MN 55904

The following charges are for July
Please call Justin @ 328-7057 with any questions.

DATE:	DESCRIPTION:	QUANTITY:	UNIT PRICE:	TOTAL :
7/31/2012	Previous Statement Balance		0	$7,995.18
7/31/2012	Payment - ITACH073012WR		0	($7,995.18)
7/31/2012	Steam Sales Firm - Heintz	57.10	14.64	$835.94
7/31/2012	Steam Sales Firm - UCR	138.20	14.64	$2,023.25
7/31/2012	Steam Sales Firm - Sports Center	16.50	14.64	$241.56
7/31/2012	Meter Service Charge	3.00	2.1	$6.30
7/31/2012	BTU Meter Serv Chg	3.00	21	$63.00
7/31/2012	Steam Gas Rate - Sports Center	16.50	4.4808	$73.93
7/31/2012	Steam Gas Rate - Heintz	57.10	4.4808	$255.85
7/31/2012	Steam Gas Rate - UCR	138.20	4.4808	$619.25
7/31/2012	Steam Interrupt Rate - Sports Center	16.50	4	($66.00)
7/31/2012	Steam Interrupt Rate - Heintz	57.10	4	($228.40)
7/31/2012	Steam Interrupt Rate - UCR	138.20	4	($552.80)

Payment Due	Current	Previous Balance
$3,271.88	$3,271.88	$0.00

C. Kellas 8-27-12

AUG 20 2012

COUNTY OF Olmsted

9/21/2012

OWEF - Solid Waste Division
2122 Campus Dr. SE
Rochester MN, 55904

Steam Heat

Customer: 2370
ROCHESTER COMMUNITY COLLE
851 30TH AVENUE SE
ROCHESTER, MN 55904

The following charges are for August
Please call Justin @ 328-7057 with any questions.

DATE:	DESCRIPTION:	QUANTITY:	UNIT PRICE:	TOTAL :
8/31/2012	Previous Statement Balance		0	$3,271.88
8/31/2012	Payment - TACH082912WR		0	($3,271.88)
8/31/2012	Meter Service Charge	3.00	2.1	$6.30
8/31/2012	BTU Meter Serv Chg	3.00	21	$63.00

Payment Due	Current	Previous Balance
$69.30	$69.30	$0.00

10.4.12

SEP 24 2012

C. Kellas

Appendix D

Opinion of Probable Cost Information

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (No VFD)						
OPTION 1						
Phase 1						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
2000A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,599,534
				Undeveloped Design Details - 30%		$1,079,860
				Contractor Overhead - 15%		$701,909
				Contractor Profit - 10%		$538,130
				Adminstration and Engineering - 15%		$887,915
				TOTAL COST		$6,807,349
				PROBABLE COST USE		**$6,810,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,010,000**

Stanley Consultants INC.			Job No.	24482-01-00
			Subject	RCTC
Computed by	Kyle Johnson	Date 12-Dec-12		Chilled Water Study
Checked by		Date		TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
Approved by		Date		OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (With VFD)						
OPTION 2						
Phase 1						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1600A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,661,534
				Undeveloped Design Details - 30%		$1,098,460
				Contractor Overhead - 15%		$713,999
				Contractor Profit - 10%		$547,399
				Adminstration and Engineering - 15%		$903,209
				TOTAL COST		$6,924,602
				PROBABLE COST USE		**$6,920,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,340,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
ABSORPTION CHILLERS						
OPTION 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1200A Main Switch Board (MSB)	1	EA	$15,000.00	$10,000.00	$25,000.00	$25,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	9200	SF	$125.00	$75.00	$200.00	$1,840,000
				SUBTOTAL		$4,126,134
				Undeveloped Design Details - 30%		$1,237,840
				Contractor Overhead - 15%		$804,596
				Contractor Profit - 10%		$616,857
				Adminstration and Engineering - 15%		$1,017,814
				TOTAL COST		$7,803,241
				PROBABLE COST USE		**$7,800,000**
Phase 2						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$9,860,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Through the Building - OPTION B						
PHASE 1						
12" Direct Buried AWWA Pipe	440	LF	$13.69	$16.89	$30.58	$13,455
12" AWWA LR Elbow	4	EA	$184.00	$126.00	$310.00	$1,240
12" Steel Pipe	745	LF	$89.00	$68.78	$157.78	$117,546
12" Pipe Insulation with Jacket	745	LF	$20.50	$8.95	$29.45	$21,940
6" Steel Pipe	300	LF	$37.50	$35.97	$73.47	$22,041
6" Pipe Insulation with Jacket	300	LF	$12.40	$6.80	$19.20	$5,760
4" Steel Pipe	360	LF	$23.50	$22.93	$46.43	$16,715
4" Pipe Insulation with Jacket	360	LF	$9.95	$6.20	$16.15	$5,814
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
12" Steel Elbow	6	EA	$3,775.00	$208.00	$3,983.00	$23,898
6" Steel Elbow	8	EA	$495.00	$139.00	$634.00	$5,072
4" Steel Elbow	4	EA	$315.00	$100.00	$415.00	$1,660
3" Steel Elbow	3	EA	$255.00	$73.00	$328.00	$984
12"x12"x4" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x12"x8" Steel Tee	2	EA	$5,875.00	$415.00	$6,290.00	$12,580
6"x6"x3" Steel Tee	2	EA	$950.00	$208.00	$1,158.00	$2,316
12"x6" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Demo and Replace Lay-In Ceiling	6408	SF	$2.21	$1.42	$3.63	$23,261
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$518,976
				Difficult Working Conditions - 20%		$103,795
				Undeveloped Design Details - 30%		$186,831
				Contractor Overhead - 15%		$121,440
				Contractor Profit - 10%		$93,104
				Adminstration and Engineering - 15%		$153,622
				TOTAL COST		$1,177,770
				PROBABLE COST USE		**$1,178,000**
PHASE 2						
12" Steel Pipe	420	LF	$89.00	$68.78	$157.78	$66,268
12" Pipe Insulation with Jacket	420	LF	$20.50	$8.95	$29.45	$12,369
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
12"x12"x12" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$161,052
				Difficult Working Conditions - 20%		$32,210
				Undeveloped Design Details - 30%		$57,979
				Contractor Overhead - 15%		$37,686
				Contractor Profit - 10%		$28,893
				Adminstration and Engineering - 15%		$47,673
				TOTAL COST		$365,493
				PROBABLE COST USE		**$365,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2365	LF	$11.85	$15.25	$27.10	$64,092
8" AWWA LR Elbow	12	EA	$144.00	$99.00	$243.00	$2,916
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
8" Steel Elbow	4	EA	$855.00	$156.00	$1,011.00	$4,044
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
			SUBTOTAL PHASE 3			$119,497
			Undeveloped Design Details - 30%			$35,849
			Contractor Overhead - 15%			$23,302
			Contractor Profit - 10%			$17,865
			Adminstration and Engineering - 15%			$11,552
			TOTAL COST			$208,065
			PROBABLE COST USE			**$208,000**
			TOTAL - OPTION B (ALL 3 PHASES):			**$1,751,000**

Stanley Consultants INC.			Job No.	24482-01-00
			Subject	RCTC
Computed by	Kyle Johnson	Date 12-Dec-12		Chilled Water Study
Checked by		Date		Distribution Outside the Building
Approved by		Date		Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Outside the Building - OPTION A						
PHASE 1						
12" Direct Buried AWWA Pipe	1025	LF	$13.69	$16.89	$30.58	$31,345
8" Direct Buried AWWA Pipe	260	LF	$11.85	$15.25	$27.10	$7,046
6" Direct Buried AWWA Pipe	1620	LF	$10.64	$14.27	$24.91	$40,354
4" Direct Buried AWWA Pipe	240	LF	$6.54	$13.52	$20.06	$4,814
12"x12" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
12"x4" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
8"x4" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
8"x6" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
12" AWWA LR Elbow	2	EA	$184.00	$126.00	$310.00	$620
6" AWWA LR Elbow	8	EA	$76.00	$58.00	$134.00	$1,072
8" AWWA Direct Buried Valve	2	EA	$825.00	$217.00	$1,042.00	$2,084
12" AWWA Direct Buried Valve	4	EA	$1,400.00	$217.00	$1,617.00	$6,468
12"x8" AWWA Reducer	2	EA	$475.00	$10.60	$485.60	$971
8"x4" AWWA Reducer	2	EA	$234.00	$10.60	$244.60	$489
6" Steel Pipe	40	LF	$37.50	$35.97	$73.47	$2,939
6" Pipe Insulation with Jacket	40	LF	$12.40	$6.80	$19.20	$768
4" Steel Pipe	120	LF	$23.50	$22.93	$46.43	$5,572
4" Pipe Insulation with Jacket	120	LF	$9.95	$6.20	$16.15	$1,938
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$309,014
				Undeveloped Design Details - 30%		$92,704
				Contractor Overhead - 15%		$60,258
				Contractor Profit - 10%		$46,198
				Adminstration and Engineering - 15%		$76,226
				TOTAL COST		$584,399
				PROBABLE COST USE		**$584,000**
PHASE 2						
12" Direct Buried AWWA Pipe	10	LF	$13.69	$16.89	$30.58	$306
8" Direct Buried AWWA Pipe	40	LF	$11.85	$15.25	$27.10	$1,084
12"x8" AWWA Reducer	2	E	$475.00	$10.60	$485.60	$971
12"x8" AWWA Tee	2	E	$306.00	$197.00	$503.00	$1,006
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$25,314
				Undeveloped Design Details - 30%		$7,594
				Contractor Overhead - 15%		$4,936
				Contractor Profit - 10%		$3,784
				Adminstration and Engineering - 15%		$6,244
				TOTAL COST		$47,873
				PROBABLE COST USE		**$48,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2800	LF	$11.85	$15.25	$27.10	$75,880
8" AWWA Reducer	10	EA	$234.00	$10.60	$244.60	$2,446
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
				SUBTOTAL PHASE 3		$104,043
				Undeveloped Design Details - 30%		$31,213
				Contractor Overhead - 15%		$20,288
				Contractor Profit - 10%		$15,554
				Adminstration and Engineering - 15%		$25,665
				TOTAL COST		$196,763
				PROBABLE COST USE		**$197,000**
				TOTAL - OPTION A (ALL 3 PHASES):		**$829,000**

Appendix E

Life Cycle Cost Analysis

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Chilled Water Plant Comparison Analysis Input & Results Summary

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Variable Cost Inputs

Demand Charge-Summer		**Energy Charge - Summer**		**On/Off Peak Split**	
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	On-Peak	70%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261	Off-Peak	30%
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
				Summer/Winter Split	
Demand Charge-Winter		**Energy Charge - Winter**		Summer	70%
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	Winter	30%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261		
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
Variable Cost Rates		**Fuel Cost (at Central Plant)**			
Purchased Steam Rate (per klb)	$17.64	Natural Gas (Per MMBtu)	$7.20	NOT USED	
Purchased CHW Rate (per ton-hr)	$0.000	Other Stm Costs (Per MMBtu)	$1.80	NOT USED	
Water Rate (per 1,000 Gal)	$0.93				
Sewage Rate (per 1,000 Gal)	$3.30				
Miscellaneous Cost (% of energy cost)	0.0%				

PV Calculation Inputs		**Load Profile Inputs**		**Steam Conditions**	
Period (years)	25	Elec Demand Transformer Losses	5%	Steam Inlet Pressure (psig)	50.0
Discount Rate	4.0%	Auxiliaries Electrical Demand (kW/ton)	0.01	Steam Inlet Temperature (°F)	400.0
Interest Rate	1.0%	Peak Make-up Water (gpm)	300	Steam Exhaust Pressure (psig)	-13.2
Variable Cost Escalation	3.0%	Peak Sewage (gpm)	50	Steam Exhaust Temperature (°F)	115.69
O&M Cost Escalation	2.0%			Condensate Pressure (psig)	0.0
Capital Cost Escalation	4.0%			Condensate Temperature (°F)	115.69
				Condensate Enthalpy (Btu/lb)	83.00

Note: Additional Input on the PV Analysis Page

Note: Additional Input on the Load Profile Case Pages

Cases

Case	Description	Temperatures	Chilled Water Source
Case 1	Central plant with constant speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 2	Central Plant with magnetic bearing variable speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 3	Central Plant with absorption chillers	42 °F Supply, 12 °F ΔT	Self Generated
Case 4	not used		Purchased

St Luke's Hospital Building Chillers vs. Central Chiller Plant Present Value Results Summary

	Case 1	Case 2	Case 3	Case 4
25-year Present Value ($)	$16,829,609	$16,573,690	$23,886,953	$0
Average Calculated CHW Cost ($/ton-hr)	$0.11	$0.11	$0.29	#DIV/0!

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	4.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 1 - Central plant with constant speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment (Equity)	$ 7,975,425	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 347,641	$ 358,070	$ 368,812	$ 379,876	$ 391,273	$ 403,011	$ 415,101	$ 427,554	$ 440,381	$ 453,592
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 8,804,425**	**$ 373,980**	**$ 385,199**	**$ 396,755**	**$ 408,658**	**$ 420,918**	**$ 433,545**	**$ 446,551**	**$ 459,948**	**$ 473,746**	**$ 487,959**
Calculated CHW Cost (per ton-hr)		**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment (Equity)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ 467,200	$ 481,216	$ 495,652	$ 510,522	$ 525,838	$ 541,613	$ 557,861	$ 574,597	$ 591,835	$ 609,590
Water Cost	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 502,598**	**$ 517,675**	**$ 533,206**	**$ 549,202**	**$ 565,678**	**$ 582,648**	**$ 600,128**	**$ 618,132**	**$ 636,675**	**$ 655,776**
Calculated CHW Cost (per ton-hr)	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**	**$ 0.13**	**$ 0.14**

25-year Present Value Cost $ 16,829,609

Case 2 - Central Plant with magnetic bearing variable speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment	$ 8,219,325	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 324,349	$ 334,079	$ 344,102	$ 354,425	$ 365,057	$ 376,009	$ 387,289	$ 398,908	$ 410,875	$ 423,201
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 9,048,325**	**$ 350,688**	**$ 361,208**	**$ 372,045**	**$ 383,206**	**$ 394,702**	**$ 406,543**	**$ 418,740**	**$ 431,302**	**$ 444,241**	**$ 457,568**
Calculated CHW Cost (per ton-hr)		**$ 0.07**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ 435,898	$ 448,974	$ 462,444	$ 476,317	$ 490,607	$ 505,325	$ 520,484	$ 536,099	$ 552,182	$ 568,747
Water Cost	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 471,295**	**$ 485,434**	**$ 499,997**	**$ 514,997**	**$ 530,447**	**$ 546,360**	**$ 562,751**	**$ 579,633**	**$ 597,023**	**$ 614,933**
Calculated CHW Cost (per ton-hr)	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**

25-year Present Value Cost $ 16,573,690

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	4.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 3 - Central Plant with absorption chillers: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ 2,840,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 915,833	$ 943,308	$ 971,607	$ 1,000,756	$ 1,030,778	$ 1,061,702	$ 1,093,553	$ 1,126,359	$ 1,160,150	$ 1,194,954	$ 1,230,803	$ 1,267,727	$ 1,305,759	$ 1,344,932	$ 1,385,280	$ 1,426,838	$ 1,469,643	$ 1,513,733	$ 1,559,145	$ 1,605,919
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 3,669,000**	**$ 942,172**	**$ 970,437**	**$ 999,551**	**$ 1,029,537**	**$ 1,060,423**	**$ 1,092,236**	**$ 1,125,003**	**$ 1,158,753**	**$ 1,193,516**	**$ 1,229,321**	**$ 1,266,201**	**$ 1,304,187**	**$ 1,343,312**	**$ 1,383,612**	**$ 1,425,120**	**$ 1,467,874**	**$ 1,511,910**	**$ 1,557,267**	**$ 1,603,985**	**$ 1,652,105**
Calculated CHW Cost (per ton-hr)		**$ 0.20**	**$ 0.20**	**$ 0.21**	**$ 0.22**	**$ 0.22**	**$ 0.23**	**$ 0.24**	**$ 0.24**	**$ 0.25**	**$ 0.26**	**$ 0.27**	**$ 0.27**	**$ 0.28**	**$ 0.29**	**$ 0.30**	**$ 0.31**	**$ 0.32**	**$ 0.33**	**$ 0.34**	**$ 0.35**

25-year Present Value Cost $ 23,886,953

Case 4 - not used: 0

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

25-year Present Value Cost $ -

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Capital Cost Calculation

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 1 **Central plant with constant speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,810,000	$	6,810,000	85.4%
Phase 2		1	ls	$600,000	$	600,000	7.5%
Phase 3		1	ls	$600,000	$	600,000	7.5%
Rebate		1	ls	($34,575)	$	(34,575)	
	Total				**$**	**7,975,425**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 2 **Central Plant with magnetic bearing variable speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,920,000	$	6,920,000	84.2%
Phase 2		1	ls	$710,000	$	710,000	8.6%
Phase 3		1	ls	$710,000	$	710,000	8.6%
Rebate		1	ls	($120,675)	$	(120,675)	
	Total				**$**	**8,219,325**	**101%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 3 **Central Plant with absorption chillers**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$780,000	$	780,000	27.5%
Phase 2		1	ls	$1,030,000	$	1,030,000	36.3%
Phase 3		1	ls	$1,030,000	$	1,030,000	36.3%
					$	-	
	Total				**$**	**2,840,000**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 4 **not used**
0

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Chillers		1	ea	$0	$	-	#DIV/0!
Chilled water pumps		1	ea	$0	$	-	#DIV/0!
AHU Coils		1	ea	$0	$	-	#DIV/0!
	Total				**$**	**-**	**#DIV/0!**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

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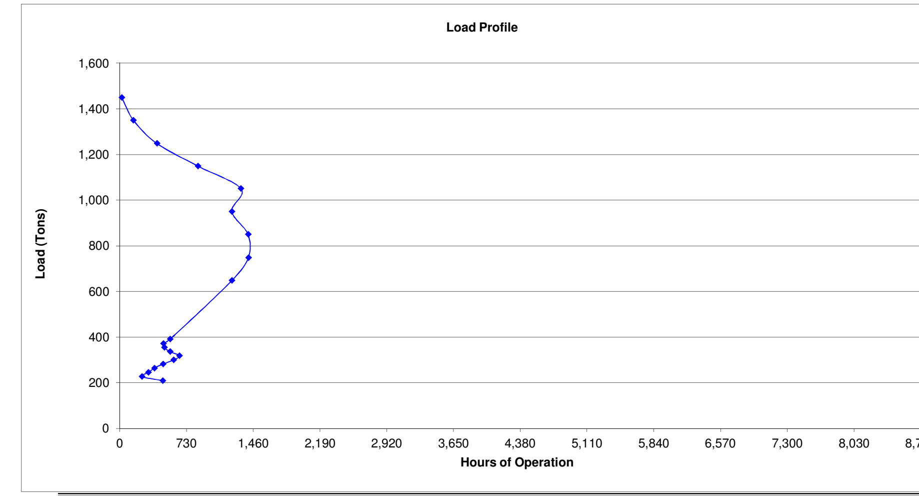


LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,712	0	11,592	69,552	11,592
90=>94	1,350	14	25	37,598	0	67,500	405,000	67,500
85=>89	1,248	12	68	90,635	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	168,644	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	233,906	0	464,100	2,784,600	464,100
70=>74	950	10	204	296,028	0	582,350	2,329,400	388,233
65=>69	850	9	234	289,598	0	596,700	2,386,800	397,800
60=>64	748	7	235	242,934	0	526,592	2,106,368	351,061
55=>59	648	6	205	174,003	0	397,872	1,591,488	265,248
50=>54	391	4	92	91,009	0	215,832	431,664	71,944
45=>49	372	4	80	70,889	0	177,816	355,632	59,272
40=>44	354	4	81	67,695	0	172,398	344,796	57,466
35=>39	336	3	92	72,643	0	185,472	370,944	61,824
30=>34	318	3	109	81,539	0	207,654	415,308	69,218
25=>29	300	3	99	69,797	0	177,300	354,600	59,100
20=>24	282	3	79	53,134	0	133,950	267,900	44,650
15=>19	264	3	63	40,089	0	100,056	200,112	33,352
10=>14	245	2	52	31,262	0	76,685	153,370	25,562
5=>9	227	2	40	22,889	0	54,934	109,868	18,311
0=>4	209	2	78	42,108	0	98,230	196,460	32,743
Total/Avg				**2,183,112**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	391	0.420	164	552	90,649	0	0.0	0.0	215,832
45=>49	372	0.397	148	478	70,593	0	0.0	0.0	177,816
40=>44	354	0.391	138	487	67,408	0	0.0	0.0	172,398
35=>39	336	0.390	131	552	72,334	0	0.0	0.0	185,472
30=>34	318	0.391	124	653	81,193	0	0.0	0.0	207,654
25=>29	300	0.392	118	591	69,502	0	0.0	0.0	177,300
20=>24	282	0.395	111	475	52,910	0	0.0	0.0	133,950
15=>19	264	0.399	105	379	39,922	0	0.0	0.0	100,056
10=>14	245	0.406	99	313	31,134	0	0.0	0.0	76,685
5=>9	227	0.415	94	242	22,798	0	0.0	0.0	54,934
0=>4	209	0.427	89	470	41,944	0	0.0	0.0	98,230
Total/Avg		**0.433**	**3,195**	**8,746**	**1,315,594**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.480**	**1,872**	**3,554**	**675,207**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.510**	**921**	**921**	**177,431**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

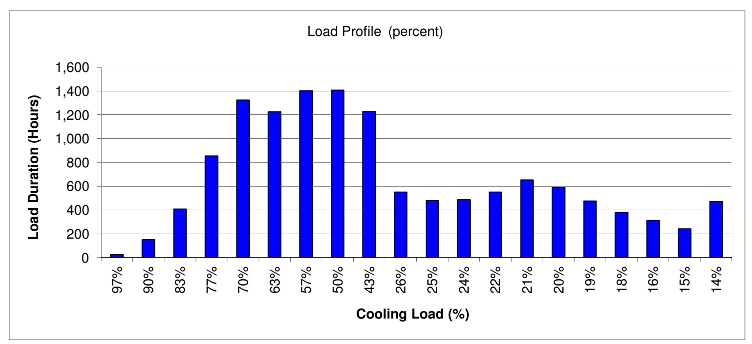
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.574	0.574	0.574	0.000	0.000	0.000
90=>94	0.552	0.552	0.552	0.000	0.000	0.000
85=>89	0.529	0.529	0.529	0.000	0.000	0.000
80=>84	0.510	0.510	0.510	0.000	0.000	0.000
75=>79	0.499	0.499	0.499	0.000	0.000	0.000
70=>74	0.505	0.505	0.000	0.000	0.000	0.000
65=>69	0.482	0.482	0.000	0.000	0.000	0.000
60=>64	0.458	0.458	0.000	0.000	0.000	0.000
55=>59	0.434	0.434	0.000	0.000	0.000	0.000
50=>54	0.420	0.000	0.000	0.000	0.000	0.000
45=>49	0.397	0.000	0.000	0.000	0.000	0.000
40=>44	0.391	0.000	0.000	0.000	0.000	0.000
35=>39	0.390	0.000	0.000	0.000	0.000	0.000
30=>34	0.391	0.000	0.000	0.000	0.000	0.000
25=>29	0.392	0.000	0.000	0.000	0.000	0.000
20=>24	0.395	0.000	0.000	0.000	0.000	0.000
15=>19	0.399	0.000	0.000	0.000	0.000	0.000
10=>14	0.406	0.000	0.000	0.000	0.000	0.000
5=>9	0.415	0.000	0.000	0.000	0.000	0.000
0=>4	0.427	0.000	0.000	0.000	0.000	0.000
Average	**0.433**	**0.480**	**0.510**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	39.96	92%	1
PCHWP 2	39.96	92%	1
PCHWP 3	39.96	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	24.35	92%	1
CWP 2	24.35	92%	1
CWP 3	24.35	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	20	20	20	0	0	0	59
90=>94	20	20	20	0	0	0	59
85=>89	20	20	20	0	0	0	59
80=>84	20	20	20	0	0	0	59
75=>79	20	20	20	0	0	0	59
70=>74	20	20	0	0	0	0	39
65=>69	20	20	0	0	0	0	39
60=>64	20	20	0	0	0	0	39
55=>59	20	20	0	0	0	0	39
50=>54	20	0	0	0	0	0	20
45=>49	20	0	0	0	0	0	20
40=>44	20	0	0	0	0	0	20
35=>39	20	0	0	0	0	0	20
30=>34	20	0	0	0	0	0	20
25=>29	20	0	0	0	0	0	20
20=>24	20	0	0	0	0	0	20
15=>19	20	0	0	0	0	0	20
10=>14	20	0	0	0	0	0	20
5=>9	20	0	0	0	0	0	20
0=>4	20	0	0	0	0	0	20
Total/Avg	**394**	**177**	**99**	**0**	**0**	**0**	**670**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	158	158	158	0	0	0	473
90=>94	985	985	985	0	0	0	2,955
85=>89	2,679	2,679	2,679	0	0	0	8,038
80=>84	5,615	5,615	5,615	0	0	0	16,844
75=>79	8,707	8,707	8,707	0	0	0	26,122
70=>74	12,076	12,076	0	0	0	0	24,152
65=>69	13,829	13,829	0	0	0	0	27,659
60=>64	13,869	13,869	0	0	0	0	27,738
55=>59	12,096	12,096	0	0	0	0	24,192
50=>54	10,874	0	0	0	0	0	10,874
45=>49	9,417	0	0	0	0	0	9,417
40=>44	9,594	0	0	0	0	0	9,594
35=>39	10,874	0	0	0	0	0	10,874
30=>34	12,864	0	0	0	0	0	12,864
25=>29	11,643	0	0	0	0	0	11,643
20=>24	9,358	0	0	0	0	0	9,358
15=>19	7,466	0	0	0	0	0	7,466
10=>14	6,166	0	0	0	0	0	6,166
5=>9	4,767	0	0	0	0	0	4,767
0=>4	9,259	0	0	0	0	0	9,259
Total/Avg	**172,296**	**70,014**	**18,144**	**0**	**0**	**0**	**260,454**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 1 Central plant with constant speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		**Chilled Water Source**	Self Generated	
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261			
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64 Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000 Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93 Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30 Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0% of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000			
					Natural Gas	$7.20 Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80 Per MMbtu	NOT USED
	On Peak	70%	Summer	70%			
	Off Peak	30%	Winter	30%			

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													2,183,112
Chilled Water Pump Energy Usage (kWh):													428,360
Condenser Water Pump Energy Usage (kWh):													260,454
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													3,300,287
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,310,201
Off Peak Energy Usage - kWh													990,086
													3,300,287
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$121,540
Off Peak Energy Cost													$52,088
EECR & AEP Cost													$0
Electricity Cost													$347,641
Total Energy Cost													**$347,641**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

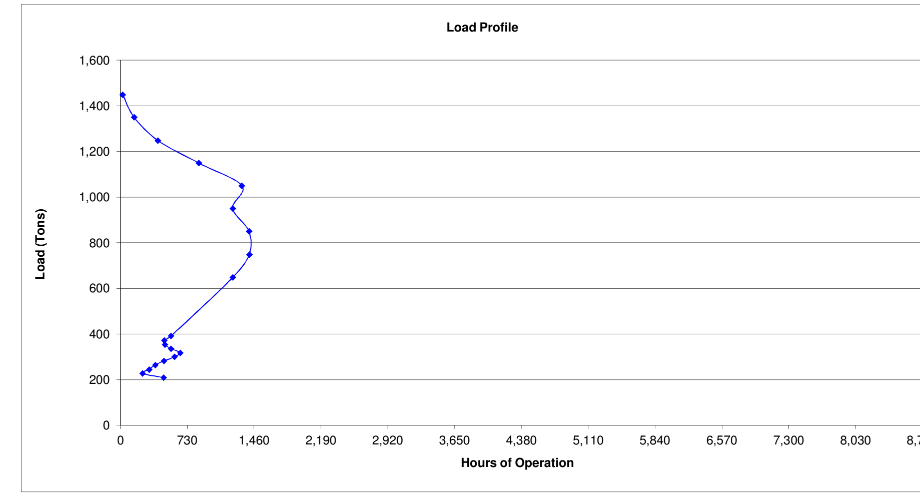
Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,758	0	11,592	69,552	11,592
90=>94	1,350	14	25	36,518	0	67,500	405,000	67,500
85=>89	1,248	12	68	83,676	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	146,704	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	191,673	0	464,100	2,784,600	464,100
70=>74	950	10	204	270,987	0	582,350	2,329,400	388,233
65=>69	850	9	234	245,443	0	596,700	2,386,800	397,800
60=>64	748	7	235	185,536	0	526,592	2,106,368	351,061
55=>59	648	6	205	117,107	0	397,872	1,591,488	265,248
50=>54	391	4	92	65,973	0	215,832	431,664	71,944
45=>49	372	4	80	47,951	0	177,816	355,632	59,272
40=>44	354	4	81	44,421	0	172,398	344,796	57,466
35=>39	336	3	92	45,935	0	185,472	370,944	61,824
30=>34	318	3	109	49,768	0	207,654	415,308	69,218
25=>29	300	3	99	41,075	0	177,300	354,600	59,100
20=>24	282	3	79	30,094	0	133,950	267,900	44,650
15=>19	264	3	63	21,779	0	100,056	200,112	33,352
10=>14	245	2	52	16,308	0	76,685	153,370	25,562
5=>9	227	2	40	11,463	0	54,934	109,868	18,311
0=>4	209	2	78	20,399	0	98,230	196,460	32,743
Total/Avg				**1,679,567**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	391	0.304	119	552	65,613	0	0.0	0.0	215,832
45=>49	372	0.268	100	478	47,655	0	0.0	0.0	177,816
40=>44	354	0.256	91	487	44,134	0	0.0	0.0	172,398
35=>39	336	0.246	83	552	45,626	0	0.0	0.0	185,472
30=>34	318	0.238	76	653	49,422	0	0.0	0.0	207,654
25=>29	300	0.230	69	591	40,779	0	0.0	0.0	177,300
20=>24	282	0.223	63	475	29,871	0	0.0	0.0	133,950
15=>19	264	0.216	57	379	21,612	0	0.0	0.0	100,056
10=>14	245	0.211	52	313	16,181	0	0.0	0.0	76,685
5=>9	227	0.207	47	242	11,371	0	0.0	0.0	54,934
0=>4	209	0.206	43	470	20,235	0	0.0	0.0	98,230
Total/Avg		**0.303**	**2,452**	**8,746**	**951,905**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.393**	**1,654**	**3,554**	**559,406**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.439**	**921**	**921**	**153,376**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)

Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

Chiller Input

CHILLER LOAD PROFILE

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)

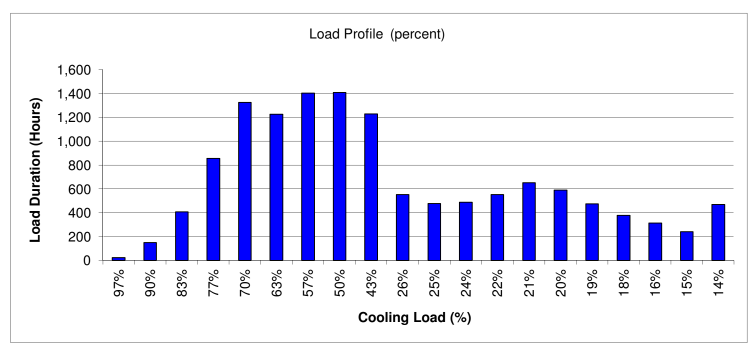
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.578	0.578	0.578	0.000	0.000	0.000
90=>94	0.536	0.536	0.536	0.000	0.000	0.000
85=>89	0.488	0.488	0.488	0.000	0.000	0.000
80=>84	0.443	0.443	0.443	0.000	0.000	0.000
75=>79	0.408	0.408	0.408	0.000	0.000	0.000
70=>74	0.462	0.462	0.000	0.000	0.000	0.000
65=>69	0.408	0.408	0.000	0.000	0.000	0.000
60=>64	0.349	0.349	0.000	0.000	0.000	0.000
55=>59	0.291	0.291	0.000	0.000	0.000	0.000
50=>54	0.304	0.000	0.000	0.000	0.000	0.000
45=>49	0.268	0.000	0.000	0.000	0.000	0.000
40=>44	0.256	0.000	0.000	0.000	0.000	0.000
35=>39	0.246	0.000	0.000	0.000	0.000	0.000
30=>34	0.238	0.000	0.000	0.000	0.000	0.000
25=>29	0.230	0.000	0.000	0.000	0.000	0.000
20=>24	0.223	0.000	0.000	0.000	0.000	0.000
15=>19	0.216	0.000	0.000	0.000	0.000	0.000
10=>14	0.211	0.000	0.000	0.000	0.000	0.000
5=>9	0.207	0.000	0.000	0.000	0.000	0.000
0=>4	0.206	0.000	0.000	0.000	0.000	0.000
Average	**0.303**	**0.393**	**0.439**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)

Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS

Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	41.23	92%	1
PCHWP 2	41.23	92%	1
PCHWP 3	41.23	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	33	33	33	0	0	0	100
90=>94	33	33	33	0	0	0	100
85=>89	33	33	33	0	0	0	100
80=>84	33	33	33	0	0	0	100
75=>79	33	33	33	0	0	0	100
70=>74	33	33	0	0	0	0	67
65=>69	33	33	0	0	0	0	67
60=>64	33	33	0	0	0	0	67
55=>59	33	33	0	0	0	0	67
50=>54	33	0	0	0	0	0	33
45=>49	33	0	0	0	0	0	33
40=>44	33	0	0	0	0	0	33
35=>39	33	0	0	0	0	0	33
30=>34	33	0	0	0	0	0	33
25=>29	33	0	0	0	0	0	33
20=>24	33	0	0	0	0	0	33
15=>19	33	0	0	0	0	0	33
10=>14	33	0	0	0	0	0	33
5=>9	33	0	0	0	0	0	33
0=>4	33	0	0	0	0	0	33
Total/Avg	**668**	**301**	**167**	**0**	**0**	**0**	**1,136**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	267	267	267	0	0	0	802
90=>94	1,670	1,670	1,670	0	0	0	5,010
85=>89	4,542	4,542	4,542	0	0	0	13,627
80=>84	9,519	9,519	9,519	0	0	0	28,557
75=>79	14,763	14,763	14,763	0	0	0	44,288
70=>74	20,474	20,474	0	0	0	0	40,948
65=>69	23,447	23,447	0	0	0	0	46,894
60=>64	23,514	23,514	0	0	0	0	47,027
55=>59	20,508	20,508	0	0	0	0	41,015
50=>54	18,437	0	0	0	0	0	18,437
45=>49	15,965	0	0	0	0	0	15,965
40=>44	16,266	0	0	0	0	0	16,266
35=>39	18,437	0	0	0	0	0	18,437
30=>34	21,810	0	0	0	0	0	21,810
25=>29	19,739	0	0	0	0	0	19,739
20=>24	15,865	0	0	0	0	0	15,865
15=>19	12,659	0	0	0	0	0	12,659
10=>14	10,454	0	0	0	0	0	10,454
5=>9	8,083	0	0	0	0	0	8,083
0=>4	15,698	0	0	0	0	0	15,698
Total/Avg	**292,116**	**118,704**	**30,761**	**0**	**0**	**0**	**441,581**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 2 Central Plant with magnetic bearing variable speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													1,679,567
Chilled Water Pump Energy Usage (kWh):													441,581
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													2,857,558
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,000,291
Off Peak Energy Usage - kWh													857,267
													2,857,558
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$105,235
Off Peak Energy Cost													$45,101
EECR & AEP Cost													$0
Electricity Cost													$324,349
Total Energy Cost													**$324,349**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

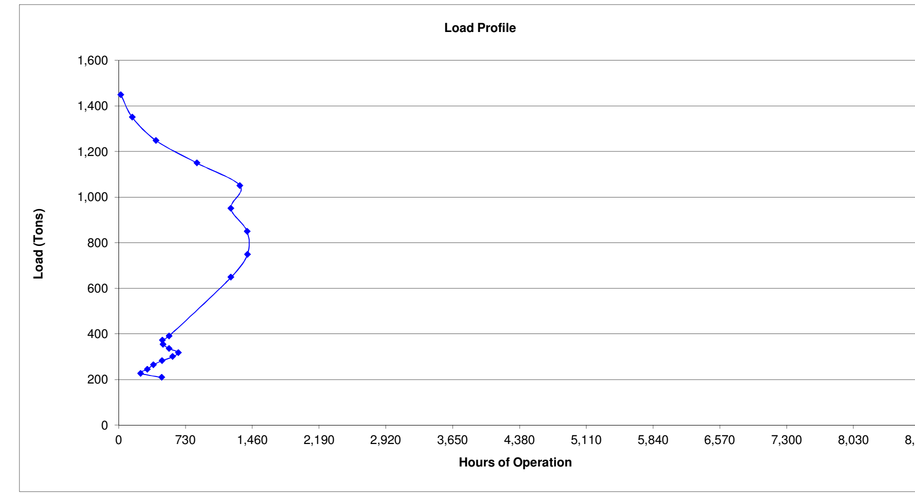
Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	58	107	11,592	69,552	11,592
90=>94	1,350	14	25	338	608	67,500	405,000	67,500
85=>89	1,248	12	68	849	1,485	169,728	1,018,368	169,728
80=>84	1,149	11	143	1,637	2,783	327,465	1,964,790	327,465
75=>79	1,050	11	221	2,321	3,857	464,100	2,784,600	464,100
70=>74	950	10	204	1,941	4,978	582,350	2,329,400	388,233
65=>69	850	9	234	1,989	4,935	596,700	2,386,800	397,800
60=>64	748	7	235	1,755	4,204	526,592	2,106,368	351,061
55=>59	648	6	205	1,326	3,069	397,872	1,591,488	265,248
50=>54	391	4	92	360	1,692	215,832	431,664	71,944
45=>49	372	4	80	296	1,371	177,816	355,632	59,272
40=>44	354	4	81	287	1,316	172,398	344,796	57,466
35=>39	336	3	92	309	1,404	185,472	370,944	61,824
30=>34	318	3	109	346	1,561	207,654	415,308	69,218
25=>29	300	3	99	296	1,324	177,300	354,600	59,100
20=>24	282	3	79	223	996	133,950	267,900	44,650
15=>19	264	3	63	167	741	100,056	200,112	33,352
10=>14	245	2	52	128	567	76,685	153,370	25,562
5=>9	227	2	40	92	406	54,934	109,868	18,311
0=>4	209	2	78	164	728	98,230	196,460	32,743
Total/Avg				**14,881**	**38,133**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	391	0.000	0	552	0	8	3.1	1,692.4	215,832
45=>49	372	0.000	0	478	0	8	2.9	1,371.4	177,816
40=>44	354	0.000	0	487	0	8	2.7	1,315.9	172,398
35=>39	336	0.000	0	552	0	8	2.5	1,404.3	185,472
30=>34	318	0.000	0	653	0	8	2.4	1,561.3	207,654
25=>29	300	0.000	0	591	0	7	2.2	1,324.4	177,300
20=>24	282	0.000	0	475	0	7	2.1	995.6	133,950
15=>19	264	0.000	0	379	0	7	2.0	740.9	100,056
10=>14	245	0.000	0	313	0	7	1.8	566.8	76,685
5=>9	227	0.000	0	242	0	7	1.7	406.1	54,934
0=>4	209	0.000	0	470	0	7	1.5	728.0	98,230
Total/Avg		**0.000**	**0**	**8,746**	**0**	**7.817**	**56.3**	**23,646.7**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**0**	**3,554**	**0**		**31.4**	**11,539.5**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**921**	**921**	**0**		**18.3**	**2,946.7**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)

Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

Chiller Input

CHILLER LOAD PROFILE

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)

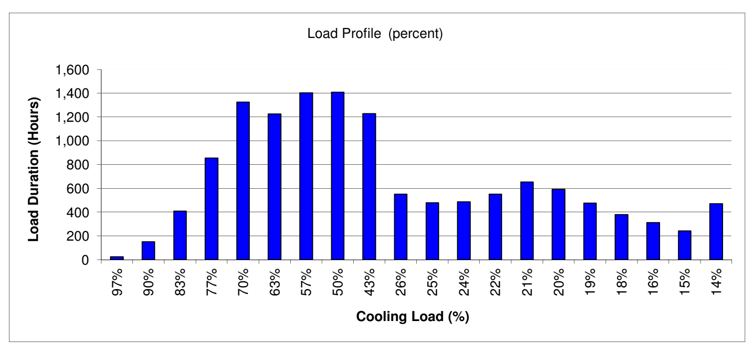
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)

Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	9.219	9.219	9.219	0.000	0.000	0.000
90=>94	9.002	9.002	9.002	0.000	0.000	0.000
85=>89	8.750	8.750	8.750	0.000	0.000	0.000
80=>84	8.499	8.499	8.499	0.000	0.000	0.000
75=>79	8.311	8.311	8.311	0.000	0.000	0.000
70=>74	8.547	8.547	0.000	0.000	0.000	0.000
65=>69	8.271	8.271	0.000	0.000	0.000	0.000
60=>64	7.984	7.984	0.000	0.000	0.000	0.000
55=>59	7.713	7.713	0.000	0.000	0.000	0.000
50=>54	7.841	0.000	0.000	0.000	0.000	0.000
45=>49	7.712	0.000	0.000	0.000	0.000	0.000
40=>44	7.633	0.000	0.000	0.000	0.000	0.000
35=>39	7.571	0.000	0.000	0.000	0.000	0.000
30=>34	7.519	0.000	0.000	0.000	0.000	0.000
25=>29	7.470	0.000	0.000	0.000	0.000	0.000
20=>24	7.433	0.000	0.000	0.000	0.000	0.000
15=>19	7.405	0.000	0.000	0.000	0.000	0.000
10=>14	7.392	0.000	0.000	0.000	0.000	0.000
5=>9	7.392	0.000	0.000	0.000	0.000	0.000
0=>4	7.411	0.000	0.000	0.000	0.000	0.000
Average	**7.817**	**8.219**	**8.480**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS

Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



CentralPlant-PV Case Comparison4%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
PCHWP 1	42.6	92%	1
PCHWP 2	42.6	92%	1
PCHWP 3	42.6	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	35	35	35	0	0	0	104
90=>94	35	35	35	0	0	0	104
85=>89	35	35	35	0	0	0	104
80=>84	35	35	35	0	0	0	104
75=>79	35	35	35	0	0	0	104
70=>74	35	35	0	0	0	0	69
65=>69	35	35	0	0	0	0	69
60=>64	35	35	0	0	0	0	69
55=>59	35	35	0	0	0	0	69
50=>54	35	0	0	0	0	0	35
45=>49	35	0	0	0	0	0	35
40=>44	35	0	0	0	0	0	35
35=>39	35	0	0	0	0	0	35
30=>34	35	0	0	0	0	0	35
25=>29	35	0	0	0	0	0	35
20=>24	35	0	0	0	0	0	35
15=>19	35	0	0	0	0	0	35
10=>14	35	0	0	0	0	0	35
5=>9	35	0	0	0	0	0	35
0=>4	35	0	0	0	0	0	35
Total/Avg	**690**	**311**	**173**	**0**	**0**	**0**	**1,173**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	276	276	276	0	0	0	828
90=>94	1,725	1,725	1,725	0	0	0	5,175
85=>89	4,692	4,692	4,692	0	0	0	14,076
80=>84	9,833	9,833	9,833	0	0	0	29,498
75=>79	15,249	15,249	15,249	0	0	0	45,747
70=>74	21,149	21,149	0	0	0	0	42,297
65=>69	24,219	24,219	0	0	0	0	48,438
60=>64	24,288	24,288	0	0	0	0	48,576
55=>59	21,183	21,183	0	0	0	0	42,366
50=>54	19,044	0	0	0	0	0	19,044
45=>49	16,491	0	0	0	0	0	16,491
40=>44	16,802	0	0	0	0	0	16,802
35=>39	19,044	0	0	0	0	0	19,044
30=>34	22,529	0	0	0	0	0	22,529
25=>29	20,390	0	0	0	0	0	20,390
20=>24	16,388	0	0	0	0	0	16,388
15=>19	13,076	0	0	0	0	0	13,076
10=>14	10,799	0	0	0	0	0	10,799
5=>9	8,349	0	0	0	0	0	8,349
0=>4	16,215	0	0	0	0	0	16,215
Total/Avg	**301,737**	**122,613**	**31,775**	**0**	**0**	**0**	**456,125**

Condenser Water Pump (CWP)

CWP Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	50	92%	1
CT 2	50	92%	1
CT 3	50	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	41	41	41	0	0	0	122
90=>94	41	41	41	0	0	0	122
85=>89	41	41	41	0	0	0	122
80=>84	41	41	41	0	0	0	122
75=>79	41	41	41	0	0	0	122
70=>74	41	41	0	0	0	0	81
65=>69	41	41	0	0	0	0	81
60=>64	41	41	0	0	0	0	81
55=>59	41	41	0	0	0	0	81
50=>54	41	0	0	0	0	0	41
45=>49	41	0	0	0	0	0	41
40=>44	41	0	0	0	0	0	41
35=>39	41	0	0	0	0	0	41
30=>34	41	0	0	0	0	0	41
25=>29	41	0	0	0	0	0	41
20=>24	41	0	0	0	0	0	41
15=>19	41	0	0	0	0	0	41
10=>14	41	0	0	0	0	0	41
5=>9	41	0	0	0	0	0	41
0=>4	41	0	0	0	0	0	41
Total/Avg	**810**	**365**	**203**	**0**	**0**	**0**	**1,377**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	324	324	324	0	0	0	972
90=>94	2,025	2,025	2,025	0	0	0	6,075
85=>89	5,508	5,508	5,508	0	0	0	16,524
80=>84	11,543	11,543	11,543	0	0	0	34,628
75=>79	17,901	17,901	17,901	0	0	0	53,703
70=>74	24,827	24,827	0	0	0	0	49,653
65=>69	28,431	28,431	0	0	0	0	56,862
60=>64	28,512	28,512	0	0	0	0	57,024
55=>59	24,867	24,867	0	0	0	0	49,734
50=>54	22,356	0	0	0	0	0	22,356
45=>49	19,359	0	0	0	0	0	19,359
40=>44	19,724	0	0	0	0	0	19,724
35=>39	22,356	0	0	0	0	0	22,356
30=>34	26,447	0	0	0	0	0	26,447
25=>29	23,936	0	0	0	0	0	23,936
20=>24	19,238	0	0	0	0	0	19,238
15=>19	15,350	0	0	0	0	0	15,350
10=>14	12,677	0	0	0	0	0	12,677
5=>9	9,801	0	0	0	0	0	9,801
0=>4	19,035	0	0	0	0	0	19,035
Total/Avg	**354,213**	**143,937**	**37,301**	**0**	**0**	**0**	**535,451**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 3 Central Plant with absorption chillers

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													38,133
Steam Cost													$672,664
Electricity Usage													
Chiller Energy Usage (kWh):													14,881
Chilled Water Pump Energy Usage (kWh):													456,125
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													535,451
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													1,314,505
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													920,154
Off Peak Energy Usage - kWh													394,352
													1,314,505
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$48,409
Off Peak Energy Cost													$20,747
EECR & AEP Cost													$0
Electricity Cost													$243,169
Total Energy Cost													**$915,833**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Chilled Water Plant Comparison Analysis Input & Results Summary

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Variable Cost Inputs

Demand Charge-Summer		**Energy Charge - Summer**		**On/Off Peak Split**	
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	On-Peak	70%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261	Off-Peak	30%
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
				Summer/Winter Split	
Demand Charge-Winter		**Energy Charge - Winter**		Summer	70%
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	Winter	30%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261		
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
Variable Cost Rates		**Fuel Cost (at Central Plant)**			
Purchased Steam Rate (per klb)	$17.64	Natural Gas (Per MMBtu)	$7.20	NOT USED	
Purchased CHW Rate (per ton-hr)	$0.000	Other Stm Costs (Per MMBtu)	$1.80	NOT USED	
Water Rate (per 1,000 Gal)	$0.93				
Sewage Rate (per 1,000 Gal)	$3.30				
Miscellaneous Cost (% of energy cost)	0.0%				

PV Calculation Inputs		**Load Profile Inputs**		**Steam Conditions**	
Period (years)	25	Elec Demand Transformer Losses	5%	Steam Inlet Pressure (psig)	50.0
Discount Rate	8.0%	Auxiliaries Electrical Demand (kW/ton)	0.01	Steam Inlet Temperature (°F)	400.0
Interest Rate	1.0%	Peak Make-up Water (gpm)	300	Steam Exhaust Pressure (psig)	-13.2
Variable Cost Escalation	3.0%	Peak Sewage (gpm)	50	Steam Exhaust Temperature (°F)	115.69
O&M Cost Escalation	2.0%			Condensate Pressure (psig)	0.0
Capital Cost Escalation	4.0%			Condensate Temperature (°F)	115.69
				Condensate Enthalpy (Btu/lb)	83.00

Note: Additional Input on the PV Analysis Page

Note: Additional Input on the Load Profile Case Pages

Cases

Case	Description	Temperatures	Chilled Water Source
Case 1	Central plant with constant speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 2	Central Plant with magnetic bearing variable speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 3	Central Plant with absorption chillers	42 °F Supply, 12 °F ΔT	Self Generated
Case 4	not used		Purchased

St Luke's Hospital Building Chillers vs. Central Chiller Plant Present Value Results Summary

	Case 1	Case 2	Case 3	Case 4
25-year Present Value ($)	$13,997,290	$13,917,772	$16,751,456	$0
Average Calculated CHW Cost ($/ton-hr)	$0.11	$0.11	$0.29	#DIV/0!

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	8.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 1 - Central plant with constant speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment (Equity)	$ 7,975,425	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 347,641	$ 358,070	$ 368,812	$ 379,876	$ 391,273	$ 403,011	$ 415,101	$ 427,554	$ 440,381	$ 453,592	$ 467,200	$ 481,216	$ 495,652	$ 510,522	$ 525,838	$ 541,613	$ 557,861	$ 574,597	$ 591,835	$ 609,590
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 8,804,425**	**$ 373,980**	**$ 385,199**	**$ 396,755**	**$ 408,658**	**$ 420,918**	**$ 433,545**	**$ 446,551**	**$ 459,948**	**$ 473,746**	**$ 487,959**	**$ 502,598**	**$ 517,675**	**$ 533,206**	**$ 549,202**	**$ 565,678**	**$ 582,648**	**$ 600,128**	**$ 618,132**	**$ 636,675**	**$ 655,776**
Calculated CHW Cost (per ton-hr)		**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**	**$ 0.13**	**$ 0.14**

25-year Present Value Cost **$ 13,997,290**

Case 2 - Central Plant with magnetic bearing variable speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ 8,219,325	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 324,349	$ 334,079	$ 344,102	$ 354,425	$ 365,057	$ 376,009	$ 387,289	$ 398,908	$ 410,875	$ 423,201	$ 435,898	$ 448,974	$ 462,444	$ 476,317	$ 490,607	$ 505,325	$ 520,484	$ 536,099	$ 552,182	$ 568,747
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 9,048,325**	**$ 350,688**	**$ 361,208**	**$ 372,045**	**$ 383,206**	**$ 394,702**	**$ 406,543**	**$ 418,740**	**$ 431,302**	**$ 444,241**	**$ 457,568**	**$ 471,295**	**$ 485,434**	**$ 499,997**	**$ 514,997**	**$ 530,447**	**$ 546,360**	**$ 562,751**	**$ 579,633**	**$ 597,023**	**$ 614,933**
Calculated CHW Cost (per ton-hr)		**$ 0.07**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**

25-year Present Value Cost **$ 13,917,772**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1		Case 2		Case 3		Case 4
		Central plant with constant speed chiller		Central Plant with magnetic bearing variable speed chiller		Central Plant with absorption chillers	not used
Peak Cooling Load (tons)		1,500		1,500		1,500	1,500
Annual Consumption (ton-hrs)		4,744,226		4,744,226		4,744,226	0
Total Energy Usage (KWh)		3,300,287		2,857,558		1,314,505	0
Total Energy Usage (klbs)		0		0		38,133	
Water Usage (gal)		17,857,020		17,857,020		17,857,020	0
Water Rate (per 1,000 Gal)	$	0.93	$	0.93	$	0.93	$ 0.93
Sewage Usage (gal)		2,976,170		2,976,170		2,976,170	0
Sewage Rate (per 1,000 Gal)	$	3.30	$	3.30	$	3.30	$ 3.30
Miscellaneous Cost (% of energy cost)		0.0%		0.0%		0.0%	0.0%
Annual Maintenance Cost		$0		$0		$0	$0
Number of Operators		0		0		0	4
Operator Salary		$0		$0		$0	$0
CHW System Capital Cost ($)	$	7,975,425	$	8,219,325	$	2,840,000	$ -
CHW Equipment Life (years)		25		25		25	25
Distribution System Cost ($)	$	829,000	$	829,000	$	829,000	$ -
Distribution System Life (years)		50		50		50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	8.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

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Comparison of Cooling System Costs

Case 3 - Central Plant with absorption chillers:

42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ 2,840,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 915,833	$ 943,308	$ 971,607	$ 1,000,756	$ 1,030,778	$ 1,061,702	$ 1,093,553	$ 1,126,359	$ 1,160,150	$ 1,194,954	$ 1,230,803	$ 1,267,727	$ 1,305,759	$ 1,344,932	$ 1,385,280	$ 1,426,838	$ 1,469,643	$ 1,513,733	$ 1,559,145	$ 1,605,919
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 3,669,000**	**$ 942,172**	**$ 970,437**	**$ 999,551**	**$ 1,029,537**	**$ 1,060,423**	**$ 1,092,236**	**$ 1,125,003**	**$ 1,158,753**	**$ 1,193,516**	**$ 1,229,321**	**$ 1,266,201**	**$ 1,304,187**	**$ 1,343,312**	**$ 1,383,612**	**$ 1,425,120**	**$ 1,467,874**	**$ 1,511,910**	**$ 1,557,267**	**$ 1,603,985**	**$ 1,652,105**
Calculated CHW Cost (per ton-hr)		**$ 0.20**	**$ 0.20**	**$ 0.21**	**$ 0.22**	**$ 0.22**	**$ 0.23**	**$ 0.24**	**$ 0.24**	**$ 0.25**	**$ 0.26**	**$ 0.27**	**$ 0.27**	**$ 0.28**	**$ 0.29**	**$ 0.30**	**$ 0.31**	**$ 0.32**	**$ 0.33**	**$ 0.34**	**$ 0.35**

25-year Present Value Cost **$ 16,751,456**

Case 4 - not used:

0

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

25-year Present Value Cost **$ -**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Capital Cost Calculation

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 1 **Central plant with constant speed chiller**
42 °F Supply, 12 °F DT

Description	Quantity	Unit	Unit Cost	Subtotal	Percent of Total
Phase 1	1	ls	$6,810,000	$ 6,810,000	85.4%
Phase 2	1	ls	$600,000	$ 600,000	7.5%
Phase 3	1	ls	$600,000	$ 600,000	7.5%
Rebate	1	ls	($34,575)	$ (34,575)	
Total				**$ 7,975,425**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 2 **Central Plant with magnetic bearing variable speed chiller**
42 °F Supply, 12 °F DT

Description	Quantity	Unit	Unit Cost	Subtotal	Percent of Total
Phase 1	1	ls	$6,920,000	$ 6,920,000	84.2%
Phase 2	1	ls	$710,000	$ 710,000	8.6%
Phase 3	1	ls	$710,000	$ 710,000	8.6%
Rebate	1	ls	($120,675)	$ (120,675)	
Total				**$ 8,219,325**	**101%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 3 **Central Plant with absorption chillers**
42 °F Supply, 12 °F DT

Description	Quantity	Unit	Unit Cost	Subtotal	Percent of Total
Phase 1	1	ls	$780,000	$ 780,000	27.5%
Phase 2	1	ls	$1,030,000	$ 1,030,000	36.3%
Phase 3	1	ls	$1,030,000	$ 1,030,000	36.3%
				$ -	
Total				**$ 2,840,000**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 4 **not used**
0

Description	Quantity	Unit	Unit Cost	Subtotal	Percent of Total
Chillers	1	ea	$0	$ -	#DIV/0!
Chilled water pumps	1	ea	$0	$ -	#DIV/0!
AHU Coils	1	ea	$0	$ -	#DIV/0!
Total				**$ -**	**#DIV/0!**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

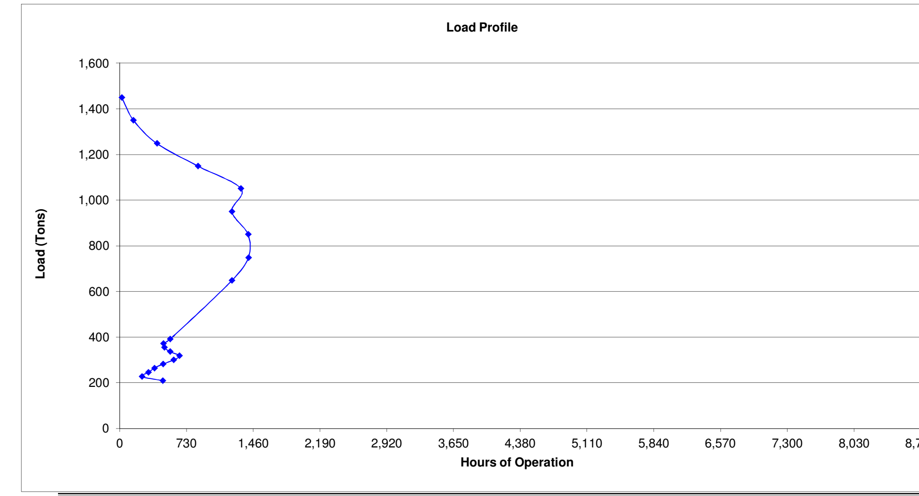
General Assumptions

Transformer Losses	5%		Peak Make-up Water:	300 gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50 gpm
Peak Cooling Load	1,500	tons		

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,712	0	11,592	69,552	11,592
90=>94	1,350	14	25	37,598	0	67,500	405,000	67,500
85=>89	1,248	12	68	90,635	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	168,644	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	233,906	0	464,100	2,784,600	464,100
70=>74	950	10	204	296,028	0	582,350	2,329,400	388,233
65=>69	850	9	234	289,598	0	596,700	2,386,800	397,800
60=>64	748	7	235	242,934	0	526,592	2,106,368	351,061
55=>59	648	6	205	174,003	0	397,872	1,591,488	265,248
50=>54	391	4	92	91,009	0	215,832	431,664	71,944
45=>49	372	4	80	70,889	0	177,816	355,632	59,272
40=>44	354	4	81	67,695	0	172,398	344,796	57,466
35=>39	336	3	92	72,643	0	185,472	370,944	61,824
30=>34	318	3	109	81,539	0	207,654	415,308	69,218
25=>29	300	3	99	69,797	0	177,300	354,600	59,100
20=>24	282	3	79	53,134	0	133,950	267,900	44,650
15=>19	264	3	63	40,089	0	100,056	200,112	33,352
10=>14	245	2	52	31,262	0	76,685	153,370	25,562
5=>9	227	2	40	22,889	0	54,934	109,868	18,311
0=>4	209	2	78	42,108	0	98,230	196,460	32,743
Total/Avg				**2,183,112**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	391	0.420	164	552	90,649	0	0.0	0.0	215,832
45=>49	372	0.397	148	478	70,593	0	0.0	0.0	177,816
40=>44	354	0.391	138	487	67,408	0	0.0	0.0	172,398
35=>39	336	0.390	131	552	72,334	0	0.0	0.0	185,472
30=>34	318	0.391	124	653	81,193	0	0.0	0.0	207,654
25=>29	300	0.392	118	591	69,502	0	0.0	0.0	177,300
20=>24	282	0.395	111	475	52,910	0	0.0	0.0	133,950
15=>19	264	0.399	105	379	39,922	0	0.0	0.0	100,056
10=>14	245	0.406	99	313	31,134	0	0.0	0.0	76,685
5=>9	227	0.415	94	242	22,798	0	0.0	0.0	54,934
0=>4	209	0.427	89	470	41,944	0	0.0	0.0	98,230
Total/Avg		**0.433**	**3,195**	**8,746**	**1,315,594**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.480**	**1,872**	**3,554**	**675,207**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.510**	**921**	**921**	**177,431**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4		0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	**High Bin**	**Chiller 1 Peak Demand (kW)**	**Chiller 2 Peak Demand (kW)**	**Chiller 3 Peak Demand (kW)**	**Chiller 4 Peak Demand (kW)**	**Chiller 5 Peak Demand (kW)**	**Chiller 6 Peak Demand (kW)**	**Total PCHWP Demand (kW)**	**Total CWP Demand (kW)**	**Total Cooling Tower Demand (kW)**	**Peak Demand (kW)**
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

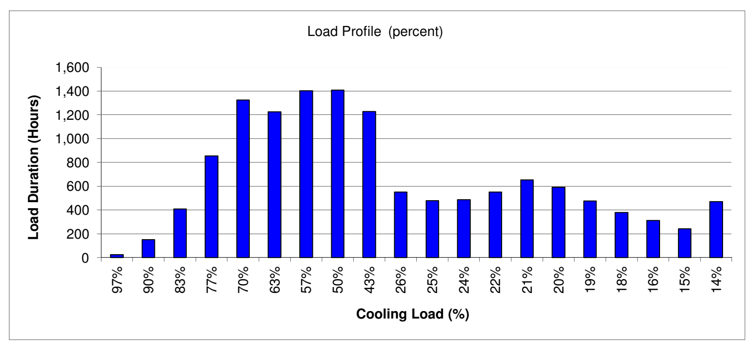
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	**Chiller 1 Load (Tons)**	**Chiller 2 Load (Tons)**	**Chiller 3 Load (Tons)**	**Chiller 4 Load (Tons)**	**Chiller 5 Load (Tons)**	**Chiller 6 Load (Tons)**	**Total Load (Tons)**	**Percent Load**
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	**Chiller 1 Demand (kW/ton)**	**Chiller 2 Efficiency (kW/ton)**	**Chiller 3 Efficiency (kW/ton)**	**Chiller 4 Efficiency (kW/ton)**	**Chiller 5 Efficiency (kW/ton)**	**Chiller 6 Efficiency (kW/ton)**
95=>99	0.574	0.574	0.574	0.000	0.000	0.000
90=>94	0.552	0.552	0.552	0.000	0.000	0.000
85=>89	0.529	0.529	0.529	0.000	0.000	0.000
80=>84	0.510	0.510	0.510	0.000	0.000	0.000
75=>79	0.499	0.499	0.499	0.000	0.000	0.000
70=>74	0.505	0.505	0.000	0.000	0.000	0.000
65=>69	0.482	0.482	0.000	0.000	0.000	0.000
60=>64	0.458	0.458	0.000	0.000	0.000	0.000
55=>59	0.434	0.434	0.000	0.000	0.000	0.000
50=>54	0.420	0.000	0.000	0.000	0.000	0.000
45=>49	0.397	0.000	0.000	0.000	0.000	0.000
40=>44	0.391	0.000	0.000	0.000	0.000	0.000
35=>39	0.390	0.000	0.000	0.000	0.000	0.000
30=>34	0.391	0.000	0.000	0.000	0.000	0.000
25=>29	0.392	0.000	0.000	0.000	0.000	0.000
20=>24	0.395	0.000	0.000	0.000	0.000	0.000
15=>19	0.399	0.000	0.000	0.000	0.000	0.000
10=>14	0.406	0.000	0.000	0.000	0.000	0.000
5=>9	0.415	0.000	0.000	0.000	0.000	0.000
0=>4	0.427	0.000	0.000	0.000	0.000	0.000
Average	**0.433**	**0.480**	**0.510**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	**Chiller 1 Demand (lb/ton)**	**Chiller 2 Demand (lb/ton)**	**Chiller 3 Demand (lb/ton)**	**Chiller 4 Demand (lb/ton)**	**Chiller 5 Demand (lb/ton)**	**Chiller 6 Demand (lb/ton)**
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	**Chiller 1 Operational Hours**	**Chiller 2 Operational Hours**	**Chiller 3 Operational Hours**	**Chiller 4 Operational Hours**	**Chiller 5 Operational Hours**	**Chiller 6 Operational Hours**	**Cumulative Operational Hours**
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	39.96	92%	1
PCHWP 2	39.96	92%	1
PCHWP 3	39.96	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	24.35	92%	1
CWP 2	24.35	92%	1
CWP 3	24.35	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	20	20	20	0	0	0	59
90=>94	20	20	20	0	0	0	59
85=>89	20	20	20	0	0	0	59
80=>84	20	20	20	0	0	0	59
75=>79	20	20	20	0	0	0	59
70=>74	20	20	0	0	0	0	39
65=>69	20	20	0	0	0	0	39
60=>64	20	20	0	0	0	0	39
55=>59	20	20	0	0	0	0	39
50=>54	20	0	0	0	0	0	20
45=>49	20	0	0	0	0	0	20
40=>44	20	0	0	0	0	0	20
35=>39	20	0	0	0	0	0	20
30=>34	20	0	0	0	0	0	20
25=>29	20	0	0	0	0	0	20
20=>24	20	0	0	0	0	0	20
15=>19	20	0	0	0	0	0	20
10=>14	20	0	0	0	0	0	20
5=>9	20	0	0	0	0	0	20
0=>4	20	0	0	0	0	0	20
Total/Avg	**394**	**177**	**99**	**0**	**0**	**0**	**670**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	158	158	158	0	0	0	473
90=>94	985	985	985	0	0	0	2,955
85=>89	2,679	2,679	2,679	0	0	0	8,038
80=>84	5,615	5,615	5,615	0	0	0	16,844
75=>79	8,707	8,707	8,707	0	0	0	26,122
70=>74	12,076	12,076	0	0	0	0	24,152
65=>69	13,829	13,829	0	0	0	0	27,659
60=>64	13,869	13,869	0	0	0	0	27,738
55=>59	12,096	12,096	0	0	0	0	24,192
50=>54	10,874	0	0	0	0	0	10,874
45=>49	9,417	0	0	0	0	0	9,417
40=>44	9,594	0	0	0	0	0	9,594
35=>39	10,874	0	0	0	0	0	10,874
30=>34	12,864	0	0	0	0	0	12,864
25=>29	11,643	0	0	0	0	0	11,643
20=>24	9,358	0	0	0	0	0	9,358
15=>19	7,466	0	0	0	0	0	7,466
10=>14	6,166	0	0	0	0	0	6,166
5=>9	4,767	0	0	0	0	0	4,767
0=>4	9,259	0	0	0	0	0	9,259
Total/Avg	**172,296**	**70,014**	**18,144**	**0**	**0**	**0**	**260,454**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 1 Central plant with constant speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		**Chilled Water Source**	Self Generated		
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													2,183,112
Chilled Water Pump Energy Usage (kWh):													428,360
Condenser Water Pump Energy Usage (kWh):													260,454
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													3,300,287
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,310,201
Off Peak Energy Usage - kWh													990,086
													3,300,287
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$121,540
Off Peak Energy Cost													$52,088
EECR & AEP Cost													$0
Electricity Cost													$347,641
Total Energy Cost													**$347,641**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

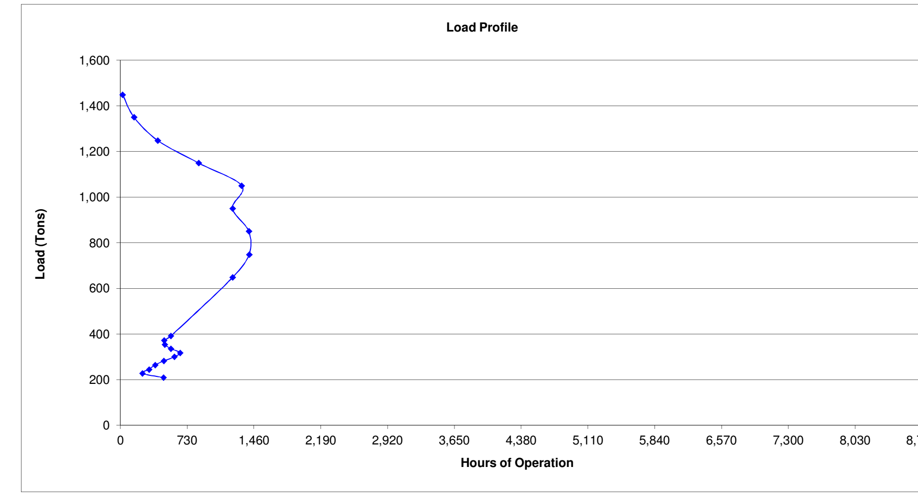
General Assumptions

Transformer Losses	5%		Peak Make-up Water:	300 gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50 gpm
Peak Cooling Load	1,500	tons		

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,758	0	11,592	69,552	11,592
90=>94	1,350	14	25	36,518	0	67,500	405,000	67,500
85=>89	1,248	12	68	83,676	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	146,704	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	191,673	0	464,100	2,784,600	464,100
70=>74	950	10	204	270,987	0	582,350	2,329,400	388,233
65=>69	850	9	234	245,443	0	596,700	2,386,800	397,800
60=>64	748	7	235	185,536	0	526,592	2,106,368	351,061
55=>59	648	6	205	117,107	0	397,872	1,591,488	265,248
50=>54	391	4	92	65,973	0	215,832	431,664	71,944
45=>49	372	4	80	47,951	0	177,816	355,632	59,272
40=>44	354	4	81	44,421	0	172,398	344,796	57,466
35=>39	336	3	92	45,935	0	185,472	370,944	61,824
30=>34	318	3	109	49,768	0	207,654	415,308	69,218
25=>29	300	3	99	41,075	0	177,300	354,600	59,100
20=>24	282	3	79	30,094	0	133,950	267,900	44,650
15=>19	264	3	63	21,779	0	100,056	200,112	33,352
10=>14	245	2	52	16,308	0	76,685	153,370	25,562
5=>9	227	2	40	11,463	0	54,934	109,868	18,311
0=>4	209	2	78	20,399	0	98,230	196,460	32,743
Total/Avg				**1,679,567**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	391	0.304	119	552	65,613	0	0.0	0.0	215,832
45=>49	372	0.268	100	478	47,655	0	0.0	0.0	177,816
40=>44	354	0.256	91	487	44,134	0	0.0	0.0	172,398
35=>39	336	0.246	83	552	45,626	0	0.0	0.0	185,472
30=>34	318	0.238	76	653	49,422	0	0.0	0.0	207,654
25=>29	300	0.230	69	591	40,779	0	0.0	0.0	177,300
20=>24	282	0.223	63	475	29,871	0	0.0	0.0	133,950
15=>19	264	0.216	57	379	21,612	0	0.0	0.0	100,056
10=>14	245	0.211	52	313	16,181	0	0.0	0.0	76,685
5=>9	227	0.207	47	242	11,371	0	0.0	0.0	54,934
0=>4	209	0.206	43	470	20,235	0	0.0	0.0	98,230
Total/Avg		**0.303**	**2,452**	**8,746**	**951,905**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.393**	**1,654**	**3,554**	**559,406**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.439**	**921**	**921**	**153,376**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile

Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

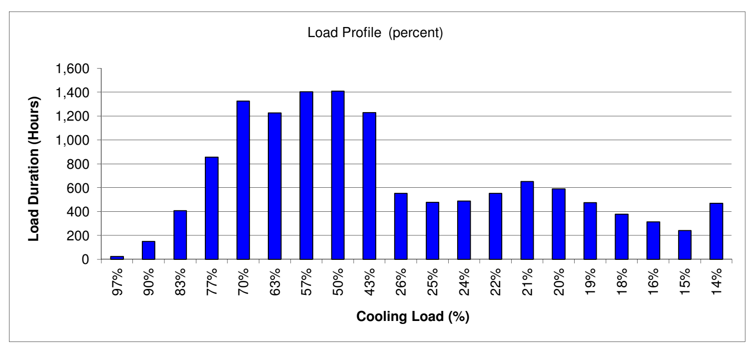
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.578	0.578	0.578	0.000	0.000	0.000
90=>94	0.536	0.536	0.536	0.000	0.000	0.000
85=>89	0.488	0.488	0.488	0.000	0.000	0.000
80=>84	0.443	0.443	0.443	0.000	0.000	0.000
75=>79	0.408	0.408	0.408	0.000	0.000	0.000
70=>74	0.462	0.462	0.000	0.000	0.000	0.000
65=>69	0.408	0.408	0.000	0.000	0.000	0.000
60=>64	0.349	0.349	0.000	0.000	0.000	0.000
55=>59	0.291	0.291	0.000	0.000	0.000	0.000
50=>54	0.304	0.000	0.000	0.000	0.000	0.000
45=>49	0.268	0.000	0.000	0.000	0.000	0.000
40=>44	0.256	0.000	0.000	0.000	0.000	0.000
35=>39	0.246	0.000	0.000	0.000	0.000	0.000
30=>34	0.238	0.000	0.000	0.000	0.000	0.000
25=>29	0.230	0.000	0.000	0.000	0.000	0.000
20=>24	0.223	0.000	0.000	0.000	0.000	0.000
15=>19	0.216	0.000	0.000	0.000	0.000	0.000
10=>14	0.211	0.000	0.000	0.000	0.000	0.000
5=>9	0.207	0.000	0.000	0.000	0.000	0.000
0=>4	0.206	0.000	0.000	0.000	0.000	0.000
Average	**0.303**	**0.393**	**0.439**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	41.23	92%	1
PCHWP 2	41.23	92%	1
PCHWP 3	41.23	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	33	33	33	0	0	0	100
90=>94	33	33	33	0	0	0	100
85=>89	33	33	33	0	0	0	100
80=>84	33	33	33	0	0	0	100
75=>79	33	33	33	0	0	0	100
70=>74	33	33	0	0	0	0	67
65=>69	33	33	0	0	0	0	67
60=>64	33	33	0	0	0	0	67
55=>59	33	33	0	0	0	0	67
50=>54	33	0	0	0	0	0	33
45=>49	33	0	0	0	0	0	33
40=>44	33	0	0	0	0	0	33
35=>39	33	0	0	0	0	0	33
30=>34	33	0	0	0	0	0	33
25=>29	33	0	0	0	0	0	33
20=>24	33	0	0	0	0	0	33
15=>19	33	0	0	0	0	0	33
10=>14	33	0	0	0	0	0	33
5=>9	33	0	0	0	0	0	33
0=>4	33	0	0	0	0	0	33
Total/Avg	**668**	**301**	**167**	**0**	**0**	**0**	**1,136**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	267	267	267	0	0	0	802
90=>94	1,670	1,670	1,670	0	0	0	5,010
85=>89	4,542	4,542	4,542	0	0	0	13,627
80=>84	9,519	9,519	9,519	0	0	0	28,557
75=>79	14,763	14,763	14,763	0	0	0	44,288
70=>74	20,474	20,474	0	0	0	0	40,948
65=>69	23,447	23,447	0	0	0	0	46,894
60=>64	23,514	23,514	0	0	0	0	47,027
55=>59	20,508	20,508	0	0	0	0	41,015
50=>54	18,437	0	0	0	0	0	18,437
45=>49	15,965	0	0	0	0	0	15,965
40=>44	16,266	0	0	0	0	0	16,266
35=>39	18,437	0	0	0	0	0	18,437
30=>34	21,810	0	0	0	0	0	21,810
25=>29	19,739	0	0	0	0	0	19,739
20=>24	15,865	0	0	0	0	0	15,865
15=>19	12,659	0	0	0	0	0	12,659
10=>14	10,454	0	0	0	0	0	10,454
5=>9	8,083	0	0	0	0	0	8,083
0=>4	15,698	0	0	0	0	0	15,698
Total/Avg	**292,116**	**118,704**	**30,761**	**0**	**0**	**0**	**441,581**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data		
Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 2 Central Plant with magnetic bearing variable speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated		
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261			
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64 Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000 Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93 Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30 Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0% of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000			
					Natural Gas	$7.20 Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80 Per MMbtu	NOT USED
	On Peak	70%	Summer	70%			
	Off Peak	30%	Winter	30%			

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													1,679,567
Chilled Water Pump Energy Usage (kWh):													441,581
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													2,857,558
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,000,291
Off Peak Energy Usage - kWh													857,267
													2,857,558
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$105,235
Off Peak Energy Cost													$45,101
EECR & AEP Cost													$0
Electricity Cost													$324,349
Total Energy Cost													**$324,349**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
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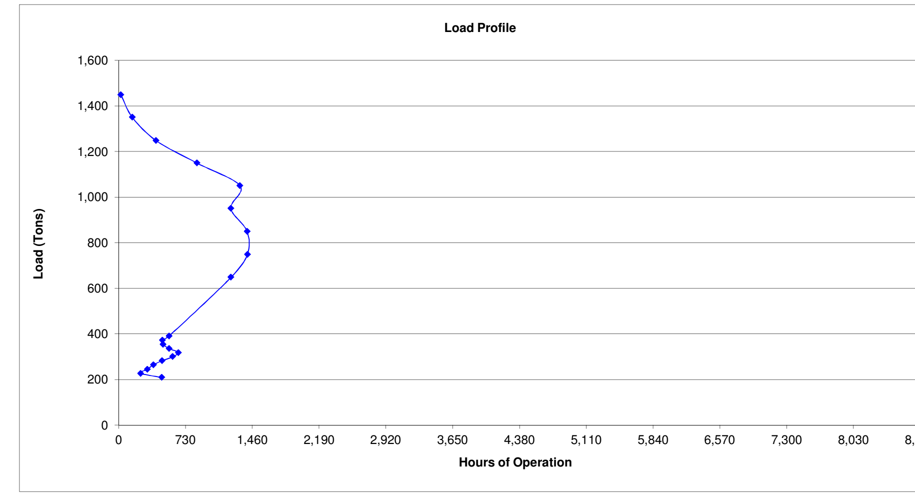
Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			



All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	58	107	11,592	69,552	11,592
90=>94	1,350	14	25	338	608	67,500	405,000	67,500
85=>89	1,248	12	68	849	1,485	169,728	1,018,368	169,728
80=>84	1,149	11	143	1,637	2,783	327,465	1,964,790	327,465
75=>79	1,050	11	221	2,321	3,857	464,100	2,784,600	464,100
70=>74	950	10	204	1,941	4,978	582,350	2,329,400	388,233
65=>69	850	9	234	1,989	4,935	596,700	2,386,800	397,800
60=>64	748	7	235	1,755	4,204	526,592	2,106,368	351,061
55=>59	648	6	205	1,326	3,069	397,872	1,591,488	265,248
50=>54	391	4	92	360	1,692	215,832	431,664	71,944
45=>49	372	4	80	296	1,371	177,816	355,632	59,272
40=>44	354	4	81	287	1,316	172,398	344,796	57,466
35=>39	336	3	92	309	1,404	185,472	370,944	61,824
30=>34	318	3	109	346	1,561	207,654	415,308	69,218
25=>29	300	3	99	296	1,324	177,300	354,600	59,100
20=>24	282	3	79	223	996	133,950	267,900	44,650
15=>19	264	3	63	167	741	100,056	200,112	33,352
10=>14	245	2	52	128	567	76,685	153,370	25,562
5=>9	227	2	40	92	406	54,934	109,868	18,311
0=>4	209	2	78	164	728	98,230	196,460	32,743
Total/Avg				**14,881**	**38,133**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	391	0.000	0	552	0	8	3.1	1,692.4	215,832
45=>49	372	0.000	0	478	0	8	2.9	1,371.4	177,816
40=>44	354	0.000	0	487	0	8	2.7	1,315.9	172,398
35=>39	336	0.000	0	552	0	8	2.5	1,404.3	185,472
30=>34	318	0.000	0	653	0	8	2.4	1,561.3	207,654
25=>29	300	0.000	0	591	0	7	2.2	1,324.4	177,300
20=>24	282	0.000	0	475	0	7	2.1	995.6	133,950
15=>19	264	0.000	0	379	0	7	2.0	740.9	100,056
10=>14	245	0.000	0	313	0	7	1.8	566.8	76,685
5=>9	227	0.000	0	242	0	7	1.7	406.1	54,934
0=>4	209	0.000	0	470	0	7	1.5	728.0	98,230
Total/Avg		**0.000**	**0**	**8,746**	**0**	**7.817**	**56.3**	**23,646.7**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**0**	**3,554**	**0**		**31.4**	**11,539.5**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**921**	**921**	**0**		**18.3**	**2,946.7**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile

Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)

Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

Chiller Input

CHILLER LOAD PROFILE

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)

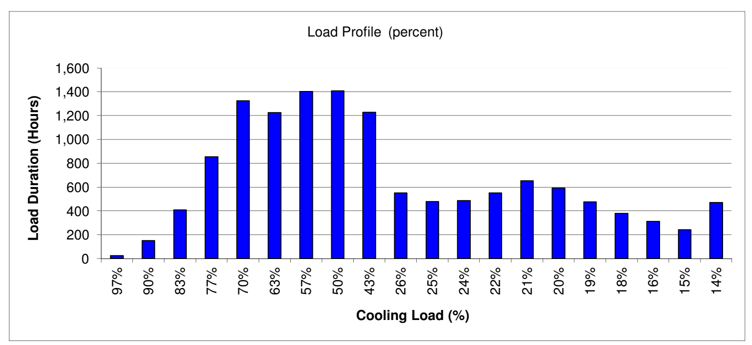
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)

Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	9.219	9.219	9.219	0.000	0.000	0.000
90=>94	9.002	9.002	9.002	0.000	0.000	0.000
85=>89	8.750	8.750	8.750	0.000	0.000	0.000
80=>84	8.499	8.499	8.499	0.000	0.000	0.000
75=>79	8.311	8.311	8.311	0.000	0.000	0.000
70=>74	8.547	8.547	0.000	0.000	0.000	0.000
65=>69	8.271	8.271	0.000	0.000	0.000	0.000
60=>64	7.984	7.984	0.000	0.000	0.000	0.000
55=>59	7.713	7.713	0.000	0.000	0.000	0.000
50=>54	7.841	0.000	0.000	0.000	0.000	0.000
45=>49	7.712	0.000	0.000	0.000	0.000	0.000
40=>44	7.633	0.000	0.000	0.000	0.000	0.000
35=>39	7.571	0.000	0.000	0.000	0.000	0.000
30=>34	7.519	0.000	0.000	0.000	0.000	0.000
25=>29	7.470	0.000	0.000	0.000	0.000	0.000
20=>24	7.433	0.000	0.000	0.000	0.000	0.000
15=>19	7.405	0.000	0.000	0.000	0.000	0.000
10=>14	7.392	0.000	0.000	0.000	0.000	0.000
5=>9	7.392	0.000	0.000	0.000	0.000	0.000
0=>4	7.411	0.000	0.000	0.000	0.000	0.000
Average	**7.817**	**8.219**	**8.480**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS

Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	42.6	92%	1
PCHWP 2	42.6	92%	1
PCHWP 3	42.6	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	35	35	35	0	0	0	104
90=>94	35	35	35	0	0	0	104
85=>89	35	35	35	0	0	0	104
80=>84	35	35	35	0	0	0	104
75=>79	35	35	35	0	0	0	104
70=>74	35	35	0	0	0	0	69
65=>69	35	35	0	0	0	0	69
60=>64	35	35	0	0	0	0	69
55=>59	35	35	0	0	0	0	69
50=>54	35	0	0	0	0	0	35
45=>49	35	0	0	0	0	0	35
40=>44	35	0	0	0	0	0	35
35=>39	35	0	0	0	0	0	35
30=>34	35	0	0	0	0	0	35
25=>29	35	0	0	0	0	0	35
20=>24	35	0	0	0	0	0	35
15=>19	35	0	0	0	0	0	35
10=>14	35	0	0	0	0	0	35
5=>9	35	0	0	0	0	0	35
0=>4	35	0	0	0	0	0	35
Total/Avg	**690**	**311**	**173**	**0**	**0**	**0**	**1,173**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	276	276	276	0	0	0	828
90=>94	1,725	1,725	1,725	0	0	0	5,175
85=>89	4,692	4,692	4,692	0	0	0	14,076
80=>84	9,833	9,833	9,833	0	0	0	29,498
75=>79	15,249	15,249	15,249	0	0	0	45,747
70=>74	21,149	21,149	0	0	0	0	42,297
65=>69	24,219	24,219	0	0	0	0	48,438
60=>64	24,288	24,288	0	0	0	0	48,576
55=>59	21,183	21,183	0	0	0	0	42,366
50=>54	19,044	0	0	0	0	0	19,044
45=>49	16,491	0	0	0	0	0	16,491
40=>44	16,802	0	0	0	0	0	16,802
35=>39	19,044	0	0	0	0	0	19,044
30=>34	22,529	0	0	0	0	0	22,529
25=>29	20,390	0	0	0	0	0	20,390
20=>24	16,388	0	0	0	0	0	16,388
15=>19	13,076	0	0	0	0	0	13,076
10=>14	10,799	0	0	0	0	0	10,799
5=>9	8,349	0	0	0	0	0	8,349
0=>4	16,215	0	0	0	0	0	16,215
Total/Avg	**301,737**	**122,613**	**31,775**	**0**	**0**	**0**	**456,125**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	50	92%	1
CT 2	50	92%	1
CT 3	50	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	41	41	41	0	0	0	122
90=>94	41	41	41	0	0	0	122
85=>89	41	41	41	0	0	0	122
80=>84	41	41	41	0	0	0	122
75=>79	41	41	41	0	0	0	122
70=>74	41	41	0	0	0	0	81
65=>69	41	41	0	0	0	0	81
60=>64	41	41	0	0	0	0	81
55=>59	41	41	0	0	0	0	81
50=>54	41	0	0	0	0	0	41
45=>49	41	0	0	0	0	0	41
40=>44	41	0	0	0	0	0	41
35=>39	41	0	0	0	0	0	41
30=>34	41	0	0	0	0	0	41
25=>29	41	0	0	0	0	0	41
20=>24	41	0	0	0	0	0	41
15=>19	41	0	0	0	0	0	41
10=>14	41	0	0	0	0	0	41
5=>9	41	0	0	0	0	0	41
0=>4	41	0	0	0	0	0	41
Total/Avg	**810**	**365**	**203**	**0**	**0**	**0**	**1,377**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	324	324	324	0	0	0	972
90=>94	2,025	2,025	2,025	0	0	0	6,075
85=>89	5,508	5,508	5,508	0	0	0	16,524
80=>84	11,543	11,543	11,543	0	0	0	34,628
75=>79	17,901	17,901	17,901	0	0	0	53,703
70=>74	24,827	24,827	0	0	0	0	49,653
65=>69	28,431	28,431	0	0	0	0	56,862
60=>64	28,512	28,512	0	0	0	0	57,024
55=>59	24,867	24,867	0	0	0	0	49,734
50=>54	22,356	0	0	0	0	0	22,356
45=>49	19,359	0	0	0	0	0	19,359
40=>44	19,724	0	0	0	0	0	19,724
35=>39	22,356	0	0	0	0	0	22,356
30=>34	26,447	0	0	0	0	0	26,447
25=>29	23,936	0	0	0	0	0	23,936
20=>24	19,238	0	0	0	0	0	19,238
15=>19	15,350	0	0	0	0	0	15,350
10=>14	12,677	0	0	0	0	0	12,677
5=>9	9,801	0	0	0	0	0	9,801
0=>4	19,035	0	0	0	0	0	19,035
Total/Avg	**354,213**	**143,937**	**37,301**	**0**	**0**	**0**	**535,451**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 3 Central Plant with absorption chillers

Input Data Summary

Energy Charge Multiplier	**Demand Charge-Summer**		**Energy Charge - Summer**		Self Generated			
1.00	First 200-kW	$16.46	On Peak	$0.05261				
	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													38,133
Steam Cost													$672,664
Electricity Usage													
Chiller Energy Usage (kWh):													14,881
Chilled Water Pump Energy Usage (kWh):													456,125
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													535,451
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													1,314,505
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													920,154
Off Peak Energy Usage - kWh													394,352
													1,314,505
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$48,409
Off Peak Energy Cost													$20,747
EECR & AEP Cost													$0
Electricity Cost													$243,169
Total Energy Cost													**$915,833**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Appendix F

Drawings

A1 – Centrifugal Chiller Building Layout

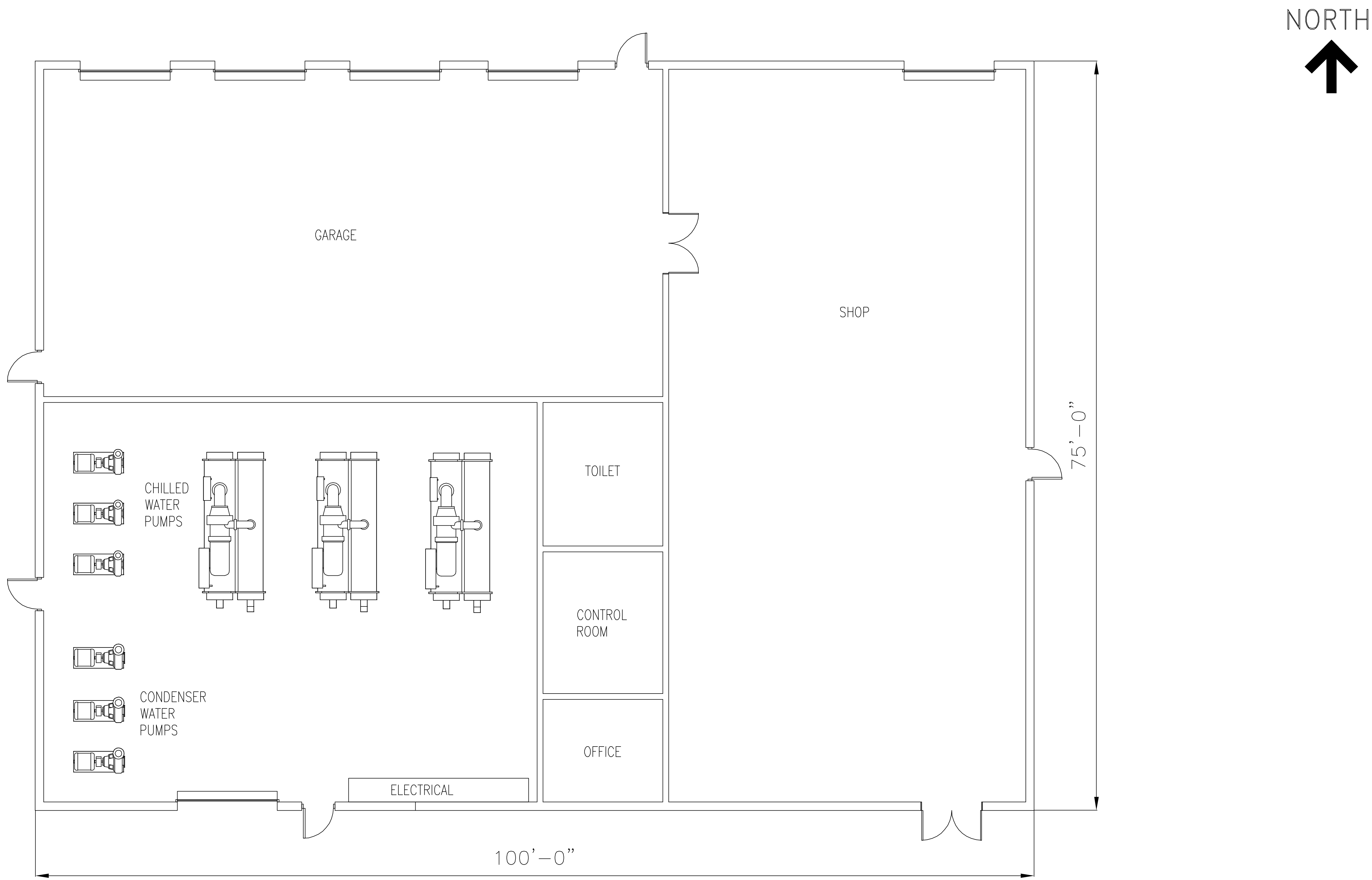
A2 – Absorption Chiller Building Layout

E1 – Existing One Line Diagram

E2 – One Line Diagram

S1 – Distribution Piping Plan – Option A

S2 – Distribution Piping Plan – Option B



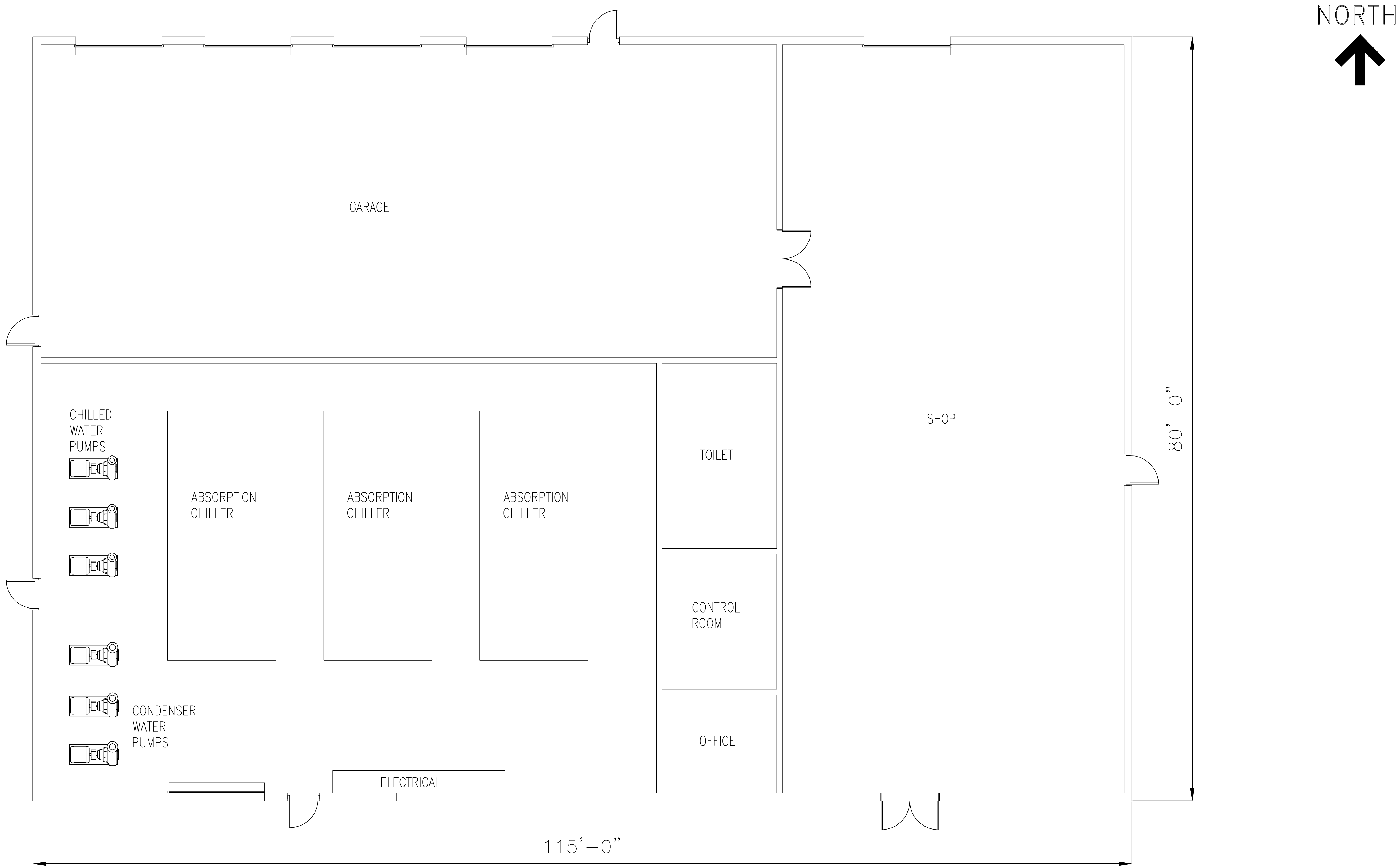
CENTRIFUGAL CHIILLER BUILDING LAYOUT

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

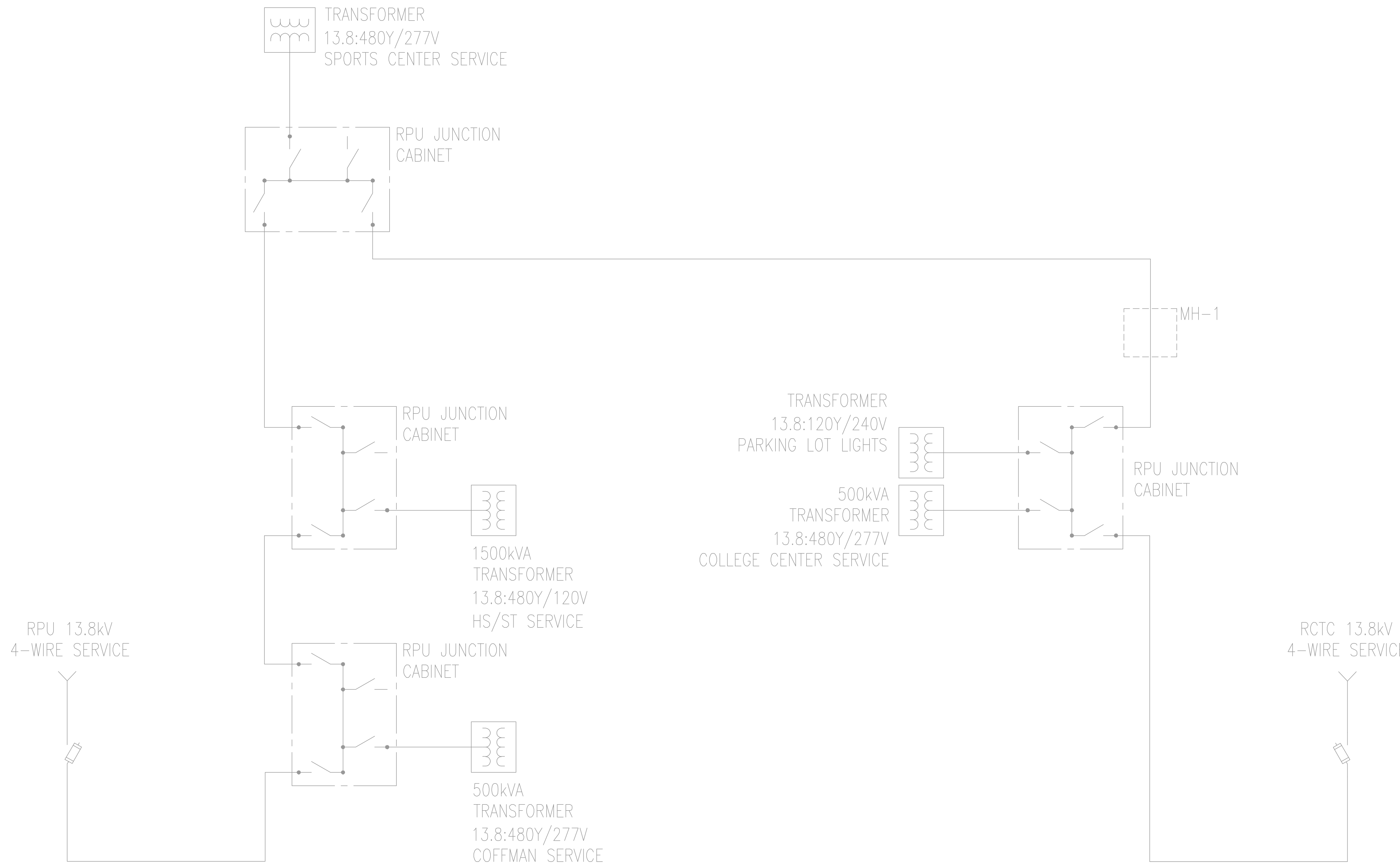
3/32"=1'–0"

A1



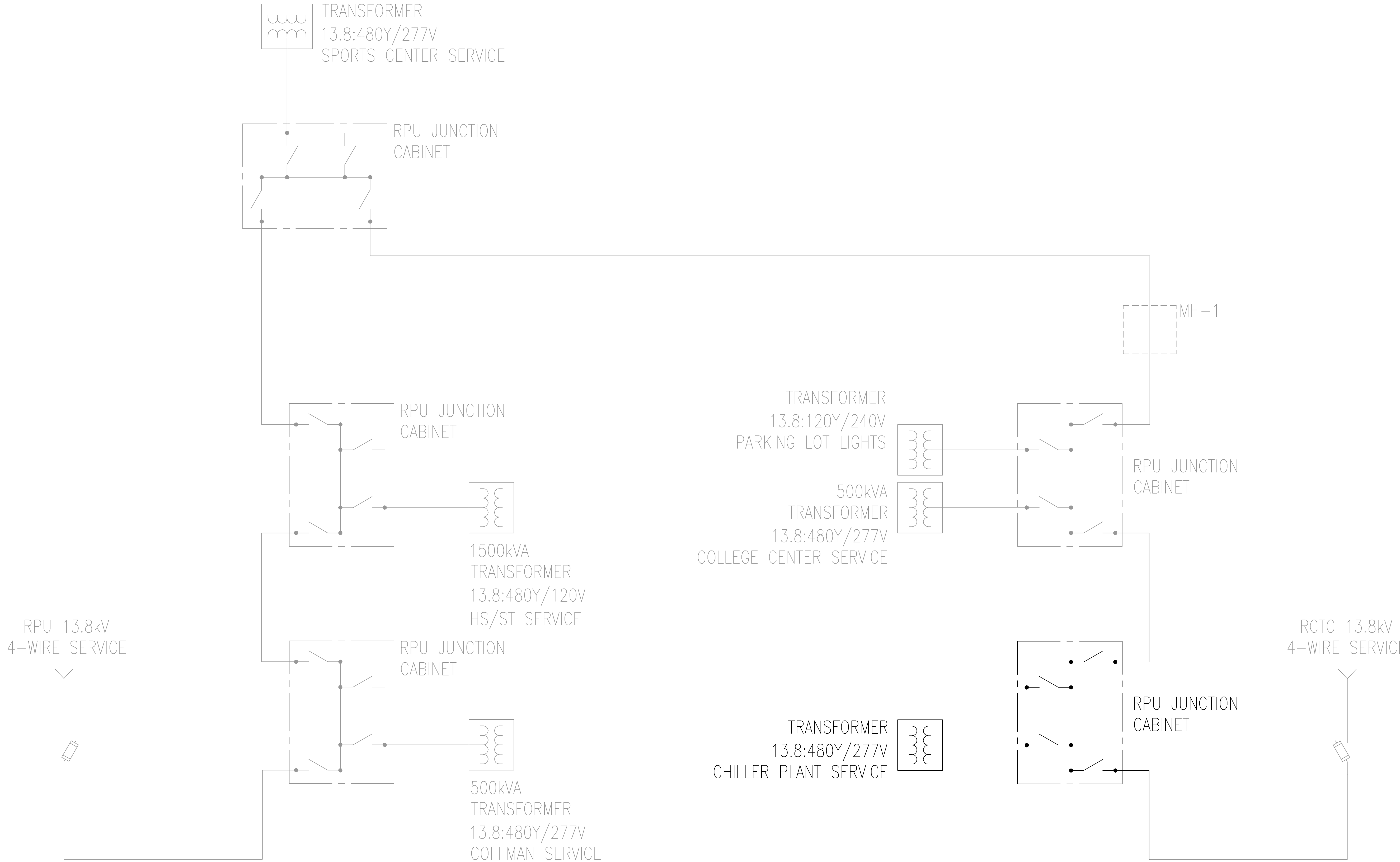
ABSORPTION CHIILLER BUILDING LAYOUT

Stanley Consultants INC.	ROCHESTER COMMUNITY AND TECHNICAL COLLEGE CHILLED WATER STUDY ROCHESTER, MINNESOTA	3/32"=1'-0" A2



EXISTING ONE LINE DIAGRAM

Stanley Consultants INC.	ROCHESTER COMMUNITY AND TECHNICAL COLLEGE CHILLED WATER STUDY ROCHESTER, MINNESOTA	NO SCALE E1



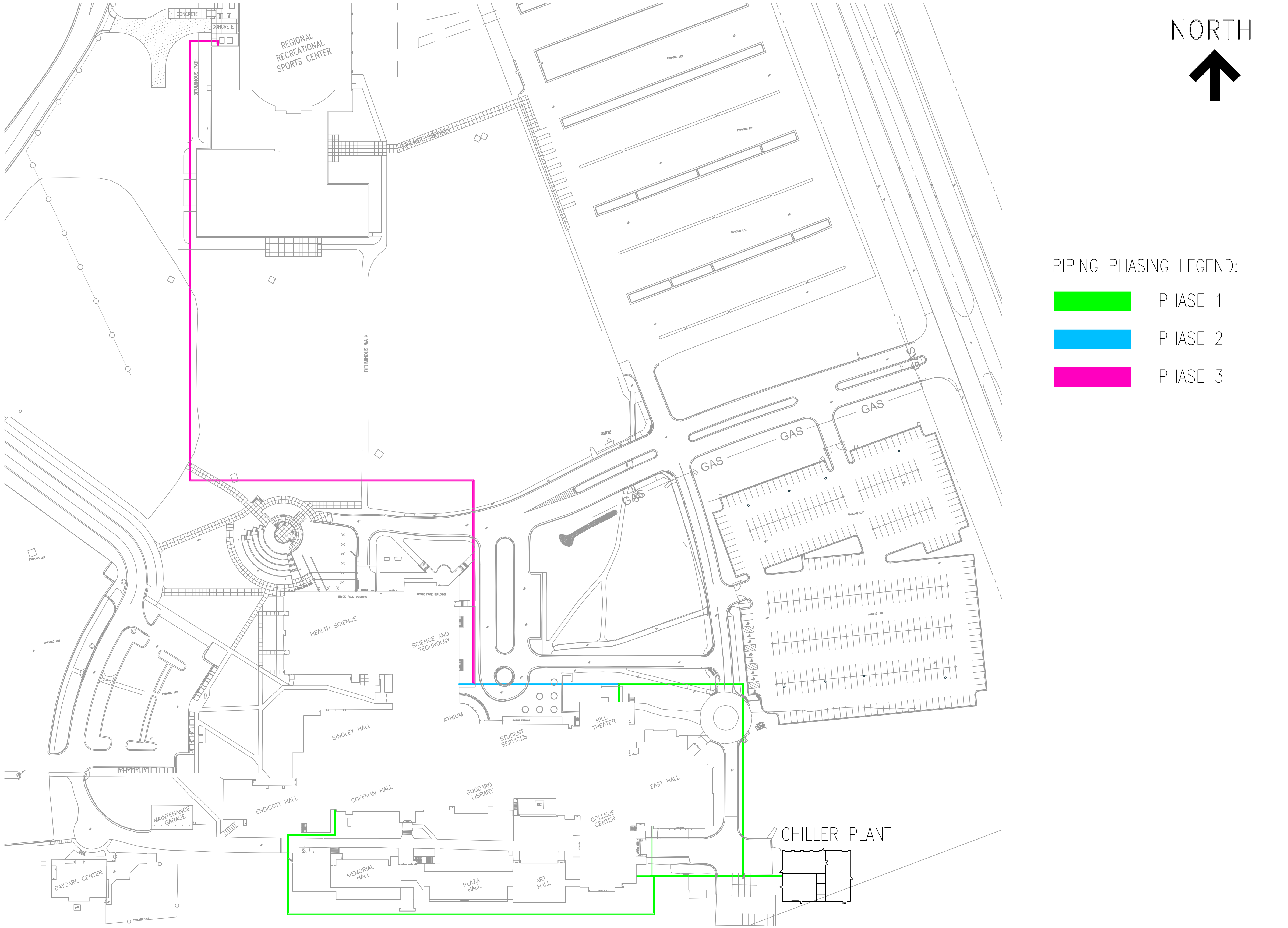
ONE LINE DIAGRAM

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

NO SCALE

E2



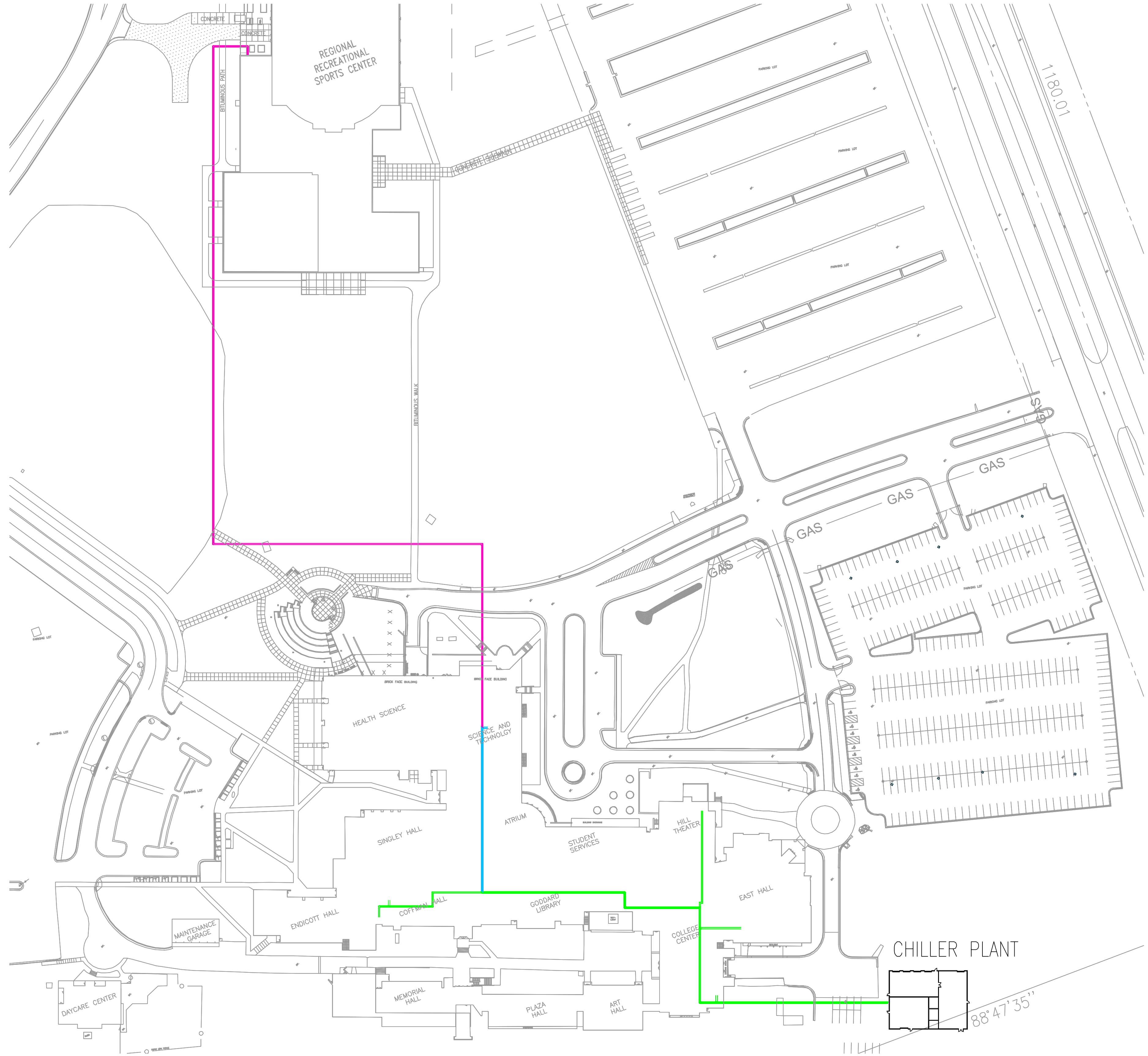
DISTRIBUTION PIPING PLAN – OPTION A

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

1"=150'

S1



PIPING PHASING LEGEND:

- PHASE 1
- PHASE 2
- PHASE 3

DISTRIBUTION PIPING PLAN – OPTION B

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

1"=150'

S2

Appendix D

Opinion of Probable Cost Information

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (No VFD)						
OPTION 1						
Phase 1						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
2000A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,599,534
			Undeveloped Design Details - 30%			$1,079,860
			Contractor Overhead - 15%			$701,909
			Contractor Profit - 10%			$538,130
			Adminstration and Engineering - 15%			$887,915
				TOTAL COST		$6,807,349
			PROBABLE COST USE			**$6,810,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
			Undeveloped Design Details - 30%			$94,725
			Contractor Overhead - 15%			$61,571
			Contractor Profit - 10%			$47,205
			Adminstration and Engineering - 15%			$77,888
				TOTAL COST		$597,139
			PROBABLE COST USE			**$600,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,010,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (With VFD)						
OPTION 2						
Phase 1						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1600A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,661,534
				Undeveloped Design Details - 30%		$1,098,460
				Contractor Overhead - 15%		$713,999
				Contractor Profit - 10%		$547,399
				Adminstration and Engineering - 15%		$903,209
				TOTAL COST		$6,924,602
				PROBABLE COST USE		**$6,920,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,340,000**

4

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
ABSORPTION CHILLERS						
OPTION 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1200A Main Switch Board (MSB)	1	EA	$15,000.00	$10,000.00	$25,000.00	$25,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	9200	SF	$125.00	$75.00	$200.00	$1,840,000
				SUBTOTAL		$4,126,134
				Undeveloped Design Details - 30%		$1,237,840
				Contractor Overhead - 15%		$804,596
				Contractor Profit - 10%		$616,857
				Adminstration and Engineering - 15%		$1,017,814
				TOTAL COST		$7,803,241
				PROBABLE COST USE		**$7,800,000**
Phase 2						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$9,860,000**

Stanley Consultants INC.			Job No.	24482-01-00			
			Subject	RCTC			
Computed by	Kyle Johnson	Date 12-Dec-12		Chilled Water Study			
Checked by		Date		Distribution Through the Building			
Approved by		Date		Option A - Ph 1,2,3			

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Through the Building - OPTION B						
PHASE 1						
12" Direct Buried AWWA Pipe	440	LF	$13.69	$16.89	$30.58	$13,455
12" AWWA LR Elbow	4	EA	$184.00	$126.00	$310.00	$1,240
12" Steel Pipe	745	LF	$89.00	$68.78	$157.78	$117,546
12" Pipe Insulation with Jacket	745	LF	$20.50	$8.95	$29.45	$21,940
6" Steel Pipe	300	LF	$37.50	$35.97	$73.47	$22,041
6" Pipe Insulation with Jacket	300	LF	$12.40	$6.80	$19.20	$5,760
4" Steel Pipe	360	LF	$23.50	$22.93	$46.43	$16,715
4" Pipe Insulation with Jacket	360	LF	$9.95	$6.20	$16.15	$5,814
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
12" Steel Elbow	6	EA	$3,775.00	$208.00	$3,983.00	$23,898
6" Steel Elbow	8	EA	$495.00	$139.00	$634.00	$5,072
4" Steel Elbow	4	EA	$315.00	$100.00	$415.00	$1,660
3" Steel Elbow	3	EA	$255.00	$73.00	$328.00	$984
12"x12"x4" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x12"x8" Steel Tee	2	EA	$5,875.00	$415.00	$6,290.00	$12,580
6"x6"x3" Steel Tee	2	EA	$950.00	$208.00	$1,158.00	$2,316
12"x6" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Demo and Replace Lay-In Ceiling	6408	SF	$2.21	$1.42	$3.63	$23,261
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$518,976
				Difficult Working Conditions - 20%		$103,795
				Undeveloped Design Details - 30%		$186,831
				Contractor Overhead - 15%		$121,440
				Contractor Profit - 10%		$93,104
				Adminstration and Engineering - 15%		$153,622
				TOTAL COST		$1,177,770
				PROBABLE COST USE		**$1,178,000**
PHASE 2						
12" Steel Pipe	420	LF	$89.00	$68.78	$157.78	$66,268
12" Pipe Insulation with Jacket	420	LF	$20.50	$8.95	$29.45	$12,369
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
12"x12"x12" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$161,052
				Difficult Working Conditions - 20%		$32,210
				Undeveloped Design Details - 30%		$57,979
				Contractor Overhead - 15%		$37,686
				Contractor Profit - 10%		$28,893
				Adminstration and Engineering - 15%		$47,673
				TOTAL COST		$365,493
				PROBABLE COST USE		**$365,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2365	LF	$11.85	$15.25	$27.10	$64,092
8" AWWA LR Elbow	12	EA	$144.00	$99.00	$243.00	$2,916
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
8" Steel Elbow	4	EA	$855.00	$156.00	$1,011.00	$4,044
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
			SUBTOTAL PHASE 3			$119,497
			Undeveloped Design Details - 30%			$35,849
			Contractor Overhead - 15%			$23,302
			Contractor Profit - 10%			$17,865
			Adminstration and Engineering - 15%			$11,552
			TOTAL COST			$208,065
			PROBABLE COST USE			**$208,000**
			TOTAL - OPTION B (ALL 3 PHASES):			**$1,751,000**

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Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Outside the Building - OPTION A						
PHASE 1						
12" Direct Buried AWWA Pipe	1025	LF	$13.69	$16.89	$30.58	$31,345
8" Direct Buried AWWA Pipe	260	LF	$11.85	$15.25	$27.10	$7,046
6" Direct Buried AWWA Pipe	1620	LF	$10.64	$14.27	$24.91	$40,354
4" Direct Buried AWWA Pipe	240	LF	$6.54	$13.52	$20.06	$4,814
12"x12" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
12"x4" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
8"x4" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
8"x6" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
12" AWWA LR Elbow	2	EA	$184.00	$126.00	$310.00	$620
6" AWWA LR Elbow	8	EA	$76.00	$58.00	$134.00	$1,072
8" AWWA Direct Buried Valve	2	EA	$825.00	$217.00	$1,042.00	$2,084
12" AWWA Direct Buried Valve	4	EA	$1,400.00	$217.00	$1,617.00	$6,468
12"x8" AWWA Reducer	2	EA	$475.00	$10.60	$485.60	$971
8"x4" AWWA Reducer	2	EA	$234.00	$10.60	$244.60	$489
6" Steel Pipe	40	LF	$37.50	$35.97	$73.47	$2,939
6" Pipe Insulation with Jacket	40	LF	$12.40	$6.80	$19.20	$768
4" Steel Pipe	120	LF	$23.50	$22.93	$46.43	$5,572
4" Pipe Insulation with Jacket	120	LF	$9.95	$6.20	$16.15	$1,938
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$309,014
				Undeveloped Design Details - 30%		$92,704
				Contractor Overhead - 15%		$60,258
				Contractor Profit - 10%		$46,198
				Adminstration and Engineering - 15%		$76,226
				TOTAL COST		$584,399
				PROBABLE COST USE		**$584,000**
PHASE 2						
12" Direct Buried AWWA Pipe	10	LF	$13.69	$16.89	$30.58	$306
8" Direct Buried AWWA Pipe	40	LF	$11.85	$15.25	$27.10	$1,084
12"x8" AWWA Reducer	2	E	$475.00	$10.60	$485.60	$971
12"x8" AWWA Tee	2	E	$306.00	$197.00	$503.00	$1,006
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$25,314
				Undeveloped Design Details - 30%		$7,594
				Contractor Overhead - 15%		$4,936
				Contractor Profit - 10%		$3,784
				Adminstration and Engineering - 15%		$6,244
				TOTAL COST		$47,873
				PROBABLE COST USE		**$48,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2800	LF	$11.85	$15.25	$27.10	$75,880
8" AWWA Reducer	10	EA	$234.00	$10.60	$244.60	$2,446
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
				SUBTOTAL PHASE 3		$104,043
				Undeveloped Design Details - 30%		$31,213
				Contractor Overhead - 15%		$20,288
				Contractor Profit - 10%		$15,554
				Adminstration and Engineering - 15%		$25,665
				TOTAL COST		$196,763
				PROBABLE COST USE		**$197,000**
				TOTAL - OPTION A (ALL 3 PHASES):		**$829,000**

HEAPR MANUAL
Phase I & II Main Campus Building Domestic Water Piping Replacement

Req. No.: 13

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$837,800	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$837,800	**Total**	

General Description of Existing Conditions and All Work

A large majority of domestic hot and cold water piping systems on the Main Campus were originally constructed with galvanized steel piping. These 40+-year old piping systems are showing signs of significant rust and deterioration resulting in leaks, breaks and poor drinking water quality. This project will replace the domestic hot and cold water piping systems (and fixtures) with copper piping or other code/MnState-approved, economically viable materials (such as stainless steel for larger pipe diameters).

Added 18% cost escalation to original 2014 estimate to mid-year 2020.

Project Title – Phase I & II Main Campus Building Domestic Water Piping Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$837,800	**Phase I & II Main Campus Building Domestic Water Piping Replacement**
$	
$	
$837,800	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Project will reduce the Main Campus FCI from 0.09 to 0.08.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Cost Estimate - TKDA

Main Campus Domestic Water Replacement	Labor & Material			
Description	**Quantity**	**Unit**	**Unit Cost**	**Total**
1966 Area Phase I				
Demolition				
Piping and Fixtures	86	EA	$ 500.00	$ 43,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	20	EA	$ 3,000.00	$ 60,000.00
Urinals and Water Clostets, Fixture and Piping	46	EA	$ 4,000.00	$ 184,000.00
Mech Room Piping (2 sets of W.H.'s in separate rooms)	2	EA	$ 10,000.00	$ 20,000.00
Mechanical Construction Subtotal				**$ 307,000**
Removal and reinstallation of ceilings	1	LS	$ 10,000.00	$ 10,000.00
Patching and Misc Repairs	1	LS	$ 20,000.00	$ 20,000.00
Construction Subtotal				**$ 317,000**
20% Undeveloped design cost				$ 31,700
25% Contractor OH&P and General Conditions				$ 79,250
2% Occupied Facility/Difficulty Factor				$ 6,340
Subtotal				**$ 434,290**
10% Owner's Contingency				$ 43,429
Construction Total				**$ 480,000**

Engineering, Cx, other Soft Costs 10%	$ 48,000.00
TOTAL	**$ 528,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 39,600.00
TOTAL PROJECT BUDGET	**$ 570,000.00**

1968 Area Phase II				
Demolition				
Piping and Fixtures	14	EA	$ 500.00	$ 7,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	6	EA	$ 3,000.00	$ 18,000.00
Urinals and Water Clostets, Fixture and Piping	8	EA	$ 4,000.00	$ 32,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 67,000**
Removal and reinstallation of ceilings	1	LS	$ 2,500.00	$ 2,500.00
Patching and Misc Repairs	1	LS	$ 5,000.00	$ 5,000.00
Construction Subtotal				**$ 69,500**
20% Undeveloped design cost				$ 6,950
25% Contractor OH&P and General Conditions				$ 17,375
2% Occupied Facility/Difficulty Factor				$ 1,390
Subtotal				**$ 95,215**
10% Owner's Contingency				$ 9,522
Construction Total				**$ 110,000**

Engineering, Cx, other Soft Costs 10%	$ 11,000.00
TOTAL	**$ 121,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 9,075.00
TOTAL PROJECT BUDGET	**$ 140,000.00**

Main Campus Domestic Water Replacement	Labor & Material			
Description	**Quantity**	**Unit**	**Unit Cost**	**Total**

1970 Area Phase III				
Demolition				
Piping and Fixtures	70	EA	$ 500.00	$ 35,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	30	EA	$ 3,000.00	$ 90,000.00
Urinals and Water Clostets, Fixture and Piping	40	EA	$ 4,000.00	$ 160,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 295,000**
Removal and reinstallation of ceilings	1	LS	$ 10,000.00	$ 10,000.00
Patching and Misc Repairs	1	LS	$ 20,000.00	$ 20,000.00
Construction Subtotal				**$ 305,000**
20% Undeveloped design cost				$ 30,500
25% Contractor OH&P and General Conditions				$ 76,250
2% Occupied Facility/Difficulty Factor				$ 6,100
Subtotal				**$ 417,850**
10% Owner's Contingency				$ 41,785
Construction Total				**$ 460,000**

Engineering, Cx, other Soft Costs 10%	$ 46,000.00
TOTAL	**$ 506,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 37,950.00
TOTAL PROJECT BUDGET	**$ 550,000.00**

1972 Area Phase IV				
Demolition				
Piping and Fixtures	14	EA	$ 500.00	$ 7,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	10	EA	$ 3,000.00	$ 30,000.00
Urinals and Water Clostets, Fixture and Piping	4	EA	$ 4,000.00	$ 16,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 63,000**
Removal and reinstallation of ceilings	1	LS	$ 2,500.00	$ 2,500.00
Patching and Misc Repairs	1	LS	$ 5,000.00	$ 5,000.00
Construction Subtotal				**$ 65,500**
20% Undeveloped design cost				$ 6,550
25% Contractor OH&P and General Conditions				$ 16,375
2% Occupied Facility/Difficulty Factor				$ 1,310
Subtotal				**$ 89,735**
10% Owner's Contingency				$ 8,974
Construction Total				**$ 100,000**

Engineering, Cx, other Soft Costs 10%	$ 10,000.00
TOTAL	**$ 110,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 8,250.00
TOTAL PROJECT BUDGET	**$ 120,000.00**
TOTAL ALL BUILDINGS	**$ 1,380,000.00**

HEAPR MANUAL
Phase III & IV Main Campus Domestic Water Piping Replacement

Req. No.: 14

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$790,600	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$790,600	**Total**	

General Description of Existing Conditions and All Work

A large majority of domestic hot and cold water piping systems on the Main Campus were originally constructed with galvanized steel piping. These 40+-year old piping systems are showing signs of significant rust and deterioration resulting in leaks, breaks and poor drinking water quality. This project will replace the domestic hot and cold water piping systems (and fixtures) with copper piping or other code/MnState-approved, economically viable materials (such as stainless steel for larger pipe diameters).

Added 18% cost escalation to original 2014 estimate to mid-year 2020.

Project Title – Phase III & IV Main Campus Domestic Water Piping Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$790,600	**Phase III & IV Main Campus Domestic Water Piping Replacement**
$	
$	
$790,600	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Project will reduce the Main Campus FCI from 0.09 to 0.08.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Project Cost Estimate - TKDA

Main Campus Domestic Water Replacement	Labor & Material			
Description	**Quantity**	**Unit**	**Unit Cost**	**Total**
1966 Area Phase I				
Demolition				
Piping and Fixtures	86	EA	$ 500.00	$ 43,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	20	EA	$ 3,000.00	$ 60,000.00
Urinals and Water Clostets, Fixture and Piping	46	EA	$ 4,000.00	$ 184,000.00
Mech Room Piping (2 sets of W.H.'s in separate rooms)	2	EA	$ 10,000.00	$ 20,000.00
Mechanical Construction Subtotal				**$ 307,000**
Removal and reinstallation of ceilings	1	LS	$ 10,000.00	$ 10,000.00
Patching and Misc Repairs	1	LS	$ 20,000.00	$ 20,000.00
Construction Subtotal				**$ 317,000**
20% Undeveloped design cost				$ 31,700
25% Contractor OH&P and General Conditions				$ 79,250
2% Occupied Facility/Difficulty Factor				$ 6,340
Subtotal				**$ 434,290**
10% Owner's Contingency				$ 43,429
Construction Total				**$ 480,000**

Engineering, Cx, other Soft Costs 10%	$	48,000.00
TOTAL	**$**	**528,000.00**
Inflation to Midpt Construction 2014 7.5%	$	39,600.00
TOTAL PROJECT BUDGET	**$**	**570,000.00**

1968 Area Phase II				
Demolition				
Piping and Fixtures	14	EA	$ 500.00	$ 7,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	6	EA	$ 3,000.00	$ 18,000.00
Urinals and Water Clostets, Fixture and Piping	8	EA	$ 4,000.00	$ 32,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 67,000**
Removal and reinstallation of ceilings	1	LS	$ 2,500.00	$ 2,500.00
Patching and Misc Repairs	1	LS	$ 5,000.00	$ 5,000.00
Construction Subtotal				**$ 69,500**
20% Undeveloped design cost				$ 6,950
25% Contractor OH&P and General Conditions				$ 17,375
2% Occupied Facility/Difficulty Factor				$ 1,390
Subtotal				**$ 95,215**
10% Owner's Contingency				$ 9,522
Construction Total				**$ 110,000**

Engineering, Cx, other Soft Costs 10%	$	11,000.00
TOTAL	**$**	**121,000.00**
Inflation to Midpt Construction 2014 7.5%	$	9,075.00
TOTAL PROJECT BUDGET	**$**	**140,000.00**

Main Campus Domestic Water Replacement	Labor & Material			
Description	Quantity	Unit	Unit Cost	Total

1970 Area Phase III				
Demolition				
Piping and Fixtures	70	EA	$ 500.00	$ 35,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	30	EA	$ 3,000.00	$ 90,000.00
Urinals and Water Clostets, Fixture and Piping	40	EA	$ 4,000.00	$ 160,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 295,000**
Removal and reinstallation of ceilings	1	LS	$ 10,000.00	$ 10,000.00
Patching and Misc Repairs	1	LS	$ 20,000.00	$ 20,000.00
Construction Subtotal				**$ 305,000**
20% Undeveloped design cost				$ 30,500
25% Contractor OH&P and General Conditions				$ 76,250
2% Occupied Facility/Difficulty Factor				$ 6,100
Subtotal				**$ 417,850**
10% Owner's Contingency				$ 41,785
Construction Total				**$ 460,000**

Engineering, Cx, other Soft Costs 10%	$ 46,000.00
TOTAL	**$ 506,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 37,950.00
TOTAL PROJECT BUDGET	**$ 550,000.00**

1972 Area Phase IV				
Demolition				
Piping and Fixtures	14	EA	$ 500.00	$ 7,000.00
Replacement				
Lavs and Service Sinks, Fixture and Piping	10	EA	$ 3,000.00	$ 30,000.00
Urinals and Water Clostets, Fixture and Piping	4	EA	$ 4,000.00	$ 16,000.00
Mech Room Piping	1	EA	$ 10,000.00	$ 10,000.00
Mechanical Construction Subtotal				**$ 63,000**
Removal and reinstallation of ceilings	1	LS	$ 2,500.00	$ 2,500.00
Patching and Misc Repairs	1	LS	$ 5,000.00	$ 5,000.00
Construction Subtotal				**$ 65,500**
20% Undeveloped design cost				$ 6,550
25% Contractor OH&P and General Conditions				$ 16,375
2% Occupied Facility/Difficulty Factor				$ 1,310
Subtotal				**$ 89,735**
10% Owner's Contingency				$ 8,974
Construction Total				**$ 100,000**

Engineering, Cx, other Soft Costs 10%	$ 10,000.00
TOTAL	**$ 110,000.00**
Inflation to Midpt Construction 2014 7.5%	$ 8,250.00
TOTAL PROJECT BUDGET	**$ 120,000.00**
TOTAL ALL BUILDINGS	**$ 1,380,000.00**

HEAPR MANUAL
College Center Second Floor Toilet Room Renovations and Accessibility Upgrades

Req. No.: 15

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$300,000	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$300,000	**Total**	

General Description of Existing Conditions and All Work

The second floor Toilet Room is the final remaining Toilet Room in the College Center to be upgraded and will be renovated to match the first and third floors above and below.

Project Title – College Center Second Floor Toilet Room Renovations and Accessibility Upgrades

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description*)

$300,00 **Main Campus – College Center 2nd Floor Toilet Room Renovations**

$300,000

$

$300,000 Total

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Students, faculty and visitors with disabilities currently are not served adequately with toilet fixtures. To relieve the inequality within the confines of existing buildings, the addition of accessible unisex toilet rooms scattered throughout the building would help resolve these inequities with minimal impact. The Federal Americans with Disabilities Act is enforceable legally. To date the campus has not been sued for inequity, but it is a potential risk the campus is taking. In addition, the exclusion of potential students and faculty with mobility issues is considered discrimination and reduces potential revenue of the campus in serving this population. This item has not yet appeared on the Deferred Maintenance list, but would become a high priority if a complaint were filed.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

HEAPR MANUAL
Art Hall AHU Replacement & Heating System Conversion

Req. No.: 18

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$590,000	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$590,000	**Total**	

General Description of Existing Conditions and All Work

Art Hall is served by two air handling units. Air Handling Unit AH-1 is a constant volume, chilled water cooling and electric preheat unit located in the west mechanical room on the third floor and serves the west half of the building with four electric duct-mounted reheat coils. AH-2 is a constant volume, chilled water cooling and electric preheat unit located in the east mechanical room on the third floor and serves the east half of the building with four electric duct-mounted reheat coils. Both air handling units will be replaced with new VAV units with chilled water cooling and hot water heating coils. Duct-mounted electric reheat coils will be replaced with new VAV boxes with hot water reheat coils. New chilled water and hot water piping systems will be installed to serve the new AHUs and VAV boxes. All associated energy management systems will be upgraded to direct digital controls and integrated into the existing campus Building Automation System.

Added 18% cost escalation to original 2014 estimate to mid-year 2020.

Project Title - Hill Theatre and Art Hall Heating System Conversion

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$590,000	Art Hall AHU Replacement & Heating System Conversion
$	
$	
$590,000	Total

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 2013 Project Cost Estimate - TKDA

University Center Conversion	Labor & Material			
Description	**Quantity**	**Unit**	**Unit Cost**	**Total**
Art Hall Conversion				
Demolition				
Remove electrical duct coils	8	EA	$ 150.00	$ 1,200.00
Remove air handling units	2	EA	$ 890.00	$ 1,780.00
Remove misc. ductwork	1500	LBS	$ 1.36	$ 2,040.00
Branch Piping				
3"HS & 3"HR, sch. 40 blk stl	350	LF	$ 48.25	$ 16,887.50
1-1/2" thick fiberglass insulation w/ASJ	350	LF	$ 10.00	$ 3,500.00
2"HS & 2"HR, sch. 40 blk stl	400	LF	$ 29.60	$ 11,840.00
1-1/2" thick fiberglass insulation w/ASJ	400	LF	$ 9.00	$ 3,600.00
1"HS & 1"HR, sch. 40 blk stl	150	LF	$ 19.80	$ 2,970.00
1-1/2" thick fiberglass insulation w/ASJ	150	LF	$ 8.00	$ 1,200.00
Equipment				
Air handling unit w/chilled wtr cooling and hot water heating	2	EA	$ 25,000.00	$ 50,000.00
VAV box with hot water reheat coil	8	EA	$ 4,650.00	$ 37,200.00
Ductwork	1500	LBS	$ 9.27	$ 13,905.00
AHU controls	72	PTS	$ 800.00	$ 57,600.00
Mechanical Construction Subtotal				**$ 203,723**
Electrical Work (Assume 20% of Mechanical Subtotal)				$ 40,745
Removal and reinstallation of ceilings	8500	SF	$ 2.00	$ 17,000.00
Construction Subtotal				**$ 261,467**
10% Undeveloped design cost				$ 26,147
25% Contractor OH&P and General Conditions				$ 65,367
2% Occupied Facility/Difficulty Factor				$ 5,229
Subtotal				**$ 358,210**
Inflation cost (7.5% - Assumes mid 2014 Construction)				$ 26,866
Subtotal				**$ 385,076**
10% Owner's Contingency				$ 38,508
Total Budget				**$ 430,000**

Engineering, Cx, other Soft Costs 15% $ 64,500.00

TOTAL PROJECT BUDGET $ 500,000.00

HEAPR MANUAL

College Center AHU & Heating System Conversion

Req. No.: 19

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$1,746,000	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,746,000	**Total**	

General Description of Existing Conditions and All Work

Air-handling Units CC-1 and CC-2 (CC-2 is not currently used) are located in the first floor mechanical room and serve the first floor with 10 electric duct-mounted reheat coils. Units CC-3 and CC-4 are located in the second floor mechanical room and serve the second and third floors with 11 electric duct-mounted reheat coils. Units CC-5 and CC-6 are located in the fourth floor mechanical room and serve the fourth floor with 9 electric duct-mounted reheat coils.

All air handling units are constant volume with electric preheat coils and chilled water cooling coils. There are seven electric cabinet unit heaters on the second and third floors. All air handling units will be replaced with new Variable Air Volume (VAV) units with hot water heating and chilled water cooling coils. Electric reheat coils will be replaced with new VAV boxes with hot water reheat coils. New hot water distribution piping systems will be installed to serve the new AHUs and VAVs. Existing chilled water piping systems will be re-used to serve the new AHUs. All associated energy management systems will be upgraded to direct digital controls and integrated into the existing campus Building Automation System.

Added 18% cost escalation to original 2014 estimate to mid-year 2020.

Project Title - College Center Heating System Conversion

Priority Project(s) and General Work Description: *(Provide estimated construction costs for specific priority project with general description)*

$1,746,000	**College Center Heating System Conversion**
$	
$	
$1,746,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 2013 Project Cost Estimate - TKDA

University Center Conversion	Labor & Material			
Description	**Quantity**	**Unit**	**Unit Cost**	**Total**
College Center Conversion				
Demolition				
Remove electrical duct coils	30	EA	$ 150.00	$ 4,500.00
Remove first floor air handling units	2	EA	$ 890.00	$ 1,780.00
Remove second and third floor air handling units	4	EA	$ 890.00	$ 3,560.00
Remove misc. ductwork	6000	LBS	$ 1.36	$ 8,160.00
Branch Piping				
4"HS & 4"HR, sch. 40 blk stl	400	LF	$ 57.60	$ 23,040.00
1-1/2" thick fiberglass insulation w/ASJ	400	LF	$ 12.00	$ 4,800.00
3"HS & 3"HR, sch. 40 blk stl	100	LF	$ 48.25	$ 4,825.00
1-1/2" thick fiberglass insulation w/ASJ	100	LF	$ 10.00	$ 1,000.00
2-1/2"HS & 2-1/2"HR, sch. 40 blk stl	800	LF	$ 39.75	$ 31,800.00
1-1/2" thick fiberglass insulation w/ASJ	800	LF	$ 10.00	$ 8,000.00
2"HS & 2"HR, sch. 40 blk stl	400	LF	$ 29.60	$ 11,840.00
1-1/2" thick fiberglass insulation w/ASJ	400	LF	$ 9.00	$ 3,600.00
1"HS & 1"HR, sch. 40 blk stl	400	LF	$ 19.80	$ 7,920.00
1-1/2" thick fiberglass insulation w/ASJ	400	LF	$ 8.00	$ 3,200.00
Equipment				
First Floor Air handling unit w/chilled wtr cooling and hot water heating	2	EA	$ 25,000.00	$ 50,000.00
Second Floor Air handling unit w/chilled wtr cooling and hot water heating	2	EA	$ 25,000.00	$ 50,000.00
Fourth Floor Air handling unit w/chilled wtr cooling and hot water heating	2	EA	$ 25,000.00	$ 50,000.00
VAV box with hot water reheat coil	30	EA	$ 4,650.00	$ 139,500.00
Ductwork	6000	LBS	$ 9.27	$ 55,620.00
AHU controls	200	PTS	$ 800.00	$ 160,000.00
Mechanical Construction Subtotal				**$ 623,145**
Electrical Work (Assume 20% of Mechanical Subtotal)				$ 124,629
Removal and reinstallation of ceilings	20000	SF	$ 2.00	$ 40,000.00
Construction Subtotal				**$ 787,774**
10% Undeveloped design cost				$ 78,777
25% Contractor OH&P and General Conditions				$ 196,944
2% Occupied Facility/Difficulty Factor				$ 15,755
Subtotal				**$ 1,079,250**
Inflation cost (7.5% - Assumes mid 2014 Construction)				$ 80,944
Subtotal				**$ 1,160,194**
10% Owner's Contingency				$ 116,019
Total Budget				**$ 1,280,000**

Engineering, Cx, other Soft Costs 15% $ 192,000.00

TOTAL PROJECT BUDGET $ 1,480,000.00

HEAPR MANUAL
East Hall Entrance Vestibule Remodel and Addition

Req. No.: 21

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Main Campus Building	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$320,000	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$0	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$320,000	**Total**	

General Description of Existing Conditions and All Work

Existing vestibule area functions as a dual-purpose entrance air-lock and holding/waiting area for students and faculty. Current footprint is inadequate for number of occupants, particularly in winter, waiting for transportation and the predominantly all glass envelope is in need of replacement. Minor expansion of footprint area and modified envelope is desirable to improve function and energy performance. Project would add approximately 400 sq. ft. addition and related upgrades.

Project Title –East Hall Entrance Vestibule Remodel and Addition

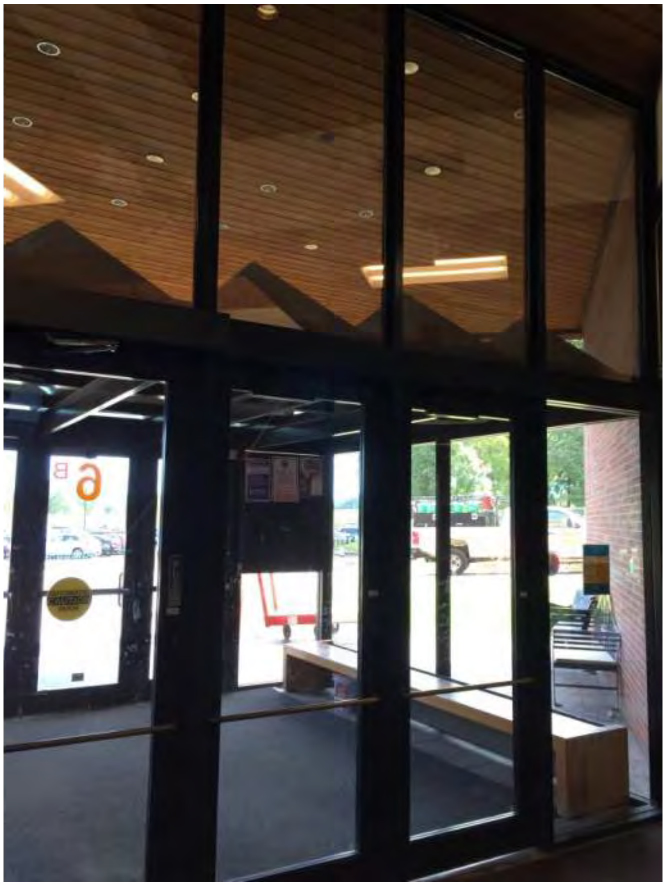
Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$320,000	**East Hall Entrance Vestibule Remodel and Addition**
$	
$	
$320,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Color Photos

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SPORTS FACILITIES

HEAPR MANUAL
Sports Facilities – Rochester Regional Sports Center Water Heater Replacement

Req. No.: 07

Date: December 2020

Institution	Rochester Community and Technical College
Campus/Building	Rochester Regional Sports Center
Project Location	Rochester, MN

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

Cost	Classification	Description
$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$225,000	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$225,000	**Total**	

General Description of Existing Conditions and All Work

The Recreation and Sports Center is served domestic hot water by two A.O. Smith natural gas-fired water heaters rated at approximately 1,000,000 Btu/hr input. These units were installed with the original building. According to reports from Facilities/Maintenance staff and DMC Plumbing & Heating, these units are oversized for their application resulting in stagnant brown water discharge with a bad smelling odor when the building heating load is low. DMC Plumbing & Heating has performed several maintenance projects on the systems, but the problems persist.

This project will replace the natural gas-fired water heaters with new systems producing domestic hot water from the steam served to the building by the Olmsted County Waste-to-Energy Facility. The new systems will be water-to-water heat exchangers connected to the boiler header pipe, allowing hot water production from either the steam-to-hot water heat exchanger or the existing gas-fired boilers in the event of a shutdown of steam service.

Added 18% cost escalation to original 2014 estimate to mid-year 2020.

Project Title – Sports Facilities – Rochester Regional Sports Center Water Heater Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

Cost	Project
$225,000	**Sports Facilities – Rochester Regional Sports Center Water Heater Replacement**
$	
$	
$225,000	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

This project will increase the FCI of the Sports Center to 0.01.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Water Heater Color Photos

2 Cost Estimate - TKDA


A.O.Smith

UCR Domestic Water Heater Replacement	Labor & Material			
Description	Quantity	Unit	Unit Cost	Total
Demolition				
Water Heaters and Associated Systems	2	EA	$ 1,000.00	$ 2,000.00
New				
Water-to-water heat exchangers	2	EA	$ 30,000.00	$ 60,000.00
Storage tank	1	LS	$ 15,000.00	$ 15,000.00
Piping, supports, valves and insulation	1	LS	$ 5,000.00	$ 5,000.00
Mechanical Construction Subtotal				**$ 82,000**
Electrical	1	LS	$ 5,000.00	$ 5,000.00
Instrumentation and Controls	1	LS	$ 10,000.00	$ 10,000.00
Construction Subtotal				**$ 97,000**
20% Undeveloped design cost				$ 9,700
25% Contractor OH&P and General Conditions				$ 24,250
2% Occupied Facility/Difficulty Factor				$ 1,940
Subtotal				**$ 132,890**
10% Owner's Contingency				$ 13,289
Construction Total				**$ 150,000**

Engineering, Cx, other Soft Costs 15%	$	22,500.00
TOTAL	**$**	**172,500.00**
Inflation to Midpt Construction 2014 7.5%	$	12,937.50
TOTAL PROJECT BUDGET	**$**	**190,000.00**

HEAPR MANUAL
Rochester Regional Sports Center Fieldhouse Floor Replacement

Req. No.: 17

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Sports Facilities	
Project Location	Rochester, MN	

General Classification of All Work: *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$456,900	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$456,900	**Total**	

General Description of Existing Conditions and All Work

Sports floor is, chipping, stained with acid spots, and in need of major repair. Replicate track, striping, and existing markings to continue to use the building for current functions. Rather than textured floor surface, the users prefer a smoother finish, similar to St. Cloud State. Entire surface will need to be removed, leveled and reinstalled. Current floor-mounted equipment will need to be removed, salvaged, stored, and reinstalled in the same locations.

Project Title - Sports Facilities Rochester Regional Sports Center Fieldhouse Floor Replacement

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

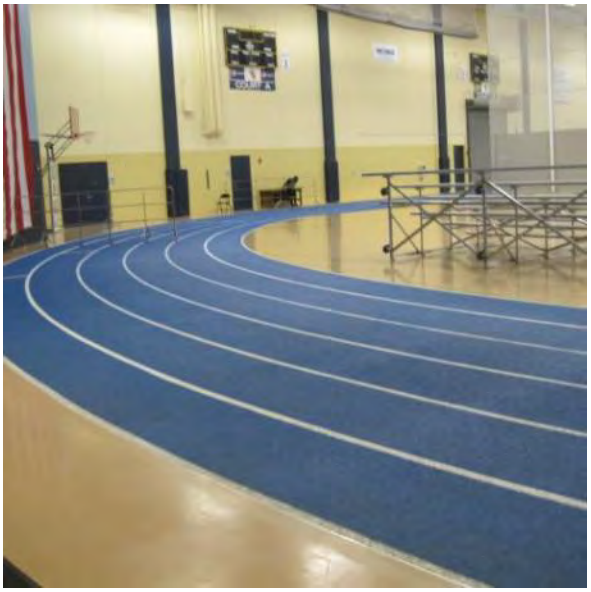
$456,900	**Sports Facilities – Replace Rochester Regional Sports Center Fieldhouse Floor**
$	
$	
$456,900	**Total**

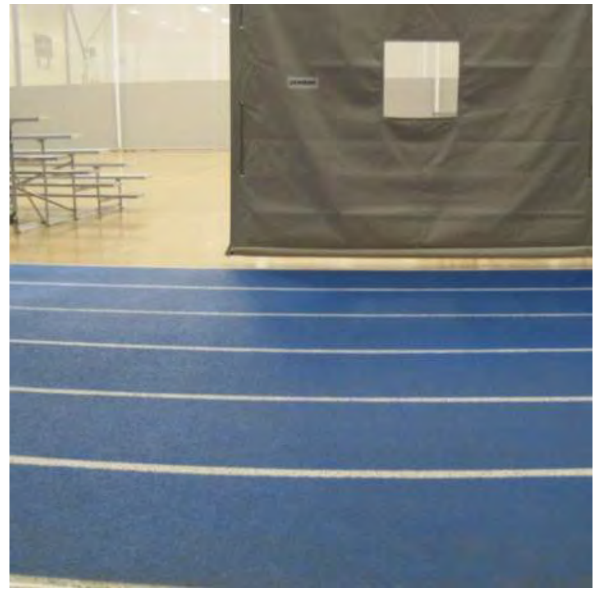
Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

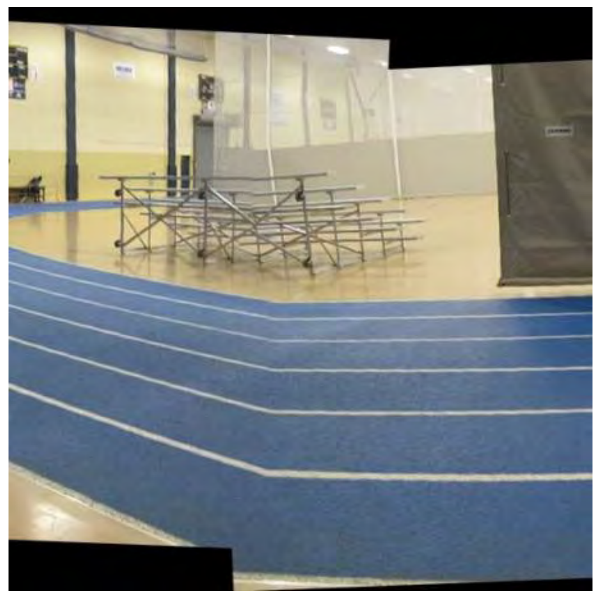
Flooring failure has impact on students and the community being able to use part or the entire space. Potential for tripping hazard and injury. In order to maintain usage of space for competitive sports, it is critical the floor be in good shape and not lead to potential career-ending injury.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Color Photos







HEAPR MANUAL

Phase III Central Chiller Plant Upgrades & Extension to Rochester Regional Sports Center

Req. No.: 20

Date: December 2020

Institution	Rochester Community and Technical College
Campus/Building	Sports Facilities
Project Location	Rochester, MN

General Classification of All Work *(Provide est. construction costs by "classification of work")*

Cost	Classification	Description
$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$1,382,600	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,382,600	**Total**	

General Description of Existing Conditions and All Work

Phase III of the project includes expansion of the Central Chiller Plant system capacity. Work includes a new 500 ton chiller and cooling tower; pumps; and buried distribution legs to the Rochester Regional Sports Center and related interior piping work.

Original 2012 Study estimate for Phase 3 increased 24% to mid-year 2020.

Project Title – Phase III Central Chilled Plant Upgrades and System Extension to Rochester Regional Sports Center

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,382,600	
$	
$	
$1,382,600	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Will reduce the Campus FCI from 0.09 to 0.03.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1. 2012 Draft Chilled Water Study - Stanley Consultants, Inc.
2. Cost Information | Appendix D of Study - Stanley Consultants, Inc.

Chilled Water Study

Rochester Community and Technical College
Rochester, Minnesota

Draft
December 17, 2012

Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Chilled Water Study

Rochester Community and Technical College
Rochester, Minnesota

Draft
December 17, 2012

I hereby certify that this plan, specification, or report was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: ______________________ Typed or Printed Name: ______________________

Date: ______________________ Reg. No.: ______________________

Stanley Consultants INC.
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Engineering, Environmental and Construction Services - Worldwide

Executive Summary

WILL BE PROVIDED WITH FINAL SUBMITTAL

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Section 1

Introduction

Introduction

Rochester Community and Technical College (RCTC) has requested Stanley Consultants, Inc. to perform a study of the chilled water systems at the main campus. Some of these systems are nearing the end of their useful life and will need to be replaced soon. The following is a list of the existing chillers serving the main campus that would be consolidated into a central chilled water plant. The list is also summarized in the appendices with the model numbers and GPMs.

Existing Conditions

The existing conditions of the chilled water systems were documented during site visits to the college in 2008 and 2012. The existing chillers range in age from 1967 to 2006. A summary of the existing chillers is included in Appendix A.

Main Building – West

The West portion of the main building (Coffman Hall, Endicott Hall, Singley Hall Goddard Library, and Memorial Hall) is served by a 200- ton Trane water cooled Centrifugal chiller located in Room CF 133. This unit cools the majority of the spaces on the west side of the main campus. These spaces include classrooms, labs, and admin spaces. The pumps are constant volume and all the valves in the system are 3-way valves. The chiller is rated at 0.862 kW/Ton with a 56 degree F entering water temperature and a 44 degree F leaving water temperature. The chiller was installed in 1967 and uses R-11 refrigerant. The cooling tower is located outside on grade to the southwest of the building. The cooling tower is a Marley Model # AV 245132 A1. Per the 2011 ASHRAE Handbook HVAC Applications Chapter 37 Table 4 (Included in Appendix A) The estimated service life for a centrifugal chiller is approximately 25 years, and the estimated service life of a cooling tower is approximately 20 years. Based on these values this chiller and cooling tower have exceeded their recommended service life.

Main Building – East

The East portion of the main building (College Center, Student Services, Art Hall, and Plaza Hall) is served by a 125-ton Carrier water cooled Centrifugal chiller located in Room CC 105. This unit cools the majority of the spaces on the east side of the main campus including classrooms, labs, and admin spaces. The pumps are constant volume and all the valves in the system are 3-way valves. The cooling tower is located to the southeast of the building. The cooling tower is a Baltimore Aircoil Company Model # 15227. The chiller was installed in 1970 and uses R-11 refrigerant. Based on the estimated service life values from ASHRAE this chiller and cooling tower have exceeded their recommended service life.

Hill Theater

Hill Theater is served by three direct expansion (DX) Carrier air-cooled units. These units were installed in 1971, total 82.5 tons, and use R-22 refrigerant. These units are located on the north side of the building, are enclosed by a fence, and serve the theater area and supporting offices. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units is approximately 20 years. Based on this value these units have passed their expected service life. These units could be retrofitted with chilled water coils and added to the proposed chilled water system.

East Hall (Winona State University Addition)

East Hall is served by a 93-ton McQuay air-cooled chiller located outside of the east side of the main building. This unit cools classrooms, labs, and admin spaces. This chiller was installed in 1986 and uses R-22 refrigerant. The chiller is rated at 1.25 KW/ton. It has constant speed distribution pumps and the system has all 3-way valves. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units (Similar to an air cooled chiller) is approximately 20 years. Based on the estimated service life values from ASHRAE this chiller has exceeded its recommended service life.

Singley Hall

The second floor of Coffman Hall (CF) is served by a 20-ton McQuay air-cooled chiller located on the roof of Singley Hall. This unit cools classrooms and offices. This chiller was installed in 1989 and uses R-22 refrigerant. Per Table 4 of 2011 ASHRAE Handbook HVAC Applications Chapter 37 the estimated service life for air cooled condensing units (Similar to an air cooled chiller) is approximately 20 years. Based on the estimated service life values from ASHRAE this chiller has exceeded its recommended service life.

Science and Technology

Science and Technology is served by two York water cooled screw chillers located in Mechanical Room ST 006. These units are 206 tons each and serve the ITV, classroom, offices, and computer labs in this building. The cooling towers are located on the roof. The distribution pumps are 20 HP with 80 feet of head, constant volume and there are 3-way valves in the system. These chillers were installed in 1992 and are using R-22 refrigerant. These chillers have not yet meet their expected service life, but will need to be replaced in the near future. Although these units do not need to be replaced at this time, their capacity will be included in the size of the proposed chiller plant so the loads they serve can be connected in the future when replacement is needed.

Sports Complex

Two Carrier air-cooled chillers are located outside of the Sports Complex. These units were installed in 2000. Each unit is 240 tons and both units serve the entire Sports Complex consisting of a gym, workout areas, and offices. These units have an entering water temperature of 54 degrees F and a leaving water temperature of 44 degrees F. There are two pumps that each are 25 HP with 60 feet of head and have a variable frequency drive (VFD) and there are 2-way and 3-way valves in the system. Based on ASHRAE Data These chillers will pass their expected service life in 2026. Although the chillers have 14 years of expected service and are a great distance from the main campus, they will be included in the proposed chilled water plant, due to current and ongoing compressor failures.

Health Sciences

There is a York water cooled screw chiller located in Mechanical Room ST 006. This unit is 34 tons and serves the entire Heath Science addition, including office, classroom, and lab space. The cooling tower is located on the roof and the pump has a VFD with 2-way and 3-way valves in the system. This chiller was installed in 2006 and uses R-22 refrigerant. This chiller will pass its expected service life in 2029. Although this chiller should perform adequately and will not need to be replaced, it will be included in the overall size of the central chilled water plant to allow for this area of campus to be connected in the future.

Electrical

The College currently has a project that is funded and currently under contract to redo the existing campus medium voltage distribution. This study will be prepared as if this work is complete. The work is expected to be complete in June of 2013.

The main campus is served by Rochester Public Utilities (RPU) via an overhead 13.8kV line routed along the south side of the main campus building. The overhead RPU line has two 13.8kV electrical service connections. One is located outside of College Center and the second is located outside of Coffman Hall directly next to Memorial Hall. The medium voltage service is looped between these two electrical utility connections with specific building services coming from this loop. See Drawing E1 in Appendix F for the existing 13.8kV distribution one-line drawing.

The existing chillers throughout the UCR are service locally by the nearest building service. Chillers are currently served by the Coffman electrical service, College Center electrical service, Science & Technology electrical service in the main building. The chillers at the Sports Center are served by its electrical service.

Load Analysis

Existing Loads

Existing drawings and site data was reviewed to determine the existing building loads that would be served by the proposed chilled water system. The chiller located in Coffman hall serves what is considered the Main-Building West (Coffman hall, Endicott Hall, Singley Hall Goddard Library, and Memorial Hall). The chiller located in College Center basement serves what is considered the Main building East (College Center, Student Services, Art Hall, and Plaza Hall) Table 1-1 summaries the chilled water loads by each area of the building.

Table 1-1 Existing Chilled Water Loads

Area	Tons
Main Building -West	200
Main Building -East	125
Hill Theater	83
East Hall (WSU)	93
Coffman Hall (2nd Floor)	20
Science and Technology	412
Sports complex	480
Health Sciences	34
Total	1447

Source: Stanley Consultants

Future Loads

The Master plan for the college includes planning in the long term for additional academic spaces. The present master plan indicates these buildings would be located between the UCR and the Regional Sports Center. There are also plans for renovations of some of the existing spaces in the UCR. At the time of this study the requirements for these remodels and additions have not been finalized and will not be included in the loads for the initial plant sizing. Provisions will be made in sizing of piping and equipment to allow for future expansion of the central plant to accommodate these additions.

Distribution System Temperature Difference (ΔT)

The existing chillers operate at a ΔT of between 10°F and 15°F with an average of around 12°F. Most of the systems appear to be sized for 42–44°F chilled water temperature. The proposed chilled water plant will be based on a design condition of 42°F chilled water supply temperature and a 12°F ΔT.

Section 2

Chilled Water System Considerations

General

This section describes some of the available technologies and strategies that could be used as part of the central plant. It also discusses common items to all of the study options.

Available Chiller Technologies

Several different types of chiller technologies are reviewed in this study. The following section gives a brief description of each type of technology and lists pros and cons for each.

Absorption Chillers

Absorption chillers utilize an absorber and generator in place of a compressor to produce chilled water. In the absorber high temperature, low pressure saturated refrigerant (usually water) combines with a liquid absorbent (typically a lithium bromide solution). This liquid mixture is then pumped to a generator where thermal energy (steam in this case) is used to heat the mixture and vaporize the refrigerant. The refrigerant vapor is than directed to the condenser where is cooled and condensed. Once cooled, the refrigerant vapor is passed through an orifice to reduce the pressure. This pressure reduction flashes some of the refrigerant and cools the remaining refrigerant to the temperature corresponding to the evaporator pressure. In the evaporator, the liquid refrigerant is boiled off by the chilled water return and becomes a gas. The refrigerant gas is directed to the absorber and the process begins again.

Absorption chillers can be either single effect or double effect. Double effect machines utilize two generators and are typically more efficient, but require a higher pressure steam than single effect machines. Efficiency for absorption chillers is listed as coefficient of performance (COP). Coefficient of performance is defined as the cooling load in BTU/hr divided by the energy input In BTU/Hr. Efficiency for an absorption chiller is relatively constant regardless of load or condenser water temperature.

In addition to the steam required to generate cooling, the electrical requirements for the condenser pumps and cooling towers is higher for absorption chillers as the condenser water flow is higher. This cost does not include the cost of treatment chemicals and make up water in generating steam.

- **Pros:**
  - Can utilize steam as energy source.
  - Low noise levels.
  - Fewer rotating parts within chiller.
- **Cons:**
  - Leaving water temperature limited to 42 F.
  - Larger physical size than other types of chillers.
  - Lower efficiency than Centrifugal machines.
  - Higher capital cost.
  - Higher operating cost.
  - Larger cooling tower required.
  - More maintenance required to ensure proper cooling fluid chemistry in system.

Centrifugal Chillers

Centrifugal chillers utilize a centrifugal compressor driven by an electric motor to produce chilled water. The compressor compresses refrigerant vapor and directs it to the condenser where it is cooled and condensed into a liquid. A metering device reduces the pressure of the refrigerant and in the process reduces the temperature. The Refrigerant is converted from a liquid to a gas in the evaporator and the process begins again. Efficiency for centrifugal chillers is typically listed in kw/ton. The efficiency changes based on load and condenser water temperature.

- **Pros:**
  - Lower operating cost.
  - Lower capital cost.
  - Can provide chilled water down to 39 F leaving water temperature.
  - Potentially lower maintenance costs.
  - May have smaller footprint.
  - Smaller cooling tower.
  - Smaller condenser pumps.

- **Cons:**
  - Does not use steam as energy source.
  - High noise levels.

Magnetic Bearing Centrifugal Chillers.

Magnetic bearing centrifugal chillers are similar to traditional centrifugal chillers with two main differences. The first difference is the unit does not use traditional bearings, but uses magnetic levitation technology for the compressor rotating components. This improves chiller efficiency slightly. The second difference is the unit includes a variable frequency drive for the compressor. This enables the much better efficiency at part loads compared to a traditional chiller. The full load efficiency is roughly the same as for a traditional centrifugal chiller.

- **Pros:**
  - Better part load efficiency than other types of chillers.
  - Less noise than traditional centrifugal.
  - Small footprint.
  - Potentially lower maintenance costs.
  - Lower operating costs.
  - Can provide chilled water down to 39 F leaving water temperature.
  - Small cooling tower.
- **Cons:**
  - Does not use steam as energy source.
  - Higher capital cost than traditional centrifugal.
  - Electrical power quality important.

Additional Plant Enhancements

Central plant performance can be enhanced by addition of thermal storage and free cooling systems. These systems are described in detail below.

Thermal Storage

Thermal storage is the storage of chilled water or ice to act as a chiller. The main goal of thermal storage is to offset either demand energy costs or potentially capital costs for a new chiller. Thermal storage is operated in three basic modes; Load leveling, and load shifting.

In Load leveling operation the storage tank acts as a chiller during the peak portion of the day to offset the capital cost of installing chillers. To accomplish this chillers typically operate at full capacity all day. When load exceeds chiller capacity thermal energy system discharges, when the load is below the chiller capacity the thermal energy system is recharged. This mode of operation minimizes chiller capacity and thermal system size.

In load shifting the entire on peak cooling load is handled by the thermal storage system. Chillers operate at off peak conditions to charge the system. This mode of operation has the highest chiller costs and thermal storage costs.

In demand limiting operation the thermal storage system is used to reduce the demand energy costs of operating chillers during the peak chilled water load. To accomplish this chillers are operated at off peak times to charge the thermal storage tank and then during the on-peak times the chillers are operated at reduced load and the thermal storage tank is discharged. Demand savings and equipment costs are higher than load leveling, and lower than load shifting.

Two types of systems exist: sensible change systems and phase change systems. Sensible change systems utilize water as the storage fluid, where phase change systems storage energy in ice.

Sensible Change Systems. Sensible change systems are classified as into two types of systems Stratified chilled water storage systems and density depressed chilled water storage systems. Both systems consist of a large tank to store water. The stratified system uses only chilled water and relies a thermocline between the hot chilled water return and cool chilled water supply of the hot and cold liquid to separate the water available for the cooling load from the water that needs to be cooled. Density depressed systems are similar but use an additive to the chilled water to allow the water to be stored below the freezing point.

- **Pros:**
  - Uses standard chillers.
  - Efficient operation of chillers.
  - Economical for most system especially larger systems.
  - Reliable and simple.
- **Cons:**
  - Low energy density.
  - Potential space constraints.
  - Most economical (smaller tank size) at high system temperature difference.

Phase Change Systems. Phase change systems use ice as the thermal storage medium. Ice storage systems require chillers to operate using glycol as the chilled water temperature needed to produce ice is below the freezing point of water. Different types of ice systems are available both all the systems have similar operation and efficiencies

- **Pros:**
  - Capable of high discharge rate.
  - Separate production and storage.
  - Allows for cold air distribution.
- **Cons:**
  - Complex system.
  - High chiller cost.
  - Chiller efficiency is reduced to create cooler charging temperature.
  - Requires glycol in chilled water loop or dedicated chiller.

Free Cooling

Free cooling is the use of a heat exchanger on the chilled water system to make cooled water directly from condenser water without the use of mechanical refrigeration. Typically used in cold weather climates where internal cooling loads exist year round. This allows for relative low cost production of chilled water when the cooling tower can produce low temperature water. If installed in series with the chillers can be used to precool the chilled water and reduce the load on the chiller.

Heat Transfer Fluid

The heat transfer fluid for central chilled water plants is the fluid that is distributed throughout the distribution system to the end users. Typically, this fluid consists of either treated water or a glycol solution.

Treated Water. Treated water, consisting of water from the local water utility with rust, microbial, and scale inhibitors is commonly used as the heat transfer medium in central plants. Treated water is less costly than glycol systems and has a specific heat of 1 btu/lb-°F. The disadvantage of treated water is the freezing point of water is above the ambient temperatures expected to be seen during the winter months. To protect coils from freezing, additional controls (face and bypass dampers, coil pump, heat exchanger to glycol fluid, etc.) are required. Freezing is typically not an issue in the distribution system or the chiller at the central plant.

Glycol Solution. Glycol solutions consisting of either a 40–50% glycol and water mixture is used as the heat transfer medium in central plants. Glycol solutions are more costly than treated water. The specific heat of glycol solutions range from 0.80 btu/lb-°F–0.93 btu/lb-°F. This lower specific heat requires larger heat transfer areas at coils and at chillers. Glycol solutions typically do not need any special controls or provisions to prevent freezing as the percentages are selected to prevent freezing. Glycol solutions have freezing points ranging from -8°F to -29°F.

Energy Savings

There are multiple ways that energy will be saved by the implementation of the proposed chilled water plant. One will be from the installation of higher efficiency equipment versus the lower efficiency older equipment currently is use. Another will be from the optimization of the chillers. This will occur because the chiller use will be able to better match the current load; and therefore, will get a better difference in supply and return chilled water temperature. There will also be less energy used by the pumps because they will have VFDs and there will be 2-way valves in the system. This will reduce the amount of required pumping power during non-peak time periods.

Climate Commitment

Through our work with other higher education clients, we have become familiar with the American College and University Presidents Climate Commitment. We understand RCTC's President, Donald Supalla, has signed on to this commitment. This commitment means that RCTC will be developing short-term and long-term action items in an effort to make the campus more climate neutral. Therefore, the motivation to act on a project such as a central chilled water plant has probably never been greater. A central chilled water plant will reduce RCTC's greenhouse gas emissions on several levels: reduction in the type and quantity of refrigerants on campus (prevent/minimize leakages); elimination of ozone depleting HCFC refrigerants on campus (R-11 has been phased out and R-22 also will be phased out of production by 2030); and a significant reduction in electrical energy usage (purchased power from RPU's primarily coal-fired plant).

Section 3

Study Options

General

The majority of the chilled water system equipment serving the Main Campus building has surpassed the expected service life. Other equipment is nearing the end or the service life or is experiencing maintenance issue. In the near future RCTC will be required to replace components of four chilled water systems and three DX systems. This study investigates adding a single central plant to campus in lieu of replacing individual equipment.

Planning Criteria

To develop the study options several items were discussed with RCTC staff and the following planning criteria were identified.

- Sufficient chilled water capacity shall be provided to serve the entire UCR building and the Sports Complex. Total plant capacity after completion will be 1500 tons.
- The plant will be completed in three phases. Each phase will install a nominal 500-ton chiller and associated equipment. The phases are based on age of installed equipment and replacing the oldest equipment as part of phase 1. The phase 1 chiller may operate above its rated conditions for short periods of time as the chillers identified in phase 1 total 546 tons. The phases will include the following :
  - Phase 1 will replace the chillers located in Main Hall East, Main Hall West, East Hall, and Singley Hall. Hill Theater DX equipment will be replaced as part of phase 1 and connected to the chilled water system. This phase will include the chiller building and chiller building piping and valves for phase 2 and phase3.
  - Phase 2 will replace the chillers located in Science and Technology
  - Phase 3 will replace the chillers at the Sports Complex.

- The plant location will be to the southeast of the UCR building. In the spot presently occupied by the storage garages
- Plant will include space for storage for campus building maintenance and work area for maintenance staff.
- The existing DX equipment serving Hill Theater will be replaced with chilled water systems. Costs for this replacement are included in the distribution system costs.
- At locations of existing chillers and pumps existing pump will be replaced and a decoupler loop added to install a primary secondary chilled water system. Coils served by new building pumps will have 3-way valves replaced with 2-way valves. Secondary chilled water pumps serving building coils will be provided with VFDs.

Chilled Water Plant Options

Option 1 – Constant Speed Centrifugal Chiller

Option 1 consists of creating a new chilled water plant to serve the UCR, and Sports Center. This plant will utilize traditional constant speed, water-cooled, centrifugal compressor, electric chillers with primary pumps located at the central plant. Cooling towers will be on grade adjacent to the plant building.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.
- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 30 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase.

Option 2 – Magnetic Bearing Variable Speed Centrifugal Chiller

Option 2 is the same as option 1, but utilizes magnetic bearing centrifugal compressor, electrical chillers with variable speed drives.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.

- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower(Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 40 Hp cooling tower will be added as part of this phase.

Option 3 – Double Effect Steam Absorption Chiller

Option 3 consists of a single chilled water plant to serve the UCR and Sports Center. This plant will utilize absorption chillers with primary pumps located in the central plant. Steam from the "Green Pipes" project will be utilized as an energy source for the absorption chillers. Cooling towers will be on grade adjacent to the plant building.

- Phase 1 will include installation of a 500-ton chiller and installation of distribution systems to Main Building East, Main Building West, East Hall, Singley Hall, and Hill Theater. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added. In addition this phase will include the construction of the central plant building and electrical and piping infrastructure for the full plant build-out.
- Phase 2 will include installation of a 500-ton chiller and installation of distribution systems to Science and Technology and Health Science. A 60 horsepower(Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added as part of this phase
- Phase 3 will include installation of a 500-ton chiller and installation of distribution systems to the sports complex. A 60 horsepower (Hp) distribution pump, 40 Hp condenser water pump and 50 Hp cooling tower will be added as part of this phase.

Distribution System Options

Two options are available for connecting the proposed chilled water plant to the existing loads. Options are evaluated on a capital cost basis only and are not included in the economic analysis for the proposed central plant.

Option A – Interior Distribution System

This option routes the majority of the distribution system through the existing building. Piping will be routed from the proposed central plant to the College Center Mechanical room (CC105) via direct buried piping. From this point the distribution system will be routed throughout the building to connect to the existing loads. To serve the sports complex direct buried piping will be routed from the Science and Technology Addition.

Option B – Exterior Distribution System

This option routes the majority of the distribution system outside the building in a direct buried piping system.

Costs are included in both options to upgrade control valves (replace 3 way valves with 2 way valves) replace building pumps, and to replace the existing DX equipment serving the Hill Theater.

Electrical Service to the New Chiller Plant

Regardless of the Option above, the new chiller plant will require a separate RPU electrical service transformer and service meter. Because RCTC has gone forward with changing the campus electrical distribution system to a 'loop' arrangement, the new chiller plant can be added to the existing distribution loop without any power disruption to other facilities.

The nearest RPU owned junction cabinet does not have a spare circuit connection available and therefore a new junction cabinet will be required to serve the new chiller plant transformer. During construction, the College will be required to install all medium voltage conduits, transformer pad, and prepare the junction cabinet base. RPU typically provides the medium voltage conductors, terminations, junction cabinet, and transformer.

The transformer will be an outdoor, pad-mount, oil-filled transformer provided by RPU. The expected transformer size will likely be between 1000kVA and 1500kVA and should be determined based on the actual design loads once this project progresses to that stage. If the absorber chiller option is chosen, the transformer and service size will be much smaller. See Drawing E2 in Appendix F for electrical service connection to the new chiller plant. The photos below represent a typical RPU junction cabinet and transformer that will be located outside the chiller plant.

Typical RPU Junction Cabinet

Figure 3-1

Typical RPU Transformer
Figure 3-2

The RPU transformer will serve a new building switchboard. The switchboard will contain a main service breaker along with breakers for each chiller and building panelboards. The main electrical gear will be located along dedicated wall space in the chiller equipment room for the purposes of this study. All proposed new chiller plant equipment, including chillers, cooling towers, thermal storage, and the garage spaces will be served from this new service. The existing switchboard should be provided with an electrical power meter that has a communication protocol to speak with the building automation system. The switchboard should also have a transient voltage surge protection device. The photo below represents a typical building electrical service switchboard that would be located in the chiller plant.

Typical Building Switchboard
Figure 3-3

Section 4

Cost Estimates and Life Cycle Cost Analysis

Opinions of Probable Construction Cost Estimate

Probable construction cost estimates were developed for a conceptual level with equipment vendor quotes used for chillers and cooling towers and industry data used for other costs. As these estimates are conceptual in nature 30% was added to each cost for undeveloped design details. Contractor overhead was included as 15% and Contractor Profit were included as 10%. The costs also include 15% to cover administration and engineering costs.

The costs estimates are based on Current costs at the time of the study. The cost estimates are conceptual in nature and based on the information available at the time of the estimate without a complete detailed design and equipment selections. The final costs will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, project schedule and other variable factors. Therefore the final project costs may vary somewhat from the estimates presented.

Table 4-1 shows the summary of opinion of probable construction costs for the three central plant options included in this study. Copies of the opinion of probable cost estimates are included in Appendix D. This table shows the costs associated for each option. Each option is divided into three phases and shows costs for each phase and the total for all three phases. All costs are based on 2012 dollars.

Table 4-1 Summary of Opinion of Probable Costs Central Plant

Option	Phase 1	Phase 2	Phase 3	Total
Option 1 – Constant Speed Centrifugal Chillers	$6,810,000	$600,000	$600,000	$8,010,000
Option 2 – Magnetic Bearing Centrifugal Chillers	$6,920,000	$710,000	$71,000	$8,340,000
Option 3 – Double Effect Steam Absorption Chillers	$7,800,000	$1,030,000	$1,030,000	$9,860,000

Source: Stanley Consultants 2012

Table 4-2 shows the summary of opinion of probable construction costs for the two distribution options that are included in this study.

Table 4-2 Summary of Opinion of Probable Costs Distribution System

Option	Phase 1	Phase 2	Phase3	Total
Option A – Interior Distribution System	$1,178,000	$365,000	$365,000	$1,751,000
Option B – Exterior Distribution System	$584,000	$48,000	$48,000	$829,000

Source: Stanley Consultants 2012

Electrical Rebates

The electrical utility, Rochester Public Utilities (RPU), offers for efficiency improvements on water chillers. Based on the information provided by the manufacturers, the chillers would qualify for rebates as outlined in Table 4-3.

Table 4-3 Summary of Chiller Rebates

Option	Chiller Rebate
Option 1 – Constant Speed Centrifugal Chillers	$34,575
Option 2 – Magnetic Bearing Centrifugal Chillers	$120,675

Additional rebates for motors and VFD for pumps may be available, but since these are the same for all three options have not been included in the analysis.

Life Cycle Cost Analysis

For each of the central plant options detailed in Section 3 of this study, capital costs, electrical costs, and steam costs are compared. These items are the major cost drivers of the central plant. The difference in operational and maintenance costs between the three options is a small percentage of the Energy costs and has not been included in this analysis.

Energy Costs

The energy costs for each option were calculated using the Peak anticipated load and Bin weather data for Minneapolis, Minnesota. A computer program was used to determine the operating costs for each option. The electrical costs are based on RPU Large General Service Rate Schedule. This rate schedule is included in Appendix C. Steam costs are based on rates from the Olmstead Waste-to-Energy Facility. The present steam rate is $17.64 per 1,000 pounds of steam.

Present Value Analysis

The present Value analysis has been performed using a discount rate of 4% and a discount rate of 8%. Costs were discounted to 2012 dollars and the total 25-year present value was compared for three options.

The following table summarizes the present value costs with a 4% discount rate.

Table 4-4 Total 25-Year Present Value Cost Comparison 4% Discount Rate

Option	Total 25-Year Present Value
Option 1 Constant Speed Centrifugal Chillers	$16,829,609
Option 2 Magnetic Bearing Centrifugal Chillers	$16,573,690
Option 3 Double Effect Steam Absorption Chillers	$23,886,953

The following table summarizes the present value costs with a 8% discount rate.

Table 4-5 Total 25-Year Present Value Cost Comparison 8% Discount Rate

Option	Total 25-Year Present Value
Option 1 Constant Speed Centrifugal Chillers	$13,997,290
Option 2 Magnetic Bearing Centrifugal Chillers	$13,917,772
Option 3 Double Effect Steam Absorption Chillers	$16,751,456

Section 5

Conclusions and Recommendations

Conclusions

Based on the review of existing data and life cycle cost analysis the following conclusions are provided

- Free cooling at central plant will provide low cost chilled water for areas with year round cooling.
- The present utility rate does not allow for an on-peak and off peak energy rate and does not provide any benefit for a thermal storage system utilized for load shifting or demand limiting.
- Thermal storage could be used to offset capital costs for installation of a chiller at the central plant.
- Distribution system efficiency could be improved if existing chilled water coils are replaced with new coils sized for higher system ΔT and design chilled water temperature.
- Capital costs for Option 3 (absorption chillers) are the highest.
- Capital costs for Option 1 (Constant Speed Centrifugal Chillers) are the lowest.
- Energy costs for Option 3 (Absorption chillers) are the highest.
- Energy costs for Option 2 (Magnetic Bearing Centrifugal Chillers) are the lowest.
- Life cycle costs are lowest for Option 2 at both discount rates when utility rebate for chillers is included.
- The difference in life cycle costs at an 8% discount rate between Option 1 and Option 2 is negligible.

Recommendations

Based on the life cycle costs, capital costs and other factors addressed in this study the following recommendations are offered for replacing the existing chillers serving the RCTC campus:.

- Design replacement cooling system for system temperature difference (DT) of 14°F or higher. (May required coils in air handling units to be designed for a higher DT than fan coil units or other terminal devices on the chilled water system.)
- Use treated water in chilled water distribution system. Where freeze protection is required, install small glycol system or other freeze protection controls.
- Provide free cooling as part of the central plant.
- Route the Distribution system as shown in Option B –Exterior Distribution System.
- Replace chillers as they exceed the useful life. As noted in the study, Coffman Hall, chiller, College Center chiller, East Hall, and Singley Hall chiller have all exceeded their useful life. Additionally, chillers serving the Science and Technology area will exceed their useful life within the next five years. Chillers serving the sports complex are expected to reach the end of their useful life in the next five to ten years.
- Replace existing chillers in phases as outlined in Option 2 – Magnetic Bearing Centrifugal Chillers.

Appendix A

Photos and Existing Equipment Information

Existing Chiller in CF133
Figure A-1

Existing Chiller in CF133
Figure A-2

Existing Chillers in Mechanical Room ST006
Figure A-3

Distance from Main Campus to Sports Complex and Location for Underground Pipe
Figure A-4

View from Parking Lot to
Proposed Southeast Chiller Plant Location
Figure A-5

Existing Chillers										
Building	**Rm #**	**Tons**	**Manuf**	**Model #**	**Date Installed**	**GPM**	**Pipe Size**	**GPM/ton**	**Series #**	**Notes**
CF	133	225	Trane	PCV-2C-C1-D2	1967	450	6"	2.00	8589	
CC	105	125	Carrier	19DH2142CD	1970	312.5		2.50		
Theater	Outside	13	Carrier	38AD014600	1971	31.25		2.50	499360	
Theater	Outside	30	Carrier	38AD034600	1971	75		2.50	J496679	
Theater	Outside	40	Carrier	38AD044600	1971	100		2.50	J495501	
WSU	Outside	93	McQuay	ALR145C	1986	232.5	4"	2.50	5RJ0705200	
SH	Roof	20	McQuay	ALP032C	1989	50		2.50	STL0506700	
ST	Room 006	200	York	YCCH163L0110YB	1992	320	10"	1.60		Chiller #1
ST	Room 006	200	York	YCCH163L0124YB	1992	320	10"	1.60		Chiller #2
SC	Outside	240	Carrier	30GTR255B—620AH	2000	520	8"	2.17	0301F57383	Chiller #2
SC	Outside	240	Carrier	30GTR255B—620AH	2000	520	8"	2.17	0301F57399	Chiller #1
ST	Room 006	34	York	YCWS0120SC46ZAADB	2006	85		2.50	RNRM017050	Chiller #3
	Total	1459.5				3016.25		2.07		

If not connecting Sports Complex	
Ton of cooling	980

T3-6847

THE TRANE COMPANY

AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT
LA CROSSE, WISCONSIN

DATE SHIPPED	BILL OF LADING NO.	INVOICE DATE	ORDER & INVOICE NO.
			T3-0847

TERMS-30 DAYS NET	F. O. B.	NO. INVOICE, CONFIRM
NET 30	LAX FRT. ALLD.	1

MARK PACKAGES
P.O. 2447
ROCHESTER JUNIOR COLLEGE

ORDER DATE	CUSTOMERS ORDER NO.	Customers Account No.
	2447	T3-44-4825-0

SHIP VIA: PREPAID TRUCK CALL TRAFFIC FOR ROUTING — COLLECT / PREPAID

SOLD TO:
KIRCKOF PLUMBING AND HEATING
P.O. BOX 198
ROCHESTER, MINNESOTA 8589

SHIP TO:
KIRCKOF PLUMBING AND HEATING
C/O NEW ROCHESTER JUNIOR COLLEGE
ROCHESTER, MINNESOTA

SHIP WITH

CENTRAVAC — PRODUCT CODE CTV 47

TAG: WATER CHILLER — Approval Dwg 04513-7102 — Serial No.

JOB AND PLACE: NEW ROCHESTER STATE JUNIOR COLLEGE, ROCHESTER — ENGINEERING NO. — PRICING

UNIT ITEM	QUAN.	MODEL	Load Limit Relay Setting	Evap. LTC Setting	Impeller
A	1	PCV-2C	436	34	29.5

Desc Dwg 04514-5000 — Comp Motor Dwg E4513-2019

DESIGN:
COMP. DWG. EXT.
EVAP. DWG. EXT.
COND. DWG. EXT.
IMPELLER (PCV ONLY) EXT. — C-1 D-2
WATER CONN. (PCV ONLY) EXT. — K-2

MOTOR:
COMPRESSOR 267 AMP 480 Volts 3600 RPM LA(POLX 54590) 70550281
OIL PUMP 1/4 HP 480 Volts 1000 RPM CENT. E48YT 70550008
PURGE UNIT 1/4 HP 115/60/1 1800 RPM

CAPACITY:
DESIGN CAPACITY .... 225 TONS REQUIRING .... BHP ...... 194 KW
AUXILIARY CHILLED WATER REQUIREMENT 4 GPM

	ENTERING WATER	LEAVING WATER	PRESSURE DROP	GPM	FOULING FACTOR	PIPING COMB.
EVAP.	56 °F	44°F	16 FT.	450	.0005	LH 2 PASS
COND.	85 °F	94°6	12 FT.	675	.0005	LH 2 PASS;

SPECIAL — ACCESSORIES & SPECIAL FEATURES

Item	Quan.	Description	
B	1	MCDONNELL-MILLER E-2 FLOW SWITCH 13040034	
C	1	CONTROL TRANSFORMER, 2 KVA, 480 PRIMARY, 120 SECONDARY	13085400
D	1	JOHNSON SERVICE T-900 TEMPERATURE CONTROLLER DIRECT ACTING, GRADUAL ACTION, STYLE B NO. 4 BULB 15 FOOT CAPILLARY, DIAL RANGE, --10 F., TO 125 F WITH WELL	13171800
E	1	VARIABLE RATIO CURRENT TRANSFORMER RATIO ...3...... DD-R 82850-678	13080014

[redacted]

AWE/CK

PAPERWORK ENTERED	SHIPMENT WANTED	HOLD FOR APPROVAL	SPECS. OK	PFD. TRANS.
180	☐ OR SOONER ☐ NOT BEFORE ☐ HOLD UNTIL DATE CONFIRMED	☐ HOLD FOR APPROVAL ___ PRINTS REQUIRED ☐ APPROVAL NOT REQ'D		

BUILDING	NEW/EXIST.	OWNER	CUSTOMER	JOB RD.	CREDIT OK	TAX OR PERMIT NUMBER	TAX CODE	AMOUNT	SALES ORDER NUMBER
							021		T3-0847

OFFICE-SALES MEN & RATE: ROCHESTER 65% STONE — TWIN CITIES 35% O'BRIEN

SHEET 1 OF 2

BILLING — NO.
☐ Lump Sum — P
☐ Net Each — S
☐ List Less — 19631

13- SPECIFICATIONS 2275

1368 JUN 30 1967

30-524 -(166)

Appendix B

Data Sheets for Proposed Equipment

OPTION 1

YORK
A JOHNSON CONTROLS COMPANY

YK MAXE CHILLER PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model No.	Net Capacity (tons)	Power	Refrigerant
Plant 2 - Case 2-CS	**3**	**YKECEQQ7-EPGS**	**500**	**460/3/60**	**R-134A**

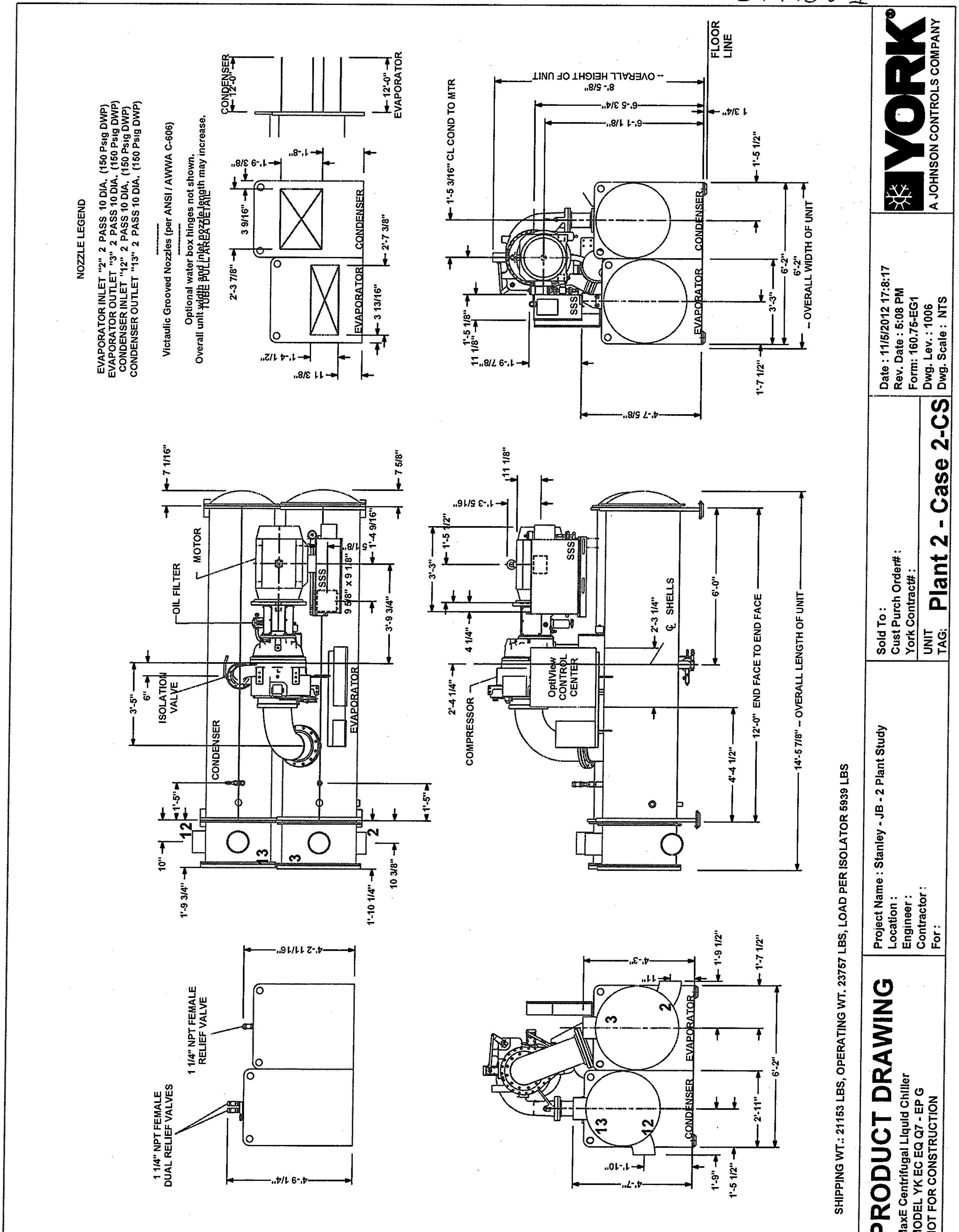
Unit Data	Evaporator	Condenser
EWT (°F):	56.00	85.00
LWT (°F):	42.00	94.29
Flow Rate (gpm):	854	1500
Pressure Drop (ft):	15.0	22.6
Fluid Type (%):	WATER	WATER
Circuit No. of Passes:	2	2
Fouling Factor (ft² °F hr / Btu):	0.00010	0.00025
Tube No. / Description:	373 - 0.035" Turbo-ESP Copper (3/4")	262 - 0.035" CSL Enhanced Copper
Design Working Pressure (psig):	150	150
Entering Water Nozzle @ Location:	2	12
Leaving Water Nozzle @ Location:	3	13
Water Box Weight, ea (lb)(2):	429	391
Cover Plate Weight , ea (lb):	500	349
Return Head Weight (lb):	176	144
Water Weight (lb):	1340	1264
Water Volume(gal):	161	152

Performance Data		Electrical Data		Other	
KW:	295	FLA:	420	Operating Wt. (lb):	23757
KW/Ton:	0.590	LRA:	3111	Per Isolator (lb):	5939
NPLV (1):	0.507	Inrush Amps:	1399	Refrigerant Wt. (lb):	1033
Gear Code:	WU	Min Circuit Amp. (Amps):	525	Oil Charge (gal):	10
Shaft HP:	378	Max Fuse/Breaker:	800	Motor Wt. (lb):	1881
OptiSound Cntrl:	YES	Oil Pump Volts:	460/3/60	Compressor Wt. (lb):	3500
Isolation Valves:	YES	Oil Pump FLA:	3.60	Starter Wt. (lb):	200
Oil Cooler Type:	Standard			Ship Wt (lb):	21153
Condenser Inlet:	Standard				
		Type Starter: Solid State Starter			

Notes:

(1) Chiller NPLV value calculated to AHRI Standard 550/590 equation.
(2) Not including cover plate on marine water boxes.

OPTION 1

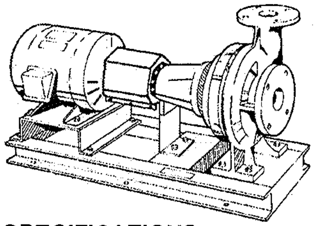

NOZZLE LEGEND
EVAPORATOR INLET "2" 2 PASS 10 DIA. (150 Psig DWP)
EVAPORATOR OUTLET "3" 2 PASS 10 DIA. (150 Psig DWP)
CONDENSER INLET "12" 2 PASS 10 DIA. (150 Psig DWP)
CONDENSER OUTLET "13" 2 PASS 10 DIA. (150 Psig DWP)
Victaulic Grooved Nozzles (per ANSI / AWWA C-606)
Optional water box hinges not shown.
Overall unit width and inlet nozzle length may increase.
TUBE PULL AREA DETAIL
CONDENSER
EVAPORATOR
12'-0"
FLOOR LINE
-- OVERALL HEIGHT OF UNIT
1'-5 3/16" CL COND TO MTR
-- OVERALL WIDTH OF UNIT
MOTOR
OIL FILTER
ISOLATION VALVE
OptiView CONTROL CENTER
COMPRESSOR
℄ SHELLS
12'-0" END FACE TO END FACE
14'-5 7/8" -- OVERALL LENGTH OF UNIT
1 1/4" NPT FEMALE RELIEF VALVE
1 1/4" NPT FEMALE DUAL RELIEF VALVES
SHIPPING WT.: 21153 LBS, OPERATING WT. 23757 LBS, LOAD PER ISOLATOR 5939 LBS
PRODUCT DRAWING
MaxE Centrifugal Liquid Chiller
MODEL YK EC EQ Q7 - EP G
NOT FOR CONSTRUCTION
Project Name : Stanley - JB - 2 Plant Study
Location :
Engineer :
Contractor :
For :
Sold To :
Cust Purch Order# :
York Contract# :
UNIT TAG: Plant 2 - Case 2-CS
Date : 11/5/2012 17:8:17
Rev. Date : 5:08 PM
Form: 160.75-EG1
Dwg. Lev. : 1006
Dwg. Scale : NTS
YORK
A JOHNSON CONTROLS COMPANY

Bell & Gossett
a xylem brand

SUBMITTAL

B-229.3F

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 1		
CHILLED WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 12/13/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW 1000 HEAD 130
HP 50 00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

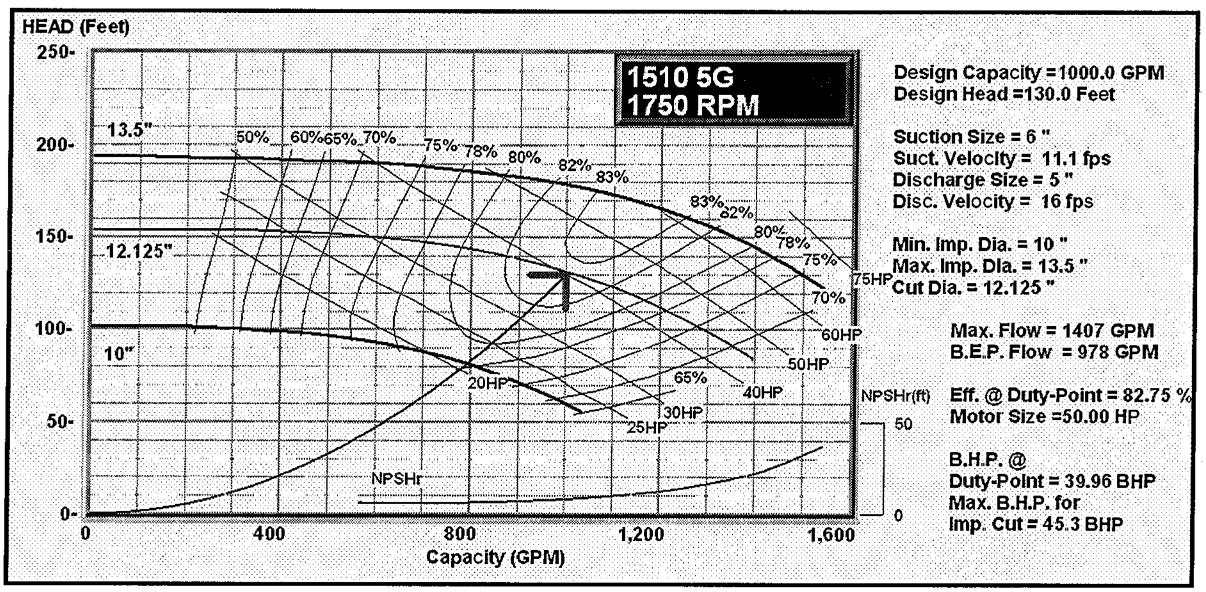
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

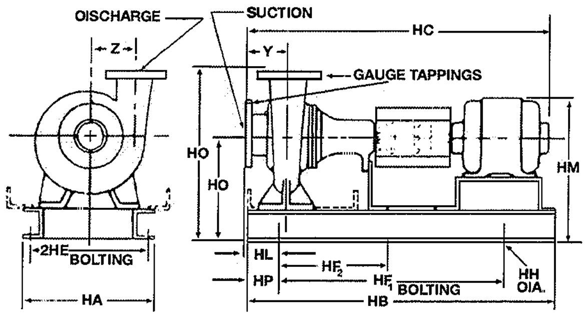
TYPE OF SEAL

☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm) **STANDARD SEAL 1510, 1510-F**

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

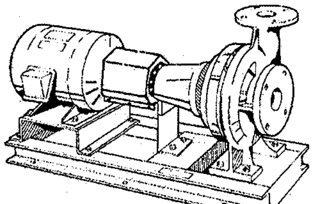
Dimensions are subject to change. Not to be used for construction purposes unless certified.

Bell & Gossett
a xylem brand

SUBMITTAL

B-225.7D

JOB: RCTC CHILLER STUDY	REPRESENTATIVE:	
OPTION 1		
CONDENSER WATER PUMP		
UNIT TAG:	ORDER NO.	DATE: 11/8/2012
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW	1500	HEAD	50
HP	30.00	RPM	1770
VOLTS	460		
CYCLE	60	PHASE	3
ENCLOSURE	ODP		
APPROX. WEIGHT	855		
SPECIALS			

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

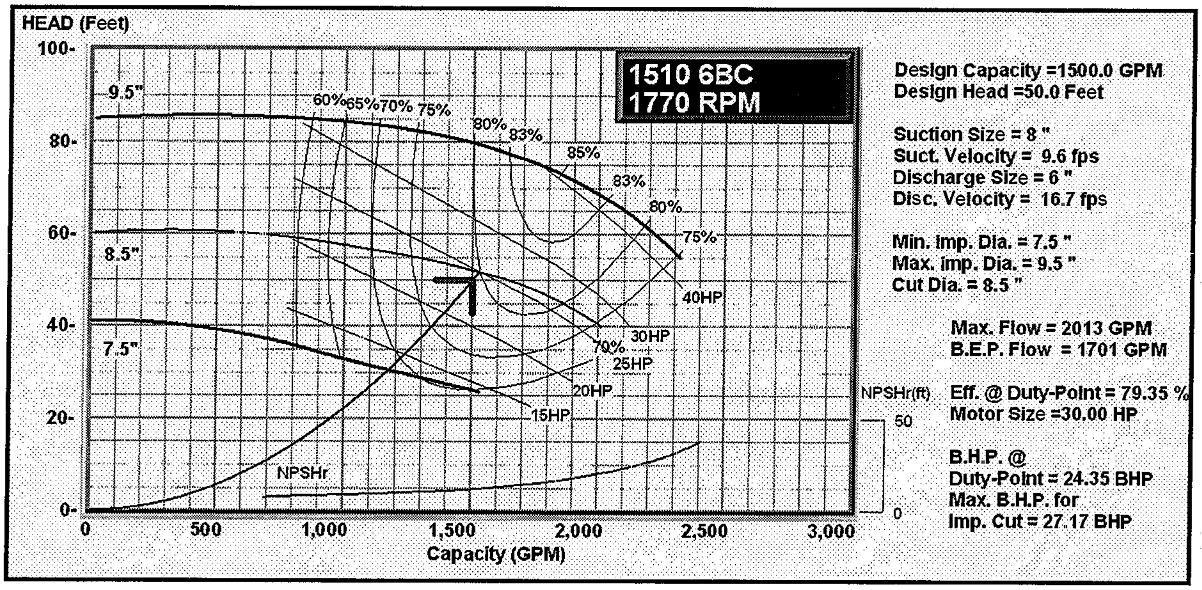
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

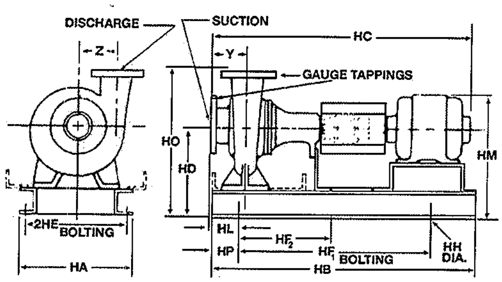
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal

B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 1

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 10:05:12 AM

Job Information

Stanley Consultants
1 cell 1500 GPM 95-85-78

Selected By

DPT Mechanical
10202 Douglas Avenue
Urbandale, IA 50322
jbeeghly@dptmechanical.com

Jason Beeghly
Tel 515-471-1902
Fax 515-727-0778

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	40.00 BHp
Model	NC8405TAN1	Fan Motor Output per cell	40.00 BHp
Cells	1	Fan Motor Output total	40.00 BHp
CTI Certified	Yes	Air Flow per cell	137600 cfm
Fan	9.000 ft, 6 Blades	Air Flow total	137600 cfm
Fan Speed	433 rpm, 12243 fpm	Static Lift	12.338 ft
Fans per cell	1	Distribution Head Loss	0.000 ft
		ASHRAE 90.1 Performance	46.9 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 77 dBA (Single Cell), 40.000 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07093 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03071
Approach	7.00 °F	Wet-Bulb Temp. Out	89.54 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	15 gpm
Relative Humidity	50.0 %	Total Heat Rejection	7473700 Btu/h
Capacity	103.0 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	8640 lb	8640 lb
Heaviest Section	8640 lb	
Max Operating Weight	20650 lb	20650 lb
Width	19.920 ft	19.920 ft
Length	9.900 ft	9.900 ft
Height	11.996 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	7.552 ft
50 % Open Wall	5.908 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8405_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	18.0	15.0	12.0	9.0	7.5	6.0	4.5
Ambient Temperature °F	-17.12	-6.95	3.22	13.39	18.47	23.56	28.64

CENTRIFUGAL CHILLER TECHNICAL DATA SHEET

OPTION 2

500T– Tech Data

Job Name:	**MN Project**
Date:	**10/30/2012**
Version:	**08.02**
Submitted By:	**Jake J Vorac**

Unit Description:

McQuay Model Number:	WME0500SSM2R/E3012-CE-2**/C2612-DNYY-2*****/R134-BAAAPAB
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)

Chiller Data:

Unit:	Compressor Type / Quantity - Size:	Centrifugal / 1 - 0500
	Capacity (ton):	496.2
	Capacity Control:	VFD / Inlet guide vanes
	Refrigerant:	R134a
	Refrigerant Charge (lb):	1,067
	Oil Cooler Type:	None
	ASHRAE 90.1 Compliancy:	'04, '07 & '10
	LEED EA Credit 4:	Pass
Evaporator:	Flow (gpm):	857.1
	LWT (°F):	42.0
	Number of Passes:	2
	Fouling Factor (°F.ft².h/Btu):	0.00010
	Tube Material:	Cu
	Tube Wall Thickness (in):	0.025
	Percentage of Water:	100
	Minimum Flow (gpm): (*see note 3*)	268.1
Condenser:	Flow (gpm):	1,500.0
	EWT (°F):	85.0
	Number of Passes:	2
	Fouling Factor (°F.ft².h/Btu):	0 00025
	Tube Material:	Cu
	Tube Wall Thickness (in):	0.028
	Percentage of Water:	100
Motor/Starter:	Starter Type:	VFD/UM
	Unit Voltage (V/Hz/Ph):	460/60/3
	Approval Listing:	ETL, ETLc
	RLA per Compressor (A): (*see note 4*)	402
	LRA per Compressor (A):	442
	Enclosure Type:	NEMA 1 gasketed
	Starter Location:	Unit mounted
	Control Circuit Transformer:	Included
	Power Connection:	Single point
	Power Factor:	0.91
	MCA (A) / MOCP (A): (*see note 4*)	505/706
	Motor Protection:	Standard
	Line Reactors:	Yes
	Ground Fault:	None
	Short Circuit Current Rating:	35 kA
	EMI Filter:	None
	Circuit Breaker:	35 KAIC with door mounted handle
	Harmonic Distortion:	Standard
	Transformer Type:	N/A
	Power Meter:	None

Design Performance rated at AHRI Condenser Relief:

Capacity (ton)	Input (kW)	Performance (kW/ton)	RLA (A)	NPLV (kW/ton)	75% Load (kW/ton)	50% Load (kW/ton)	25 % Load (kW/ton)	Evaporator PD (ft H_2O)	Evaporator EWT (°F)	Condenser PD (ft H_2O)	Condenser LWT (°F)
496.2	291.2	0.587	402	0.343	0.429	0.290	0.327	17.8	55.9	33.0	94.3

Performance Points rated at AHRI Condenser Relief:

CENTRIFUGAL CHILLER TECHNICAL DATA SHEET

Point #	%Load Request	Capacity (ton)	Input Power (kW)	Performance (kW/ton)	RLA (A)	Evaporator Flow (gpm)	Evaporator EWT (°F)	Evaporator LWT (°F)	Evaporator PD (ft H_2O)	Condenser Flow (gpm)	Condenser EWT (°F)	Condenser LWT (°F)	Condenser PD (ft H_2O)
1	100.0	496.2	291.2	0.587	402	857.1	55.9	42.0	17.8	1,500.0	85.0	94.3	33.0
2	90.0	446.6	232.3	0.520	329	857.1	54.5	42.0	17.9	1,500.0	81.0	89.2	33.6
3	80.0	397.0	182.2	0.459	262	857.1	53.1	42.0	17.9	1,500.0	77.0	84.2	34.1
4	70.0	347.3	137.9	0.397	207	857.1	51.7	42.0	17.9	1,500.0	73.0	79.2	34.7
5	60.0	297.7	101.7	0.342	160	857.1	50.3	42.0	18.0	1,500.0	69.0	74.3	35.3
6	50.0	248.1	71.9	0.290	116	857.1	48.9	42.0	18.0	1,500.0	65.0	69.3	35.9
7	40.0	198.5	58.6	0.295	96	857.1	47.6	42.0	18.1	1,500.0	65.0	68.5	36.0
8	30.0	148.9	46.6	0.313	77	857.1	46.2	42.0	18.1	1,500.0	65.0	67.6	36.1
9	20.0	99.2	40.6	0.409	69	857.1	44.8	42.0	18.1	1,500.0	65.0	66.8	36.1
10	10.0	49.6	27.9	0.563	49	857.1	43.4	42.0	18.2	1,500.0	65.0	66.0	36.2

Sound Pressure:

63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Overall (dBA)
41.0	59.0	68.0	73.0	74.0	72.0	84.0	72.0	86.3
							75% Load	80.6
							50% Load	79.6
							25% Load	81.4

Sound Pressure (with Sound Insulation) (dB) measured in accordance with ANSI/AHRI Standard 575-2008 (A-weighted)

Service Points rated at AHRI Condenser Relief:

Point #	Refrig. Charge (lb)	LRAD (A)	PD Capacity (lb)	Superheat (Δ °F)	Subcooling (Δ °F)	Evaporator Temp (°F)	Evaporator Pressure (psig)	Evaporator Velocity (ft/s)	Condenser Temp (°F)	Condenser Pressure (psig)	Condenser Velocity (ft/s)
1	1,067	442	1,869	1.0	8.7	40.7	35.8	6.7	96.5	117.0	9.9
2	1,067	442	1,869	1.0	7.9	40.8	35.9	6.7	91.2	106.7	9.9
3	1,067	442	1,869	1.0	7.1	41.0	36.0	6.7	86.0	97.1	9.9
4	1,067	442	1,869	1.0	6.3	41.1	36.1	6.7	80.8	88.1	9.9
5	1,067	442	1,869	1.0	5.6	41.2	36.2	6.7	75.7	79.8	9.9
6	1,067	442	1,869	1.0	4.7	41.3	36.4	6.7	70.5	71.9	9.9
7	1,067	442	1,869	1.0	3.9	41.5	36.5	6.7	69.5	70.3	9.9
8	1,067	442	1,869	1.0	3.1	41.6	36.6	6.7	68.4	68.8	9.9
9	1,067	442	1,869	1.0	2.2	41.7	36.8	6.7	67.3	67.3	9.9
10	1,067	442	1,869	1.0	1.2	41.9	36.9	6.7	66.2	65.7	9.9

Certification:

Notes:

1. Above RLA, MCA and MOCP values are per Compressor and are for input amps.
2. Performance kW values are total kW, unless noted otherwise.
3. Minimum flow is based upon standard condenser water relief and not increased lift due to constant condenser water temperature.
4. The field wiring must be sized in accordance with the MCA and not the RLA as some selections may be below the minimum required protection.
5. Motor overload settings determined by motor amps. Refer to unit nameplate for proper settings.
6. The USGBC bases it's LEED EA credit 4 calculations for Enhanced Refrigerant Management on the default values for a water cooled centrifugal chiller with a 25-year life, 10% end of life loss and 2% annual leak rate. The gross ARI cooling capacity for the unit is at least 343 tons, and the refrigerant charge is 1067 lbs.
7. The LEED result above considers the chiller only. When applying this information for credit or prerequisite compliance the entire building must be considered.

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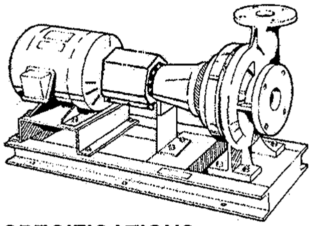
SUBMITTAL
B-229.3F

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 2		
CHILLED WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 12/13/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS
FLOW 1000 HEAD 135
HP 50 00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

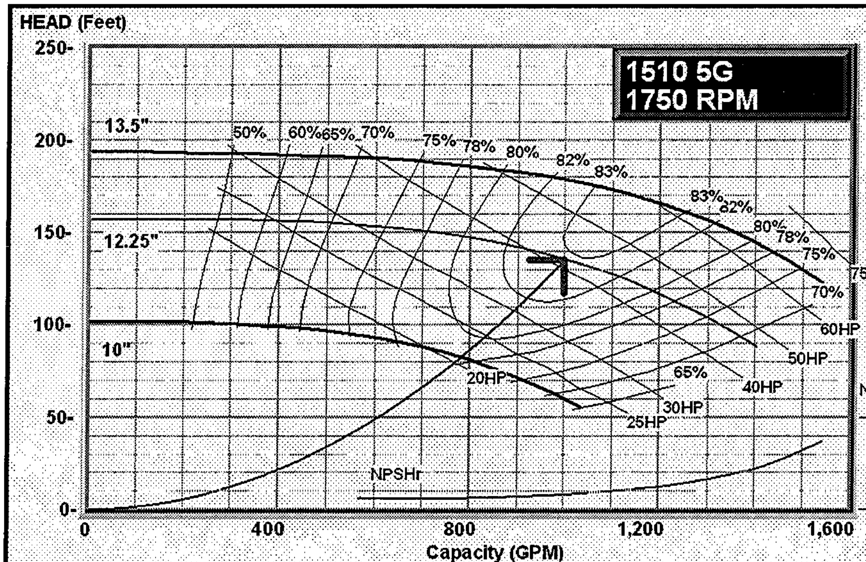
Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION
☐ BRONZE FITTED ☐ ALL IRON

FEATURES
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE
☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Design Capacity =1000.0 GPM
Design Head =135.0 Feet

Suction Size = 6 "
Suct. Velocity = 11.1 fps
Discharge Size = 5 "
Disc. Velocity = 16 fps

Min. Imp. Dia. = 10 "
Max. Imp. Dia. = 13.5 "
Cut Dia. = 12.25 "

Max. Flow = 1428 GPM
B.E.P. Flow = 998 GPM

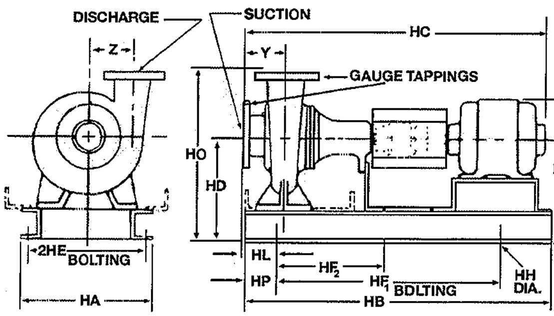
Eff. @ Duty-Point = 82.89 %
Motor Size =50.00 HP

B.H.P. @ Duty-Point = 41.23 BHP
Max. B.H.P. for Imp. Cut = 46.96 BHP

Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal

B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: 125# ANSI - STANDARD; 250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

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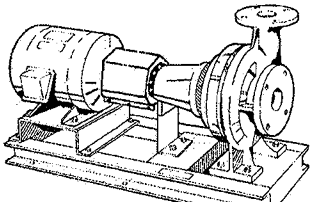
SUBMITTAL
B-225.7D

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 2		
CONDENSER WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 11/8/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS
FLOW 1500 HEAD 60
HP 40.00 RPM 1770
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 995
SPECIALS

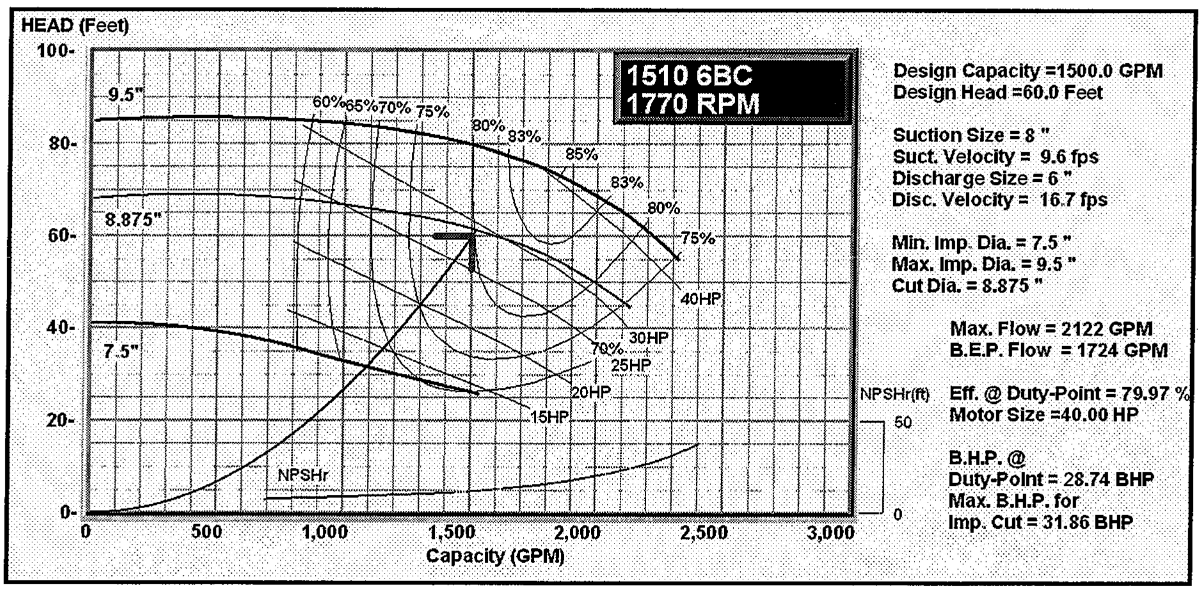
Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION
☐ BRONZE FITTED ☐ ALL IRON

FEATURES
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE
☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

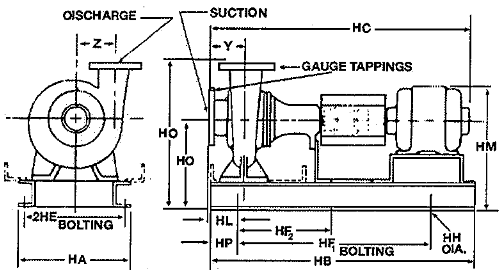
TYPE OF SEAL
☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal

B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 2

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 10:05:12 AM

Job Information

Stanley Consultants
1 cell 1500 GPM 95-85-78

Selected By

DPT Mechanical
10202 Douglas Avenue
Urbandale, IA 50322
jbeeghly@dptmechanical.com

Jason Beeghly
Tel 515-471-1902
Fax 515-727-0778

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	40.00 BHp
Model	NC8405TAN1	Fan Motor Output per cell	40.00 BHp
Cells	1	Fan Motor Output total	40.00 BHp
CTI Certified	Yes	Air Flow per cell	137600 cfm
Fan	9.000 ft, 6 Blades	Air Flow total	137600 cfm
Fan Speed	433 rpm, 12243 fpm	Static Lift	12.338 ft
Fans per cell	1	Distribution Head Loss	0.000 ft
		ASHRAE 90.1 Performance	46.9 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 77 dBA (Single Cell), 40.000 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07093 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03071
Approach	7.00 °F	Wet-Bulb Temp. Out	89.54 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	15 gpm
Relative Humidity	50.0 %	Total Heat Rejection	7473700 Btu/h
Capacity	103.0 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	8640 lb	8640 lb
Heaviest Section	8640 lb	
Max Operating Weight	20650 lb	20650 lb
Width	19.920 ft	19.920 ft
Length	9.900 ft	9.900 ft
Height	11.996 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	7.552 ft
50 % Open Wall	5.908 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8405_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	18.0	15.0	12.0	9.0	7.5	6.0	4.5
Ambient Temperature °F	-17.12	-6.95	3.22	13.39	18.47	23.56	28.64

OPTION 3

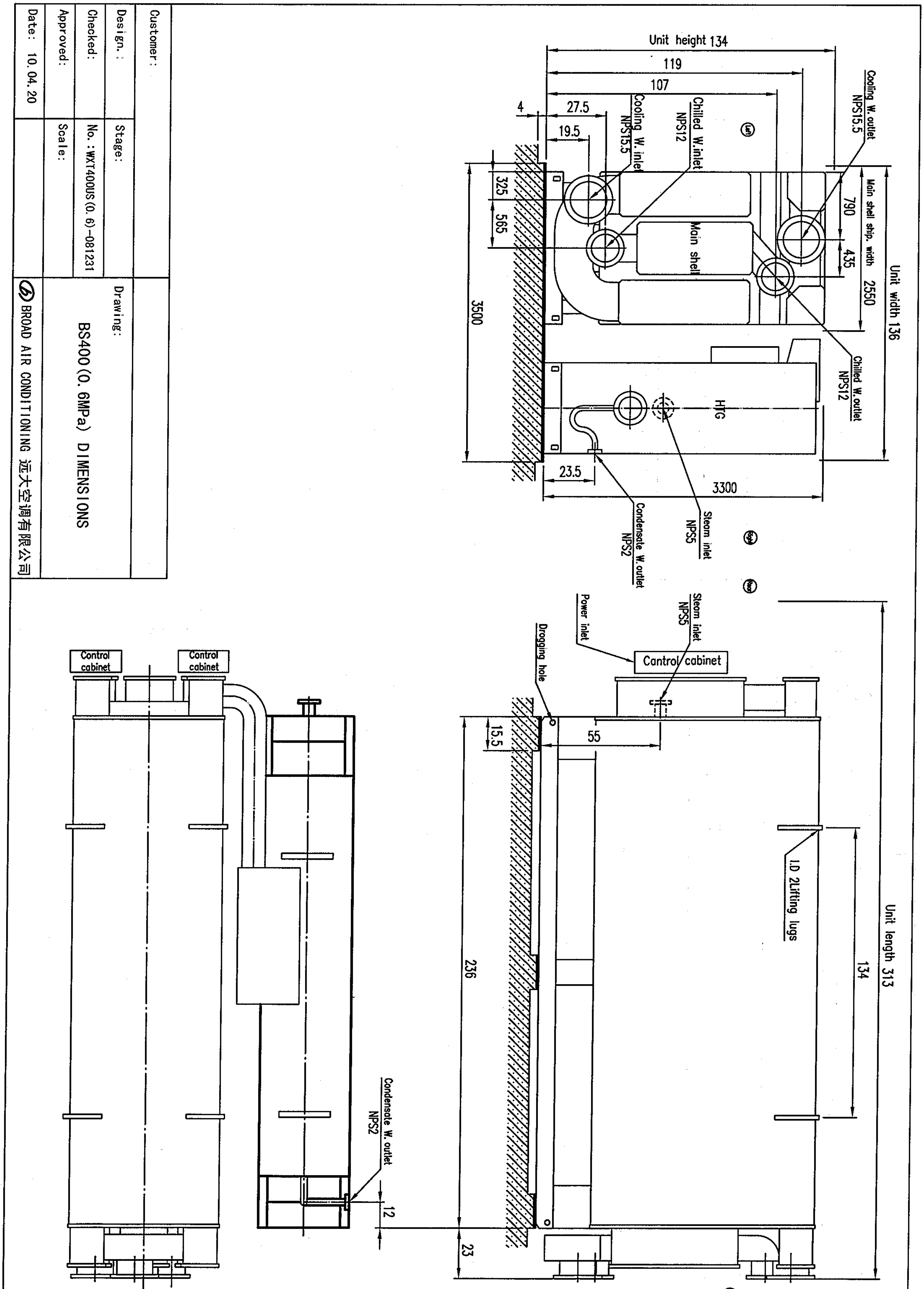
Chiller Performance Data

Our Reference No.:　　　　　　　　　　Project Name:

Date: Nov. 2nd, 2012　　　　　　　　　Chiller Model: BS400

		Customer's Request	BROAD Proposition
Model			**BS151X0.34-37.8/29.4-5.6/13.3-B3-400**
Quantity			**1**
Cooling capacity	RT	500	500
Cooling capacity	kW		1759
Cooling capacity	10^4kcal/h		151
Chilled water			
Chilled W. outlet temp.	°F	42	42
Chilled W. inlet temp.	°F	56	56
Flowrate	GPM		863
Working pressure	psig		116
Pressure drop	ftH2O		25
Fouling factor	hr ft2 °F/Btu		0.0001
Cooling water			
Cooling W. outlet temp.	°F	85	85
Cooling W. inlet temp.	°F	100	100
Flowrate	GPM		1409
Working pressure	psig		116
Pressure drop	ftH2O		35
Fouling factor	hr ft2 °F/Btu		0.00025
Steam source			
Steam pressure	psig	50	50
Flowrate	lb/s		4,063
Others			
Power			460V/60Hz/3P/4wire
Chiller Power Consumption	kW		13.2
Rated COP For Exhaust Heat Source	COP		1.28
Unit ship. Wt.	klbs		49
Operation wt.	klbs		105

This selection is based on information provided by inquirer, reference only, product specifications subject to change.

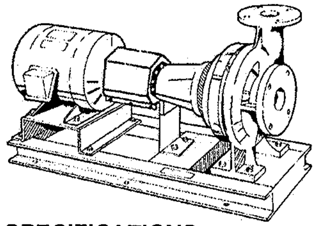

Customer:
Design.:
Checked:
Approved:
Date: 10.04.20
Stage:
No.: WXT400US(0.6)-081231
Scale:
Drawing:
BS400(0.6MPa) DIMENSIONS
BROAD AIR CONDITIONING 远大空调有限公司
Unit height 134
119
107
27.5
19.5
4
Cooling W. inlet NPS15.5
Chilled W. inlet NPS12
Cooling W. outlet NPS15.5
Main shell
Main shell ship. width
790
435
2550
Unit width 136
Chilled W. outlet NPS12
HTG
325
565
3500
23.5
3300
Steam inlet NPS5
Condensate W. outlet NPS2
Power inlet
Dragging hole
Control cabinet
15.5
55
I.D 2Lifting lugs
134
Unit length 313
236
23
Condensate W. outlet NPS2
12

Bell & Gossett
a xylem brand

SUBMITTAL

B-229.3F

JOB: RCTC CHILLER STUDY	**REPRESENTATIVE:**	
OPTION 3		
CHILLED WATER PUMP		
UNIT TAG:	**ORDER NO.**	**DATE:** 12/13/2012
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



5G
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW 1000 HEAD 140
HP 50.00 RPM 1750
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX. WEIGHT 1135
SPECIALS

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

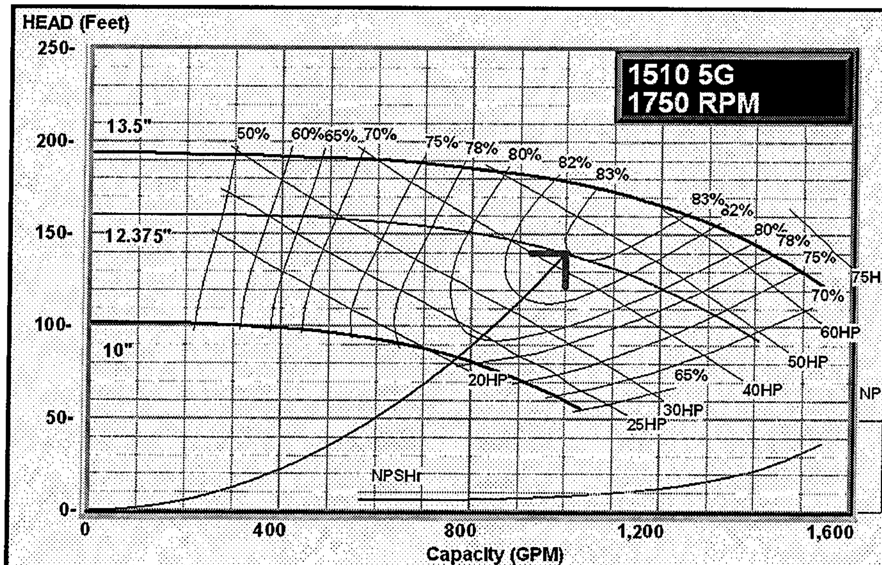
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Design Capacity =1000.0 GPM
Design Head =140.0 Feet

Suction Size = 6 "
Suct. Velocity = 11.1 fps
Discharge Size = 5 "
Disc. Velocity = 16 fps

Min. Imp. Dia. = 10 "
Max. Imp. Dia. = 13.5 "
Cut Dia. = 12.375 "

Max. Flow = 1446 GPM
B.E.P. Flow = 1018 GPM

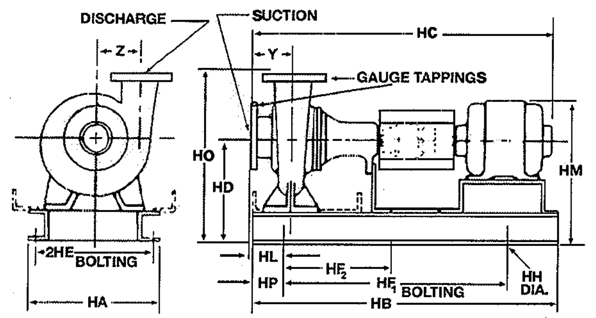
Eff. @ Duty-Point = 82.97 %
Motor Size =50.00 HP

B.H.P. @ Duty-Point = 42.6 BHP
Max. B.H.P. for Imp. Cut = 48.66 BHP

Bell & Gossett

Series 1510 5G Centrifugal Pump Submittal

B-229.3F



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	5" (127)	1-3/8 (35)	10-3/4 (273)
Suction	6" (152)	1-7/16 (37)	12-1/8 (308)

FLANGES ARE: **125# ANSI - STANDARD**
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm)

STANDARD SEAL 1510, 1510-F

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF$_1$	HF$_2$	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	47-1/8 (1197)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	48-7/8 (1241)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	49-7/8 (1267)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	51-3/8 (1305)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	53-3/8 (1356)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	54-7/8 (1394)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	57-1/8 (1451)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	58-1/8 (1476)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF$_1$	HF$_2$	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	24 (610)	56 (1422)	49-1/2 (1257)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
256T	24 (610)	56 (1422)	51-1/4 (1302)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	23-3/8 (594)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
284T	24 (610)	56 (1422)	52-1/4 (1327)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
286T	24 (610)	56 (1422)	53-3/4 (1365)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	24-1/2 (622)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
324T	24 (610)	56 (1422)	55-3/4 (1416)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
326T	24 (610)	56 (1422)	57-1/4 (1454)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	25-5/8 (651)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
364T	24 (610)	56 (1422)	59-1/2 (1511)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)
365T	24 (610)	56 (1422)	60-1/2 (1537)	16-1/2 (419)	21-1/2 (546)	44 (1118)	22 (559)	1 (25)	5-7/16 (138)	26-3/4 (679)	29-1/2 (749)	6 (152)	6 (152)	9 (229)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

Bell & Gossett
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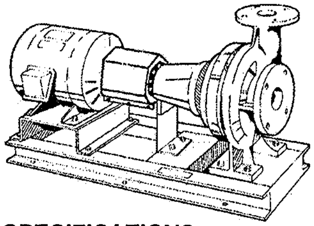
SUBMITTAL
B-225.7D

JOB: RCTC CHILLER STUDY	REPRESENTATIVE:	
OPTION 3		
CONDENSER WATER PUMP		
UNIT TAG:	ORDER NO.	DATE: 11/8/2012
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



6BC
Series 1510
Centrifugal Pumps - Base Mounted

SPECIFICATIONS

FLOW 1500 HEAD 60
HP 40 00 RPM 1770
VOLTS 460
CYCLE 60 PHASE 3
ENCLOSURE ODP
APPROX WEIGHT 995
SPECIALS

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☐ BRONZE FITTED ☐ ALL IRON

FEATURES

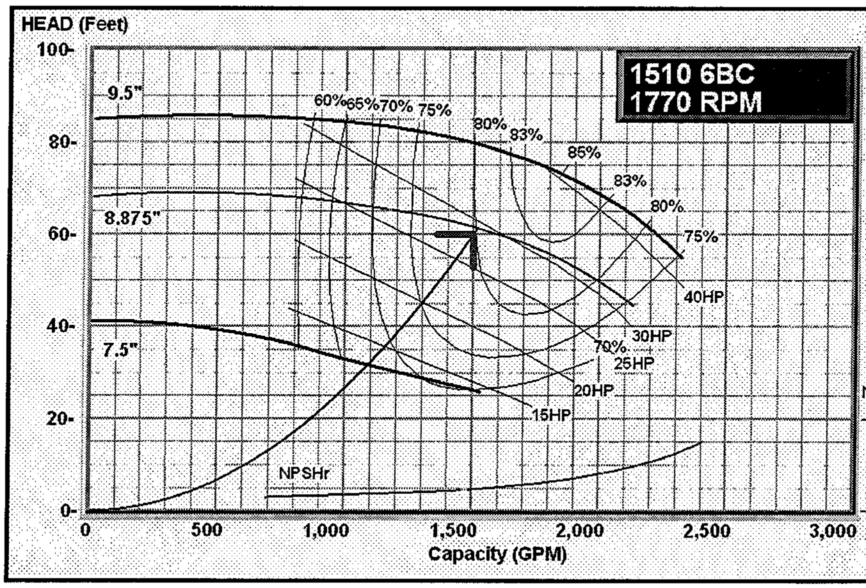
☒ ANSI/OSHA Coupling Guard
☒ Center Drop Out Spacer Coupling
☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☐ 175 psi (12 bar) W.P. w/125# ANSI flange drilling
☐ 250 psi (17 bar) W.P. w/250# ANSI flange drilling (requires 1510-S)

TYPE OF SEAL

☐ 1510 Standard Seal (Buna-Carbon/Ceramic)
☐ 1510 -F Standard Seal w/ Flush Line (Buna-Carbon/Ceramic)
☐ 1510 -S Stuffing Box construction w/ Flushed Mechanical Single Seal (EPR-Tungsten Carbide/Carbon)
☐ 1510 -D Stuffing Box construction w/ Flushed Double Mechanical Seal (EPR-Carbon/Ceramic) Requires external water source
☐ 1510 -PF Stuffing Box Construction w/ Packing (Graphite Impregnated Teflon)



Design Capacity =1500.0 GPM
Design Head =60.0 Feet

Suction Size = 8 "
Suct. Velocity = 9.6 fps
Discharge Size = 6 "
Disc. Velocity = 16.7 fps

Min. Imp. Dia. = 7.5 "
Max. Imp. Dia. = 9.5 "
Cut Dia. = 8.875 "

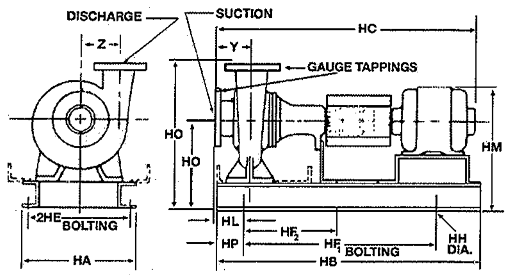
Max. Flow = 2122 GPM
B.E.P. Flow = 1724 GPM

Eff. @ Duty-Point = 79.97 %
Motor Size =40.00 HP

B.H.P. @ Duty-Point = 28.74 BHP
Max. B.H.P. for Imp. Cut = 31.86 BHP

Bell & Gossett

Series 1510 6BC Centrifugal Pump Submittal B-225.7D



FLANGE DIMENSIONS IN INCHES (MM)	SIZE	THICKNESS	O.D.
Discharge	6" (152)	1-7/16" (37))	12-1/8" (308)
Suction	8" (203)	1-5/8" (41)	14-3/4" (375)

FLANGES ARE 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS - Inches (mm) — **STANDARD SEAL 1510, 1510-F**

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	46-1/2 (1181)	50-5/8 (1286)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	46-1/2 (1181)	52-3/8 (1330)	15 (381)	14 (356)	36-1/2 (927)	18-1/4 (464)	7/8 (22)	8-3/8 (213)	21-7/8 (556)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	53-1/8 (1349)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	54-5/8 (1387)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	56-7/8 (1445)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	58-3/8 (1483)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

STUFFING BOX 1510-PF, 1510-S, 1510-D

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF_1	HF_2	HH	HL	HM MAX	HO	HP	Y	Z
	"L" FRAME													
254T	16 (406)	51-3/4 (1314)	53 (1346)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
256T	16 (406)	51-3/4 (1314)	54-3/4 (1391)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	21-7/8 (555)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
284T	16 (406)	51-3/4 (1314)	55-1/2 (1410)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
286T	16 (406)	51-3/4 (1314)	57 (1448)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	23 (584)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
324T	16 (406)	51-3/4 (1314)	59-1/4 (1505)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)
326T	16 (406)	51-3/4 (1314)	60-3/4 (1543)	15 (381)	14 (356)	41-3/4 (1060)	20-7/8 (530)	7/8 (22)	8-3/8 (213)	24-1/8 (613)	25-1/2 (648)	5 (127)	7 (178)	8-1/4 (210)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

OPTION 3

UPDATE™ Version 4.14.9
Product Data: 5/31/2012 (Current)

11/8/2012 2:43:54 PM

Job Information

Selected By

Bovenkamp
225 Iowa Ave.
Muscatine, IA 52761
bovenkampjon@stanleygroup.com
Jon
Tel (563) 264-6490

SPX Cooling Technologies Contact

The RS Stover
3809 S. Center St.
Marshalltown, Iowa 50158
dan.hampton@rsstover.com
Tel 641-753-5557
Fax 641-752-7977

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Fan Motor Capacity per cell	50.00 BHp
Model	NC8409UAN1	Fan Motor Output per cell	49.62 BHp
Cells	1	Fan Motor Output total	49.62 BHp
CTI Certified	Yes	Air Flow per cell	196600 cfm
Fan	12.00 ft, 6 Blades	Air Flow total	196600 cfm
Fan Speed	273 rpm, 10292 fpm	Static Lift	12.34 ft
Fans per cell	1	Distribution Head Loss	0.00 ft
		ASHRAE 90.1 Performance	52.5 gpm/Hp

Model Group: Standard Low Sound (A)
Sound Pressure Level: 81 dBA (Single Cell), 5.00 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	1500 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	100.00 °F	Air Density Out	0.07085 lb/ft³
Range	15.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03124
Approach	7.00 °F	Wet-Bulb Temp. Out	90.06 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	23 gpm
Relative Humidity	50.0 %	Total Heat Rejection	11205000 Btu/h
Capacity	116.5 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	13120 lb	13120 lb
Heaviest Section	13120 lb	
Max Operating Weight	32010 lb	32010 lb
Width	22.42 ft	22.42 ft
Length	13.90 ft	13.90 ft
Height	12.02 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	8.40 ft
50 % Open Wall	6.37 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8409_ALN.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	30.0	24.0	18.0	15.0	12.0	9.0	7.5
Ambient Temperature °F	-21.50	-8.40	4.71	11.26	17.81	24.36	27.64

Appendix C

Utility Information

ROCHESTER PUBLIC UTILITIES
(RPU)

RATE SCHEDULE LGS
SHEET 1 OF 2

LARGE GENERAL SERVICE

AVAILABILITY:

At all locations for loads where the measured demand is at least 1,000 kW or more for three or more billing periods in a given calendar year, but less than 10,000 kW, and where facilities of adequate capacity and suitable voltage are adjacent to the premises to be served. For loads where the service desired by the customer is not adjacent to the premises to be served, additional contract arrangements may be required prior to service being furnished.

APPLICATION:

To commercial, industrial, and governmental customers with all service taken at one point and measured through one meter. Also applicable to temporary service in accordance with RPU's published Electric Service Rules and Regulations. Not applicable to standby service.

CHARACTER OF SERVICE:

Three phase, 60 Hertz, alternating current at any one of the standard secondary service voltages as described in RPU's published Electric Service Rules and Regulations.

RATE:

Demand Charge:	$16.463 per kW
Energy Charge:	5.261¢ per kWh

POWER SUPPLY ADJUSTMENT:

Bills computed under this rate schedule are subject to adjustment in accordance with the Power Supply Adjustment (PSA).

POWER FACTOR ADJUSTMENT:

The customer agrees to maintain an average power factor of 0.95 or greater for the billing period and to prevent a leading power factor. If the customer's average power factor is less than 0.95 for the billing period, the billing demand will be determined by multiplying the measured demand by 0.95 and dividing the results by the customer's average power factor. The average power factor is defined to be the quotient obtained by dividing the kWh used during the month by the square root of the sum of the squares of the kWh used and the lagging reactive kilovoltampere-hours supplied during the same period. The customer's average power factor will be determined by means of permanently installed meters.

PRIMARY METER DISCOUNT:

Customers approved for metering at 13.8 kV will receive a discount of 1.25% on base rate charges for measured demand and energy.

TRANSFORMER OWNERSHIP CREDIT:

Customers owning transformers will receive a credit of $.20 per kW on each month's measured demand.

LARGE GENERAL SERVICE (Cont.)

DETERMINATION OF DEMAND:

Measured demand is defined as the maximum rate at which energy is used for any period of fifteen consecutive minutes during the billing period. The billing demand shall be the greater of the measured demand for the billing period adjusted for power factor, or 75% of the maximum measured demand for the most current June - September billing periods adjusted for power factor. Billing periods may not coincide with calendar months.

MINIMUM BILL:

The minimum bill shall not be less than the billing demand, as provided above, whether or not energy is used.

PAYMENT:

Payments are due on or before the due date.

CONDITIONS OF DELIVERY:

1. Service furnished under this rate schedule is subject to applicable provisions of RPU's published Electric Service Rules and Regulations.
2. Unless authorized by separate written agreement, standby electric generating equipment installed by the customer shall not be interconnected or operated in parallel with the RPU system. Customer shall own, install, operate, and maintain electrical interlocking equipment, which will prevent parallel operation, and such equipment shall be approved by RPU prior to installation.
3. RPU shall not be liable for any damage or loss sustained by customer resulting from interruptions, deficiencies, or imperfections of service provided under this rate.
4. Energy furnished under this rate shall not be resold.
5. A separate electric service agreement may be required for service under this rate schedule.

Approved by Rochester Public Utility Board:	December 12, 2008
Effective Date:	January 1, 2009

CONSERVE & $AVE®

COMMERCIAL COOLING EQUIPMENT REBATE APPLICATION

1. CUSTOMER INFORMATION (please print)

Account Name — Doing Business As (if different from Account Name)

Installation Address — City — State — Zip Code

Mailing Address (if different from above) (rebate check will be mailed here) — City — State — Zip Code

Account Number

❑ Send us a rebate check. ❑ Apply rebate to our account.

Type of Business: ❑ Church ❑ Government ❑ Grocery ❑ Health ❑ Industrial ❑ Lodging ❑ Multi-family ❑ Office ❑ Restaurant ❑ Retail ❑ School ❑ Other__________

How did you hear about CONSERVE & SAVE®? ❑ Billboard ❑ Chamber of Commerce ❑ Contractor ❑ Newspaper ❑ Radio ❑ Retailer/Vendor ❑ TV ❑ Utility Mailing ❑ Utility Newsletter ❑ Utility Representative ❑ Utility Web Site ❑ Other__________

2. CONTACT INFORMATION (please print)/CUSTOMER SIGNATURE

ATTENTION: ALL INVOICES OR RECEIPTS AND ALL SPECIFICATION SHEETS MUST BE INCLUDED WITH YOUR FULLY-COMPLETED AND SIGNED APPLICATION OR APPLICATION WILL BE RETURNED.

Contact Name (rebate check will be mailed to contact) — ( ) Daytime Phone Number

Email

I certify that all the information in the application (including any associated worksheets) is correct to the best of my knowledge. I have read and agree to the Terms and Conditions on the back of this application booklet. I understand that if any equipment in conjunction with this application is ordered, purchased, or installed before approval from The Utility is received, the proposed project may not qualify for a rebate.

Customer's Signature — Date

❑ **Check here if you DO NOT give us permission to use your business name in advertising our CONSERVE & SAVE® programs.**

3. CONTRACTOR/VENDOR INFORMATION (please print)

Company Name

Address — City — State — Zip Code

Contact Name — ( ) Daytime Phone Number

Email

TEAMING UP TO SAVE YOU MONEY

AUSTIN UTILITIES — OWATONNA PUBLIC UTILITIES — rpu we pledge, we deliver® — CONSERVE & $AVE®

OFFICE USE ONLY Date Received________

Pre-Inspected? ❑ YES ❑ NO Date________ Initials______

Post-Inspected? ❑ YES ❑ NO Date________ Initials______

TOTAL REBATE AMOUNT $

4. REBATE INFORMATION – ROOFTOP, PACKAGED, AND CONDENSING A/C UNITS

Project Type: ☐ **RETROFIT** ☐ **NEW CONSTRUCTION**

EXISTING SYSTEM (if applicable)			NEW SYSTEM										REBATE					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Unit Size *(Tons)*	Existing SEER* or EER*	Qty.	Unit Code *(Table 1)*	Manufacturer Name	Model Number	Unit Size *(Tons)*	AHRI Ref Number	Minimum Efficiency *(Table 1)*	Actual SEER* or EER*	Qty.	Annual Hours of Operation *(Table 2)*	Equipment Cost	Base Rebate $/Ton *(Table 1)*	Base Rebate *(G x K x N)*	Eligible Efficiency Bonus *(J – I)*	Bonus Rebate** $/Ton *(Table 1)*	Bonus Rebate *(P x Q) x (G x K) x 10*	Total Rebate *(O + R)*
1.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
2.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
3.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
4.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
5.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$
6.	☐ SEER ☐ EER								☐ SEER ☐ EER			$	$	$		$	$	$

TOTAL $

TABLE 1 – QUALIFYING EFFICIENCIES AND REBATE SCHEDULE

Unit Code	Qualifying Equipment	Minimum Efficiency	Base Rebate $/Ton	Efficiency Bonus Rebate** $/Ton
UT–1	Less than or equal to 65,000 BTU/hour	14.0 SEER*	$75	$5
UT–2	65,001 – 134,999 BTU/hour	10.8 EER*	$75	$5
UT–3	135,000 – 239,999 BTU/hour	10.7 EER*	$75	$5
UT–4	240,000 – 759,999 BTU/hour	10.2 EER*	$75	$5
UT–5	760,000 BTU/hour and greater	9.6 EER*	$75	$5
PTAC	Packaged Terminal A/C Units (all sizes)	10.8 EER*	$75	$5
PTHP	Packaged Terminal Heat Pump Units (all sizes)	10.6 EER*	$75	$5

TABLE 2 – GUIDELINES FOR COOLING HOURS

Business Type	Estimated Hours
Education – Community College	632
Education – Secondary School	384
Education – University	828
Health/Medical – Clinic	756
Health/Medical – Hospital	1,408
Lodging	1,193
Office	902
Retail	867

***In Columns B and J, please enter Existing and Actual SEER or EER value, respectively, and then check SEER or EER.**
SEER=Seasonal Energy Efficiency Rating; EER=Energy Efficiency Rating

**Efficiency Bonus Rebate provides an additional incentive for each .1 SEER/EER above the Minimum Efficiency.

Note: Qualifying unitary A/C units must have been rated in accordance with the most recent version of AHRI Standard 210/240 if under 65,000 BTU/hour and AHRI 340/360 if above 65,000 BTU/hour, and have nameplate data stamped with the SEER/EER. If equipment is larger than the AHRI Standard certification process, it must be listed as a standard combination in manufacturer's literature. **A copy of the manufacturer's applicable unit rating must accompany this application.** The AHRI directory and standards are located at www.ahridirectory.org.

5. REBATE INFORMATION -- CENTRAL CHILLERS

Project Type: ☐ **RETROFIT** ☐ **NEW CONSTRUCTION**

EXISTING SYSTEM (if applicable)				NEW SYSTEM											REBATE						
A Unit Code *(Table 3)*	B Unit Size *(Tons)*	C Existing kW/Ton	D Qty.	E Unit Code *(Table 3)*	F Manufacturer Name	G Model Number	H Size *(Tons)*	I Full Load Eff. *(Table 3)*	J Rated Full Load Eff.	K IPLV Eff. *(Table 3)*	L Rated IPLV Eff.	M Qty.	N Annual Hours of Operation *(Table 4)*	O Equipment Cost	P Base Rebate $/Ton *(Table 3)*	Q Base Rebate *(H x M x P)*	R Eligible Efficiency Bonus *(K – L)*	S Bonus Rebate* $/Ton *(Table 3)*	T Water Cooled Bonus Rebate *(R x S) x (H x M) x 100*	U Air Cooled Bonus Rebate *(R x S) x (H x M) x 10*	V Total Rebate *(Q+T) or (Q+U)*
1.														$	$	$		$	$	$	$
2.														$	$	$		$	$	$	$
3.														$	$	$		$	$	$	$
4.														$	$	$		$	$	$	$
5.														$	$	$		$	$	$	$
6.														$	$	$		$	$	$	$

TOTAL $

TABLE 3 – QUALIFYING EFFICIENCIES AND REBATE SCHEDULE

Unit Code	Qualifying Equipment (Water or Air Cooled)	Full-Load Efficiency	IPLV Efficiency	Base Rebate $/Ton	Efficiency Bonus* Rebate ($/Ton)
C–1	Water-Cooled Screw/Scroll Chiller – Less than 150 Tons	0.74 kW per Ton	0.63 kW per Ton	$15	$3.50/IPLV
C–2	Water-Cooled Screw/Scroll Chiller – 150 to 299 Tons	0.67 kW per Ton	0.58 kW per Ton	$15	$3.50/IPLV
C–3	Water-Cooled Screw/Scroll Chiller – 300 Tons and Greater	0.59 kW per Ton	0.52 kW per Ton	$15	$3.50/IPLV
C–4	Water-Cooled Centrifugal Chiller – Less than 150 Tons	0.69 kW per Ton	0.65 kW per Ton	$15	$3.50/IPLV
C–5	Water-Cooled Centrifugal Chiller – 150 to 299 Tons	0.62 kW per Ton	0.58 kW per Ton	$15	$3.50/IPLV
C–6	Water-Cooled Centrifugal Chiller – 300 Tons and Greater	0.56 kW per Ton	0.53 kW per Ton	$15	$3.50/IPLV
C–7	Air-Cooled Chiller (all types)	9.7 EER	12.0 EER	$8	$2.25/IPLV

* Efficiency Bonus Rebate provides additional incentive for each .01 kW per Ton below the Minimum IPLV Efficiency (water-cooled chillers), or for each 0.1 EER above the minimum IPLV efficiency (air-cooled chillers).

IPLV – Integrated Part Load Value; EER – Energy Efficiency Rating

Note: Qualifying chillers must meet both full load and IPLV minimum efficiency requirements shown in Table 3 above to be eligible and have kW per Ton ratings stamped on the nameplate. **Documentation is required.** This can be a printout from the AHRI directory (www.ahridirectory.org) or if the chiller has not been tested by AHRI, manufacturer documentation must show the rated capacity (tons), and the IPLV efficiency and full-load efficiency at AHRI standard 550/590 rating conditions.

The motors and/or variable speed drives in chiller units <u>are not</u> independently eligible for additional rebates offered under the Commercial Motor and Variable Speed Drive Rebate Program.

TABLE 4 – GUIDELINES FOR COOLING HOURS

Business Type	Estimated Hours
Education – Community College	632
Education – Secondary School	384
Education – University	828
Health/Medical – Clinic	756
Health/Medical – Hospital	1,408
Lodging	1,193
Office	902
Retail	867

6. TERMS AND CONDITIONS

1. ELIGIBILITY
Rebates are available to non-residential electric customers of Austin Utilities, Owatonna Public Utilities, and Rochester Public Utilities (herein referred to as The Utility). All products must be in use in facilities in The Utility service territory.

2. APPLICATION
Program is offered January 1 through December 31 of the respective calendar year. **Due to limited funding, this rebate offer can be changed or withdrawn at any time without notice and is available on a first-come, first-serve basis.** The entire rebate application must be read and filled out completely or application will be returned.

3. INSPECTION AND VERIFICATION
The Utility reserves the right to inspect the customer's facility through on-site visits before and after new equipment installation to verify rebate eligibility.

4. INSTALLATION AND REBATE AMOUNTS
Qualifying energy-efficient equipment installed and operational within six (6) months of the date of purchase are eligible for rebate. Additional time may be granted subject to The Utility's pre-approval. In no case will the rebate paid by The Utility exceed the purchase price of the equipment. The maximum rebate amount is $100,000 per customer location per technology per year. The Utility can, at its sole discretion, increase rebate amounts.

5. INVOICE AND PAYMENT
Following inspection and verification (see #3) and completed installation, the customer must notify The Utility and submit original invoices specifying the quantity and price of all materials purchased, the date ordered, installation costs, and applicable taxes. Additionally, SEER/EER (Rooftop, Packaged, and Condensing A/C Units) certification data or manufacturer's kW per Ton (Central Chillers) is required to be submitted with invoices. After satisfactory review of the application and invoices, a rebate check or bill credit will be issued to the customer. Please allow 6-10 weeks from the date of application submission for delivery of rebate check or bill credit.

6. EQUIPMENT ELIGIBILITY REQUIREMENTS
Eligible high-efficiency cooling equipment must be new and meet or exceed The Utility's minimum efficiency requirements as identified in Tables 1 and 3 according to its respective characteristics. Eligible high-efficiency cooling units must replace units of lesser efficiencies and of equivalent or greater capacity (Tons or Btu's/hour) to qualify for a rebate.

Rooftop, Packaged, and Condensing A/C Units: Qualifying unitary A/C units must have been rated in accordance with the most recent version of AHRI Standard 210/240 if under 65,000 BTU/hour and AHRI 340/360 if above 65,000 BTU/hour, and have nameplate data stamped with the SEER/EER. If equipment is larger than the AHRI Standard certification process, it must be listed as a standard combination in manufacturer's literature. A copy of the manufacturer's applicable unit rating must accompany this application. The AHRI directory and standards are located at www.ahridirectory.org.

Central Chillers: Qualifying chillers must meet the efficiency requirements shown in Table 3 to be eligible and have kW per Ton ratings stamped on the nameplate. Documentation is required. This can be a printout from the AHRI directory (www.ahridirectory.org) or if the chiller has not been tested by AHRI, manufacturer documentation must show the rated capacity (tons), and the IPLV efficiency and the full-load efficiency at AHRI standard 550/590 rating conditions:
- 44° F leaving chilled water temperature
- 85° F entering condenser water temperature (for water cooled chillers)
- 95° F entering condenser air temperature (for air cooled chillers)

7. TAX INFORMATION
The Utility will not be responsible for any tax liability imposed as a result of the rebate payment(s). Customers are advised to consult their tax advisors for details.

8. DISCLAIMER
The Utility does not guarantee that the implementation of energy-efficient measures or use of the equipment purchased or installed pursuant to this program will result in energy or cost savings. The Utility makes no warranties, expressed or implied, with respect to any equipment purchased or installed including, but not limited to, any warrant of merchantability or fitness for purpose. In no event shall The Utility be liable for any incidental or consequential damages. Customers are solely responsible for the proper disposal of existing equipment. Consult the Minnesota Pollution Control Agency (MPCA) office for details at (800) 657-3864.

9. ENDORSEMENT
The Utility does not endorse any particular vendor, manufacturer, product, or system in promoting this rebate program. Listing a vendor or product does not constitute an endorsement, nor does it imply that unlisted vendors or products are deficient or defective in any way.

10. PRIVACY
Information contained in this rebate application may be shared with the Minnesota Department of Commerce and our co-op partners and also may be used in our advertising efforts with your permission as granted in Section 2 of this rebate application.

RETURN COMPLETED APPLICATION AND REQUIRED DOCUMENTATION TO YOUR UTILITY PROVIDER:

Austin Utilities	Owatonna Public Utilities	Rochester Public Utilities
Attn: Rebate Processing	Attn: Rebate Processing	Attn: Rebate Processing
400 - 4th Street NE	P.O. Box 800	4000 East River Road NE
Austin, MN 55912	Owatonna, MN 55060	Rochester, MN 55906-2813
(507) 433-8886	(507) 451-2480	(507) 280-1500
(507) 433-5045 fax	(507) 451-4940 fax	(507) 280-1542 fax
www.austinutilities.com	www.owatonnautilities.com	www.rpu.org

PLEASE PRINT ON RECYCLED PAPER

COUNTY OF Olmsted

8/15/2012

OWEF - Solid Waste Division
2122 Campus Dr. SE
Rochester MN, 55904

Customer: 2370
ROCHESTER COMMUNITY COLLE
851 30TH AVENUE SE
ROCHESTER, MN 55904

The following charges are for July
Please call Justin @ 328-7057 with any questions.

DATE:	DESCRIPTION:	QUANTITY:	UNIT PRICE:	TOTAL:
7/31/2012	Previous Statement Balance		0	$7,995.18
7/31/2012	Payment - ITACH073012WR		0	($7,995.18)
7/31/2012	Steam Sales Firm - Heintz	57.10	14.64	$835.94
7/31/2012	Steam Sales Firm - UCR	138.20	14.64	$2,023.25
7/31/2012	Steam Sales Firm - Sports Center	16.50	14.64	$241.56
7/31/2012	Meter Service Charge	3.00	2.1	$6.30
7/31/2012	BTU Meter Serv Chg	3.00	21	$63.00
7/31/2012	Steam Gas Rate - Sports Center	16.50	4.4808	$73.93
7/31/2012	Steam Gas Rate - Heintz	57.10	4.4808	$255.85
7/31/2012	Steam Gas Rate - UCR	138.20	4.4808	$619.25
7/31/2012	Steam Interrupt Rate - Sports Center	16.50	4	($66.00)
7/31/2012	Steam Interrupt Rate - Heintz	57.10	4	($228.40)
7/31/2012	Steam Interrupt Rate - UCR	138.20	4	($552.80)

Payment Due	Current	Previous Balance
$3,271.88	$3,271.88	$0.00

C. Kellas 8-27-12

AUG 20 2012

COUNTY OF Olmsted

9/21/2012

OWEF - Solid Waste Division
2122 Campus Dr. SE
Rochester MN, 55904

Steam Heat

Customer: 2370
ROCHESTER COMMUNITY COLLE
851 30TH AVENUE SE
ROCHESTER, MN 55904

The following charges are for August
Please call Justin @ 328-7057 with any questions.

DATE:	DESCRIPTION:	QUANTITY:	UNIT PRICE:	TOTAL :
8/31/2012	Previous Statement Balance		0	$3,271.88
8/31/2012	Payment - TACH082912WR		0	($3,271.88)
8/31/2012	Meter Service Charge	3.00	2.1	$6.30
8/31/2012	BTU Meter Serv Chg	3.00	21	$63.00

Payment Due	Current	Previous Balance
$69.30	$69.30	$0.00

10-4-12

SEP 24 2012

C. Kelbas

Appendix D

Opinion of Probable Cost Information

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12	Job No.	24482-01-00
Checked by		Date		Subject	RCTC
Approved by		Date			Chilled Water Study
					TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
					OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
<u>TRADITIONAL CENTRIFUGAL CHILLERS</u> (No VFD)						
OPTION 1						
Phase 1						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
2000A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,599,534
				Undeveloped Design Details - 30%		$1,079,860
				Contractor Overhead - 15%		$701,909
				Contractor Profit - 10%		$538,130
				Adminstration and Engineering - 15%		$887,915
				TOTAL COST		$6,807,349
				PROBABLE COST USE		**$6,810,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,010,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (With VFD)						
OPTION 2						
Phase 1						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1600A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,661,534
				Undeveloped Design Details - 30%		$1,098,460
				Contractor Overhead - 15%		$713,999
				Contractor Profit - 10%		$547,399
				Adminstration and Engineering - 15%		$903,209
				TOTAL COST		$6,924,602
				PROBABLE COST USE		**$6,920,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,340,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12	Job No.	24482-01-00
Checked by		Date		Subject	RCTC
Approved by		Date			Chilled Water Study
					ABSORPTION CHILLERS
					OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
ABSORPTION CHILLERS						
OPTION 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1200A Main Switch Board (MSB)	1	EA	$15,000.00	$10,000.00	$25,000.00	$25,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	9200	SF	$125.00	$75.00	$200.00	$1,840,000
				SUBTOTAL		$4,126,134
				Undeveloped Design Details - 30%		$1,237,840
				Contractor Overhead - 15%		$804,596
				Contractor Profit - 10%		$616,857
				Adminstration and Engineering - 15%		$1,017,814
				TOTAL COST		$7,803,241
				PROBABLE COST USE		**$7,800,000**
Phase 2						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$9,860,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Through the Building - OPTION B						
PHASE 1						
12" Direct Buried AWWA Pipe	440	LF	$13.69	$16.89	$30.58	$13,455
12" AWWA LR Elbow	4	EA	$184.00	$126.00	$310.00	$1,240
12" Steel Pipe	745	LF	$89.00	$68.78	$157.78	$117,546
12" Pipe Insulation with Jacket	745	LF	$20.50	$8.95	$29.45	$21,940
6" Steel Pipe	300	LF	$37.50	$35.97	$73.47	$22,041
6" Pipe Insulation with Jacket	300	LF	$12.40	$6.80	$19.20	$5,760
4" Steel Pipe	360	LF	$23.50	$22.93	$46.43	$16,715
4" Pipe Insulation with Jacket	360	LF	$9.95	$6.20	$16.15	$5,814
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
12" Steel Elbow	6	EA	$3,775.00	$208.00	$3,983.00	$23,898
6" Steel Elbow	8	EA	$495.00	$139.00	$634.00	$5,072
4" Steel Elbow	4	EA	$315.00	$100.00	$415.00	$1,660
3" Steel Elbow	3	EA	$255.00	$73.00	$328.00	$984
12"x12"x4" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x12"x8" Steel Tee	2	EA	$5,875.00	$415.00	$6,290.00	$12,580
6"x6"x3" Steel Tee	2	EA	$950.00	$208.00	$1,158.00	$2,316
12"x6" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Demo and Replace Lay-In Ceiling	6408	SF	$2.21	$1.42	$3.63	$23,261
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$518,976
				Difficult Working Conditions - 20%		$103,795
				Undeveloped Design Details - 30%		$186,831
				Contractor Overhead - 15%		$121,440
				Contractor Profit - 10%		$93,104
				Adminstration and Engineering - 15%		$153,622
				TOTAL COST		$1,177,770
				PROBABLE COST USE		**$1,178,000**
PHASE 2						
12" Steel Pipe	420	LF	$89.00	$68.78	$157.78	$66,268
12" Pipe Insulation with Jacket	420	LF	$20.50	$8.95	$29.45	$12,369
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
12"x12"x12" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$161,052
				Difficult Working Conditions - 20%		$32,210
				Undeveloped Design Details - 30%		$57,979
				Contractor Overhead - 15%		$37,686
				Contractor Profit - 10%		$28,893
				Adminstration and Engineering - 15%		$47,673
				TOTAL COST		$365,493
				PROBABLE COST USE		**$365,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2365	LF	$11.85	$15.25	$27.10	$64,092
8" AWWA LR Elbow	12	EA	$144.00	$99.00	$243.00	$2,916
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
8" Steel Elbow	4	EA	$855.00	$156.00	$1,011.00	$4,044
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
				SUBTOTAL PHASE 3		$119,497
				Undeveloped Design Details - 30%		$35,849
				Contractor Overhead - 15%		$23,302
				Contractor Profit - 10%		$17,865
				Adminstration and Engineering - 15%		$11,552
				TOTAL COST		$208,065
				PROBABLE COST USE		**$208,000**
				TOTAL - OPTION B (ALL 3 PHASES):		**$1,751,000**

Stanley Consultants INC.		Job No.	24482-01-00
		Subject	RCTC
Computed by Kyle Johnson	Date 12-Dec-12		Chilled Water Study
Checked by	Date		Distribution Outside the Building
Approved by	Date		Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Outside the Building - OPTION A						
PHASE 1						
12" Direct Buried AWWA Pipe	1025	LF	$13.69	$16.89	$30.58	$31,345
8" Direct Buried AWWA Pipe	260	LF	$11.85	$15.25	$27.10	$7,046
6" Direct Buried AWWA Pipe	1620	LF	$10.64	$14.27	$24.91	$40,354
4" Direct Buried AWWA Pipe	240	LF	$6.54	$13.52	$20.06	$4,814
12"x12" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
12"x4" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
8"x4" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
8"x6" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
12" AWWA LR Elbow	2	EA	$184.00	$126.00	$310.00	$620
6" AWWA LR Elbow	8	EA	$76.00	$58.00	$134.00	$1,072
8" AWWA Direct Buried Valve	2	EA	$825.00	$217.00	$1,042.00	$2,084
12" AWWA Direct Buried Valve	4	EA	$1,400.00	$217.00	$1,617.00	$6,468
12"x8" AWWA Reducer	2	EA	$475.00	$10.60	$485.60	$971
8"x4" AWWA Reducer	2	EA	$234.00	$10.60	$244.60	$489
6" Steel Pipe	40	LF	$37.50	$35.97	$73.47	$2,939
6" Pipe Insulation with Jacket	40	LF	$12.40	$6.80	$19.20	$768
4" Steel Pipe	120	LF	$23.50	$22.93	$46.43	$5,572
4" Pipe Insulation with Jacket	120	LF	$9.95	$6.20	$16.15	$1,938
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
				SUBTOTAL PHASE 1		$309,014
				Undeveloped Design Details - 30%		$92,704
				Contractor Overhead - 15%		$60,258
				Contractor Profit - 10%		$46,198
				Adminstration and Engineering - 15%		$76,226
				TOTAL COST		$584,399
				PROBABLE COST USE		**$584,000**
PHASE 2						
12" Direct Buried AWWA Pipe	10	LF	$13.69	$16.89	$30.58	$306
8" Direct Buried AWWA Pipe	40	LF	$11.85	$15.25	$27.10	$1,084
12"x8" AWWA Reducer	2	E	$475.00	$10.60	$485.60	$971
12"x8" AWWA Tee	2	E	$306.00	$197.00	$503.00	$1,006
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
				SUBTOTAL PHASE 2		$25,314
				Undeveloped Design Details - 30%		$7,594
				Contractor Overhead - 15%		$4,936
				Contractor Profit - 10%		$3,784
				Adminstration and Engineering - 15%		$6,244
				TOTAL COST		$47,873
				PROBABLE COST USE		**$48,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2800	LF	$11.85	$15.25	$27.10	$75,880
8" AWWA Reducer	10	EA	$234.00	$10.60	$244.60	$2,446
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
			SUBTOTAL PHASE 3			$104,043
			Undeveloped Design Details - 30%			$31,213
			Contractor Overhead - 15%			$20,288
			Contractor Profit - 10%			$15,554
			Adminstration and Engineering - 15%			$25,665
			TOTAL COST			$196,763
			PROBABLE COST USE			**$197,000**
		TOTAL - OPTION A (ALL 3 PHASES):				**$829,000**

Appendix E

Life Cycle Cost Analysis

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Chilled Water Plant Comparison Analysis Input & Results Summary

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Variable Cost Inputs

Demand Charge-Summer		**Energy Charge - Summer**		**On/Off Peak Split**	
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	On-Peak	70%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261	Off-Peak	30%
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
				Summer/Winter Split	
Demand Charge-Winter		**Energy Charge - Winter**		Summer	70%
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	Winter	30%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261		
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
Variable Cost Rates		**Fuel Cost (at Central Plant)**			
Purchased Steam Rate (per klb)	$17.64	Natural Gas (Per MMBtu)	$7.20	NOT USED	
Purchased CHW Rate (per ton-hr)	$0.000	Other Stm Costs (Per MMBtu)	$1.80	NOT USED	
Water Rate (per 1,000 Gal)	$0.93				
Sewage Rate (per 1,000 Gal)	$3.30				
Miscellaneous Cost (% of energy cost)	0.0%				

PV Calculation Inputs		**Load Profile Inputs**		**Steam Conditions**	
Period (years)	25	Elec Demand Transformer Losses	5%	Steam Inlet Pressure (psig)	50.0
Discount Rate	4.0%	Auxiliaries Electrical Demand (kW/ton)	0.01	Steam Inlet Temperature (°F)	400.0
Interest Rate	1.0%	Peak Make-up Water (gpm)	300	Steam Exhaust Pressure (psig)	-13.2
Variable Cost Escalation	3.0%	Peak Sewage (gpm)	50	Steam Exhaust Temperature (°F)	115.69
O&M Cost Escalation	2.0%			Condensate Pressure (psig)	0.0
Capital Cost Escalation	4.0%			Condensate Temperature (°F)	115.69
				Condensate Enthalpy (Btu/lb)	83.00

Note: Additional Input on the PV Analysis Page

Note: Additional Input on the Load Profile Case Pages

Cases

Case	Description	Temperatures	Chilled Water Source
Case 1	Central plant with constant speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 2	Central Plant with magnetic bearing variable speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 3	Central Plant with absorption chillers	42 °F Supply, 12 °F ΔT	Self Generated
Case 4	not used		Purchased

St Luke's Hospital Building Chillers vs. Central Chiller Plant Present Value Results Summary

	Case 1	Case 2	Case 3	Case 4
25-year Present Value ($)	$16,829,609	$16,573,690	$23,886,953	$0
Average Calculated CHW Cost ($/ton-hr)	$0.11	$0.11	$0.29	#DIV/0!

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	4.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 1 - Central plant with constant speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment (Equity)	$ 7,975,425	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 347,641	$ 358,070	$ 368,812	$ 379,876	$ 391,273	$ 403,011	$ 415,101	$ 427,554	$ 440,381	$ 453,592	$ 467,200	$ 481,216	$ 495,652	$ 510,522	$ 525,838	$ 541,613	$ 557,861	$ 574,597	$ 591,835	$ 609,590
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 8,804,425**	**$ 373,980**	**$ 385,199**	**$ 396,755**	**$ 408,658**	**$ 420,918**	**$ 433,545**	**$ 446,551**	**$ 459,948**	**$ 473,746**	**$ 487,959**	**$ 502,598**	**$ 517,675**	**$ 533,206**	**$ 549,202**	**$ 565,678**	**$ 582,648**	**$ 600,128**	**$ 618,132**	**$ 636,675**	**$ 655,776**
Calculated CHW Cost (per ton-hr)		**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**	**$ 0.13**	**$ 0.14**

25-year Present Value Cost **$ 16,829,609**

Case 2 - Central Plant with magnetic bearing variable speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ 8,219,325	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 324,349	$ 334,079	$ 344,102	$ 354,425	$ 365,057	$ 376,009	$ 387,289	$ 398,908	$ 410,875	$ 423,201	$ 435,898	$ 448,974	$ 462,444	$ 476,317	$ 490,607	$ 505,325	$ 520,484	$ 536,099	$ 552,182	$ 568,747
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 9,048,325**	**$ 350,688**	**$ 361,208**	**$ 372,045**	**$ 383,206**	**$ 394,702**	**$ 406,543**	**$ 418,740**	**$ 431,302**	**$ 444,241**	**$ 457,568**	**$ 471,295**	**$ 485,434**	**$ 499,997**	**$ 514,997**	**$ 530,447**	**$ 546,360**	**$ 562,751**	**$ 579,633**	**$ 597,023**	**$ 614,933**
Calculated CHW Cost (per ton-hr)		**$ 0.07**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**

25-year Present Value Cost **$ 16,573,690**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	4.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

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Comparison of Cooling System Costs

Case 3 - Central Plant with absorption chillers: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment	$ 2,840,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 915,833	$ 943,308	$ 971,607	$ 1,000,756	$ 1,030,778	$ 1,061,702	$ 1,093,553	$ 1,126,359	$ 1,160,150	$ 1,194,954
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 3,669,000**	**$ 942,172**	**$ 970,437**	**$ 999,551**	**$ 1,029,537**	**$ 1,060,423**	**$ 1,092,236**	**$ 1,125,003**	**$ 1,158,753**	**$ 1,193,516**	**$ 1,229,321**
Calculated CHW Cost (per ton-hr)		**$ 0.20**	**$ 0.20**	**$ 0.21**	**$ 0.22**	**$ 0.22**	**$ 0.23**	**$ 0.24**	**$ 0.24**	**$ 0.25**	**$ 0.26**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ 1,230,803	$ 1,267,727	$ 1,305,759	$ 1,344,932	$ 1,385,280	$ 1,426,838	$ 1,469,643	$ 1,513,733	$ 1,559,145	$ 1,605,919
Water Cost	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 1,266,201**	**$ 1,304,187**	**$ 1,343,312**	**$ 1,383,612**	**$ 1,425,120**	**$ 1,467,874**	**$ 1,511,910**	**$ 1,557,267**	**$ 1,603,985**	**$ 1,652,105**
Calculated CHW Cost (per ton-hr)	**$ 0.27**	**$ 0.27**	**$ 0.28**	**$ 0.29**	**$ 0.30**	**$ 0.31**	**$ 0.32**	**$ 0.33**	**$ 0.34**	**$ 0.35**

25-year Present Value Cost **$ 23,886,953**

Case 4 - not used: 0

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

25-year Present Value Cost **$ -**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Capital Cost Calculation

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 1 **Central plant with constant speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,810,000	$	6,810,000	85.4%
Phase 2		1	ls	$600,000	$	600,000	7.5%
Phase 3		1	ls	$600,000	$	600,000	7.5%
Rebate		1	ls	($34,575)	$	(34,575)	
	Total				**$**	**7,975,425**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 2 **Central Plant with magnetic bearing variable speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,920,000	$	6,920,000	84.2%
Phase 2		1	ls	$710,000	$	710,000	8.6%
Phase 3		1	ls	$710,000	$	710,000	8.6%
Rebate		1	ls	($120,675)	$	(120,675)	
	Total				**$**	**8,219,325**	**101%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 3 **Central Plant with absorption chillers**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$780,000	$	780,000	27.5%
Phase 2		1	ls	$1,030,000	$	1,030,000	36.3%
Phase 3		1	ls	$1,030,000	$	1,030,000	36.3%
					$	-	
	Total				**$**	**2,840,000**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 4 **not used**
0

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Chillers		1	ea	$0	$	-	#DIV/0!
Chilled water pumps		1	ea	$0	$	-	#DIV/0!
AHU Coils		1	ea	$0	$	-	#DIV/0!
	Total				**$**	**-**	**#DIV/0!**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

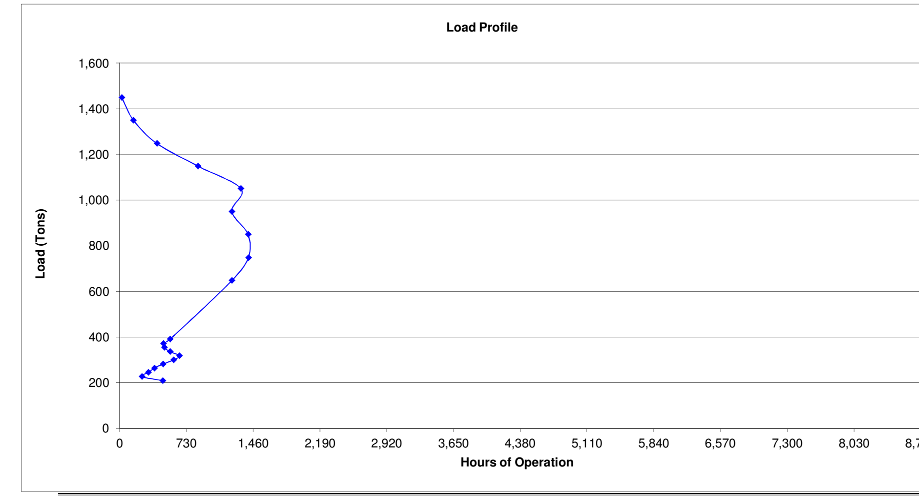
Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,712	0	11,592	69,552	11,592
90=>94	1,350	14	25	37,598	0	67,500	405,000	67,500
85=>89	1,248	12	68	90,635	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	168,644	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	233,906	0	464,100	2,784,600	464,100
70=>74	950	10	204	296,028	0	582,350	2,329,400	388,233
65=>69	850	9	234	289,598	0	596,700	2,386,800	397,800
60=>64	748	7	235	242,934	0	526,592	2,106,368	351,061
55=>59	648	6	205	174,003	0	397,872	1,591,488	265,248
50=>54	391	4	92	91,009	0	215,832	431,664	71,944
45=>49	372	4	80	70,889	0	177,816	355,632	59,272
40=>44	354	4	81	67,695	0	172,398	344,796	57,466
35=>39	336	3	92	72,643	0	185,472	370,944	61,824
30=>34	318	3	109	81,539	0	207,654	415,308	69,218
25=>29	300	3	99	69,797	0	177,300	354,600	59,100
20=>24	282	3	79	53,134	0	133,950	267,900	44,650
15=>19	264	3	63	40,089	0	100,056	200,112	33,352
10=>14	245	2	52	31,262	0	76,685	153,370	25,562
5=>9	227	2	40	22,889	0	54,934	109,868	18,311
0=>4	209	2	78	42,108	0	98,230	196,460	32,743
Total/Avg				**2,183,112**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	391	0.420	164	552	90,649	0	0.0	0.0	215,832
45=>49	372	0.397	148	478	70,593	0	0.0	0.0	177,816
40=>44	354	0.391	138	487	67,408	0	0.0	0.0	172,398
35=>39	336	0.390	131	552	72,334	0	0.0	0.0	185,472
30=>34	318	0.391	124	653	81,193	0	0.0	0.0	207,654
25=>29	300	0.392	118	591	69,502	0	0.0	0.0	177,300
20=>24	282	0.395	111	475	52,910	0	0.0	0.0	133,950
15=>19	264	0.399	105	379	39,922	0	0.0	0.0	100,056
10=>14	245	0.406	99	313	31,134	0	0.0	0.0	76,685
5=>9	227	0.415	94	242	22,798	0	0.0	0.0	54,934
0=>4	209	0.427	89	470	41,944	0	0.0	0.0	98,230
Total/Avg		**0.433**	**3,195**	**8,746**	**1,315,594**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.480**	**1,872**	**3,554**	**675,207**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.510**	**921**	**921**	**177,431**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	**High Bin**	**Chiller 1 Peak Demand (kW)**	**Chiller 2 Peak Demand (kW)**	**Chiller 3 Peak Demand (kW)**	**Chiller 4 Peak Demand (kW)**	**Chiller 5 Peak Demand (kW)**	**Chiller 6 Peak Demand (kW)**	**Total PCHWP Demand (kW)**	**Total CWP Demand (kW)**	**Total Cooling Tower Demand (kW)**	**Peak Demand (kW)**
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

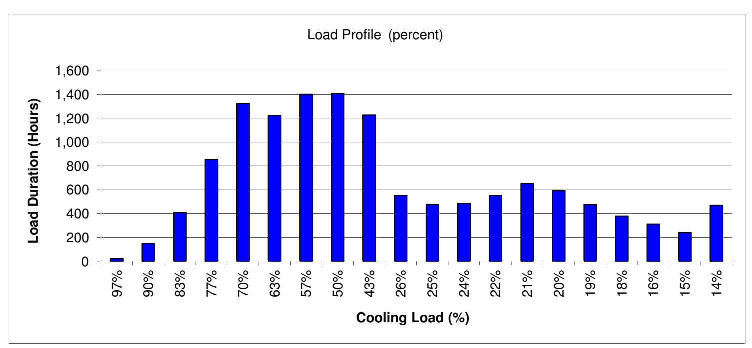
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	**Chiller 1 Load (Tons)**	**Chiller 2 Load (Tons)**	**Chiller 3 Load (Tons)**	**Chiller 4 Load (Tons)**	**Chiller 5 Load (Tons)**	**Chiller 6 Load (Tons)**	**Total Load (Tons)**	**Percent Load**
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	**Chiller 1 Demand (kW/ton)**	**Chiller 2 Efficiency (kW/ton)**	**Chiller 3 Efficiency (kW/ton)**	**Chiller 4 Efficiency (kW/ton)**	**Chiller 5 Efficiency (kW/ton)**	**Chiller 6 Efficiency (kW/ton)**
95=>99	0.574	0.574	0.574	0.000	0.000	0.000
90=>94	0.552	0.552	0.552	0.000	0.000	0.000
85=>89	0.529	0.529	0.529	0.000	0.000	0.000
80=>84	0.510	0.510	0.510	0.000	0.000	0.000
75=>79	0.499	0.499	0.499	0.000	0.000	0.000
70=>74	0.505	0.505	0.000	0.000	0.000	0.000
65=>69	0.482	0.482	0.000	0.000	0.000	0.000
60=>64	0.458	0.458	0.000	0.000	0.000	0.000
55=>59	0.434	0.434	0.000	0.000	0.000	0.000
50=>54	0.420	0.000	0.000	0.000	0.000	0.000
45=>49	0.397	0.000	0.000	0.000	0.000	0.000
40=>44	0.391	0.000	0.000	0.000	0.000	0.000
35=>39	0.390	0.000	0.000	0.000	0.000	0.000
30=>34	0.391	0.000	0.000	0.000	0.000	0.000
25=>29	0.392	0.000	0.000	0.000	0.000	0.000
20=>24	0.395	0.000	0.000	0.000	0.000	0.000
15=>19	0.399	0.000	0.000	0.000	0.000	0.000
10=>14	0.406	0.000	0.000	0.000	0.000	0.000
5=>9	0.415	0.000	0.000	0.000	0.000	0.000
0=>4	0.427	0.000	0.000	0.000	0.000	0.000
Average	**0.433**	**0.480**	**0.510**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	**Chiller 1 Demand (lb/ton)**	**Chiller 2 Demand (lb/ton)**	**Chiller 3 Demand (lb/ton)**	**Chiller 4 Demand (lb/ton)**	**Chiller 5 Demand (lb/ton)**	**Chiller 6 Demand (lb/ton)**
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	**Chiller 1 Operational Hours**	**Chiller 2 Operational Hours**	**Chiller 3 Operational Hours**	**Chiller 4 Operational Hours**	**Chiller 5 Operational Hours**	**Chiller 6 Operational Hours**	**Cumulative Operational Hours**
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	39.96	92%	1
PCHWP 2	39.96	92%	1
PCHWP 3	39.96	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	24.35	92%	1
CWP 2	24.35	92%	1
CWP 3	24.35	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	20	20	20	0	0	0	59
90=>94	20	20	20	0	0	0	59
85=>89	20	20	20	0	0	0	59
80=>84	20	20	20	0	0	0	59
75=>79	20	20	20	0	0	0	59
70=>74	20	20	0	0	0	0	39
65=>69	20	20	0	0	0	0	39
60=>64	20	20	0	0	0	0	39
55=>59	20	20	0	0	0	0	39
50=>54	20	0	0	0	0	0	20
45=>49	20	0	0	0	0	0	20
40=>44	20	0	0	0	0	0	20
35=>39	20	0	0	0	0	0	20
30=>34	20	0	0	0	0	0	20
25=>29	20	0	0	0	0	0	20
20=>24	20	0	0	0	0	0	20
15=>19	20	0	0	0	0	0	20
10=>14	20	0	0	0	0	0	20
5=>9	20	0	0	0	0	0	20
0=>4	20	0	0	0	0	0	20
Total/Avg	**394**	**177**	**99**	**0**	**0**	**0**	**670**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	158	158	158	0	0	0	473
90=>94	985	985	985	0	0	0	2,955
85=>89	2,679	2,679	2,679	0	0	0	8,038
80=>84	5,615	5,615	5,615	0	0	0	16,844
75=>79	8,707	8,707	8,707	0	0	0	26,122
70=>74	12,076	12,076	0	0	0	0	24,152
65=>69	13,829	13,829	0	0	0	0	27,659
60=>64	13,869	13,869	0	0	0	0	27,738
55=>59	12,096	12,096	0	0	0	0	24,192
50=>54	10,874	0	0	0	0	0	10,874
45=>49	9,417	0	0	0	0	0	9,417
40=>44	9,594	0	0	0	0	0	9,594
35=>39	10,874	0	0	0	0	0	10,874
30=>34	12,864	0	0	0	0	0	12,864
25=>29	11,643	0	0	0	0	0	11,643
20=>24	9,358	0	0	0	0	0	9,358
15=>19	7,466	0	0	0	0	0	7,466
10=>14	6,166	0	0	0	0	0	6,166
5=>9	4,767	0	0	0	0	0	4,767
0=>4	9,259	0	0	0	0	0	9,259
Total/Avg	**172,296**	**70,014**	**18,144**	**0**	**0**	**0**	**260,454**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 1 Central plant with constant speed chiller

Input Data Summary

Energy Charge Multiplier
1.00

Demand Charge-Summer		**Energy Charge - Summer**	
First 200-kW	$16.46	On Peak	$0.05261
Next 800-kW	$16.46	Off Peak	$0.05261
Over 1000 kW	$16.46	Energy Cost Adj	$0.00000
Demand Charge-Winter		**Energy Charge - Winter**	
First 200-kW	$16.46	On Peak	$0.05261
Next 800-kW	$16.46	Off Peak	$0.05261
Over 1000 kW	$16.46	Energy Cost Adj	$0.00000
On/Off Peak Split		**Summer/Winter Split**	
On Peak	70%	Summer	70%
Off Peak	30%	Winter	30%

Chilled Water Source	Self Generated		
Purchased Steam Rate (per klb)	$17.64	Per kLB	
Purchased CHW Rate (per ton-hr)	$0.000	Per Ton-hr	
Water Rate (per 1,000 Gal)	$0.93	Per 1000 Gal	
Sewage Rate (per 1,000 Gal)	$3.30	Per 1000 Gal	
Miscellaneous Cost (% of energy cost)	0%	of Energy Cost	
Natural Gas	$7.20	Per MMbtu	NOT USED
Other Stm Costs	$1.80	Per MMbtu	NOT USED

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													2,183,112
Chilled Water Pump Energy Usage (kWh):													428,360
Condenser Water Pump Energy Usage (kWh):													260,454
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													3,300,287
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,310,201
Off Peak Energy Usage - kWh													990,086
													3,300,287
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$121,540
Off Peak Energy Cost													$52,088
EECR & AEP Cost													$0
Electricity Cost													$347,641
Total Energy Cost													**$347,641**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

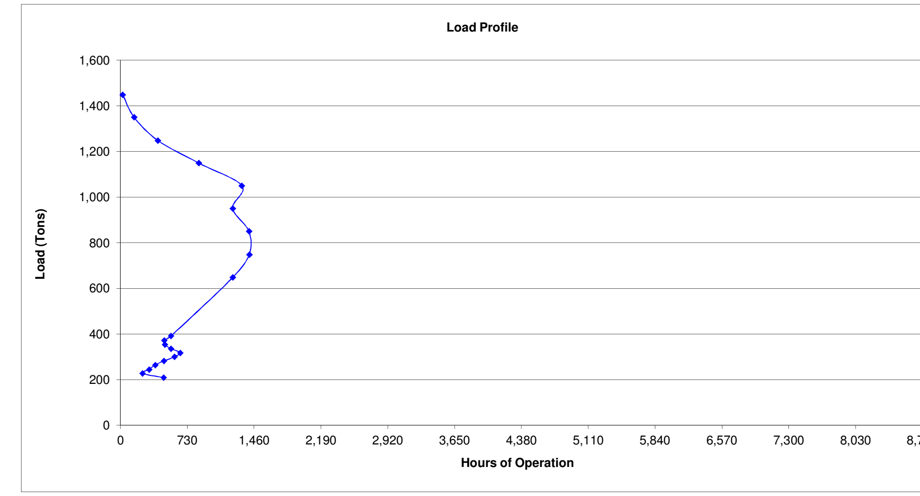
Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,758	0	11,592	69,552	11,592
90=>94	1,350	14	25	36,518	0	67,500	405,000	67,500
85=>89	1,248	12	68	83,676	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	146,704	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	191,673	0	464,100	2,784,600	464,100
70=>74	950	10	204	270,987	0	582,350	2,329,400	388,233
65=>69	850	9	234	245,443	0	596,700	2,386,800	397,800
60=>64	748	7	235	185,536	0	526,592	2,106,368	351,061
55=>59	648	6	205	117,107	0	397,872	1,591,488	265,248
50=>54	391	4	92	65,973	0	215,832	431,664	71,944
45=>49	372	4	80	47,951	0	177,816	355,632	59,272
40=>44	354	4	81	44,421	0	172,398	344,796	57,466
35=>39	336	3	92	45,935	0	185,472	370,944	61,824
30=>34	318	3	109	49,768	0	207,654	415,308	69,218
25=>29	300	3	99	41,075	0	177,300	354,600	59,100
20=>24	282	3	79	30,094	0	133,950	267,900	44,650
15=>19	264	3	63	21,779	0	100,056	200,112	33,352
10=>14	245	2	52	16,308	0	76,685	153,370	25,562
5=>9	227	2	40	11,463	0	54,934	109,868	18,311
0=>4	209	2	78	20,399	0	98,230	196,460	32,743
Total/Avg				**1,679,567**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	391	0.304	119	552	65,613	0	0.0	0.0	215,832
45=>49	372	0.268	100	478	47,655	0	0.0	0.0	177,816
40=>44	354	0.256	91	487	44,134	0	0.0	0.0	172,398
35=>39	336	0.246	83	552	45,626	0	0.0	0.0	185,472
30=>34	318	0.238	76	653	49,422	0	0.0	0.0	207,654
25=>29	300	0.230	69	591	40,779	0	0.0	0.0	177,300
20=>24	282	0.223	63	475	29,871	0	0.0	0.0	133,950
15=>19	264	0.216	57	379	21,612	0	0.0	0.0	100,056
10=>14	245	0.211	52	313	16,181	0	0.0	0.0	76,685
5=>9	227	0.207	47	242	11,371	0	0.0	0.0	54,934
0=>4	209	0.206	43	470	20,235	0	0.0	0.0	98,230
Total/Avg		**0.303**	**2,452**	**8,746**	**951,905**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.393**	**1,654**	**3,554**	**559,406**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.439**	**921**	**921**	**153,376**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)

Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

Chiller Input

CHILLER LOAD PROFILE

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)

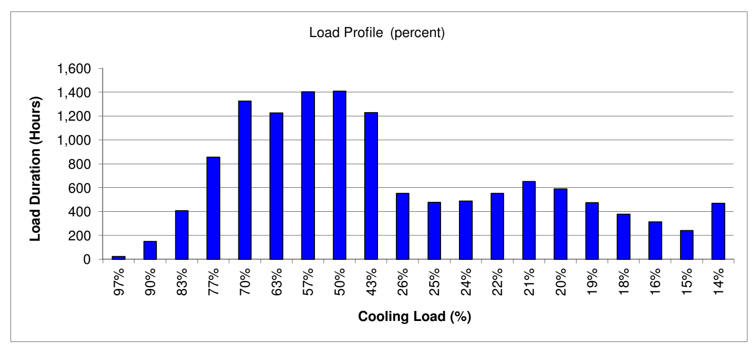
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.578	0.578	0.578	0.000	0.000	0.000
90=>94	0.536	0.536	0.536	0.000	0.000	0.000
85=>89	0.488	0.488	0.488	0.000	0.000	0.000
80=>84	0.443	0.443	0.443	0.000	0.000	0.000
75=>79	0.408	0.408	0.408	0.000	0.000	0.000
70=>74	0.462	0.462	0.000	0.000	0.000	0.000
65=>69	0.408	0.408	0.000	0.000	0.000	0.000
60=>64	0.349	0.349	0.000	0.000	0.000	0.000
55=>59	0.291	0.291	0.000	0.000	0.000	0.000
50=>54	0.304	0.000	0.000	0.000	0.000	0.000
45=>49	0.268	0.000	0.000	0.000	0.000	0.000
40=>44	0.256	0.000	0.000	0.000	0.000	0.000
35=>39	0.246	0.000	0.000	0.000	0.000	0.000
30=>34	0.238	0.000	0.000	0.000	0.000	0.000
25=>29	0.230	0.000	0.000	0.000	0.000	0.000
20=>24	0.223	0.000	0.000	0.000	0.000	0.000
15=>19	0.216	0.000	0.000	0.000	0.000	0.000
10=>14	0.211	0.000	0.000	0.000	0.000	0.000
5=>9	0.207	0.000	0.000	0.000	0.000	0.000
0=>4	0.206	0.000	0.000	0.000	0.000	0.000
Average	**0.303**	**0.393**	**0.439**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)

Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS

Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	41.23	92%	1
PCHWP 2	41.23	92%	1
PCHWP 3	41.23	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	33	33	33	0	0	0	100
90=>94	33	33	33	0	0	0	100
85=>89	33	33	33	0	0	0	100
80=>84	33	33	33	0	0	0	100
75=>79	33	33	33	0	0	0	100
70=>74	33	33	0	0	0	0	67
65=>69	33	33	0	0	0	0	67
60=>64	33	33	0	0	0	0	67
55=>59	33	33	0	0	0	0	67
50=>54	33	0	0	0	0	0	33
45=>49	33	0	0	0	0	0	33
40=>44	33	0	0	0	0	0	33
35=>39	33	0	0	0	0	0	33
30=>34	33	0	0	0	0	0	33
25=>29	33	0	0	0	0	0	33
20=>24	33	0	0	0	0	0	33
15=>19	33	0	0	0	0	0	33
10=>14	33	0	0	0	0	0	33
5=>9	33	0	0	0	0	0	33
0=>4	33	0	0	0	0	0	33
Total/Avg	**668**	**301**	**167**	**0**	**0**	**0**	**1,136**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	267	267	267	0	0	0	802
90=>94	1,670	1,670	1,670	0	0	0	5,010
85=>89	4,542	4,542	4,542	0	0	0	13,627
80=>84	9,519	9,519	9,519	0	0	0	28,557
75=>79	14,763	14,763	14,763	0	0	0	44,288
70=>74	20,474	20,474	0	0	0	0	40,948
65=>69	23,447	23,447	0	0	0	0	46,894
60=>64	23,514	23,514	0	0	0	0	47,027
55=>59	20,508	20,508	0	0	0	0	41,015
50=>54	18,437	0	0	0	0	0	18,437
45=>49	15,965	0	0	0	0	0	15,965
40=>44	16,266	0	0	0	0	0	16,266
35=>39	18,437	0	0	0	0	0	18,437
30=>34	21,810	0	0	0	0	0	21,810
25=>29	19,739	0	0	0	0	0	19,739
20=>24	15,865	0	0	0	0	0	15,865
15=>19	12,659	0	0	0	0	0	12,659
10=>14	10,454	0	0	0	0	0	10,454
5=>9	8,083	0	0	0	0	0	8,083
0=>4	15,698	0	0	0	0	0	15,698
Total/Avg	**292,116**	**118,704**	**30,761**	**0**	**0**	**0**	**441,581**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data		
Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

Stanley Consultants
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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 2 Central Plant with magnetic bearing variable speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													1,679,567
Chilled Water Pump Energy Usage (kWh):													441,581
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													2,857,558
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,000,291
Off Peak Energy Usage - kWh													857,267
													2,857,558
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$105,235
Off Peak Energy Cost													$45,101
EECR & AEP Cost													$0
Electricity Cost													$324,349
Total Energy Cost													**$324,349**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile

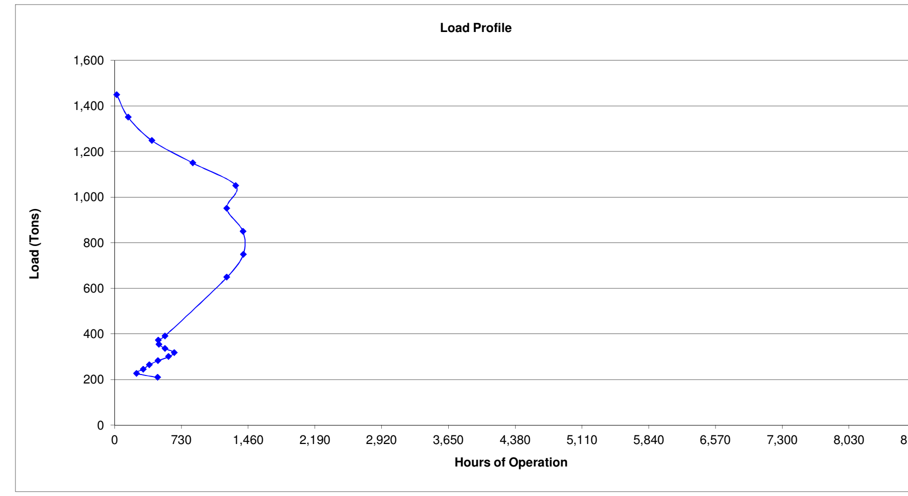
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	58	107	11,592	69,552	11,592
90=>94	1,350	14	25	338	608	67,500	405,000	67,500
85=>89	1,248	12	68	849	1,485	169,728	1,018,368	169,728
80=>84	1,149	11	143	1,637	2,783	327,465	1,964,790	327,465
75=>79	1,050	11	221	2,321	3,857	464,100	2,784,600	464,100
70=>74	950	10	204	1,941	4,978	582,350	2,329,400	388,233
65=>69	850	9	234	1,989	4,935	596,700	2,386,800	397,800
60=>64	748	7	235	1,755	4,204	526,592	2,106,368	351,061
55=>59	648	6	205	1,326	3,069	397,872	1,591,488	265,248
50=>54	391	4	92	360	1,692	215,832	431,664	71,944
45=>49	372	4	80	296	1,371	177,816	355,632	59,272
40=>44	354	4	81	287	1,316	172,398	344,796	57,466
35=>39	336	3	92	309	1,404	185,472	370,944	61,824
30=>34	318	3	109	346	1,561	207,654	415,308	69,218
25=>29	300	3	99	296	1,324	177,300	354,600	59,100
20=>24	282	3	79	223	996	133,950	267,900	44,650
15=>19	264	3	63	167	741	100,056	200,112	33,352
10=>14	245	2	52	128	567	76,685	153,370	25,562
5=>9	227	2	40	92	406	54,934	109,868	18,311
0=>4	209	2	78	164	728	98,230	196,460	32,743
Total/Avg				**14,881**	**38,133**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	391	0.000	0	552	0	8	3.1	1,692.4	215,832
45=>49	372	0.000	0	478	0	8	2.9	1,371.4	177,816
40=>44	354	0.000	0	487	0	8	2.7	1,315.9	172,398
35=>39	336	0.000	0	552	0	8	2.5	1,404.3	185,472
30=>34	318	0.000	0	653	0	8	2.4	1,561.3	207,654
25=>29	300	0.000	0	591	0	7	2.2	1,324.4	177,300
20=>24	282	0.000	0	475	0	7	2.1	995.6	133,950
15=>19	264	0.000	0	379	0	7	2.0	740.9	100,056
10=>14	245	0.000	0	313	0	7	1.8	566.8	76,685
5=>9	227	0.000	0	242	0	7	1.7	406.1	54,934
0=>4	209	0.000	0	470	0	7	1.5	728.0	98,230
Total/Avg		**0.000**	**0**	**8,746**	**0**	**7.817**	**56.3**	**23,646.7**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**0**	**3,554**	**0**		**31.4**	**11,539.5**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**921**	**921**	**0**		**18.3**	**2,946.7**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	**High Bin**	**Chiller 1 Peak Demand (kW)**	**Chiller 2 Peak Demand (kW)**	**Chiller 3 Peak Demand (kW)**	**Chiller 4 Peak Demand (kW)**	**Chiller 5 Peak Demand (kW)**	**Chiller 6 Peak Demand (kW)**	**Total PCHWP Demand (kW)**	**Total CWP Demand (kW)**	**Total Cooling Tower Demand (kW)**	**Peak Demand (kW)**
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

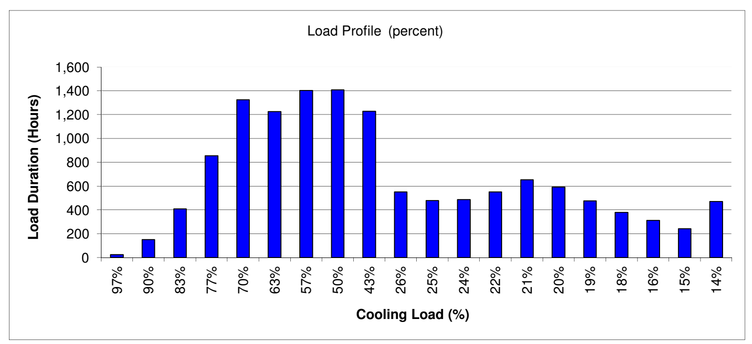
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	**Chiller 1 Load (Tons)**	**Chiller 2 Load (Tons)**	**Chiller 3 Load (Tons)**	**Chiller 4 Load (Tons)**	**Chiller 5 Load (Tons)**	**Chiller 6 Load (Tons)**	**Total Load (Tons)**	**Percent Load**
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	**Chiller 1 Demand (kW/ton)**	**Chiller 2 Efficiency (kW/ton)**	**Chiller 3 Efficiency (kW/ton)**	**Chiller 4 Efficiency (kW/ton)**	**Chiller 5 Efficiency (kW/ton)**	**Chiller 6 Efficiency (kW/ton)**
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	**Chiller 1 Demand (lb/ton)**	**Chiller 2 Demand (lb/ton)**	**Chiller 3 Demand (lb/ton)**	**Chiller 4 Demand (lb/ton)**	**Chiller 5 Demand (lb/ton)**	**Chiller 6 Demand (lb/ton)**
95=>99	9.219	9.219	9.219	0.000	0.000	0.000
90=>94	9.002	9.002	9.002	0.000	0.000	0.000
85=>89	8.750	8.750	8.750	0.000	0.000	0.000
80=>84	8.499	8.499	8.499	0.000	0.000	0.000
75=>79	8.311	8.311	8.311	0.000	0.000	0.000
70=>74	8.547	8.547	0.000	0.000	0.000	0.000
65=>69	8.271	8.271	0.000	0.000	0.000	0.000
60=>64	7.984	7.984	0.000	0.000	0.000	0.000
55=>59	7.713	7.713	0.000	0.000	0.000	0.000
50=>54	7.841	0.000	0.000	0.000	0.000	0.000
45=>49	7.712	0.000	0.000	0.000	0.000	0.000
40=>44	7.633	0.000	0.000	0.000	0.000	0.000
35=>39	7.571	0.000	0.000	0.000	0.000	0.000
30=>34	7.519	0.000	0.000	0.000	0.000	0.000
25=>29	7.470	0.000	0.000	0.000	0.000	0.000
20=>24	7.433	0.000	0.000	0.000	0.000	0.000
15=>19	7.405	0.000	0.000	0.000	0.000	0.000
10=>14	7.392	0.000	0.000	0.000	0.000	0.000
5=>9	7.392	0.000	0.000	0.000	0.000	0.000
0=>4	7.411	0.000	0.000	0.000	0.000	0.000
Average	**7.817**	**8.219**	**8.480**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	**Chiller 1 Operational Hours**	**Chiller 2 Operational Hours**	**Chiller 3 Operational Hours**	**Chiller 4 Operational Hours**	**Chiller 5 Operational Hours**	**Chiller 6 Operational Hours**	**Cumulative Operational Hours**
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	42.6	92%	1
PCHWP 2	42.6	92%	1
PCHWP 3	42.6	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	35	35	35	0	0	0	104
90=>94	35	35	35	0	0	0	104
85=>89	35	35	35	0	0	0	104
80=>84	35	35	35	0	0	0	104
75=>79	35	35	35	0	0	0	104
70=>74	35	35	0	0	0	0	69
65=>69	35	35	0	0	0	0	69
60=>64	35	35	0	0	0	0	69
55=>59	35	35	0	0	0	0	69
50=>54	35	0	0	0	0	0	35
45=>49	35	0	0	0	0	0	35
40=>44	35	0	0	0	0	0	35
35=>39	35	0	0	0	0	0	35
30=>34	35	0	0	0	0	0	35
25=>29	35	0	0	0	0	0	35
20=>24	35	0	0	0	0	0	35
15=>19	35	0	0	0	0	0	35
10=>14	35	0	0	0	0	0	35
5=>9	35	0	0	0	0	0	35
0=>4	35	0	0	0	0	0	35
Total/Avg	**690**	**311**	**173**	**0**	**0**	**0**	**1,173**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	276	276	276	0	0	0	828
90=>94	1,725	1,725	1,725	0	0	0	5,175
85=>89	4,692	4,692	4,692	0	0	0	14,076
80=>84	9,833	9,833	9,833	0	0	0	29,498
75=>79	15,249	15,249	15,249	0	0	0	45,747
70=>74	21,149	21,149	0	0	0	0	42,297
65=>69	24,219	24,219	0	0	0	0	48,438
60=>64	24,288	24,288	0	0	0	0	48,576
55=>59	21,183	21,183	0	0	0	0	42,366
50=>54	19,044	0	0	0	0	0	19,044
45=>49	16,491	0	0	0	0	0	16,491
40=>44	16,802	0	0	0	0	0	16,802
35=>39	19,044	0	0	0	0	0	19,044
30=>34	22,529	0	0	0	0	0	22,529
25=>29	20,390	0	0	0	0	0	20,390
20=>24	16,388	0	0	0	0	0	16,388
15=>19	13,076	0	0	0	0	0	13,076
10=>14	10,799	0	0	0	0	0	10,799
5=>9	8,349	0	0	0	0	0	8,349
0=>4	16,215	0	0	0	0	0	16,215
Total/Avg	**301,737**	**122,613**	**31,775**	**0**	**0**	**0**	**456,125**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
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Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	50	92%	1
CT 2	50	92%	1
CT 3	50	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	41	41	41	0	0	0	122
90=>94	41	41	41	0	0	0	122
85=>89	41	41	41	0	0	0	122
80=>84	41	41	41	0	0	0	122
75=>79	41	41	41	0	0	0	122
70=>74	41	41	0	0	0	0	81
65=>69	41	41	0	0	0	0	81
60=>64	41	41	0	0	0	0	81
55=>59	41	41	0	0	0	0	81
50=>54	41	0	0	0	0	0	41
45=>49	41	0	0	0	0	0	41
40=>44	41	0	0	0	0	0	41
35=>39	41	0	0	0	0	0	41
30=>34	41	0	0	0	0	0	41
25=>29	41	0	0	0	0	0	41
20=>24	41	0	0	0	0	0	41
15=>19	41	0	0	0	0	0	41
10=>14	41	0	0	0	0	0	41
5=>9	41	0	0	0	0	0	41
0=>4	41	0	0	0	0	0	41
Total/Avg	**810**	**365**	**203**	**0**	**0**	**0**	**1,377**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	324	324	324	0	0	0	972
90=>94	2,025	2,025	2,025	0	0	0	6,075
85=>89	5,508	5,508	5,508	0	0	0	16,524
80=>84	11,543	11,543	11,543	0	0	0	34,628
75=>79	17,901	17,901	17,901	0	0	0	53,703
70=>74	24,827	24,827	0	0	0	0	49,653
65=>69	28,431	28,431	0	0	0	0	56,862
60=>64	28,512	28,512	0	0	0	0	57,024
55=>59	24,867	24,867	0	0	0	0	49,734
50=>54	22,356	0	0	0	0	0	22,356
45=>49	19,359	0	0	0	0	0	19,359
40=>44	19,724	0	0	0	0	0	19,724
35=>39	22,356	0	0	0	0	0	22,356
30=>34	26,447	0	0	0	0	0	26,447
25=>29	23,936	0	0	0	0	0	23,936
20=>24	19,238	0	0	0	0	0	19,238
15=>19	15,350	0	0	0	0	0	15,350
10=>14	12,677	0	0	0	0	0	12,677
5=>9	9,801	0	0	0	0	0	9,801
0=>4	19,035	0	0	0	0	0	19,035
Total/Avg	**354,213**	**143,937**	**37,301**	**0**	**0**	**0**	**535,451**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 3 Central Plant with absorption chillers

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													38,133
Steam Cost													$672,664
Electricity Usage													
Chiller Energy Usage (kWh):													14,881
Chilled Water Pump Energy Usage (kWh):													456,125
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													535,451
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													1,314,505
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													920,154
Off Peak Energy Usage - kWh													394,352
													1,314,505
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$48,409
Off Peak Energy Cost													$20,747
EECR & AEP Cost													$0
Electricity Cost													$243,169
Total Energy Cost													**$915,833**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison4%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Chilled Water Plant Comparison Analysis Input & Results Summary

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Variable Cost Inputs

Demand Charge-Summer		**Energy Charge - Summer**		**On/Off Peak Split**	
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	On-Peak	70%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261	Off-Peak	30%
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
				Summer/Winter Split	
Demand Charge-Winter		**Energy Charge - Winter**		Summer	70%
First 200-kW	$16.46	On Peak (Per kWh)	$0.05261	Winter	30%
Next 800-kW	$16.46	Off Peak (Per kWh)	$0.05261		
All over 1000 kW	$16.46	Energy Cost Adj (Per kWh)	$0.00000		
Variable Cost Rates		**Fuel Cost (at Central Plant)**			
Purchased Steam Rate (per klb)	$17.64	Natural Gas (Per MMBtu)	$7.20	NOT USED	
Purchased CHW Rate (per ton-hr)	$0.000	Other Stm Costs (Per MMBtu)	$1.80	NOT USED	
Water Rate (per 1,000 Gal)	$0.93				
Sewage Rate (per 1,000 Gal)	$3.30				
Miscellaneous Cost (% of energy cost)	0.0%				

PV Calculation Inputs		**Load Profile Inputs**		**Steam Conditions**	
Period (years)	25	Elec Demand Transformer Losses	5%	Steam Inlet Pressure (psig)	50.0
Discount Rate	8.0%	Auxiliaries Electrical Demand (kW/ton)	0.01	Steam Inlet Temperature (°F)	400.0
Interest Rate	1.0%	Peak Make-up Water (gpm)	300	Steam Exhaust Pressure (psig)	-13.2
Variable Cost Escalation	3.0%	Peak Sewage (gpm)	50	Steam Exhaust Temperature (°F)	115.69
O&M Cost Escalation	2.0%			Condensate Pressure (psig)	0.0
Capital Cost Escalation	4.0%			Condensate Temperature (°F)	115.69
				Condensate Enthalpy (Btu/lb)	83.00

Note: Additional Input on the PV Analysis Page

Note: Additional Input on the Load Profile Case Pages

Cases

Case	Description	Temperatures	Chilled Water Source
Case 1	Central plant with constant speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 2	Central Plant with magnetic bearing variable speed chiller	42 °F Supply, 12 °F ΔT	Self Generated
Case 3	Central Plant with absorption chillers	42 °F Supply, 12 °F ΔT	Self Generated
Case 4	not used		Purchased

St Luke's Hospital Building Chillers vs. Central Chiller Plant Present Value Results Summary

	Case 1	Case 2	Case 3	Case 4
25-year Present Value ($)	$13,997,290	$13,917,772	$16,751,456	$0
Average Calculated CHW Cost ($/ton-hr)	$0.11	$0.11	$0.29	#DIV/0!

CentralPlant-PV Case Comparison8%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	8.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 1 - Central plant with constant speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment (Equity)	$ 7,975,425	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 347,641	$ 358,070	$ 368,812	$ 379,876	$ 391,273	$ 403,011	$ 415,101	$ 427,554	$ 440,381	$ 453,592	$ 467,200	$ 481,216	$ 495,652	$ 510,522	$ 525,838	$ 541,613	$ 557,861	$ 574,597	$ 591,835	$ 609,590
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 8,804,425**	**$ 373,980**	**$ 385,199**	**$ 396,755**	**$ 408,658**	**$ 420,918**	**$ 433,545**	**$ 446,551**	**$ 459,948**	**$ 473,746**	**$ 487,959**	**$ 502,598**	**$ 517,675**	**$ 533,206**	**$ 549,202**	**$ 565,678**	**$ 582,648**	**$ 600,128**	**$ 618,132**	**$ 636,675**	**$ 655,776**
Calculated CHW Cost (per ton-hr)		**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**	**$ 0.13**	**$ 0.14**

25-year Present Value Cost **$ 13,997,290**

Case 2 - Central Plant with magnetic bearing variable speed chiller: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ 8,219,325	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 324,349	$ 334,079	$ 344,102	$ 354,425	$ 365,057	$ 376,009	$ 387,289	$ 398,908	$ 410,875	$ 423,201	$ 435,898	$ 448,974	$ 462,444	$ 476,317	$ 490,607	$ 505,325	$ 520,484	$ 536,099	$ 552,182	$ 568,747
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 9,048,325**	**$ 350,688**	**$ 361,208**	**$ 372,045**	**$ 383,206**	**$ 394,702**	**$ 406,543**	**$ 418,740**	**$ 431,302**	**$ 444,241**	**$ 457,568**	**$ 471,295**	**$ 485,434**	**$ 499,997**	**$ 514,997**	**$ 530,447**	**$ 546,360**	**$ 562,751**	**$ 579,633**	**$ 597,023**	**$ 614,933**
Calculated CHW Cost (per ton-hr)		**$ 0.07**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.08**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.09**	**$ 0.10**	**$ 0.10**	**$ 0.10**	**$ 0.11**	**$ 0.11**	**$ 0.11**	**$ 0.12**	**$ 0.12**	**$ 0.12**	**$ 0.13**	**$ 0.13**

25-year Present Value Cost **$ 13,917,772**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Present Value Analysis

Prepared By: J. J. Bovenkamp
Date: 12-Dec-2012

Assumptions

	Case 1	Case 2	Case 3	Case 4
	Central plant with constant speed chiller	Central Plant with magnetic bearing variable speed chiller	Central Plant with absorption chillers	not used
Peak Cooling Load (tons)	1,500	1,500	1,500	1,500
Annual Consumption (ton-hrs)	4,744,226	4,744,226	4,744,226	0
Total Energy Usage (KWh)	3,300,287	2,857,558	1,314,505	0
Total Energy Usage (klbs)	0	0	38,133	
Water Usage (gal)	17,857,020	17,857,020	17,857,020	0
Water Rate (per 1,000 Gal)	$ 0.93	$ 0.93	$ 0.93	$ 0.93
Sewage Usage (gal)	2,976,170	2,976,170	2,976,170	0
Sewage Rate (per 1,000 Gal)	$ 3.30	$ 3.30	$ 3.30	$ 3.30
Miscellaneous Cost (% of energy cost)	0.0%	0.0%	0.0%	0.0%
Annual Maintenance Cost	$0	$0	$0	$0
Number of Operators	0	0	0	4
Operator Salary	$0	$0	$0	$0
CHW System Capital Cost ($)	$ 7,975,425	$ 8,219,325	$ 2,840,000	$ -
CHW Equipment Life (years)	25	25	25	25
Distribution System Cost ($)	$ 829,000	$ 829,000	$ 829,000	$ -
Distribution System Life (years)	50	50	50	50

Financing Information

	CHW System	Distribution System
Percent Financed	0%	0%
Equity Percent	100%	100%
Loan Period (years)	5	5
Interest Rate	1.0%	1.0%
Capital Recovery Factor (CRF)	0.2060398	0.2060398
Replacement System Percent Financed	0%	0%
Replacement System Equity Percent	100%	100%
Replacement System Loan Period (years)	5	5
Replacement System Interest Rate	1.0%	1.0%
Replacement System Capital Recovery Factor (CRF)	0.2060398	0.2060398

Other Information

Period (years)	25
Discount Rate	8.0%

Escalation

Variable Cost Escalation	3.0%
O&M Cost Escalation	2.0%
Capital Cost Escalation	4.0%

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Comparison of Cooling System Costs

Case 3 - Central Plant with absorption chillers: 42 °F Supply, 12 °F DT

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment	$ 2,840,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ 829,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ 915,833	$ 943,308	$ 971,607	$ 1,000,756	$ 1,030,778	$ 1,061,702	$ 1,093,553	$ 1,126,359	$ 1,160,150	$ 1,194,954
Water Cost		$ 16,518	$ 17,013	$ 17,524	$ 18,049	$ 18,591	$ 19,149	$ 19,723	$ 20,315	$ 20,924	$ 21,552
Sewage Cost		$ 9,821	$ 10,116	$ 10,419	$ 10,732	$ 11,054	$ 11,386	$ 11,727	$ 12,079	$ 12,441	$ 12,815
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 3,669,000**	**$ 942,172**	**$ 970,437**	**$ 999,551**	**$ 1,029,537**	**$ 1,060,423**	**$ 1,092,236**	**$ 1,125,003**	**$ 1,158,753**	**$ 1,193,516**	**$ 1,229,321**
Calculated CHW Cost (per ton-hr)		**$ 0.20**	**$ 0.20**	**$ 0.21**	**$ 0.22**	**$ 0.22**	**$ 0.23**	**$ 0.24**	**$ 0.24**	**$ 0.25**	**$ 0.26**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ 1,230,803	$ 1,267,727	$ 1,305,759	$ 1,344,932	$ 1,385,280	$ 1,426,838	$ 1,469,643	$ 1,513,733	$ 1,559,145	$ 1,605,919
Water Cost	$ 22,198	$ 22,864	$ 23,550	$ 24,257	$ 24,985	$ 25,734	$ 26,506	$ 27,301	$ 28,120	$ 28,964
Sewage Cost	$ 13,199	$ 13,595	$ 14,003	$ 14,423	$ 14,856	$ 15,301	$ 15,760	$ 16,233	$ 16,720	$ 17,222
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ 1,266,201**	**$ 1,304,187**	**$ 1,343,312**	**$ 1,383,612**	**$ 1,425,120**	**$ 1,467,874**	**$ 1,511,910**	**$ 1,557,267**	**$ 1,603,985**	**$ 1,652,105**
Calculated CHW Cost (per ton-hr)	**$ 0.27**	**$ 0.27**	**$ 0.28**	**$ 0.29**	**$ 0.30**	**$ 0.31**	**$ 0.32**	**$ 0.33**	**$ 0.34**	**$ 0.35**

25-year Present Value Cost **$ 16,751,456**

Case 4 - not used: 0

Year:	0	1	2	3	4	5	6	7	8	9	10
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

Year:	11	12	13	14	15	16	17	18	19	20
Plant Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Capital Investment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Principal Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Interest Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Distribution Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Energy Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sewage Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Variable Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Operations Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Calculated CHW Cost (per ton-hr)	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

25-year Present Value Cost **$ -**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Capital Cost Calculation

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 1 **Central plant with constant speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,810,000	$	6,810,000	85.4%
Phase 2		1	ls	$600,000	$	600,000	7.5%
Phase 3		1	ls	$600,000	$	600,000	7.5%
Rebate		1	ls	($34,575)	$	(34,575)	
	Total				**$**	**7,975,425**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 2 **Central Plant with magnetic bearing variable speed chiller**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$6,920,000	$	6,920,000	84.2%
Phase 2		1	ls	$710,000	$	710,000	8.6%
Phase 3		1	ls	$710,000	$	710,000	8.6%
Rebate		1	ls	($120,675)	$	(120,675)	
	Total				**$**	**8,219,325**	**101%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 3 **Central Plant with absorption chillers**
42 °F Supply, 12 °F DT

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Phase 1		1	ls	$780,000	$	780,000	27.5%
Phase 2		1	ls	$1,030,000	$	1,030,000	36.3%
Phase 3		1	ls	$1,030,000	$	1,030,000	36.3%
					$	-	
	Total				**$**	**2,840,000**	**100%**

Capital Cost (Refer to Detailed Cost Estimate for Break Down)

Case 4 **not used**
0

Description		Quantity	Unit	Unit Cost		Subtotal	Percent of Total
Chillers		1	ea	$0	$	-	#DIV/0!
Chilled water pumps		1	ea	$0	$	-	#DIV/0!
AHU Coils		1	ea	$0	$	-	#DIV/0!
	Total				**$**	**-**	**#DIV/0!**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

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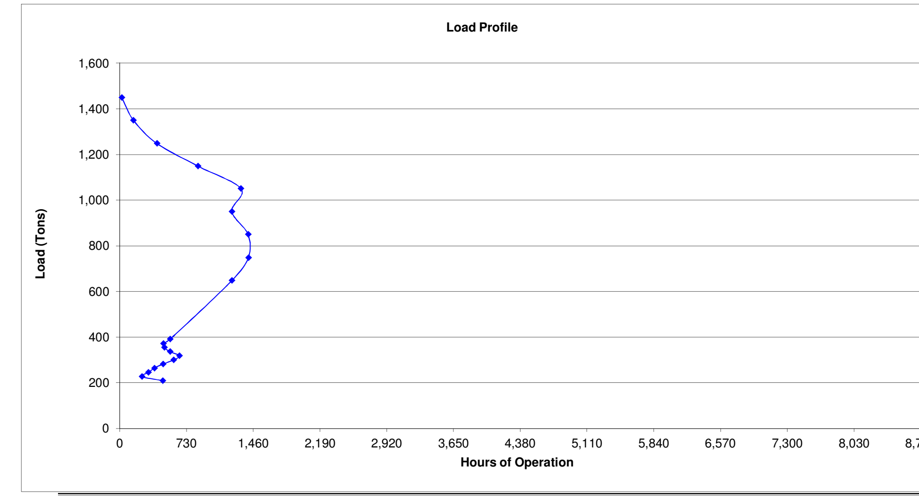


LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,712	0	11,592	69,552	11,592
90=>94	1,350	14	25	37,598	0	67,500	405,000	67,500
85=>89	1,248	12	68	90,635	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	168,644	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	233,906	0	464,100	2,784,600	464,100
70=>74	950	10	204	296,028	0	582,350	2,329,400	388,233
65=>69	850	9	234	289,598	0	596,700	2,386,800	397,800
60=>64	748	7	235	242,934	0	526,592	2,106,368	351,061
55=>59	648	6	205	174,003	0	397,872	1,591,488	265,248
50=>54	391	4	92	91,009	0	215,832	431,664	71,944
45=>49	372	4	80	70,889	0	177,816	355,632	59,272
40=>44	354	4	81	67,695	0	172,398	344,796	57,466
35=>39	336	3	92	72,643	0	185,472	370,944	61,824
30=>34	318	3	109	81,539	0	207,654	415,308	69,218
25=>29	300	3	99	69,797	0	177,300	354,600	59,100
20=>24	282	3	79	53,134	0	133,950	267,900	44,650
15=>19	264	3	63	40,089	0	100,056	200,112	33,352
10=>14	245	2	52	31,262	0	76,685	153,370	25,562
5=>9	227	2	40	22,889	0	54,934	109,868	18,311
0=>4	209	2	78	42,108	0	98,230	196,460	32,743
Total/Avg				**2,183,112**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	391	0.420	164	552	90,649	0	0.0	0.0	215,832
45=>49	372	0.397	148	478	70,593	0	0.0	0.0	177,816
40=>44	354	0.391	138	487	67,408	0	0.0	0.0	172,398
35=>39	336	0.390	131	552	72,334	0	0.0	0.0	185,472
30=>34	318	0.391	124	653	81,193	0	0.0	0.0	207,654
25=>29	300	0.392	118	591	69,502	0	0.0	0.0	177,300
20=>24	282	0.395	111	475	52,910	0	0.0	0.0	133,950
15=>19	264	0.399	105	379	39,922	0	0.0	0.0	100,056
10=>14	245	0.406	99	313	31,134	0	0.0	0.0	76,685
5=>9	227	0.415	94	242	22,798	0	0.0	0.0	54,934
0=>4	209	0.427	89	470	41,944	0	0.0	0.0	98,230
Total/Avg		**0.433**	**3,195**	**8,746**	**1,315,594**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	475	0.505	240	613	147,043	0	0.0	0.0	291,175
65=>69	425	0.482	205	702	143,805	0	0.0	0.0	298,350
60=>64	374	0.458	171	704	120,590	0	0.0	0.0	263,296
55=>59	324	0.434	141	614	86,338	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.480**	**1,872**	**3,554**	**675,207**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.574	277	8	2,218	0	0.0	0.0	3,864
90=>94	450	0.552	248	50	12,420	0	0.0	0.0	22,500
85=>89	416	0.529	220	136	29,929	0	0.0	0.0	56,576
80=>84	383	0.510	195	285	55,669	0	0.0	0.0	109,155
75=>79	350	0.499	175	442	77,195	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.510**	**921**	**921**	**177,431**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	**High Bin**	**Chiller 1 Peak Demand (kW)**	**Chiller 2 Peak Demand (kW)**	**Chiller 3 Peak Demand (kW)**	**Chiller 4 Peak Demand (kW)**	**Chiller 5 Peak Demand (kW)**	**Chiller 6 Peak Demand (kW)**	**Total PCHWP Demand (kW)**	**Total CWP Demand (kW)**	**Total Cooling Tower Demand (kW)**	**Peak Demand (kW)**
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

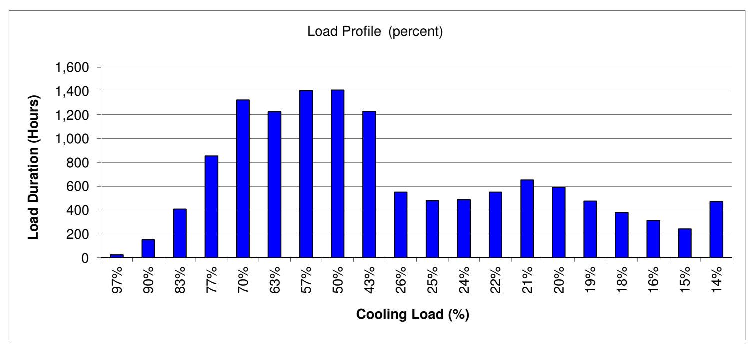
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	**Chiller 1 Load (Tons)**	**Chiller 2 Load (Tons)**	**Chiller 3 Load (Tons)**	**Chiller 4 Load (Tons)**	**Chiller 5 Load (Tons)**	**Chiller 6 Load (Tons)**	**Total Load (Tons)**	**Percent Load**
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	**Chiller 1 Demand (kW/ton)**	**Chiller 2 Efficiency (kW/ton)**	**Chiller 3 Efficiency (kW/ton)**	**Chiller 4 Efficiency (kW/ton)**	**Chiller 5 Efficiency (kW/ton)**	**Chiller 6 Efficiency (kW/ton)**
95=>99	0.574	0.574	0.574	0.000	0.000	0.000
90=>94	0.552	0.552	0.552	0.000	0.000	0.000
85=>89	0.529	0.529	0.529	0.000	0.000	0.000
80=>84	0.510	0.510	0.510	0.000	0.000	0.000
75=>79	0.499	0.499	0.499	0.000	0.000	0.000
70=>74	0.505	0.505	0.000	0.000	0.000	0.000
65=>69	0.482	0.482	0.000	0.000	0.000	0.000
60=>64	0.458	0.458	0.000	0.000	0.000	0.000
55=>59	0.434	0.434	0.000	0.000	0.000	0.000
50=>54	0.420	0.000	0.000	0.000	0.000	0.000
45=>49	0.397	0.000	0.000	0.000	0.000	0.000
40=>44	0.391	0.000	0.000	0.000	0.000	0.000
35=>39	0.390	0.000	0.000	0.000	0.000	0.000
30=>34	0.391	0.000	0.000	0.000	0.000	0.000
25=>29	0.392	0.000	0.000	0.000	0.000	0.000
20=>24	0.395	0.000	0.000	0.000	0.000	0.000
15=>19	0.399	0.000	0.000	0.000	0.000	0.000
10=>14	0.406	0.000	0.000	0.000	0.000	0.000
5=>9	0.415	0.000	0.000	0.000	0.000	0.000
0=>4	0.427	0.000	0.000	0.000	0.000	0.000
Average	**0.433**	**0.480**	**0.510**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	**Chiller 1 Demand (lb/ton)**	**Chiller 2 Demand (lb/ton)**	**Chiller 3 Demand (lb/ton)**	**Chiller 4 Demand (lb/ton)**	**Chiller 5 Demand (lb/ton)**	**Chiller 6 Demand (lb/ton)**
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	**Chiller 1 Operational Hours**	**Chiller 2 Operational Hours**	**Chiller 3 Operational Hours**	**Chiller 4 Operational Hours**	**Chiller 5 Operational Hours**	**Chiller 6 Operational Hours**	**Cumulative Operational Hours**
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
Printed: 12/14/2012

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	39.96	92%	1
PCHWP 2	39.96	92%	1
PCHWP 3	39.96	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	24.35	92%	1
CWP 2	24.35	92%	1
CWP 3	24.35	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	20	20	20	0	0	0	59
90=>94	20	20	20	0	0	0	59
85=>89	20	20	20	0	0	0	59
80=>84	20	20	20	0	0	0	59
75=>79	20	20	20	0	0	0	59
70=>74	20	20	0	0	0	0	39
65=>69	20	20	0	0	0	0	39
60=>64	20	20	0	0	0	0	39
55=>59	20	20	0	0	0	0	39
50=>54	20	0	0	0	0	0	20
45=>49	20	0	0	0	0	0	20
40=>44	20	0	0	0	0	0	20
35=>39	20	0	0	0	0	0	20
30=>34	20	0	0	0	0	0	20
25=>29	20	0	0	0	0	0	20
20=>24	20	0	0	0	0	0	20
15=>19	20	0	0	0	0	0	20
10=>14	20	0	0	0	0	0	20
5=>9	20	0	0	0	0	0	20
0=>4	20	0	0	0	0	0	20
Total/Avg	**394**	**177**	**99**	**0**	**0**	**0**	**670**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	158	158	158	0	0	0	473
90=>94	985	985	985	0	0	0	2,955
85=>89	2,679	2,679	2,679	0	0	0	8,038
80=>84	5,615	5,615	5,615	0	0	0	16,844
75=>79	8,707	8,707	8,707	0	0	0	26,122
70=>74	12,076	12,076	0	0	0	0	24,152
65=>69	13,829	13,829	0	0	0	0	27,659
60=>64	13,869	13,869	0	0	0	0	27,738
55=>59	12,096	12,096	0	0	0	0	24,192
50=>54	10,874	0	0	0	0	0	10,874
45=>49	9,417	0	0	0	0	0	9,417
40=>44	9,594	0	0	0	0	0	9,594
35=>39	10,874	0	0	0	0	0	10,874
30=>34	12,864	0	0	0	0	0	12,864
25=>29	11,643	0	0	0	0	0	11,643
20=>24	9,358	0	0	0	0	0	9,358
15=>19	7,466	0	0	0	0	0	7,466
10=>14	6,166	0	0	0	0	0	6,166
5=>9	4,767	0	0	0	0	0	4,767
0=>4	9,259	0	0	0	0	0	9,259
Total/Avg	**172,296**	**70,014**	**18,144**	**0**	**0**	**0**	**260,454**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 1 Central plant with constant speed chiller

Input Data Summary

Energy Charge Multiplier 1.00

Demand Charge-Summer		**Energy Charge - Summer**	
First 200-kW	$16.46	On Peak	$0.05261
Next 800-kW	$16.46	Off Peak	$0.05261
Over 1000 kW	$16.46	Energy Cost Adj	$0.00000
Demand Charge-Winter		**Energy Charge - Winter**	
First 200-kW	$16.46	On Peak	$0.05261
Next 800-kW	$16.46	Off Peak	$0.05261
Over 1000 kW	$16.46	Energy Cost Adj	$0.00000
On/Off Peak Split		**Summer/Winter Split**	
On Peak	70%	Summer	70%
Off Peak	30%	Winter	30%

Chilled Water Source	Self Generated	
Purchased Steam Rate (per klb)	$17.64 Per kLB	
Purchased CHW Rate (per ton-hr)	$0.000 Per Ton-hr	
Water Rate (per 1,000 Gal)	$0.93 Per 1000 Gal	
Sewage Rate (per 1,000 Gal)	$3.30 Per 1000 Gal	
Miscellaneous Cost (% of energy cost)	0% of Energy Cost	
Natural Gas	$7.20 Per MMbtu	NOT USED
Other Stm Costs	$1.80 Per MMbtu	NOT USED

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													2,183,112
Chilled Water Pump Energy Usage (kWh):													428,360
Condenser Water Pump Energy Usage (kWh):													260,454
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													3,300,287
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,310,201
Off Peak Energy Usage - kWh													990,086
													3,300,287
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$121,540
Off Peak Energy Cost													$52,088
EECR & AEP Cost													$0
Electricity Cost													$347,641
Total Energy Cost													**$347,641**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

Stanley Consultants
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Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

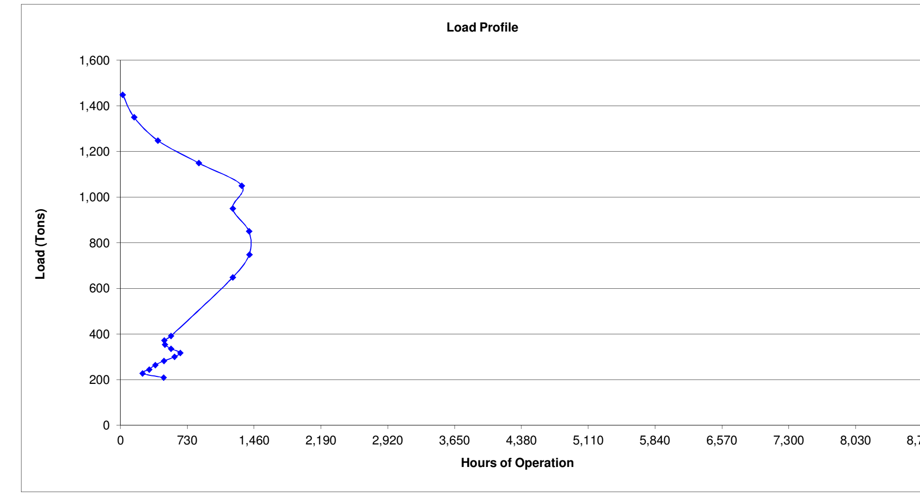
Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions					
Transformer Losses	5%		Peak Make-up Water:	300	gpm
Auxiliaries Electrical Demand	0.01	kW/ton	Peak Sewage:	50	gpm
Peak Cooling Load	1,500	tons			

LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	6,758	0	11,592	69,552	11,592
90=>94	1,350	14	25	36,518	0	67,500	405,000	67,500
85=>89	1,248	12	68	83,676	0	169,728	1,018,368	169,728
80=>84	1,149	11	143	146,704	0	327,465	1,964,790	327,465
75=>79	1,050	11	221	191,673	0	464,100	2,784,600	464,100
70=>74	950	10	204	270,987	0	582,350	2,329,400	388,233
65=>69	850	9	234	245,443	0	596,700	2,386,800	397,800
60=>64	748	7	235	185,536	0	526,592	2,106,368	351,061
55=>59	648	6	205	117,107	0	397,872	1,591,488	265,248
50=>54	391	4	92	65,973	0	215,832	431,664	71,944
45=>49	372	4	80	47,951	0	177,816	355,632	59,272
40=>44	354	4	81	44,421	0	172,398	344,796	57,466
35=>39	336	3	92	45,935	0	185,472	370,944	61,824
30=>34	318	3	109	49,768	0	207,654	415,308	69,218
25=>29	300	3	99	41,075	0	177,300	354,600	59,100
20=>24	282	3	79	30,094	0	133,950	267,900	44,650
15=>19	264	3	63	21,779	0	100,056	200,112	33,352
10=>14	245	2	52	16,308	0	76,685	153,370	25,562
5=>9	227	2	40	11,463	0	54,934	109,868	18,311
0=>4	209	2	78	20,399	0	98,230	196,460	32,743
Total/Avg				**1,679,567**	**0**	**4,744,226**	**17,857,020**	**2,976,170**

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	391	0.304	119	552	65,613	0	0.0	0.0	215,832
45=>49	372	0.268	100	478	47,655	0	0.0	0.0	177,816
40=>44	354	0.256	91	487	44,134	0	0.0	0.0	172,398
35=>39	336	0.246	83	552	45,626	0	0.0	0.0	185,472
30=>34	318	0.238	76	653	49,422	0	0.0	0.0	207,654
25=>29	300	0.230	69	591	40,779	0	0.0	0.0	177,300
20=>24	282	0.223	63	475	29,871	0	0.0	0.0	133,950
15=>19	264	0.216	57	379	21,612	0	0.0	0.0	100,056
10=>14	245	0.211	52	313	16,181	0	0.0	0.0	76,685
5=>9	227	0.207	47	242	11,371	0	0.0	0.0	54,934
0=>4	209	0.206	43	470	20,235	0	0.0	0.0	98,230
Total/Avg		**0.303**	**2,452**	**8,746**	**951,905**	**0.000**	**0.0**	**0.0**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	475	0.462	219	613	134,523	0	0.0	0.0	291,175
65=>69	425	0.408	173	702	121,727	0	0.0	0.0	298,350
60=>64	374	0.349	131	704	91,890	0	0.0	0.0	263,296
55=>59	324	0.291	94	614	57,890	0	0.0	0.0	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.393**	**1,654**	**3,554**	**559,406**		**0.0**	**0.0**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.578	279	8	2,233	0	0.0	0.0	3,864
90=>94	450	0.536	241	50	12,060	0	0.0	0.0	22,500
85=>89	416	0.488	203	136	27,609	0	0.0	0.0	56,576
80=>84	383	0.443	170	285	48,356	0	0.0	0.0	109,155
75=>79	350	0.408	143	442	63,118	0	0.0	0.0	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.439**	**921**	**921**	**153,376**		**0.0**	**0.0**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)

Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

Chiller Input

CHILLER LOAD PROFILE

Temperature Bin (℉)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)

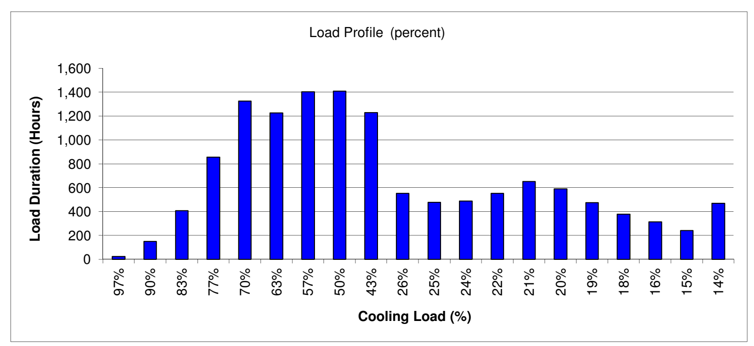
Temperature Bin (℉)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.578	0.578	0.578	0.000	0.000	0.000
90=>94	0.536	0.536	0.536	0.000	0.000	0.000
85=>89	0.488	0.488	0.488	0.000	0.000	0.000
80=>84	0.443	0.443	0.443	0.000	0.000	0.000
75=>79	0.408	0.408	0.408	0.000	0.000	0.000
70=>74	0.462	0.462	0.000	0.000	0.000	0.000
65=>69	0.408	0.408	0.000	0.000	0.000	0.000
60=>64	0.349	0.349	0.000	0.000	0.000	0.000
55=>59	0.291	0.291	0.000	0.000	0.000	0.000
50=>54	0.304	0.000	0.000	0.000	0.000	0.000
45=>49	0.268	0.000	0.000	0.000	0.000	0.000
40=>44	0.256	0.000	0.000	0.000	0.000	0.000
35=>39	0.246	0.000	0.000	0.000	0.000	0.000
30=>34	0.238	0.000	0.000	0.000	0.000	0.000
25=>29	0.230	0.000	0.000	0.000	0.000	0.000
20=>24	0.223	0.000	0.000	0.000	0.000	0.000
15=>19	0.216	0.000	0.000	0.000	0.000	0.000
10=>14	0.211	0.000	0.000	0.000	0.000	0.000
5=>9	0.207	0.000	0.000	0.000	0.000	0.000
0=>4	0.206	0.000	0.000	0.000	0.000	0.000
Average	**0.303**	**0.393**	**0.439**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)

Temperature Bin (℉)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS

Temperature Bin (℉)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
PCHWP 1	41.23	92%	1
PCHWP 2	41.23	92%	1
PCHWP 3	41.23	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)

Temperature Bin (°F)	PCHWP 1 Demand (kW)	PCHWP 2 Demand (kW)	PCHWP 3 Demand (kW)	PCHWP 4 Demand (kW)	PCHWP 5 Demand (kW)	PCHWP 6 Demand (kW)	Total PCHWP Demand (kW)
95=>99	33	33	33	0	0	0	100
90=>94	33	33	33	0	0	0	100
85=>89	33	33	33	0	0	0	100
80=>84	33	33	33	0	0	0	100
75=>79	33	33	33	0	0	0	100
70=>74	33	33	0	0	0	0	67
65=>69	33	33	0	0	0	0	67
60=>64	33	33	0	0	0	0	67
55=>59	33	33	0	0	0	0	67
50=>54	33	0	0	0	0	0	33
45=>49	33	0	0	0	0	0	33
40=>44	33	0	0	0	0	0	33
35=>39	33	0	0	0	0	0	33
30=>34	33	0	0	0	0	0	33
25=>29	33	0	0	0	0	0	33
20=>24	33	0	0	0	0	0	33
15=>19	33	0	0	0	0	0	33
10=>14	33	0	0	0	0	0	33
5=>9	33	0	0	0	0	0	33
0=>4	33	0	0	0	0	0	33
Total/Avg	**668**	**301**	**167**	**0**	**0**	**0**	**1,136**

PCHWP Energy Usage (kWh)

Temperature Bin (°F)	PCHWP 1 Energy Usage (kWh)	PCHWP 2 Energy Usage (kWh)	PCHWP 3 Energy Usage (kWh)	PCHWP 4 Energy Usage (kWh)	PCHWP 5 Energy Usage (kWh)	PCHWP 6 Energy Usage (kWh)	Total PCHWP Energy Usage (kWh)
95=>99	267	267	267	0	0	0	802
90=>94	1,670	1,670	1,670	0	0	0	5,010
85=>89	4,542	4,542	4,542	0	0	0	13,627
80=>84	9,519	9,519	9,519	0	0	0	28,557
75=>79	14,763	14,763	14,763	0	0	0	44,288
70=>74	20,474	20,474	0	0	0	0	40,948
65=>69	23,447	23,447	0	0	0	0	46,894
60=>64	23,514	23,514	0	0	0	0	47,027
55=>59	20,508	20,508	0	0	0	0	41,015
50=>54	18,437	0	0	0	0	0	18,437
45=>49	15,965	0	0	0	0	0	15,965
40=>44	16,266	0	0	0	0	0	16,266
35=>39	18,437	0	0	0	0	0	18,437
30=>34	21,810	0	0	0	0	0	21,810
25=>29	19,739	0	0	0	0	0	19,739
20=>24	15,865	0	0	0	0	0	15,865
15=>19	12,659	0	0	0	0	0	12,659
10=>14	10,454	0	0	0	0	0	10,454
5=>9	8,083	0	0	0	0	0	8,083
0=>4	15,698	0	0	0	0	0	15,698
Total/Avg	**292,116**	**118,704**	**30,761**	**0**	**0**	**0**	**441,581**

Condenser Water Pump (CWP)

CWP Energy Data

Pump	Horsepower	Efficiency	Switch Point
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)

Temperature Bin (°F)	CWP 1 Demand (kW)	CWP 2 Demand (kW)	CWP 3 Demand (kW)	CWP 4 Demand (kW)	CWP 5 Demand (kW)	CWP 6 Demand (kW)	Total CWP Demand (kW)
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)

Temperature Bin (°F)	CWP 1 Energy Usage (kWh)	CWP 2 Energy Usage (kWh)	CWP 3 Energy Usage (kWh)	CWP 4 Energy Usage (kWh)	CWP 5 Energy Usage (kWh)	CWP 6 Energy Usage (kWh)	Total CWP Energy Usage (kWh)
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	40	92%	1
CT 2	40	92%	1
CT 3	40	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	32	32	32	0	0	0	97
90=>94	32	32	32	0	0	0	97
85=>89	32	32	32	0	0	0	97
80=>84	32	32	32	0	0	0	97
75=>79	32	32	32	0	0	0	97
70=>74	32	32	0	0	0	0	65
65=>69	32	32	0	0	0	0	65
60=>64	32	32	0	0	0	0	65
55=>59	32	32	0	0	0	0	65
50=>54	32	0	0	0	0	0	32
45=>49	32	0	0	0	0	0	32
40=>44	32	0	0	0	0	0	32
35=>39	32	0	0	0	0	0	32
30=>34	32	0	0	0	0	0	32
25=>29	32	0	0	0	0	0	32
20=>24	32	0	0	0	0	0	32
15=>19	32	0	0	0	0	0	32
10=>14	32	0	0	0	0	0	32
5=>9	32	0	0	0	0	0	32
0=>4	32	0	0	0	0	0	32
Total/Avg	**648**	**292**	**162**	**0**	**0**	**0**	**1,102**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	259	259	259	0	0	0	778
90=>94	1,620	1,620	1,620	0	0	0	4,860
85=>89	4,406	4,406	4,406	0	0	0	13,219
80=>84	9,234	9,234	9,234	0	0	0	27,702
75=>79	14,321	14,321	14,321	0	0	0	42,962
70=>74	19,861	19,861	0	0	0	0	39,722
65=>69	22,745	22,745	0	0	0	0	45,490
60=>64	22,810	22,810	0	0	0	0	45,619
55=>59	19,894	19,894	0	0	0	0	39,787
50=>54	17,885	0	0	0	0	0	17,885
45=>49	15,487	0	0	0	0	0	15,487
40=>44	15,779	0	0	0	0	0	15,779
35=>39	17,885	0	0	0	0	0	17,885
30=>34	21,157	0	0	0	0	0	21,157
25=>29	19,148	0	0	0	0	0	19,148
20=>24	15,390	0	0	0	0	0	15,390
15=>19	12,280	0	0	0	0	0	12,280
10=>14	10,141	0	0	0	0	0	10,141
5=>9	7,841	0	0	0	0	0	7,841
0=>4	15,228	0	0	0	0	0	15,228
Total/Avg	**283,370**	**115,150**	**29,840**	**0**	**0**	**0**	**428,360**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 2 Central Plant with magnetic bearing variable speed chiller

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													0
Steam Cost													$0
Electricity Usage													
Chiller Energy Usage (kWh):													1,679,567
Chilled Water Pump Energy Usage (kWh):													441,581
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													428,360
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													2,857,558
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													2,000,291
Off Peak Energy Usage - kWh													857,267
													2,857,558
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$105,235
Off Peak Energy Cost													$45,101
EECR & AEP Cost													$0
Electricity Cost													$324,349
Total Energy Cost													**$324,349**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

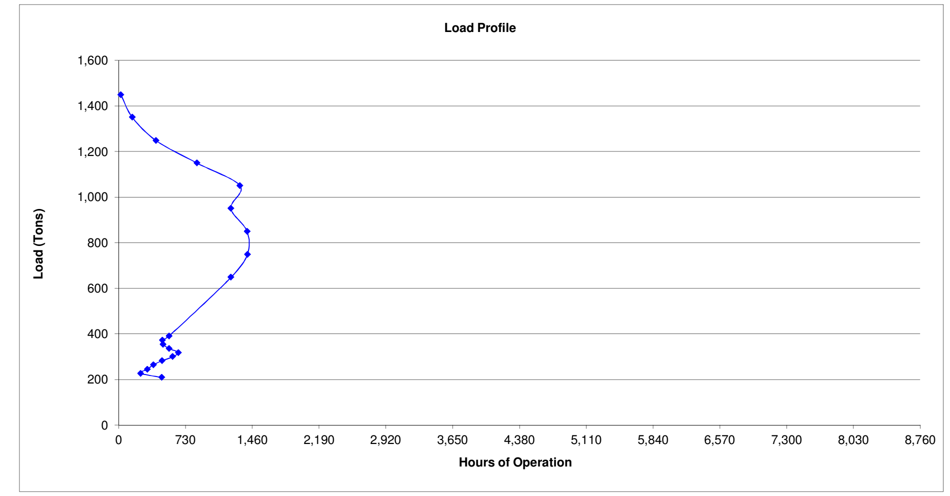
Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

General Assumptions

Transformer Losses	5%	Peak Make-up Water:	300 gpm
Auxiliaries Electrical Demand	0.01 kW/ton	Peak Sewage:	50 gpm
Peak Cooling Load	1,500 tons		

All recommendations and/or advice presented in this document are Stanley Consultants' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available to us, input by the owner, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions. We have no control over new and/or non-public information, changed conditions, cost of land, cost of labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.



LOAD SUMMARY

Temperature Bin (°F)	Total Load (Tons)	Auxiliaries Demand (kW)	Aux Operational Hours	Total Electrical Energy Usage (kWh)	Total Steam Energy Usage (klb)	Total Energy Usage (Ton-Hrs)	Water Usage (Gal)	Sewage Usage (Gal)
95=>99	1,449	14	4	58	107	11,592	69,552	11,592
90=>94	1,350	14	25	338	608	67,500	405,000	67,500
85=>89	1,248	12	68	849	1,485	169,728	1,018,368	169,728
80=>84	1,149	11	143	1,637	2,783	327,465	1,964,790	327,465
75=>79	1,050	11	221	2,321	3,857	464,100	2,784,600	464,100
70=>74	950	10	204	1,941	4,978	582,350	2,329,400	388,233
65=>69	850	9	234	1,989	4,935	596,700	2,386,800	397,800
60=>64	748	7	235	1,755	4,204	526,592	2,106,368	351,061
55=>59	648	6	205	1,326	3,069	397,872	1,591,488	265,248
50=>54	391	4	92	360	1,692	215,832	431,664	71,944
45=>49	372	4	80	296	1,371	177,816	355,632	59,272
40=>44	354	4	81	287	1,316	172,398	344,796	57,466
35=>39	336	3	92	309	1,404	185,472	370,944	61,824
30=>34	318	3	109	346	1,561	207,654	415,308	69,218
25=>29	300	3	99	296	1,324	177,300	354,600	59,100
20=>24	282	3	79	223	996	133,950	267,900	44,650
15=>19	264	3	63	167	741	100,056	200,112	33,352
10=>14	245	2	52	128	567	76,685	153,370	25,562
5=>9	227	2	40	92	406	54,934	109,868	18,311
0=>4	209	2	78	164	728	98,230	196,460	32,743
Total/Avg				**14,881**	**38,133**	**4,744,226**	**17,857,020**	**2,976,170**

CHILLER 1

Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 1 Electric Efficiency (kW/Ton)	Chiller 1 Demand (kW)	Chiller 1 Operational Hours	Chiller 1 Energy Usage (kWh)	Chiller 1 Steam Efficiency (lbs/Ton-hr)	Chiller 1 Steam Demand (klbs/hr)	Chiller 1 Steam Energy Usage (klbs)	Chiller 1 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	391	0.000	0	552	0	8	3.1	1,692.4	215,832
45=>49	372	0.000	0	478	0	8	2.9	1,371.4	177,816
40=>44	354	0.000	0	487	0	8	2.7	1,315.9	172,398
35=>39	336	0.000	0	552	0	8	2.5	1,404.3	185,472
30=>34	318	0.000	0	653	0	8	2.4	1,561.3	207,654
25=>29	300	0.000	0	591	0	7	2.2	1,324.4	177,300
20=>24	282	0.000	0	475	0	7	2.1	995.6	133,950
15=>19	264	0.000	0	379	0	7	2.0	740.9	100,056
10=>14	245	0.000	0	313	0	7	1.8	566.8	76,685
5=>9	227	0.000	0	242	0	7	1.7	406.1	54,934
0=>4	209	0.000	0	470	0	7	1.5	728.0	98,230
Total/Avg		**0.000**	**0**	**8,746**	**0**	**7.817**	**56.3**	**23,646.7**	**2,998,879**

CHILLER 2

Temperature Bin (°F)	Chiller 2 Load (Tons)	Chiller 2 Electric Efficiency (kW/Ton)	Chiller 2 Demand (kW)	Chiller 2 Operational Hours	Chiller 2 Energy Usage (kWh)	Chiller 2 Steam Efficiency (klbs/Ton-hr)	Chiller 2 Steam Demand (klbs/hr)	Chiller 2 Steam Energy Usage (klbs)	Chiller 2 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	475	0.000	0	613	0	9	4.1	2,488.8	291,175
65=>69	425	0.000	0	702	0	8	3.5	2,467.5	298,350
60=>64	374	0.000	0	704	0	8	3.0	2,102.1	263,296
55=>59	324	0.000	0	614	0	8	2.5	1,534.4	198,936
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**0**	**3,554**	**0**		**31.4**	**11,539.5**	**1,398,552**

CHILLER 3

Temperature Bin (°F)	Chiller 3 Load (Tons)	Chiller 3 Electric Efficiency (kW/Ton)	Chiller 3 Demand (kW)	Chiller 3 Operational Hours	Chiller 3 Energy Usage (kWh)	Chiller 3 Steam Efficiency (lbs/Ton-hr)	Chiller 3 Steam Demand (klbs/hr)	Chiller 3 Steam Energy Usage (klbs)	Chiller 3 Energy Usage (Ton-hrs)
95=>99	483	0.000	0	8	0	9	4.5	35.6	3,864
90=>94	450	0.000	0	50	0	9	4.1	202.6	22,500
85=>89	416	0.000	0	136	0	9	3.6	495.0	56,576
80=>84	383	0.000	0	285	0	8	3.3	927.7	109,155
75=>79	350	0.000	0	442	0	8	2.9	1,285.8	154,700
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**0.000**	**921**	**921**	**0**		**18.3**	**2,946.7**	**346,795**

CHILLER 4

Temperature Bin (°F)	Chiller 4 Load (Tons)	Chiller 4 Electric Efficiency (kW/Ton)	Chiller 4 Demand (kW)	Chiller 4 Operational Hours	Chiller 4 Energy Usage (kWh)	Chiller 4 Steam Efficiency (lbs/Ton-hr)	Chiller 4 Steam Demand (klbs/hr)	Chiller 4 Steam Energy Usage (klbs)	Chiller 4 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0		0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 5

Temperature Bin (°F)	Chiller 5 Load (Tons)	Chiller 5 Electric Efficiency (kW/Ton)	Chiller 5 Demand (kW)	Chiller 5 Operational Hours	Chiller 5 Energy Usage (kWh)	Chiller 5 Steam Efficiency (lbs/Ton-hr)	Chiller 5 Steam Demand (klbs/hr)	Chiller 5 Steam Energy Usage (klbs)	Chiller 5 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

CHILLER 6

Temperature Bin (°F)	Chiller 6 Load (Tons)	Chiller 6 Electric Efficiency (kW/Ton)	Chiller 6 Demand (kW)	Chiller 6 Operational Hours	Chiller 6 Energy Usage (kWh)	Chiller 6 Steam Efficiency (lbs/Ton-hr)	Chiller 6 Steam Demand (klbs/hr)	Chiller 6 Steam Energy Usage (klbs)	Chiller 6 Energy Usage (Ton-hrs)
95=>99	0	0.000	0	0	0	0	0.0	0.0	0
90=>94	0	0.000	0	0	0	0	0.0	0.0	0
85=>89	0	0.000	0	0	0	0	0.0	0.0	0
80=>84	0	0.000	0	0	0	0	0.0	0.0	0
75=>79	0	0.000	0	0	0	0	0.0	0.0	0
70=>74	0	0.000	0	0	0	0	0.0	0.0	0
65=>69	0	0.000	0	0	0	0	0.0	0.0	0
60=>64	0	0.000	0	0	0	0	0.0	0.0	0
55=>59	0	0.000	0	0	0	0	0.0	0.0	0
50=>54	0	0.000	0	0	0	0	0.0	0.0	0
45=>49	0	0.000	0	0	0	0	0.0	0.0	0
40=>44	0	0.000	0	0	0	0	0.0	0.0	0
35=>39	0	0.000	0	0	0	0	0.0	0.0	0
30=>34	0	0.000	0	0	0	0	0.0	0.0	0
25=>29	0	0.000	0	0	0	0	0.0	0.0	0
20=>24	0	0.000	0	0	0	0	0.0	0.0	0
15=>19	0	0.000	0	0	0	0	0.0	0.0	0
10=>14	0	0.000	0	0	0	0	0.0	0.0	0
5=>9	0	0.000	0	0	0	0	0.0	0.0	0
0=>4	0	0.000	0	0	0	0	0.0	0.0	0
Total/Avg		**#DIV/0!**	**0**	**0**	**0**		**0.0**	**0.0**	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile

Case 1 Central plant with constant speed chiller

PEAK ELECTRICAL DEMAND (including transformer losses)											
Month	High Bin	Chiller 1 Peak Demand (kW)	Chiller 2 Peak Demand (kW)	Chiller 3 Peak Demand (kW)	Chiller 4 Peak Demand (kW)	Chiller 5 Peak Demand (kW)	Chiller 6 Peak Demand (kW)	Total PCHWP Demand (kW)	Total CWP Demand (kW)	Total Cooling Tower Demand (kW)	Peak Demand (kW)
January	55=>59	148	148	0	0	0	0	68	41	68	473
February	60=>64	180	180	0	0	0	0	68	41	68	537
March	70=>74	252	252	0	0	0	0	68	41	68	681
April	85=>89	231	231	231	0	0	0	102	62	102	959
May	90=>94	261	261	261	0	0	0	102	62	102	1,049
June	95=>99	291	291	291	0	0	0	102	62	102	1,139
July	95=>99	291	291	291	0	0	0	102	62	102	1,139
August	95=>99	291	291	291	0	0	0	102	62	102	1,139
September	95=>99	291	291	291	0	0	0	102	62	102	1,139
October	85=>89	231	231	231	0	0	0	102	62	102	959
November	75=>79	183	183	183	0	0	0	102	62	102	816
December	60=>64	180	180	0	0	0	0	68	41	68	537

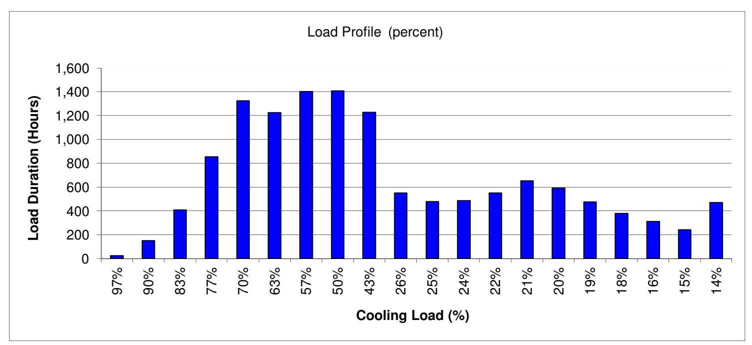
Chiller Input

CHILLER LOAD PROFILE								
Temperature Bin (°F)	Chiller 1 Load (Tons)	Chiller 2 Load (Tons)	Chiller 3 Load (Tons)	Chiller 4 Load (Tons)	Chiller 5 Load (Tons)	Chiller 6 Load (Tons)	Total Load (Tons)	Percent Load
95=>99	483	483	483	0	0	0	1,449	97%
90=>94	450	450	450	0	0	0	1,350	90%
85=>89	416	416	416	0	0	0	1,248	83%
80=>84	383	383	383	0	0	0	1,149	77%
75=>79	350	350	350	0	0	0	1,050	70%
70=>74	475	475	0	0	0	0	950	63%
65=>69	425	425	0	0	0	0	850	57%
60=>64	374	374	0	0	0	0	748	50%
55=>59	324	324	0	0	0	0	648	43%
50=>54	391	0	0	0	0	0	391	26%
45=>49	372	0	0	0	0	0	372	25%
40=>44	354	0	0	0	0	0	354	24%
35=>39	336	0	0	0	0	0	336	22%
30=>34	318	0	0	0	0	0	318	21%
25=>29	300	0	0	0	0	0	300	20%
20=>24	282	0	0	0	0	0	282	19%
15=>19	264	0	0	0	0	0	264	18%
10=>14	245	0	0	0	0	0	245	16%
5=>9	227	0	0	0	0	0	227	15%
0=>4	209	0	0	0	0	0	209	14%
Peak	**483**	**483**	**483**	**0**	**0**	**0**	**1,449**	

CHILLER EFFICIENCY (ELECTRIC)						
Temperature Bin (°F)	Chiller 1 Demand (kW/ton)	Chiller 2 Efficiency (kW/ton)	Chiller 3 Efficiency (kW/ton)	Chiller 4 Efficiency (kW/ton)	Chiller 5 Efficiency (kW/ton)	Chiller 6 Efficiency (kW/ton)
95=>99	0.000	0.000	0.000	0.000	0.000	0.000
90=>94	0.000	0.000	0.000	0.000	0.000	0.000
85=>89	0.000	0.000	0.000	0.000	0.000	0.000
80=>84	0.000	0.000	0.000	0.000	0.000	0.000
75=>79	0.000	0.000	0.000	0.000	0.000	0.000
70=>74	0.000	0.000	0.000	0.000	0.000	0.000
65=>69	0.000	0.000	0.000	0.000	0.000	0.000
60=>64	0.000	0.000	0.000	0.000	0.000	0.000
55=>59	0.000	0.000	0.000	0.000	0.000	0.000
50=>54	0.000	0.000	0.000	0.000	0.000	0.000
45=>49	0.000	0.000	0.000	0.000	0.000	0.000
40=>44	0.000	0.000	0.000	0.000	0.000	0.000
35=>39	0.000	0.000	0.000	0.000	0.000	0.000
30=>34	0.000	0.000	0.000	0.000	0.000	0.000
25=>29	0.000	0.000	0.000	0.000	0.000	0.000
20=>24	0.000	0.000	0.000	0.000	0.000	0.000
15=>19	0.000	0.000	0.000	0.000	0.000	0.000
10=>14	0.000	0.000	0.000	0.000	0.000	0.000
5=>9	0.000	0.000	0.000	0.000	0.000	0.000
0=>4	0.000	0.000	0.000	0.000	0.000	0.000
Average	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

CHILLER EFFICIENCY (STEAM)						
Temperature Bin (°F)	Chiller 1 Demand (lb/ton)	Chiller 2 Demand (lb/ton)	Chiller 3 Demand (lb/ton)	Chiller 4 Demand (lb/ton)	Chiller 5 Demand (lb/ton)	Chiller 6 Demand (lb/ton)
95=>99	9.219	9.219	9.219	0.000	0.000	0.000
90=>94	9.002	9.002	9.002	0.000	0.000	0.000
85=>89	8.750	8.750	8.750	0.000	0.000	0.000
80=>84	8.499	8.499	8.499	0.000	0.000	0.000
75=>79	8.311	8.311	8.311	0.000	0.000	0.000
70=>74	8.547	8.547	0.000	0.000	0.000	0.000
65=>69	8.271	8.271	0.000	0.000	0.000	0.000
60=>64	7.984	7.984	0.000	0.000	0.000	0.000
55=>59	7.713	7.713	0.000	0.000	0.000	0.000
50=>54	7.841	0.000	0.000	0.000	0.000	0.000
45=>49	7.712	0.000	0.000	0.000	0.000	0.000
40=>44	7.633	0.000	0.000	0.000	0.000	0.000
35=>39	7.571	0.000	0.000	0.000	0.000	0.000
30=>34	7.519	0.000	0.000	0.000	0.000	0.000
25=>29	7.470	0.000	0.000	0.000	0.000	0.000
20=>24	7.433	0.000	0.000	0.000	0.000	0.000
15=>19	7.405	0.000	0.000	0.000	0.000	0.000
10=>14	7.392	0.000	0.000	0.000	0.000	0.000
5=>9	7.392	0.000	0.000	0.000	0.000	0.000
0=>4	7.411	0.000	0.000	0.000	0.000	0.000
Average	**7.817**	**8.219**	**8.480**	**0.000**	**0.000**	**0.000**

CHILLER OPERATIONAL HOURS							
Temperature Bin (°F)	Chiller 1 Operational Hours	Chiller 2 Operational Hours	Chiller 3 Operational Hours	Chiller 4 Operational Hours	Chiller 5 Operational Hours	Chiller 6 Operational Hours	Cumulative Operational Hours
95=>99	8	8	8	0	0	0	24
90=>94	50	50	50	0	0	0	150
85=>89	136	136	136	0	0	0	408
80=>84	285	285	285	0	0	0	855
75=>79	442	442	442	0	0	0	1,326
70=>74	613	613	0	0	0	0	1,226
65=>69	702	702	0	0	0	0	1,404
60=>64	704	704	0	0	0	0	1,408
55=>59	614	614	0	0	0	0	1,228
50=>54	552	0	0	0	0	0	552
45=>49	478	0	0	0	0	0	478
40=>44	487	0	0	0	0	0	487
35=>39	552	0	0	0	0	0	552
30=>34	653	0	0	0	0	0	653
25=>29	591	0	0	0	0	0	591
20=>24	475	0	0	0	0	0	475
15=>19	379	0	0	0	0	0	379
10=>14	313	0	0	0	0	0	313
5=>9	242	0	0	0	0	0	242
0=>4	470	0	0	0	0	0	470
Total	**8,746**	**3,554**	**921**	**0**	**0**	**0**	



Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Primary Chilled Water Pump (PCHWP)

PCHWP Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
PCHWP 1	42.6	92%	1
PCHWP 2	42.6	92%	1
PCHWP 3	42.6	92%	1
PCHWP 4	0	92%	1
PCHWP 5	0	92%	1
PCHWP 6	0	92%	1

PCHWP Demand (kW)							
Temperature Bin (°F)	**PCHWP 1 Demand (kW)**	**PCHWP 2 Demand (kW)**	**PCHWP 3 Demand (kW)**	**PCHWP 4 Demand (kW)**	**PCHWP 5 Demand (kW)**	**PCHWP 6 Demand (kW)**	**Total PCHWP Demand (kW)**
95=>99	35	35	35	0	0	0	104
90=>94	35	35	35	0	0	0	104
85=>89	35	35	35	0	0	0	104
80=>84	35	35	35	0	0	0	104
75=>79	35	35	35	0	0	0	104
70=>74	35	35	0	0	0	0	69
65=>69	35	35	0	0	0	0	69
60=>64	35	35	0	0	0	0	69
55=>59	35	35	0	0	0	0	69
50=>54	35	0	0	0	0	0	35
45=>49	35	0	0	0	0	0	35
40=>44	35	0	0	0	0	0	35
35=>39	35	0	0	0	0	0	35
30=>34	35	0	0	0	0	0	35
25=>29	35	0	0	0	0	0	35
20=>24	35	0	0	0	0	0	35
15=>19	35	0	0	0	0	0	35
10=>14	35	0	0	0	0	0	35
5=>9	35	0	0	0	0	0	35
0=>4	35	0	0	0	0	0	35
Total/Avg	**690**	**311**	**173**	**0**	**0**	**0**	**1,173**

PCHWP Energy Usage (kWh)							
Temperature Bin (°F)	**PCHWP 1 Energy Usage (kWh)**	**PCHWP 2 Energy Usage (kWh)**	**PCHWP 3 Energy Usage (kWh)**	**PCHWP 4 Energy Usage (kWh)**	**PCHWP 5 Energy Usage (kWh)**	**PCHWP 6 Energy Usage (kWh)**	**Total PCHWP Energy Usage (kWh)**
95=>99	276	276	276	0	0	0	828
90=>94	1,725	1,725	1,725	0	0	0	5,175
85=>89	4,692	4,692	4,692	0	0	0	14,076
80=>84	9,833	9,833	9,833	0	0	0	29,498
75=>79	15,249	15,249	15,249	0	0	0	45,747
70=>74	21,149	21,149	0	0	0	0	42,297
65=>69	24,219	24,219	0	0	0	0	48,438
60=>64	24,288	24,288	0	0	0	0	48,576
55=>59	21,183	21,183	0	0	0	0	42,366
50=>54	19,044	0	0	0	0	0	19,044
45=>49	16,491	0	0	0	0	0	16,491
40=>44	16,802	0	0	0	0	0	16,802
35=>39	19,044	0	0	0	0	0	19,044
30=>34	22,529	0	0	0	0	0	22,529
25=>29	20,390	0	0	0	0	0	20,390
20=>24	16,388	0	0	0	0	0	16,388
15=>19	13,076	0	0	0	0	0	13,076
10=>14	10,799	0	0	0	0	0	10,799
5=>9	8,349	0	0	0	0	0	8,349
0=>4	16,215	0	0	0	0	0	16,215
Total/Avg	**301,737**	**122,613**	**31,775**	**0**	**0**	**0**	**456,125**

Condenser Water Pump (CWP)

CWP Energy Data			
Pump	**Horsepower**	**Efficiency**	**Switch Point**
CWP 1	28.74	92%	1
CWP 2	28.74	92%	1
CWP 3	28.74	92%	1
CWP 4	0	92%	1
CWP 5	0	92%	1
CWP 6	0	92%	1

CWP Demand (kW)							
Temperature Bin (°F)	**CWP 1 Demand (kW)**	**CWP 2 Demand (kW)**	**CWP 3 Demand (kW)**	**CWP 4 Demand (kW)**	**CWP 5 Demand (kW)**	**CWP 6 Demand (kW)**	**Total CWP Demand (kW)**
95=>99	23	23	23	0	0	0	70
90=>94	23	23	23	0	0	0	70
85=>89	23	23	23	0	0	0	70
80=>84	23	23	23	0	0	0	70
75=>79	23	23	23	0	0	0	70
70=>74	23	23	0	0	0	0	47
65=>69	23	23	0	0	0	0	47
60=>64	23	23	0	0	0	0	47
55=>59	23	23	0	0	0	0	47
50=>54	23	0	0	0	0	0	23
45=>49	23	0	0	0	0	0	23
40=>44	23	0	0	0	0	0	23
35=>39	23	0	0	0	0	0	23
30=>34	23	0	0	0	0	0	23
25=>29	23	0	0	0	0	0	23
20=>24	23	0	0	0	0	0	23
15=>19	23	0	0	0	0	0	23
10=>14	23	0	0	0	0	0	23
5=>9	23	0	0	0	0	0	23
0=>4	23	0	0	0	0	0	23
Total/Avg	**466**	**210**	**117**	**0**	**0**	**0**	**792**

CWP Energy Usage (kWh)							
Temperature Bin (°F)	**CWP 1 Energy Usage (kWh)**	**CWP 2 Energy Usage (kWh)**	**CWP 3 Energy Usage (kWh)**	**CWP 4 Energy Usage (kWh)**	**CWP 5 Energy Usage (kWh)**	**CWP 6 Energy Usage (kWh)**	**Total CWP Energy Usage (kWh)**
95=>99	186	186	186	0	0	0	559
90=>94	1,165	1,165	1,165	0	0	0	3,495
85=>89	3,169	3,169	3,169	0	0	0	9,506
80=>84	6,641	6,641	6,641	0	0	0	19,922
75=>79	10,299	10,299	10,299	0	0	0	30,896
70=>74	14,283	14,283	0	0	0	0	28,566
65=>69	16,357	16,357	0	0	0	0	32,713
60=>64	16,403	16,403	0	0	0	0	32,806
55=>59	14,306	14,306	0	0	0	0	28,612
50=>54	12,862	0	0	0	0	0	12,862
45=>49	11,137	0	0	0	0	0	11,137
40=>44	11,347	0	0	0	0	0	11,347
35=>39	12,862	0	0	0	0	0	12,862
30=>34	15,215	0	0	0	0	0	15,215
25=>29	13,770	0	0	0	0	0	13,770
20=>24	11,068	0	0	0	0	0	11,068
15=>19	8,831	0	0	0	0	0	8,831
10=>14	7,293	0	0	0	0	0	7,293
5=>9	5,639	0	0	0	0	0	5,639
0=>4	10,951	0	0	0	0	0	10,951
Total/Avg	**203,782**	**82,808**	**21,459**	**0**	**0**	**0**	**308,049**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Load Profile
Case 1 Central plant with constant speed chiller

Cooling Tower

Cooling Tower Energy Data

Pump	Horsepower	Efficiency	Switch Point
CT 1	50	92%	1
CT 2	50	92%	1
CT 3	50	92%	1
CT 4	0	92%	1
CT 5	0	92%	1
CT 6	0	92%	1

Cooling Tower Demand (kW)

Temperature Bin (°F)	Cooling Tower 1 Demand (kW)	Cooling Tower 2 Demand (kW)	Cooling Tower 3 Demand (kW)	Cooling Tower 4 Demand (kW)	Cooling Tower 5 Demand (kW)	Cooling Tower 6 Demand (kW)	Total Cooling Tower Demand (kW)
95=>99	41	41	41	0	0	0	122
90=>94	41	41	41	0	0	0	122
85=>89	41	41	41	0	0	0	122
80=>84	41	41	41	0	0	0	122
75=>79	41	41	41	0	0	0	122
70=>74	41	41	0	0	0	0	81
65=>69	41	41	0	0	0	0	81
60=>64	41	41	0	0	0	0	81
55=>59	41	41	0	0	0	0	81
50=>54	41	0	0	0	0	0	41
45=>49	41	0	0	0	0	0	41
40=>44	41	0	0	0	0	0	41
35=>39	41	0	0	0	0	0	41
30=>34	41	0	0	0	0	0	41
25=>29	41	0	0	0	0	0	41
20=>24	41	0	0	0	0	0	41
15=>19	41	0	0	0	0	0	41
10=>14	41	0	0	0	0	0	41
5=>9	41	0	0	0	0	0	41
0=>4	41	0	0	0	0	0	41
Total/Avg	**810**	**365**	**203**	**0**	**0**	**0**	**1,377**

Cooling Tower Energy Usage (kWh)

Temperature Bin (°F)	Cooling Tower 1 Energy Usage (kWh)	Cooling Tower 2 Energy Usage (kWh)	Cooling Tower 3 Energy Usage (kWh)	Cooling Tower 4 Energy Usage (kWh)	Cooling Tower 5 Energy Usage (kWh)	Cooling Tower 6 Energy Usage (kWh)	Total Cooling Tower Energy Usage (kWh)
95=>99	324	324	324	0	0	0	972
90=>94	2,025	2,025	2,025	0	0	0	6,075
85=>89	5,508	5,508	5,508	0	0	0	16,524
80=>84	11,543	11,543	11,543	0	0	0	34,628
75=>79	17,901	17,901	17,901	0	0	0	53,703
70=>74	24,827	24,827	0	0	0	0	49,653
65=>69	28,431	28,431	0	0	0	0	56,862
60=>64	28,512	28,512	0	0	0	0	57,024
55=>59	24,867	24,867	0	0	0	0	49,734
50=>54	22,356	0	0	0	0	0	22,356
45=>49	19,359	0	0	0	0	0	19,359
40=>44	19,724	0	0	0	0	0	19,724
35=>39	22,356	0	0	0	0	0	22,356
30=>34	26,447	0	0	0	0	0	26,447
25=>29	23,936	0	0	0	0	0	23,936
20=>24	19,238	0	0	0	0	0	19,238
15=>19	15,350	0	0	0	0	0	15,350
10=>14	12,677	0	0	0	0	0	12,677
5=>9	9,801	0	0	0	0	0	9,801
0=>4	19,035	0	0	0	0	0	19,035
Total/Avg	**354,213**	**143,937**	**37,301**	**0**	**0**	**0**	**535,451**

Air Handling Unit (AHU)

AHU Supply Fan Energy Data

Coil Pressure drop	0	
Other Pressure drop	0	
Typical Airflow rate	0	cfm
Fan Efficiency	70%	
Supply Horsepower	0.0	
# of fans	1	
Efficiency	92%	
Switch Point	30%	

Cooling Tower Demand (kW)

Temperature Bin (°F)	Percent Load	AHU Demand (kW)
95=>99	97%	0
90=>94	90%	0
85=>89	83%	0
80=>84	77%	0
75=>79	70%	0
70=>74	63%	0
65=>69	57%	0
60=>64	50%	0
55=>59	43%	0
50=>54	26%	0
45=>49	25%	0
40=>44	24%	0
35=>39	22%	0
30=>34	21%	0
25=>29	20%	0
20=>24	19%	0
15=>19	18%	0
10=>14	16%	0
5=>9	15%	0
0=>4	14%	0
Total/Avg		**0**

AHU Energy Usage (kWh)

Temperature Bin (°F)	AHU Energy Usage (kWh)
95=>99	0
90=>94	0
85=>89	0
80=>84	0
75=>79	0
70=>74	0
65=>69	0
60=>64	0
55=>59	0
50=>54	0
45=>49	0
40=>44	0
35=>39	0
30=>34	0
25=>29	0
20=>24	0
15=>19	0
10=>14	0
5=>9	0
0=>4	0
Total/Avg	**0**

Central Plant PV Analysis
Rochester Technical and Community College
Rochester, Minnesota

Variable Cost
Case 3 Central Plant with absorption chillers

Input Data Summary

	Demand Charge-Summer		**Energy Charge - Summer**		Self Generated			
Energy Charge Multiplier	First 200-kW	$16.46	On Peak	$0.05261				
1.00	Next 800-kW	$16.46	Off Peak	$0.05261	**Purchased Steam Rate (per klb)**	$17.64	Per kLB	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000	**Purchased CHW Rate (per ton-hr)**	$0.000	Per Ton-hr	
	Demand Charge-Winter		**Energy Charge - Winter**		**Water Rate (per 1,000 Gal)**	$0.93	Per 1000 Gal	
	First 200-kW	$16.46	On Peak	$0.05261	**Sewage Rate (per 1,000 Gal)**	$3.30	Per 1000 Gal	
	Next 800-kW	$16.46	Off Peak	$0.05261	**Miscellaneous Cost (% of energy cost)**	0%	of Energy Cost	
	Over 1000 kW	$16.46	Energy Cost Adj	$0.00000				
					Natural Gas	$7.20	Per MMbtu	NOT USED
	On/Off Peak Split		**Summer/Winter Split**		**Other Stm Costs**	$1.80	Per MMbtu	NOT USED
	On Peak	70%	Summer	70%				
	Off Peak	30%	Winter	30%				

Variable Cost Calculation

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Energy Costs													
CHW Usage (Ton-Hrs)													4,744,226
												4%	
Purchased CHW Cost													$0
Steam Usage													
Energy Usage (klb):													38,133
Steam Cost													$672,664
Electricity Usage													
Chiller Energy Usage (kWh):													14,881
Chilled Water Pump Energy Usage (kWh):													456,125
Condenser Water Pump Energy Usage (kWh):													308,049
Cooling Tower Energy Usage (kWh):													535,451
AHU Supply Fan Energy Usage (kWh):													0
Total Energy Usage													1,314,505
Chiller Peak Demand (kW):	473	537	681	959	1,049	1,139	1,139	1,139	1,139	959	816	537	
On Peak Energy Usage - kWh													920,154
Off Peak Energy Usage - kWh													394,352
													1,314,505
Demand Charge	$7,783	$8,843	$11,214	$15,794	$17,264	$18,759	$18,759	$18,759	$18,759	$15,794	$13,439	$8,843	$174,013
On Peak Energy Cost													$48,409
Off Peak Energy Cost													$20,747
EECR & AEP Cost													$0
Electricity Cost													$243,169
Total Energy Cost													**$915,833**
Other Variable Costs													
Water Usage													17,857,020
Water Cost													**$16,518**
Sewage Usage													2,976,170
Sewage Cost													**$9,821**
Miscellaneous (0% of Energy Cost)													**$0**
Other Variable Costs													**$26,339**

CentralPlant-PV Case Comparison8%discount Rate.xlsx

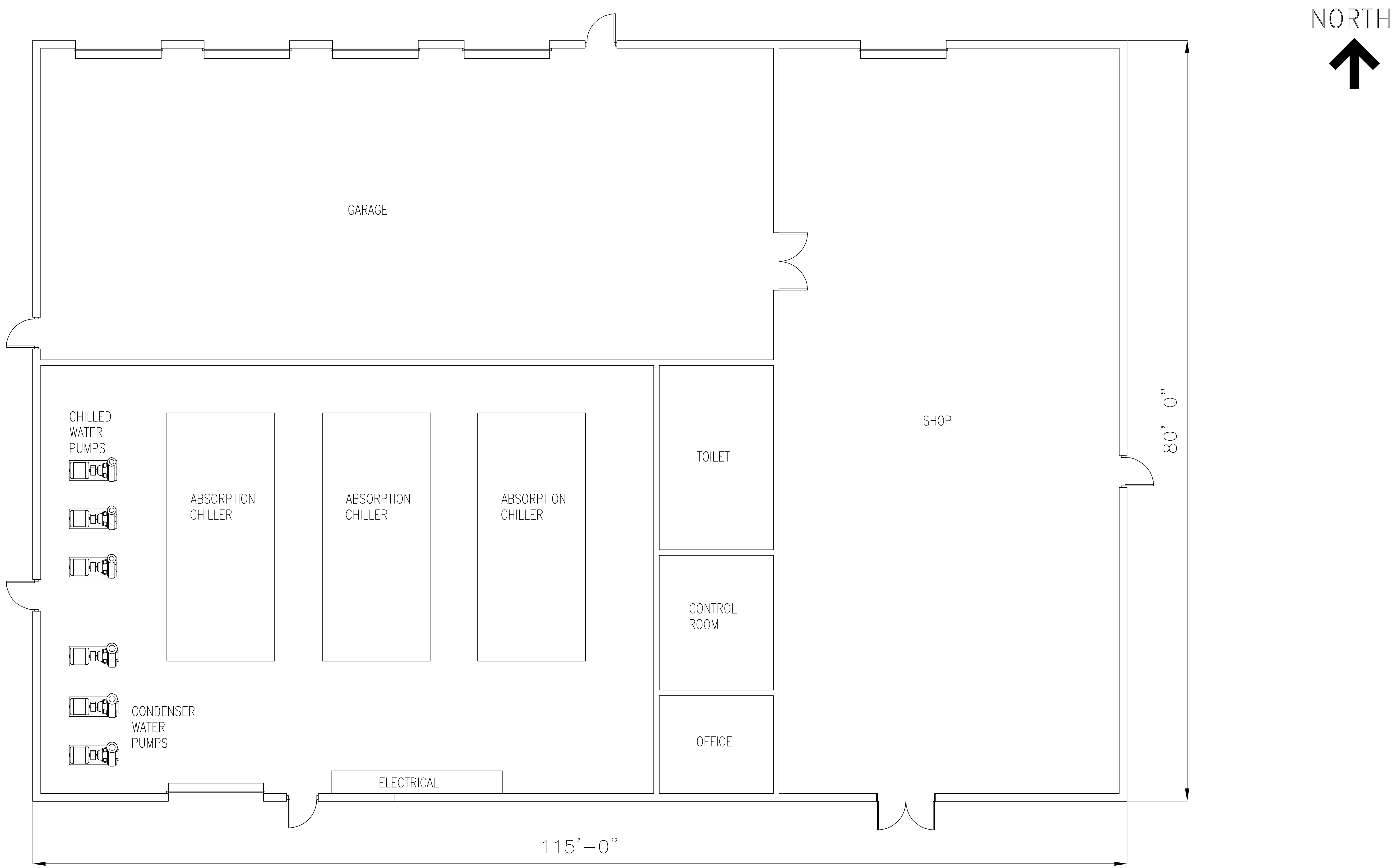
Stanley Consultants
Printed: 12/14/2012

Appendix F

Drawings

CENTRIFUGAL CHIILLER BUILDING LAYOUT

Stanley Consultants INC.	ROCHESTER COMMUNITY AND TECHNICAL COLLEGE CHILLED WATER STUDY ROCHESTER, MINNESOTA	3/32"=1'-0" A1



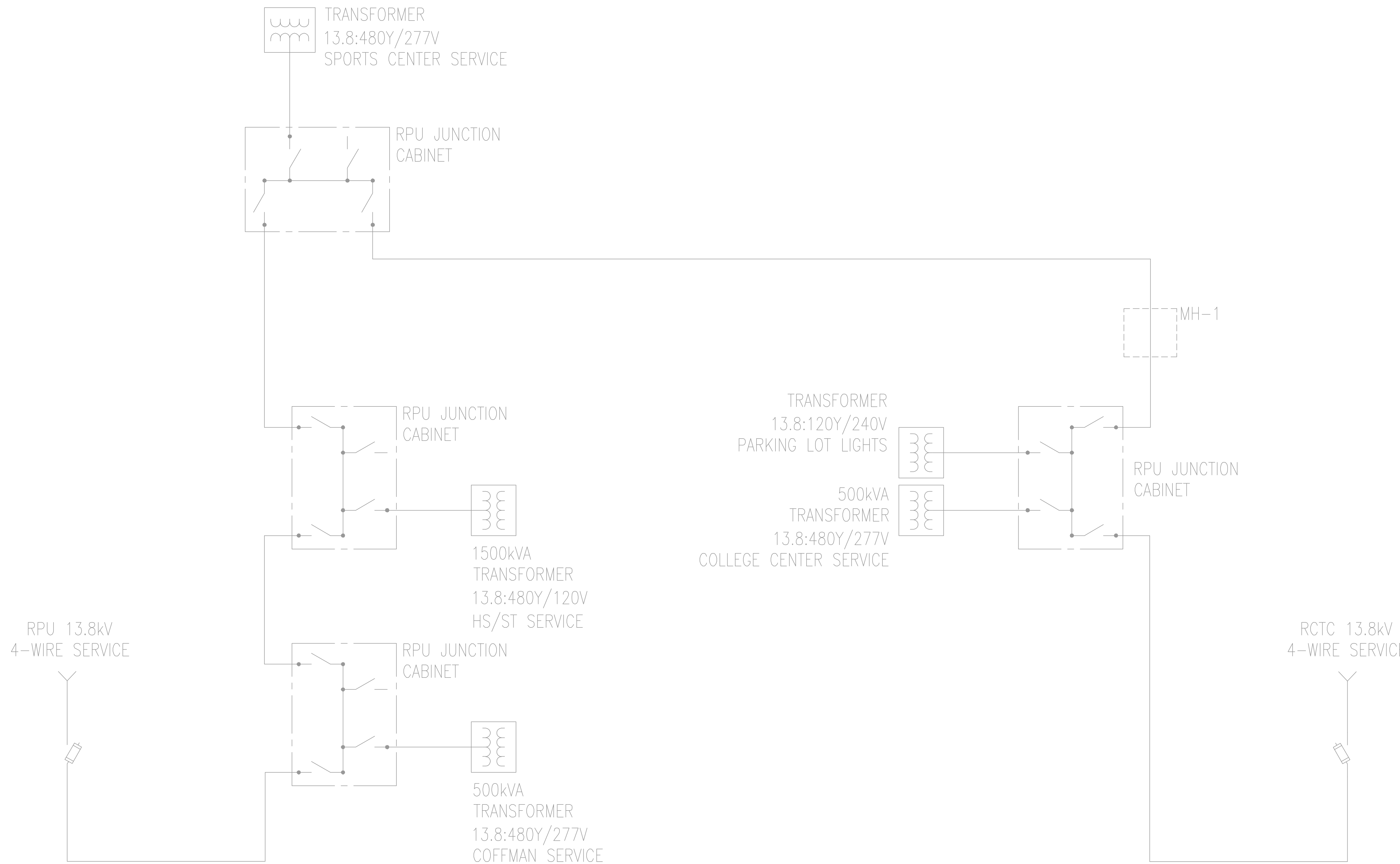
ABSORPTION CHIILLER BUILDING LAYOUT

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

3/32"=1'-0"

A2



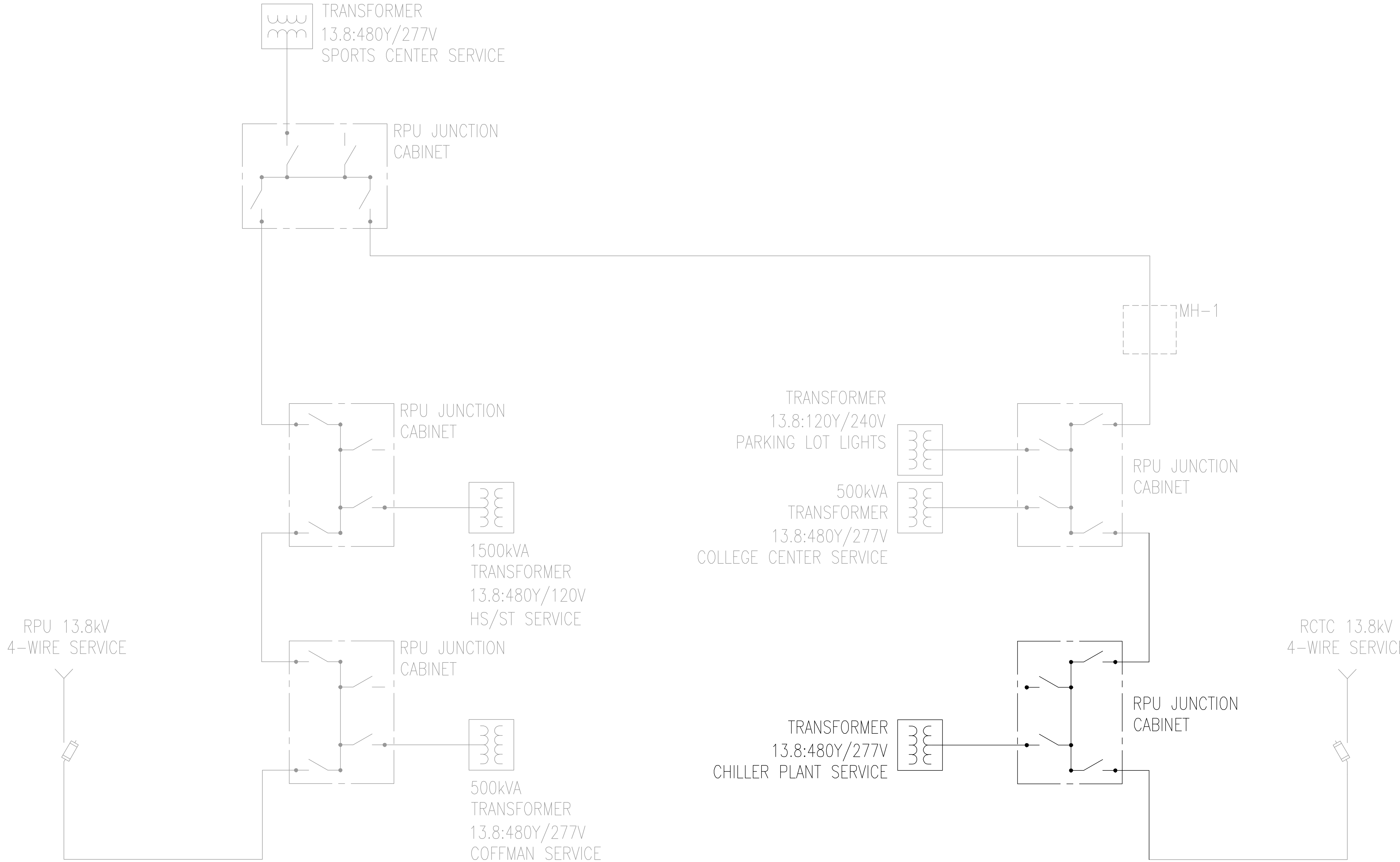
EXISTING ONE LINE DIAGRAM

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

NO SCALE

E1



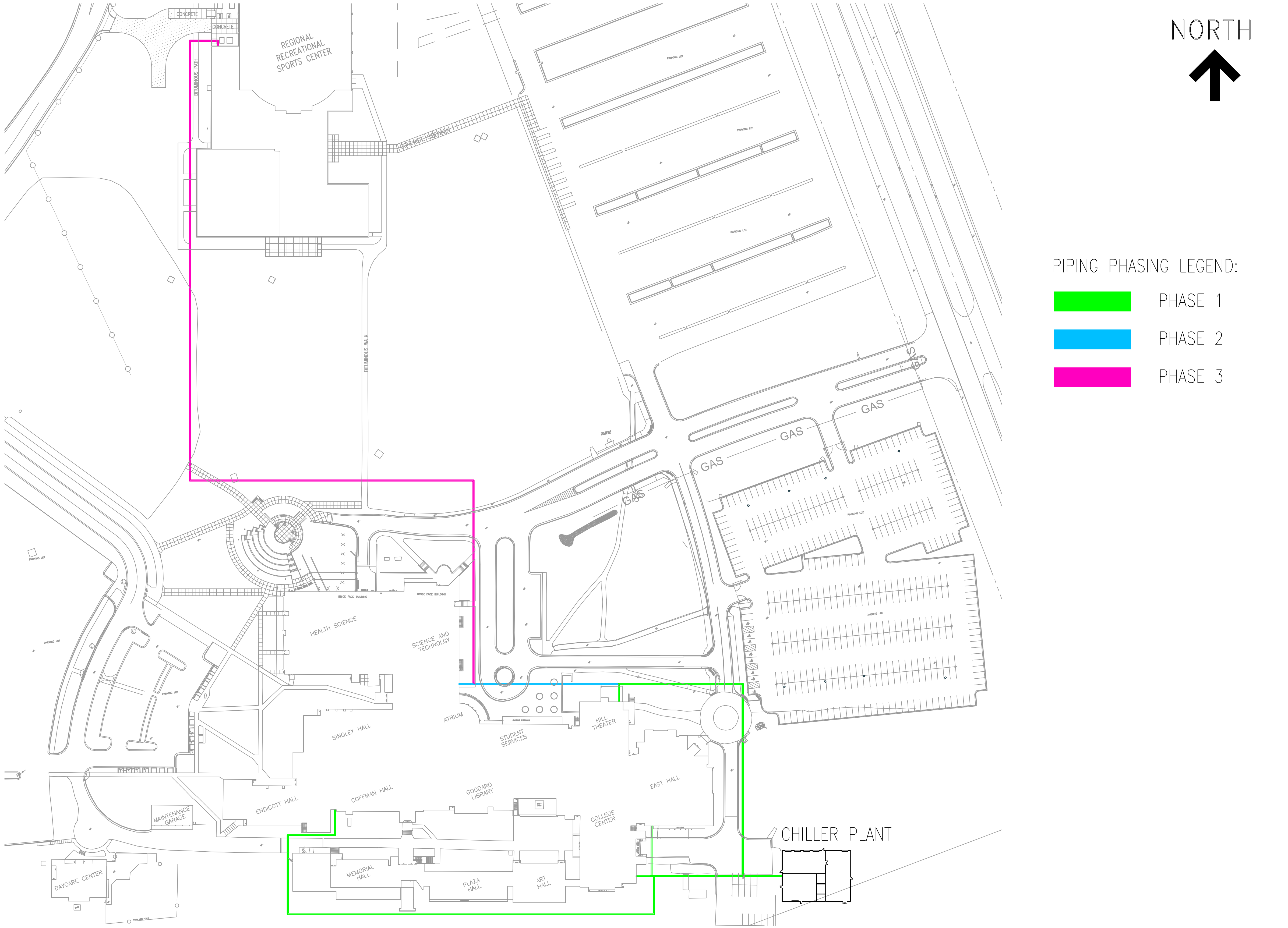
ONE LINE DIAGRAM

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

NO SCALE

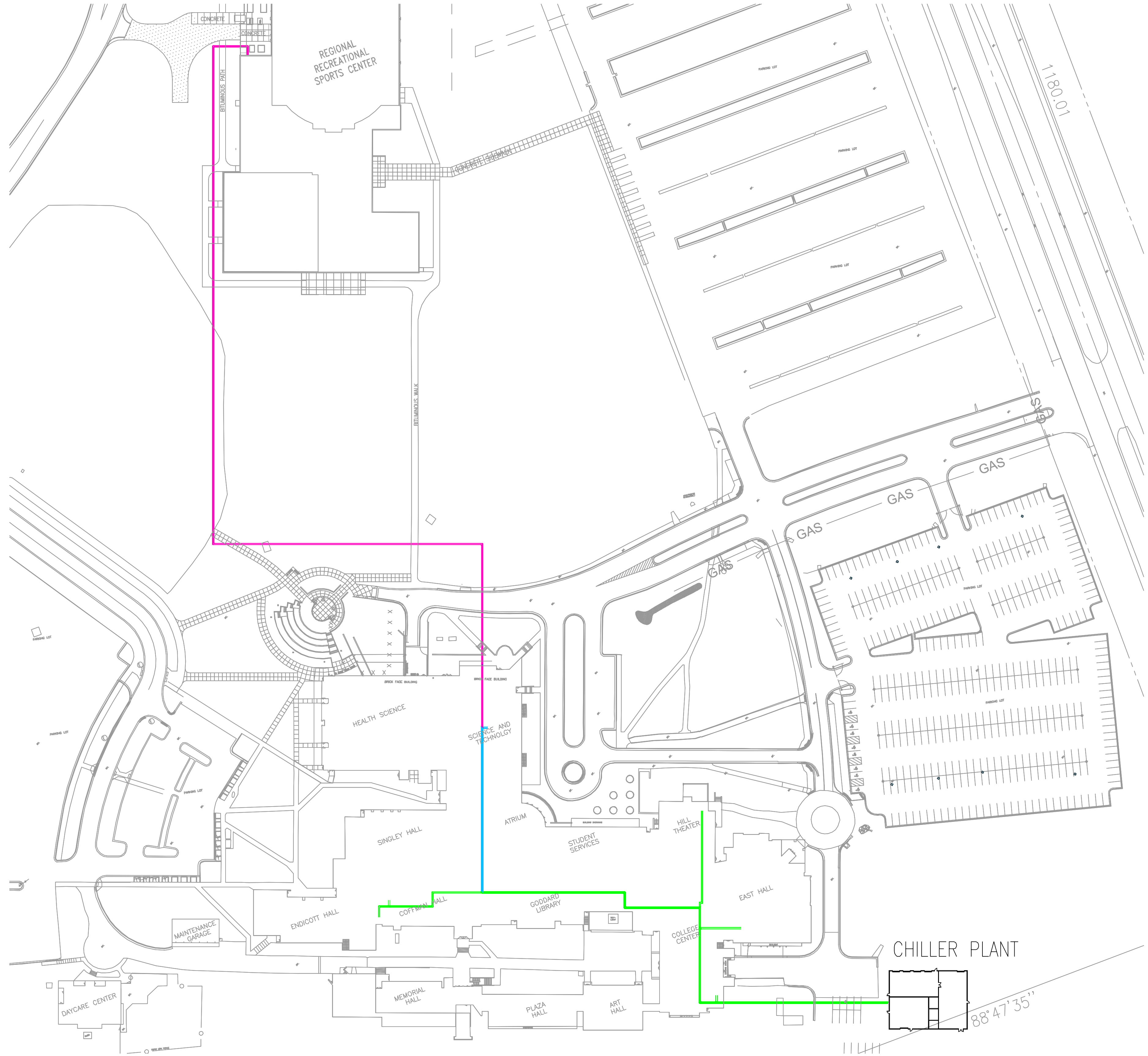
E2



DISTRIBUTION PIPING PLAN – OPTION A

Stanley Consultants INC.	ROCHESTER COMMUNITY AND TECHNICAL COLLEGE CHILLED WATER STUDY ROCHESTER, MINNESOTA	1"=150' S1

NORTH



PIPING PHASING LEGEND:

PHASE 1

PHASE 2

PHASE 3

DISTRIBUTION PIPING PLAN – OPTION B

Stanley Consultants INC.

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
CHILLED WATER STUDY
ROCHESTER, MINNESOTA

1"=150'

S2

Appendix D

Opinion of Probable Cost Information

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12	Job No.	24482-01-00
Checked by		Date		Subject	RCTC
Approved by		Date			Chilled Water Study
					TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
					OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (No VFD)						
OPTION 1						
Phase 1						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
2000A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,599,534
				Undeveloped Design Details - 30%		$1,079,860
				Contractor Overhead - 15%		$701,909
				Contractor Profit - 10%		$538,130
				Adminstration and Engineering - 15%		$887,915
				TOTAL COST		$6,807,349
				PROBABLE COST USE		**$6,810,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No.	24482-01-00
Subject	RCTC
	Chilled Water Study
	TRADITIONAL CENTRIFUGAL CHILLERS (NO VFD)
	OPTION 1

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers	1	EA	$170,000.00	$16,000.00	$186,000.00	$186,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pumps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$315,750
				Undeveloped Design Details - 30%		$94,725
				Contractor Overhead - 15%		$61,571
				Contractor Profit - 10%		$47,205
				Adminstration and Engineering - 15%		$77,888
				TOTAL COST		$597,139
				PROBABLE COST USE		**$600,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,010,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
TRADITIONAL CENTRIFUGAL CHILLERS (With VFD)						
OPTION 2						
Phase 1						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1600A Main Switch Board (MSB)	1	EA	$40,000.00	$25,000.00	$65,000.00	$65,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	7500	SF	$125.00	$75.00	$200.00	$1,500,000
				SUBTOTAL		$3,661,534
				Undeveloped Design Details - 30%		$1,098,460
				Contractor Overhead - 15%		$713,999
				Contractor Profit - 10%		$547,399
				Adminstration and Engineering - 15%		$903,209
				TOTAL COST		$6,924,602
				PROBABLE COST USE		**$6,920,000**
Phase 2						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12	
Checked by		Date		
Approved by		Date		

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
TRADITIONAL CENTRIFUGAL CHILLERS (with VFD)
OPTION 2

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Traditional Centrifugal Chillers with VFD	1	EA	$232,000.00	$16,000.00	$248,000.00	$248,000
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$55,500.00	$5,400.00	$60,900.00	$60,900
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$377,750
				Undeveloped Design Details - 30%		$113,325
				Contractor Overhead - 15%		$73,661
				Contractor Profit - 10%		$56,474
				Adminstration and Engineering - 15%		$93,181
				TOTAL COST		$714,391
				PROBABLE COST USE		**$710,000**
				TOTAL - OPTION 1 (ALL 3 PHASES):		**$8,340,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
ABSORPTION CHILLERS						
OPTION 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Piping and Accessories	1	LS	$350,000.00	$300,000.00	$650,000.00	$650,000
12" Butterfly Valves	20	EA	$4,925.00	$735.00	$5,660.00	$113,200
8" Butterfly Valves	12	EA	$1,975.00	$500.00	$2,475.00	$29,700
13.8 kV Underground Cable & Conduit	900	LF	$45.00	$30.00	$75.00	$67,500
Pad Mounted Transformer, 13 kV/480V	1	EA	$4,750.00	$1,304.00	$6,054.00	$6,054
480V Cable & Conduit, Secondary to MSB	150	LF	$12.00	$11.00	$23.00	$3,450
1200A Main Switch Board (MSB)	1	EA	$15,000.00	$10,000.00	$25,000.00	$25,000
Motor Control Center	1	EA	$50,000.00	$35,000.00	$85,000.00	$85,000
Low Voltage Transformer	2	EA	$1,450.00	$700.00	$2,150.00	$4,300
Motor Starter Disconnects	18	EA	$2,400.00	$910.00	$3,310.00	$59,580
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
Digital Control System	1	LS	$400,000.00	$300,000.00	$700,000.00	$700,000
Building	9200	SF	$125.00	$75.00	$200.00	$1,840,000
				SUBTOTAL		$4,126,134
				Undeveloped Design Details - 30%		$1,237,840
				Contractor Overhead - 15%		$804,596
				Contractor Profit - 10%		$616,857
				Adminstration and Engineering - 15%		$1,017,814
				TOTAL COST		$7,803,241
				PROBABLE COST USE		**$7,800,000**
Phase 2						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
				SUBTOTAL		$542,350
				Undeveloped Design Details - 30%		$162,705
				Contractor Overhead - 15%		$105,758
				Contractor Profit - 10%		$81,081
				Adminstration and Engineering - 15%		$133,784
				TOTAL COST		$1,025,679
				PROBABLE COST USE		**$1,030,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
ABSORPTION CHILLERS
OPTION 3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Phase 3						
500 Ton Absorption Chillers	1	EA	$350,000.00	$17,800.00	$367,800.00	$367,800
500 Ton Cooling Tower for Centrifugal Chiller	1	EA	$96,250.00	$9,450.00	$105,700.00	$105,700
Primary Pumps, 60 HP (1200 GPM @ 130' TDH)	1	EA	$22,300.00	$1,500.00	$23,800.00	$23,800
Condenser Pummps, 30 HP (1500 GPM @ 50' TDH)	1	EA	$14,000.00	$1,050.00	$15,050.00	$15,050
Pump VFD	2	EA	$10,000.00	$5,000.00	$15,000.00	$30,000
					SUBTOTAL	$542,350
					Undeveloped Design Details - 30%	$162,705
					Contractor Overhead - 15%	$105,758
					Contractor Profit - 10%	$81,081
					Adminstration and Engineering - 15%	$133,784
					TOTAL COST	$1,025,679
					PROBABLE COST USE	**$1,030,000**
					TOTAL - OPTION 1 (ALL 3 PHASES):	**$9,860,000**

Stanley Consultants INC.			Job No.	24482-01-00			
			Subject	RCTC			
Computed by Kyle Johnson	Date 12-Dec-12			Chilled Water Study			
Checked by	Date			Distribution Through the Building			
Approved by	Date			Option A - Ph 1,2,3			

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Through the Building - OPTION B						
PHASE 1						
12" Direct Buried AWWA Pipe	440	LF	$13.69	$16.89	$30.58	$13,455
12" AWWA LR Elbow	4	EA	$184.00	$126.00	$310.00	$1,240
12" Steel Pipe	745	LF	$89.00	$68.78	$157.78	$117,546
12" Pipe Insulation with Jacket	745	LF	$20.50	$8.95	$29.45	$21,940
6" Steel Pipe	300	LF	$37.50	$35.97	$73.47	$22,041
6" Pipe Insulation with Jacket	300	LF	$12.40	$6.80	$19.20	$5,760
4" Steel Pipe	360	LF	$23.50	$22.93	$46.43	$16,715
4" Pipe Insulation with Jacket	360	LF	$9.95	$6.20	$16.15	$5,814
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
12" Steel Elbow	6	EA	$3,775.00	$208.00	$3,983.00	$23,898
6" Steel Elbow	8	EA	$495.00	$139.00	$634.00	$5,072
4" Steel Elbow	4	EA	$315.00	$100.00	$415.00	$1,660
3" Steel Elbow	3	EA	$255.00	$73.00	$328.00	$984
12"x12"x4" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x12"x8" Steel Tee	2	EA	$5,875.00	$415.00	$6,290.00	$12,580
6"x6"x3" Steel Tee	2	EA	$950.00	$208.00	$1,158.00	$2,316
12"x6" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Demo and Replace Lay-In Ceiling	6408	SF	$2.21	$1.42	$3.63	$23,261
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
			SUBTOTAL PHASE 1			$518,976
			Difficult Working Conditions - 20%			$103,795
			Undeveloped Design Details - 30%			$186,831
			Contractor Overhead - 15%			$121,440
			Contractor Profit - 10%			$93,104
			Adminstration and Engineering - 15%			$153,622
			TOTAL COST			$1,177,770
			PROBABLE COST USE			**$1,178,000**
PHASE 2						
12" Steel Pipe	420	LF	$89.00	$68.78	$157.78	$66,268
12" Pipe Insulation with Jacket	420	LF	$20.50	$8.95	$29.45	$12,369
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
12"x12"x12" Steel Tee	6	EA	$5,875.00	$415.00	$6,290.00	$37,740
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
			SUBTOTAL PHASE 2			$161,052
			Difficult Working Conditions - 20%			$32,210
			Undeveloped Design Details - 30%			$57,979
			Contractor Overhead - 15%			$37,686
			Contractor Profit - 10%			$28,893
			Adminstration and Engineering - 15%			$47,673
			TOTAL COST			$365,493
			PROBABLE COST USE			**$365,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Through the Building
Option A - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2365	LF	$11.85	$15.25	$27.10	$64,092
8" AWWA LR Elbow	12	EA	$144.00	$99.00	$243.00	$2,916
8" Steel Pipe	160	LF	$55.50	$44.82	$100.32	$16,051
8" Pipe Insulation with Jacket	160	LF	$14.80	$7.55	$22.35	$3,576
8" Steel Elbow	4	EA	$855.00	$156.00	$1,011.00	$4,044
12"x8" Steel Reducer	2	EA	$3,825.00	$179.00	$4,004.00	$8,008
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
				SUBTOTAL PHASE 3		$119,497
				Undeveloped Design Details - 30%		$35,849
				Contractor Overhead - 15%		$23,302
				Contractor Profit - 10%		$17,865
				Adminstration and Engineering - 15%		$11,552
				TOTAL COST		$208,065
				PROBABLE COST USE		**$208,000**
				TOTAL - OPTION B (ALL 3 PHASES):		**$1,751,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
Distribution Outside the Building - OPTION A						
PHASE 1						
12" Direct Buried AWWA Pipe	1025	LF	$13.69	$16.89	$30.58	$31,345
8" Direct Buried AWWA Pipe	260	LF	$11.85	$15.25	$27.10	$7,046
6" Direct Buried AWWA Pipe	1620	LF	$10.64	$14.27	$24.91	$40,354
4" Direct Buried AWWA Pipe	240	LF	$6.54	$13.52	$20.06	$4,814
12"x12" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
12"x4" AWWA Tee	2	EA	$306.00	$197.00	$503.00	$1,006
8"x4" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
8"x6" AWWA Tee	2	EA	$240.00	$154.00	$394.00	$788
12" AWWA LR Elbow	2	EA	$184.00	$126.00	$310.00	$620
6" AWWA LR Elbow	8	EA	$76.00	$58.00	$134.00	$1,072
8" AWWA Direct Buried Valve	2	EA	$825.00	$217.00	$1,042.00	$2,084
12" AWWA Direct Buried Valve	4	EA	$1,400.00	$217.00	$1,617.00	$6,468
12"x8" AWWA Reducer	2	EA	$475.00	$10.60	$485.60	$971
8"x4" AWWA Reducer	2	EA	$234.00	$10.60	$244.60	$489
6" Steel Pipe	40	LF	$37.50	$35.97	$73.47	$2,939
6" Pipe Insulation with Jacket	40	LF	$12.40	$6.80	$19.20	$768
4" Steel Pipe	120	LF	$23.50	$22.93	$46.43	$5,572
4" Pipe Insulation with Jacket	120	LF	$9.95	$6.20	$16.15	$1,938
3" Steel Pipe	160	LF	$17.20	$19.93	$37.13	$5,941
3" Pipe Insulation with Jacket	160	LF	$8.65	$5.95	$14.60	$2,336
AHU (12.5 Tons, 5000 CFM)	1	EA	$26,500.00	$1,600.00	$28,100.00	$28,100
AHU (30 Tons, 12000 CFM)	1	EA	$54,500.00	$2,450.00	$56,950.00	$56,950
AHU (40 Tons, 16000 CFM)	1	EA	$79,500.00	$3,100.00	$82,600.00	$82,600
Secondary CHWP (CC) 10 HP (450 GPM. 60' TDH)	1	EA	$7,900.00	$620.00	$8,520.00	$8,520
Secondary CHWP (CF) 7.5 HP (312.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (Theater) 7.5 HP (206.25 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (EH) 7.5 HP (232.5 GPM. 60' TDH)	1	EA	$3,725.00	$475.00	$4,200.00	$4,200
Secondary CHWP (SH) 2 HP (50 GPM. 60' TDH)	1	EA	$1,685.00	$214.00	$1,899.00	$1,899
			SUBTOTAL PHASE 1			$309,014
			Undeveloped Design Details - 30%			$92,704
			Contractor Overhead - 15%			$60,258
			Contractor Profit - 10%			$46,198
			Adminstration and Engineering - 15%			$76,226
			TOTAL COST			$584,399
			PROBABLE COST USE			**$584,000**
PHASE 2						
12" Direct Buried AWWA Pipe	10	LF	$13.69	$16.89	$30.58	$306
8" Direct Buried AWWA Pipe	40	LF	$11.85	$15.25	$27.10	$1,084
12"x8" AWWA Reducer	2	E	$475.00	$10.60	$485.60	$971
12"x8" AWWA Tee	2	E	$306.00	$197.00	$503.00	$1,006
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (ST) 10 HP (362.5 GPM. 60' TDH)	2	EA	$7,900.00	$620.00	$8,520.00	$17,040
			SUBTOTAL PHASE 2			$25,314
			Undeveloped Design Details - 30%			$7,594
			Contractor Overhead - 15%			$4,936
			Contractor Profit - 10%			$3,784
			Adminstration and Engineering - 15%			$6,244
			TOTAL COST			$47,873
			PROBABLE COST USE			**$48,000**

Stanley Consultants INC.

Computed by	Kyle Johnson	Date	12-Dec-12
Checked by		Date	
Approved by		Date	

Job No. 24482-01-00
Subject RCTC
Chilled Water Study
Distribution Outside the Building
Option B - Ph 1,2,3

Item Description	Quantity		Unit Cost			Total Cost
	No. of Unit	UOM	Material	Labor	Total Unit Cost	
PHASE 3						
8" Direct Buried AWWA Pipe	2800	LF	$11.85	$15.25	$27.10	$75,880
8" AWWA Reducer	10	EA	$234.00	$10.60	$244.60	$2,446
8" Steel Pipe	40	LF	$55.50	$44.82	$100.32	$4,013
8" Pipe Insulation with Jacket	40	LF	$14.80	$7.55	$22.35	$894
Secondary CHWP (SC) 15 HP (520 GPM. 60' TDH)	2	EA	$9,625.00	$780.00	$10,405.00	$20,810
				SUBTOTAL PHASE 3		$104,043
				Undeveloped Design Details - 30%		$31,213
				Contractor Overhead - 15%		$20,288
				Contractor Profit - 10%		$15,554
				Adminstration and Engineering - 15%		$25,665
				TOTAL COST		$196,763
				PROBABLE COST USE		**$197,000**
				TOTAL - OPTION A (ALL 3 PHASES):		**$829,000**

HEINTZ CENTER

HEAPR MANUAL
Heintz Center Roof Replacement,1976 Addition

Req. No.: 04

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Heintz Center	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$1,433,600	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$1,433,600	**Total**	

General Description of Existing Conditions and All Work

Roof is already past its useful life expectancy. Extensive leakage is causing class disruption and damage to infrastructure. Utility costs can be improved with better insulation. Ceiling damage in H Wing and Student Commons.

1. The existing steel deck has little or no structural slope; therefore, a fully-tapered insulation system is required.
2. Two large air handlers, vent stacks, and heat stacks must be raised to accommodate the necessary base flashing heights for the support curbs. All mechanical, electrical, and communication lines will need to be modified and rerouted. This work will require the services of mechanical and electrical consultants.
3. The sleeper curbs appear unstable and will be evaluated and reinforced accordingly. This work will require the services of a structural consultant.
4. The existing skylight will be removed and deck replacement provided or replaced with new. This work will require the services of a window consultant.
5. All obsolete capped curbs, vent stacks and sleeper curbs will be removed and deck replacement provided where necessary.
6. The existing drains will be replaced and relocated where necessary in order to provide a symmetrical and unobstructed drainage layout. Overflow drains and scuppers will be provided. The drain work will require the services of a mechanical consultant.
7. The existing access ladder will be replaced with a new OSHA approved access ladder. This work will require the services of a structural consultant.
8. All obsolete capped curbs, vent stacks, and sleeper curbs will be removed and deck replacement provided where necessary.
9. All gas lines will be relocated to the interior of the building. This will require the services of a mechanical consultant.
10. The existing antennas will be relocated to the ground or exterior walls. This will require the services of electrical and structural consultants.

Due to white staining on the interior face of brick walls on the Student Commons in the Heinz Center, it appears moisture has come through the walls. The roofs were recently replaced in these areas, and brick appears to have been patched at a couple of these areas of staining. Investigation should determine if the efflorescence is still current or if it is old. If the latter, the brick can be cleaned. If the staining continues, there is moisture infiltrating the walls that should be further researched at the transition to the roof from the walls.

There are a few areas with stains on the ceiling tiles that appear to be moisture damage. Verify that these stains are old and change out the ceiling tiles. If the stains remain fresh and moisture is found, survey the area for the source of moisture and fix or replace elements as required and then replace the ceiling tiles.

Original 2011 Predesign estimate increased 27% to mid-year 2020.

Project Title - Heintz Center Roof Replacement, 1976 Addtion

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$1,433,600	**Heintz Center Roof Replacement, 1976 Addition (includes minor repairs to other areas)**
$	
$	
$1,433,600	**Total**

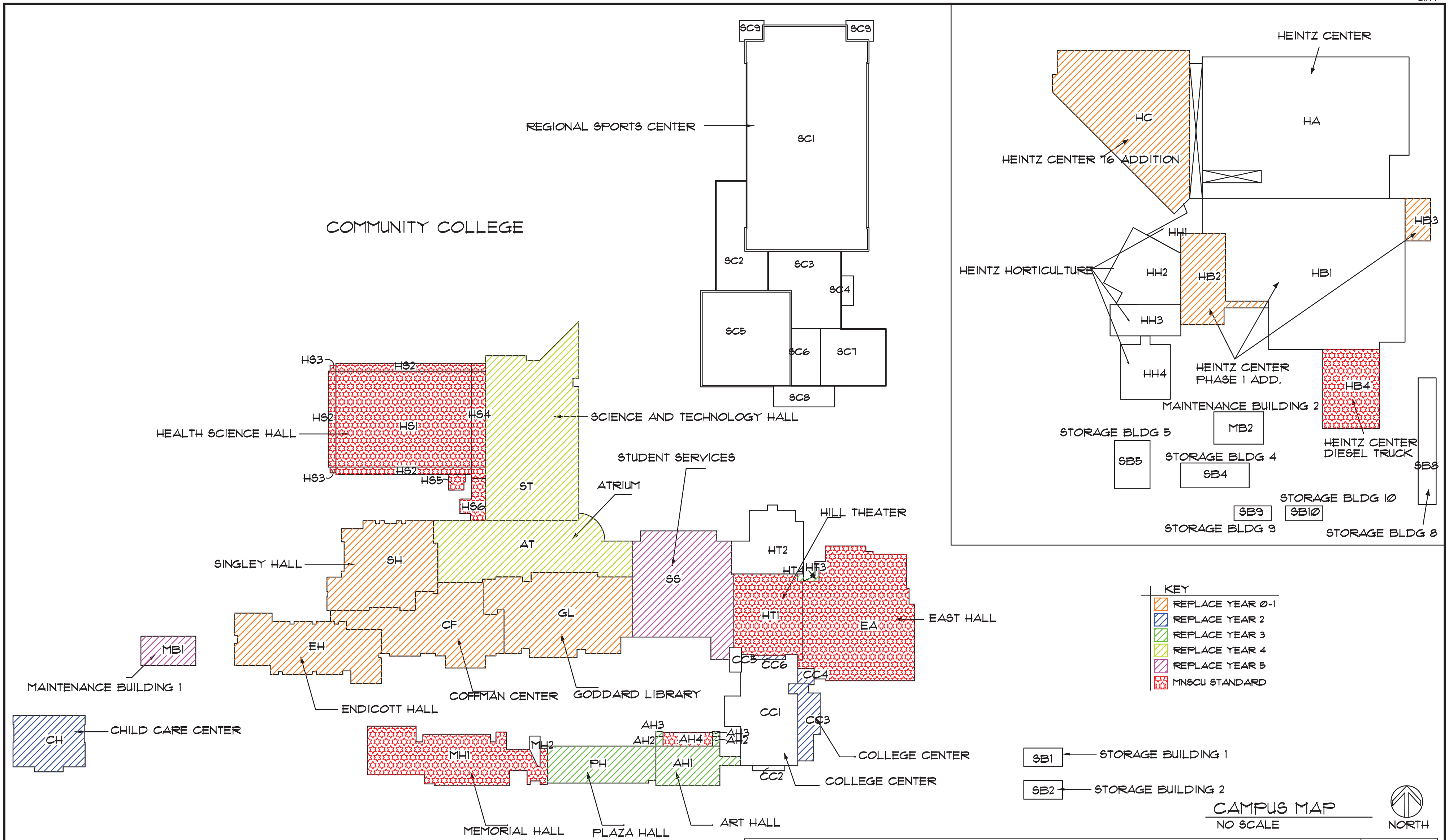
Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Damaged classrooms, ceilings, walls, roof structures. Ongoing expensive repairs and interior finish replacement. Excessive utility costs.

Project will reduce Heintz Center FCI from 0.07 to 0.02.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Campus Roof Plan - InSpec
2 1976 Addition Roof Plan
3 1976 Addition Roof Report - Roof Spec, Inc.
4 Diesel Truck Roof Report - Roof Spec, Inc.
5 Roof Aerial Photo

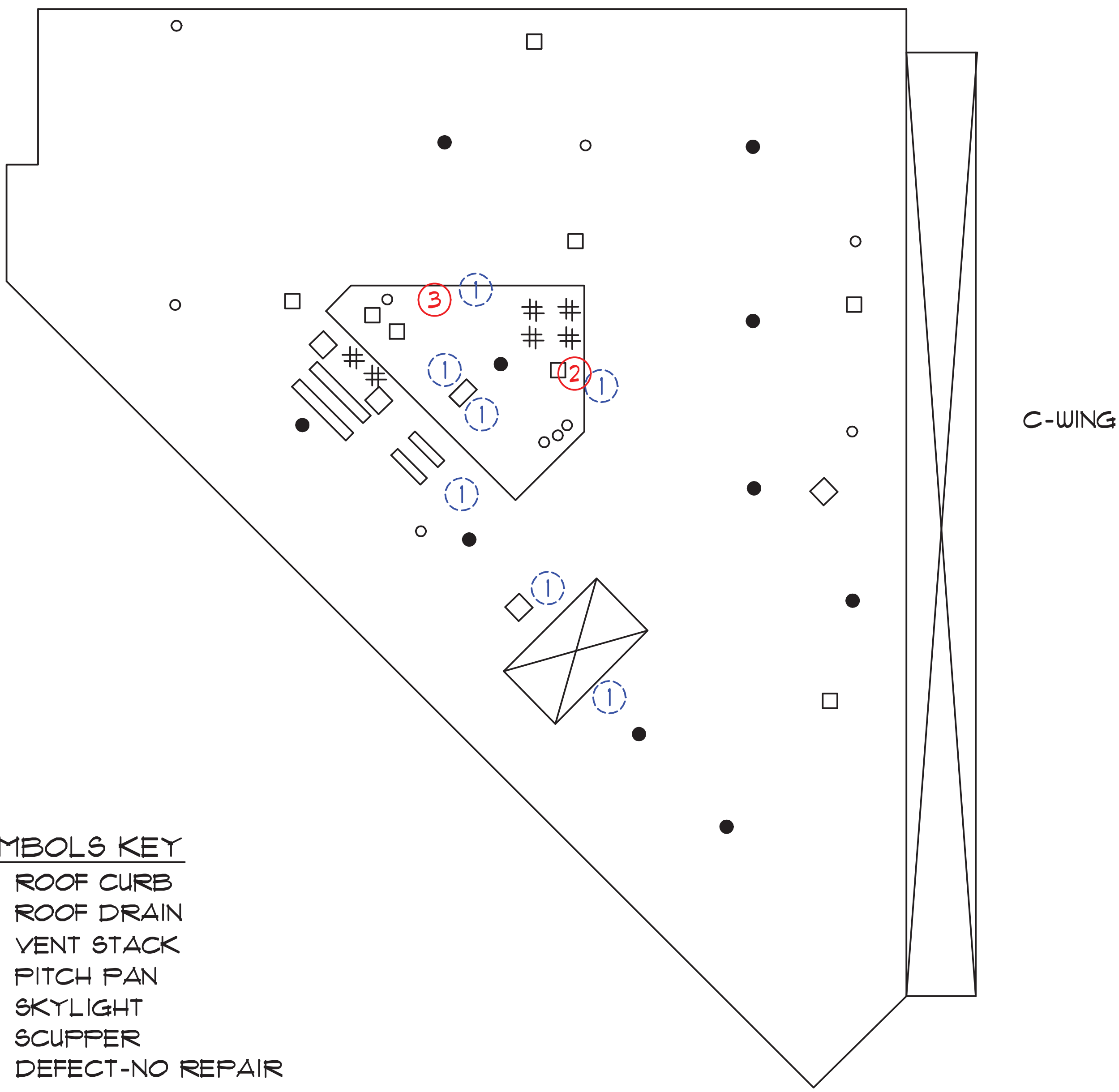


ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

ROCHESTER, MN

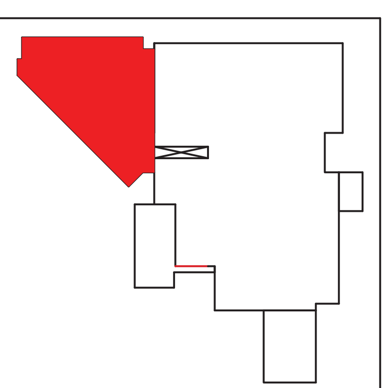
INSPEC
5801 Duluth Street
Minneapolis, MN 55422
Ph. 763-546-3434

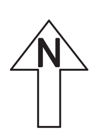
HEINTZ CENTER 76 ADDITION
HC

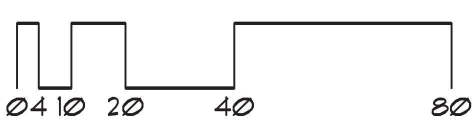


SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- VENT STACK
- PITCH PAN
- SKYLIGHT
- SCUPPER
- 1 DEFECT-NO REPAIR







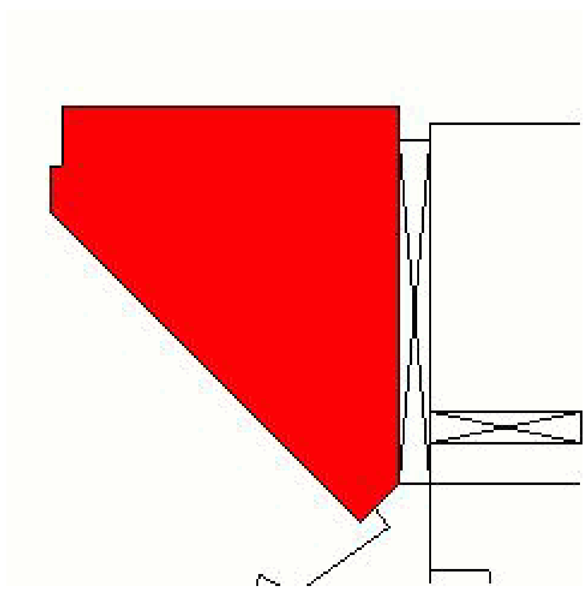
Full Facility Roof Report

Prepared for:

Heintz Center-1976 Addition

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



Heintz Center-1976 Addition

Last Inspection Date : Sep 16, 2019

Facility: Heintz Center-1976 Addition

Contact Name:

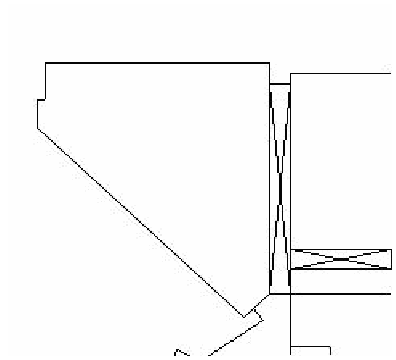
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 16, 2019

Type of building: Academic

Type of Neighborhood:

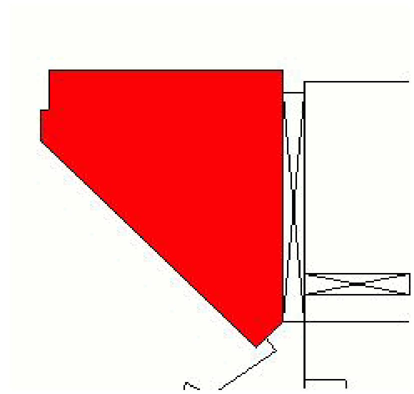


Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HC	2020	Repair	No	Expense	Moderate	$1,500
Remove all vegetation from the roof and repair all open seams and flashing.						
HC	2020	Replacement	No	Capital	High	$1,121,001
Budget cost estimate is based on replacement of Sections HC and Phase I Addition HB 2 at the same time. The budget cost is based on the 2011 predesign report. Recommend updating the predesign report.						
						$1,122,501

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HC	2020	Repair	No	Expense	Moderate	$1,500
HC	2020	Replacement	No	Capital	High	$1,121,001
						$1,122,501



Roof Name:	E26148C0276
Roof Size:	25,500 sq. ft.
Est. replacement Cost:	$874,140.00
Existing System Type:	(EPDM-B) Ballasted Ethylene-Propylene-Diene-Monomer
Year Installed:	1987
Assessed Service Life Remaining (Years) :	0
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	The estimated replacement cost is based on the 2011 predesign report. Recommend updating the predesign report.

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	200	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Base Flashing -Slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #04	Monitor	1	Ea.

ID #4 OBSERVED: 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Contaminant on roof

REPAIR: Monitor for possible future repair.

COMMENTS:

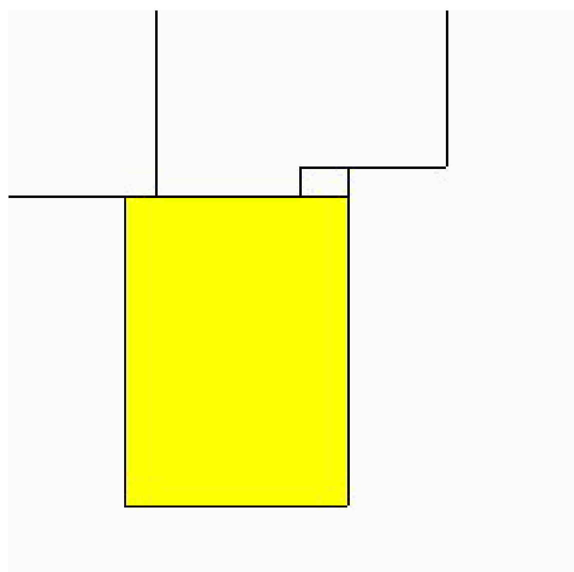
Full Facility Roof Report

Prepared for:

Heintz Center-Diesel Truck

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



Heintz Center-Diesel Truck

Last Inspection Date : Sep 16, 2019

Facility: Heintz Center-Diesel Truck

Contact Name:

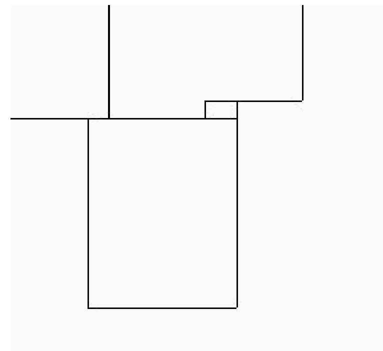
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 16, 2019

Type of building: Academic

Type of Neighborhood:



Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HDT	2020	Repair	Yes	Expense	Low	$1,000
Remove vegetation from around drains and replace damaged drain strainer.						
						$1,000

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HDT	2020	Repair	Yes	Expense	Low	$1,000
						$1,000

Roof Name: E26148C0379

Roof Size: 8,162 sq. ft.

Est. replacement Cost: $122,430.00

Existing System Type: MnSCU Std. 4-Ply Asphalt

Year Installed: 1998

Assessed Service Life Remaining (Years) : 19

Height: 0 Ft.

Slope:

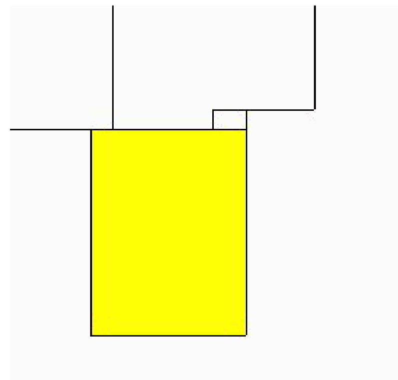
Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details:



Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	3	Ea.

ID #1 OBSERVED: 6/22/2016, 6/19/2017

Blistered base flashing

REPAIR: Monitor for possible future repair.

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	2	Ea.

ID #2 OBSERVED: 6/22/2016, 6/19/2017

Erosion of aggregate surfacing

REPAIR: Monitor for possible future repair.

COMMENTS:

Membrane Defects - Outstanding Continued...

Defect Type	Severity	Quantity	Unit
Defect #03	Repair	2	Ea.

ID #3 OBSERVED: 9/16/2019

Vegetation/Debris

REPAIR: Removes vegetation from around drain strainers.

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #04	Repair	1	Ea.

ID #4 OBSERVED: 9/16/2019

Broken drain strainer

REPAIR: Replace broken drain strainer.

COMMENTS:


Olmsted County
Adult Services
College View Rd E
College View Rd E
College View Rd E
College View Rd E
RCTC Heintz
Center
19th Ave SE
19th Ave SE
Heintz Center
West Lot
Heintz
Center
St Mary's
University Minnesota
P
Ucr Pkwy SE
Ucr Pkwy SE
Ucr Pkwy SE
Ucr Pkwy SE

HEAPR MANUAL
Heintz Center Exterior Envelope Repairs

Req. No.: 05

Date: December 2020

Institution	Rochester Community and Technical College
Campus/Building	Heintz Center
Project Location	Rochester, MN

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$360,500	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$360,500	**Total**	

General Description of Existing Conditions and All Work

Exterior bricks are spalled and falling from building, mortar joints missing, control joints need resealing. Flashing failing throughout. Damage to interior walls. Replace bricks, flashing and provide tuckpointing throughout. Repaint interiors where damaged.

Original 2012 Design Development estimate increased 24% to mid-year 2020.

Project Title - Heintz Center Exterior Envelope Repairs

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$360,500	**Heintz Center Exterior Envelope Repairs**
$	
$	
$360,500	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Mitigate exterior structure damage, hazard to students, and moisture migration to interior.

Project will reduce Heintz Center FCI from 0.07 to 0.06.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 Field Findings Summary - Skyline Building Envelope Consultants
2 Exterior Repair Drawings - Skyline Building Envelope Consultants
3 Cost Estimate - Kane & Johnson Architects, Inc.

SKYLINE BUILDING ENVELOPE CONSULTANTS

ADVANCED CONSULTING & PROJECT MANAGEMENT SERVICES FOR FACILITIES MANAGEMENT WHICH INCLUDE:
ALL TYPES OF ROOFING & WATERPROOFING, BUILDING ENVELOPE & FACADE EVALUATIONS & RESTORATION,
PARKING GARAGE EVALUATIONS & RESTORATION, FORENSIC EVALUATIONS.

HEINTZ CENTER SUMMARY OF FIELD FINDINGS

General Conditions and Recommendations:

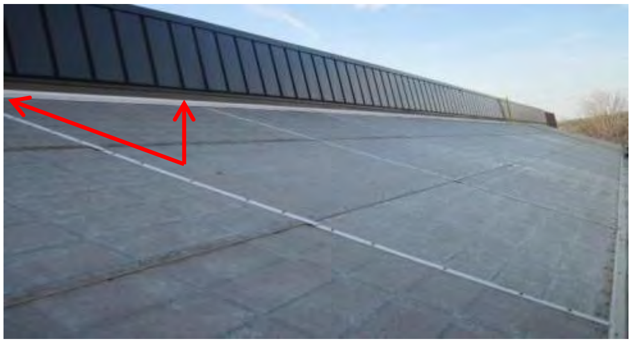
Phase I:

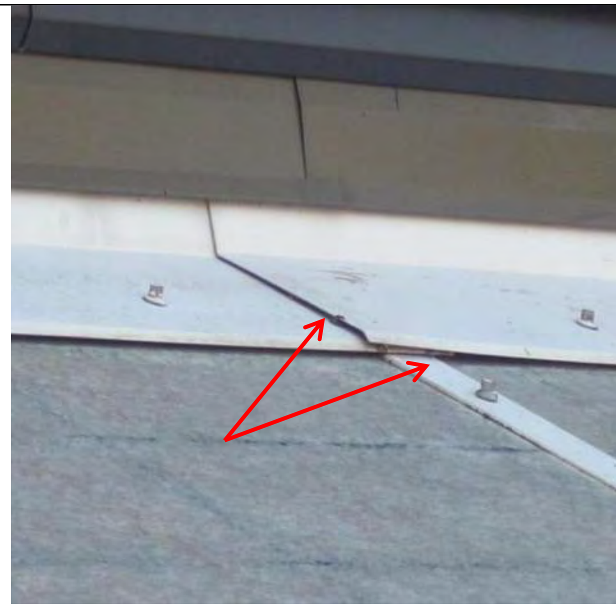
<table>
<tr>
<td>Phase I was constructed in 1968. The majority of the exterior façade consists of brick veneer with cavity wall construction and maintenance free double pane windows.
</td>
<td>.
</td>
</tr>
<tr>
<td></td>
<td>The Southern elevation consists of Concrete Masonry Units (CMU’s) which are painted to match the color of the adjoining EIFS wall systems.
</td>
</tr>
</table>

The upper perimeter of the walls consists of "transite asbestos panels" which are considered hazardous materials. Many of the panels have large cracks and evidence of moisture infiltration (efflorescence) was present at the underlying brick. 	
Existing building plans indicate through-wall was installed. No through-wall flashings were visible. The brick veneer and possibly the through-wall flashings were covered by gradation throughout the building.	
Through-wall flashings installed around this time period have been prone to failure depending on the type of material used. A destructive test opening is recommended to determine the type and condition of the existing through-wall flashing material. Areas where the through-wall flashing has been covered with gradation should be uncovered to allow proper drainage of the cavity wall.	

The brick and mortar are in good condition with isolated areas of deteriorated mortar and cracked or damaged brick. 	. 
Much of the sealant around the windows, doors, masonry control joints, and wall penetrations has deteriorated or is open to water infiltration.	
	

Leakage was reported along the skylights between the Phase I and Phase V construction. Some gaps were visible at the metal counter-flashings and batten strips. A water test should be performed to determine the source of leakage.



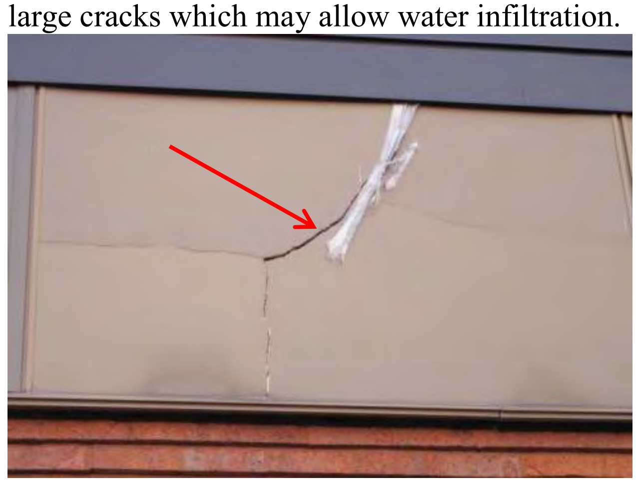


Typeically at roof drains the water is dumping onto the wall causing the brick and mortar to deteriorate.

Phase II:

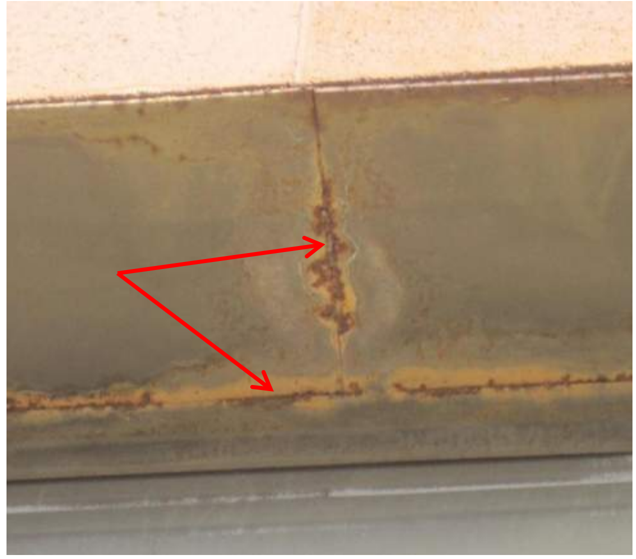
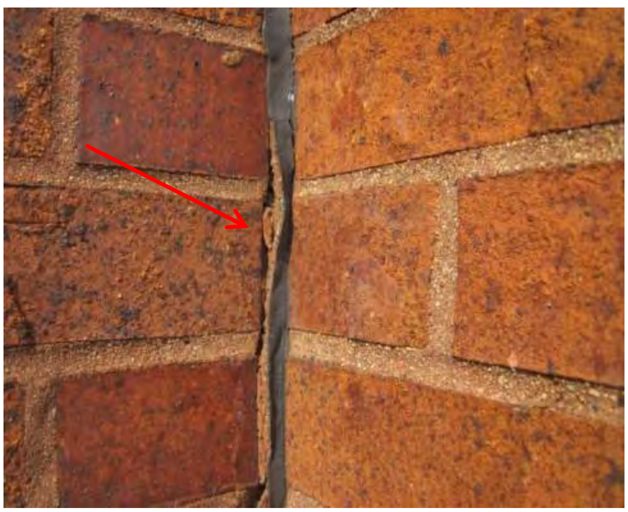
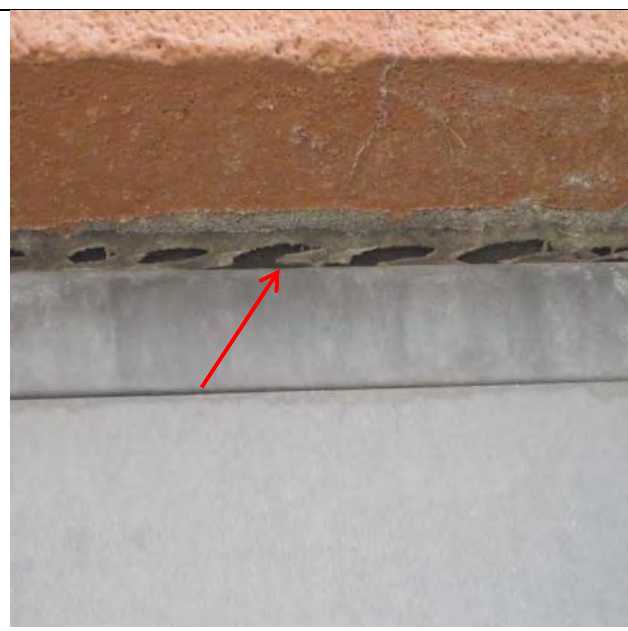
Phase II was constructed in 1976. The exterior façade consists of brick veneer with cavity wall construction and maintenance free double pane windows.

The upper perimeter of the walls consists of "transite panels" which are considered hazardous materials. Many of the panels have large cracks which may allow water infiltration.



Phase III & IV:

Phase III & IV were constructed in 1978 and 1979. The exterior façade consists of brick veneer on the East elevation and concrete masonry units (CMU's) on the South and West elevations. 	. 
The upper perimeter of the East wall consists of "transite asbestos panels" which are considered hazardous materials. Many of the panels have large cracks which are allowing water infiltration.	
There were multiple vertical cracks through the Concrete Masonry Units (CMU's) on the South and West elevations. The cracked CMU's should be repaired or replaced and additional masonry control joints installed to allow for movement. 	. 

The steel lintels above the garage doors have begun to rust. Some of the rust appears to go through the entire width of the lintel. Clean, prime and paint overhead lintels. Install new through-wall flashings above lintels. 	. 
Much of the sealant around the masonry control joints, and wall penetrations has deteriorated or is open to water infiltration. 	
Much of the sealant around the windows, louvers, masonry control joints, and wall penetrations has deteriorated or is open to water infiltration. 	

Phase V:

Phase V was constructed in 1986. The South exterior façade consists of wall insulation board covered by a plaster coating over a reinforcement mesh.

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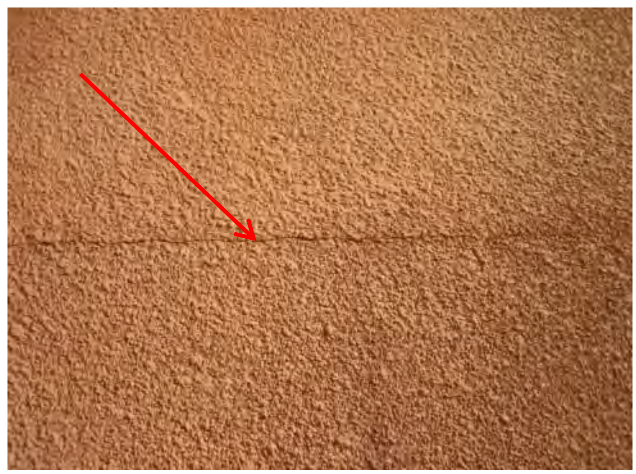
Some of the plaster has become unattached to the underlying insulation causing the elastormeric coating to “bulge out”.

Horizontal cracking was observed in many of the panels.



Some physical damage exposing the underlying reinforcement mesh and insulation was also observed.

The “V” channels between the wall panels had open cracks which could or will allow water entry into the wall system.

The East addition exterior façade consists of brick veneer with cavity wall construction.

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The lintel above the east entry has surface rust and should be primed and painted.

Two wall penetrations had open sealant.

The Northwest addition exterior façade consists of brick veneer with cavity wall construction and double pane windows.

Most of the corners of the brick veneer at grade and on the roof have mortar that has cracked or become un-bonded. These areas should have mortar cut back and foam backer rod and sealant installed.

Much of the sealant around the windows, doors, masonry control joints, and wall penetrations has deteriorated or is open to water infiltration.

There were two areas on the roof and at grade where vertical cracking occurred through the brick veneer. The cracked brick should be replaced with matching units.

There was one wall on the roof that had sealant installed over the existing mortar. The sealant should be removed and the joint tuck-pointed. 	
Evidence of through-wall flashing was present at some locations and did not extend out to the brick face to create a drip edge. We recommend performing a test opening of the wall to determine the existing condition of the through-wall flashing material.	

II. Building Summary:

There were no immediate safety concerns at this time. The leakage occurring at the skylights should be the top priority in resolving to minimize any further interior damage. SBEC can perform a water test to determine the exact cause of water infiltration. The next immediate need would be replacement of the transite asbestos panels to eliminate further deterioration of the adjacent brick veneer.

Wall test openings should be performed at the different phase locations to determine the condition of the existing through-wall flashings. Through-wall flashings are keys to draining moisture out of the walls, and if they are deteriorated or not properly installed, they should be replaced according to current MNSCU standards. Areas where the through-wall flashings have been covered with gradation should be uncovered to allow proper drainage of the wall systems.

The **Plaster** wall system on the South elevations is starting to separate between the surface coating and underlying insulation. Many of the “V” channels are cracked and there is physical damage at other locations. The existing wall system was poorly installed and will continue to worsen with time. These areas should be replaced with an appropriate wall system that meets the Universities architectural and performance standards.

The remaining wall defects are typical for buildings these ages and should be repaired after the issues listed above have been taken care of. SBEC and Kane and Johnson will meet with qualified masonry contractors to obtain accurate repair estimates to be provided to the Campus for budget purposes.

This is a summary of our findings on the Heintz Center Building. All quantities and repair recommendations are based on our visual inspections, existing plan review and building personnel background information.

Respectfully Submitted,

Rob Johnston Project Manager

Skyline Building Envelope Consultants

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2012 EXTERIOR REPAIRS - U.C.R. HEINTZ CAMPUS

ABBREVIATIONS

A.B.	ANCHOR BOLT	INSUL.	INSULATION	T.B.	TOWEL BAR
ACOUST.	ACOUSTICAL	INT.	INTERIOR	UR.	URINAL
A.C.	AIR CONDITIONER	INV.	INVERT	U.O.N.	UNLESS OTHERWISE NOTED
ALUM.	ALUMINUM	JAN.	JANITOR	VTR.	VENT TO ROOF
ANCH.	ANCHOR	JT.	JOINT	V.C.T.	VINYL COMPOSITION TILE
APPROX.	APPROXIMATELY	JST.	JOIST	V.G.	VERTICAL GRAIN
ASB.	ASBESTOS	LAV.	LAVATORY	VERT.	VERTICAL
BM.	BENCHMARK/BEAM	LAM.	LAMINATE	W/	WITH
BLK.	BLOCK	LT. WT.	LIGHT WEIGHT	W.C.	WATER CLOSET
BD.	BOARD	M.B.	MACHINE BOLT	W.F.	WIDE FLANGE
BLDG.	BUILDING	M.H.	MANHOLE	WWF.	WELDED WIRE FABRIC
B.O.	BOTTOM OF	M.O.	MASONRY OPENING	W/O	WITHOUT
BOT.	BOTTOM	MACH.	MACHINE	WD.	WOOD
CAB.	CABINET	MANUF.	MANUFACTURER	W.I.	WROUGHT IRON
C.I.	CAST IRON	MAT.	MATERIAL	W.P.	WATER PROOF
C.B.	CATCH BASIN	MAS.	MASONRY		
C.J.	CONTROL JOINT	MAX.	MAXIMUM		
C.M.U.	CONCRETE MASONRY UNIT	MECH.	MECHANICAL		
CEM.	CEMENT	MET.	METAL		
CER.	CERAMIC	MEMB.	MEMBRANE		
CLG.	CEILING	MIN.	MINIMUM		
COL.	COLUMN	NAT.	NATURAL		
CONC.	CONCRETE	NO.	NUMBER		
CONST.	CONSTRUCTION	N.I.C.	NOT IN CONTRACT		
CONT.	CONTINUOUS	N.T.S.	NOT TO SCALE		
DBL.	DOUBLE	NOM.	NOMINAL		
DST.	DETAIL	O/	OVER		
DIA.	DIAMETER	O.C.	ON CENTER		
DIAG.	DIAGONAL	OPP.	OPPOSITE		
DIM.	DIMENSION	O.D.	OUTSIDE DIAMETER		
DISP.	DISPENSER	OPNG.	OPENING		
DN.	DOWN	O/H	OVERHANG		
DWG.	DRAWING	O.S.A.	OUTSIDE AIR		
DF.	DRINKING FOUNTAIN	PR.	PAIR		
D.S.	DOWNSPOUT	PART.	PARTITION		
D.F.	DOUGLAS FIR	PTD.	PAPER TOWEL DISPENSER		
DWV.	DRAIN, WASTE,& VENT PIPE	PLAST.	PLASTER		
EA.	EACH	PLAM.	PLASTIC LAMINATE		
ELECT.	ELECTRICAL	PLT.	PLATE		
ELEV.	ELEVATION	PLYWD.	PLYWOOD		
E.J.	EXPANSION JOINT	P.V.C.	POLYVINYL CHLORIDE		
E.W.	EACH WAY	P.L.	PROPERTY LINE		
ENAM.	ENAMEL	P-P-T	PRIME, PAINT, TEXTURE		
EQ	EQUAL	PROP.	PROPERTY		
EQUIP.	EQUIPMENT	PORC.	PORCELAIN		
(E)	(E) EXISTING	Q.T.	QUARRY TILE		
EXIST.	EXISTING	RAD.	RADIUS		
EXP.	EXPANSION	RWD.	REDWOOD		
EXT.	EXTERIOR	R.D.	ROOF DRAIN		
FAS.	FASCIA	REF.	REFRIGERATOR		
FBGL.	FIBERGLASS	R.O.	ROUGH OPENING		
FOC.	FACE OF CONCRETE	R.S.	RESAWN		
FOM.	FACE OF MASONRY	R.A.	RETURN AIR		
FOS.	FACE OF STUDS	RM.	ROOM		
FIN.	FINISH	REC.	RECESSED		
FDN.	FOUNDATION	REINF.	REINFORCED		
F.D.	FLOOR DRAIN	REQ'D.	REQUIRED		
FLR.	FLOOR	RESIL.	RESILIENT		
FLUOR.	FLUORESCENT	RET.	RETAINING		
F.R.P.	FIBERGLASS REINFORCED PLASTIC	SCHED.	SCHEDULE		
FRM.	FRAME	S.S.	STAINLESS STEEL		
FT.	FOOT	SHTG.	SHEETING		
FTG.	FOOTING	SHT.	SHEET		
GALV.	GALVANIZED	SIM.	SIMILAR		
GA.	GAUGE	SDR.	SOAP DISPENSER		
G.I.	GALVANIZED IRON	S.C.	SOLID CORE		
G.S.M.	GALVANIZED SHEET METAL	SECT.	SECTION		
GEN.	GENERAL	SPEC.	SPECIFICATION		
GL.	GLASS	SQ.	SQUARE		
GLU-LAM	GLUE-LAMINATED STRUCTURE	STD.	STANDARD		
GRD.	GRADE	STL.	STEEL		
GRT.	GROUT	STRUCT.	STRUCTURAL		
GYP. BRD.	GYPSUM BOARD	SUSP.	SUSPENDED		
H.C.	HOLLOW CORE	STOR.	STORAGE		
H.M.	HOLLOW METAL	S.D.	STORM DRAIN		
HD.	HEAD	T.B.M.	TEMPORARY BENCHMARK		
HDR.	HEADER	TEL.	TELEPHONE		
HT.	HEIGHT	T.P.D.	TOILET PAPER DISPENSER		
HDWD.	HARDWOOD	T.& B.	TOP AND BOTTOM		
HORIZ.	HORIZONTAL	T.& G.	TONGUE AND GROOVE		
H.B.	HOSE BIBB	T.O.S.	TOP OF SLAB		
HWH.	HOT WATER HEATER	T.O.	TOP OF		
I.D.	INSIDE DIAMETER	T.O.C.	TOP OF CONCRETE		
IN.	INCH	TYP.	TYPICAL		

CODE INFO.

INTERNATIONAL BUILDING CODE (2006)
WITH MINNESOTA ADOPTIONS (2007)

LEGEND

- TITLE MARKER / VIEW NAME / SCALE: 1/8" = 1'-0" / SHEET NUMBER
- BUILDING GRID
- PLAN NOTE
- WINDOW TYPE SYMBOL
- REVISION
- DEMOLITION NOTE
- ELEVATION
- ROOM NAME (XXX) — ROOM NAME AND NUMBER
- DRAWING NUMBER / SECTION SYMBOL / SHEET NUMBER
- DRAWING NUMBER / ELEVATION SYMBOL / SHEET NUMBER
- PHOTO KEY
- DRAWING NUMBER / DETAIL SYMBOL / SHEET NUMBER
- WALL TYPE SYMBOL (FULL HEIGHT) SEE A1.2
- WALL TYPE SYMBOL (WALL TO EXTEND "X" " ABOVE FINISHED FLOOR) SEE A1.2
- NEW WALL- SEE WALL TYPES
- EXISTING WALL- SEE WALL TYPES
- NEW CONCRETE WALL- SEE WALL TYPES
- RIGID INSULATION
- EIFS
- BRICK
- POURED CONCRETE
- FIBERGLASS BATT INSULATION (SECTION)
- SAND/GYPSUM BOARD- (SECTION)
- EIFS- (ELEVATION)

BASE BIDS AND ALTERNATES DESCRIPTIONS:

BASE BID #1: Include all work in Area-1 at RCTC Main Campus in this Bid.

ALTERNATE BID #1-1: Deduct all door and door frame replacement work.
ALTERNATE BID #1-2: Deduct all new metal wall panel work.

BASE BID #2: Include all work in Area-2 at RCTC Main Campus in this Bid.

ALTERNATE BID #2-1: Deduct all door and door frame replacement work.
ALTERNATE BID #2-2: Deduct all new metal wall panel work.

BASE BID #3: Include all work at RCTC Heintz Center in this Bid.

ALTERNATE BID #3-1: Deduct all door and door frame replacement work.
ALTERNATE BID #3-2: Deduct all new metal wall panel work.

SHEET INDEX

ARCHITECTURAL

A000	TITLE SHEET
A100	OVERALL ROOF PLAN
A501	ENLARGED ELEVATIONS
A502	ENLARGED ELEVATIONS
A503	ENLARGED ELEVATIONS
A504	ENLARGED ELEVATIONS
A600	SECTIONS
A700	DETAILS

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ARCHITECT: DAVID KANE
PROJECT MANAGER: JAMES COYLE

BUILDING ENVELOPE:

SKYLINE BUILDING ENVELOPE CONSULTANTS
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ROCHESTER, MN 55901
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PROJECT MANAGER: ROB JOHNSTON

STRUCTURAL:

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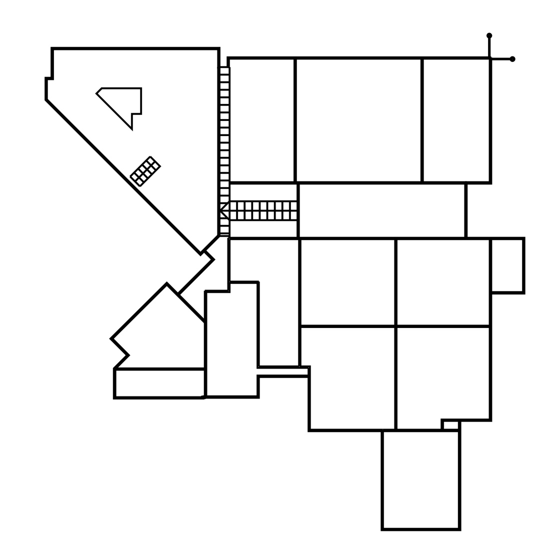
(507) 529-5310
ENGINEER: AL HINIKER

VICINITY MAP

R.C.T.C.
851 30TH AVE SE
ROCHESTER, MN 55904

KEY PLAN



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CONSULTANTS

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15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural Design Group

REVISIONS

Date: By:

Drawn By: TCK Date:
File Number:
Plot Scale: 1" = 1'-0"
Project Status: CD
Updated By: Date:

Rochester Community and Technical College

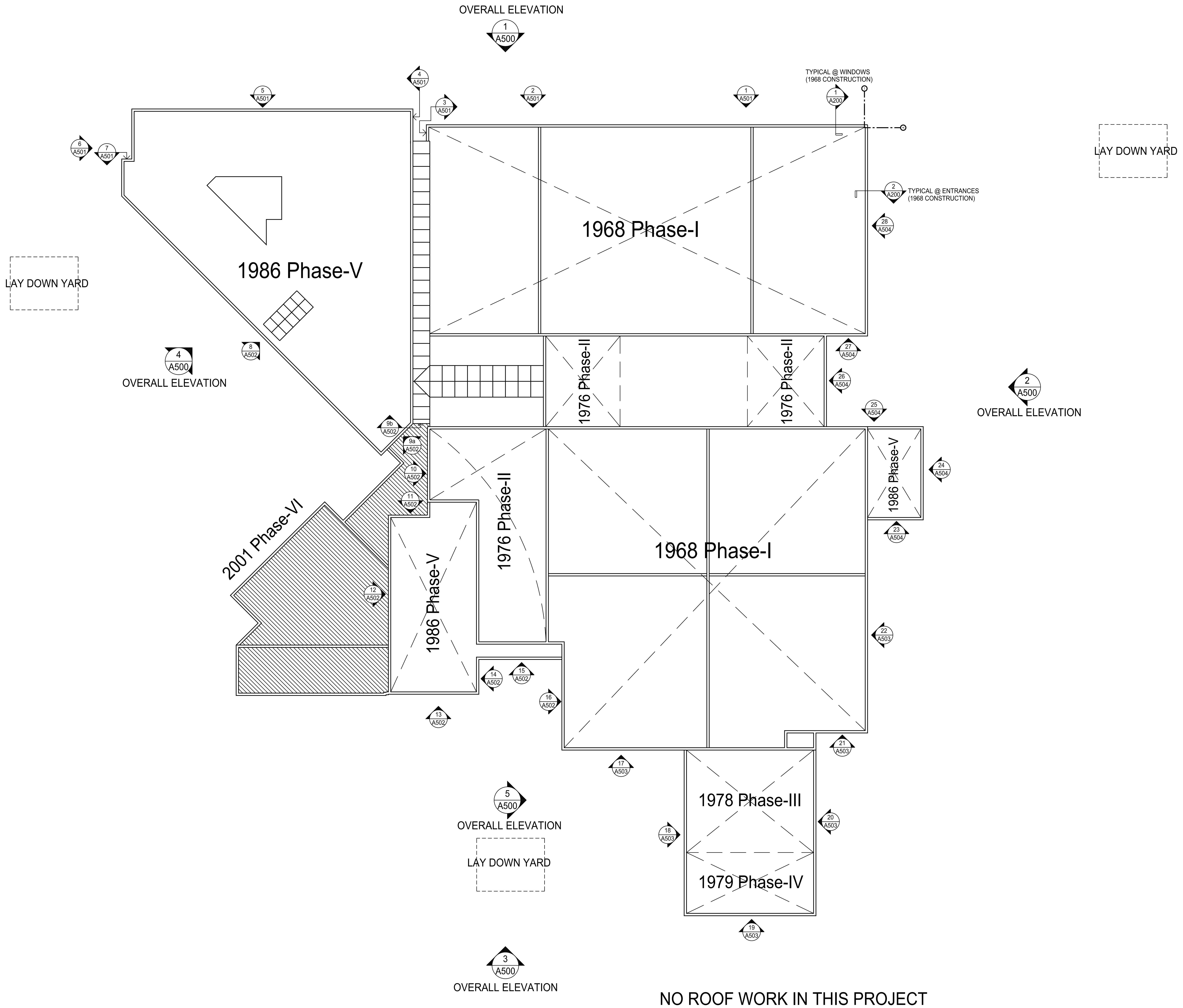
2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

ROCHESTER, MN

TITLE SHEET

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A000
OF 8



NO ROOF WORK IN THIS PROJECT

1 A100 ROOF PLAN
1" = 30'-0"

NOTES:

1	TUCK POINT BRICK VENEER	04 01 00
2	REPLACE DAMAGED BRICK VENEER	04 01 00
3	REPLACE EXISTING CONTROL JOINT SEALANT	07 90 05
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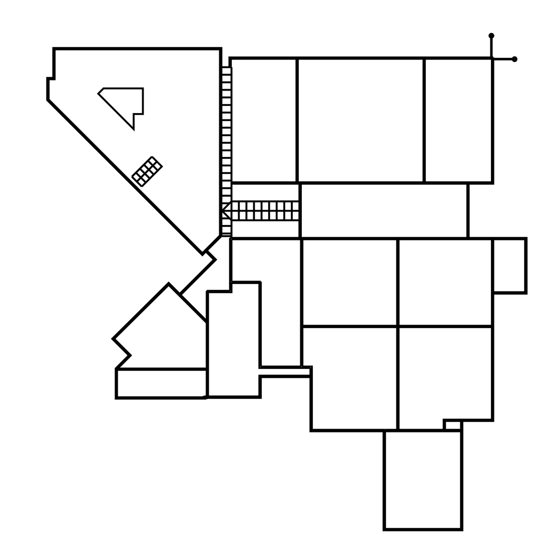
SYMBOL LEGEND

- LOUVRE
- SCUPPER
- HOSE BIB
- WALL LIGHT
- DOWN SPOUT NOZZLE
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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Structural Design Group

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Rochester Community and Technical College

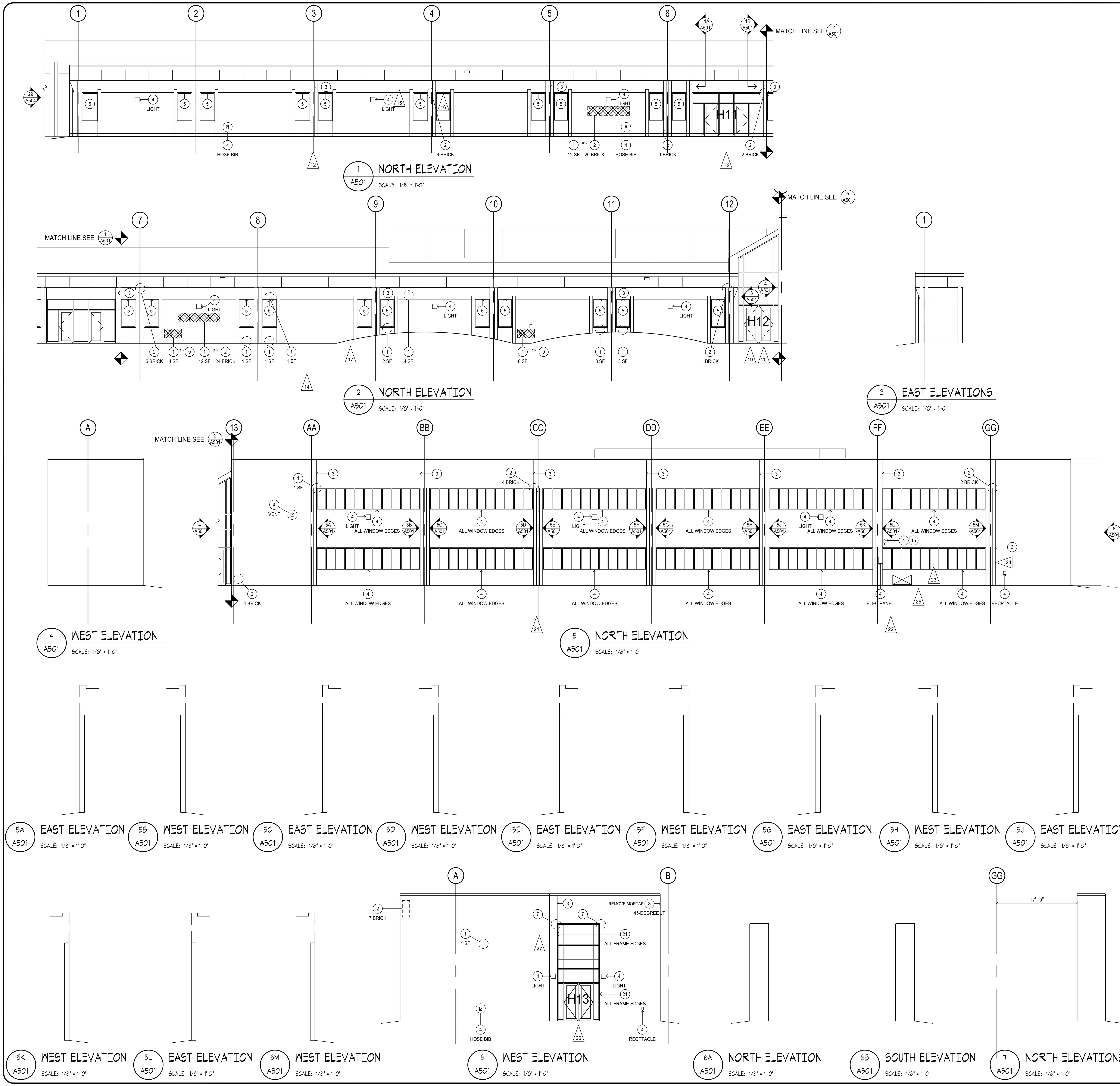
2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

ROCHESTER, MN

ROOF PLAN

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A100
OF 8



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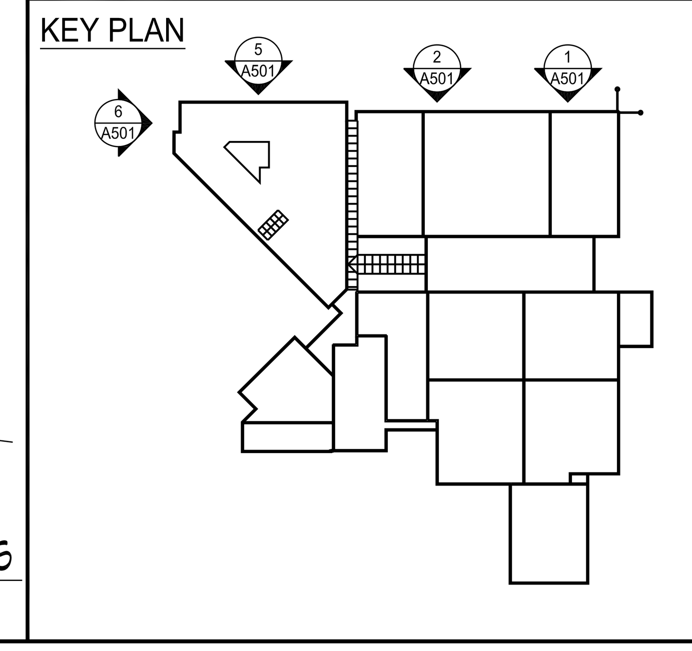

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2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A501
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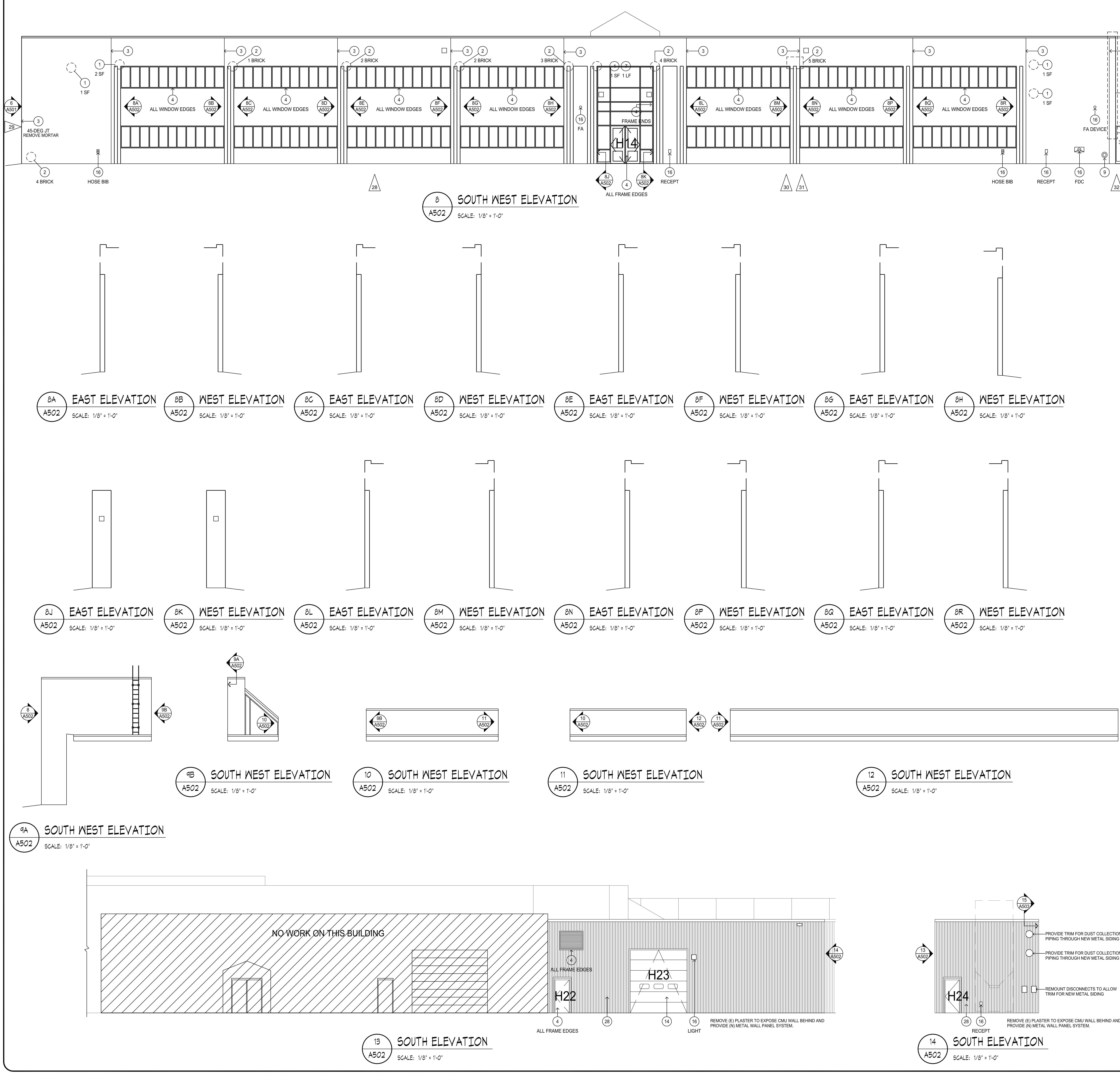

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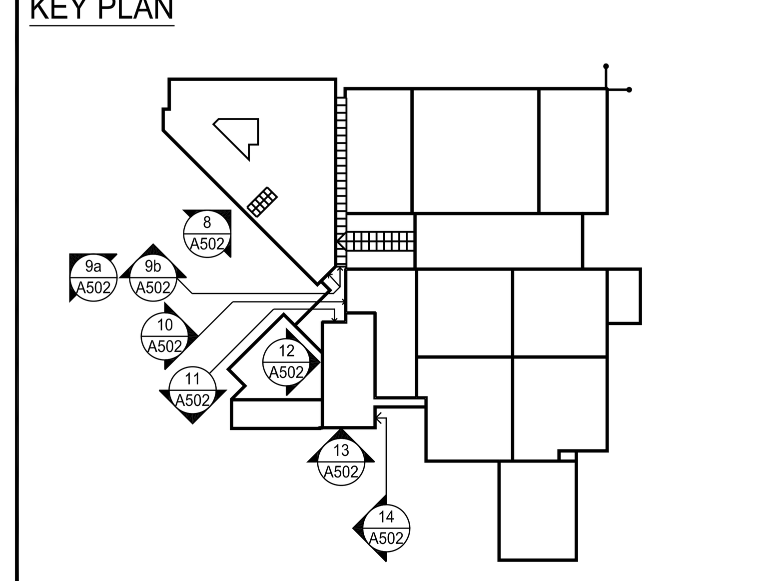

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File Number:		
Plot Scale:	1/8" = 1'-0"	
Project Status:	CD	
Updated By:		Date:

Rochester Community and Technical College

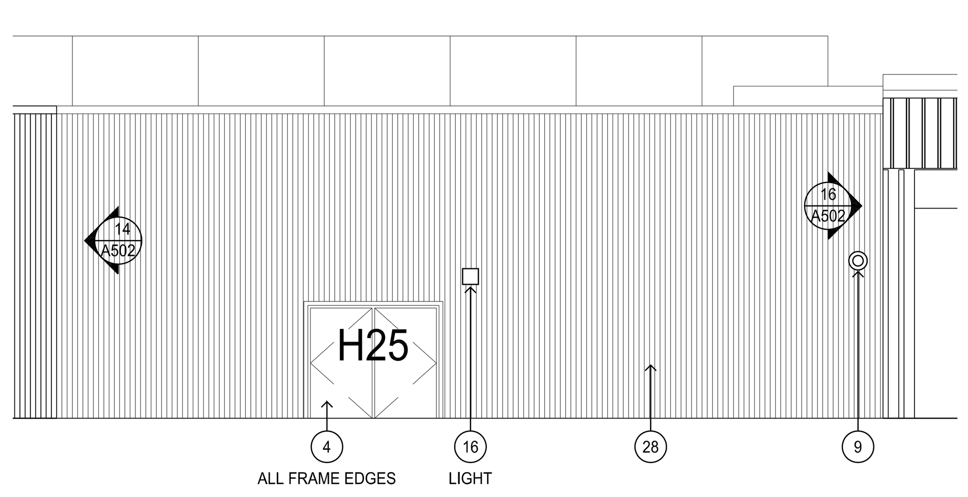
2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

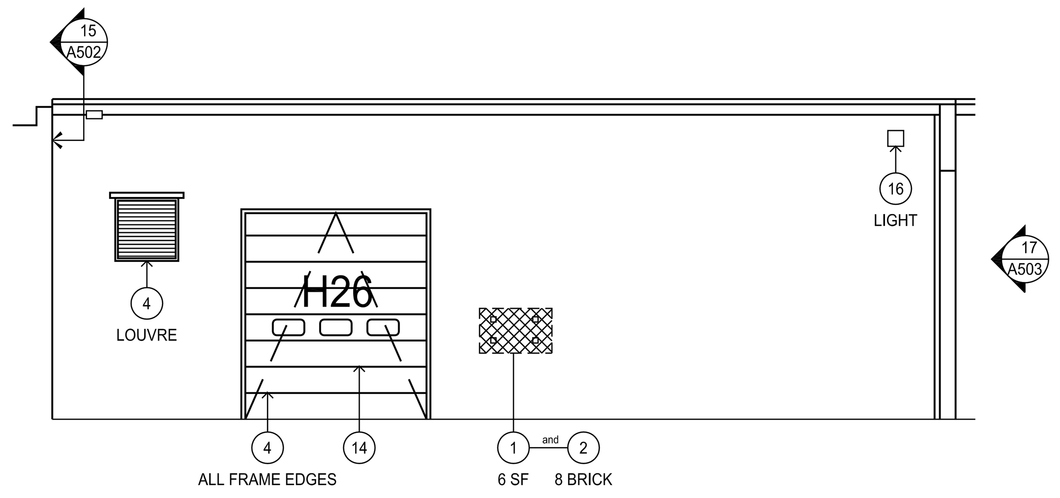
ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

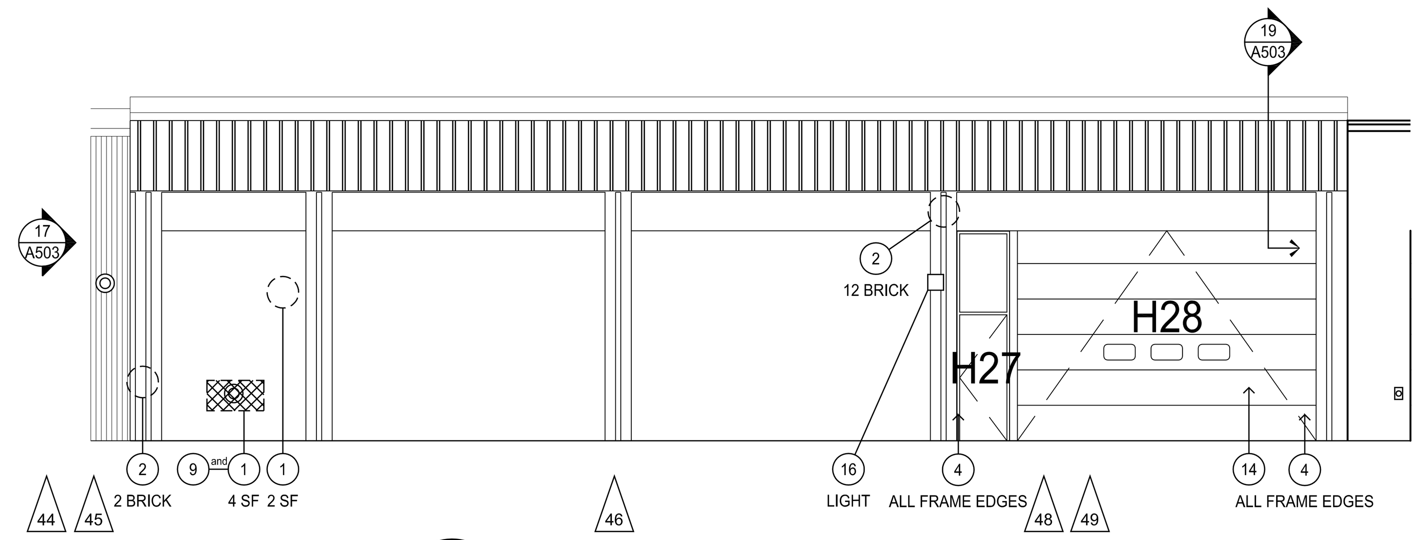
ISSUE DATE:	5/22/12
KJA PROJECT #	2012204
SHEET	A502
OF	8



15 A502 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



16 A502 WEST ELEVATION
SCALE: 1/8" = 1'-0"



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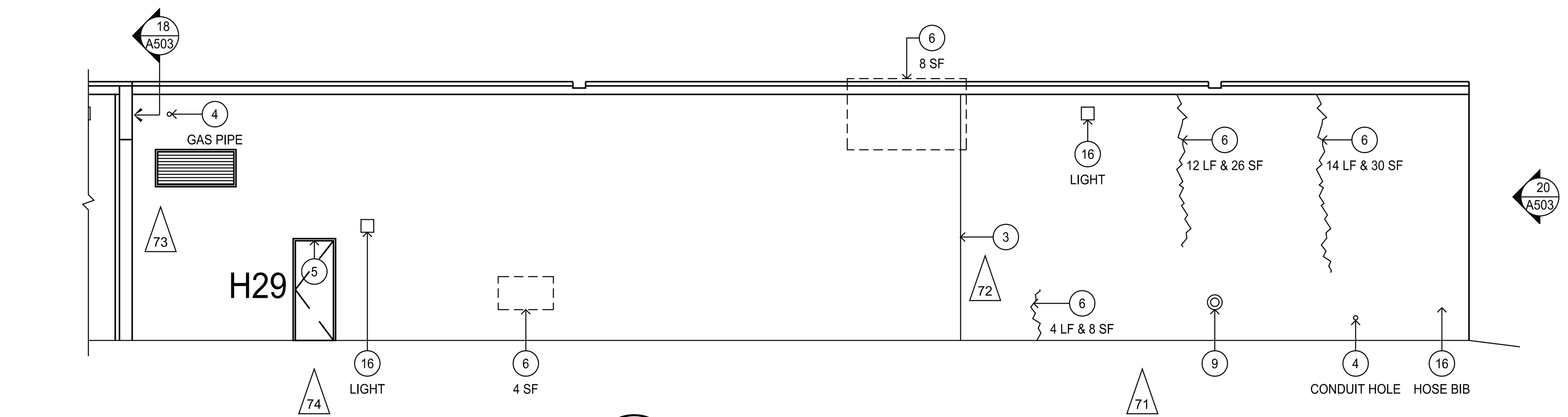

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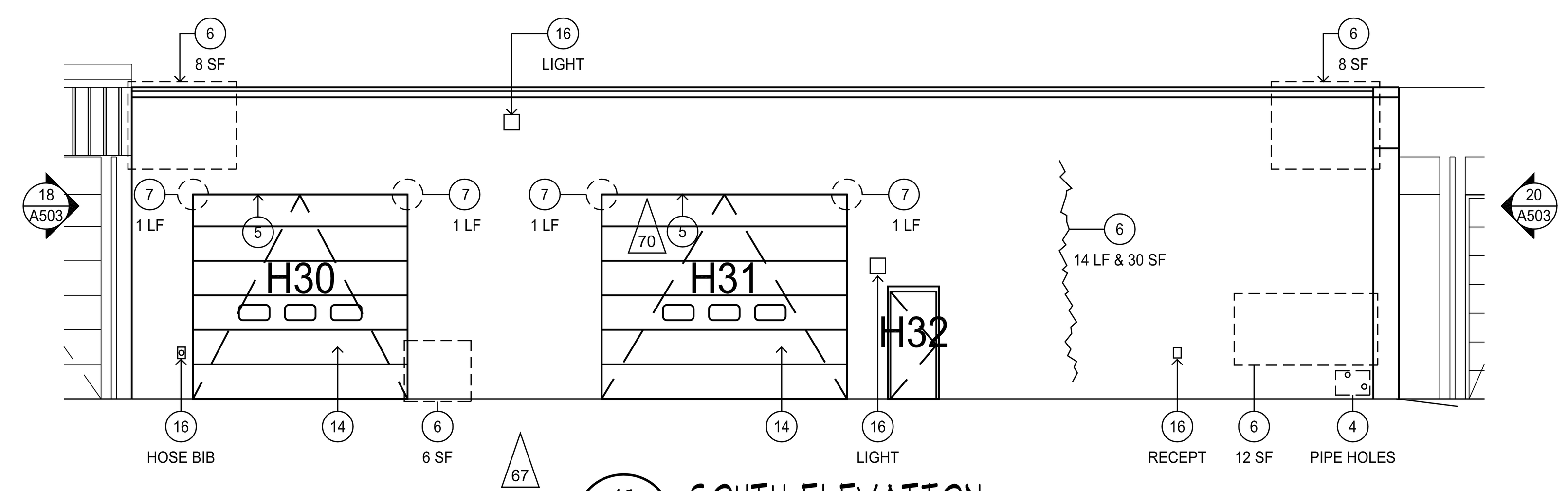
SCALE: 1/8" = 1'-0"



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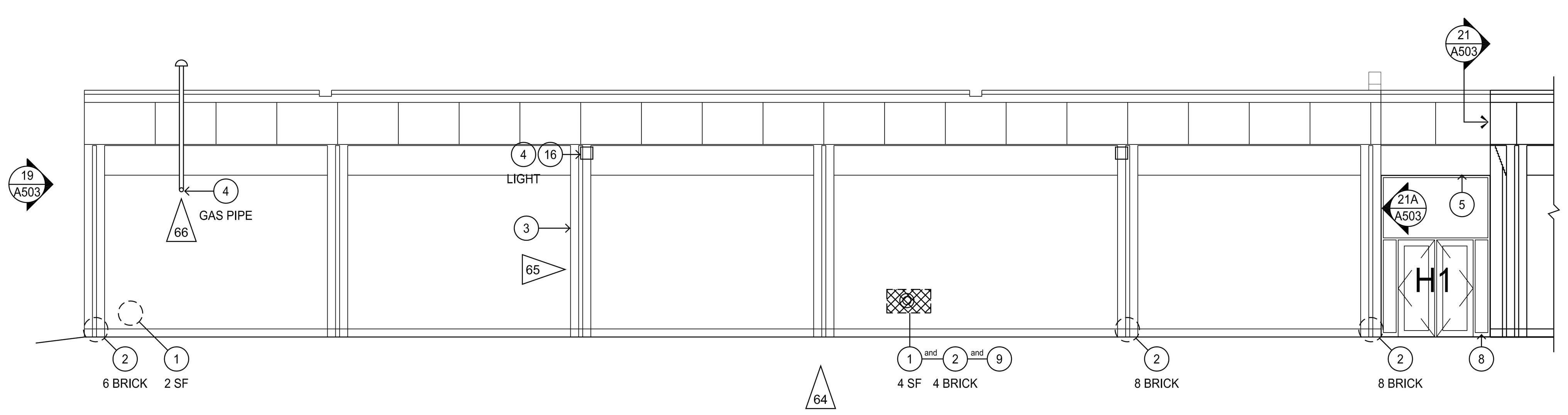

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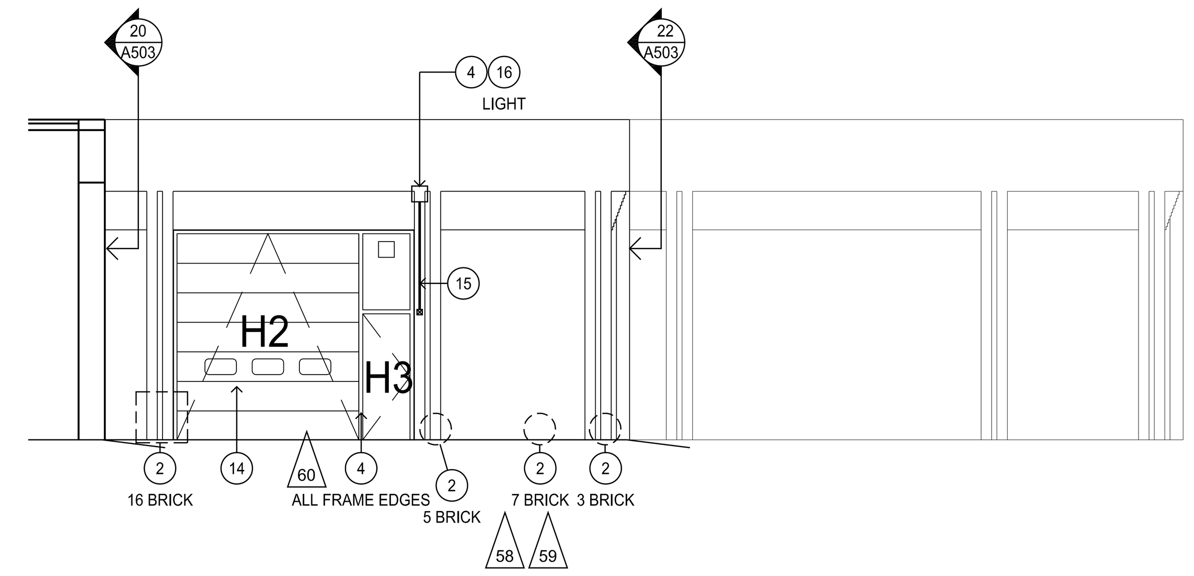
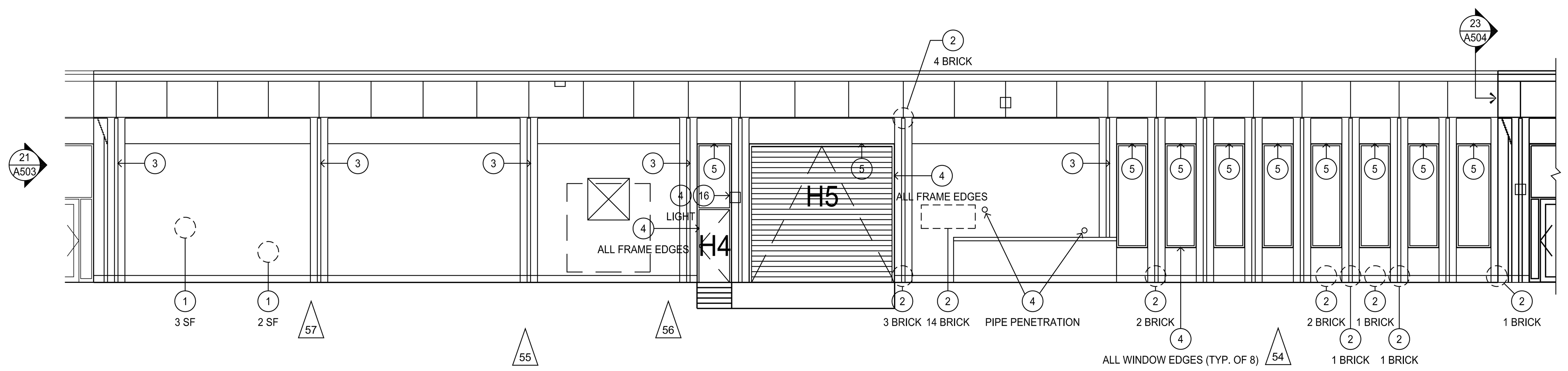
SCALE: 1/8" = 1'-0"



21 A503 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



22 A503 EAST ELEVATION
SCALE: 1/8" = 1'-0"

NOTES:

1	TUCK POINT BRICK VENEER	04 01 00
2	REPLACE DAMAGED BRICK VENEER	04 01 00
3	REPLACE EXISTING CONTROL JOINT SEALANT	07 90 05
4	REPLACE EXISTING FENESTRATION JOINT SEALANT	07 90 05
5	CLEAN, PRIME AND PAINT STEEL LINTEL. REPLACE SEALANTS.	09 90 00
6	TUCK POINT C.M.U. WALL AND REPAIR BROKEN BLOCK	04 01 00
7	REMOVE MORTAR AND PROVIDE SEALANT AT LINTEL ENDS	07 90 05
8	REPAIR AND RE-PAINT DAMAGED STEEL DOOR FRAME	09 90 00
9	REPLACE SEALANT AT ROOF DRAIN NOZZLE	07 90 05
10	REPLACE TRAFFIC CAULK AT CONCRETE STOOP	07 90 05
11	REPLACE THROUGH WALL FLASHING	07 62 00
12	REMOVE GASKET AND PROVIDE SEALANT AT PANEL EDGES	04 01 00
13	PROVIDE NEW METAL WALL PANEL	07 42 14
14	RE-PAINT EXISTING OVERHEAD DOORS	09 90 00
15	PROTECT EXISTING CONDUIT THAT WILL REMAIN	N/A
16	EXISTING FIXTURE/HOSE BID/RECEPTACLE THAT WILL REMAIN	N/A
17	REPLACE EXISTING SEALANT AROUND WINDOWS AND STONE	07 90 05
18	CLEAN BIO-STAINED AREAS WITH RECOMMENDED CLEANER	04 01 00
19	CUT NEW CONTROL JOINT INTO BRICK VENEER.	07 90 05
20	REPLACE EXISTING SEALANT AROUND SHELF LEDGE	07 90 05
21	REPLACE EXISTING SEALANT AROUND WINDOW/DOOR FRAME	07 90 05
22	REMOVE EXISTING SEALANT ON CONCRETE AND RESEAL.	07 90 05
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24	REMOVE MORTAR AND PROVIDE SEALANT AT BRICK CORNER	07 90 05
25	REMOVE SEALANT IN C.I.P. WALL, INJECT EPOXY IN CRACK AND RE-SEAL	
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27	CLEAN, PRIME AND PAINT STEEL CORNER GUARDS	
28	REMOVE EXISTING PLASTER AND REPLACE WITH NEW METAL WALL PANEL	

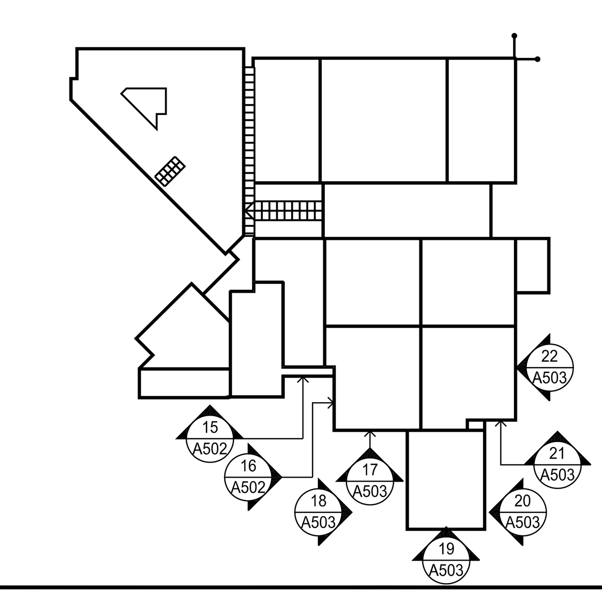
SYMBOL LEGEND

- LOUVRE
- SCUPPER
- HOSE BIB
- WALL LIGHT
- DOWN SPOUT NOZZLE
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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CERTIFICATION

I hereby certify that this Plan, Specification or Report was prepared by me or under my direct supervision and that I am a duly licensed Architect under the laws of the state of Minnesota

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5/22/12

Name
Date: Lic. No.

CONSULTANTS

SKYLINE BUILDING
ENVELOPE
CONSULTANTS
15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural
Design Group

REVISIONS

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ENLARGED EXTERIOR ELEVATIONS

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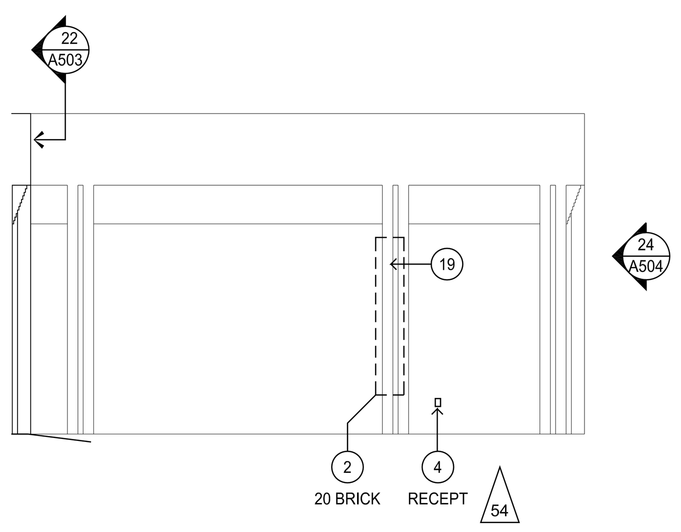
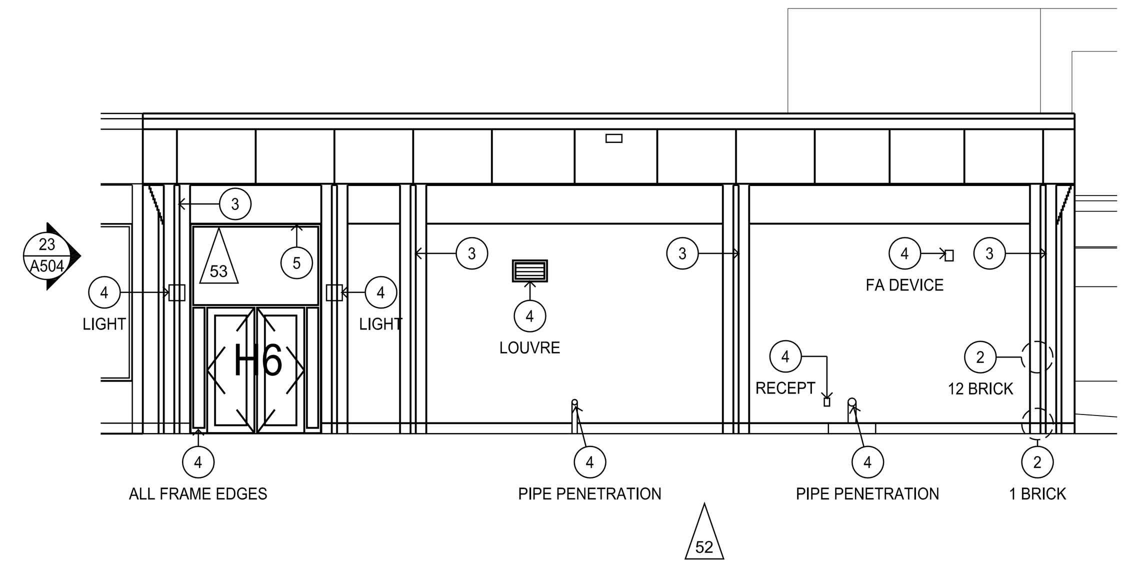
SHEET A503
OF 8



23 A504 EAST ELEVATION
SCALE: 1/8" = 1'-0"



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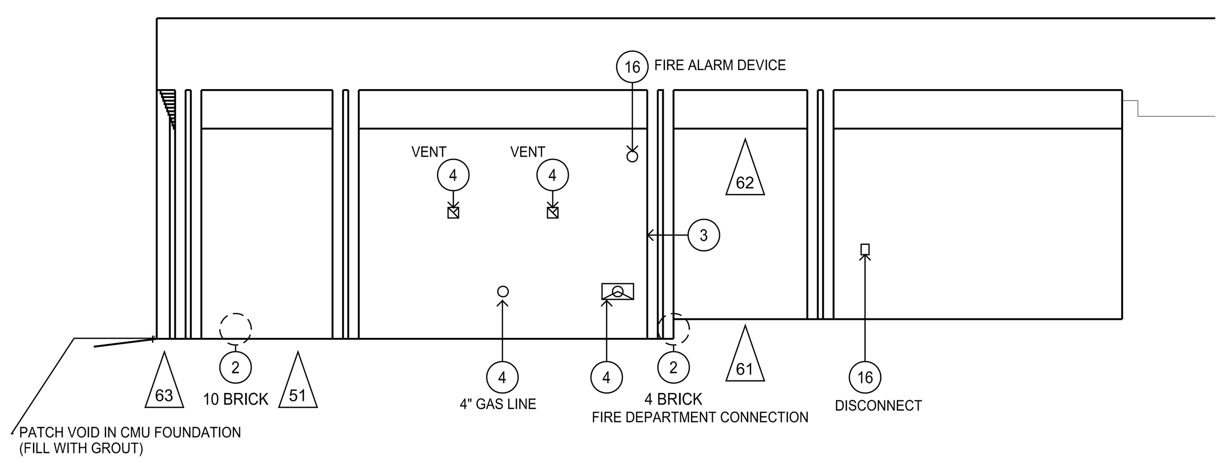
SCALE: 1/8" = 1'-0"



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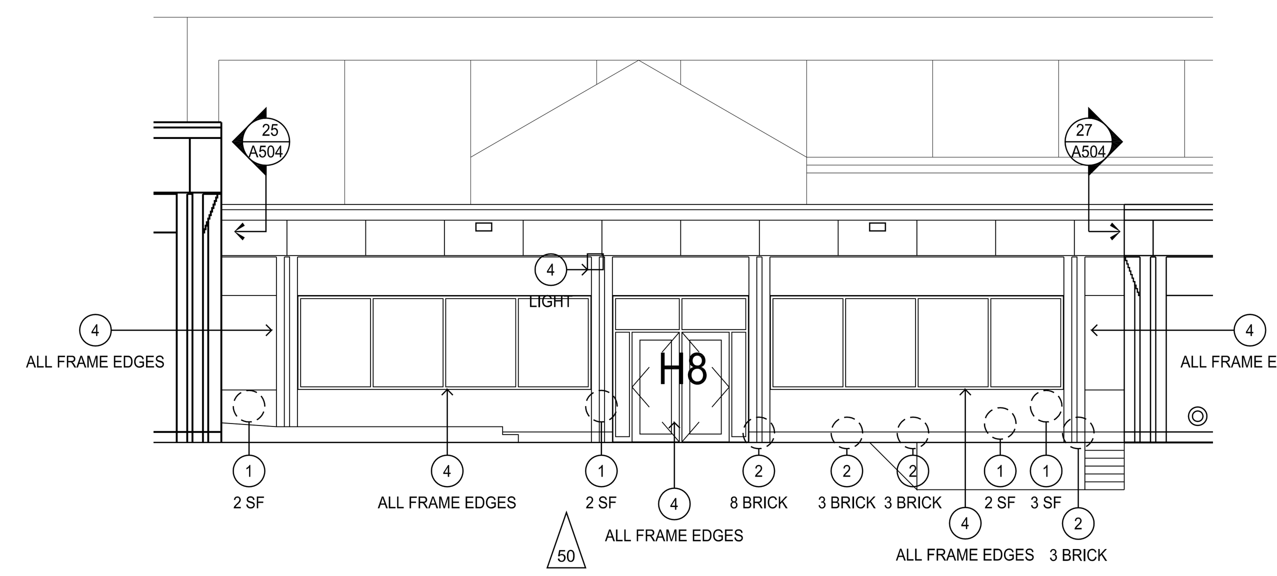
SCALE: 1/8" = 1'-0"



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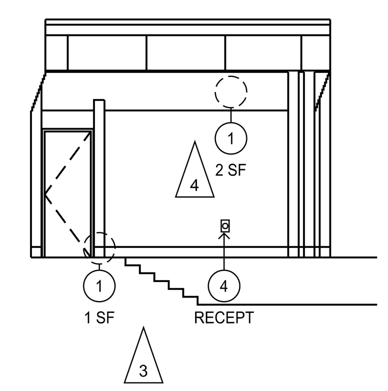

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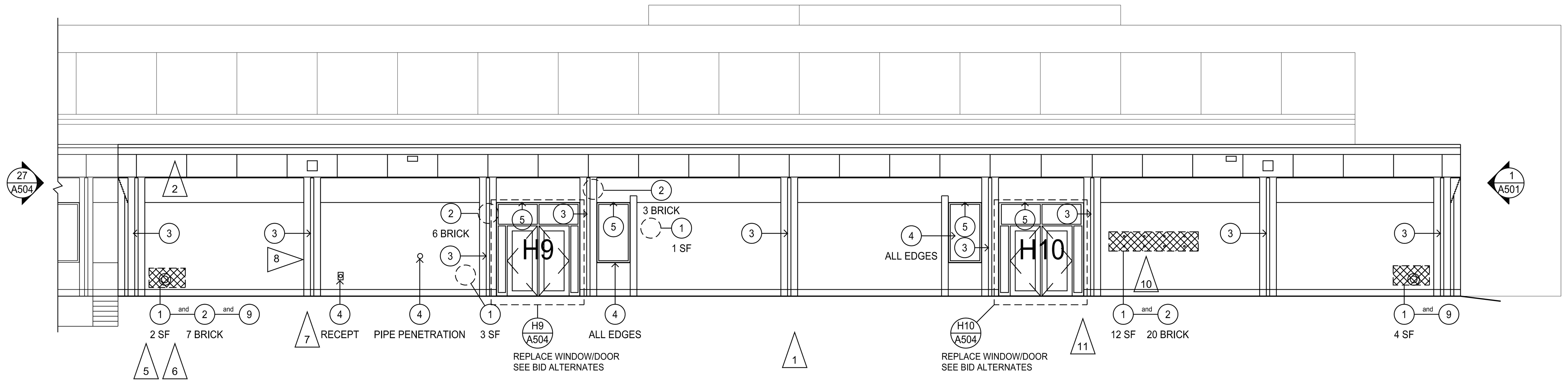
SCALE: 1/8" = 1'-0"



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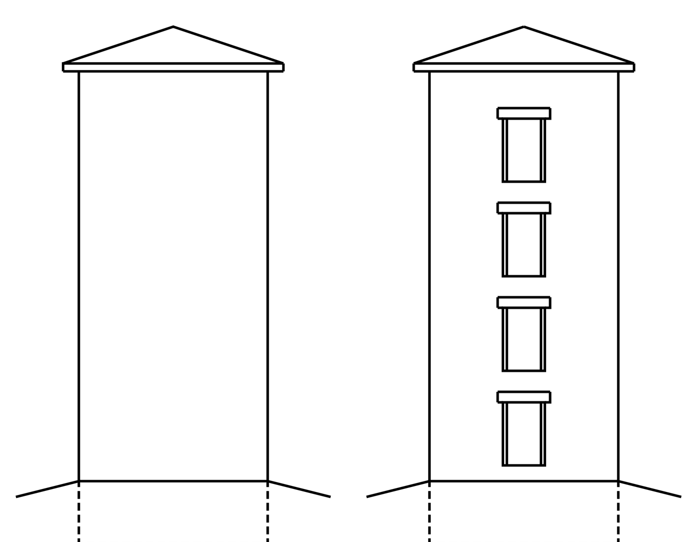
SCALE: 1/8" = 1'-0"



29 A504 SILO ELEVATIONS
SCALE: 1/8" = 1'-0"

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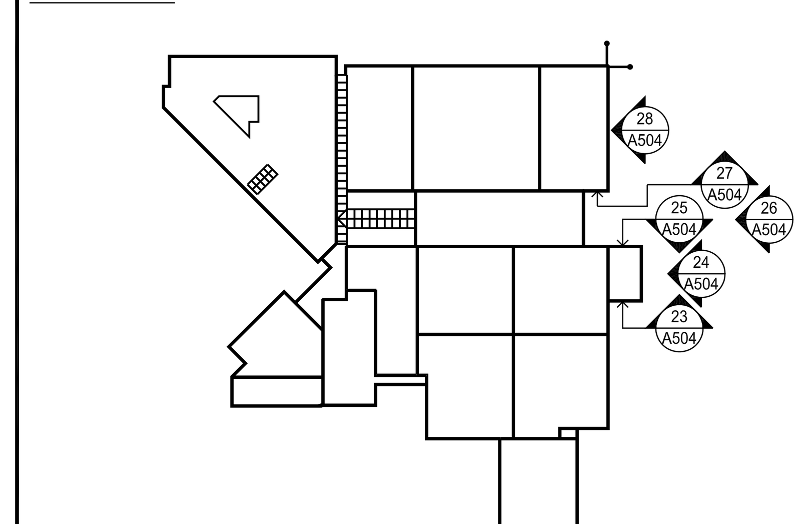

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CERTIFICATION

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CONSULTANTS

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15050 CEDAR AVE S #116-333
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Structural Design Group

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ENLARGED EXTERIOR ELEVATIONS

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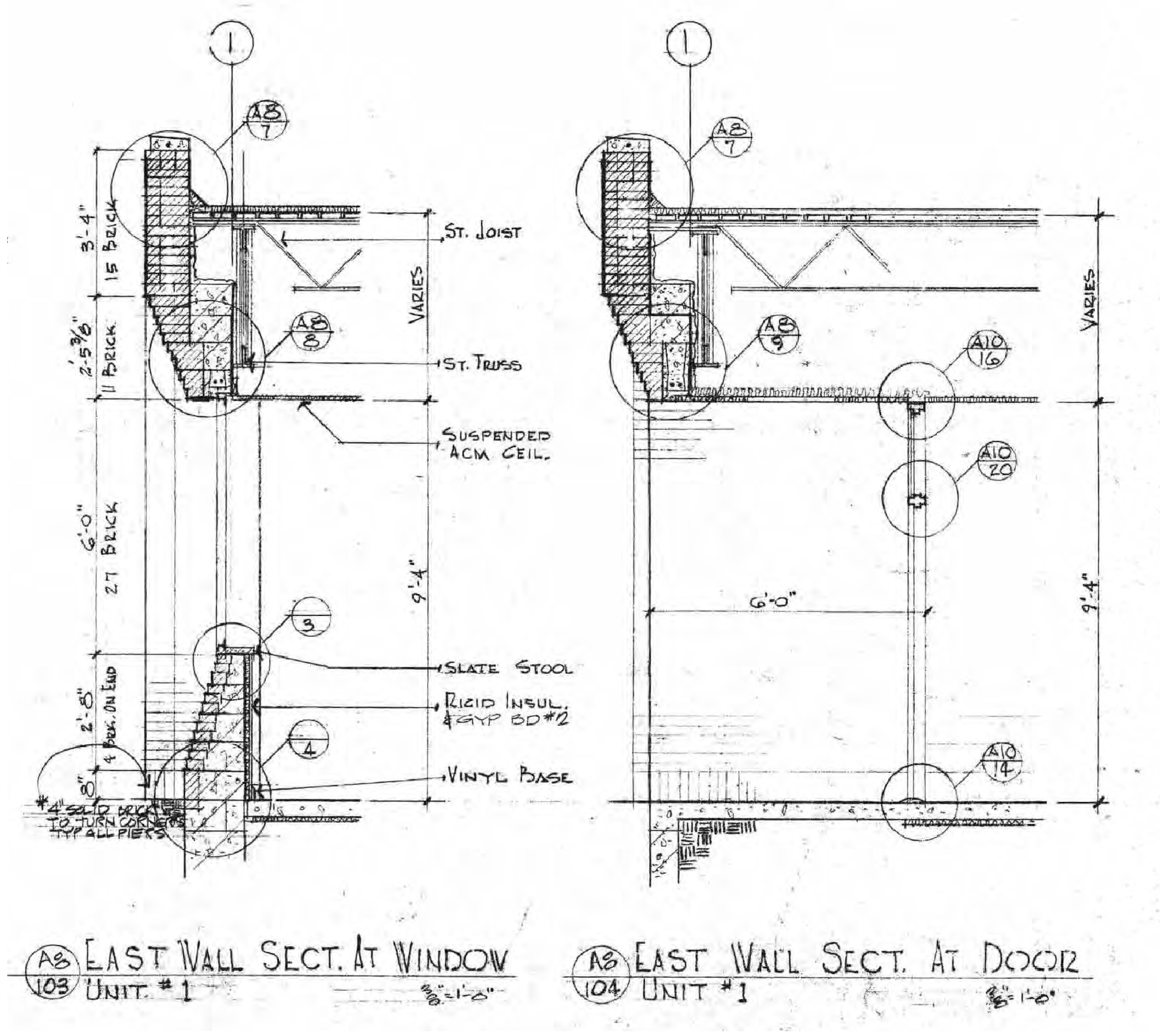
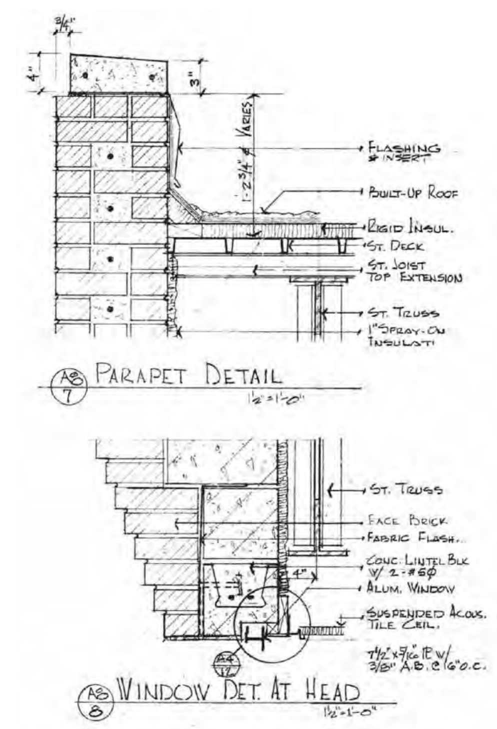
SHEET A504
OF 8



1 EXISTING SECTION A8/103
A600
1/2" = 1'-0"

2 EXISTING SECTION A8/104
A600
1/2" = 1'-0"



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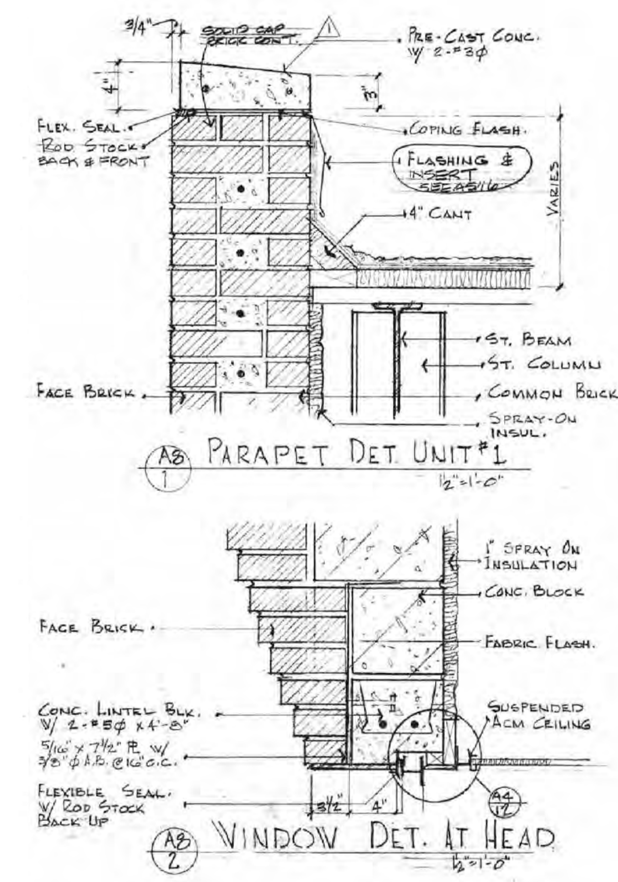
1" = 1'-0"



4 EXISTING DETAILS 3 & 4/A8
A600
1" = 1'-0"

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Structural Design Group

REVISIONS

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Drawn By:	TCK	Date:	
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Project Status:	CD		
Updated By:		Date:	

Rochester Community and Technical College

2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

ROCHESTER, MN

SECTIONS

ISSUE DATE: 5/22/12

KJA PROJECT # 2012204

SHEET A600

OF 8

TUCKPOINTING PROCEDURE NOTES

TUCKPOINT SPECIFIED MORTAR JOINTS IN ACCORDANCE WITH THE BRICK INSTITUTE OF AMERICA TECHNICAL NOTES 7F AS OUTLINED BELOW.

1. WHERE MORTAR IS NOT YET REMOVED FROM JOINT, REMOVE MORTAR WITH HAND TOOLS OR SMALL POWER TOOLS IN SUCH A MANNER AS TO NOT DAMAGE THE BRICK TO REMAIN. ANY DAMAGED BRICK SHALL BE REMOVED AND REPLACED IN ACCORDANCE WITH BRICK REPAIR PROCEDURES.

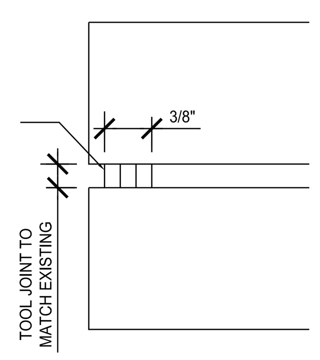
2. REMOVE ALL DUST AND DEBRIS FROM THE JOINT BY WIRE BRUSHING AND BLOWING WITH AIR.

3. TUCKPOINTING MORTAR SHALL BE OF THE PROPORTIONS SPECIFIED IN THE MORTAR SPECIFICATION NOTES. THE COLOR OF THE SAND AND COLORING AGENTS IF NECESSARY SHALL BE SELECTED TO MATCH EXISTING MORTAR. MORTAR SHALL BE PREHYDRATED TO REDUCE EXCESSIVE SHRINKAGE.

4. JOINTS TO BE TUCKPOINTED SHALL BE DAMPENED TO ENSURE A GOOD BOND. THE BRICK WORK MUST ABSORB ALL SURFACE WATER.

5. JOINTS SHALL BE FILLED WITH PREHYDRATED MORTAR BY PACKING MORTAR TIGHTLY INTO THE JOINTS IN THIN LAYERS OF APPROXIMATELY 1/4" MAXIMUM. EACH LAYER SHALL BE "THUMBPRINT HARD" BEFORE APPLYING THE NEXT LAYER. THE JOINTS SHALL BE TOOLED TO MATCH THE EXISTING JOINTS AFTER THE LAST LAYER OF MORTAR IS "THUMBPRINT HARD".

INSTALL EACH LIFT MAXIMUM 1/4" THICK IN ACCORDANCE WITH TUCKPOINTING PROCEDURE NOTES AND BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F. SEE TUCKPOINTING PROCEDURE NOTES.



1 A700 TYPICAL JOINT SEALANT DETAIL
6" = 1'-0"

BRICK REPAIR PROCEDURE NOTES

THE INTENT OF THIS REPAIR IS TO REMOVE ANY EXISTING CRACKED, BROKEN, SPALLED OR DISCLOSED BRICK MASONRY. TO REPLACE WITH NEW BRICK MASONRY TO MATCH EXISTING, AND TO REPAIR ANY CRACKED MORTAR JOINTS.

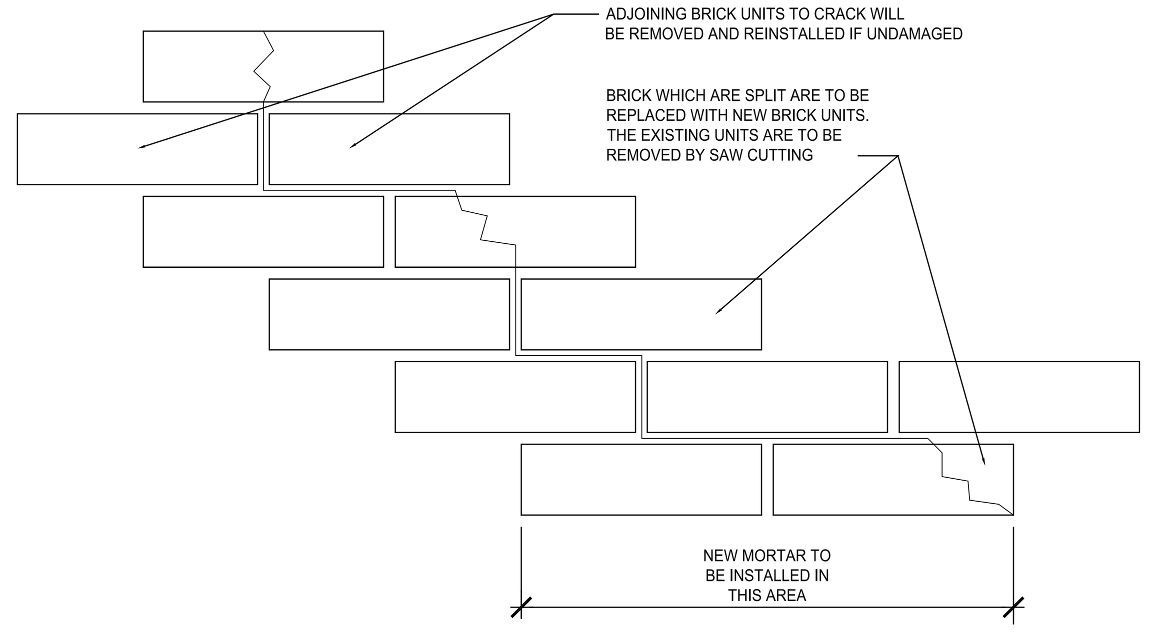
1. REMOVE INDIVIDUAL OR SECTIONS OF BRICK MASONRY AS SHOWN ON THE BUILDING ELEVATIONS AND/OR OTHERWISE DIRECTED ON THE DRAWINGS OR IN THE FIELD. REMOVAL SHALL BE WITH SMALL POWER OR HAND TOOLS SO AS NOT TO DAMAGE DAMAGE BRICK TO REMAIN.

2. POWER TOOL CLEAN ALL MORTAR FROM EXISTING BRICK MASONRY TO REMAIN AROUND THE REPAIR.

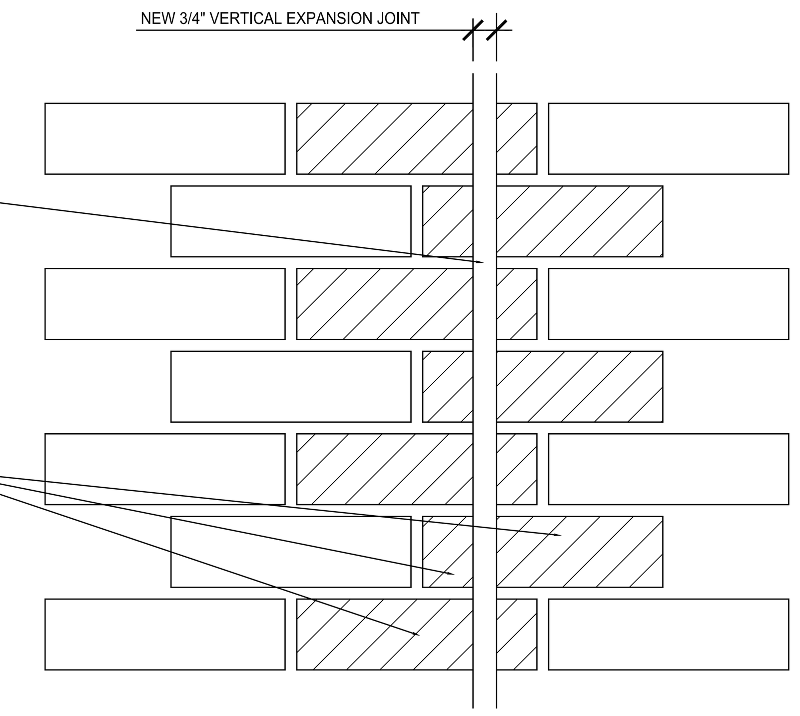
3. REVIEW BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F FOR GUIDELINES ON TUCKPOINTING AND BRICK REPLACEMENT. ALL BRICK REPLACEMENT SHALL BE INSTALLED IN ACCORDANCE WITH B.I.A. TECHNICAL NOTES 7F. ALL HEAD AND BED JOINTS SHALL BE FULL. THE FINAL BRICKS IN A CONFINED AREA SUCH AS PORTIONS OF THE JOINTS IN TOOTHED MASONRY AND SOME JOINTS IN MASONRY ALONG REPAIR CRACKS SHALL BE TUCKPOINTED IN LAYERS IN ACCORDANCE WITH THE B.I.A. GUIDELINES AND TUCKPOINTING PROCEDURE NOTES ON THE DRAWINGS. ALL JOINTS WHERE SAW KERF EXTENDS INTO MORTAR BEYOND THE END OF AREA REMOVED SHALL ALSO BE TUCKPOINTED.

4. INSTALL NEW BRICK MASONRY USING A PREHYDRATED MORTAR AS DESCRIBED IN B.I.A. TECHNICAL NOTES 7F.5. DRY PACK ALL HEAD JOINTS IN THE REPAIRED AREA WITH A PREHYDRATED MORTAR AS DESCRIBED IN TUCKPOINTING PROCEDURE NOTES.

NOTE: ALL MORTAR AROUND THESE REPLACED BRICK SECTIONS IS TO BE REMOVED AND REPLACED.



2 A700 TYPICAL DIAGONAL CRACK BRICK REPAIR DETAIL
3" = 1'-0"



3 A700 TYPICAL FORMED VERTICAL EXPANSION BRICK REPAIR DETAIL
3" = 1'-0"

1. NEW VERTICAL SAWCUT JOINTS SHALL BE 3/4" WIDE AND THE JOINT SHALL BE CUT COMPLETELY THROUGH THE EXTERIOR WY OF BRICK AT LOCATIONS SHOWN ON THE BUILDING ELEVATIONS. EXISTING BUILDING EXPANSION JOINTS WHICH ARE LESS THAN 3/4" WIDE SHALL BE SAWCUT TO FULL 3/4" WIDTH.

2. SAWCUTS FOR CUTTING THE JOINTS SHALL BE MOUNTED ON TRACKS ATTACHED TO THE WALL OR SHALL BE HAND HELD SAWS GUIDED BY A WALL-MOUNTED GUIDE OR TRACK TO ENSURE A NEAT, STRAIGHT, VERTICAL CUT. SAWING ALONG A LINE WITH HAND HELD SAWS SHALL NOT BE PERMITTED. REPAIR ANY MASONRY DAMAGED BY SAWCUTTING.

3. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF ANY MATERIALS OR OBJECTS WHICH ARE LOCATED AT NEW AND EXISTING EXPANSION JOINTS AND WHICH MUST BE REMOVED IN ORDER FOR THE JOINTS TO BE CONSTRUCTED.

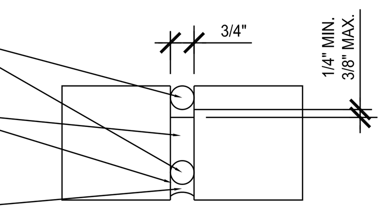
4. PROVIDE NEW BRICK MASONRY WHERE ANY BRICKS ARE BROKEN OR SPALLED CURING THE IMPLEMENTATION OF THIS REPAIR TYPE. TUCKPOINT MORTAR JOINTS BETWEEN NEW AND EXISTING BRICK AS SPECIFIED.

5. TERMINATE BOTTOM OF EXPANSION JOINT AT TOP OF FOUNDATION WALL. EXTEND EXPANSION JOINT THROUGH TOP OF BRICK AT CAP FLASHING.

6. WIRE BRUSH CLEAN SIDES OF JOINT AND BLOW CLEAN WITH OIL-FREE COMPRESSED AIR. CLEANING SHALL REMOVE ALL DUST, DIRT, AND EXISTING SEALANT MATERIALS.

7. INSTALL NEW BACKER ROD AND ALLOW NEWLY INSTALLED MASONRY ADJACENT TO JOINT TO CURE FOR 28 DAYS PRIOR TO INSTALLING SEALANT. INSTALL CONTINIOUS SEALANT. TOOL SEALANT TO A SLIGHTLY CONCAVE FINISH. SEE SPECIFICATIONS FOR BACKER ROD AND SEALANT.

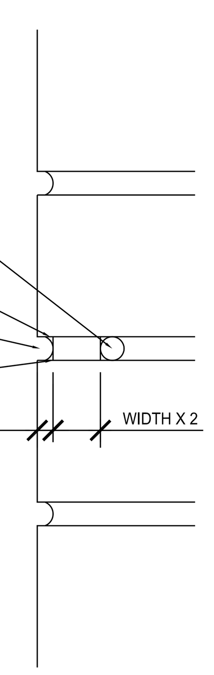
8. CLEAN BRICK UPON COMPLETION OF SAWCUTTING AND OTHER MASONRY REPAIR.



NOTE: THIS DETAIL APPLIES AT ALL EXISTING EXPANSION JOINTS

4 A700 TYPICAL VERTICAL EXPANSION BRICK REPAIR DETAIL
3" = 1'-0"

NOTE: SEALANT TO BE INSTALLED WITHIN MANUFACTURERS TEMPERATURE LIMITATIONS



DEPTH OF THE CAULK TO BE A MINIMUM OF 2X THE WIDTH OF THE JOINT.

CONCAVE ON JOINT SEALANT TO BE A MINIMUM OF 1/4" DEEP, BUT NO MORE THAN A MINIMUM OF 1/2" DEEP.

5 A700 TYPICAL JOINT SEALANT DETAIL
6" = 1'-0"

BRICK REPAIR PROCEDURE NOTES

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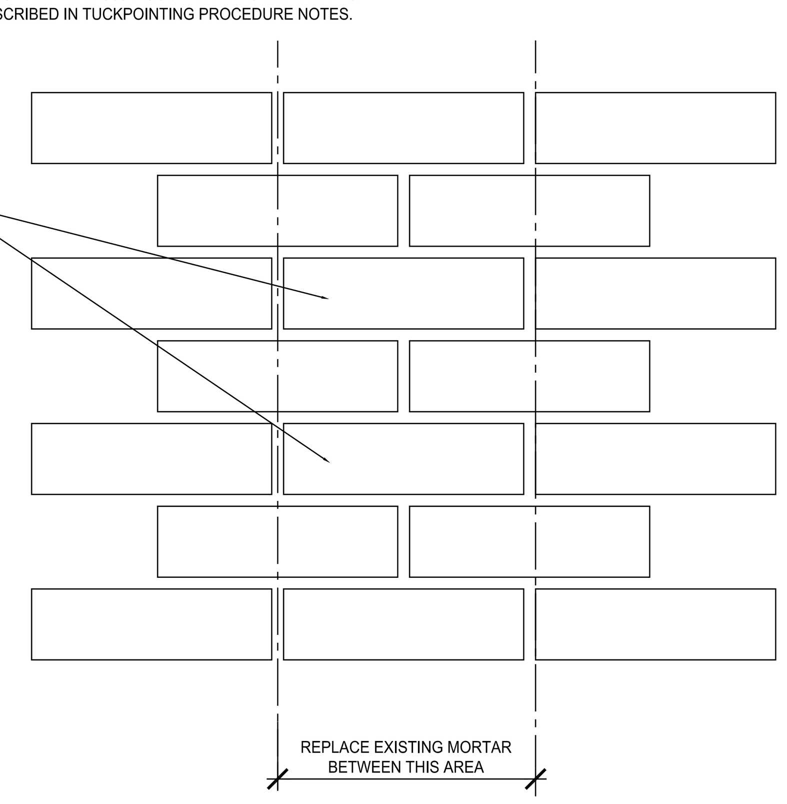
1. REMOVE INDIVIDUAL OR SECTIONS OF BRICK MASONRY AS SHOWN ON THE BUILDING ELEVATIONS AND/OR OTHERWISE DIRECTED ON THE DRAWINGS OR IN THE FIELD. REMOVAL SHALL BE WITH SMALL POWER OR HAND TOOLS SO AS NOT TO DAMAGE DAMAGE BRICK TO REMAIN.

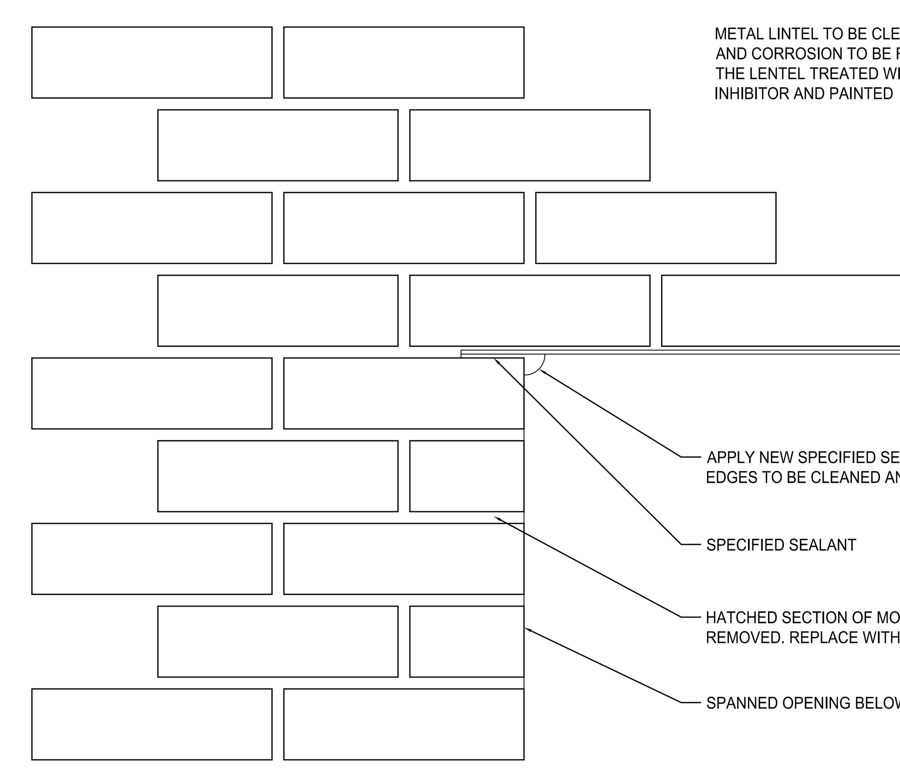
2. POWER TOOL CLEAN ALL MORTAR FROM EXISTING BRICK MASONRY TO REMAIN AROUND THE REPAIR.

3. REVIEW BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F FOR GUIDELINES ON TUCKPOINTING AND BRICK REPLACEMENT. ALL BRICK REPLACEMENT SHALL BE INSTALLED IN ACCORDANCE WITH B.I.A. TECHNICAL NOTES 7F. ALL HEAD AND BED JOINTS SHALL BE FULL. THE FINAL BRICKS IN A CONFINED AREA SUCH AS PORTIONS OF THE JOINTS IN TOOTHED MASONRY AND SOME JOINTS IN MASONRY ALONG REPAIR CRACKS SHALL BE TUCKPOINTED IN LAYERS IN ACCORDANCE WITH THE B.I.A. GUIDELINES AND TUCKPOINTING PROCEDURE NOTES ON THE DRAWINGS. ALL JOINTS WHERE SAW KERF EXTENDS INTO MORTAR BEYOND THE END OF AREA REMOVED SHALL ALSO BE TUCKPOINTED.

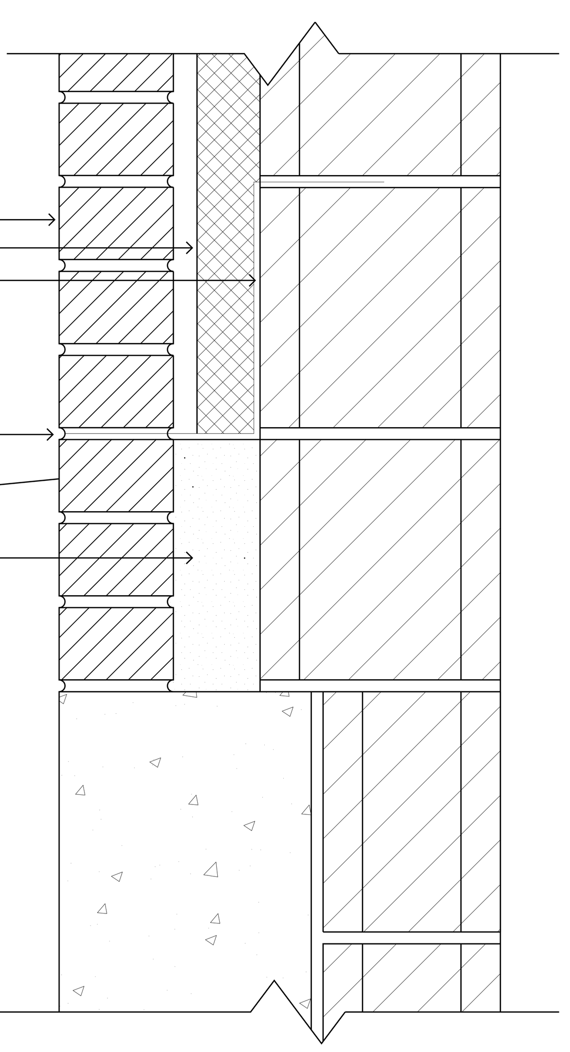
4. INSTALL NEW BRICK MASONRY USING A PREHYDRATED MORTAR AS DESCRIBED IN B.I.A. TECHNICAL NOTES 7F.5. DRY PACK ALL HEAD JOINTS IN THE REPAIRED AREA WITH A PREHYDRATED MORTAR AS DESCRIBED IN TUCKPOINTING PROCEDURE NOTES.



6 A700 TYPICAL VERTICAL CRACK BRICK REPAIR DETAIL
3" = 1'-0"



7 A700 TYPICAL LINTEL BRICK REPAIR DETAIL
3" = 1'-0"



8 A700 BRICK LEDGE DETAIL
3" = 1'-0"

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15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural Design Group

REVISIONS

Date: By:

Drawn By: TCK Date:
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Plot Scale: 3" = 1'-0"
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Rochester Community and Technical College

2012 EXTERIOR FACADE REPAIRS

U.C.R. HEINTZ CAMPUS

ROCHESTER, MN

DETAILS

ISSUE DATE: 5/22/12

KJA PROJECT # 2012204

SHEET A700

OF 8

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

851 30TH AVE. S.E., ROCHESTER, MN 55904

2012 EXTERIOR REPAIRS - U.C.R. MAIN CAMPUS

ABBREVIATIONS

A.B.	ANCHOR BOLT	INSUL.	INSULATION	T.B.	TOWEL BAR
ACOUST.	ACOUSTICAL	INT.	INTERIOR	UR.	URINAL
A.C.	AIR CONDITIONER	INV.	INVERT	U.O.N.	UNLESS OTHERWISE NOTED
ALUM.	ALUMINUM	JAN.	JANITOR	VTR.	VENT TO ROOF
ANCH.	ANCHOR	JT.	JOINT	V.C.T.	VINYL COMPOSITION TILE
APPROX.	APPROXIMATELY	JST.	JOIST	V.G.	VERTICAL GRAIN
ASB.	ASBESTOS	LAV.	LAVATORY	VERT.	VERTICAL
BM.	BENCHMARK/BEAM	LAM.	LAMINATE	W/	WITH
BLK.	BLOCK	LT. WT.	LIGHT WEIGHT	W.C.	WATER CLOSET
BD.	BOARD	M.B.	MACHINE BOLT	W.F.	WIDE FLANGE
BLDG.	BUILDING	M.H.	MANHOLE	WWF.	WELDED WIRE FABRIC
B.O.	BOTTOM OF	M.O.	MASONRY OPENING	W/O	WITHOUT
BOT.	BOTTOM	MACH.	MACHINE	WD.	WOOD
CAB.	CABINET	MANUF.	MANUFACTURER	W.I.	WROUGHT IRON
C.I.	CAST IRON	MAT.	MATERIAL	W.P.	WATER PROOF
C.B.	CATCH BASIN	MAS.	MASONRY		
C.J.	CONTROL JOINT	MAX.	MAXIMUM		
C.M.U.	CONCRETE MASONRY UNIT	MECH.	MECHANICAL		
CEM.	CEMENT	MET.	METAL		
CER.	CERAMIC	MEMB.	MEMBRANE		
CLG.	CEILING	MIN.	MINIMUM		
COL.	COLUMN	NAT.	NATURAL		
CONC.	CONCRETE	NO.	NUMBER		
CONST.	CONSTRUCTION	N.I.C.	NOT IN CONTRACT		
CONT.	CONTINUOUS	N.T.S.	NOT TO SCALE		
DBL.	DOUBLE	NOM.	NOMINAL		
DST.	DETAIL	O/	OVER		
DIA.	DIAMETER	O.C.	ON CENTER		
DIAG.	DIAGONAL	OPP.	OPPOSITE		
DIM.	DIMENSION	O.D.	OUTSIDE DIAMETER		
DISP.	DISPENSER	OPNG.	OPENING		
DN.	DOWN	O/H	OVERHANG		
DWG.	DRAWING	O.S.A.	OUTSIDE AIR		
DF.	DRINKING FOUNTAIN	PR.	PAIR		
D.S.	DOWNSPOUT	PART.	PARTITION		
D.F.	DOUGLAS FIR	PTD.	PAPER TOWEL DISPENSER		
DWV.	DRAIN, WASTE,& VENT PIPE	PLAST.	PLASTER		
EA.	EACH	PLAM.	PLASTIC LAMINATE		
ELECT.	ELECTRICAL	PLT.	PLATE		
ELEV.	ELEVATION	PLYWD.	PLYWOOD		
E.J.	EXPANSION JOINT	P.V.C.	POLYVINYL CHLORIDE		
E.W.	EACH WAY	P.L.	PROPERTY LINE		
ENAM.	ENAMEL	P-P-T	PRIME, PAINT, TEXTURE		
EQ	EQUAL	PROP.	PROPERTY		
EQUIP.	EQUIPMENT	PORC.	PORCELAIN		
(E)	(E) EXISTING	Q.T.	QUARRY TILE		
EXIST.	EXISTING	RAD.	RADIUS		
EXP.	EXPANSION	RWD.	REDWOOD		
EXT.	EXTERIOR	R.D.	ROOF DRAIN		
FAS.	FASCIA	REF.	REFRIGERATOR		
FBGL.	FIBERGLASS	R.O.	ROUGH OPENING		
FOC.	FACE OF CONCRETE	R.S.	RESAWN		
FOM.	FACE OF MASONRY	R.A.	RETURN AIR		
FOS.	FACE OF STUDS	RM.	ROOM		
FIN.	FINISH	REC.	RECESSED		
FDN.	FOUNDATION	REINF.	REINFORCED		
F.D.	FLOOR DRAIN	REQ'D.	REQUIRED		
FLR.	FLOOR	RESIL.	RESILIENT		
FLUOR.	FLUORESCENT	RET.	RETAINING		
F.R.P.	FIBERGLASS REINFORCED PLASTIC	SCHED.	SCHEDULE		
FRM.	FRAME	S.S.	STAINLESS STEEL		
FT.	FOOT	SHTG.	SHEETING		
FTG.	FOOTING	SHT.	SHEET		
GALV.	GALVANIZED	SIM.	SIMILAR		
GA.	GAUGE	SDR.	SOAP DISPENSER		
G.I.	GALVANIZED IRON	S.C.	SOLID CORE		
G.S.M.	GALVANIZED SHEET METAL	SECT.	SECTION		
GEN.	GENERAL	SPEC.	SPECIFICATION		
GL.	GLASS	SQ.	SQUARE		
GLU-LAM	GLUE-LAMINATED STRUCTURE	STD.	STANDARD		
GRD.	GRADE	STL.	STEEL		
GRT.	GROUT	STRUCT.	STRUCTURAL		
GYP. BRD.	GYPSUM BOARD	SUSP.	SUSPENDED		
H.C.	HOLLOW CORE	STOR.	STORAGE		
H.M.	HOLLOW METAL	S.D.	STORM DRAIN		
HD.	HEAD	T.B.M.	TEMPORARY BENCHMARK		
HDR.	HEADER	TEL.	TELEPHONE		
HT.	HEIGHT	T.P.D.	TOILET PAPER DISPENSER		
HDWD.	HARDWOOD	T.& B.	TOP AND BOTTOM		
HORIZ.	HORIZONTAL	T.& G.	TONGUE AND GROOVE		
H.B.	HOSE BIBB	T.O.S.	TOP OF SLAB		
HWH.	HOT WATER HEATER	T.O.	TOP OF		
I.D.	INSIDE DIAMETER	T.O.C.	TOP OF CONCRETE		
IN.	INCH	TYP.	TYPICAL		

CODE INFO.

INTERNATIONAL BUILDING CODE (2006)
WITH MINNESOTA ADOPTIONS (2007)

LEGEND

- TITLE MARKER / VIEW NAME / SCALE: 1/8" = 1'-0" / SHEET NUMBER
- BUILDING GRID
- PLAN NOTE
- WINDOW TYPE SYMBOL
- REVISION
- DEMOLITION NOTE
- ELEVATION
- ROOM NAME AND NUMBER
- DRAWING NUMBER / SECTION SYMBOL / SHEET NUMBER
- DRAWING NUMBER / ELEVATION SYMBOL / SHEET NUMBER
- PHOTO KEY
- DRAWING NUMBER / DETAIL SYMBOL / SHEET NUMBER
- WALL TYPE SYMBOL (FULL HEIGHT) SEE A1.2
- WALL TYPE SYMBOL (WALL TO EXTEND "X" " ABOVE FINISHED FLOOR) SEE A1.2
- NEW WALL- SEE WALL TYPES
- EXISTING WALL- SEE WALL TYPES
- NEW CONCRETE WALL- SEE WALL TYPES
- RIGID INSULATION
- EIFS
- BRICK
- POURED CONCRETE
- FIBERGLASS BATT INSULATION (SECTION)
- SAND/GYPSUM BOARD- (SECTION)
- EIFS- (ELEVATION)

BASE BIDS AND ALTERNATES DESCRIPTIONS:

BASE BID #1: Include all work in Area-1 at RCTC Main Campus in this Bid.

ALTERNATE BID #1-1: Deduct all door and door frame replacement work.
ALTERNATE BID #1-2: Deduct all new metal wall panel work.

BASE BID #2: Include all work in Area-2 at RCTC Main Campus in this Bid.

ALTERNATE BID #2-1: Deduct all door and door frame replacement work.
ALTERNATE BID #2-2: Deduct all new metal wall panel work.

BASE BID #3: Include all work at RCTC Heintz Center in this Bid.

ALTERNATE BID #3-1: Deduct all door and door frame replacement work.
ALTERNATE BID #3-2: Deduct all new metal wall panel work.

SHEET INDEX

ARCHITECTURAL

A000	TITLE SHEET
A100	OVERALL ROOF PLAN
A501	ENLARGED ELEVATIONS
A502	ENLARGED ELEVATIONS
A503	ENLARGED ELEVATIONS
A504	ENLARGED ELEVATIONS
A505	ENLARGED ELEVATIONS
A506	ENLARGED ELEVATIONS
A507	ENLARGED ELEVATIONS
A508	ENLARGED ELEVATIONS
A600	EXISTING DETAILS
A601	EXISTING DETAILS
A602	EXISTING DETAILS
A603	EXISTING DETAILS
A700	DETAILS
A701	DETAILS

CONTACT INFORMATION

OWNER:

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851 30TH AVE SE
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ARCHITECT:

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ROCHESTER, MN 55906
(507) 288-1839
ARCHITECT: DAVID KANE
PROJECT MANAGER: JAMES COYLE

BUILDING ENVELOPE:

SKYLINE BUILDING ENVELOPE CONSULTANTS
APPLE VALLEY, MN 55124
ROCHESTER, MN 55901
(763) 229-2771
PROJECT MANAGER: ROB JOHNSTON

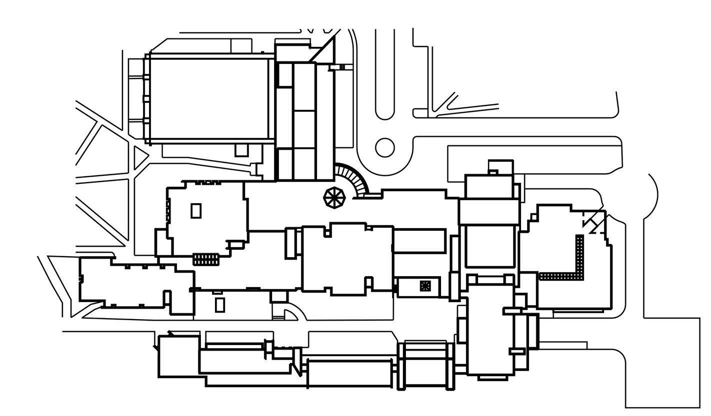
STRUCTURAL:

STRUCTURAL DESIGN GROUP
3270 19TH ST NW, SUITE 210
ROCHESTER, MN 55901
(507) 529-5310
ENGINEER: AL HINIKER

VICINITY MAP

R.C.T.C.
851 30TH AVE SE
ROCHESTER, MN 55904

KEY PLAN



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Structural Design Group

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Drawn By: TCK Date:
File Number:
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Updated By: Date:

Rochester Community and Technical College

2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

ROCHESTER, MN

TITLE SHEET

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
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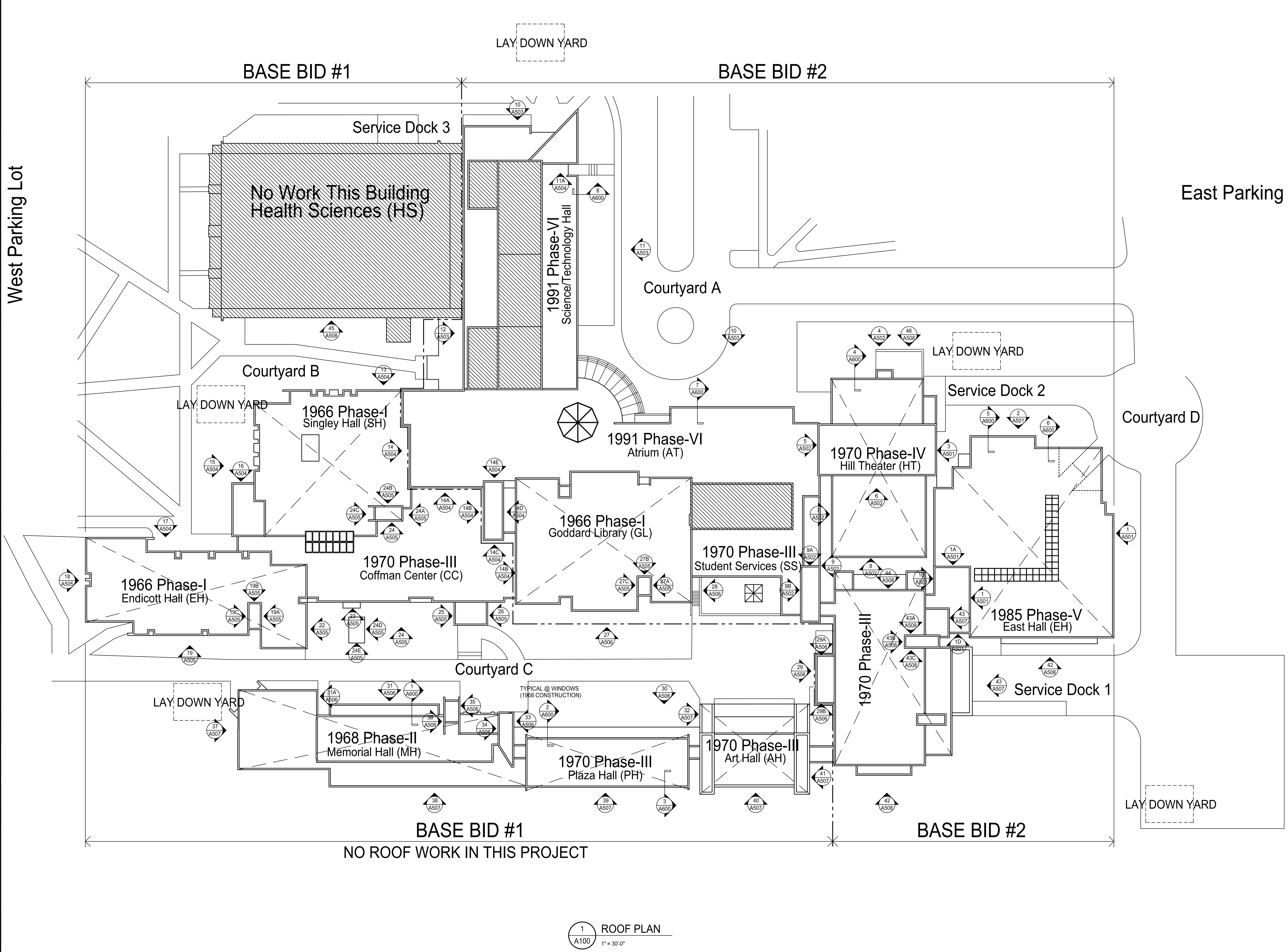

1 A100 ROOF PLAN
1" = 30'-0"

NOTES:

1	TUCK POINT BRICK VENEER	04 01 00
2	REPLACE DAMAGED BRICK VENEER	04 01 00
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SYMBOL LEGEND

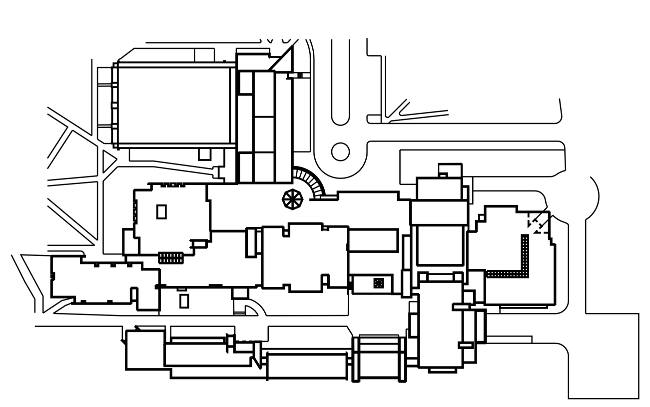
- LOUVRE
- SCUPPER
- HOSE BIB
- WALL LIGHT
- DOWN SPOUT NOZZLE
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

LEGEND:

— # SF — TUCKPOINT AREA

— # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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2012 EXTERIOR FACADE REPAIRS

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ROCHESTER, MN

ROOF PLAN

ISSUE DATE: 5/22/12

KJA PROJECT # 2012204

SHEET A100

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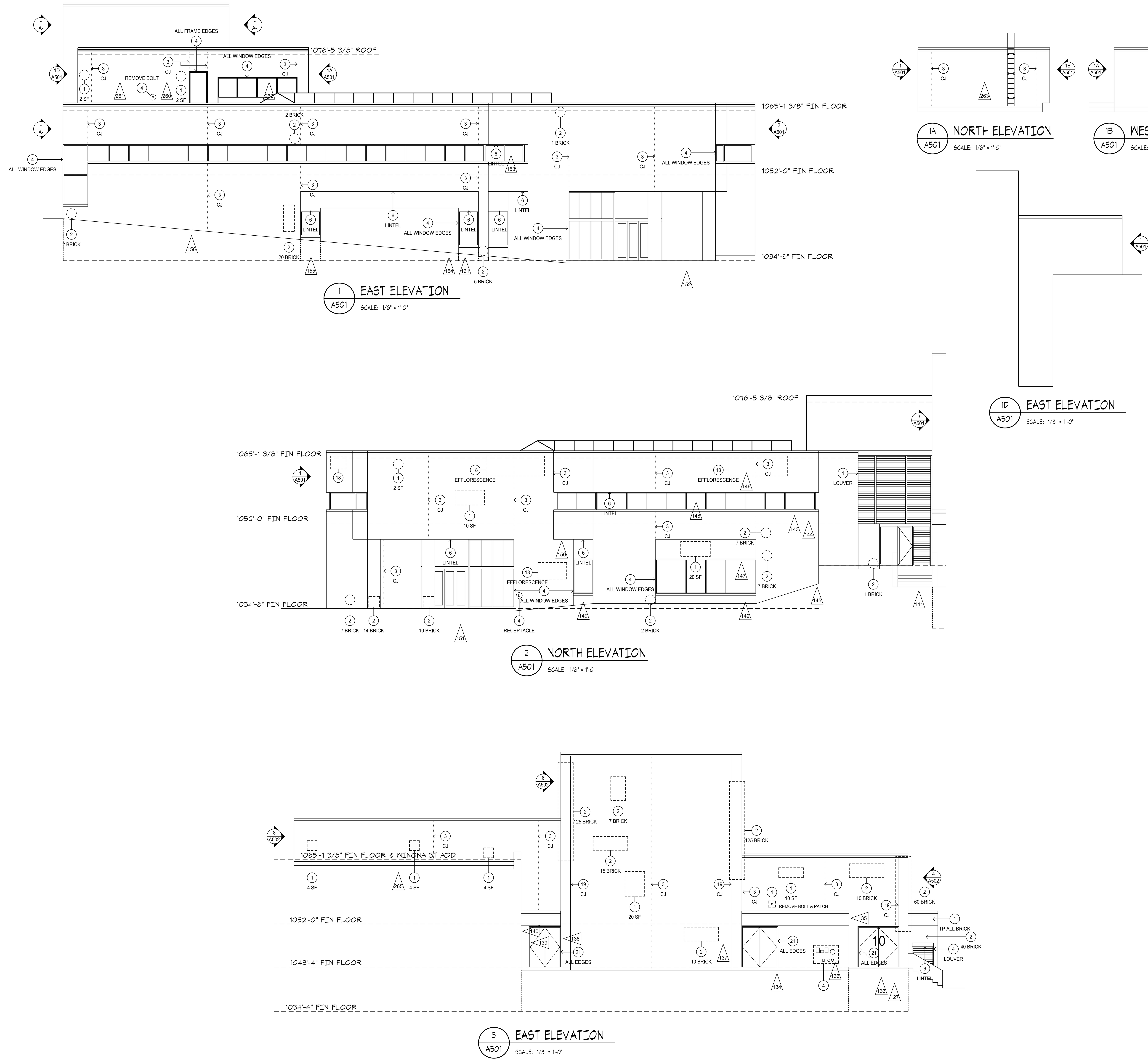

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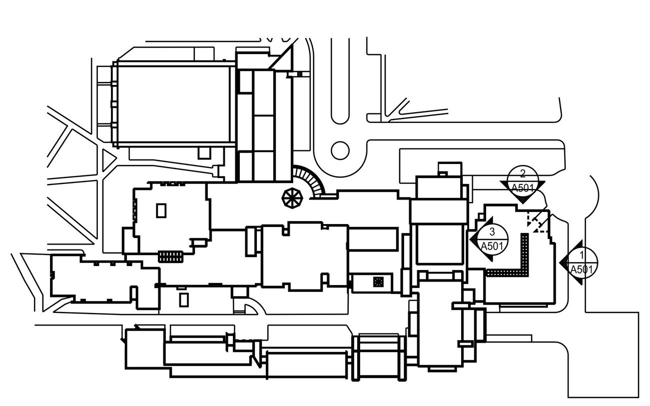

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2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A501
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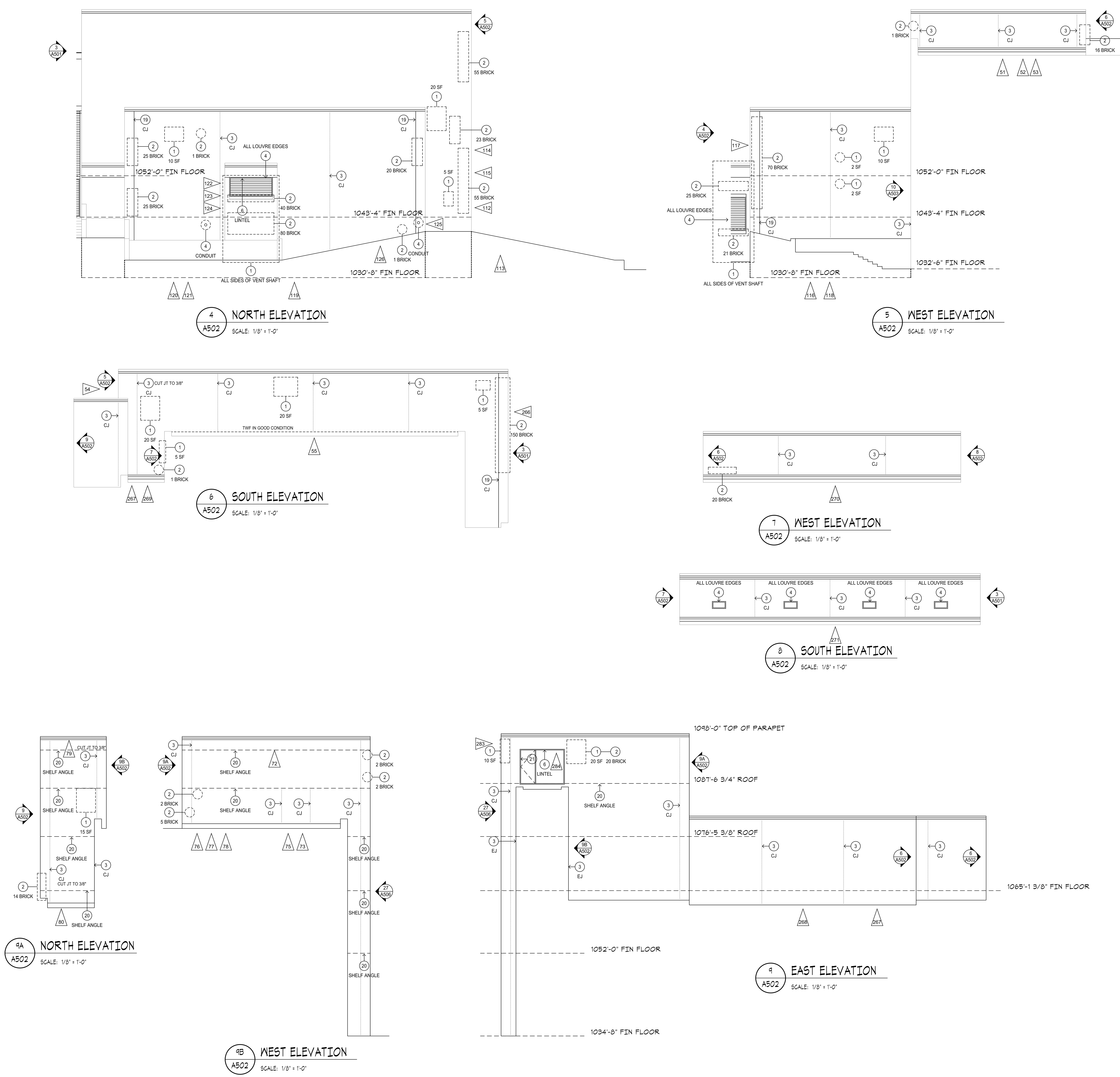

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28	REMOVE EXISTING PLASTER AND REPLACE WITH NEW METAL WALL PANEL	

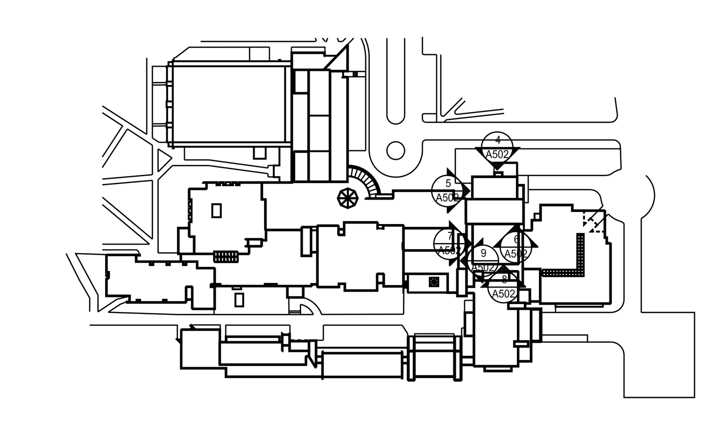
SYMBOL LEGEND

- LOUVRE
- SCUPPER
- HOSE BIB
- WALL LIGHT
- DOWN SPOUT NOZZLE
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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CONSULTANTS

SKYLINE BUILDING ENVELOPE CONSULTANTS
15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural Design Group

REVISIONS

Date: By:

Drawn By: TCK Date:
File Number:
Plot Scale: 1/8" = 1'-0"
Project Status: CD
Updated By: Date:

Rochester Community and Technical College

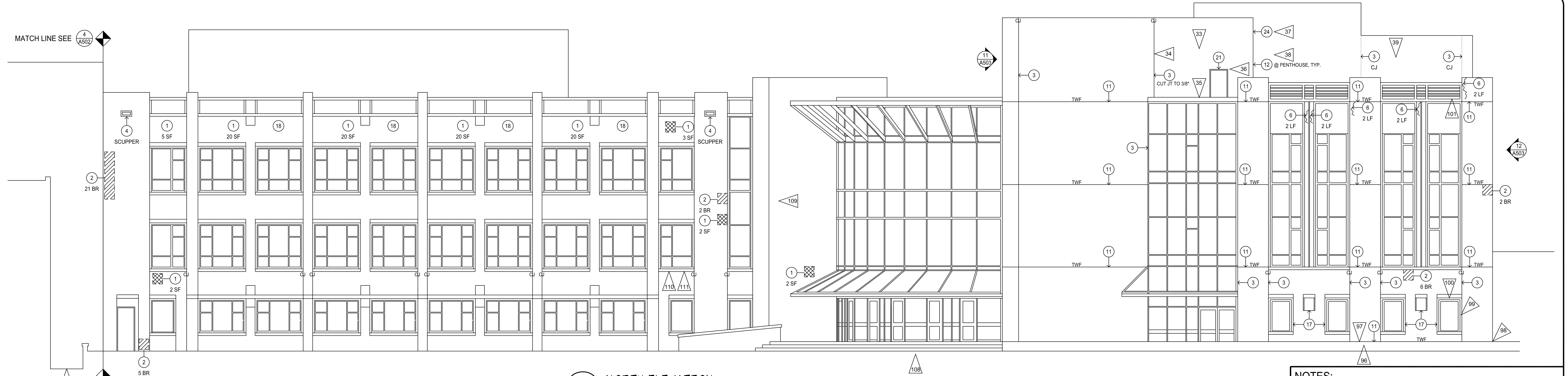
2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

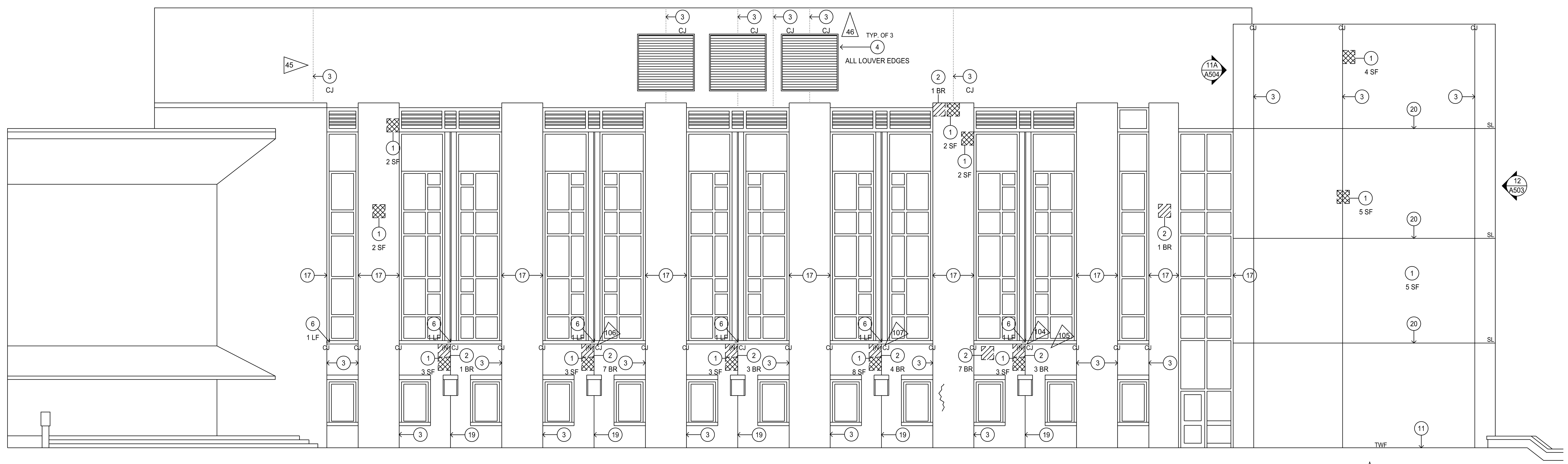
ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A502
OF 16



10 A503 NORTH ELEVATION
SCALE: 1/8" = 1'-0"



11 A503 EAST ELEVATION
SCALE: 1/8" = 1'-0"

12 A503 WEST ELEVATION
SCALE: 1/8" = 1'-0"

NOTES:

1	TUCK POINT BRICK VENEER	04 01 00
2	REPLACE DAMAGED BRICK VENEER	04 01 00
3	REPLACE EXISTING CONTROL JOINT SEALANT	07 90 05
4	REPLACE EXISTING FENESTRATION JOINT SEALANT	07 90 05
5	CLEAN, PRIME AND PAINT STEEL LINTEL. REPLACE SEALANTS.	09 90 00
6	TUCK POINT C.M.U. WALL AND REPAIR BROKEN BLOCK	04 01 00
7	REMOVE MORTAR AND PROVIDE SEALANT AT LINTEL ENDS	07 90 05
8	REPAIR AND RE-PAINT DAMAGED STEEL DOOR FRAME	09 90 00
9	REPLACE SEALANT AT ROOF DRAIN NOZZLE	07 90 05
10	REPLACE TRAFFIC CAULK AT CONCRETE STOOP	07 90 05
11	REPLACE THROUGH WALL FLASHING	07 62 00
12	REMOVE GASKET AND PROVIDE SEALANT AT PANEL EDGES	04 01 00
13	PROVIDE NEW METAL WALL PANEL	07 42 14
14	RE-PAINT EXISTING OVERHEAD DOORS	09 90 00
15	PROTECT EXISTING CONDUIT THAT WILL REMAIN	N/A
16	EXISTING FIXTURE/HOSE BID/RECEPTACLE THAT WILL REMAIN	N/A
17	REPLACE EXISTING SEALANT AROUND WINDOWS AND STONE	07 90 05
18	CLEAN BIO-STAINED AREAS WITH RECOMMENDED CLEANER	04 01 00
19	CUT NEW CONTROL JOINT INTO BRICK VENEER.	07 90 05
20	REPLACE EXISTING SEALANT AROUND SHELF LEDGE	07 90 05
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SYMBOL LEGEND

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- SCUPPER
- HOSE BIB
- WALL LIGHT
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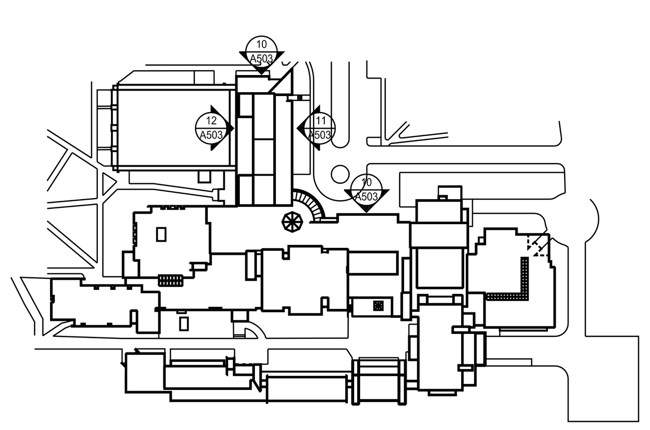
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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Structural Design Group

REVISIONS

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Drawn By: TCK Date:
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Rochester COMMUNITY AND TECHNICAL College

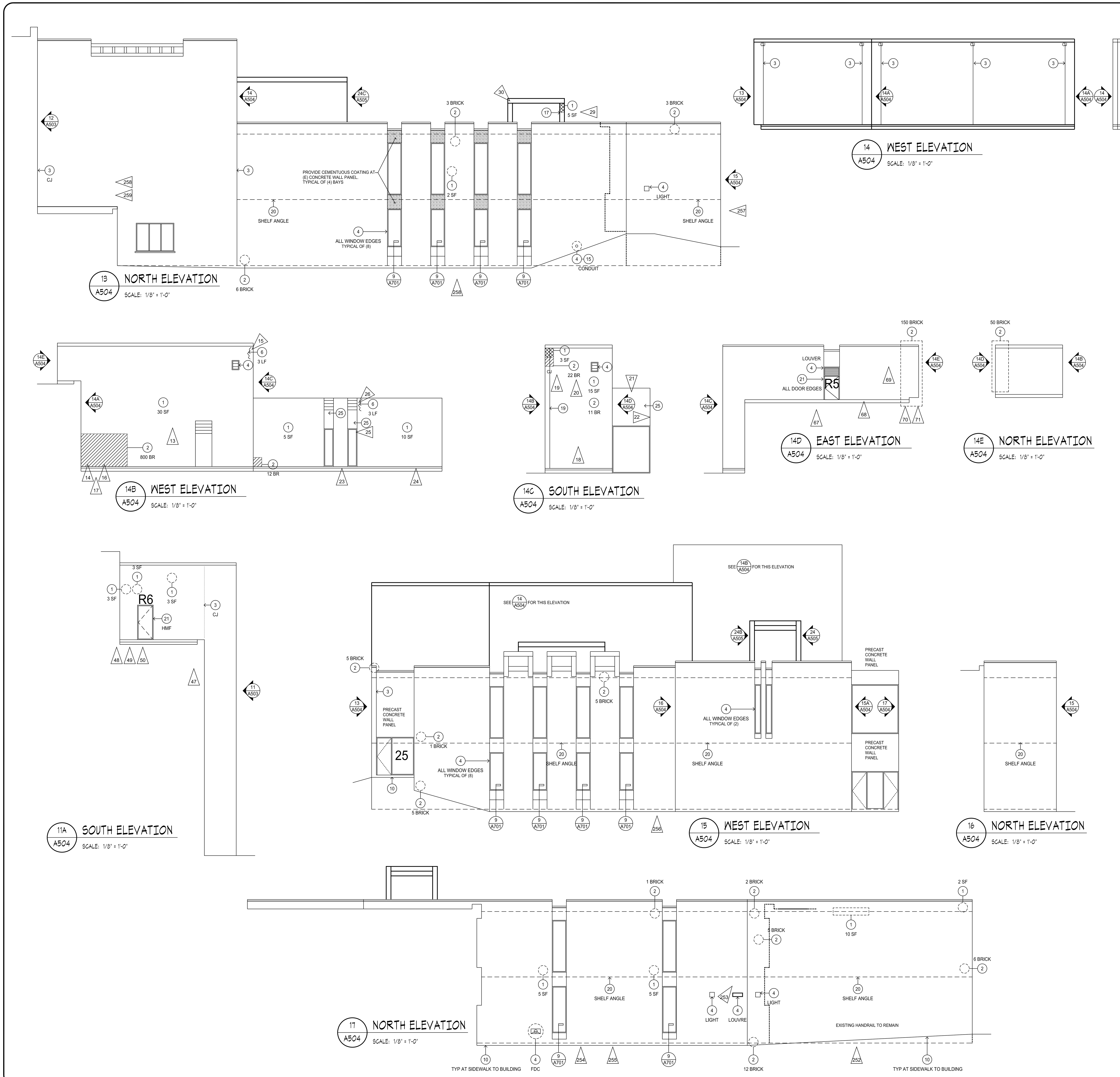
2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A503
OF 16



NOTES:

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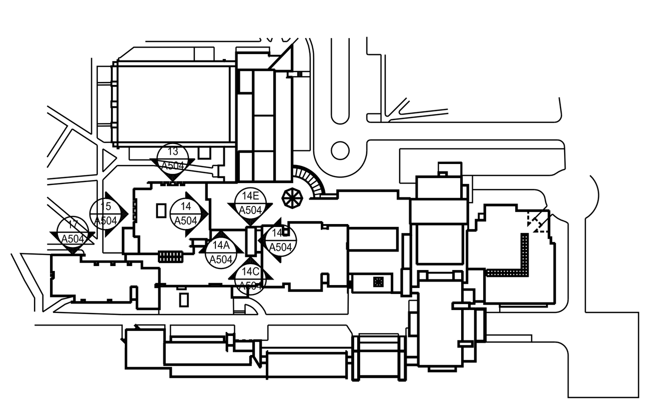
- FIRE ALARM DEVICE

HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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Rochester Community and Technical College

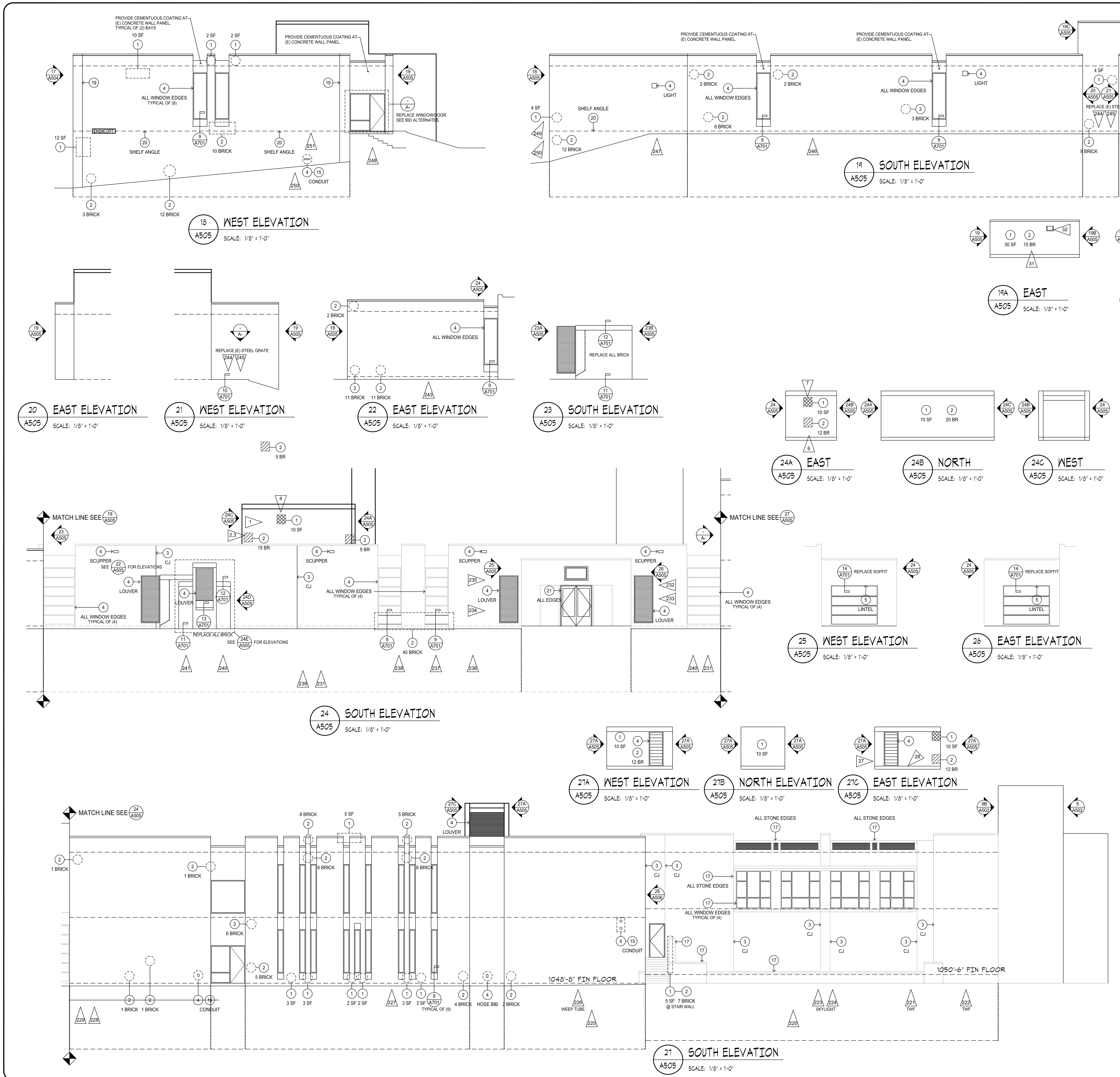
2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A504
OF 16



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13. PROVIDE NEW METAL WALL PANEL — 07 42 14
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SYMBOL LEGEND

LOUVRE
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HOSE BIB
WALL LIGHT
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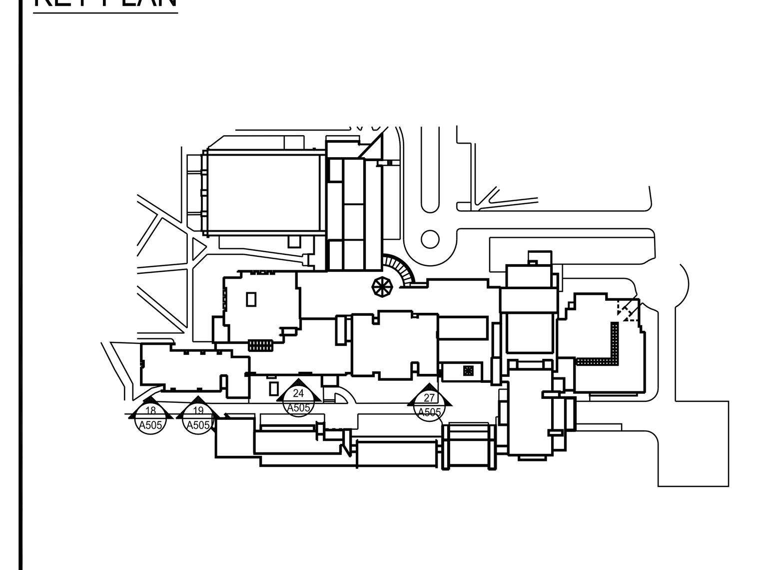
EXHAUST FAN VENT COVER
FIRE ALARM DEVICE

HATCH LEGEND:

SF — TUCKPOINT AREA
BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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Rochester Community and Technical College

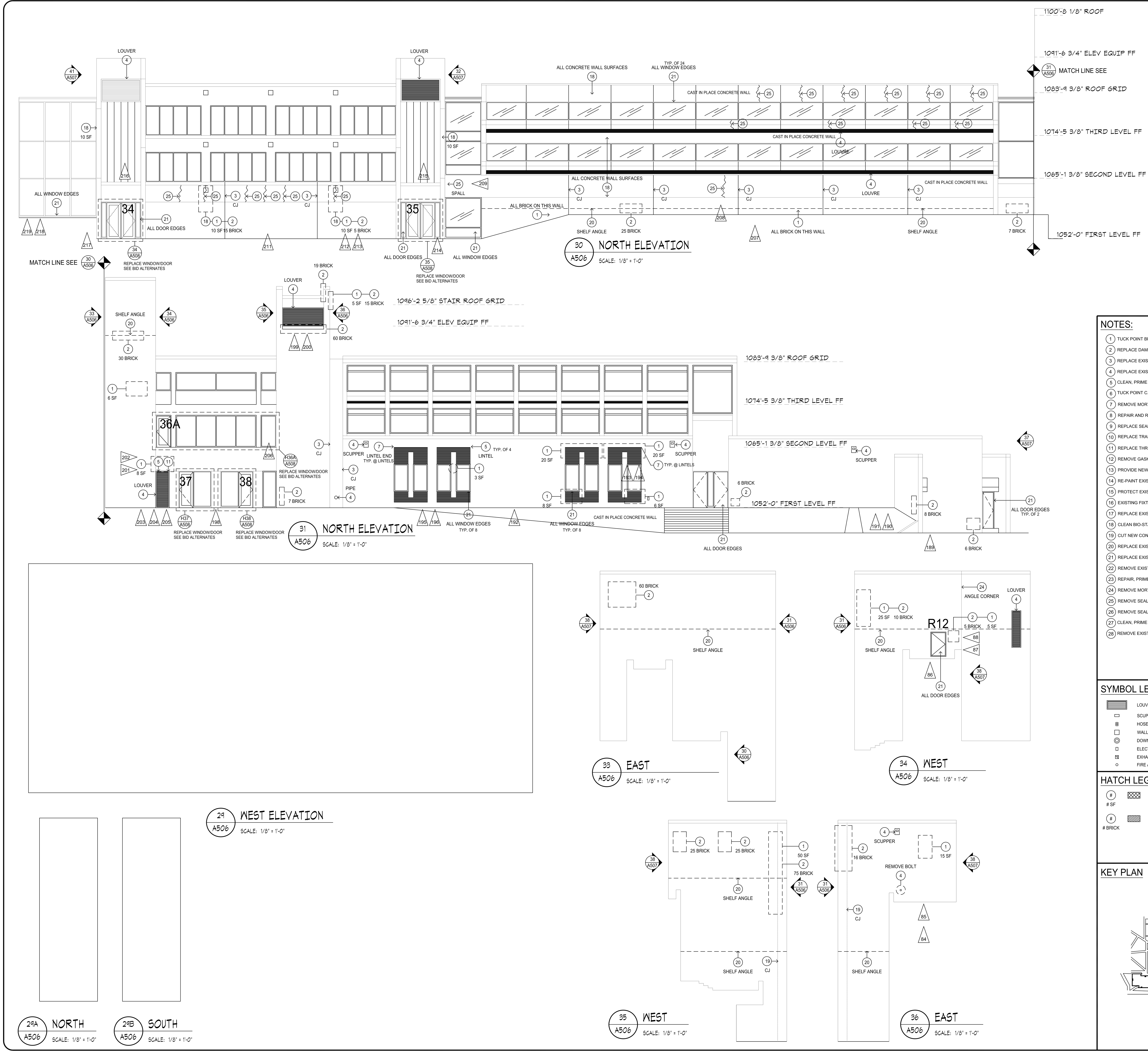
2012 EXTERIOR FACADE REPAIRS

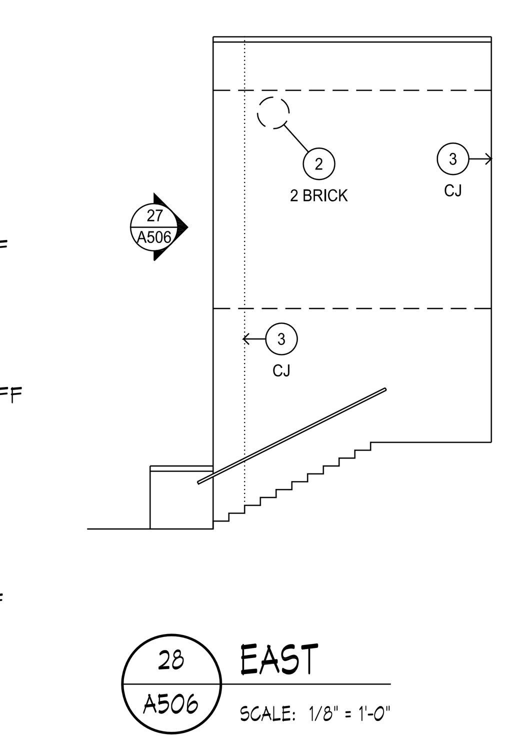
U.C.R. MAIN CAMPUS

ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A505
OF 16





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SYMBOL LEGEND

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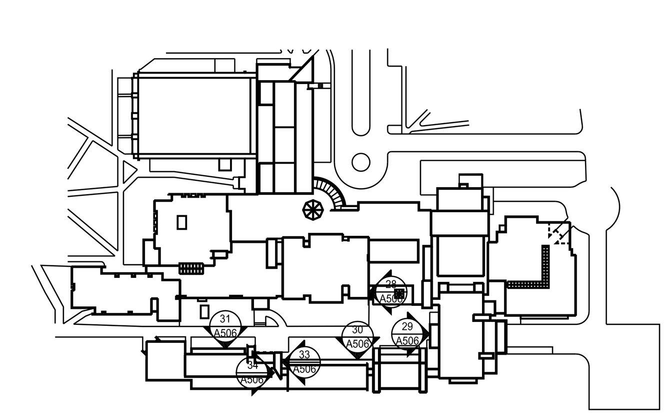
HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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SHEET A506
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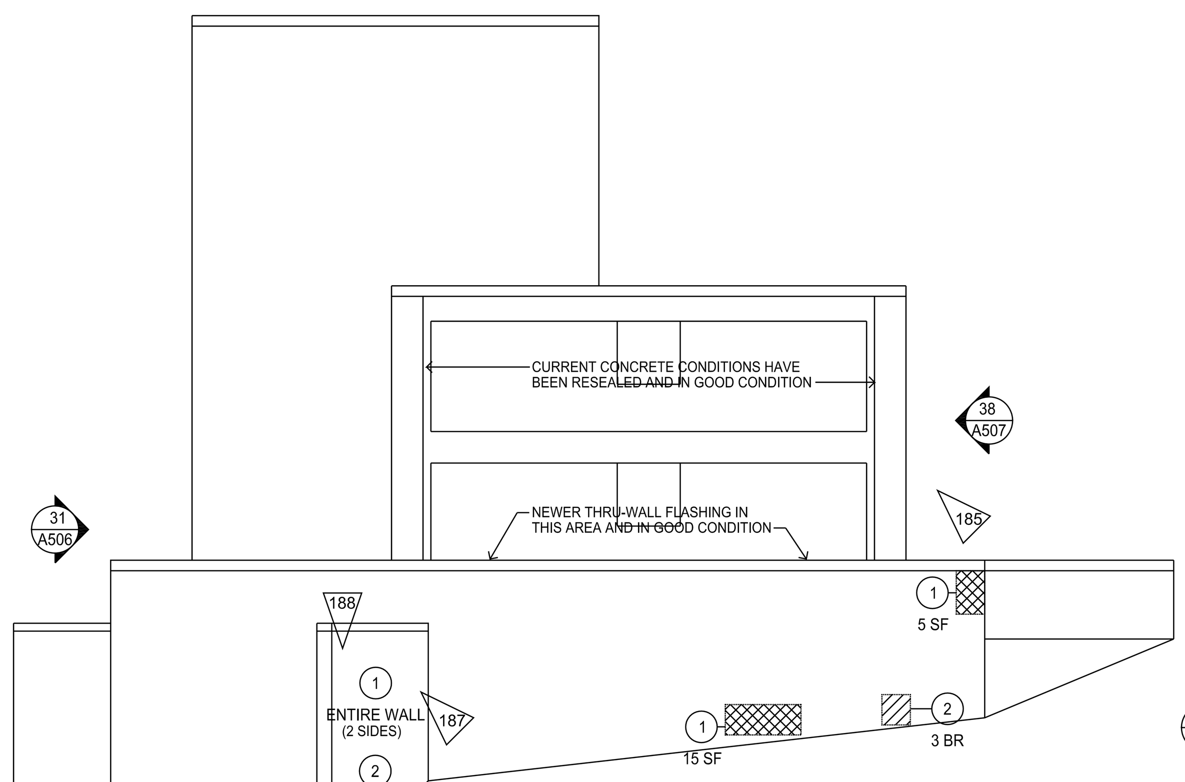
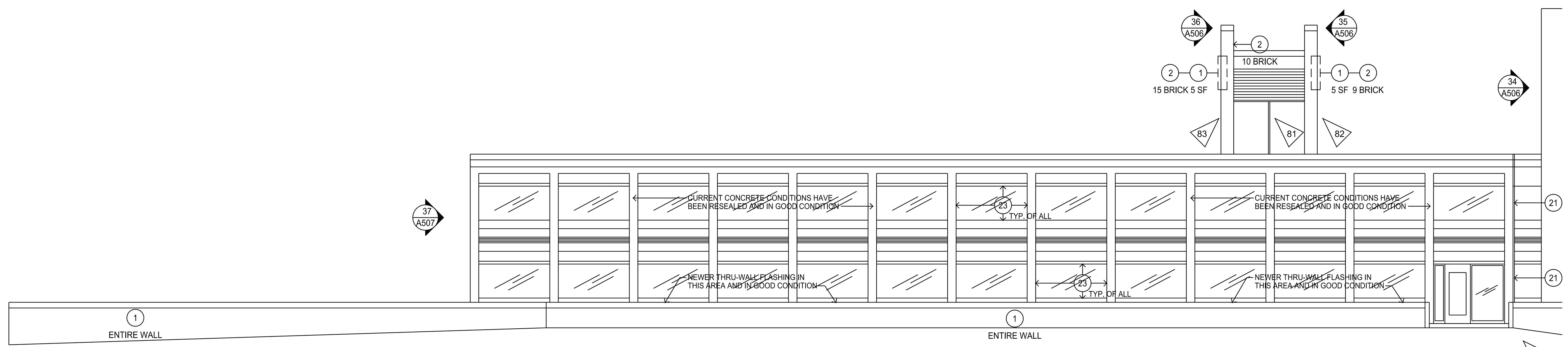
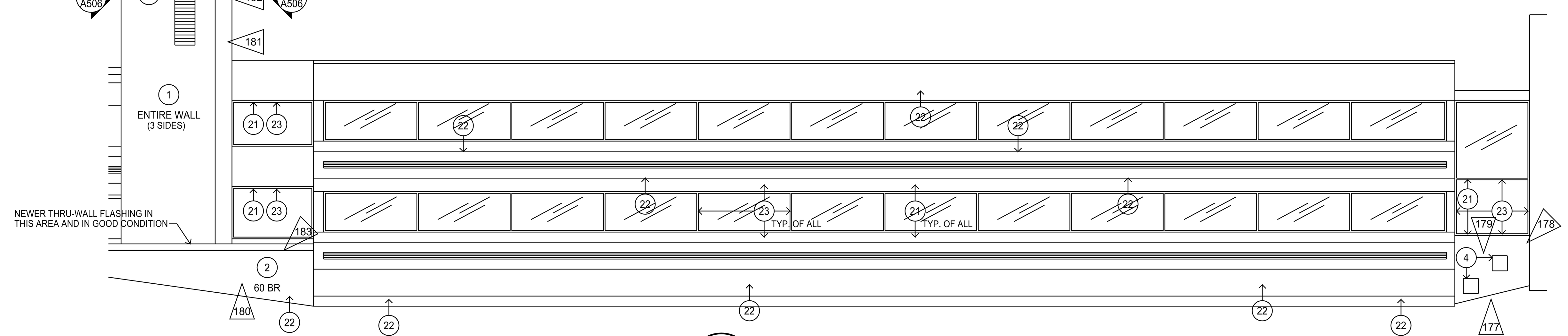


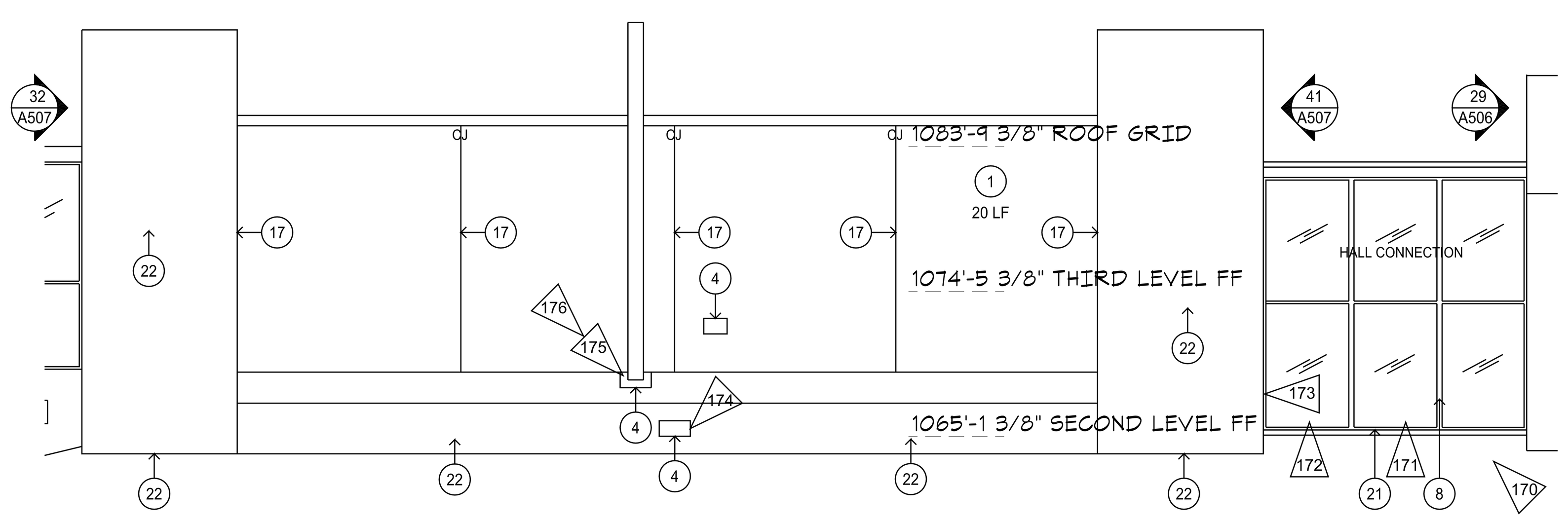
37 A507 WEST ELEVATION
SCALE: 1/8" = 1'-0"



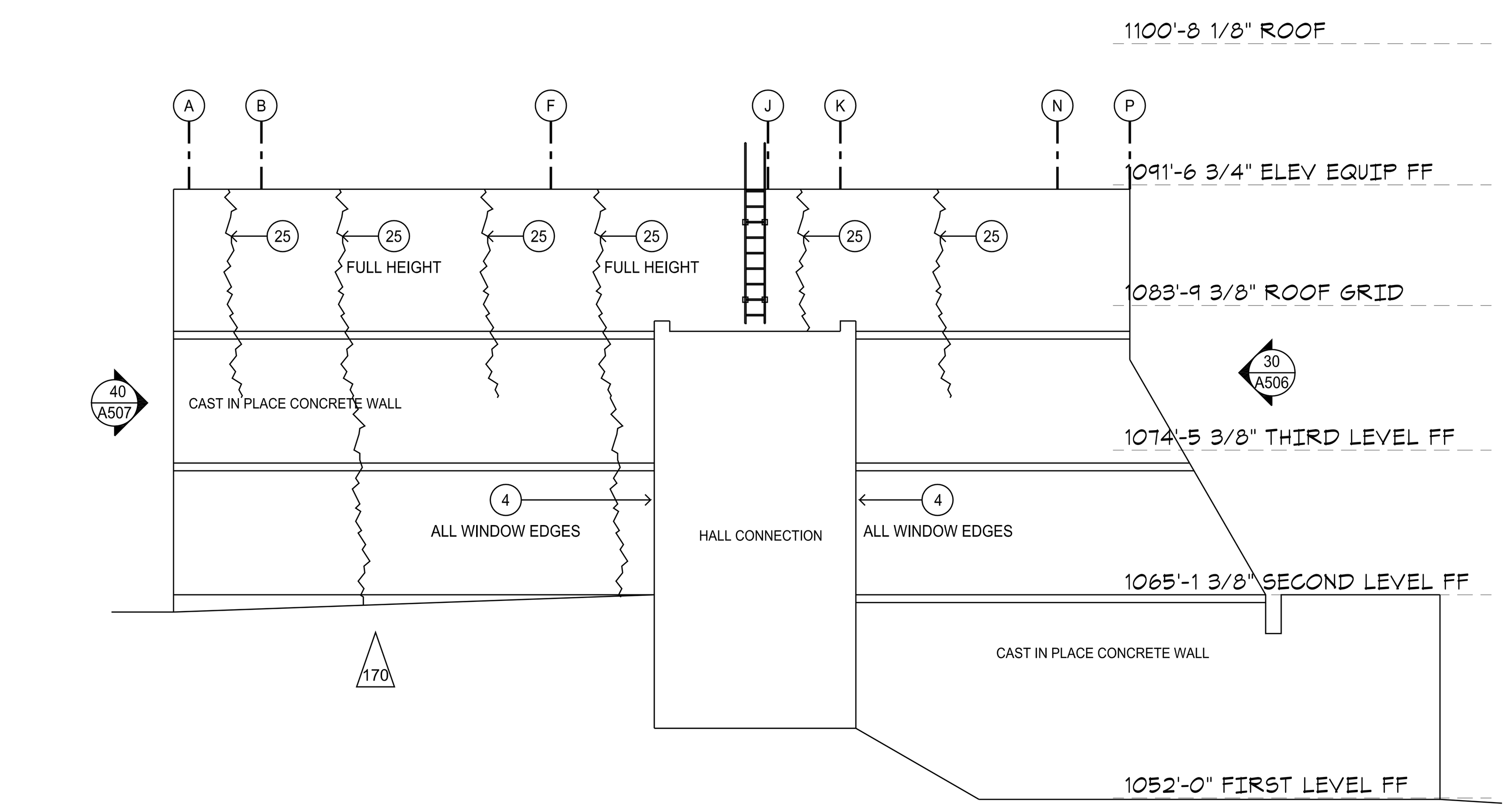
38 A507 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



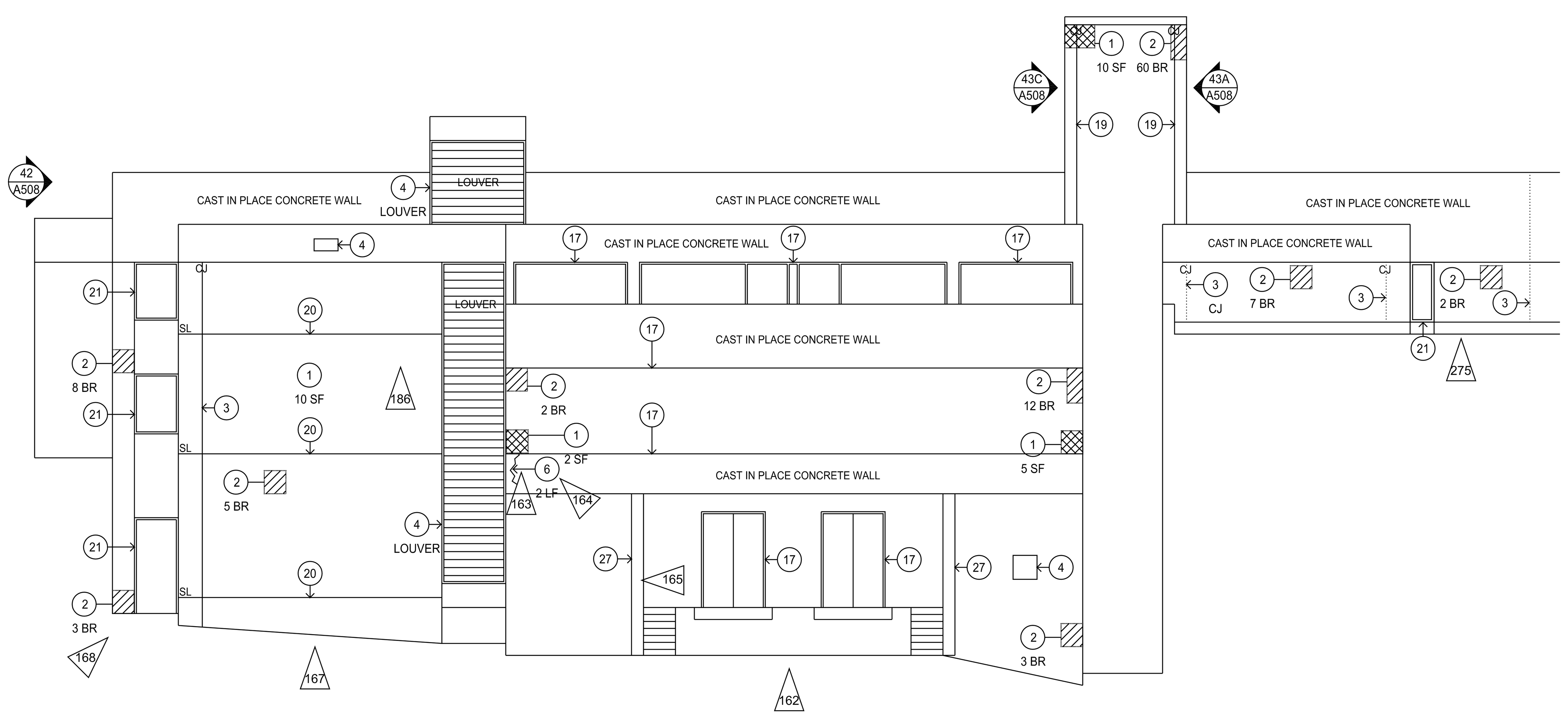
39 A507 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



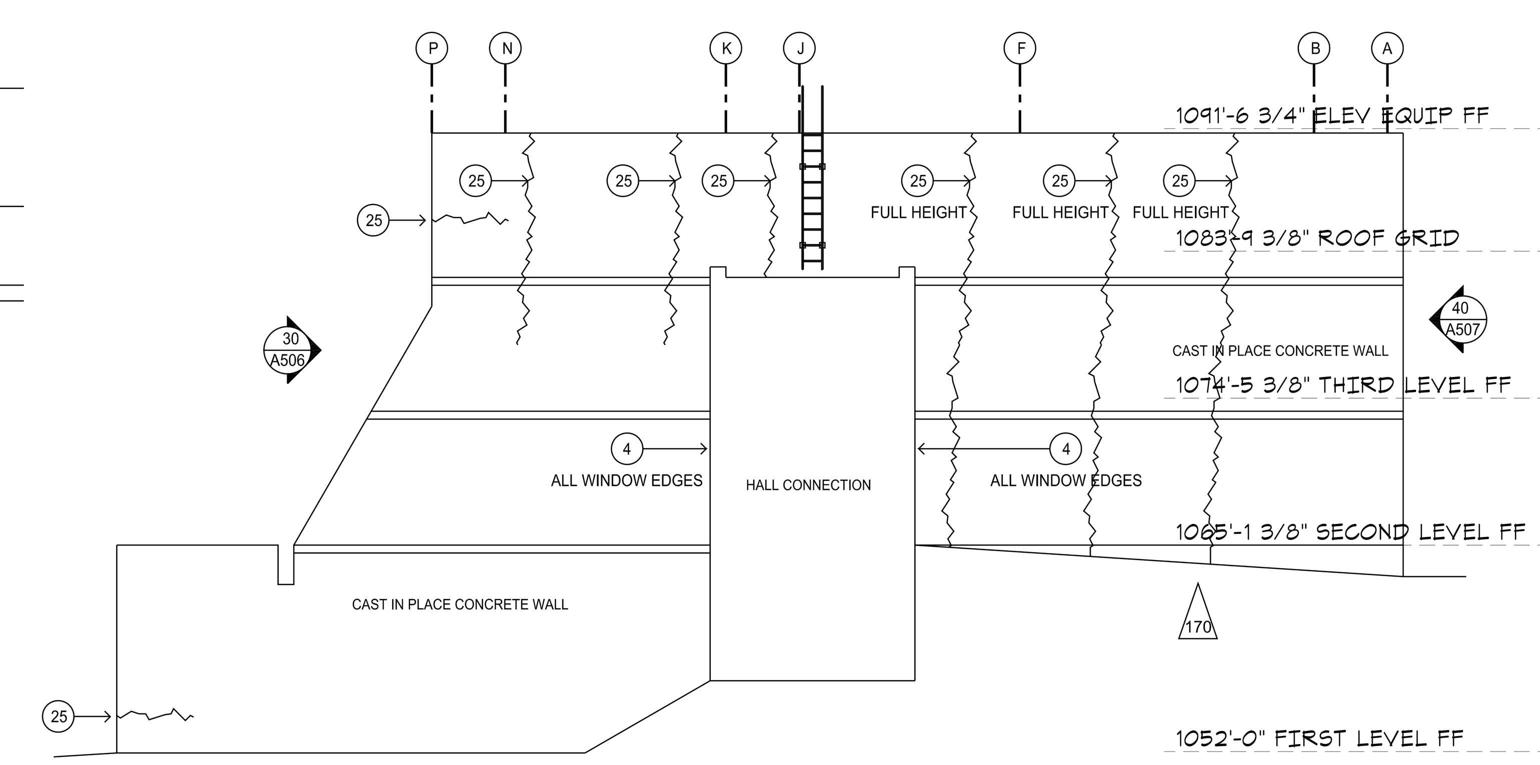
40 A507 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



41 A507 EAST ELEVATION
SCALE: 1/8" = 1'-0"



43 A507 EAST ELEVATION
SCALE: 1/8" = 1'-0"



32 A507 EAST ELEVATION
SCALE: 1/8" = 1'-0"

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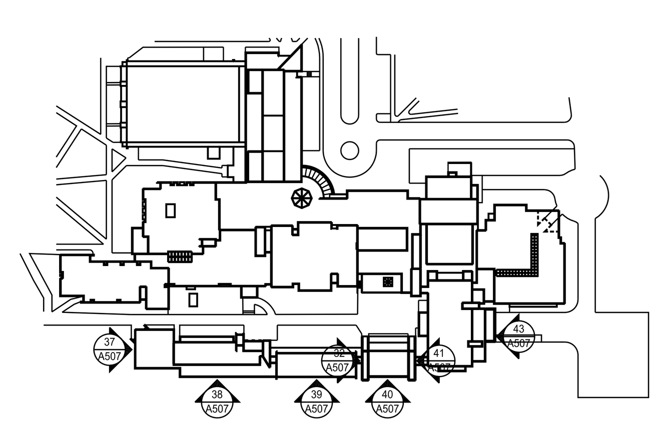
WALL LIGHT
DOWN SPOUT NOZZLE
ELECTRICAL RECEPTACLE WP
EXHAUST FAN VENT COVER
FIRE ALARM DEVICE

HATCH LEGEND:

SF — TUCKPOINT AREA
BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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CONSULTANTS

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15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural Design Group

REVISIONS
Date: By:

Drawn By:	TCK	Date:	
File Number:			
Plot Scale:	1/8" = 1'-0"		
Project Status:	CD		
Updated By:		Date:	

Rochester Community and Technical College

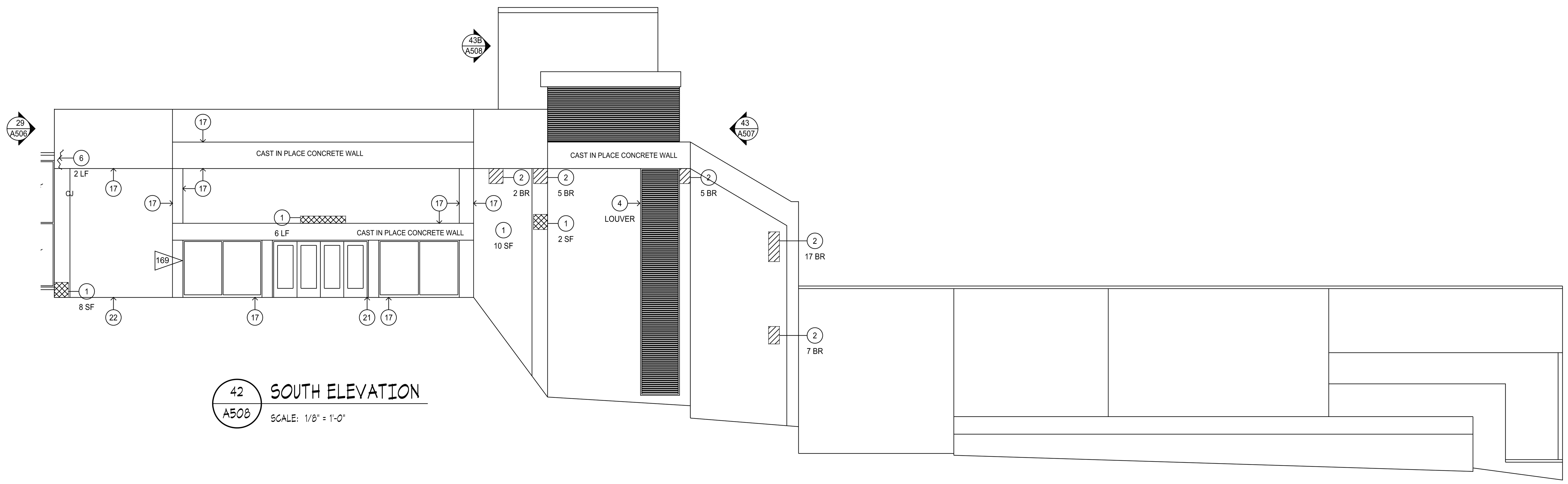
2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

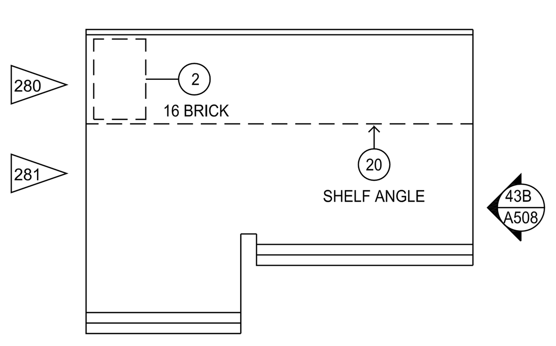
ROCHESTER, MN

ENLARGED EXTERIOR ELEVATIONS

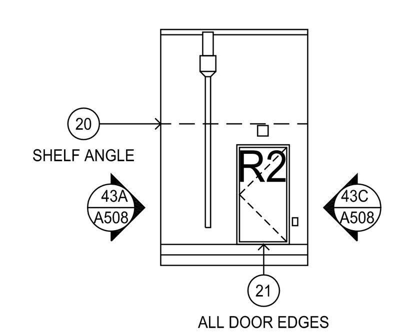
ISSUE DATE:	5/22/12
KJA PROJECT #	2012204
SHEET	A507
OF	16



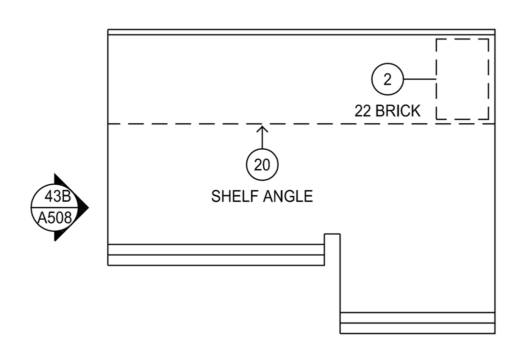
42 SOUTH ELEVATION
A508
SCALE: 1/8" = 1'-0"



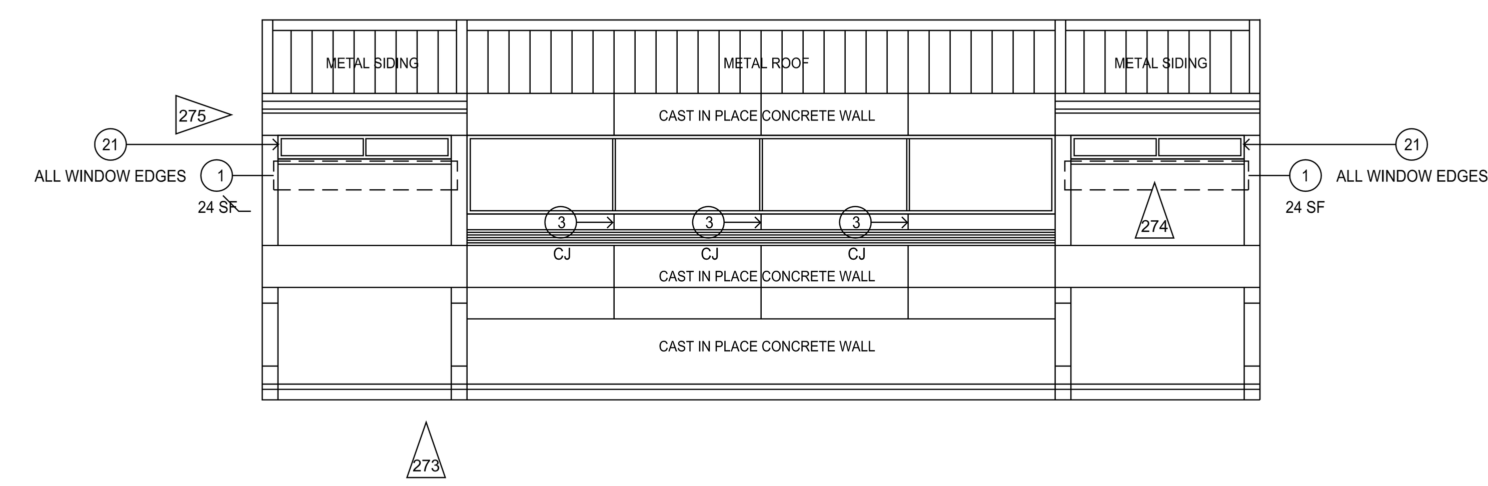
43A NORTH ELEVATION
A508
SCALE: 1/8" = 1'-0"



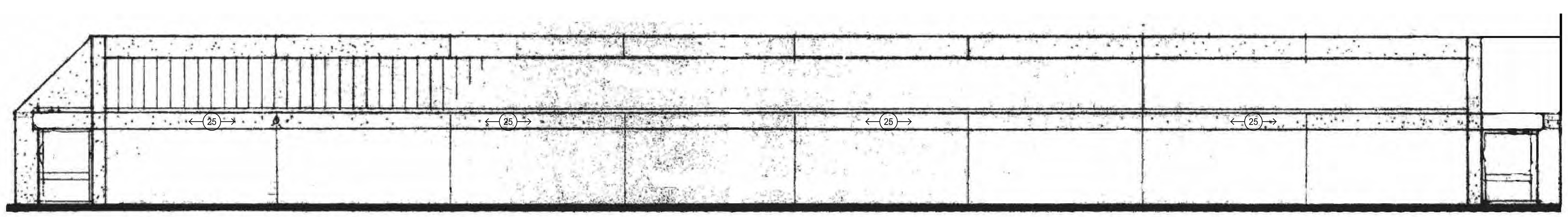
43B WEST ELEVATION
A508
SCALE: 1/8" = 1'-0"



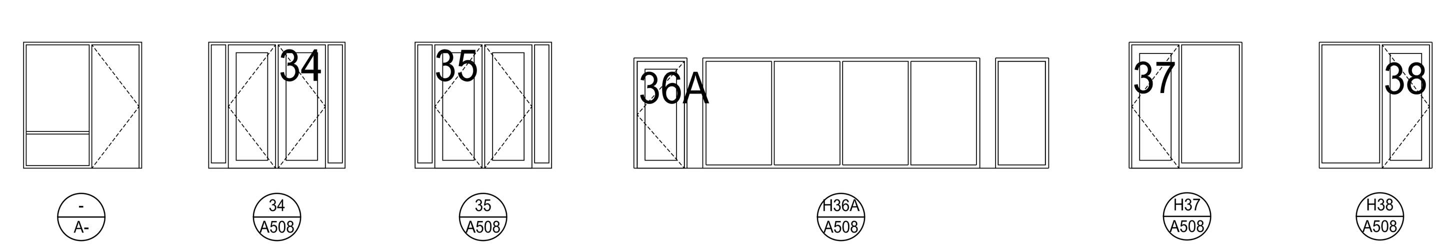
43C SOUTH ELEVATION
A508
SCALE: 1/8" = 1'-0"



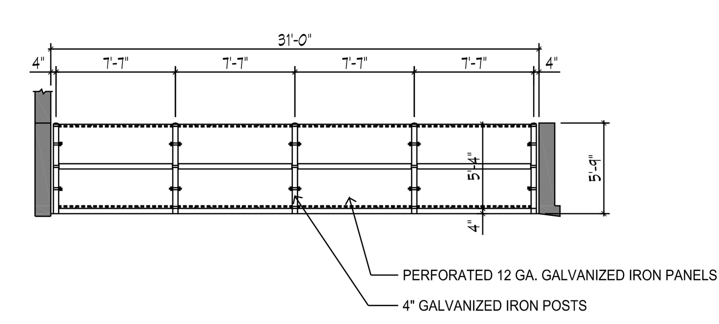
44 NORTH ELEVATION
A508
SCALE: 1/8" = 1'-0"



45 SOUTH ELEVATION
A508
SCALE: 1/8" = 1'-0"

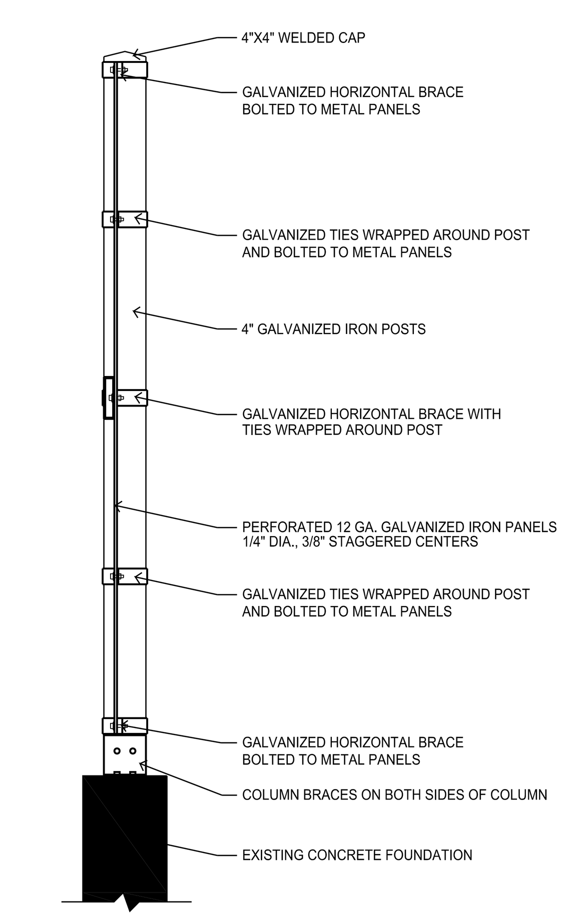


DOOR FRAMES



SCREEN WALL BID ALTERNATE 2-4

46 NORTH ELEVATION
A508
SCALE: 1/8" = 1'-0"



47 SECTION
A508
SCALE: 1/8" = 1'-0"

NOTES:

1	TUCK POINT BRICK VENEER	04 01 00
2	REPLACE DAMAGED BRICK VENEER	04 01 00
3	REPLACE EXISTING CONTROL JOINT SEALANT	07 90 05
4	REPLACE EXISTING FENESTRATION JOINT SEALANT	07 90 05
5	CLEAN, PRIME AND PAINT STEEL LINTEL. REPLACE SEALANTS.	09 90 00
6	TUCK POINT C.M.U. WALL AND REPAIR BROKEN BLOCK	04 01 00
7	REMOVE MORTAR AND PROVIDE SEALANT AT LINTEL ENDS	07 90 05
8	REPAIR AND RE-PAINT DAMAGED STEEL DOOR FRAME	09 90 00
9	REPLACE SEALANT AT ROOF DRAIN NOZZLE	07 90 05
10	REPLACE TRAFFIC CAULK AT CONCRETE STOOP	07 90 05
11	REPLACE THROUGH WALL FLASHING	07 62 00
12	REMOVE GASKET AND PROVIDE SEALANT AT PANEL EDGES	04 01 00
13	PROVIDE NEW METAL WALL PANEL	07 42 14
14	RE-PAINT EXISTING OVERHEAD DOORS	09 90 00
15	PROTECT EXISTING CONDUIT THAT WILL REMAIN	N/A
16	EXISTING FIXTURE/HOSE BID/RECEPTACLE THAT WILL REMAIN	N/A
17	REPLACE EXISTING SEALANT AROUND WINDOWS AND STONE	07 90 05
18	CLEAN BIO-STAINED AREAS WITH RECOMMENDED CLEANER	04 01 00
19	CUT NEW CONTROL JOINT INTO BRICK VENEER.	07 90 05
20	REPLACE EXISTING SEALANT AROUND SHELF LEDGE	07 90 05
21	REPLACE EXISTING SEALANT AROUND WINDOW/DOOR FRAME	07 90 05
22	REMOVE EXISTING SEALANT ON CONCRETE AND RESEAL.	07 90 05
23	REPAIR, PRIME AND RE-PAINT DAMAGED WINDOW FRAMES.	09 90 00
24	REMOVE MORTAR AND PROVIDE SEALANT AT BRICK CORNER	07 90 05
25	REMOVE SEALANT IN C.I.P. WALL, INJECT EPOXY IN CRACK AND RE-SEAL	
26	REMOVE SEALANT IN C.I.P. WALL, ROUTE CRACK AND RE-SEAL	
27	CLEAN, PRIME AND PAINT STEEL CORNER GUARDS	
28	REMOVE EXISTING PLASTER AND REPLACE WITH NEW METAL WALL PANEL	

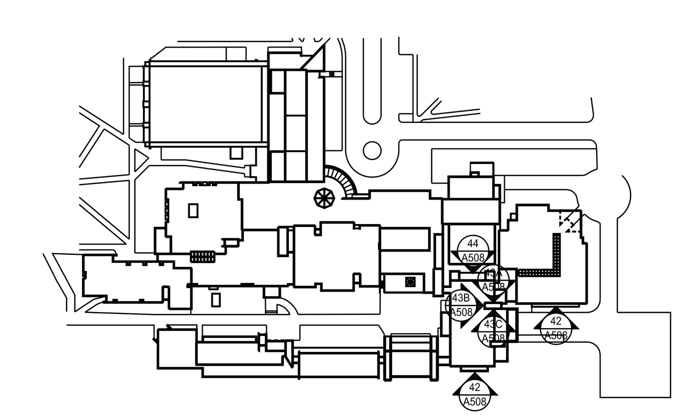
SYMBOL LEGEND

- LOUVRE
- SCUPPER
- HOSE BIB
- WALL LIGHT
- DOWN SPOUT NOZZLE
- ELECTRICAL RECEPTACLE WP
- EXHAUST FAN VENT COVER
- FIRE ALARM DEVICE

HATCH LEGEND:

- # SF — TUCKPOINT AREA
- # BRICK — BRICK REPLACEMENT AREA

KEY PLAN



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Rochester Community and Technical College

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U.C.R. MAIN CAMPUS

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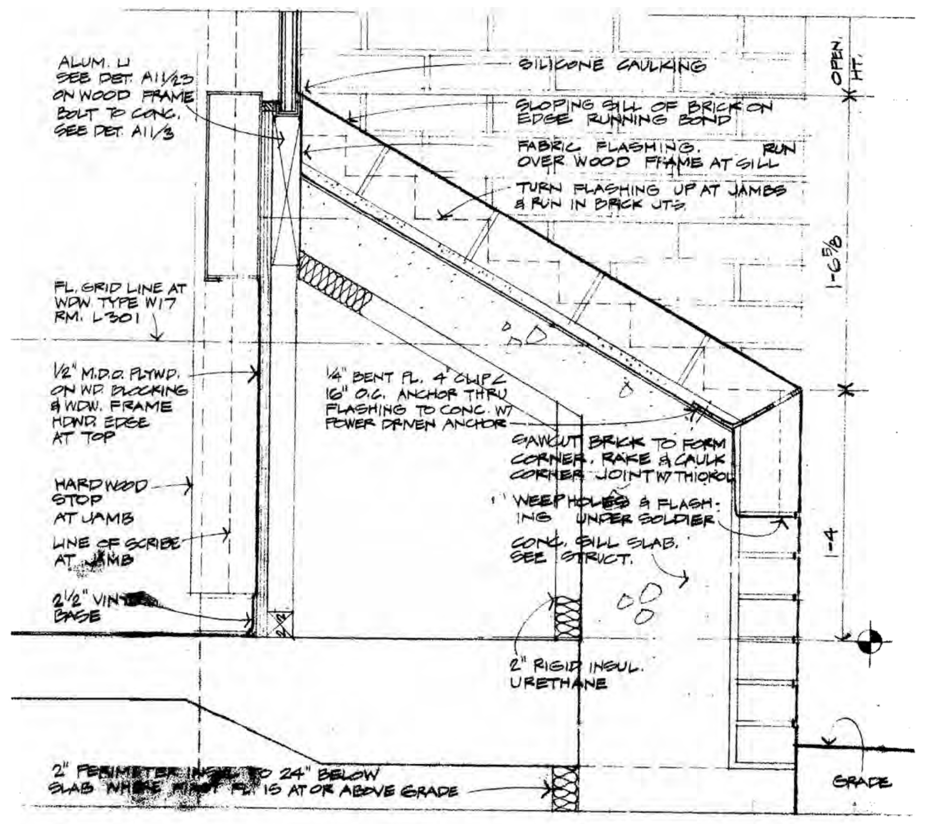
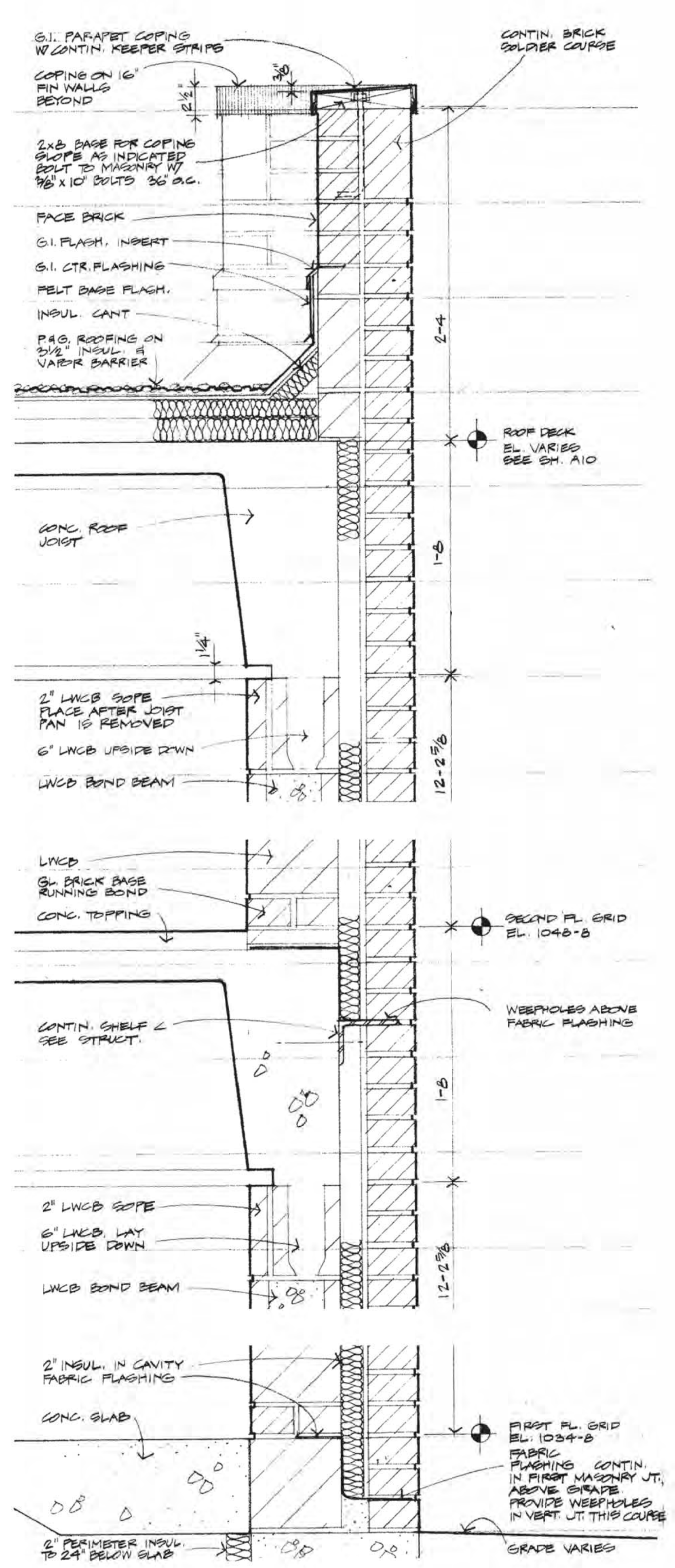


1 A600 EXISTING SECTION 4/A11
1 1/2" = 1'-0"



2 A600 EXISTING SECTION 1,2,3/A12
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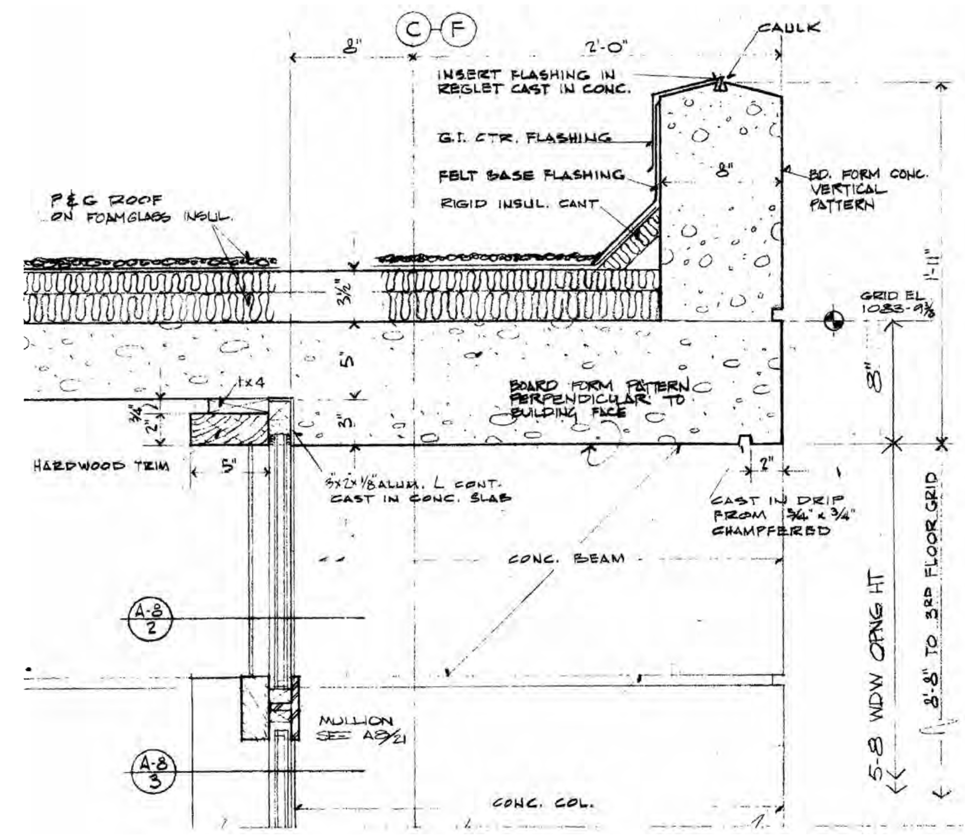
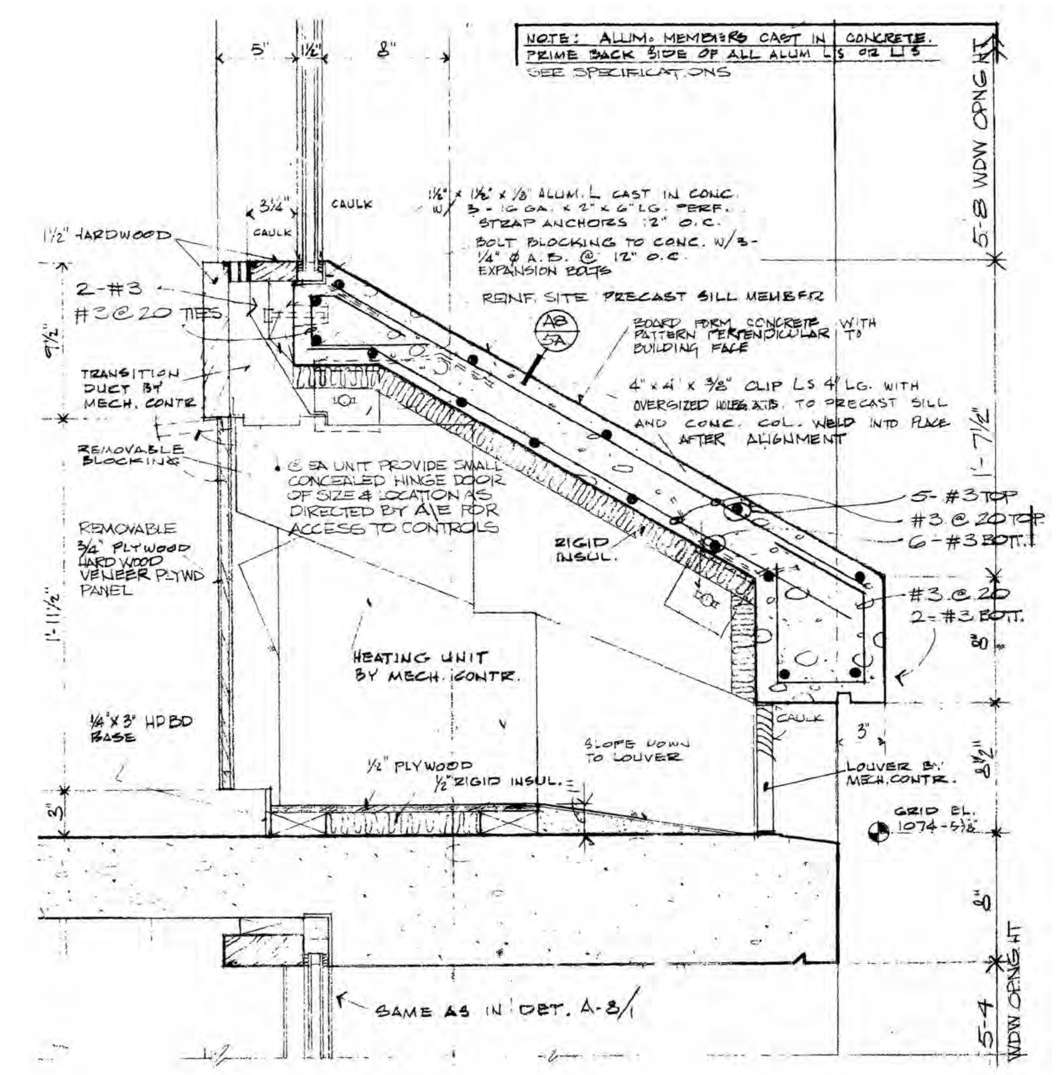
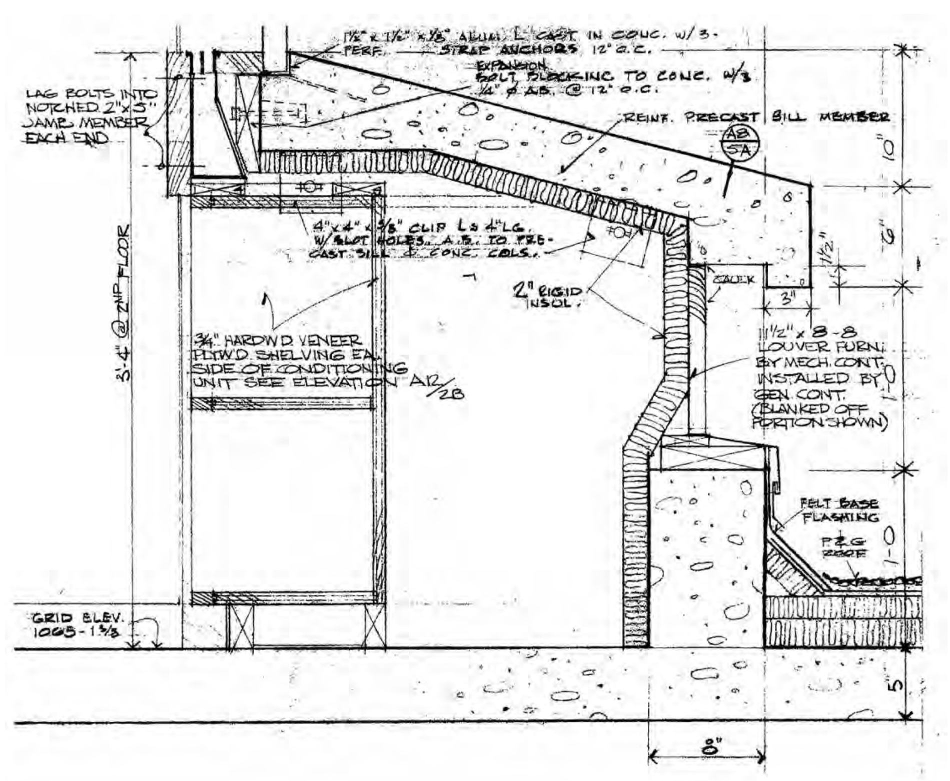


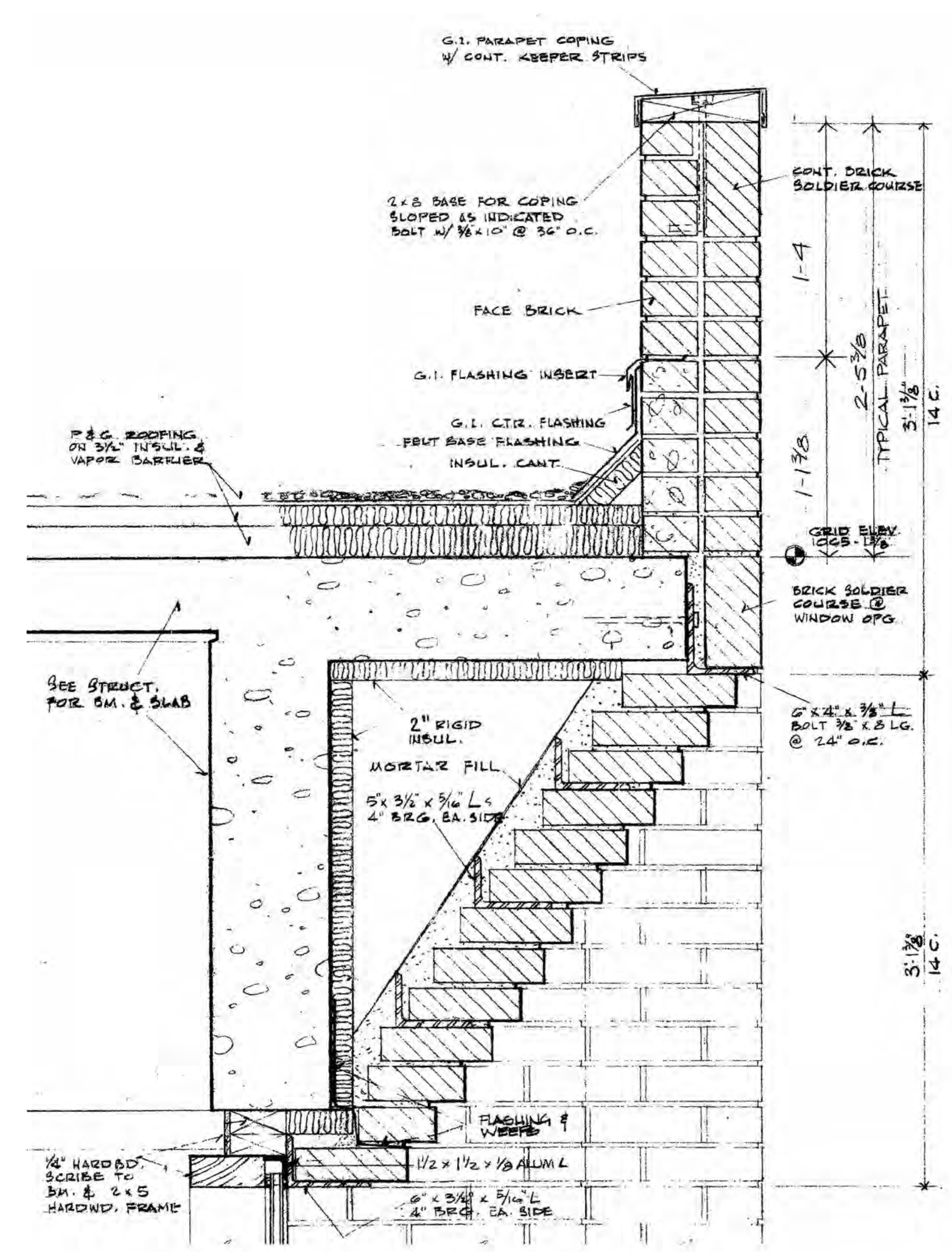
3 A600 EXISTING DETAILS 1/A8
1 1/2" = 1'-0"



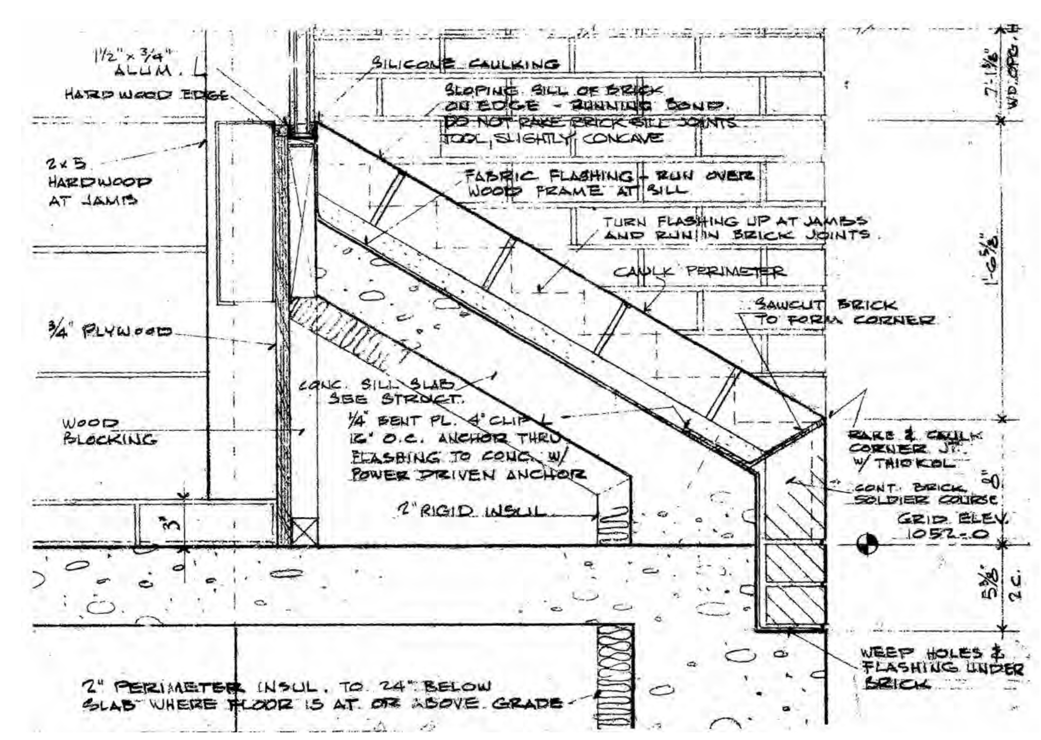
4 A600 EXISTING DETAILS 4/A8
1 1/2" = 1'-0"



5 A600 EXISTING DETAILS 5/A8
1 1/2" = 1'-0"



6 A600 EXISTING DETAILS 10/A8
1 1/2" = 1'-0"



7 A600 EXISTING DETAILS 12/A8
1 1/2" = 1'-0"

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Rochester COMMUNITY AND TECHNICAL College

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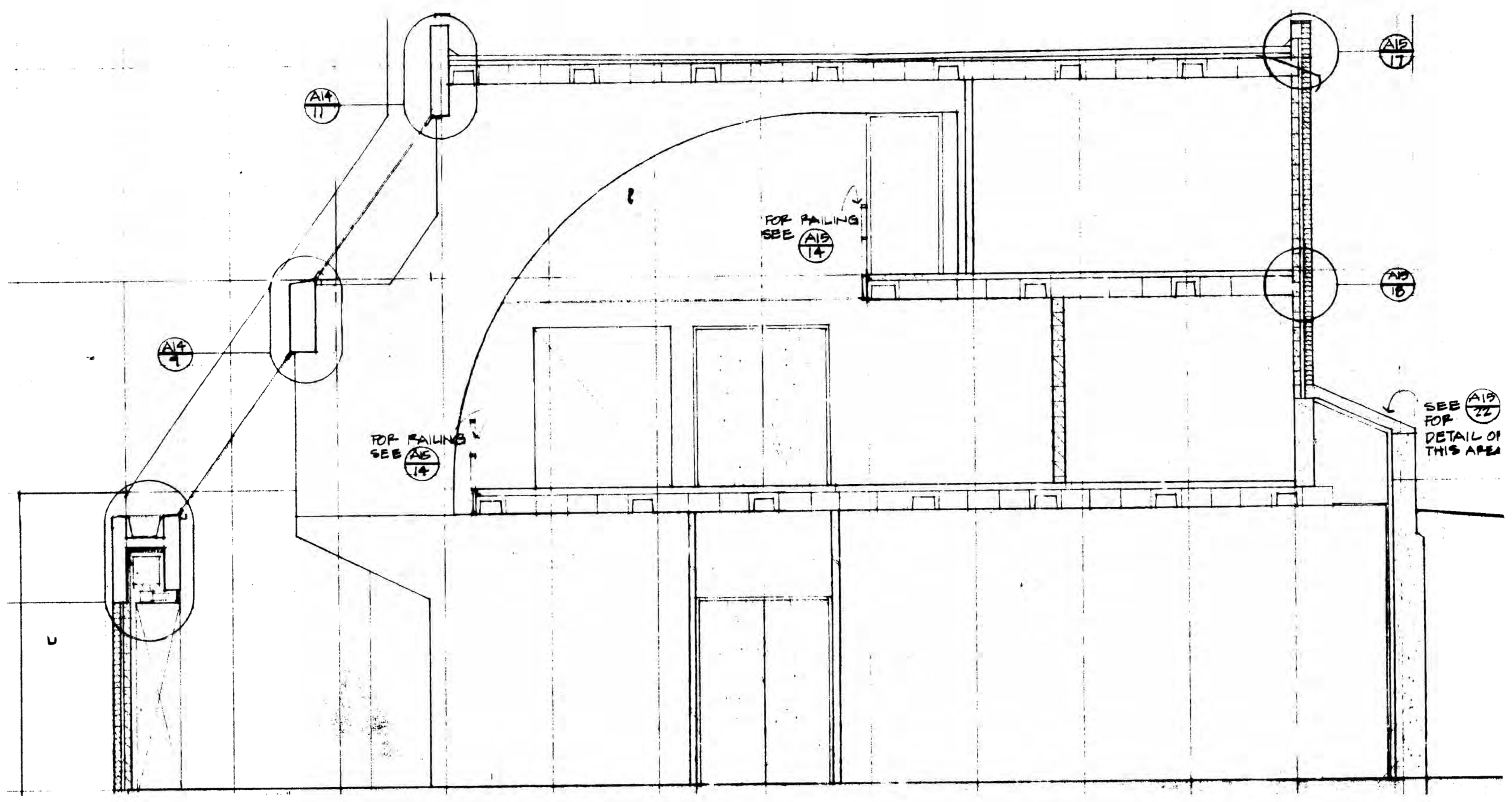

8 A601 EXISTING DETAILS 2/A11
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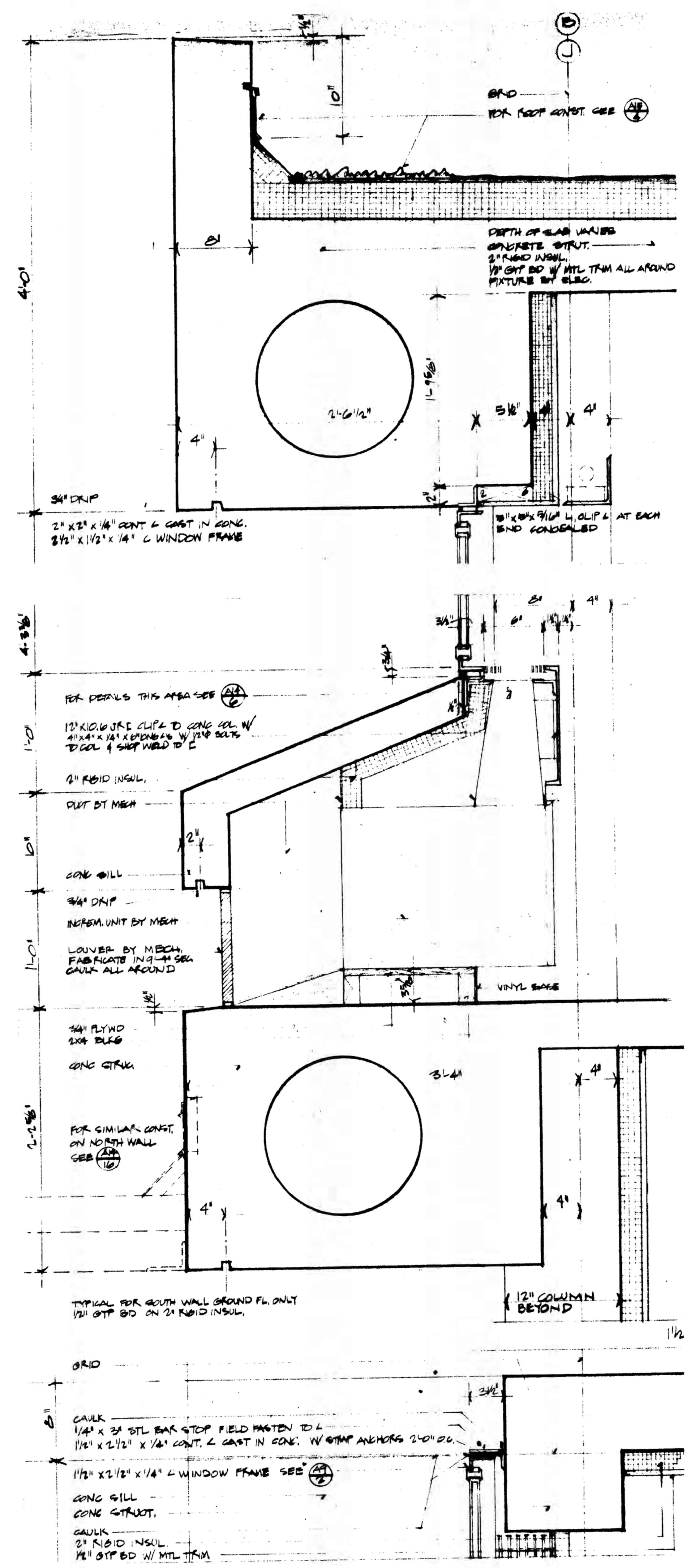

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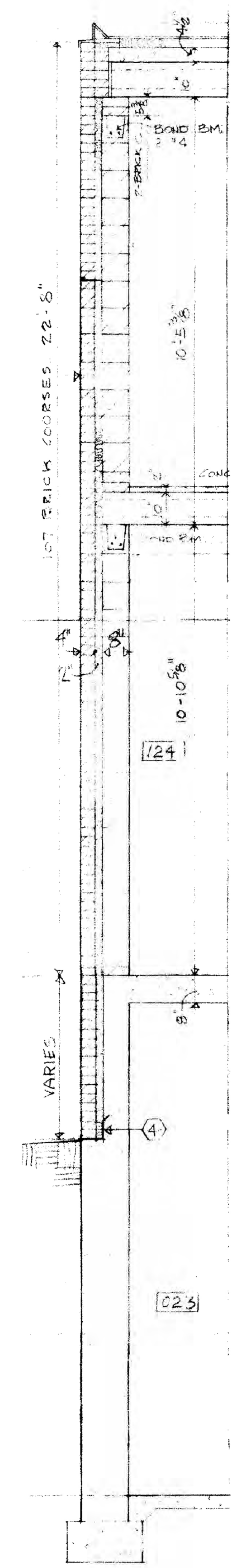

10 A601 EXISTING DETAILS 5/A10
1/2" = 1'-0"

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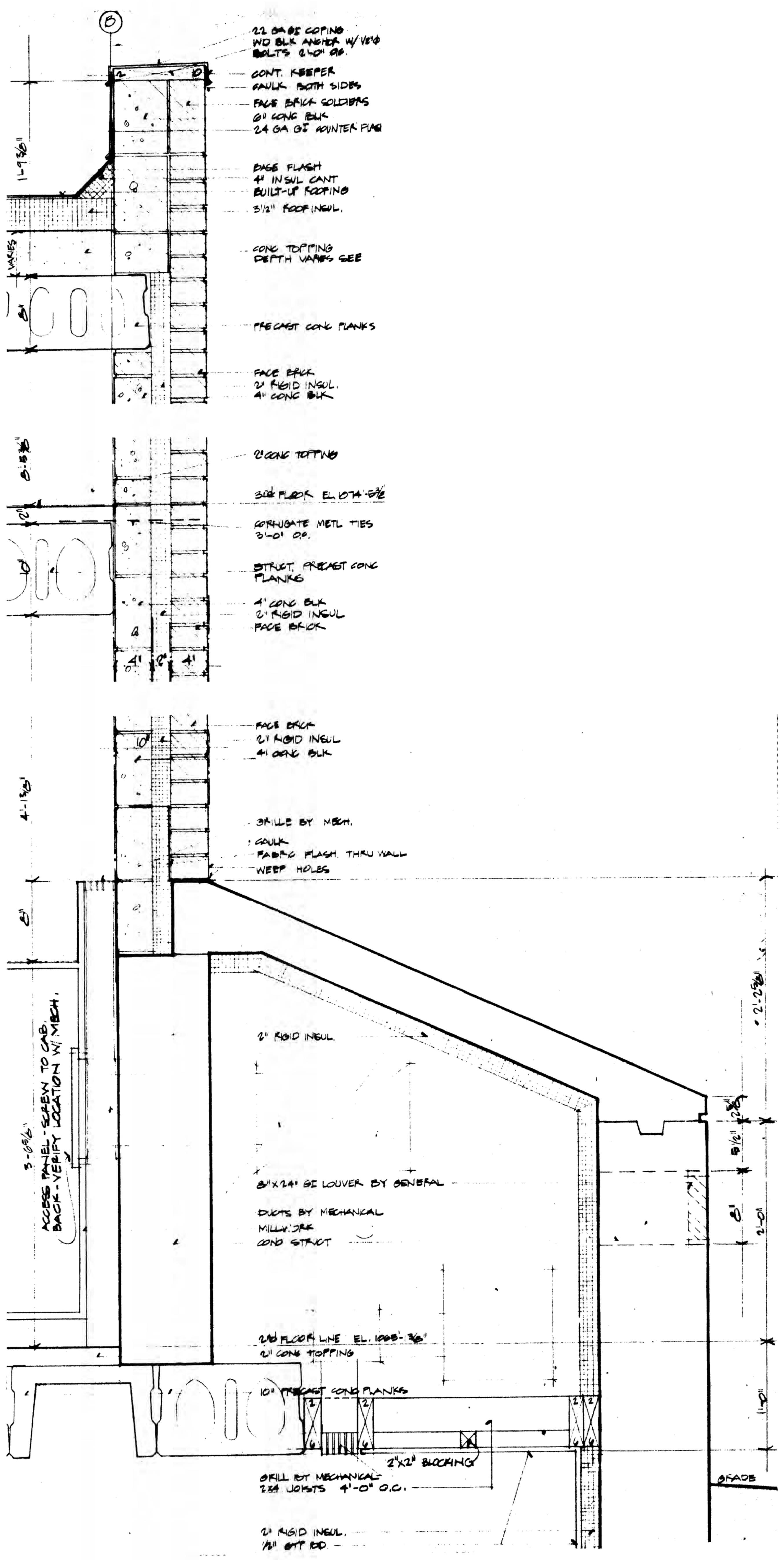

11 A602 EXISTING DETAILS 17,18,22/A15
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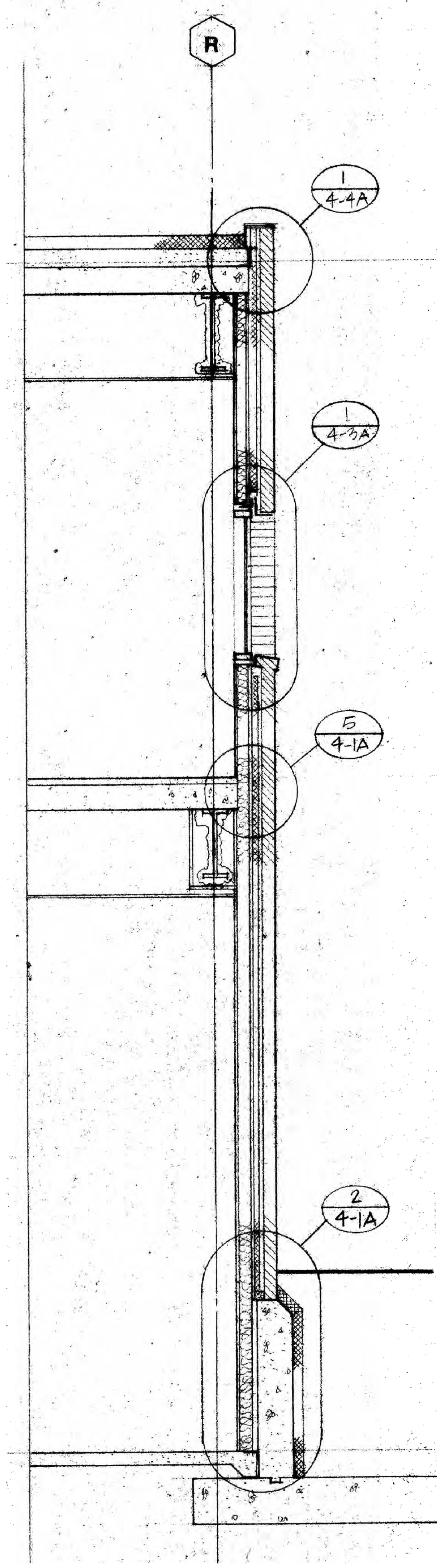

12 A602 EXISTING DETAILS 1,2/A9
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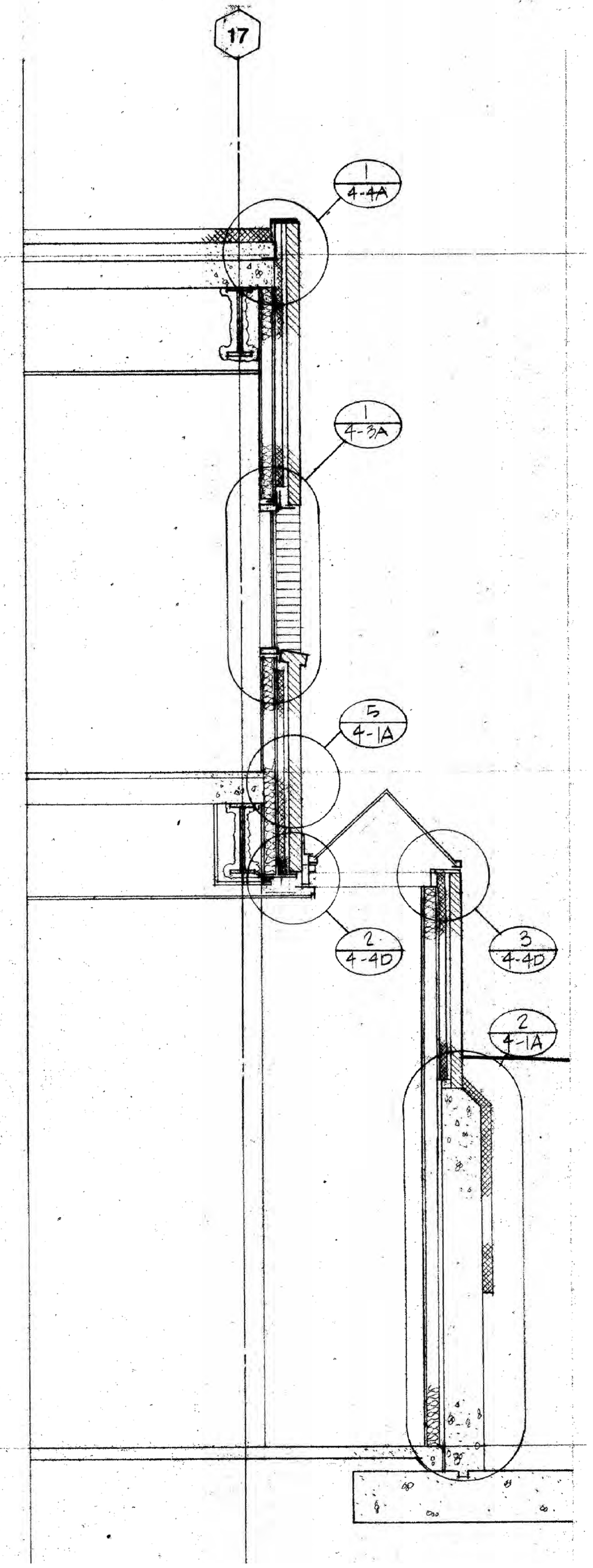

13 A602 EXISTING DETAILS 1,2/A9
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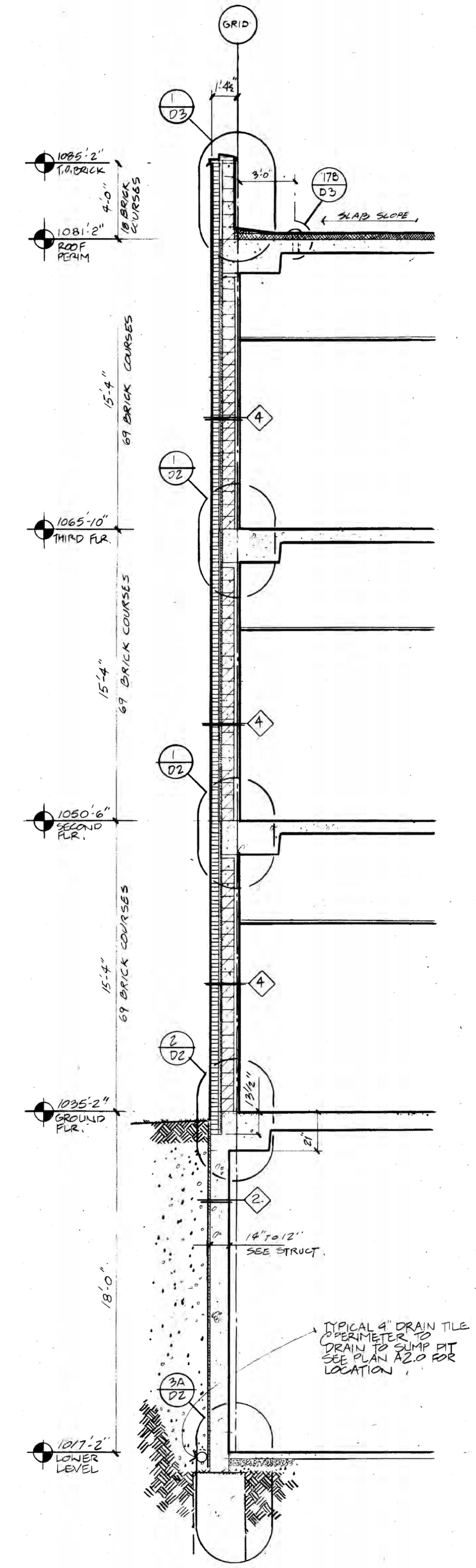

14 A602 EXISTING DETAILS 2/A6
1/4" = 1'-0"

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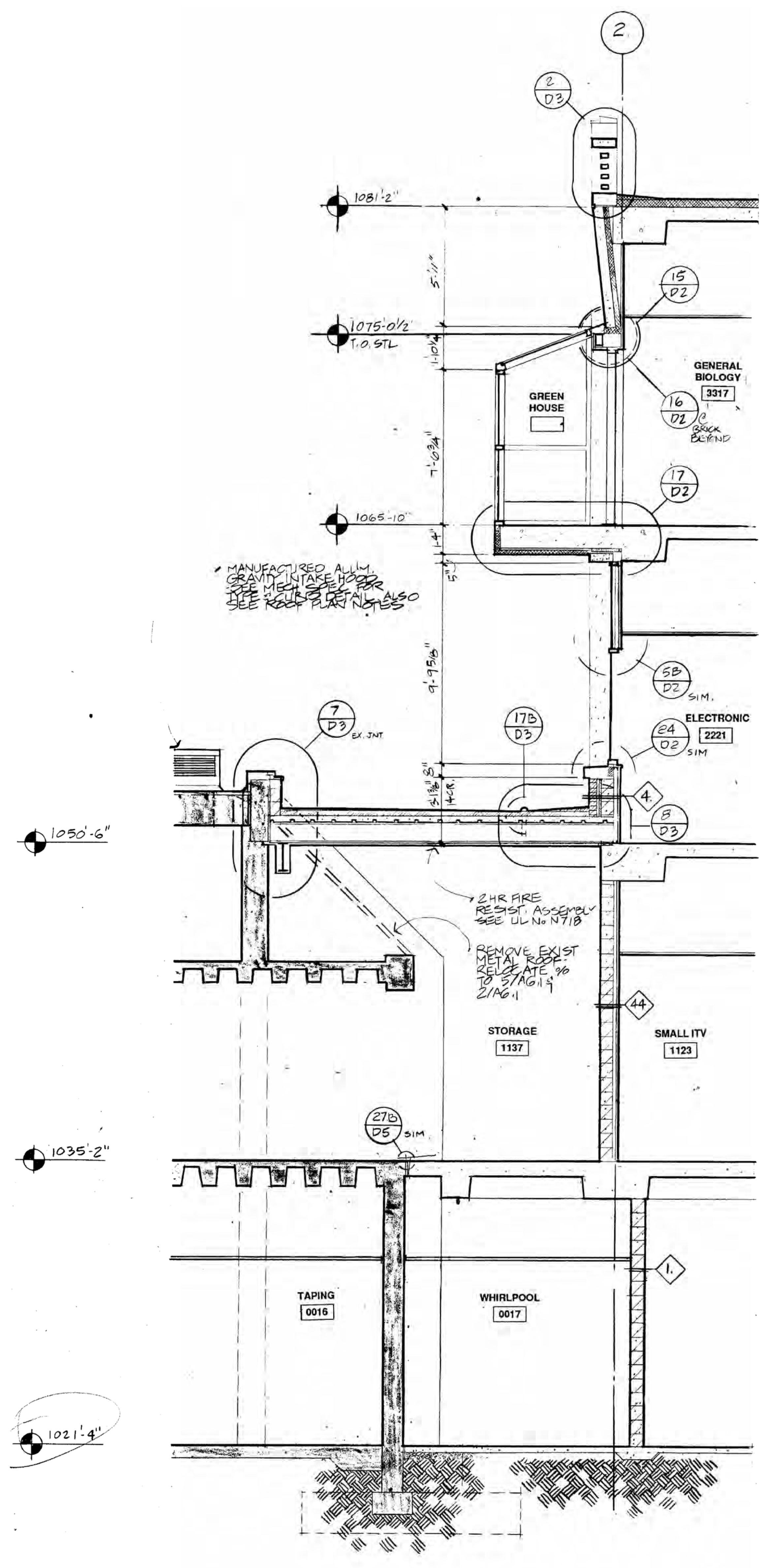
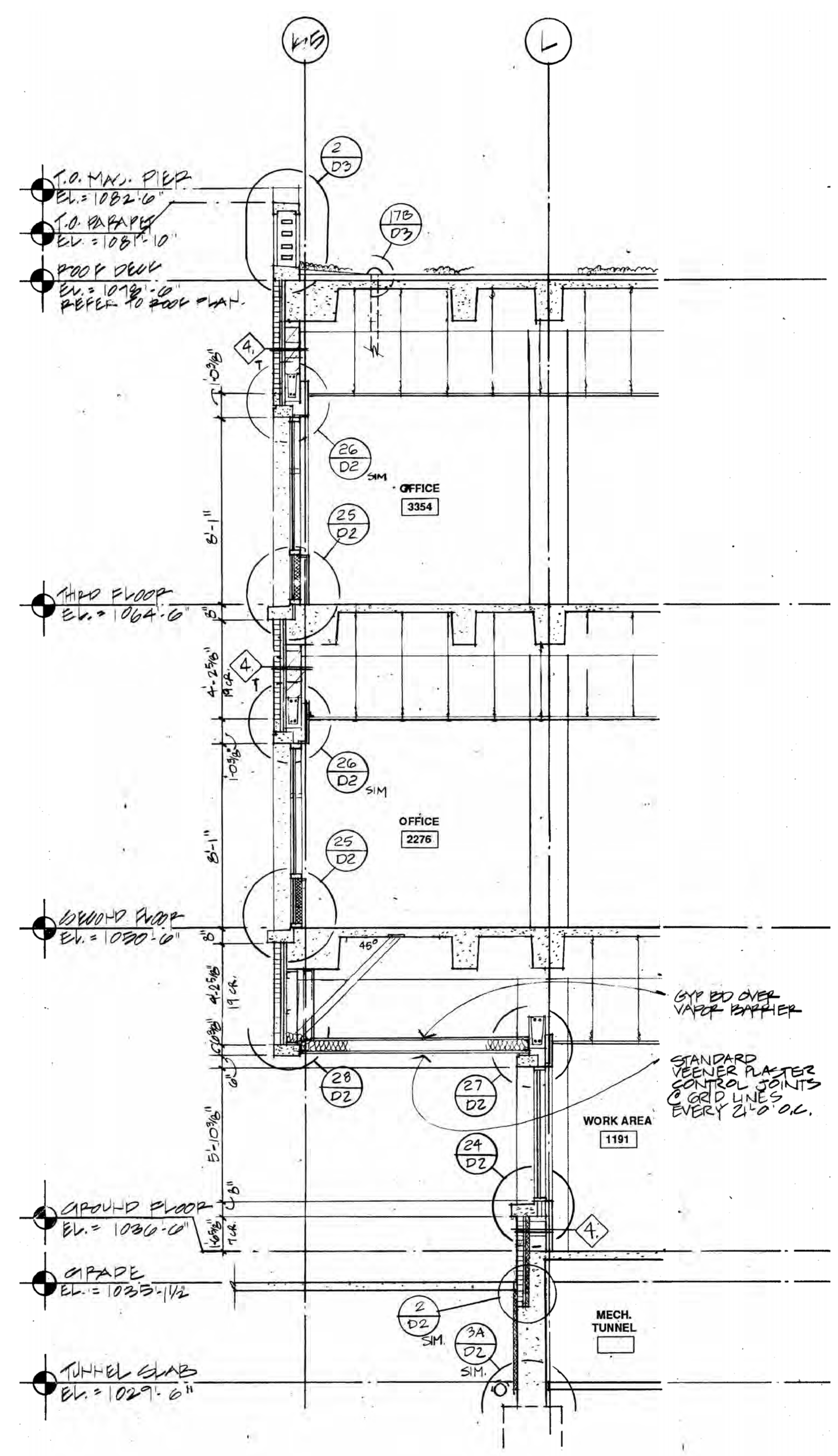


15 A603 EXISTING DETAILS 6/A6.1
1/4" = 1'-0"



16 A603 EXISTING DETAILS 1/A6.5
1/4" = 1'-0"

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TUCKPOINTING PROCEDURE NOTES

TUCKPOINT SPECIFIED MORTAR JOINTS IN ACCORDANCE WITH THE BRICK INSTITUTE OF AMERICA TECHNICAL NOTES 7F AS OUTLINED BELOW.

1. WHERE MORTAR IS NOT YET REMOVED FROM JOINT, REMOVE MORTAR WITH HAND TOOLS OR SMALL POWER TOOLS IN SUCH A MANNER AS TO NOT DAMAGE THE BRICK TO REMAIN. ANY DAMAGED BRICK SHALL BE REMOVED AND REPLACED IN ACCORDANCE WITH BRICK REPAIR PROCEDURES.

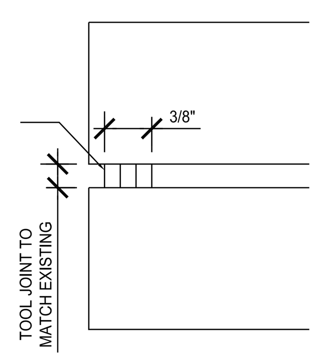
2. REMOVE ALL DUST AND DEBRIS FROM THE JOINT BY WIRE BRUSHING AND BLOWING WITH AIR.

3. TUCKPOINTING MORTAR SHALL BE OF THE PROPORTIONS SPECIFIED IN THE MORTAR SPECIFICATION NOTES. THE COLOR OF THE SAND AND COLORING AGENTS IF NECESSARY SHALL BE SELECTED TO MATCH EXISTING MORTAR. MORTAR SHALL BE PREHYDRATED TO REDUCE EXCESSIVE SHRINKAGE.

4. JOINTS TO BE TUCKPOINTED SHALL BE DAMPENED TO ENSURE A GOOD BOND. THE BRICK WORK MUST ABSORB ALL SURFACE WATER.

5. JOINTS SHALL BE FILLED WITH PREHYDRATED MORTAR BY PACKING MORTAR TIGHTLY INTO THE JOINTS IN THIN LAYERS OF APPROXIMATELY 1/4" MAXIMUM. EACH LAYER SHALL BE "THUMBPRINT HARD" BEFORE APPLYING THE NEXT LAYER. THE JOINTS SHALL BE TOOLED TO MATCH THE EXISTING JOINTS AFTER THE LAST LAYER OF MORTAR IS "THUMBPRINT HARD".

INSTALL EACH LIFT MAXIMUM 1/4" THICK IN ACCORDANCE WITH TUCKPOINTING PROCEDURE NOTES AND BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F. SEE TUCKPOINTING PROCEDURE NOTES.



1 / A700 TYPICAL JOINT SEALANT DETAIL

6" = 1'-0"

BRICK REPAIR PROCEDURE NOTES

THE INTENT OF THIS REPAIR IS TO REMOVE ANY EXISTING CRACKED, BROKEN, SPALLED OR DISCLOSED BRICK MASONRY. TO REPLACE WITH NEW BRICK MASONRY TO MATCH EXISTING, AND TO REPAIR ANY CRACKED MORTAR JOINTS.

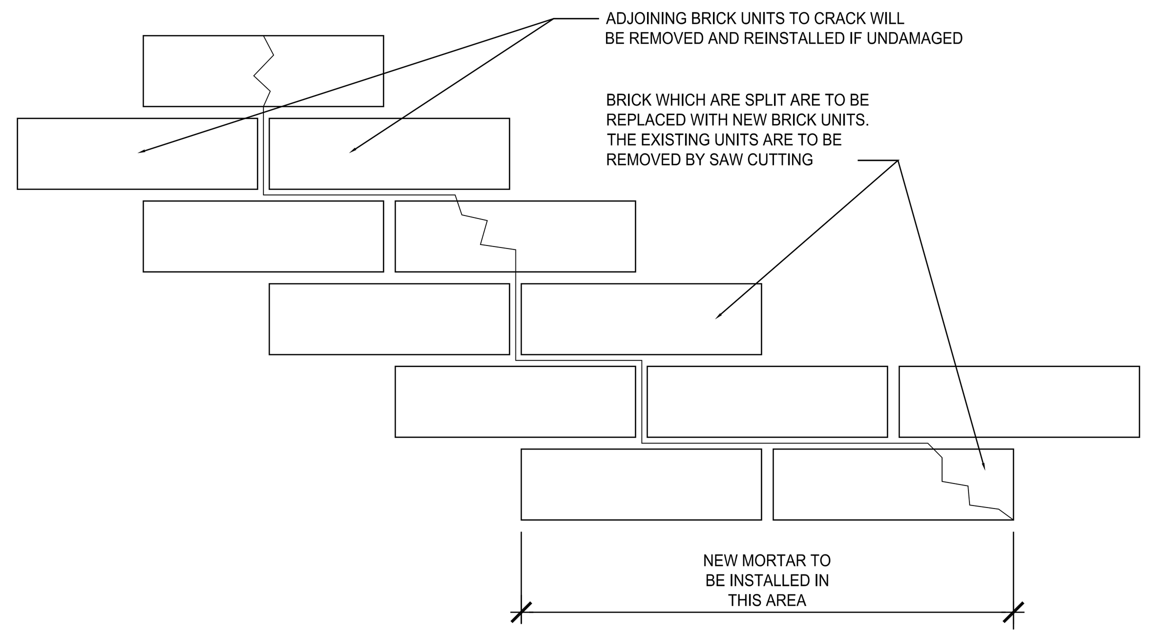
1. REMOVE INDIVIDUAL OR SECTIONS OF BRICK MASONRY AS SHOWN ON THE BUILDING ELEVATIONS AND/OR OTHERWISE DIRECTED ON THE DRAWINGS OR IN THE FIELD. REMOVAL SHALL BE WITH SMALL POWER OR HAND TOOLS SO AS NOT TO DAMAGE DAMAGE BRICK TO REMAIN.

2. POWER TOOL CLEAN ALL MORTAR FROM EXISTING BRICK MASONRY TO REMAIN AROUND THE REPAIR.

3. REVIEW BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F FOR GUIDELINES ON TUCKPOINTING AND BRICK REPLACEMENT. ALL BRICK REPLACEMENT SHALL BE INSTALLED IN ACCORDANCE WITH B.I.A. TECHNICAL NOTES 7F. ALL HEAD AND BED JOINTS SHALL BE FULL. THE FINAL BRICKS IN A CONFINED AREA SUCH AS PORTIONS OF THE JOINTS IN TOOTHED MASONRY AND SOME JOINTS IN MASONRY ALONG REPAIR CRACKS SHALL BE TUCKPOINTED IN LAYERS IN ACCORDANCE WITH THE B.I.A. GUIDELINES AND TUCKPOINTING PROCEDURE NOTES ON THE DRAWINGS. ALL JOINTS WHERE SAW KERF EXTENDS INTO MORTAR BEYOND THE END OF AREA REMOVED SHALL ALSO BE TUCKPOINTED.

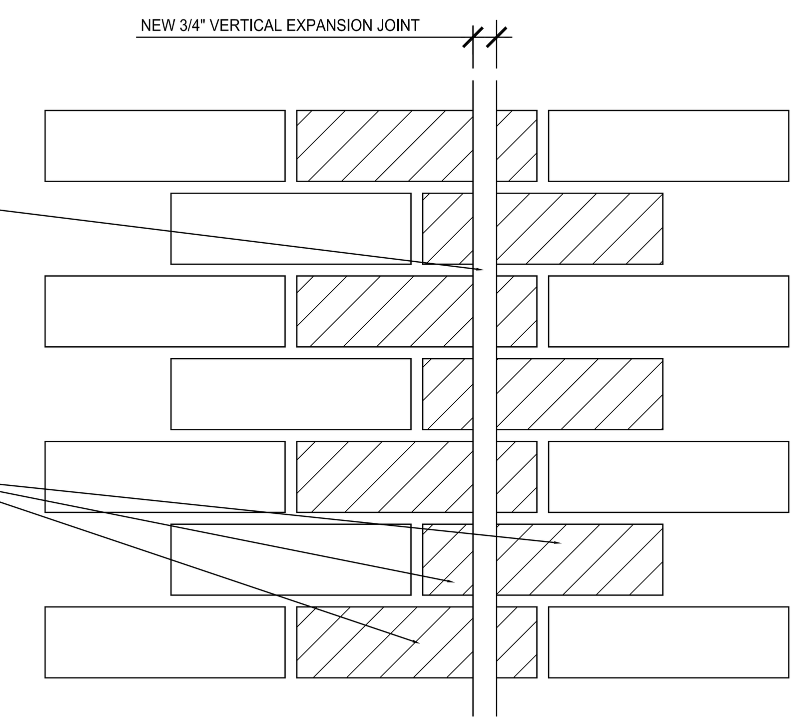
4. INSTALL NEW BRICK MASONRY USING A PREHYDRATED MORTAR AS DESCRIBED IN B.I.A. TECHNICAL NOTES 7F.5. DRY PACK ALL HEAD JOINTS IN THE REPAIRED AREA WITH A PREHYDRATED MORTAR AS DESCRIBED IN TUCKPOINTING PROCEDURE NOTES.

NOTE: ALL MORTAR AROUND THESE REPLACED BRICK SECTIONS IS TO BE REMOVED AND REPLACED.



2 / A700 TYPICAL DIAGONAL CRACK BRICK REPAIR DETAIL

3" = 1'-0"



REMOVE LAST COURSES OF BRICK AT MASONRY. SAW CUT TO FORM NEW BRICK EXPANSION JOINT.

3 / A700 TYPICAL FORMED VERTICAL EXPANSION BRICK REPAIR DETAIL

3" = 1'-0"

1. NEW VERTICAL SAWCUT JOINTS SHALL BE 3/4" WIDE AND THE JOINT SHALL BE CUT COMPLETELY THROUGH THE EXTERIOR WY OF BRICK AT LOCATIONS SHOWN ON THE BUILDING ELEVATIONS. EXISTING BUILDING EXPANSION JOINTS WHICH ARE LESS THAN 3/4" WIDE SHALL BE SAWCUT TO FULL 3/4" WIDTH.

2. SAWCUTS FOR CUTTING THE JOINTS SHALL BE MOUNTED ON TRACKS ATTACHED TO THE WALL OR SHALL BE HAND HELD SAWS GUIDED BY A WALL-MOUNTED GUIDE OR TRACK TO ENSURE A NEAT, STRAIGHT, VERTICAL CUT. SAWING ALONG A LINE WITH HAND HELD SAWS SHALL NOT BE PERMITTED. REPAIR ANY MASONRY DAMAGED BY SAWCUTTING.

3. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF ANY MATERIALS OR OBJECTS WHICH ARE LOCATED AT NEW AND EXISTING EXPANSION JOINTS AND WHICH MUST BE REMOVED IN ORDER FOR THE JOINTS TO BE CONSTRUCTED.

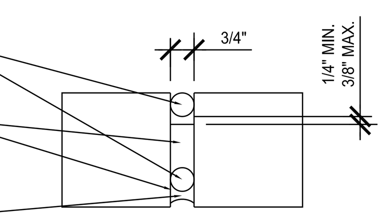
4. PROVIDE NEW BRICK MASONRY WHERE ANY BRICKS ARE BROKEN OR SPALLED CURING THE IMPLEMENTATION OF THIS REPAIR TYPE. TUCKPOINT MORTAR JOINTS BETWEEN NEW AND EXISTING BRICK AS SPECIFIED.

5. TERMINATE BOTTOM OF EXPANSION JOINT AT TOP OF FOUNDATION WALL. EXTEND EXPANSION JOINT THROUGH TOP OF BRICK AT CAP FLASHING.

6. WIRE BRUSH CLEAN SIDES OF JOINT AND BLOW CLEAN WITH OIL-FREE COMPRESSED AIR. CLEANING SHALL REMOVE ALL DUST, DIRT, AND EXISTING SEALANT MATERIALS.

7. INSTALL NEW BACKER ROD AND ALLOW NEWLY INSTALLED MASONRY ADJACENT TO JOINT TO CURE FOR 28 DAYS PRIOR TO INSTALLING SEALANT. INSTALL CONTINIOUS SEALANT. TOOL SEALANT TO A SLIGHTLY CONCAVE FINISH. SEE SPECIFICATIONS FOR BACKER ROD AND SEALANT.

8. CLEAN BRICK UPON COMPLETION OF SAWCUTTING AND OTHER MASONRY REPAIR.

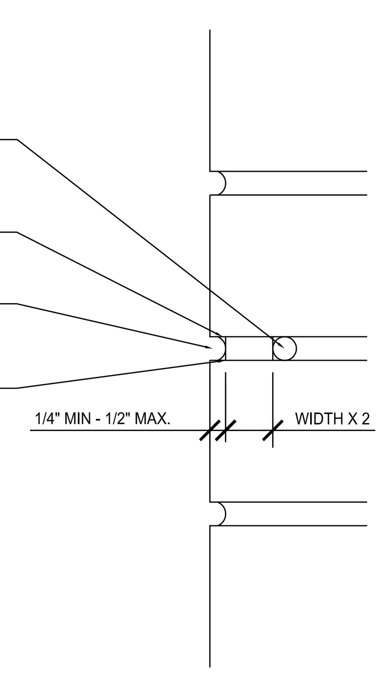


NOTE: THIS DETAIL APPLIES AT ALL EXISTING EXPANSION JOINTS

4 / A700 TYPICAL VERTICAL EXPANSION BRICK REPAIR DETAIL

3" = 1'-0"

NOTE: SEALANT TO BE INSTALLED WITHIN MANUFACTURERS TEMPERATURE LIMITATIONS



DEPTH OF THE CAULK TO BE A MINIMUM OF 2X THE WIDTH OF THE JOINT.

CONCAVE ON JOINT SEALANT TO BE A MINIMUM OF 1/4" DEEP, BUT NO MORE THAN A MINIMUM OF 1/2" DEEP.

5 / A700 TYPICAL JOINT SEALANT DETAIL

6" = 1'-0"

BRICK REPAIR PROCEDURE NOTES

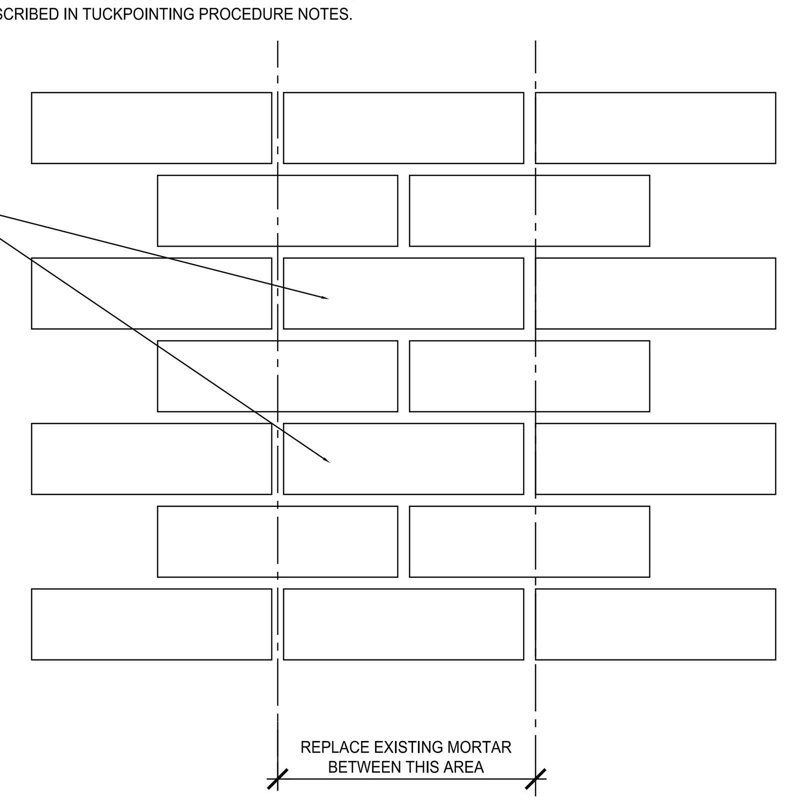
THE INTENT OF THIS REPAIR IS TO REMOVE ANY EXISTING CRACKED, BROKEN, SPALLED OR DISCLOSED BRICK MASONRY. TO REPLACE WITH NEW BRICK MASONRY TO MATCH EXISTING, AND TO REPAIR ANY CRACKED MORTAR JOINTS.

1. REMOVE INDIVIDUAL OR SECTIONS OF BRICK MASONRY AS SHOWN ON THE BUILDING ELEVATIONS AND/OR OTHERWISE DIRECTED ON THE DRAWINGS OR IN THE FIELD. REMOVAL SHALL BE WITH SMALL POWER OR HAND TOOLS SO AS NOT TO DAMAGE DAMAGE BRICK TO REMAIN.

2. POWER TOOL CLEAN ALL MORTAR FROM EXISTING BRICK MASONRY TO REMAIN AROUND THE REPAIR.

3. REVIEW BRICK INSTITUTE OF AMERICA (B.I.A.) TECHNICAL NOTES 7F FOR GUIDELINES ON TUCKPOINTING AND BRICK REPLACEMENT. ALL BRICK REPLACEMENT SHALL BE INSTALLED IN ACCORDANCE WITH B.I.A. TECHNICAL NOTES 7F. ALL HEAD AND BED JOINTS SHALL BE FULL. THE FINAL BRICKS IN A CONFINED AREA SUCH AS PORTIONS OF THE JOINTS IN TOOTHED MASONRY AND SOME JOINTS IN MASONRY ALONG REPAIR CRACKS SHALL BE TUCKPOINTED IN LAYERS IN ACCORDANCE WITH THE B.I.A. GUIDELINES AND TUCKPOINTING PROCEDURE NOTES ON THE DRAWINGS. ALL JOINTS WHERE SAW KERF EXTENDS INTO MORTAR BEYOND THE END OF AREA REMOVED SHALL ALSO BE TUCKPOINTED.

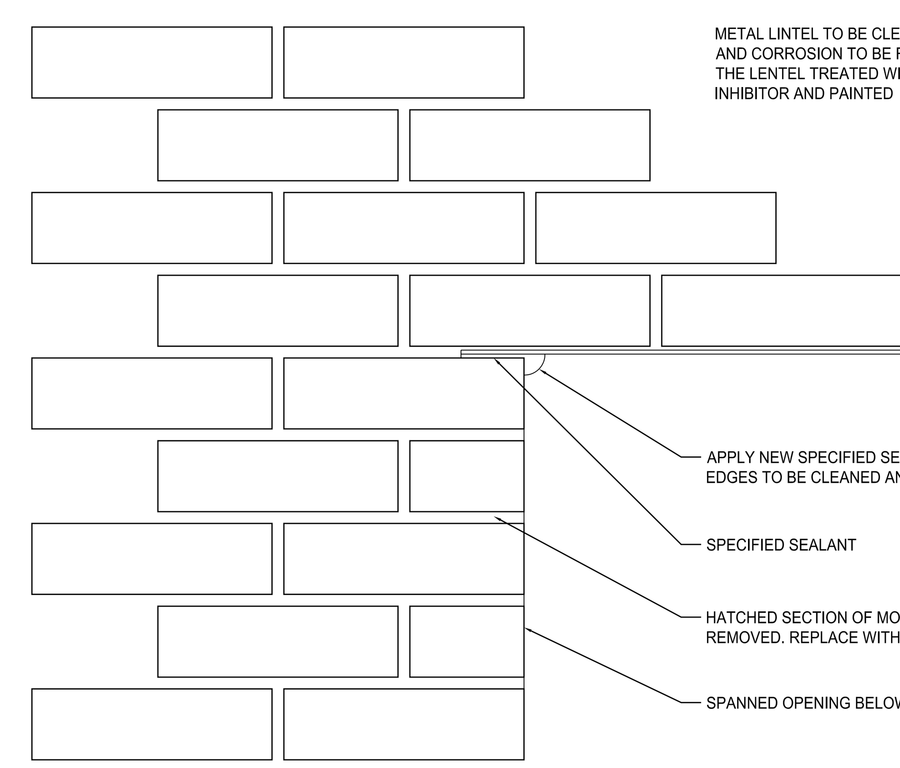
4. INSTALL NEW BRICK MASONRY USING A PREHYDRATED MORTAR AS DESCRIBED IN B.I.A. TECHNICAL NOTES 7F.5. DRY PACK ALL HEAD JOINTS IN THE REPAIRED AREA WITH A PREHYDRATED MORTAR AS DESCRIBED IN TUCKPOINTING PROCEDURE NOTES.



NOTE: ALL MORTAR AROUND THESE REPLACED BRICK SECTIONS IS TO BE REMOVED AND REPLACED.

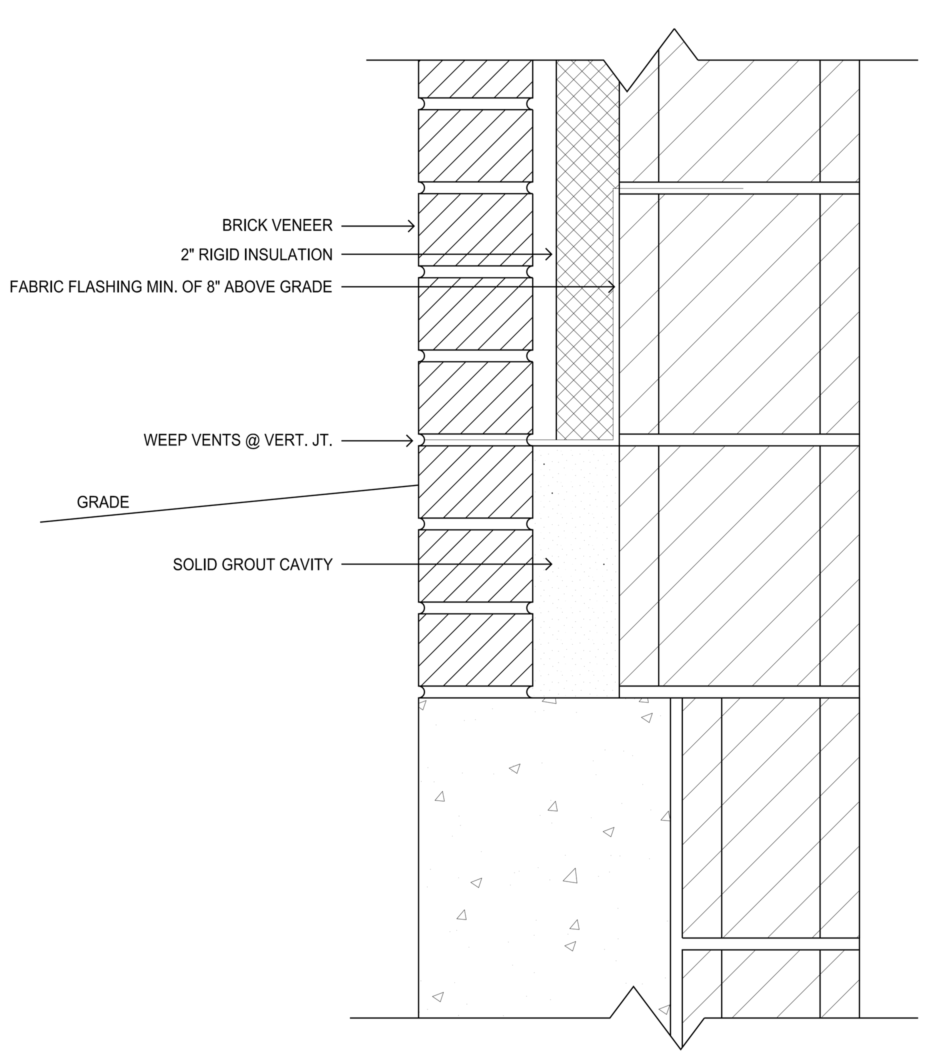
6 / A700 TYPICAL VERTICAL CRACK BRICK REPAIR DETAIL

3" = 1'-0"



7 / A700 TYPICAL LINTEL BRICK REPAIR DETAIL

3" = 1'-0"



8 / A700 BRICK LEDGE DETAIL

3" = 1'-0"

KANE AND JOHNSON ARCHITECTS, INC.
2460 HIGHWAY 63 NORTH SUITE 100
ROCHESTER, MN 55906
PH (507) 288-1839 FAX (507) 288-1830 ■

2469 UNIVERSITY AVE WEST
ST. PAUL, MN 55114
PH (651) 644-8224 FAX (651) 644-8084 □

CERTIFICATION

I hereby certify that this Plan, Specification or Report was prepared by me or under my direct supervision and that I am a duly licensed Architect under the laws of the state of Minnesota

Name: ______

Date: ______ Lic. No.: ______

This drawing is conditionally issued and reproduction or use of any technical design information is strictly forbidden without written agreement from the responsible architect.

100% CD
NOT TO BE USED
FOR CONSTRUCTION
5/22/12

CONSULTANTS

SKYLINE BUILDING ENVELOPE CONSULTANTS
15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural Design Group

REVISIONS

Date: By:

Drawn By:	TCK	Date:
File Number:		
Plot Scale:	3" = 1'-0"	
Project Status:	CD	
Updated By:		Date:

Rochester Community and Technical College

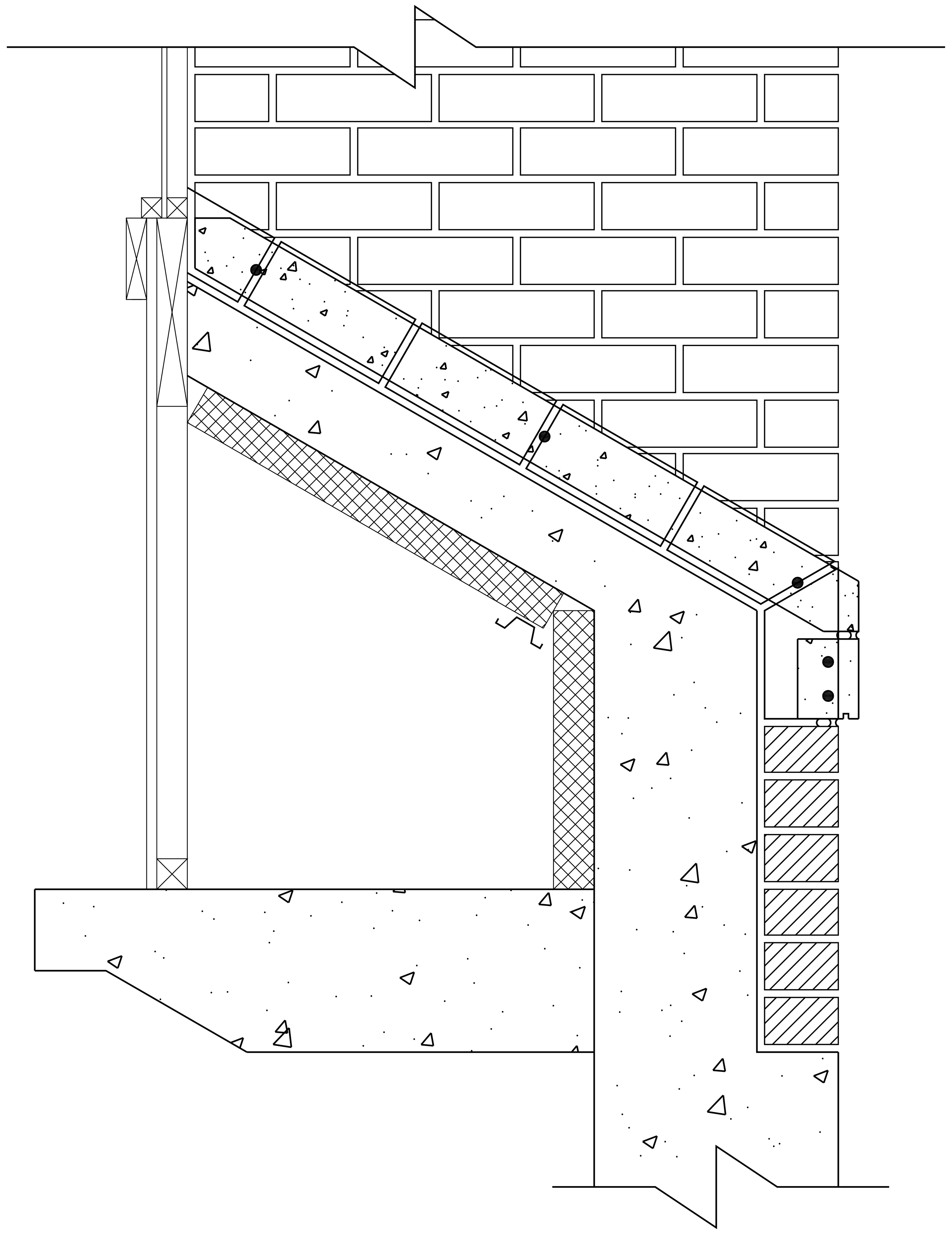
2012 EXTERIOR FACADE REPAIRS

U.C.R. MAIN CAMPUS

ROCHESTER, MN

DETAILS

ISSUE DATE:	5/22/12
KJA PROJECT #	2012204
SHEET	A700
OF	16



9
A701
REPLACEMENT SILL DETAIL
3" = 1'-0"

KANE AND JOHNSON
ARCHITECTS, INC.
2460 HIGHWAY 63 NORTH SUITE 100
ROCHESTER, MN 55906
PH (507) 288-1839 FAX (507) 288-1830 ■

2469 UNIVERSITY AVE WEST
ST. PAUL, MN 55114
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5/22/12

CONSULTANTS

SKYLINE BUILDING
ENVELOPE
CONSULTANTS
15050 CEDAR AVE S #116-333
APPLE VALLEY, MN 55124

Structural
Design Group

REVISIONS

Date: By:

Drawn By: TCK Date:
File Number:
Plot Scale: 3" = 1'-0"
Project Status: CD
Updated By: Date:

Rochester
COMMUNITY AND TECHNICAL
College

2012 EXTERIOR
FACADE REPAIRS

U.C.R. MAIN
CAMPUS

ROCHESTER, MN

DETAILS

ISSUE DATE: 5/22/12
KJA PROJECT # 2012204
SHEET A701
OF 16

KANE AND JOHNSON ARCHITECTS, INC.
2460 Highway 63 North • Suite 100 • Rochester, MN • 55906
507/ 288-1839 • Fax 507/ 288-1830 • email info@kjarchitects.com

Project Construction Cost Estimate for:

Rochester Community & Technical College: 2012 Exterior Repairs @ Heintz Center

Architect's #2012-204

Work Scope (MASONRY TUCKPOINT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Masonry Tuckpointing	4012	$8	SF	3000	$24,000.00	based on common running bond
TOTAL COST					$24,000.00	

Work Scope (MASONRY RE-BUILD, TWF, WEEP SYSTEM and OTHER FLASHINGS)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Selective Demolition	4910	$11	VLF	750	$7,875.00	replace 5-brick for thru-wall
Debris Disposal	2200	$70	TON	5	$350.00	
4x2x8 Brick	4211	$18	SF	2100	$37,800.00	based on common running bond
Weep System	7600	$9.00	LF	200	$1,800.00	
Thru Wall Flashing	7600	$90.00	LF	200	$18,000.00	
TOTAL COST					$65,830.00	

Work Scope (CAULKING REPLACEMENT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Caulking Demolition	7900	$2	LF	10000	$21,000.00	
Caulking Replacement	7900	$3	LF	10000	$30,000.00	
TOTAL COST					$51,000.00	

Work Scope (NEW METAL WALL PANEL)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Debris Disposal	2200	$70	TON	7	$490.00	
Plaster Demolition		$4	SF	1500	$6,000.00	
Water Proofing		$2.50	SF	1500	$3,750.00	
Flashing Repair		$8	LF	250	$2,000.00	
CMU Block Repair		$12.00	SF	200	$2,400.00	
Metal Wall Panel and Girt Framing		$25.00	SF	1500	$37,500.00	
TOTAL COST					$52,140.00	

Work Scope (LINTEL REPLACEMENT)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Demolition		$9	SF	0	$0.00	
Steel Support Systems		$6	SF	0	$0.00	
Replacement Lintels		$25	SF	0	$0.00	
TOTAL COST					$0.00	

Work Scope (PAINTING)

	CSI	COST	UNIT	TAKEOFF	TOTAL	DESCRIPTION
Surface Preparation		$3	SF	500	$1,500.00	
Paint Steel Frames & Lintels		$6	SF	500	$3,000.00	
TOTAL COST					$4,500.00	

Total Work Scope Cost Basis

Masonry Tuckpoint	$24,000.00
Masonry Rebuild - TWF,WS & F	$65,830.00
Caulking Replacement	$51,000.00
New Metal Wall Panel System	$52,140.00
Lintel Replacement	$0.00
Painting	$4,500.00
TOTAL COST	$197,470.00

Contractor Cost Basis

Mobilization ON & OFF SITE					$9,873.50	Based on 5% of Scope Total
General Project Conditions					$9,873.50	Based on 5% of Scope Total
Overhead & Profit					$19,747.00	Based on 10% of Scope Total
Insurance					$2,962.05	Based on 1.5% of Scope Total
Bonding					$2,962.05	Based on 1.5% of Scope Total
Equipment Rental		700	WEEK	8	$5,600.00	Lift/Reach per 8-weeks
Scaffolding	1500	$83.50	CSF	215	$17,952.50	Rented installed/teardown
Swing Staging (24' section per month)	1540	$1,350.00	EA	1.5	$2,025.00	Rented installed/teardown
Fencing	1560	$5.05	LF	500	$2,525.00	Rented installed/teardown, 6'
TOTAL COST					$73,520.60	

Total Cost This Project

Total Work Scope Cost Basis		$197,470.00
Contractor Cost Basis		$73,520.60
Architect/Engineer Cost Basis		NIC
10% Contingency		$19,747.00
Escalation Factor	(use 3% for prior year estimate)	NIC
Location Factor	(use 12.2% for Minneapolis)	NIC
		$290,737.60 **TOTAL**

Issue Date: 4-17-2012

HEAPR MANUAL
Heintz Lighting Upgrades

Req. No.: 16

Institution	Rochester Community and Technical College	***Date: December 2020***
Campus/Building	Heintz Center Building	
Project Location	Rochester, MN	

General Classification of All Work *(Provide est. construction costs by "classification of work")*

$	**Exterior Envelope**	*(exterior roof, walls, windows, exterior doors)*
$	**Building Interior**	*(ceilings, walls, non-painted wall finishes, floors, floor finishes, interior doors)*
$	**Fire Suppression**	*(sprinkler systems, components, piping, equipment)*
$	**Plumbing**	*(plumbing systems, components, piping, fixtures, equipment)*
$	**HVAC**	*(HVAC systems, components, piping, equipment, heating & cooling plants)*
$108,700	**Electrical**	*(Electrical systems, power distribution, lighting, equipment)*
$	**Life Safety and Security**	*(Fire alarm systems, public address, building security)*
$108,700	**Total**	

General Description of Existing Conditions and All Work

The Heintz Center has fluorescent downlights installed throughout significant portions of the building including corridors and classrooms. The fixtures provide poor light quality, cover less area and thus more downlights are required, and are less energy efficient. The project will replace the downlights with fewer new 2x2 LED light fixtures in the majority of public areas.

Project Title – Heintz Center Lighting Upgrades

Priority Project(s) and General Work Description: (*Provide estimated construction costs for specific priority project with general description)*

$108,700	**Heintz Center Lighting Upgrades**
$	
$	
$108,700	**Total**

Explain how the project will reduce the backlog of Deferred Maintenance identified for your Campus:

Replace old fixtures, and reduce energy consumption and long-term maintenance.

Supporting Materials *(Master Plans, Reports, Design Documents as available from campus)*

1 2020 Lighting Study & Cost Estimate - TKDA

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

LIGHTING STUDY
HEINTZ CENTER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

June 19, 2020

The owner has requested budget pricing to replace the existing light fixtures in public spaces within Heintz Center. It would be recommended some of the light fixture styles be changed within the corridors for a more modern look.

The fixtures were mostly fluorescent fixtures using a combination of T5 and T8 lamps. Some small areas have been updated with LED fixtures.

Lighting control at all modified spaces would also need to be upgraded to meet the current energy code. Until a fixture is selected, lighting control pricing is difficult to determine, however $1.75 per sq/ft could be used for budgeting.

All downlights replaced with 6" LED downlights:

30 fixtures x $150.00ea = $4,500.00 material cost.

Installation approximately $80.00 per fixture for direct replacement. $80.00 x 30 = $2,400.00

Total cost not including OH &P, taxes etc. = **$6,900.00**

2'x2' fluorescent replaced with 2'x'2 ' LED troffers:

2'x2' LED troffer: 20 fixtures x $95.00 = $1,900.00
Installation approximately $125.00 per fixture. $125.00 x 20 = $2,500.00

Total cost not including OH &P, taxes etc. = **$4,400.00**

2'x4' fluorescent replaced with 2'x4' LED troffers:

2'x4' LED troffer: 246 fixtures x $100.00 = $24,600.00
Installation approximately $125.00 per fixture. $125.00 x 246 = $30,750.00

Total cost not including OH &P, taxes etc. = **$55,350.00**

14"x14" up-lights replaced with similar LED fixture (commons area):

LED fixture 16 fixtures x $250.00 = $4,000.00
Installation approximately $175.00 per fixture. $175.00 x 16 = $2,800.00

Total cost not including OH &P, taxes etc. = **$6800.00**

<u>Corridor up/down fixtures replaced with similar LED fixture</u>:

LED fixture 27 fixtures x $250.00 = $6,750.00
Installation approximately $175.00 per fixture. $175.00 x 27 = $4,725.00

Total cost not including OH &P, taxes etc. = **$11,475.00**

<u>Corridor parabolic wall-wash fixtures replaced with similar LED fixture</u>:

LED fixture 25 fixtures x $225.00 = $5,625.00
Installation approximately $125.00 per fixture. $125.00 x 25 = $3,125.00

Total cost not including OH &P, taxes etc. = **$8,750.00**

<u>Miscellaneous Fluorescent fixtures replaced with similar LED fixture</u>:

LED fixture 50 fixtures x $175.00 = $8,750.00
Installation approximately $125.00 per fixture. $125.00 x 50 = $6,250.00

Total cost not including OH &P, taxes etc. = **$15,000.00**

<u>Total cost for all fixtures:</u>

Material = $56,125.00
Labor = $52,550.00

<u>Total = $108,675.00</u>

Rob Schweich, LC | Electrical Engineering Designer

TKDA
444 Cedar Street, Suite 1500, Saint Paul, MN 55101
P **651.292.4458** | C **651.276.6790**
robert.schweich@tkda.com
tkda.com

APPENDIX

Full Facility Roof Reports and Campus Maps from System Office

Note: See individual project sheets where roofing reports were superseded.

Full Facility Roof Report

Prepared for:

CC-Concession Building

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:

CC-Concession Building

Last Inspection Date : Sep 10, 2019

Facility: CC-Concession Building

Contact Name:

Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

Type of building:

Type of Neighborhood:

Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
Area A	2020	Repair	No	Expense	Low	$500
Remove vegetation from around roof drains and install counterflashing at roof curb.						
						$500

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
Area A	2020	Repair	No	Expense	Low	$500
						$500

Roof Name:	
Roof Size:	0 sq. ft.
Est. replacement Cost:	$0.00
Existing System Type:	(EPDM-FA) Fully Adhered Ethylene-Propylene-Diene-Monc
Year Installed:	N/A
Assessed Service Life Remaining (Years) :	12
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #02	Repair	1	Ea.

ID #2 OBSERVED: 6/22/2016, 9/10/2019

Missing counterflashing

REPAIR: Install counterflashing where missing at curb.

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #01	Repair	6	Ea.

ID #1 OBSERVED: 6/22/2016, 6/19/2017, 9/10/2019

Vegetation/debris

REPAIR: Remove vegetation from the roof area and around the roof drains.

COMMENTS:

Membrane Defects - Outstanding Continued...

Defect Type	Severity	Quantity	Unit
Defect #03	Monitor	12	Ea.

ID #3 OBSERVED: 6/22/2016, 9/10/2019

Low flashing height

REPAIR: Monitor for possible future repair.

COMMENTS:

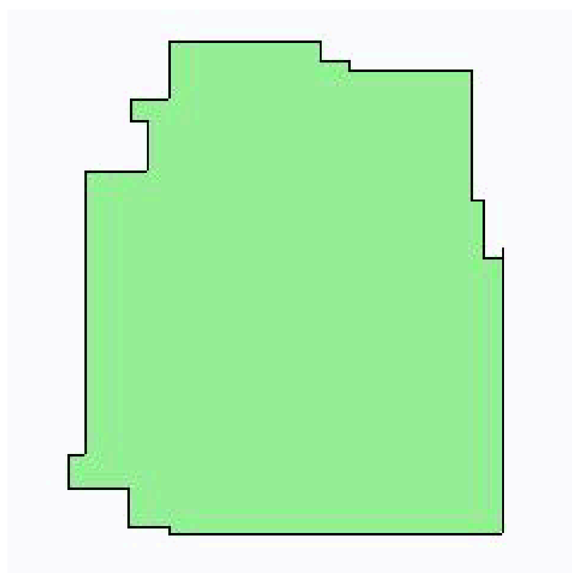
Full Facility Roof Report

Prepared for:

CC-East Hall

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-East Hall

Last Inspection Date : Sep 10, 2019

Facility: CC-East Hall

Contact Name:

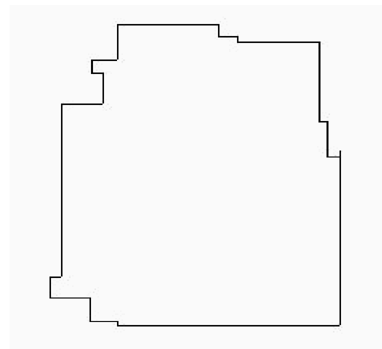
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

Type of building: Academic

Type of Neighborhood:

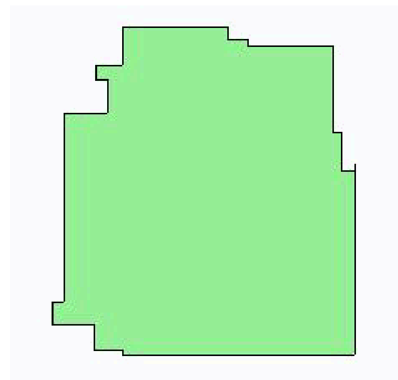


Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
EA	2020	Repair	No	Expense	Moderate	$5,000
Install additional aggregate surfacing in hot asphalt at areas where the original surfacing has eroded.						
						$5,000

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
EA	2020	Repair	No	Expense	Moderate	$5,000
						$5,000



Roof Name:	E26148C1386
Roof Size:	16,129 sq. ft.
Est. replacement Cost:	$241,935.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2003
Assessed Service Life Remaining (Years) :	14
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Repair	20	Ea.

ID#: 1 OBSERVED: 10/09/13, 9/1/2015, 6/19/2017, 9/10/2019

Surfacing loss with no membrane deterioration/damage

REPAIR: Restore surfacing

COMMENTS:

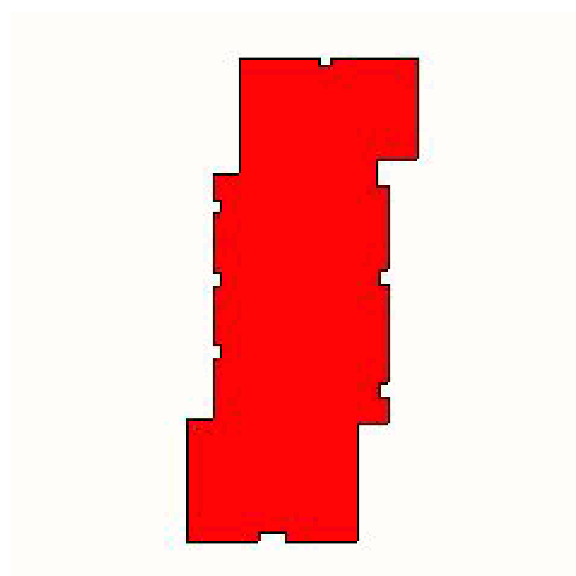
Full Facility Roof Report

Prepared for:

CC-Endicott Hall

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-Endicott Hall

Last Inspection Date : Sep 10, 2019

Facility: CC-Endicott Hall

Contact Name:

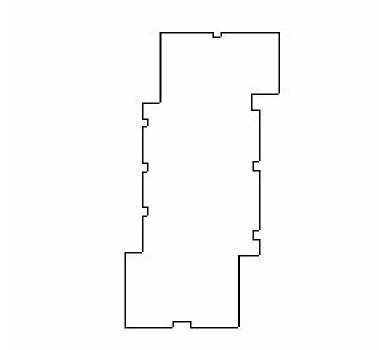
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

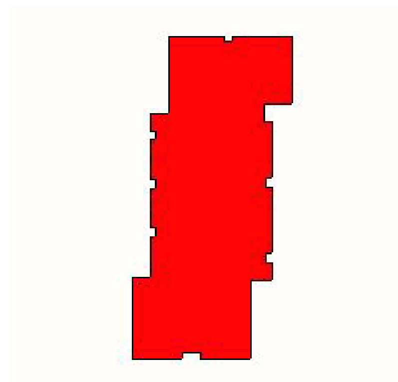
Type of building: Academic

Type of Neighborhood:



Recommendation Details						
Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
EH	2018	Replacement	No	Capital	Low	$549,000
The budget cost is from the 2011 predesign report. Recommend updating the predesign report.						
EH	2018	Repair	No	Expense	Moderate	$500
Emergency repairs should be performed as needed to maintain a watertight condition until replacement takes place.						
						$549,500

Recommendation Summary						
Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
EH	2018	Replacement	No	Capital	Low	$549,000
EH	2018	Repair	No	Expense	Moderate	$500
						$549,500



Roof Name:	E26148C0368
Roof Size:	10,000 sq. ft.
Est. replacement Cost:	$549,000.00
Existing System Type:	(EPDM-B) Ballasted Ethylene-Propylene-Diene-Monomer
Year Installed:	1988
Assessed Service Life Remaining (Years) :	0
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	The estimated replacement cost is based on the 2011 predesign. Recommend updating he predesign report.

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Repair	900	Ea.

ID#: 1 OBSERVED: 10/09/13, 9/1/2015, 6/22/2016, 6/19/2017

Displaced Ballast

REPAIR: Redistribute Ballast

COMMENTS:

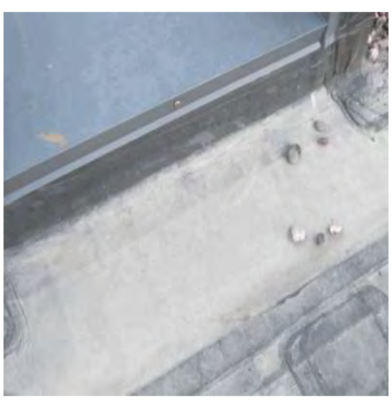
Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	100	Ea.

ID#: 2 OBSERVED: 10/09/13, 9/1/2015, 6/22/2016, 6/19/2017

Base flashing slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:



Membrane Defects - Outstanding Continued...

Defect Type	Severity	Quantity	Unit
Defect #04	Monitor	5,000	Ea.

ID#:4 OBSERVED: 9/1/2015, 6/22/2016, 6/9/2017

Ponding exists

COMMENTS:

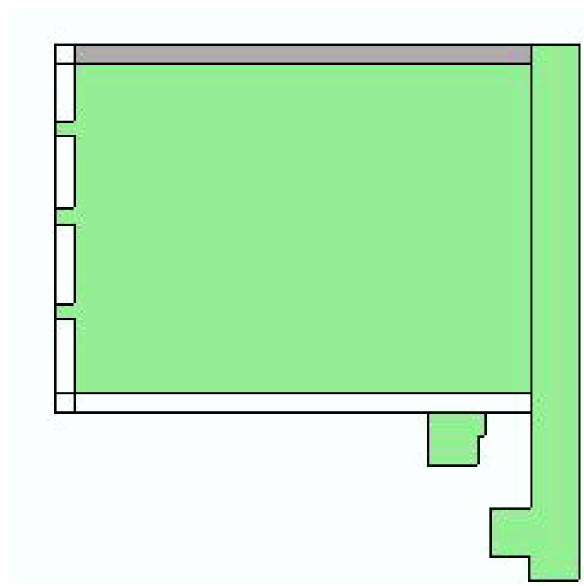
Full Facility Roof Report

Prepared for:

CC-Health Science

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-Health Science

Last Inspection Date : Sep 10, 2019

Facility: CC-Health Science

Contact Name:

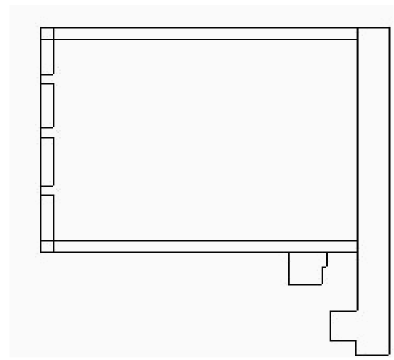
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

Type of building: Academic

Type of Neighborhood:

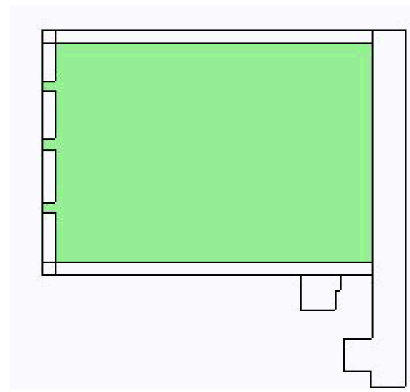


Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HS4, HS6	2020	Repair	No	Expense	Moderate	$300
Replace area of missing or deteriorated sealant.						
HS5	2018	Repair	No	Expense	Low	$300
Remove vegetation and debris from the roof.						
						$600

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HS4, HS6	2020	Repair	No	Expense	Moderate	$300
HS5	2018	Repair	No	Expense	Low	$300
						$600



Roof Name:	E26148C0570
Roof Size:	16,300 sq. ft.
Est. replacement Cost:	$244,500.00
Existing System Type:	4-Ply Built-up Asphalt Roofing
Year Installed:	2007
Assessed Service Life Remaining (Years) :	28
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	6	Ea.

ID #1 OBSERVED: 6/22/2016, 6/19/2017, 9/10/2019

Erosion of aggregate surfacing

REPAIR: Monitor for possible future repair.

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	3	Ea.

ID #3 OBSERVED: 6/19/2017, 9/10/2019

Improper equipment support

REPAIR: Perimeter railing resting directly on the roof membrane. Monitor for possible future repair.

COMMENTS:

Membrane Defects - Outstanding Continued...

Defect Type	Severity	Quantity	Unit
Defect #03	Monitor	1	Ea.

ID #3 OBSERVED: 9/10/2019

Blistered base flashing

REPAIR: Monitor for possible future repair.

COMMENTS:

Roof Name: Not Updated

Roof Size: 3,800 sq. ft.

Est. replacement Cost: $38,000.00

Existing System Type: Standing Seam Sheet Metal Roofing

Year Installed: 2007

Assessed Service Life Remaining (Years) : 18

Height: 0 Ft.

Slope:

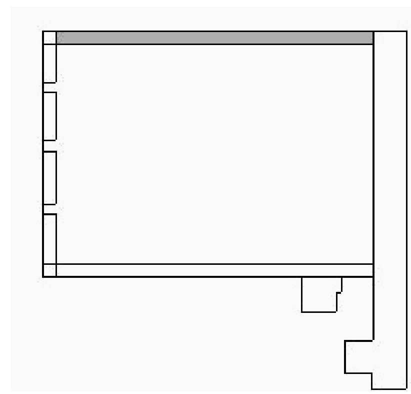
Interior Sensitivity:

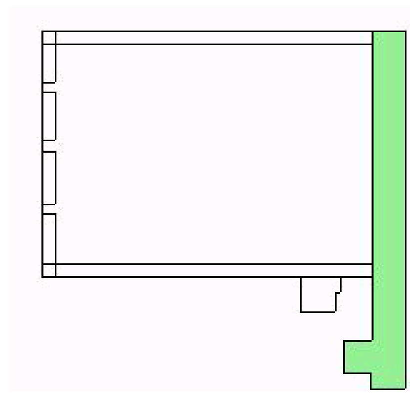
Drainage: Inadequate

Currently Leaking? Unknown

History of Leaking? Unknown

Drainage and Leak Details:





Roof Name:	E26148C0570
Roof Size:	2,920 sq. ft.
Est. replacement Cost:	$43,800.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2007
Assessed Service Life Remaining (Years) :	28
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

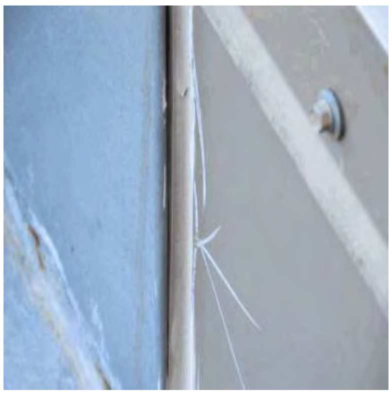
Defect Type	Severity	Quantity	Unit
Defect #01	Repair	2	Ea.

ID#: 1 OBSERVED: 10/09/13, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Missing or failed sealant

REPAIR: Remove old and install new high quality sealant

COMMENTS:



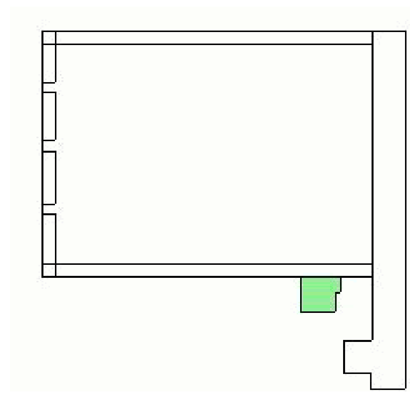
Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	6	Ea.

ID #2 OBSERVED: 6/22/2016, 6/19/2017, 9/10/2019

Erosion of aggregate surfacing

REPAIR: Monitor for possible future repair.

COMMENTS:



Roof Name: E26148C0570

Roof Size: 300 sq. ft.

Est. replacement Cost: $4,500.00

Existing System Type: MnSCU Std. 4-Ply Asphalt

Year Installed: 2007

Assessed Service Life Remaining (Years) : 28

Height: 0 Ft.

Slope:

Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details:

Membrane Defects - Outstanding

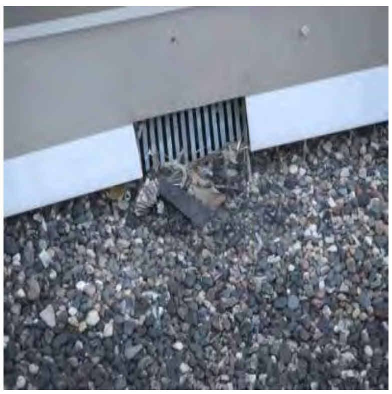
Defect Type	Severity	Quantity	Unit
Defect #01	Repair	1	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Plugged roof drain screen

REPAIR: Remove material from drain screen

COMMENTS:



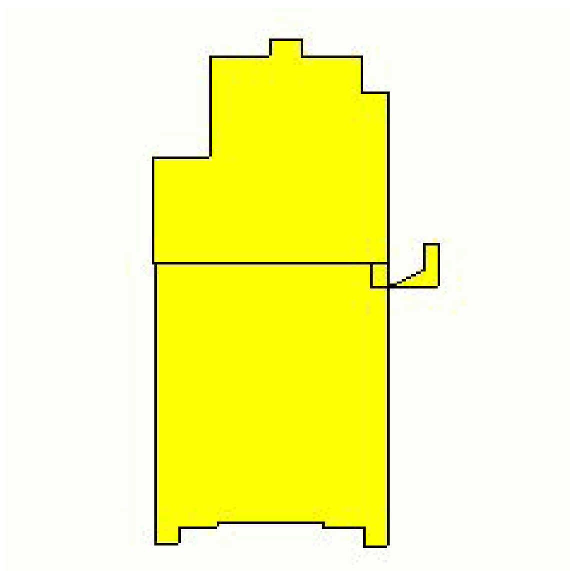
Full Facility Roof Report

Prepared for:

CC-Hill Theatre

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-Hill Theatre

Last Inspection Date : Sep 10, 2019

Facility: CC-Hill Theatre

Contact Name:

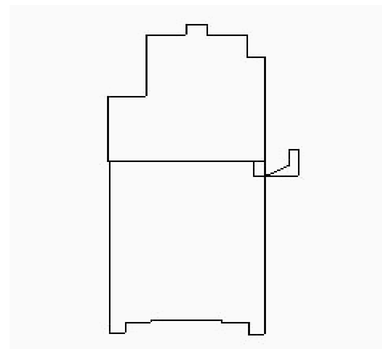
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 10, 2019

Type of building: Academic

Type of Neighborhood:

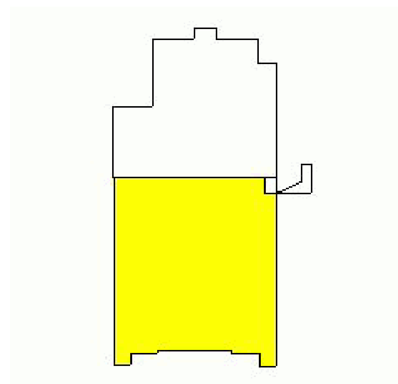


Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HT1	2020	Repair	No	Expense	High	$2,500
Remove all vegetation and debris from the roof area. Resurface exposed areas of membrane.						
HT2	2020	Repair	No	Expense	High	$2,000
Verify and replace wet insulation.						
HT2	2020	predesign	No	Expense	Low	$1,500
The roof is approaching the end of its anticipated service life. Recommend performing a predesign study for an accurate budget.						
HT2	2024	Replacement	No	Capital	Moderate	$177,048
HT3	2020	Replacement	No	Capital	Moderate	$172,001
Budget cost estimate is based on replacement of Sections HT3 and HT4 at the same time. The budget cost is based on the 2011 predesign report. Recommend updating the predesign report.						
HT4	2020	Replacement	No	Capital	Moderate	$1
Budget cost estimate of $172,000.00 is based on replacement of Sections HT3 and HT4 at the same time. The budget cost is based on the 2011 predesign report. Recommend updating the predesign report.						
						$355,050

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
HT1	2020	Repair	No	Expense	High	$2,500
HT2	2020	Repair	No	Expense	High	$2,000
HT2	2020	predesign	No	Expense	Low	$1,500
HT2	2024	Replacement	No	Capital	Moderate	$177,048
HT3	2020	Replacement	No	Capital	Moderate	$172,001
HT4	2020	Replacement	No	Capital	Moderate	$1
						$355,050



Roof Name:	E26148C1174
Roof Size:	8,000 sq. ft.
Est. replacement Cost:	$120,000.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2003
Assessed Service Life Remaining (Years) :	14
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	5	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016,6/19/2017, 9/10/2019

Surfacing loss with membrane deterioration/damage

REPAIR: Repair deteriorated/damaged membrane and restore surfacing.

COMMENTS:

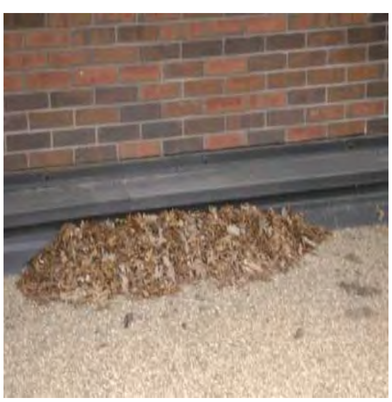
Defect Type	Severity	Quantity	Unit
Defect #02	Repair	10	Ea.

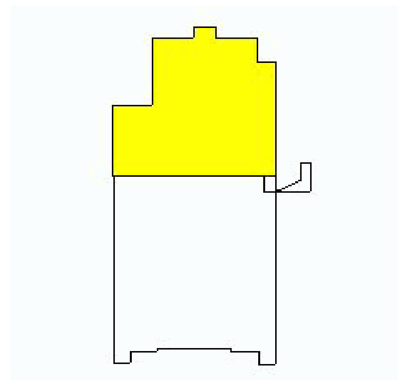
ID#: 2 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Debris/vegetation/foreign materials on roof

REPAIR: Remove debris/vegetation/foreign materials

COMMENTS:





Roof Name:	E26148C1174
Roof Size:	4,918 sq. ft.
Est. replacement Cost:	$177,048.00
Existing System Type:	4-Ply Built-up Asphalt Roofing
Year Installed:	1997
Assessed Service Life Remaining (Years) :	4
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	Yes
History of Leaking?	Yes
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Investigate and repair	90	Ea.

ID#: 1 OBSERVED: 08/23/12,9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Suspected wet insulation

REPAIR: Remove and replace wet insulation

COMMENTS:

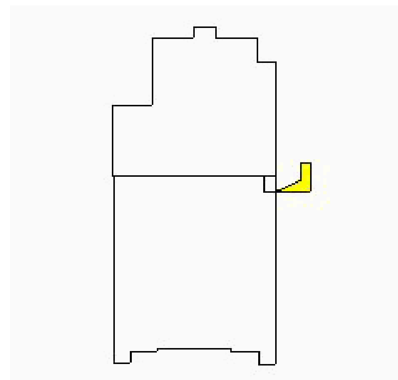
Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	15	Ea.

ID#: 2 OBSERVED: 9/24/14, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Surfacing loss with no membrane deterioration/damage

REPAIR: Install hot asphalt and aggregate surfacing at exposed areas of membrane.

COMMENTS:



Roof Name: E26148C1174

Roof Size: 100 sq. ft.

Est. replacement Cost: $86,000.00

Existing System Type: (EPDM-B) Ballasted Ethylene-Propylene-Diene-Monomer

Year Installed: 1986

Assessed Service Life Remaining (Years) : 0

Height: 0 Ft.

Slope:

Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details: The estimated replacement cost is based on the 2011 predesign report. Recommend updating the predesign report.

Membrane Defects - Outstanding

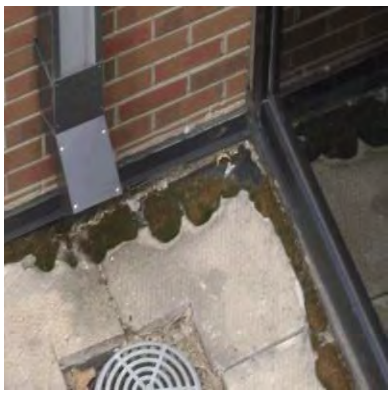
Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	5	Ea.

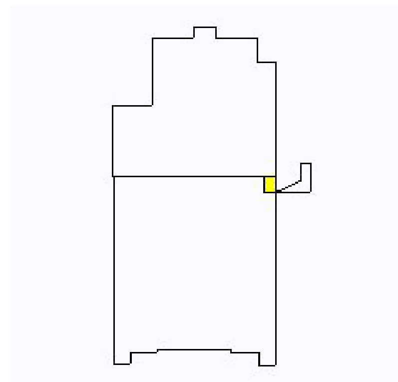
ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/10/2019

Debris/vegetation/foreign materials on roof

REPAIR: Monitor for repair need prior to reroofing

COMMENTS: Significant amounts of vegetation.





Roof Name: E26148C1174

Roof Size: 100 sq. ft.

Est. replacement Cost: $86,000.00

Existing System Type: (EPDM-FA) Fully Adhered Ethylene-Propylene-Diene-Monc

Year Installed: 1997

Assessed Service Life Remaining (Years) : 0

Height: 0 Ft.

Slope:

Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details: The estimated replacement cost is based on the 2011 predesign report. Recommend updating the predesign report.

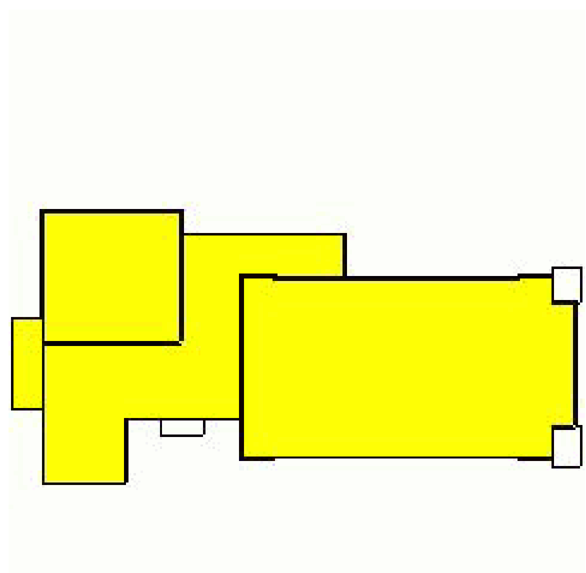
Full Facility Roof Report

Prepared for:

CC-Regional Sports Center

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:



CC-Regional Sports Center

Last Inspection Date : Sep 16, 2019

Facility: CC-Regional Sports Center

Contact Name:

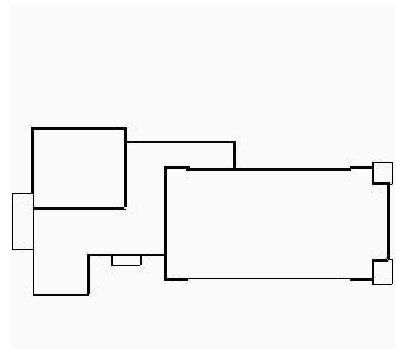
Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 16, 2019

Type of building: Academic

Type of Neighborhood:

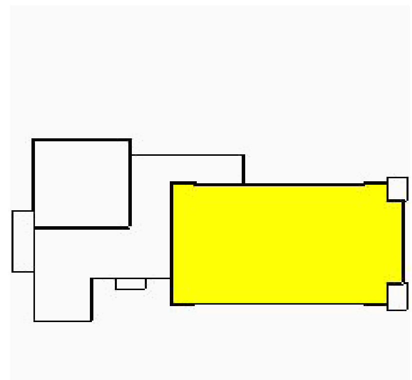


Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
SC1	2020	Repair	No	Expense	Moderate	$2,000
Replace any loose or missing fasteners. Replace sealant at joints in coping and intersection to the scuppers.						
SC2, 3, 6, 7	2020	Repair	No	Expense	Moderate	$5,000
Install plastic cement and fabric over open flashing joints. Install additional sealant where missing or deteriorated. Verify and replace any wet insulation.						
SC4, 8, 9	2018	Repair	No	Expense	Low	$500
Install plastic cement and fabric over open joints in the base flashing. Replace blistered base flashing. Remove debris from the roof.						
SC5	2020	Repair	No	Expense	Low	$1,500
Install plastic cement and fabric over open flashing joints and repair displaced metal. Replace any loose or missing fasteners.						
						$9,000

Recommendation Summary						
Section ID	**Budget Year**	**Activity Type**	**Action Item ?**	**Allocation**	**Urgency**	**Budget Amount**
SC1	2020	Repair	No	Expense	Moderate	$2,000
SC2, 3, 6, 7	2020	Repair	No	Expense	Moderate	$5,000
SC4, 8, 9	2018	Repair	No	Expense	Low	$500
SC5	2020	Repair	No	Expense	Low	$1,500
						$9,000

Roof Name:	E26148C1202
Roof Size:	47,392 sq. ft.
Est. replacement Cost:	$710,880.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2001
Assessed Service Life Remaining (Years) :	22
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	



Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Repair	10	Ea.

ID#: 1 OBSERVED: 08/23/12 9/14 - some repaired, 6/22/2016, 6/19/2017, 9/16/2019

Missing or failed sealant

REPAIR: Remove old and install new high quality sealant

COMMENTS: Cap flashing joints and scuppers.

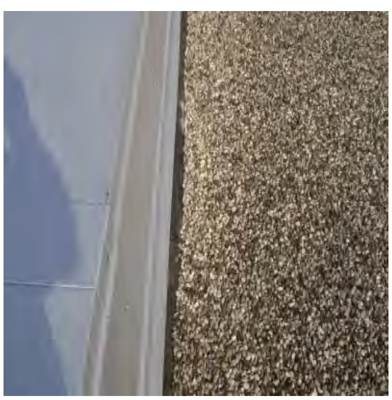
Defect Type	Severity	Quantity	Unit
Defect #02	Monitor	2	Ea.

ID#: 2 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Base flashing - Slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:



Membrane Defects - Outstanding Continued...

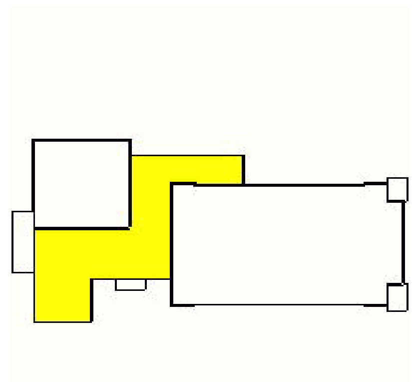
Defect Type	Severity	Quantity	Unit
Defect #03	Repair	1	Ea.

ID#: 3 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Loose or missing fasteners

REPAIR: Resecure or replace fastener

COMMENTS: Use oversized fasteners if required



Roof Name:	E26148C1202
Roof Size:	25,376 sq. ft.
Est. replacement Cost:	$380,640.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2001
Assessed Service Life Remaining (Years) :	22
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	15	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Base flashing slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Repair	4	Ea.

ID#: 2 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Missing or failed sealant

REPAIR: Remove old and install new high quality sealant

COMMENTS:

Membrane Defects - Outstanding Continued...

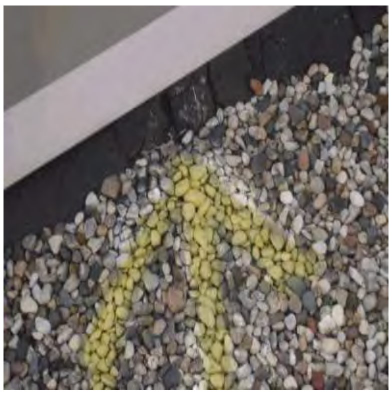
Defect Type	Severity	Quantity	Unit
Defect #03	Repair	25	Ea.

ID#: 3 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Open side laps

REPAIR: Reseal open side laps using appropriate materials

COMMENTS:



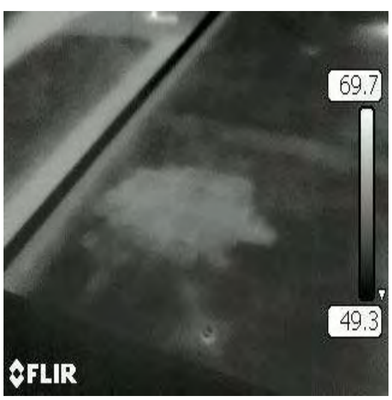
Defect Type	Severity	Quantity	Unit
Defect #04	Repair	150	Ea.

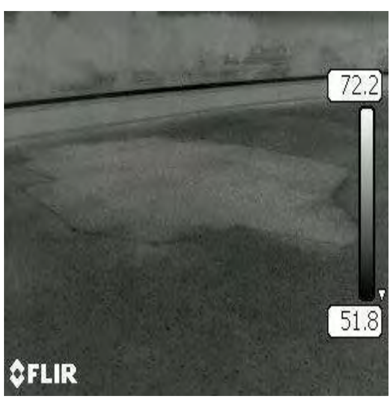
ID#: 4 OBSERVED: 10/23/14,9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Suspected wet insulation

REPAIR: Remove and replace wet insulation

COMMENTS:





Roof Name: E26148C1202

Roof Size: 4,702 sq. ft.

Est. replacement Cost: $70,530.00

Existing System Type: MnSCU Std. 4-Ply Asphalt

Year Installed: 2001

Assessed Service Life Remaining (Years) : 22

Height: 0 Ft.

Slope:

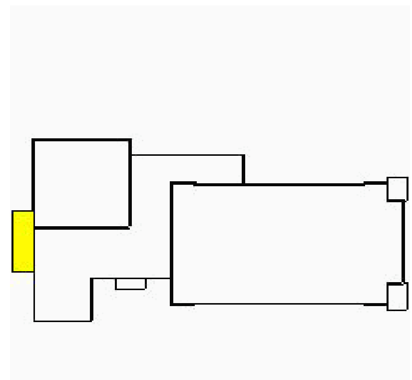
Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details:



Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	4	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Base flashing slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Repair	10	Ea.

ID #2 OBSERVED: 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Open Flashing Joint

REPAIR: install plastic cement and fabric over open flashing joints.

COMMENTS:

Membrane Defects - Outstanding Continued...

Defect Type	Severity	Quantity	Unit
Defect #03	Monitor	2	Ea.

ID #3 OBSERVED: 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Erosion of Aggregate Surfacing

REPAIR: Monitor for possible future repair.

COMMENTS:

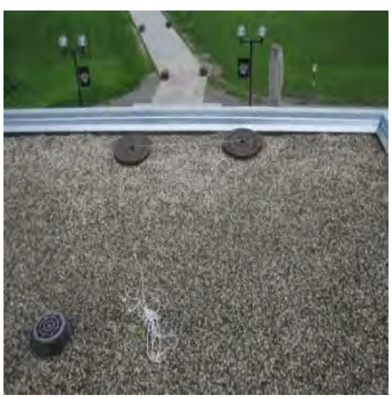
Defect Type	Severity	Quantity	Unit
Defect #04	Repair	4	Ea.

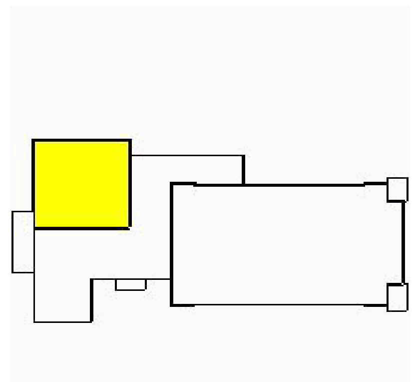
ID #4 OBSERVED: 6/22/2016, 6/19/2017, 9/16/2019

Debris on roof

REPAIR: Remove debris from the roof.

COMMENTS:





Roof Name:	E26148C1202
Roof Size:	14,750 sq. ft.
Est. replacement Cost:	$221,250.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	2001
Assessed Service Life Remaining (Years) :	22
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Adequate
Currently Leaking?	No
History of Leaking?	No
Drainage and Leak Details:	

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Monitor	2	Ea.

ID#: 1 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Base flashing slippage, wrinkling, blistering or bridging

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Repair	3	Ea.

ID#: 2 OBSERVED: 08/23/12, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Metal flashing is missing or displaced

REPAIR: Properly reinstall or replace

COMMENTS:

Membrane Defects - Outstanding Continued...

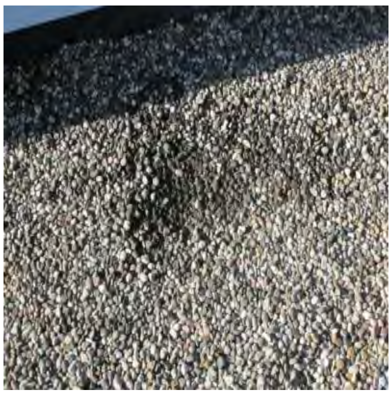
Defect Type	Severity	Quantity	Unit
Defect #03	Monitor	23	Ea.

ID#: 3 OBSERVED: 10/09/13, 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Surfacing loss with no membrane deterioration/damage

REPAIR: Monitor for repair need prior to reroofing

COMMENTS:



Defect Type	Severity	Quantity	Unit
Defect #04	Repair	30	Ea.

ID #4 OBSERVED: 9/1/2015, 6/22/2016, 6/19/2017, 9/16/2019

Open flashing joint

REPAIR: Install plastic cement and fabric over the joints in the base flashing.

COMMENTS:

Membrane Defects - Outstanding Continued...

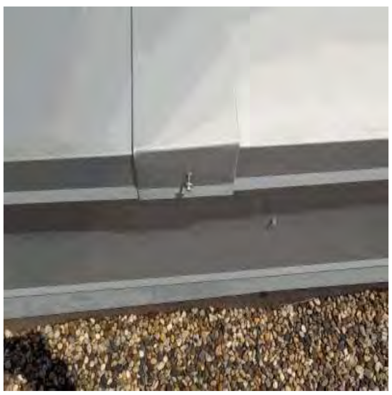
Defect Type	Severity	Quantity	Unit
Defect #05	Repair	1	Ea.

ID #5 OBSERVED: 6/19/2017, 9/16/2019

Loose/missing fastener

REPAIR: Replace any loose or missing fasteners

COMMENTS:



Full Facility Roof Report

Prepared for:

CC-Rochester Regional Stadium

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:

CC-Rochester Regional Stadium

Last Inspection Date : Sep 16, 2019

Facility: CC-Rochester Regional Stadium

Contact Name:

Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 16, 2019

Type of building:

Type of Neighborhood:

Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
Area A	2018	Repair	No	Expense	Low	$1,000
Install counterflashing at three roof curbs where missing. Remove all debris from the roof and install sealant at various sheet metal openings. Replace missing drain strainer.						
						$1,000

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
Area A	2018	Repair	No	Expense	Low	$1,000
						$1,000

Roof Name:

Roof Size: 0 sq. ft.

Est. replacement Cost: $0.00

Existing System Type: (EPDM-FA) Fully Adhered Ethylene-Propylene-Diene-Monc

Year Installed: N/A

Assessed Service Life Remaining (Years) : 12

Height: 0 Ft.

Slope:

Interior Sensitivity:

Drainage: Adequate

Currently Leaking? No

History of Leaking? No

Drainage and Leak Details:

Membrane Defects - Outstanding

Defect Type	Severity	Quantity	Unit
Defect #01	Repair	3	Ea.

ID #1 OBSERVED: 6/22/2016, 9/16/2019

Missing counterflashing

REPAIR: Install counterflashing where missing at curbs.

COMMENTS:

Defect Type	Severity	Quantity	Unit
Defect #02	Repair	1	Ea.

ID #2 OBSERVED: 6/22/2016, 6/19/2017, 9/16/2019

Debris on roof

REPAIR: Remove debris from the roof.

COMMENTS:

Membrane Defects - Outstanding Continued...

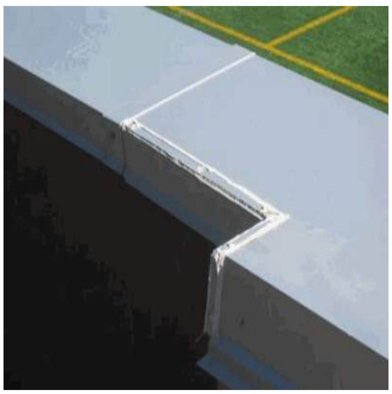
Defect Type	Severity	Quantity	Unit
Defect #03	Repair	6	Ea.

ID #3 OBSERVED: 6/22/2016, 6/19/2017, 9/16/2019

Missing/deteriorated sealant

REPAIR: Install sealant at open joints in sheet metal.

COMMENTS: Sheet metal is spliced together at isolated coping locations and it may be necessary to replace these areas in the future.



Defect Type	Severity	Quantity	Unit
Defect #04	Repair	1	Ea.

ID #4 OBSERVED: 9/16/2019

Missing Drain Strainer

REPAIR: Replace missing drain strainer

COMMENTS:

Full Facility Roof Report

Prepared for:

CC-Singley Hall

Prepared by:

Jim Morgan
Roof Spec, Inc.
Phone:
Fax:

CC-Singley Hall

Last Inspection Date : Sep 16, 2019

Facility: CC-Singley Hall

Contact Name:

Contact Telephone:

Contact Fax:

Date of Last Inspection: Sep 16, 2019

Type of building: Academic

Type of Neighborhood:

Recommendation Details

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
SH	2020	Repair	Yes	Expense	Low	$300
Remove vegetation from the roof.						
						$300

Recommendation Summary

Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
SH	2020	Repair	Yes	Expense	Low	$300
						$300

Roof Name:	Not Updated
Roof Size:	10,000 sq. ft.
Est. replacement Cost:	$150,000.00
Existing System Type:	MnSCU Std. 4-Ply Asphalt
Year Installed:	N/A
Assessed Service Life Remaining (Years) :	18
Height:	0 Ft.
Slope:	
Interior Sensitivity:	
Drainage:	Inadequate
Currently Leaking?	Unknown
History of Leaking?	Unknown
Drainage and Leak Details:	

Membrane Defects - Outstanding

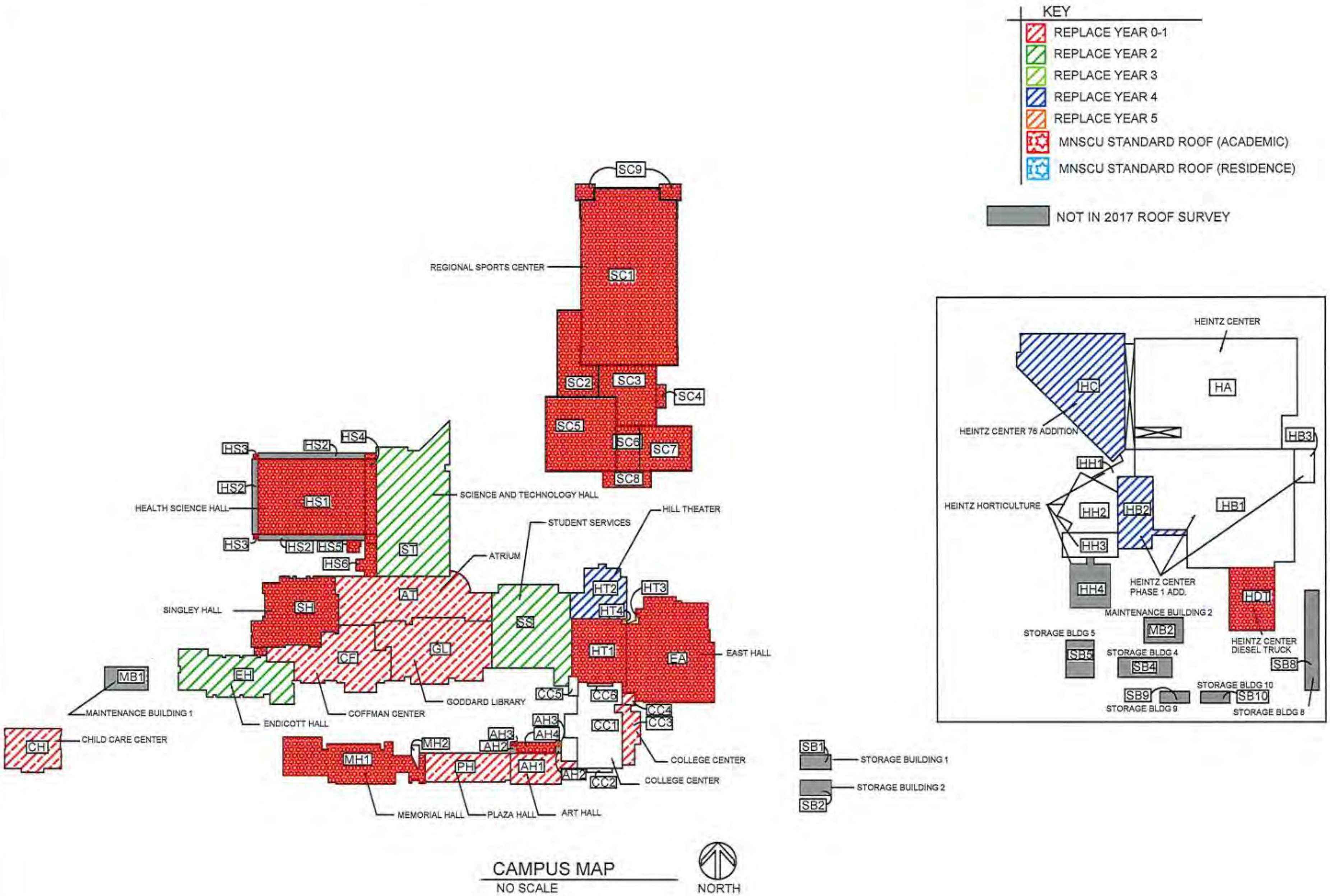
Defect Type	Severity	Quantity	Unit
Defect #01	Repair	3	Ea.

ID #1 OBSERVED: 9/16/2019

Vegetation debris

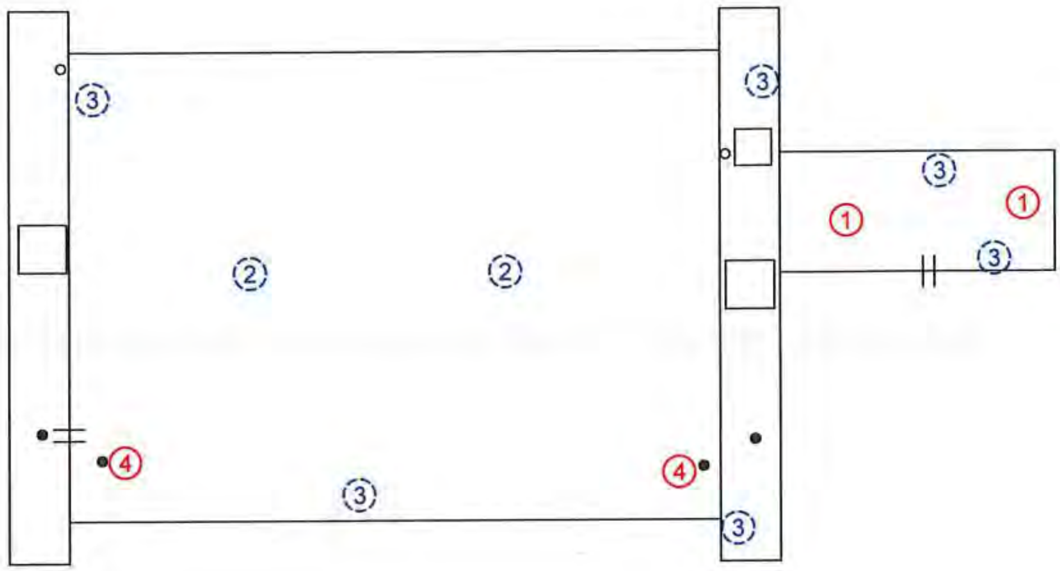
REPAIR: Remove vegetation from the roof.

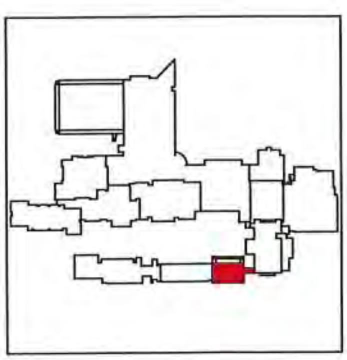
COMMENTS:



CAMPUS MAP
NO SCALE

CAMPUS	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





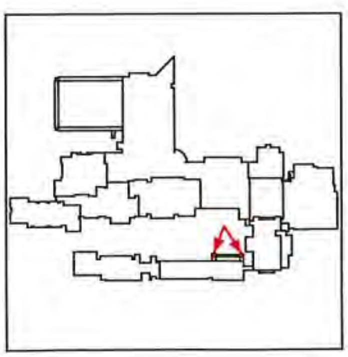
SYMBOLS KEY
- ROOF CURB
- ROOF DRAIN
- SCUPPER
- VENT STACK
- DEFECT-REPAIR
- DEFECT-MONITOR

DEFECT KEY
1. VEGETATION / DEBRIS
2. PONDING / EVIDENCE OF PONDING
3. MEMBRANE BRIDGING
4. PLUGGED DRAIN SCREEN

N

0 2 4 8 16 32

CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	ART HALL SECTION AH1	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

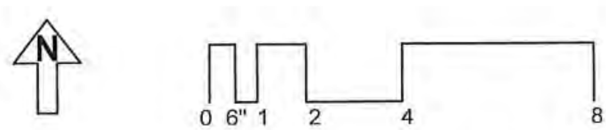


SYMBOLS KEY

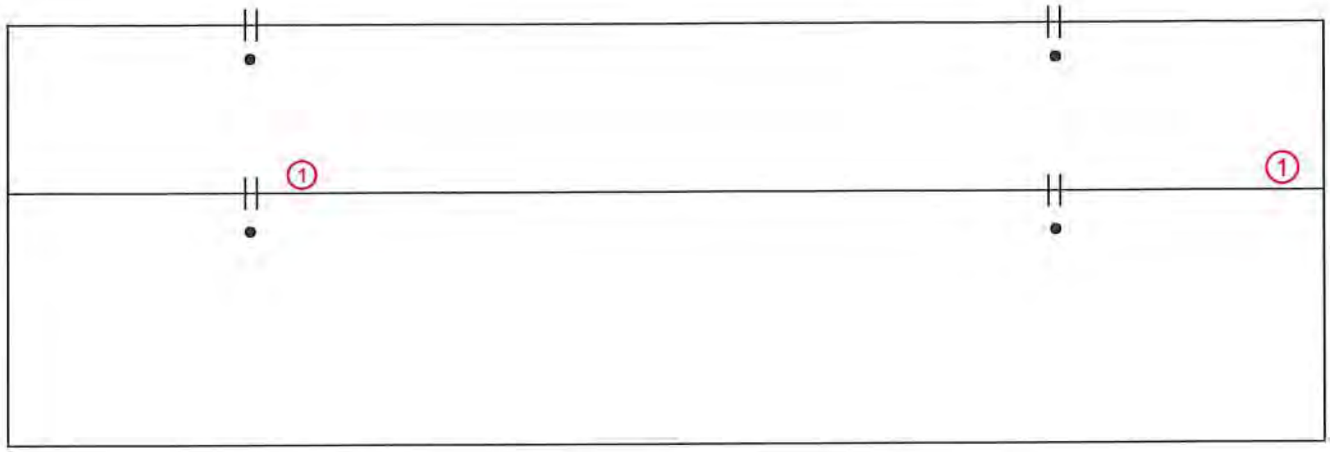
- SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

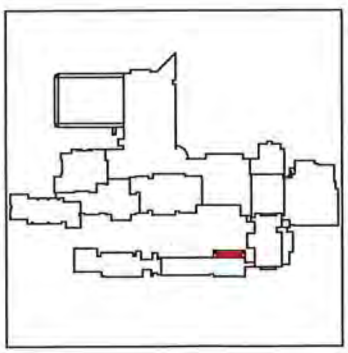
DEFECT KEY

- (1) VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	ART HALL SECTION AH3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



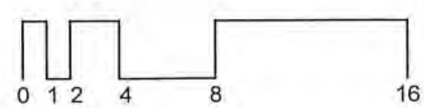


SYMBOLS KEY

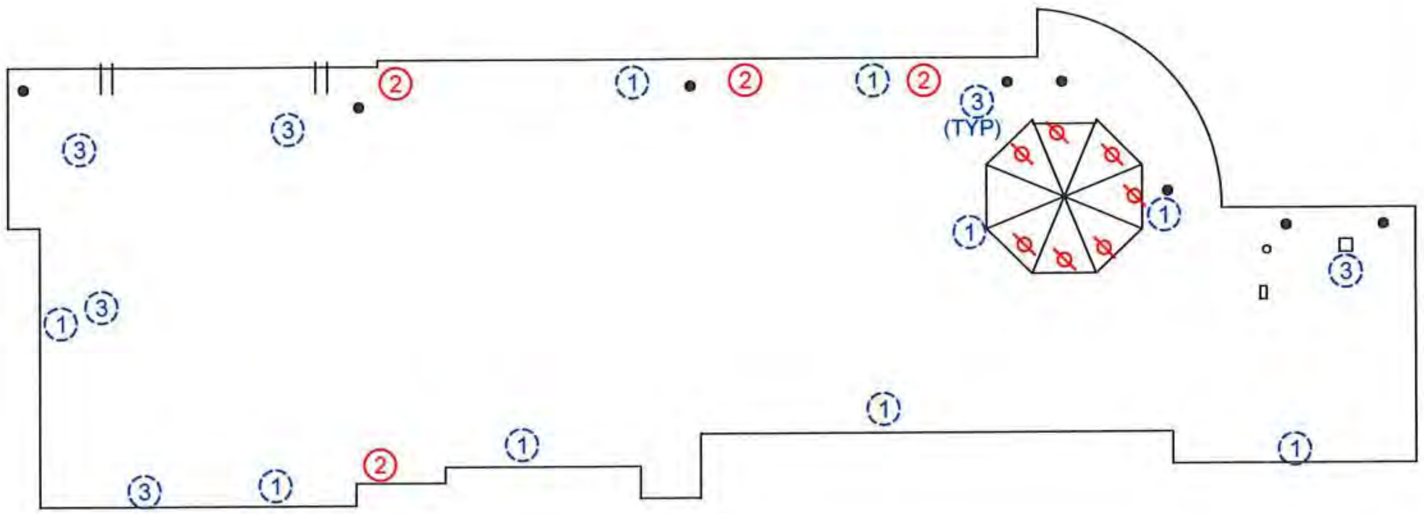
- SCUPPER
- ROOF DRAIN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

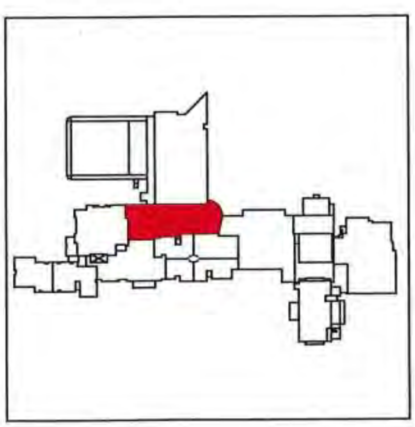
DEFECT KEY

- (1) VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	ART HALL SECTION AH4	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



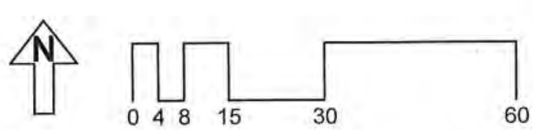


SYMBOLS KEY

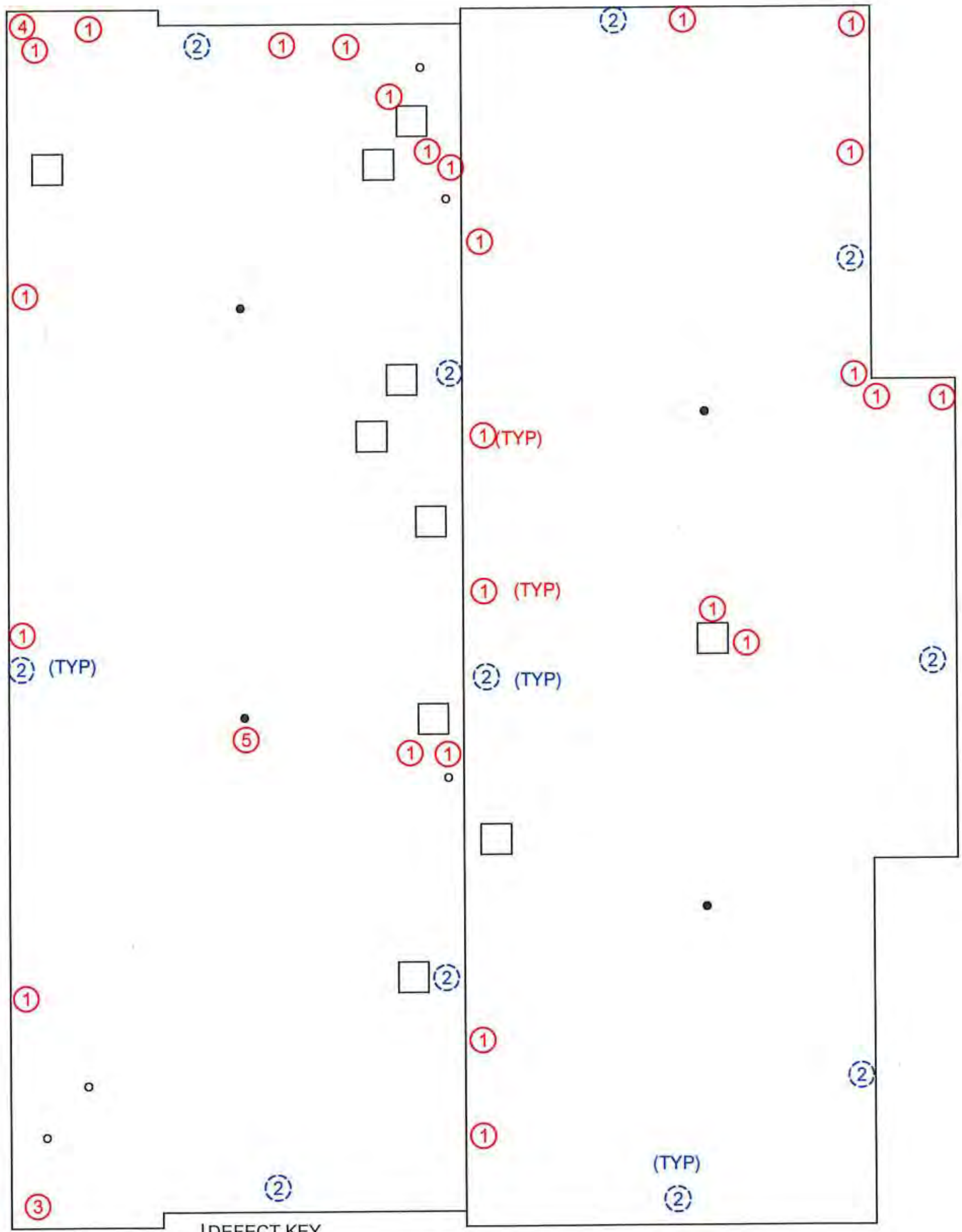
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SCUPPER
- PITCH PAN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY

- (1) MEMBRANE BRIDGING
- (2) OPEN SEAM / FLASHING
- (3) BROKEN / DAMAGED PAVERS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	ATRIUM SECTION AT	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

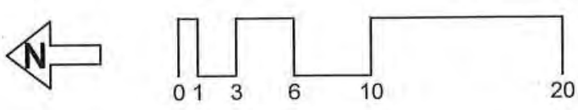


SYMBOLS KEY

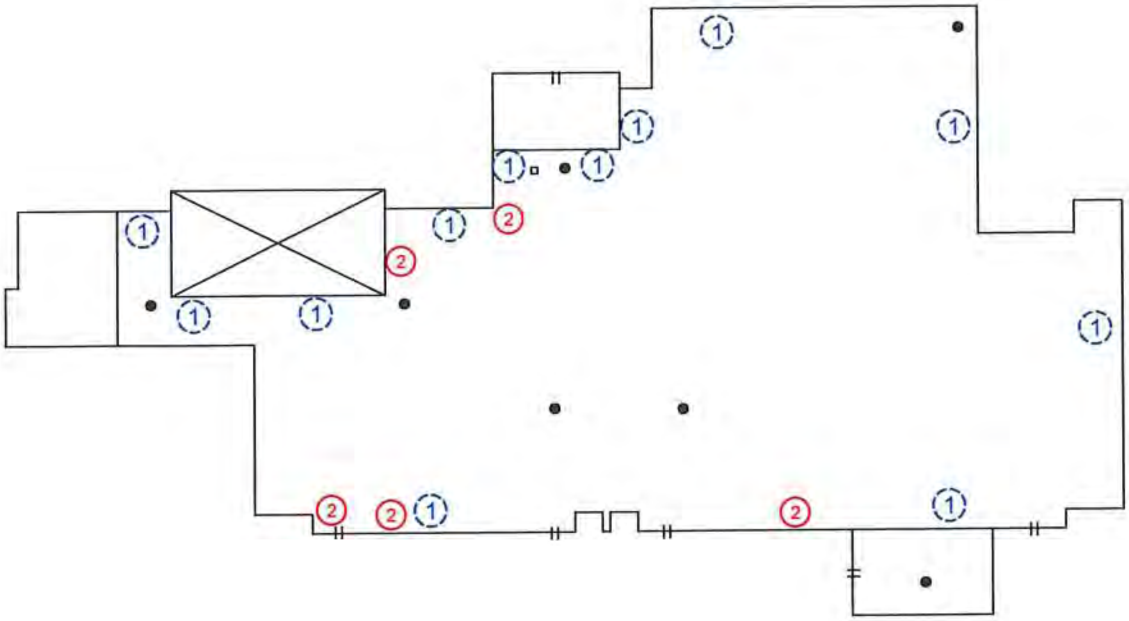
- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

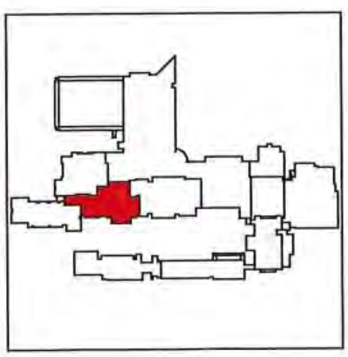
DEFECT KEY

1. OPEN SEAM / FLASHING
2. MEMBRANE BRIDGING
3. OVERHANGING TREES
4. PUNCTURED MEMBRANE
5. PLUGGED DRAIN SCREEN



CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	CHILD CARE CENTER SECTION CH	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SCUPPER
- SKYLIGHT
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

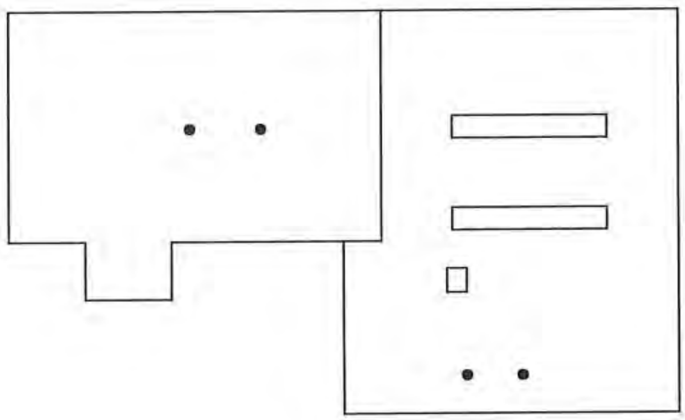
DEFECT KEY

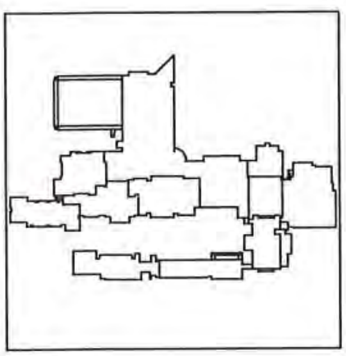
(1) MEMBRANE BRIDGING
(2) OPEN SEAM / FLASHING

N

0 4 8 15 30 60

CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	COFFMAN CENTER SECTION CF1	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



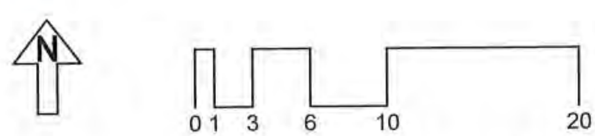


SYMBOLS KEY

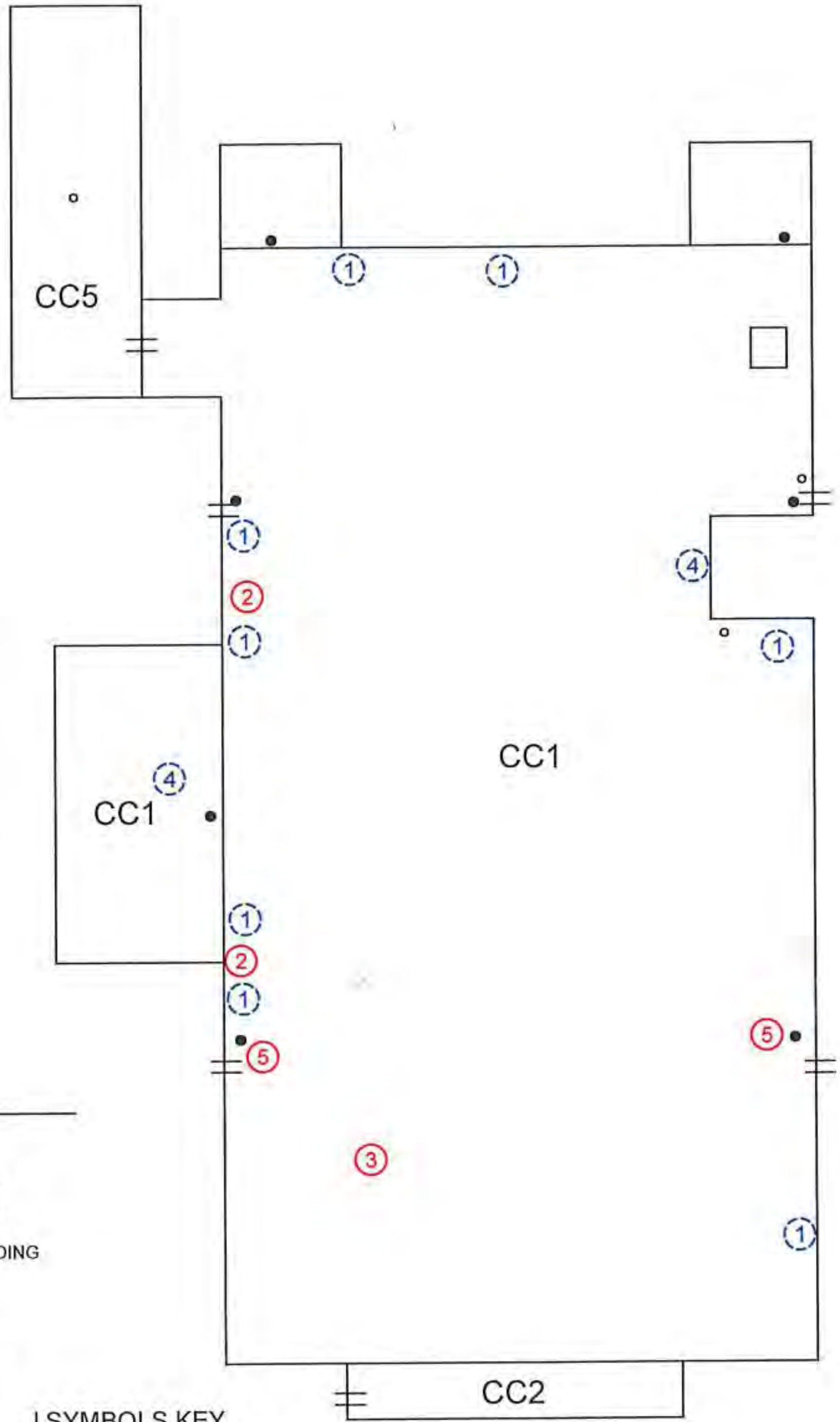
- ROOF CURB
- ROOF DRAIN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY

- (#) 2019 NO DEFECT
- (#) 2019 NO DEFECT

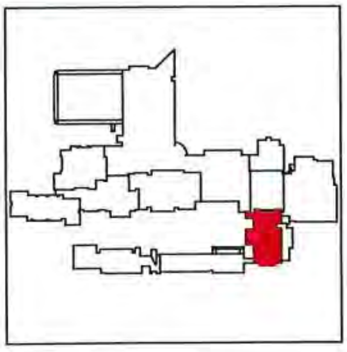


CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	COFFMAN CENTER SECTION CF2	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



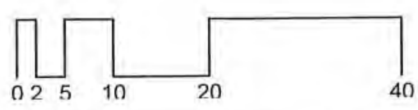
DEFECT KEY

- (1) BLISTER BASE FLASHING
- (2) LOOSE / MISSING FASTENERS
- (3) SUSPECTED WET INSULATION
- (4) PONDING / EVIDENCE OF PONDING
- (5) PLUGGED DRAIN SCREEN

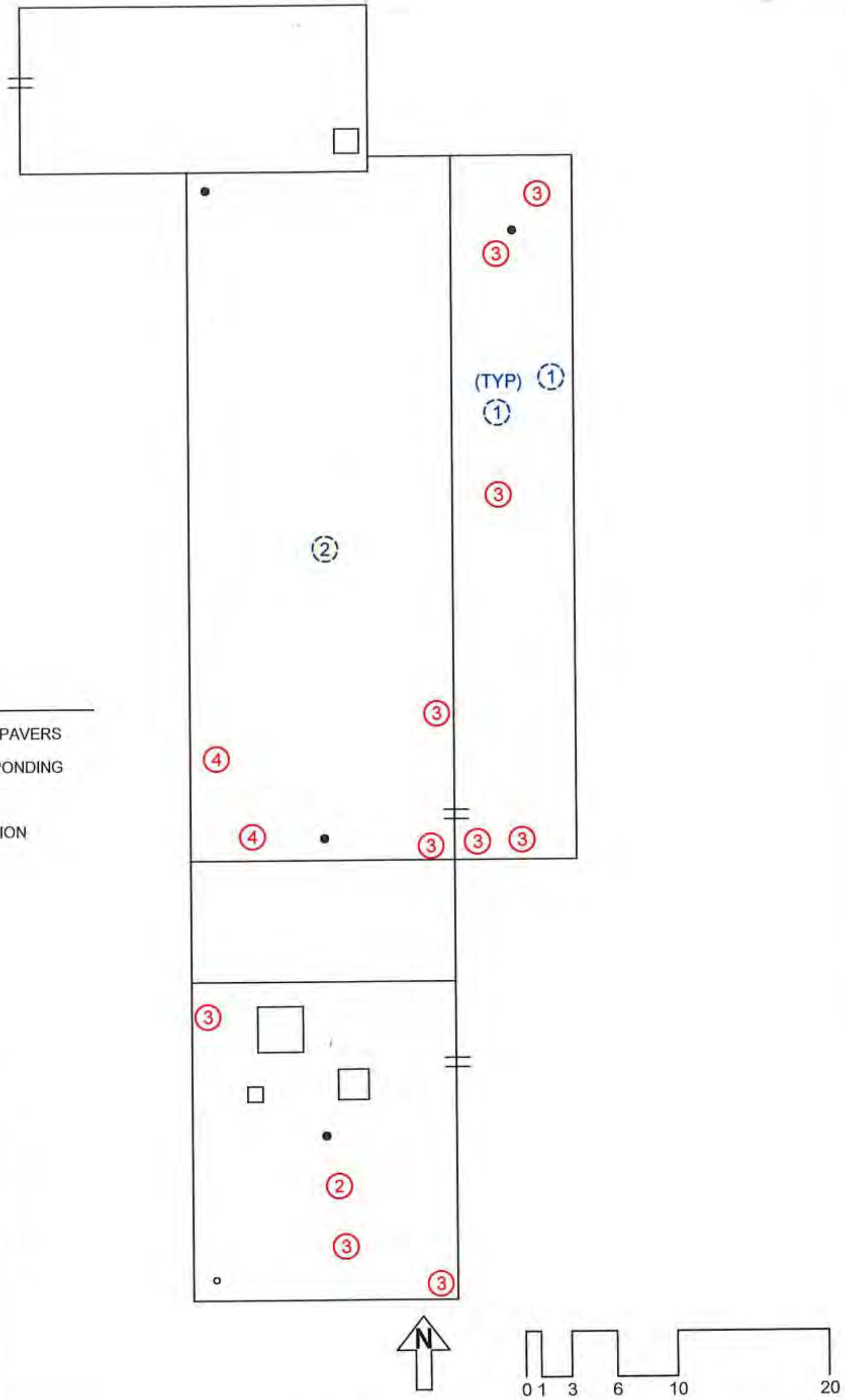


SYMBOLS KEY

- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- ╪ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	COLLEGE CENTER SECTION CC1,CC2,CC5	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

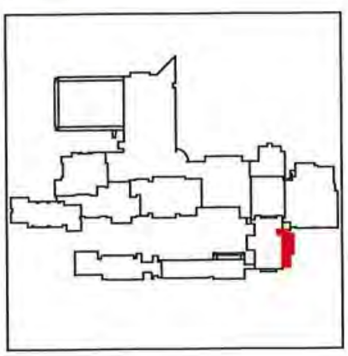


DEFECT KEY

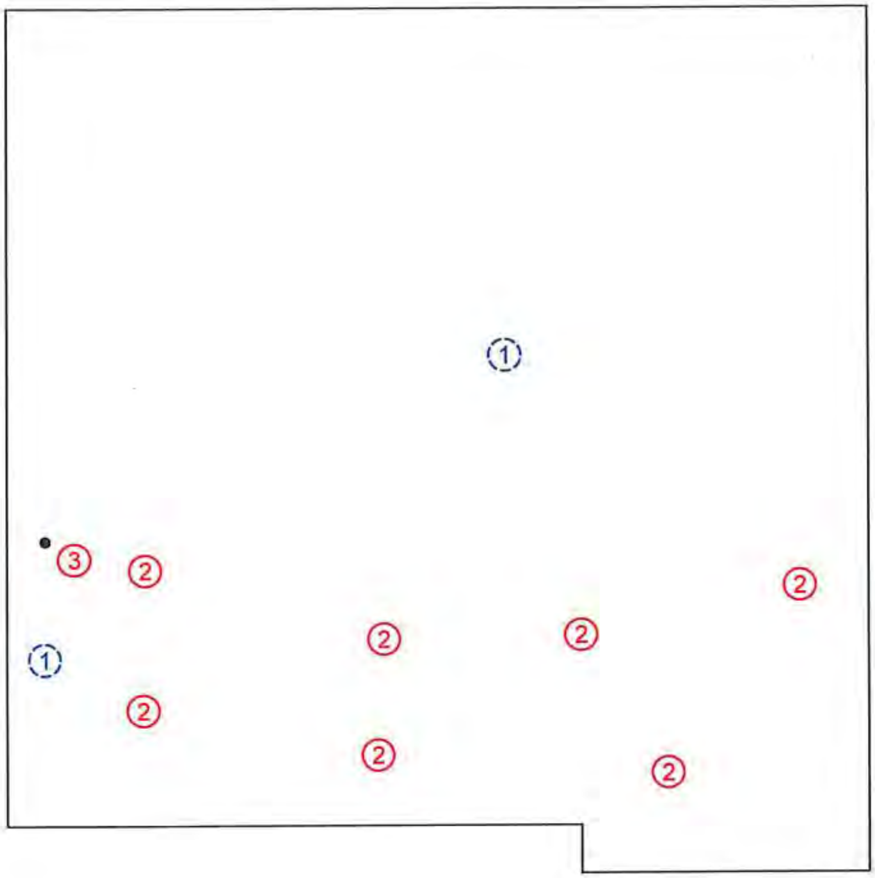
- (1) BROKEN / DETERIORATED PAVERS
- (2) PONDING / EVIDENCE OF PONDING
- (3) VEGETATION / DEBRIS
- (4) SUSPECTED WET INSULATION

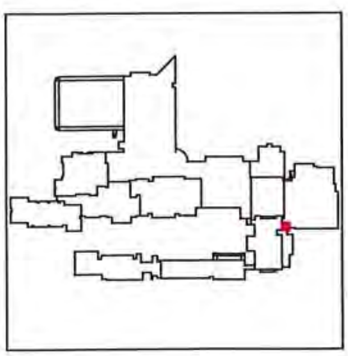
SYMBOLS KEY

- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- ‡ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	COLLEGE CENTER SECTION CC3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



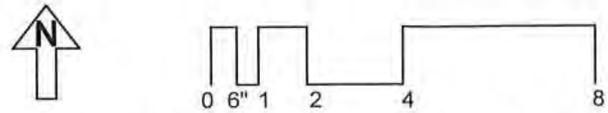


SYMBOLS KEY

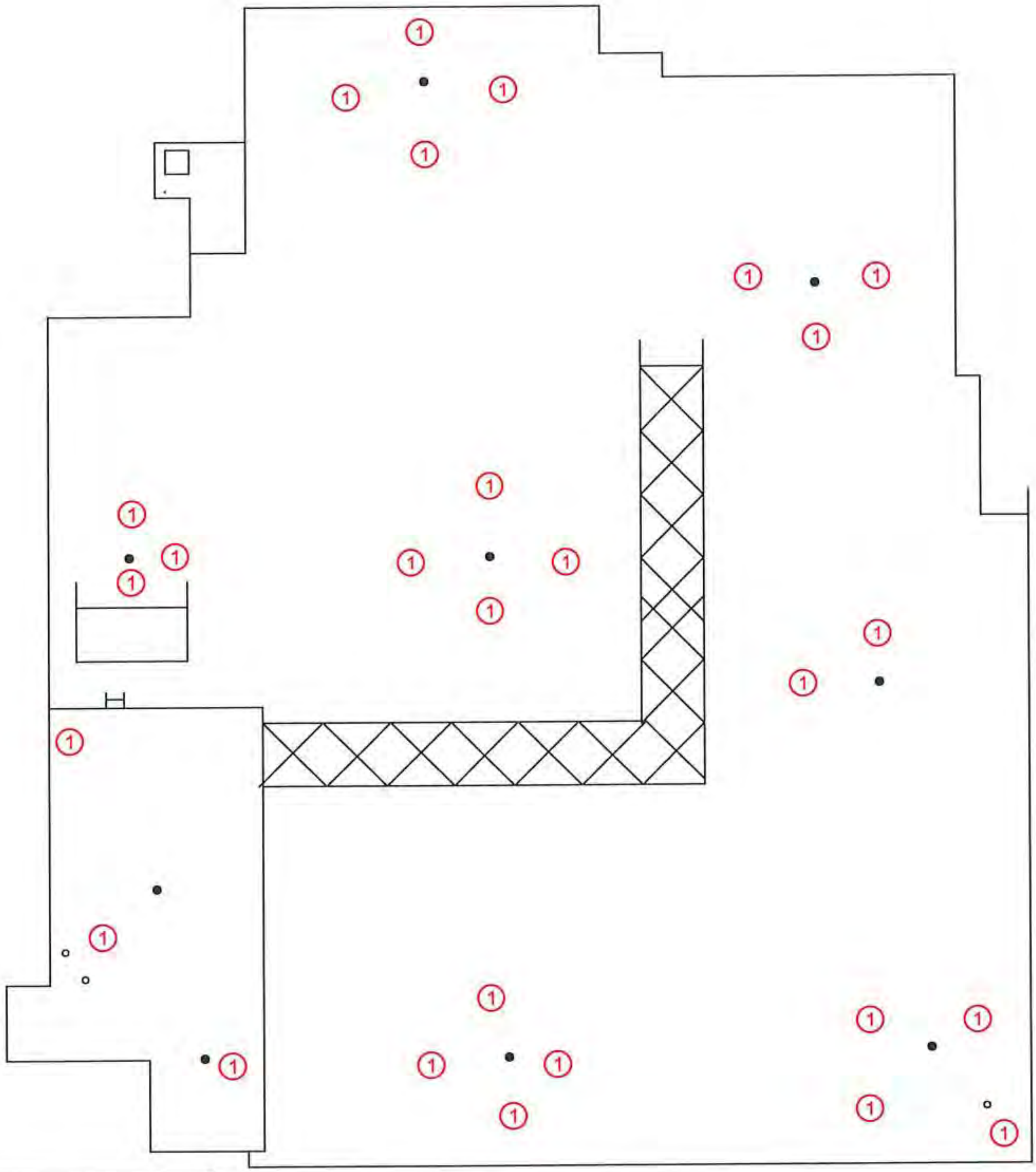
- ● ROOF DRAIN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

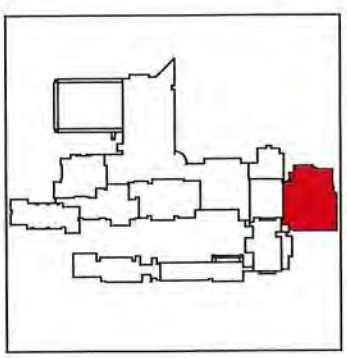
DEFECT KEY

- (1) PONDING / EVIDENCE OF PONDING
- (2) SUSPECTED WET INSULATION
- (3) VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	COLLEGE CENTER SECTION CC4	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



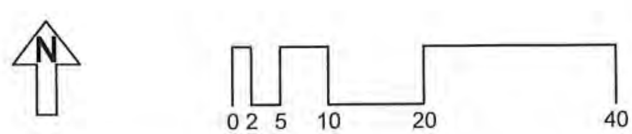


SYMBOLS KEY

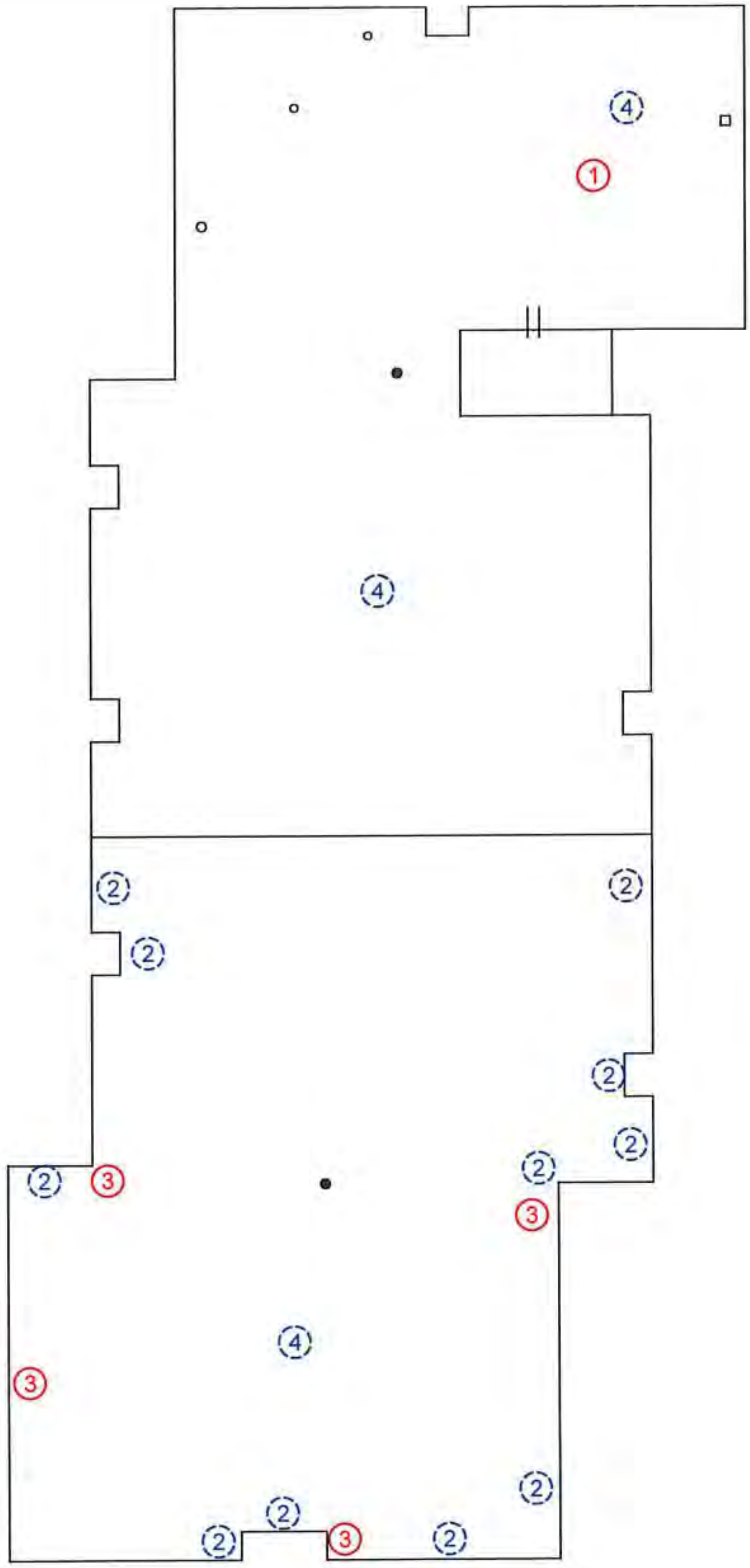
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SKYLIGHT
- LADDER
- DEFECT-REPAIR
- DEFECT-MONITOR

DEFECT KEY

1 EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	EAST HALL SECTION EA	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

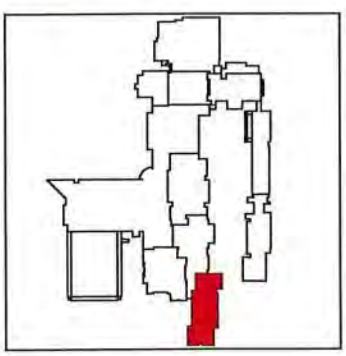


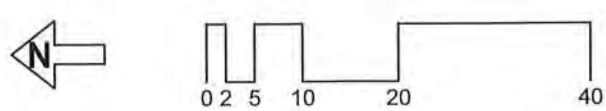
DEFECT KEY

- (1) DISPLACED BALLAST
- (2) MEMBRANE BRIDGING
- (3) OPEN FLASHING JOINT
- (4) PONDING / EVIDENCE OF PONDING

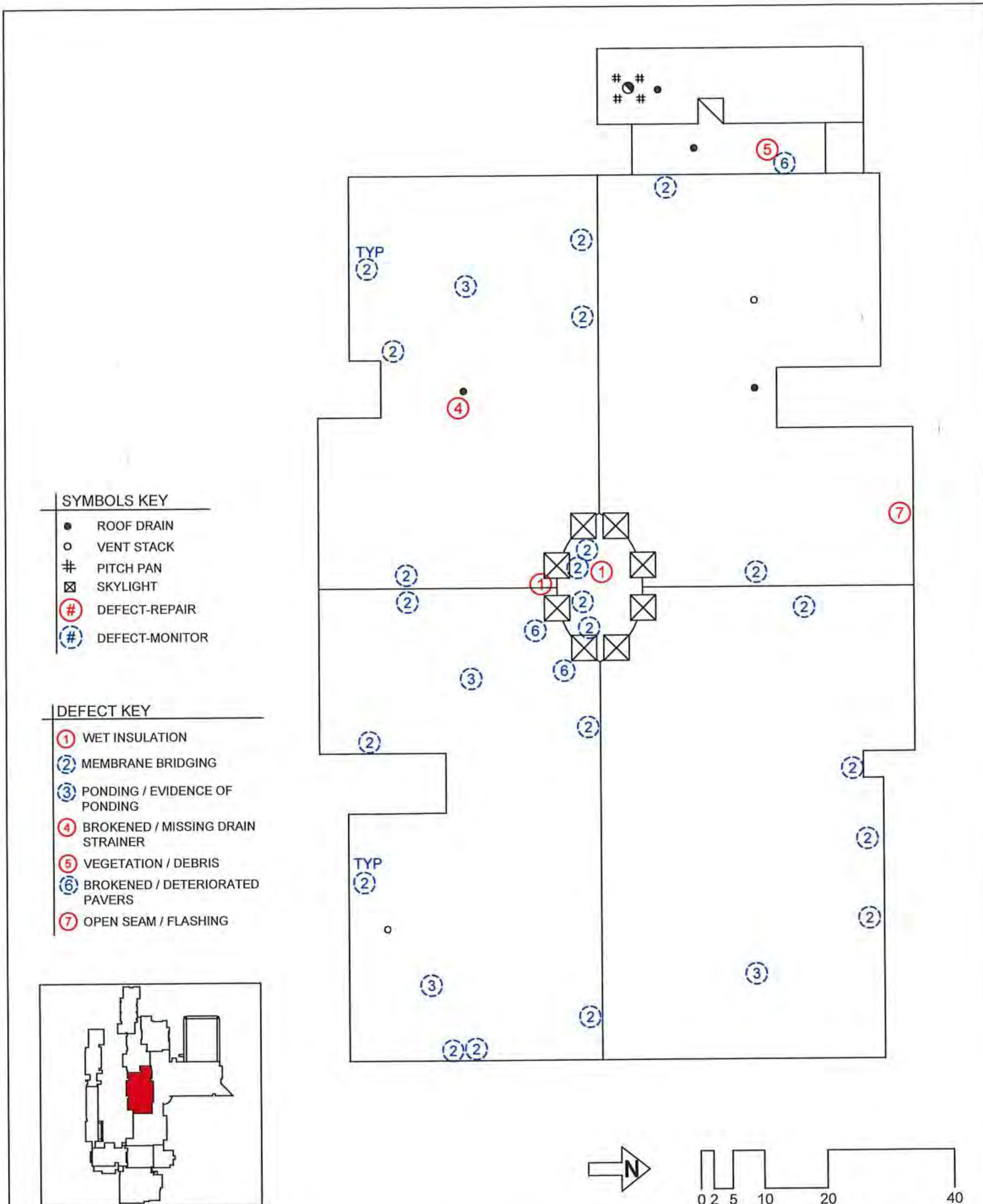
SYMBOLS KEY

- □ ROOF CURB
- ● ROOF DRAIN
- o VENT STACK
- ‡ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

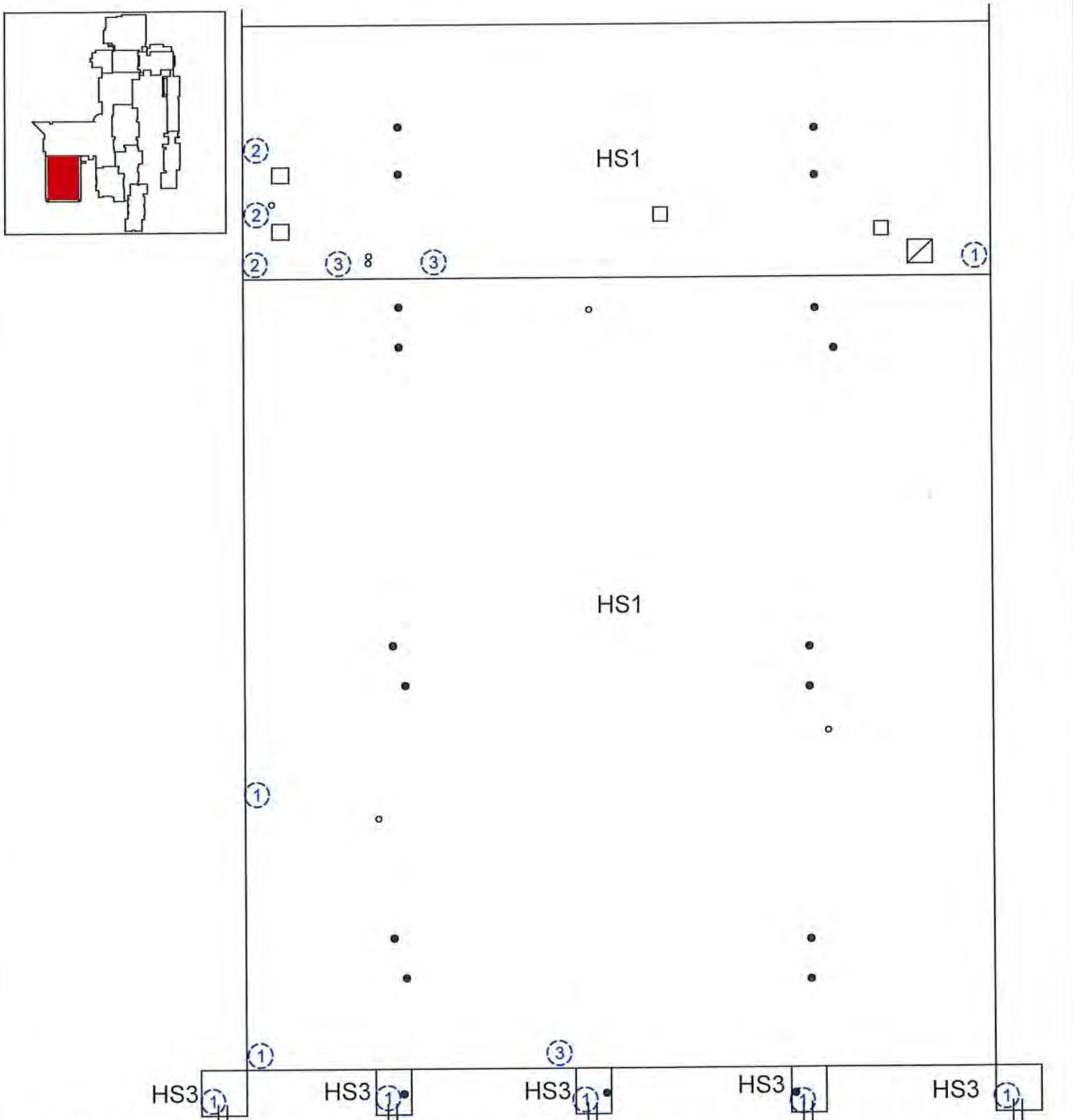




CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	ENDICOTT HALL SECTION EH	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	GODDARD LIBRARY SECTION GL	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

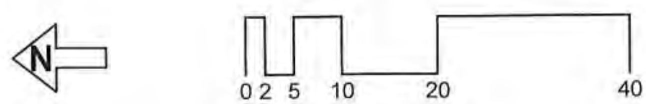


SYMBOLS KEY

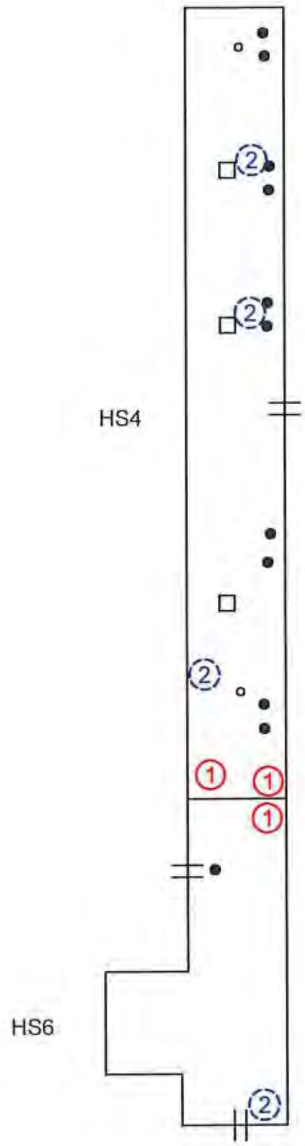
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SCUPPER
- DEFECT-REPAIR
- DEFECT-MONITOR

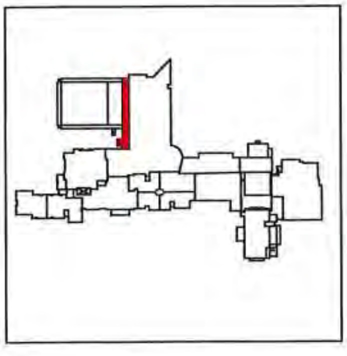
DEFECT KEY

1. EROSION OF AGGREGATE SURFACING
2. IMPROPER EQUIPMENT SUPPORT
3. BLISTERED BASE FLASHING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEALTH SCIENCE SECTION HS1, HS3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



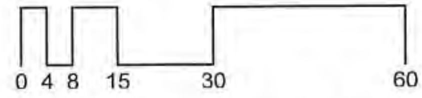


SYMBOLS KEY

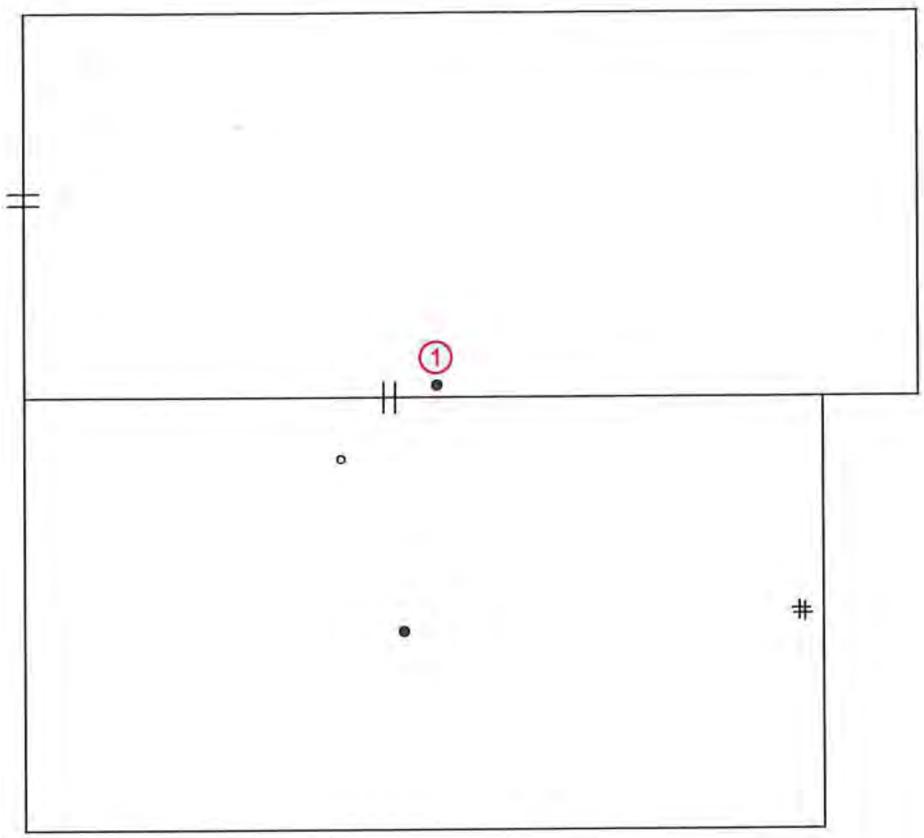
□	ROOF CURB
●	ROOF DRAIN
○	VENT STACK
╫	SCUPPER
⊠	SKYLIGHT
(#)	DEFECT-REPAIR
(#)	DEFECT-MONITOR

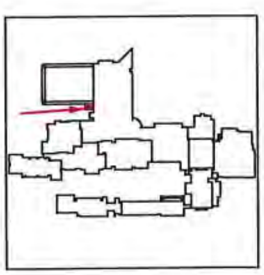
DEFECT KEY

1. MISSING / DETERIORATED SEALANT
2. EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEALTH SCIENCE SECTION HS4, HS6	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



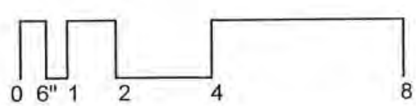


SYMBOLS KEY

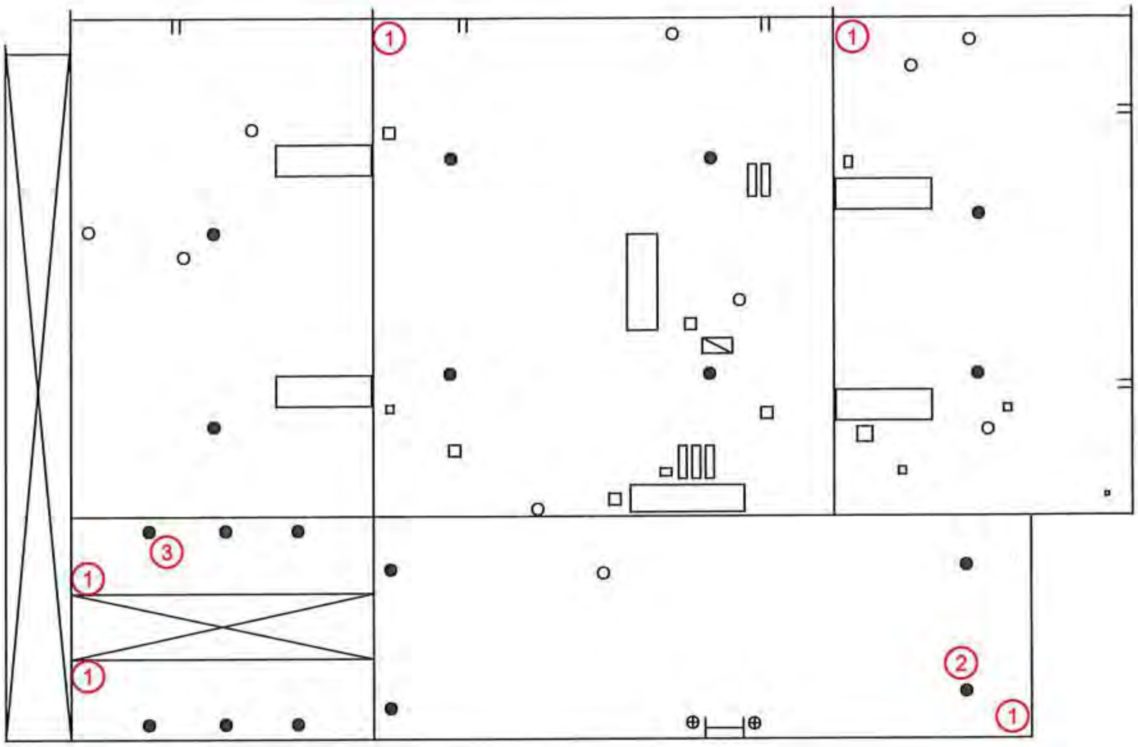
- ROOF DRAIN
- VENT STACK
- SCUPPER
- PITCH PAN
- DEFECT-REPAIR
- DEFECT-MONITOR

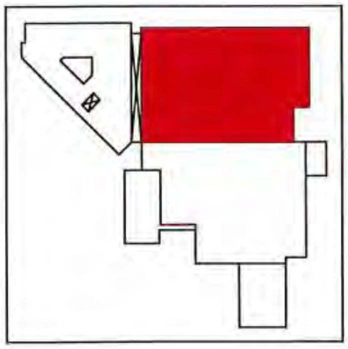
DEFECT KEY

1 VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEALTH SCIENCE SECTION HS5	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SCUPPER
- SKYLIGHT
- ROOF HATCH
- PITCH PAN
- DEFECT-REPAIR
- DEFECT-MONITOR

DEFECT KEY

1. VEGETATION / DEBRIS
2. EROSION OF AGGREGATE SURFACING
3. PLUGGED DRAIN STRAINER

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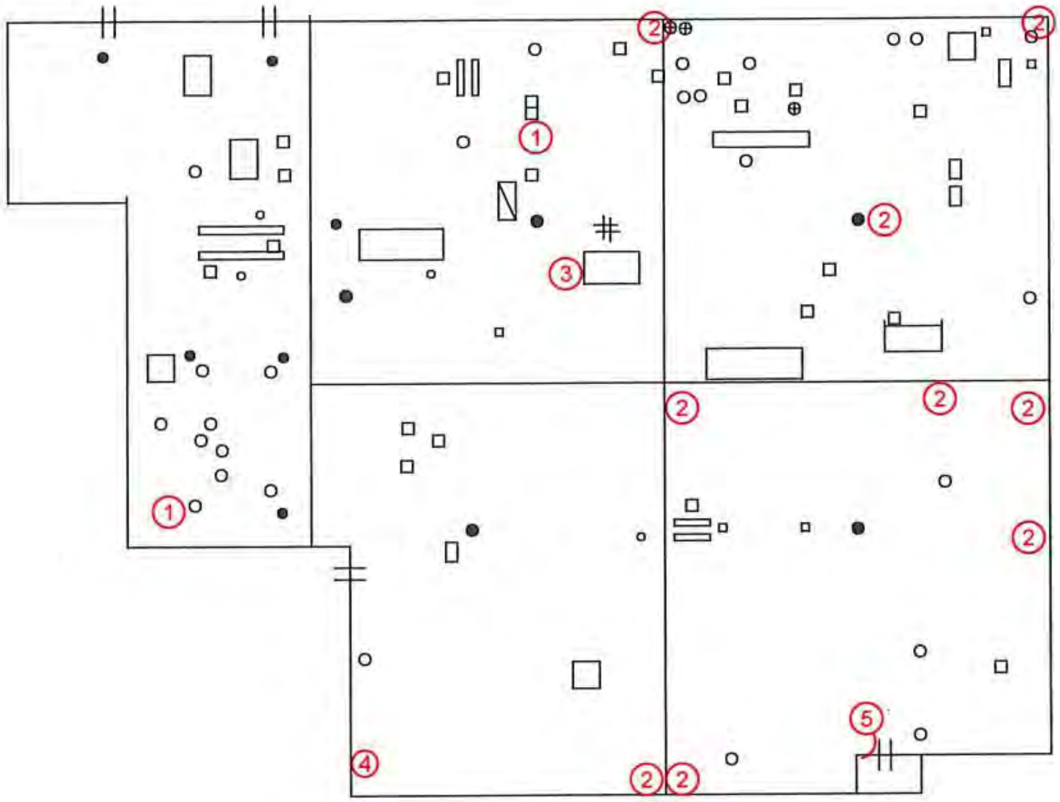
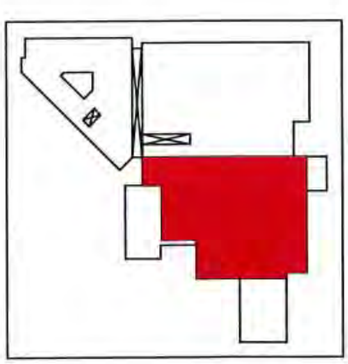
0 6 12 25 50 100

CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER MAIN BUILDING SECTION HA	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



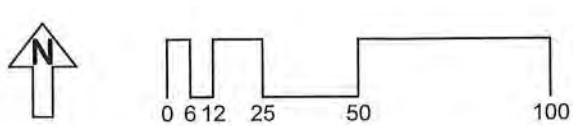


SYMBOLS KEY

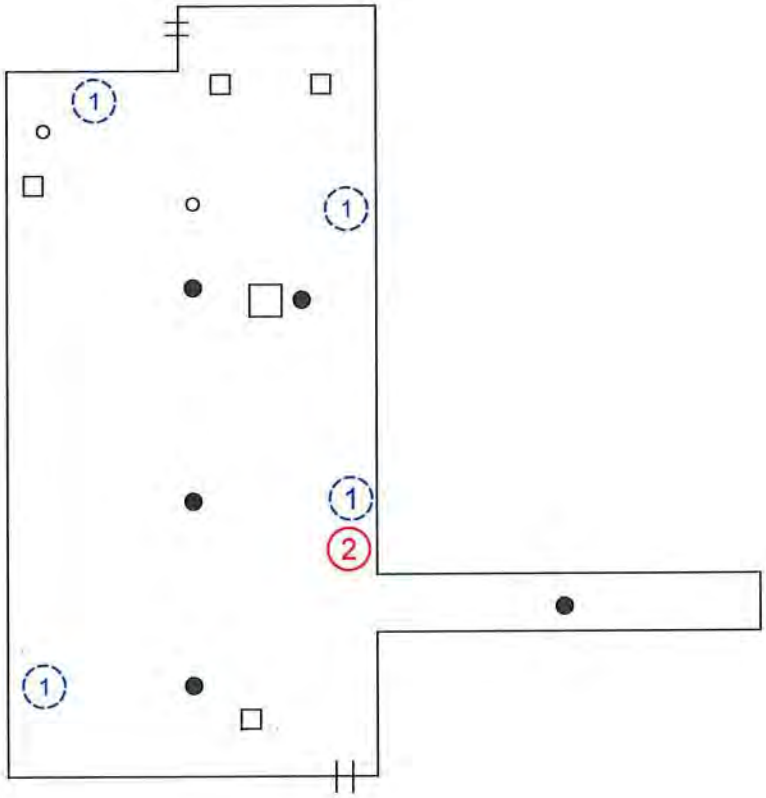
- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- SCUPPER
- PITCH PAN
- ⊕ FLASHED PENETRATION
- ROOF HATCH
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

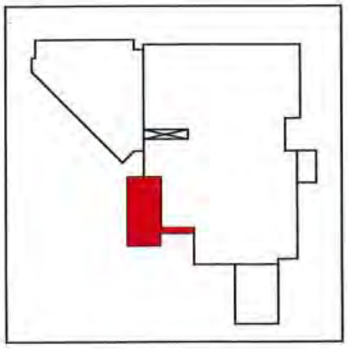
DEFECT KEY

1. MISSING / DETERIORATED SEALANT
2. VEGETATION / DEBRIS
3. IMPROPER EQUIPMENT SUPPORT
4. EROSION OF AGGREGATE SURFACING
5. BLISTERED BASE FLASHING



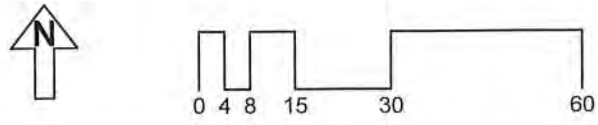
CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER PHASE 1 ADDITION SECTION HB1	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



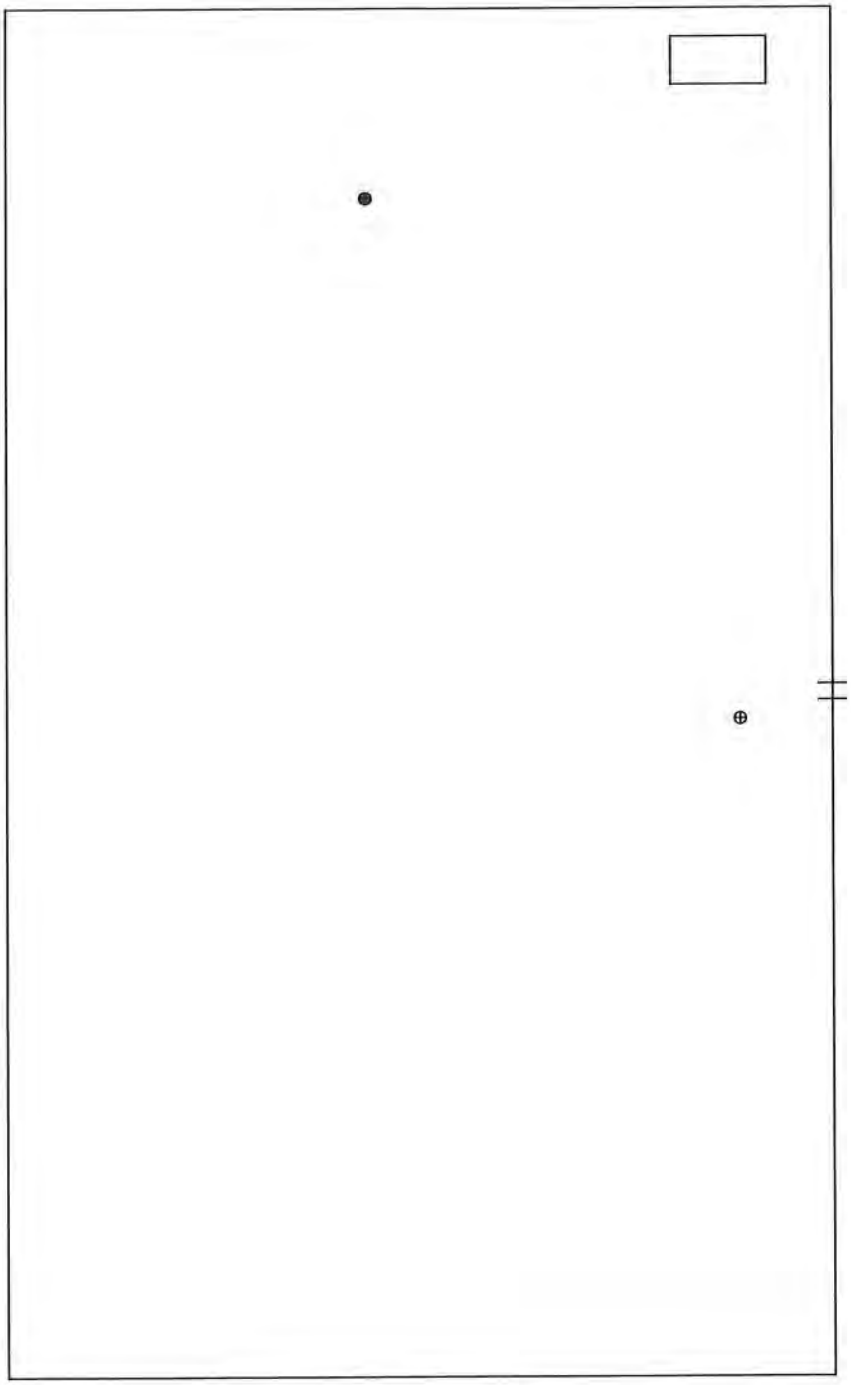


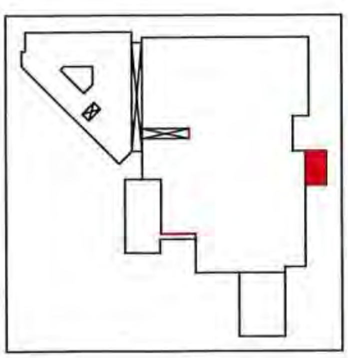
SYMBOLS KEY
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SCUPPER
- DEFECT-REPAIR
- DEFECT-MONITOR

DEFECT KEY
- 1 MEMBRANE BRIDGING
- 2 OPEN SEAM FLASHING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER PHASE 1 ADDITION SECTION HB2	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- SCUPPER
- FLASHED PENETRATION
- DEFECT-REPAIR
- DEFECT-MONITOR

DEFECT KEY

- 2019 NO DEFECT
- 2019 NO DEFECT

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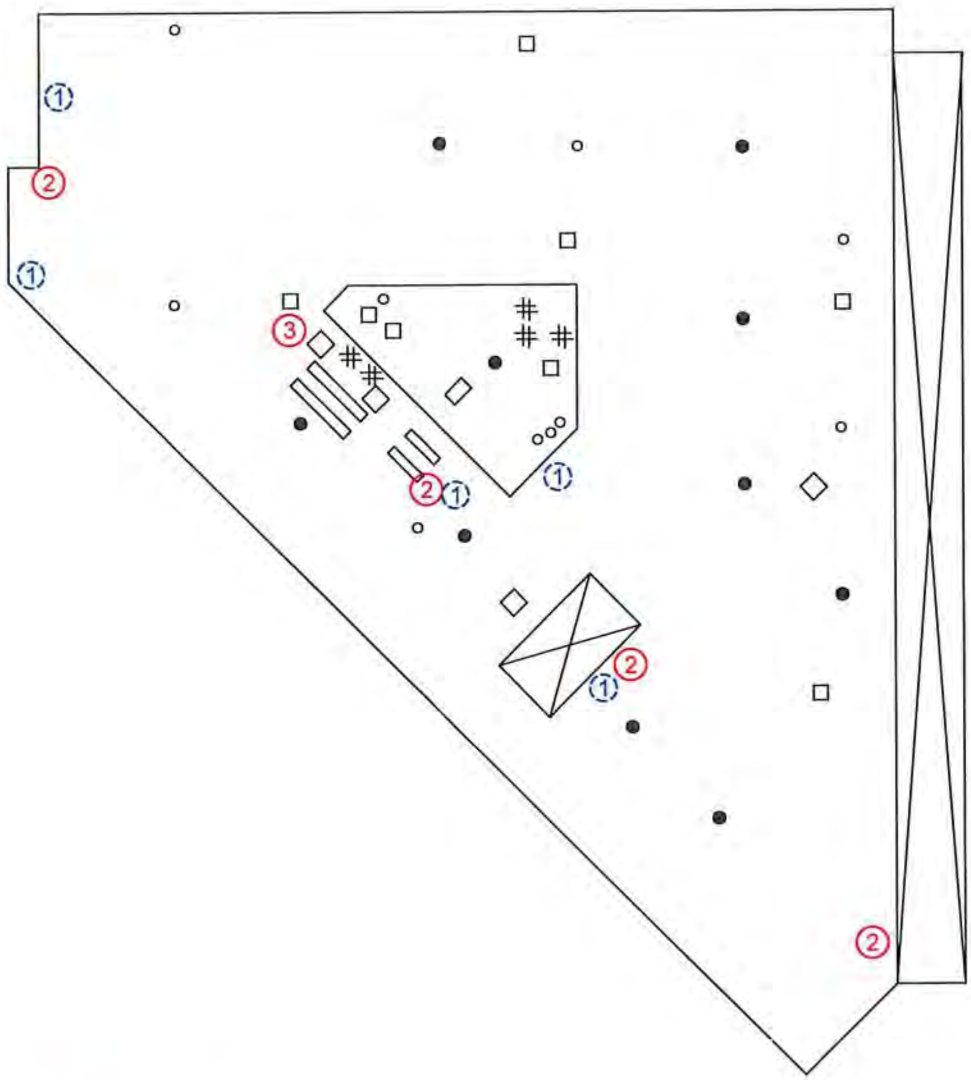
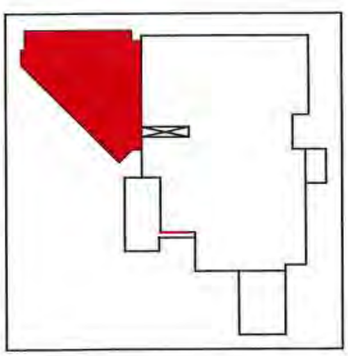
CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER PHASE 1 ADDITION SECTION HB3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



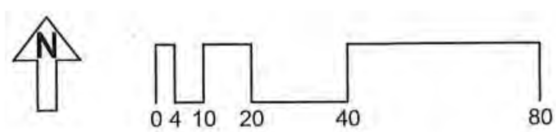


SYMBOLS KEY

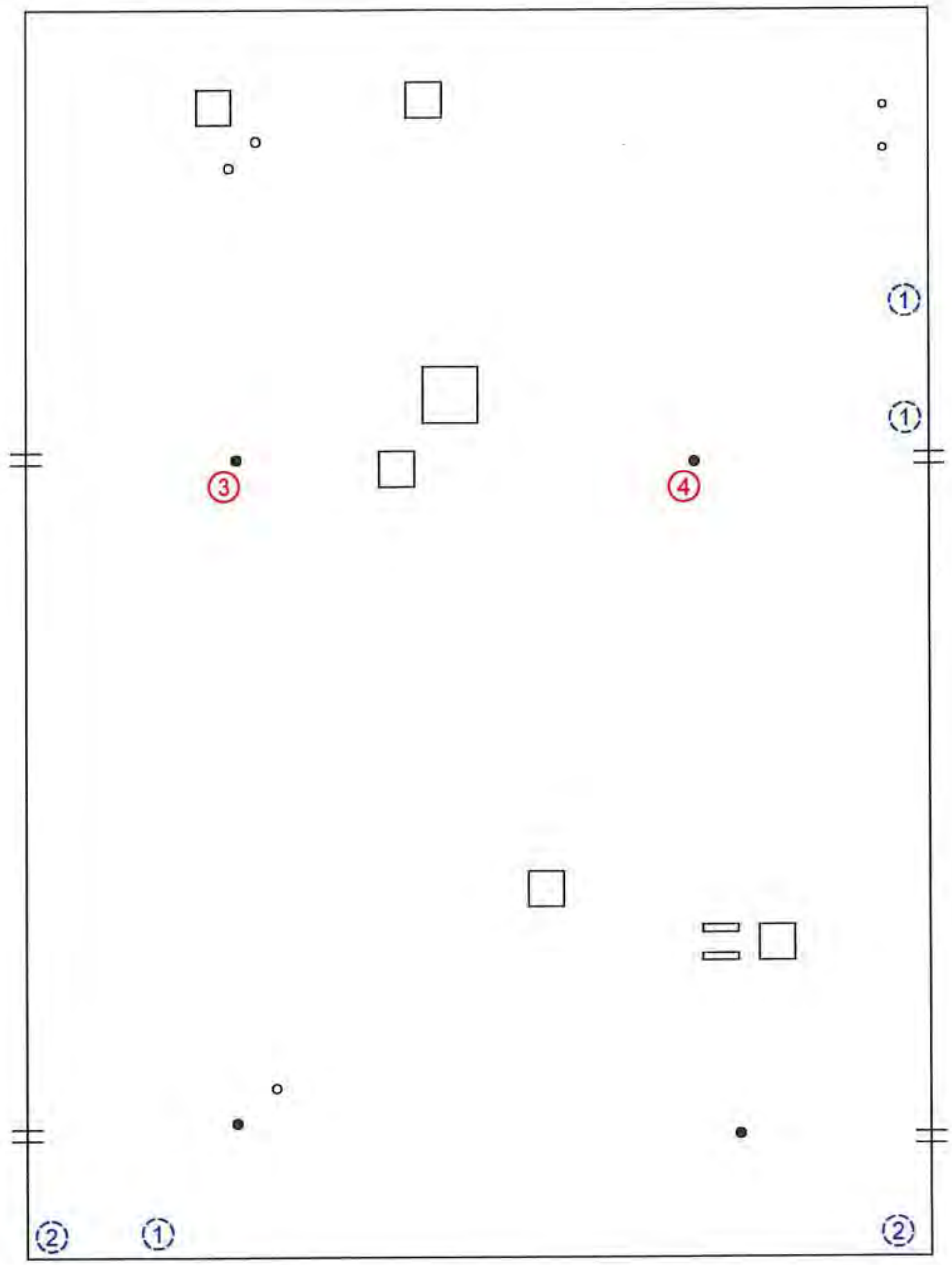
- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- # PITCH PAN
- ⊠ SKYLIGHT
- ╫ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

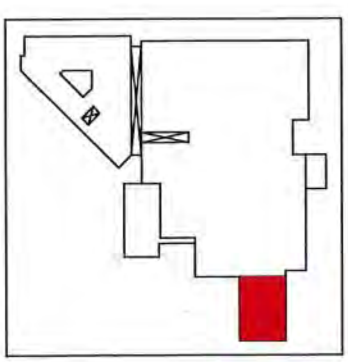
DEFECT KEY

- (1) MEMBRANE BRIDGING
- (2) OPEN SEAM / FLASHING
- (3) VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER 76 ADDITION SECTION HC	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



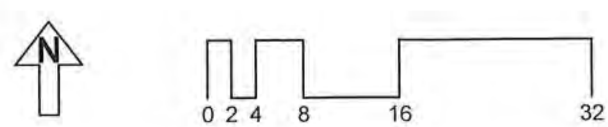


DEFECT KEY

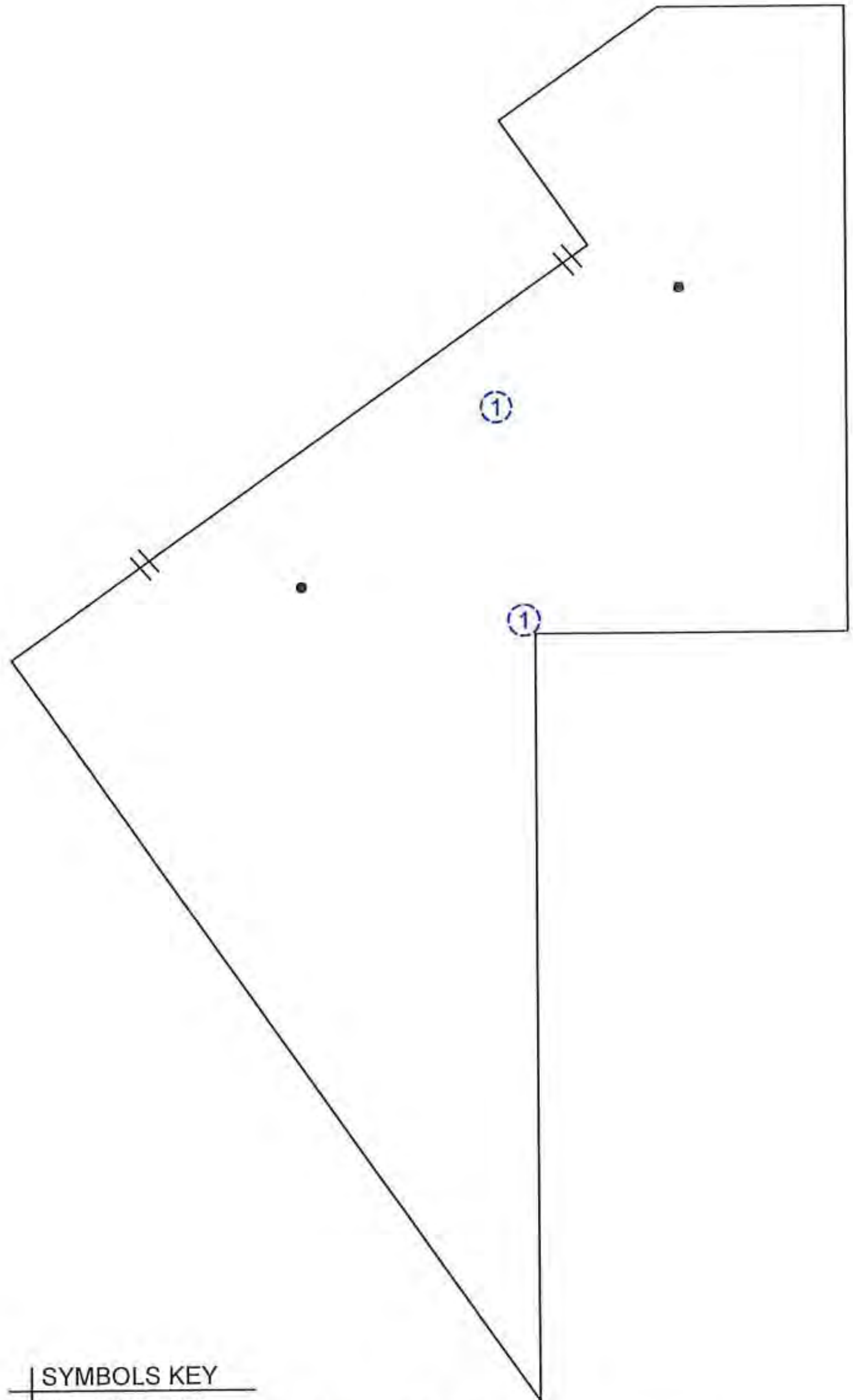
- (1) BLISTERED BASE FLASHING
- (2) EROSION OF AGGREGATE SURFACING
- (3) VEGETATION / DEBRIS
- (4) BROKEN DRAIN STRAINER

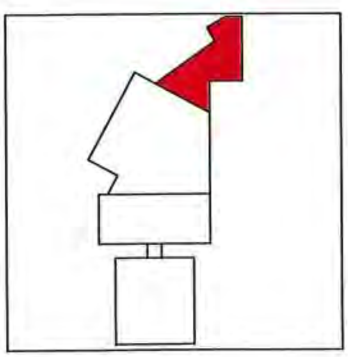
SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- SCUPPER
- VENT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR



CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ CENTER DIESEL TRUCK SECTION HDT	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



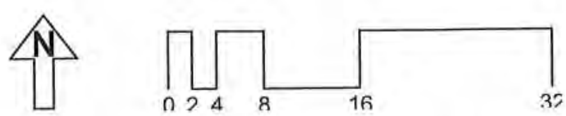


SYMBOLS KEY

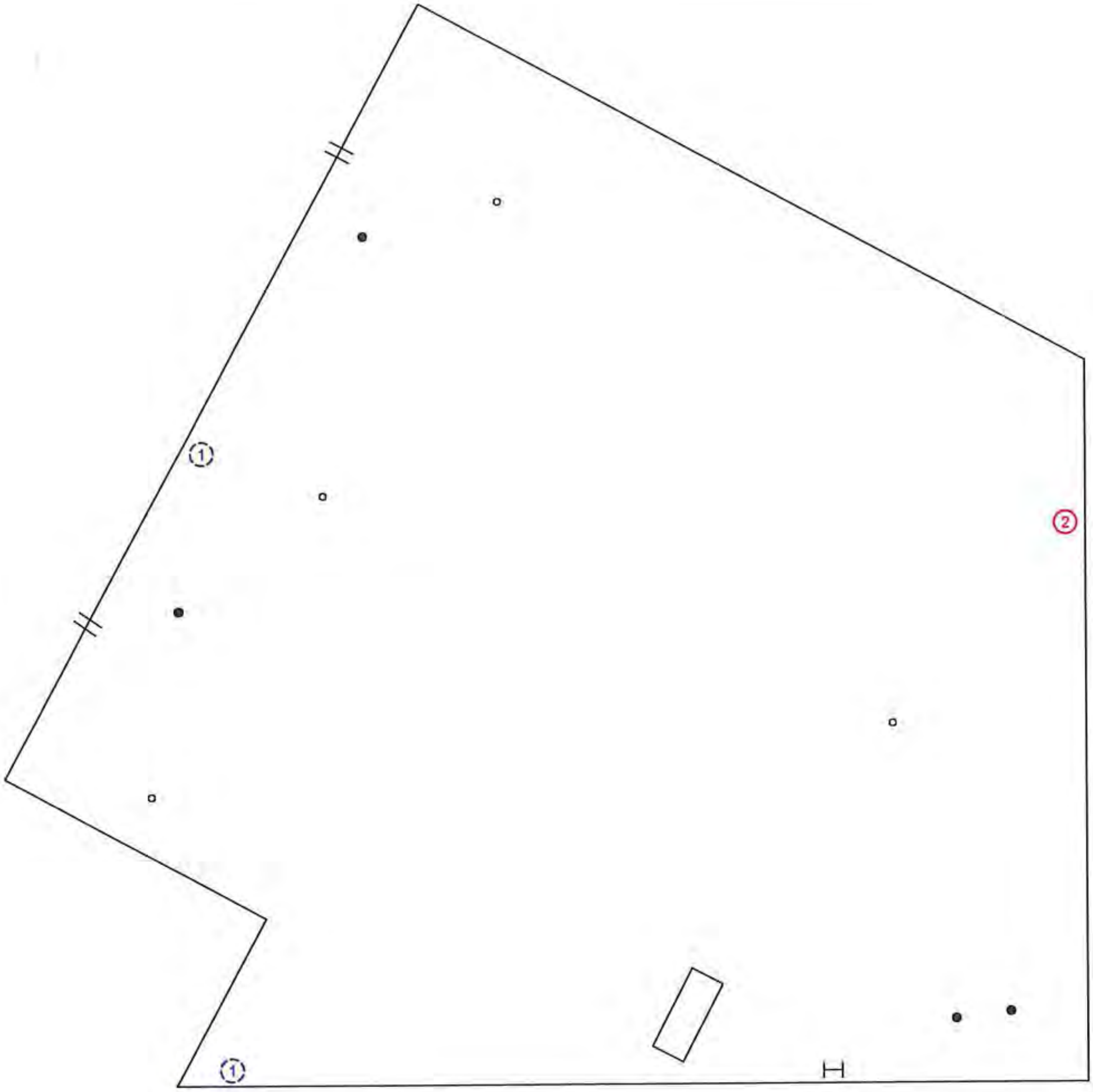
- □ ROOF CURB
- ● ROOF DRAIN
- ╫ SCUPPER
- ○ VENT STACK
- ⌶ LADDER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

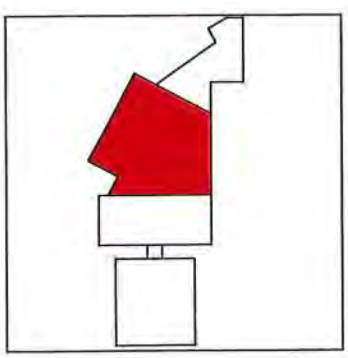
DEFECT KEY

(1) EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ HORTICULTURE SECTION HH1	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



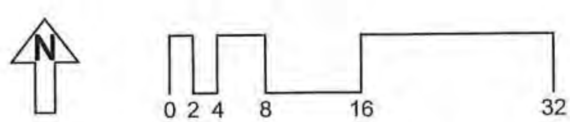


SYMBOLS KEY

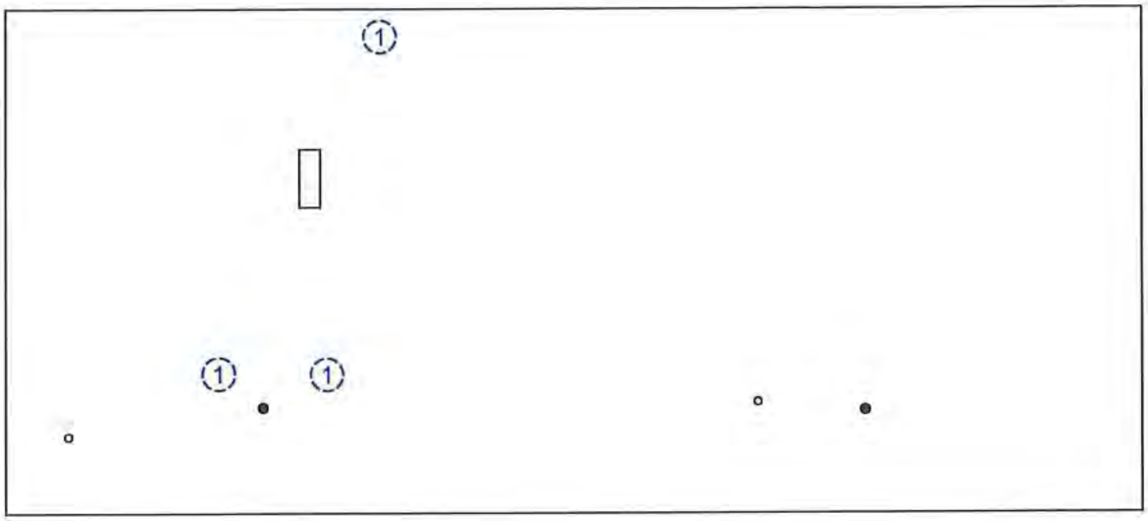
- □ ROOF CURB
- ● ROOF DRAIN
- ╫ SCUPPER
- o VENT STACK
- ⌶ LADDER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

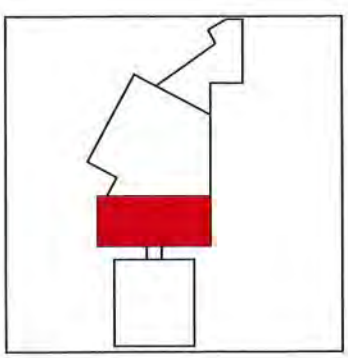
DEFECT KEY

- (1) EROSION OF AGGREGATE SURFACING
- (2) LOOSE / MISSING FASTENER



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ HORTICULTURE SECTION HH2	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



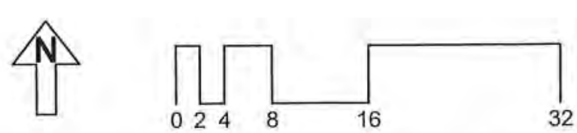


SYMBOLS KEY

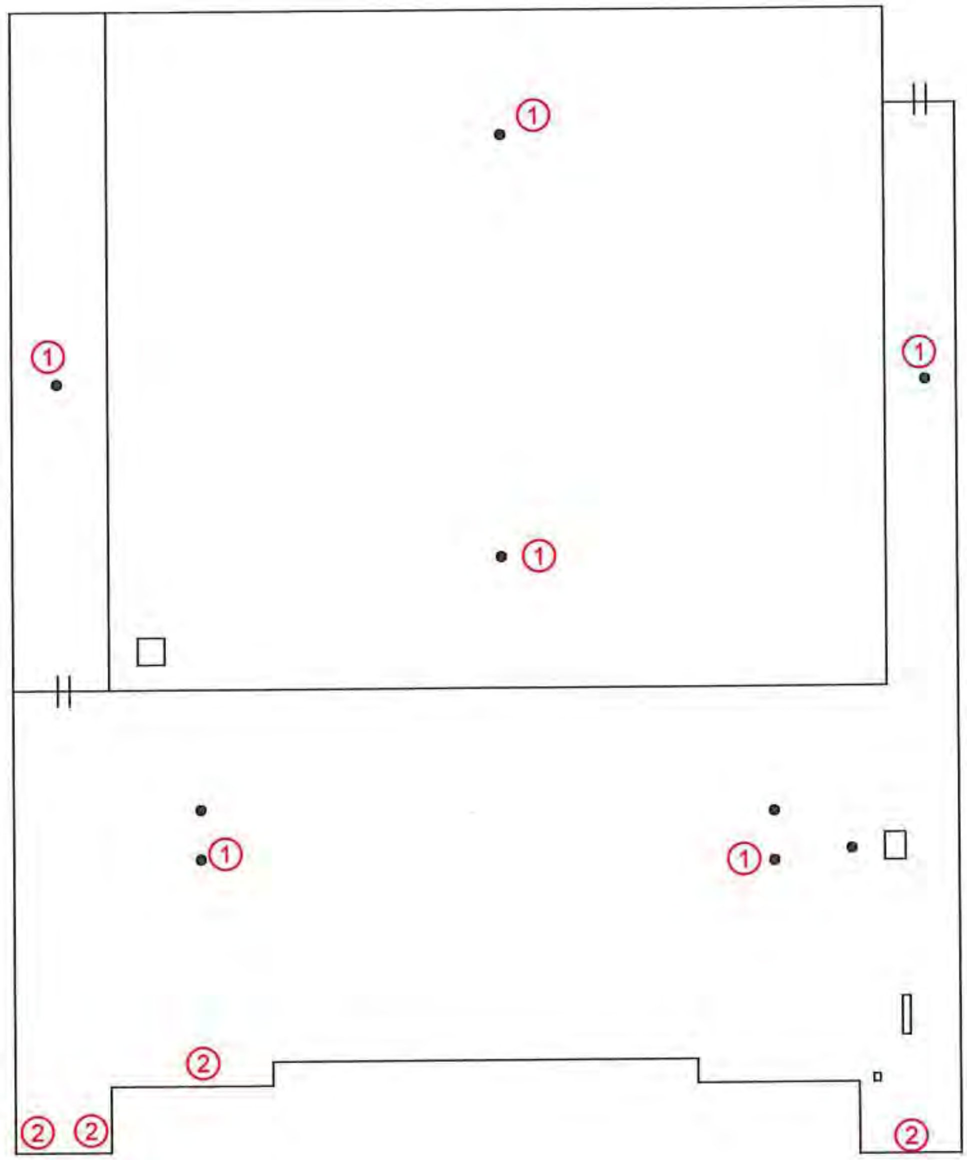
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

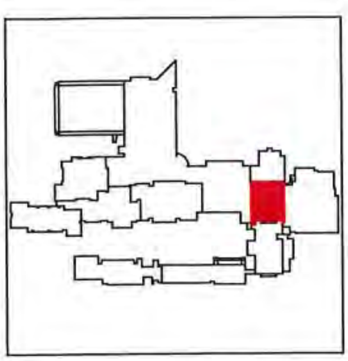
DEFECT KEY

(1) EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HEINTZ HORTICULTURE SECTION HH3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



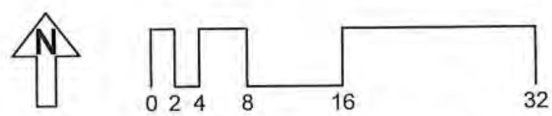


SYMBOLS KEY

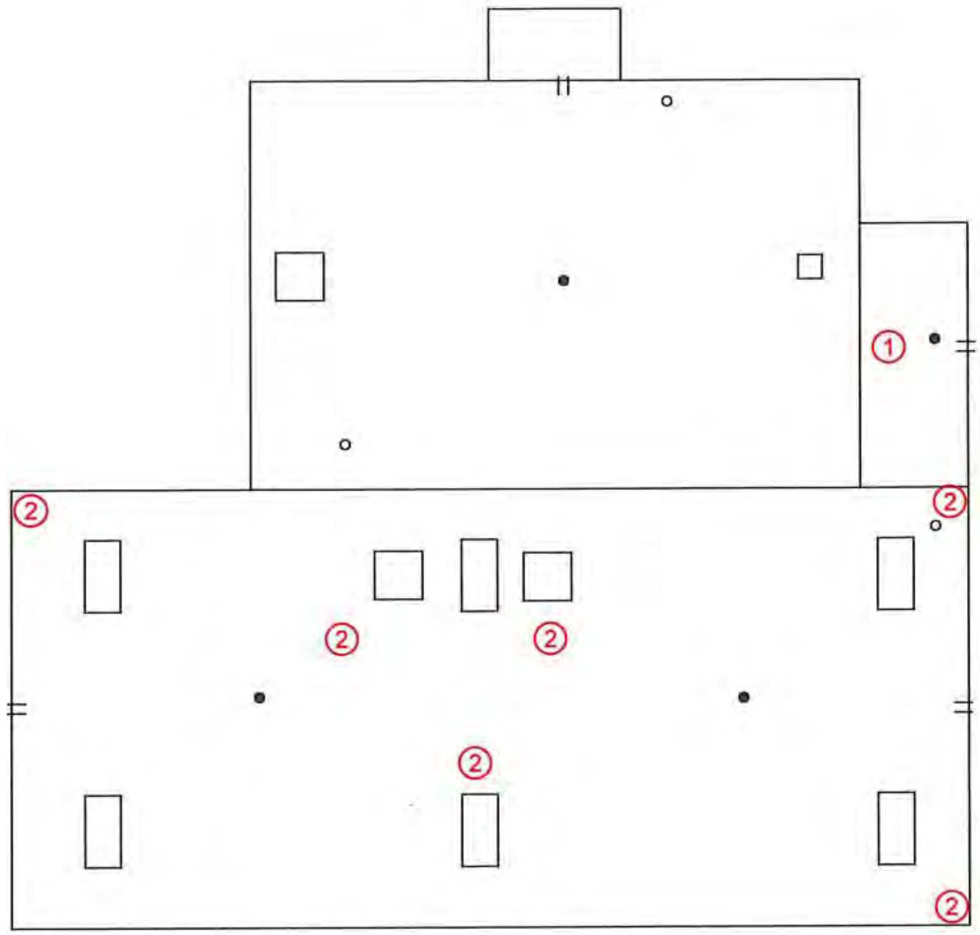
- □ ROOF CURB
- ● ROOF DRAIN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

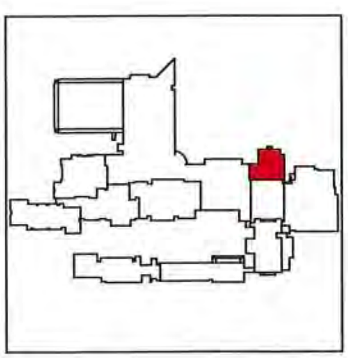
DEFECT KEY

1. EROSION OF AGGREGATE SURFACING
2. VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HILL THEATRE SECTION HT1	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



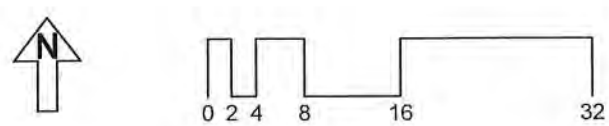


SYMBOLS KEY

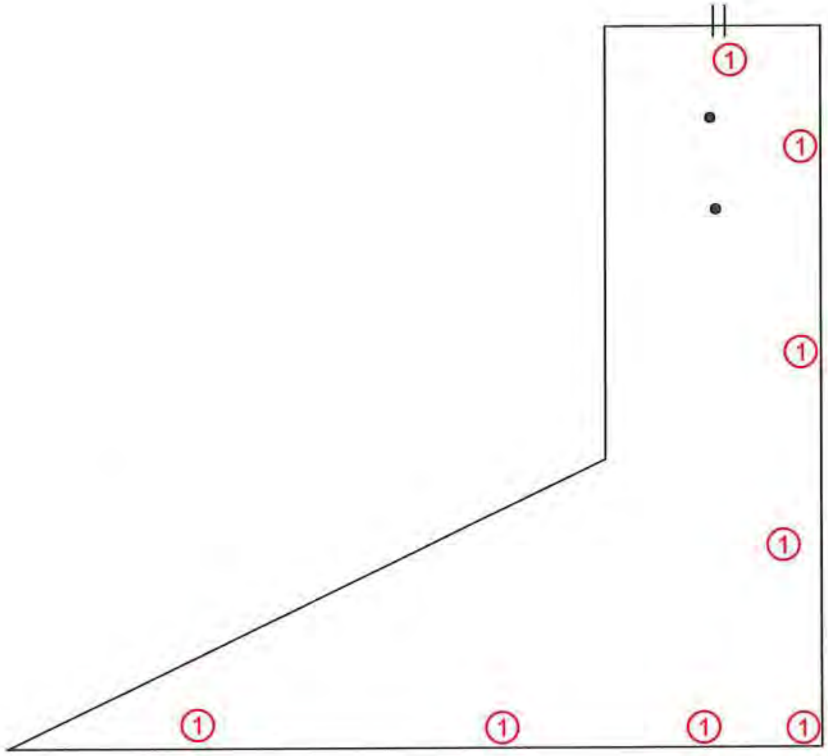
- □ ROOF CURB
- ● ROOF DRAIN
- ╫ SCUPPER
- o VENT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

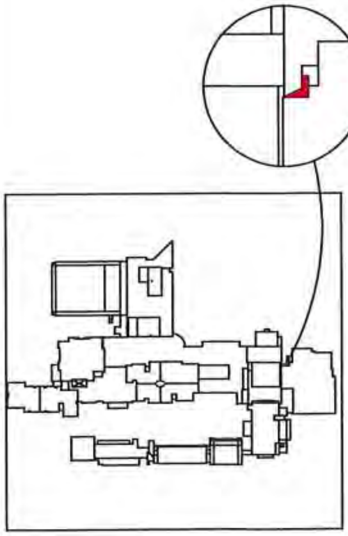
DEFECT KEY

1. SUSPECTED WET INSULATION
2. EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HILL THEATRE SECTION HT2	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





SYMBOLS KEY

- ● ROOF DRAIN
- ‡ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY

(1) VEGETATION / DEBRIS

N

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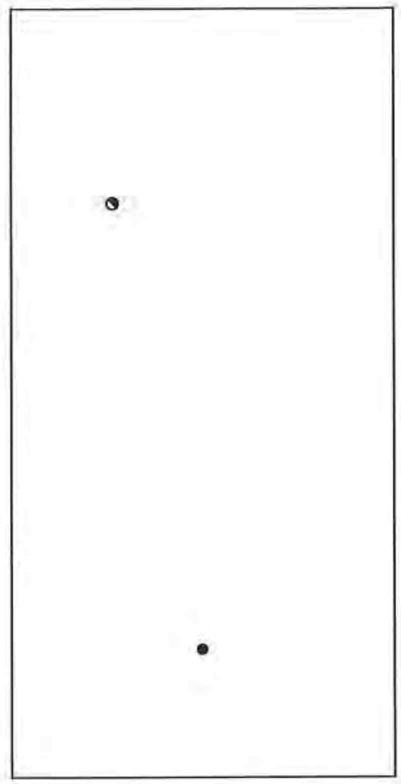
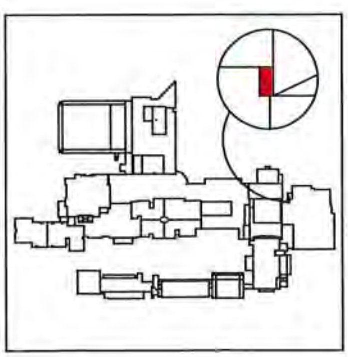
CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HILL THEATRE SECTION HT3	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



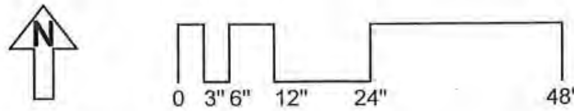


SYMBOLS KEY

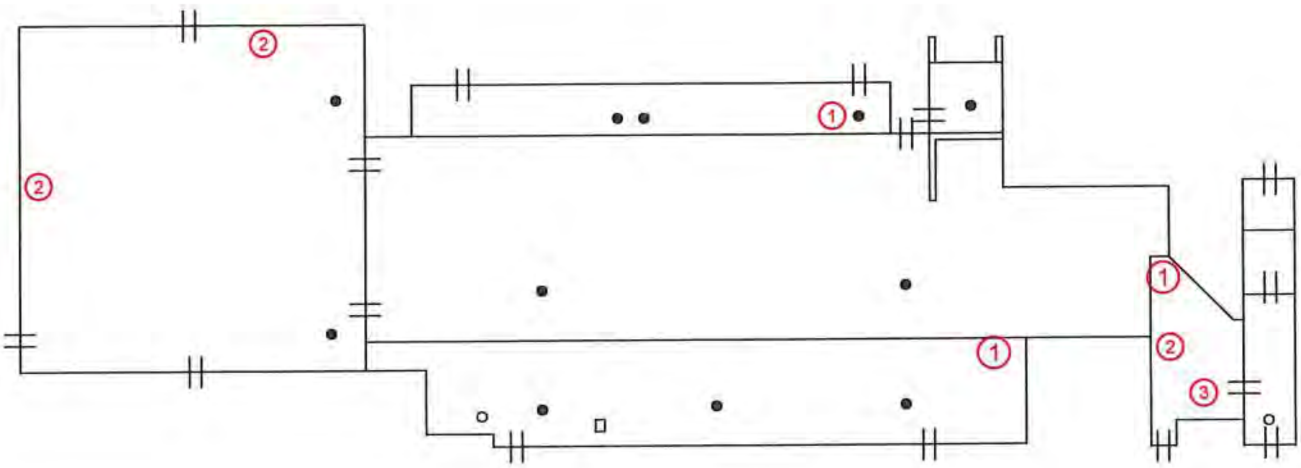
- ● ROOF DRAIN
- ◔ HEAT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

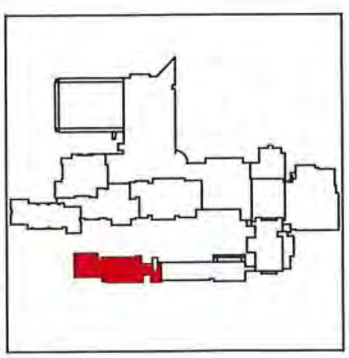
DEFECT KEY

- (#) 2019 NO DEFECT
- (#) 2019 NO DEFECT



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	HILL THEATRE	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01
	SECTION			DATE
	HT4			10/14/2019



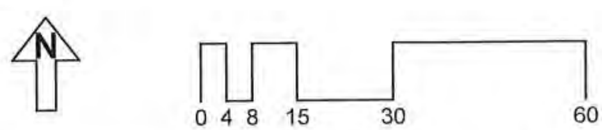


SYMBOLS KEY

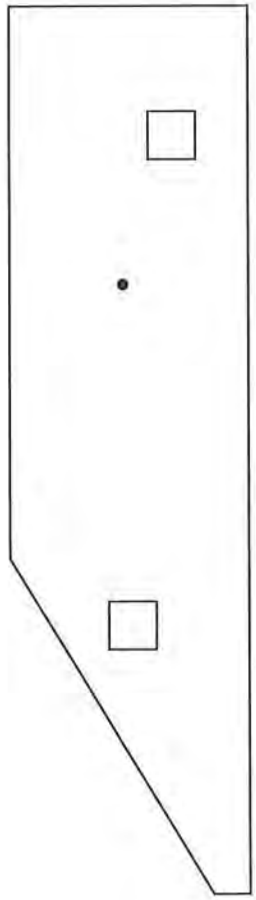
- □ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- ╫ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

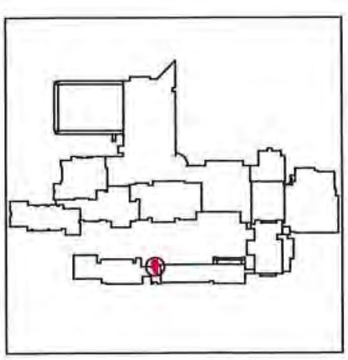
DEFECT KEY

1. VEGETATION / DEBRIS
2. OPEN FLASHING JOINT
3. EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	MEMORIAL HALL SECTION MH1	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019





SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

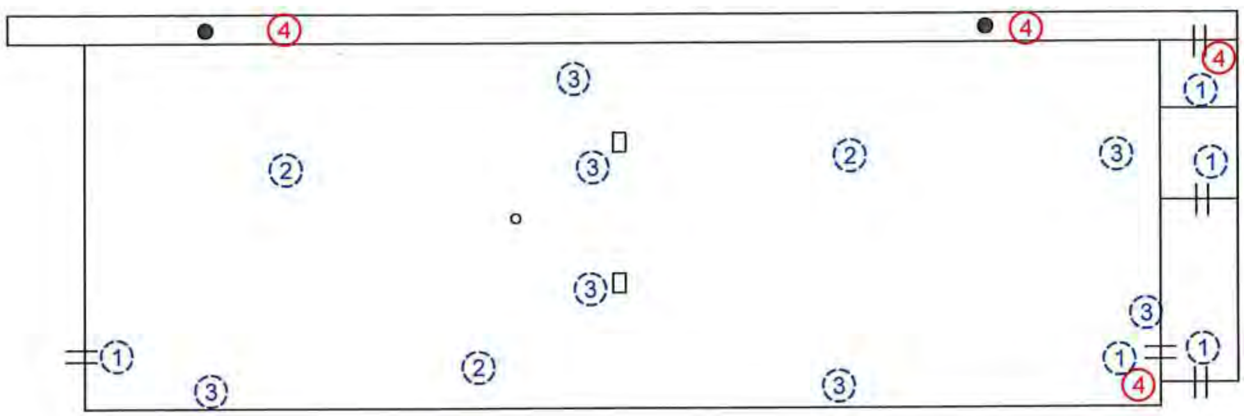
DEFECT KEY

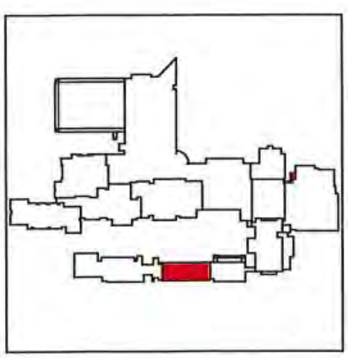
- (#) 2019 NO DEFECT
- (#) 2019 NO DEFECT

N

0 1 2 4 8 16

CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	MEMORIAL HALL SECTION MH2	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



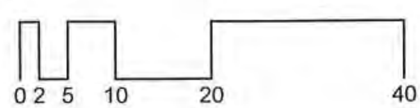


SYMBOLS KEY

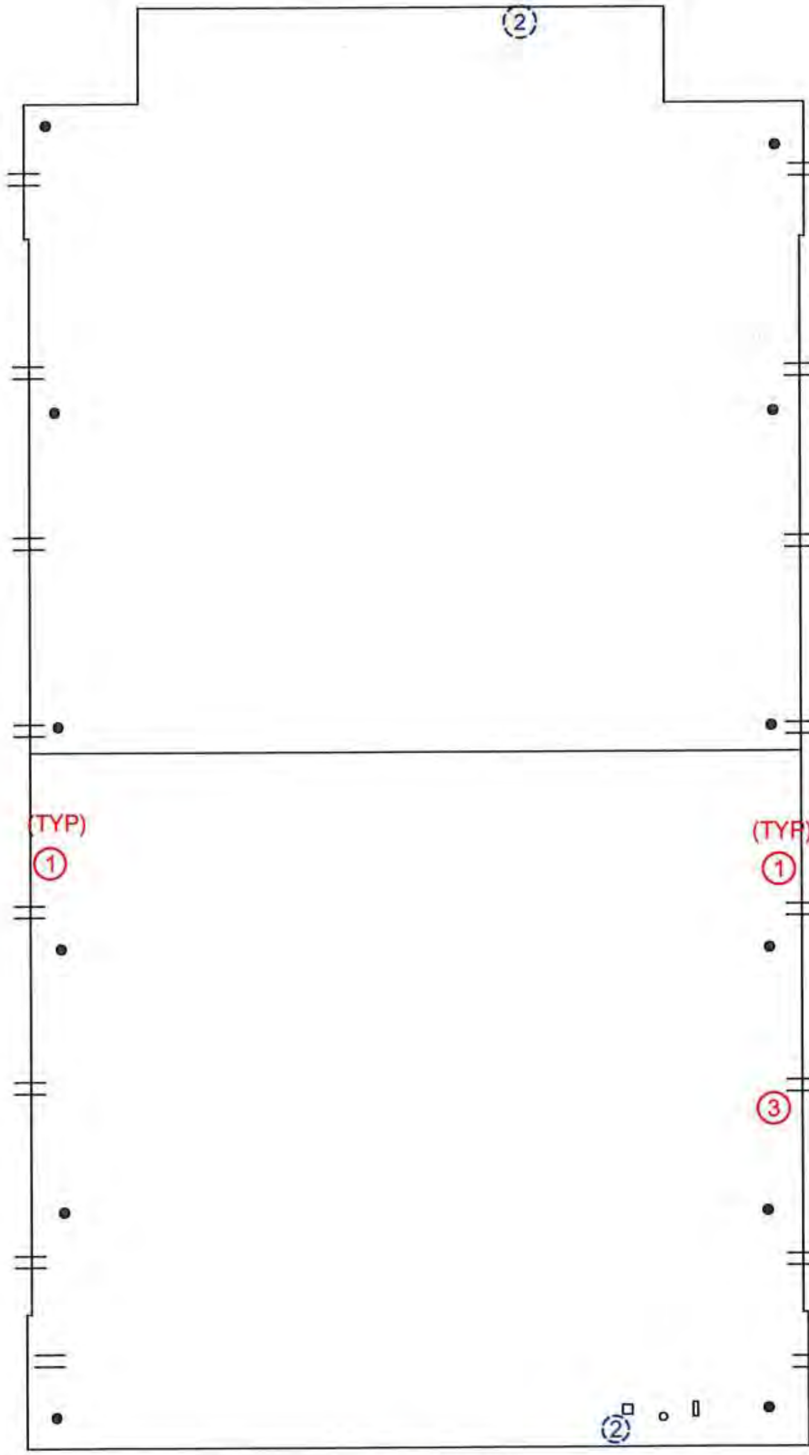
- ROOF CURB
- ROOF DRAIN
- VENT STACK
- SKYLIGHT
- LADDER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

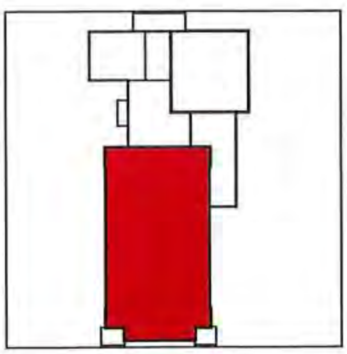
DEFECT KEY

- (1) BROKEN / DETERIORATED PAVERS
- (2) PONDING / EVIDENCE OF PONDING
- (3) MEMBRANE BRIDGING
- (4) VEGETATION / DEBRIS



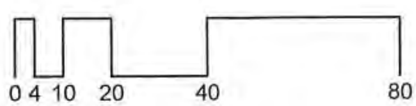
CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	PLAZA HALL SECTION PH	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



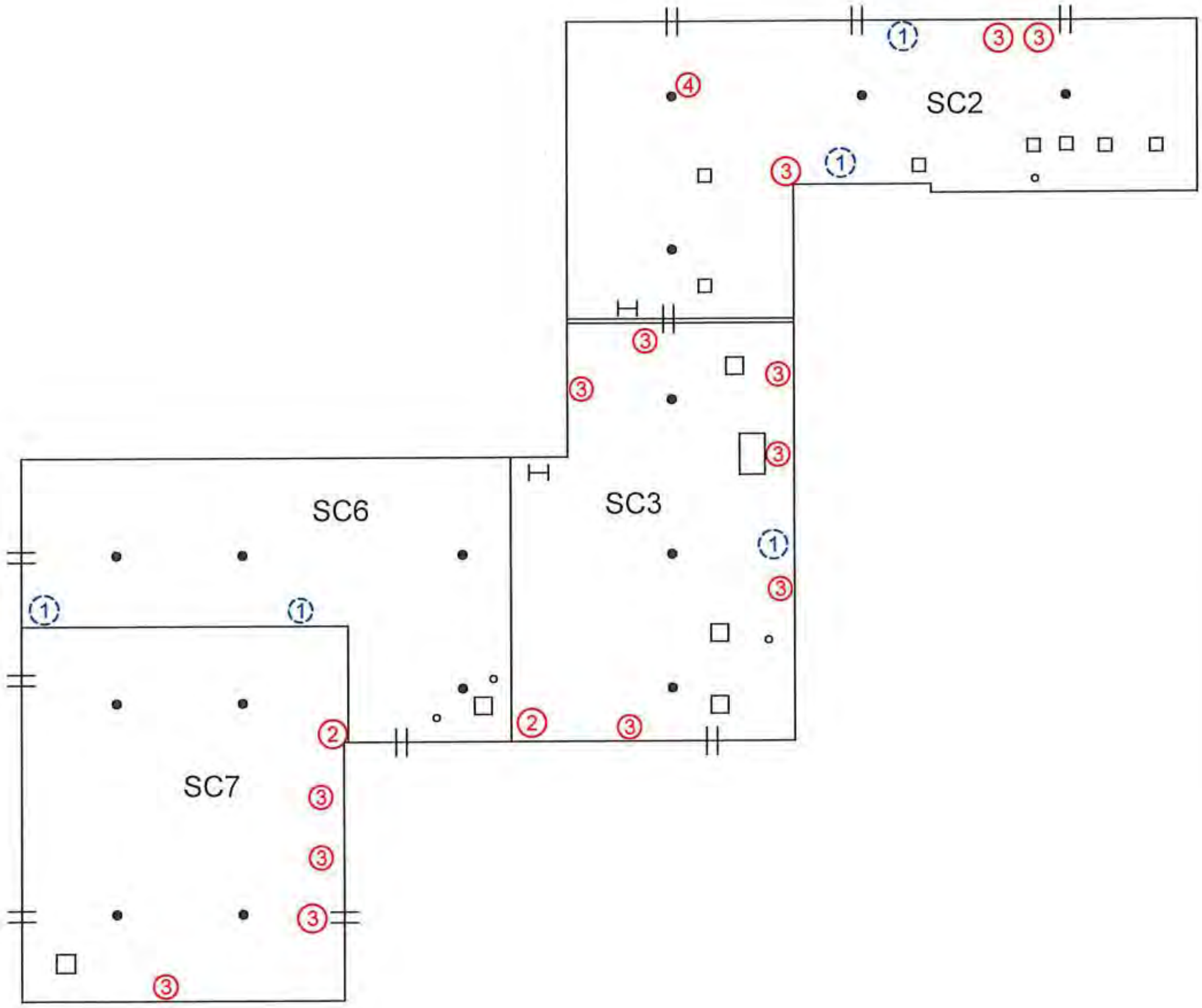


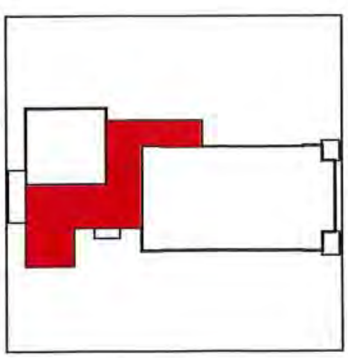
SYMBOLS KEY
- ● ROOF DRAIN
- o VENT STACK
- SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY
- (1) MISSING / DETERIORATED SEALANT
- (2) BLISTERED BASE FLASHING
- (3) LOOSE / MISSING FASTENERS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01
	SECTION			DATE
	SC1			10/14/2019



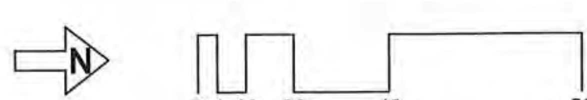


SYMBOLS KEY

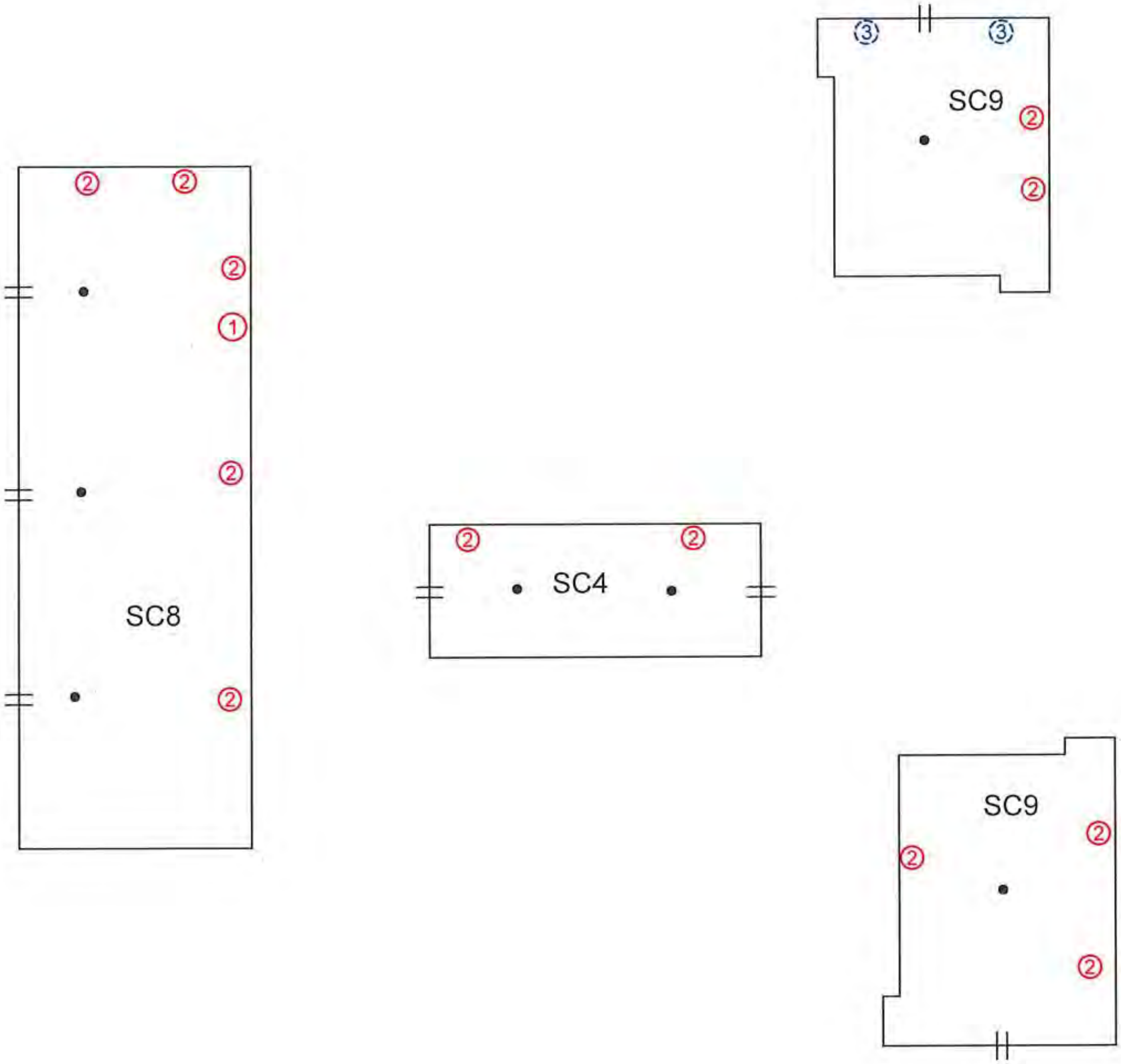
- ROOF CURB
- ROOF DRAIN
- SCUPPER
- LADDER
- DEFECT-REPAIR
- DEFECT-MONITOR

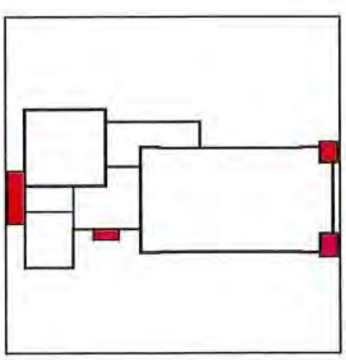
DEFECT KEY

1. BLISTERED BASE FLASHING
2. MISSING / DETERIORATED SEALANT
3. OPEN FLASHING JOINTS
4. SUSPECTED WET INSULATION



CAMPUS	BUILDING	CLIENT	RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS SECTION SC2, SC3, SC6, SC7	MINNESOTA STATE 500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



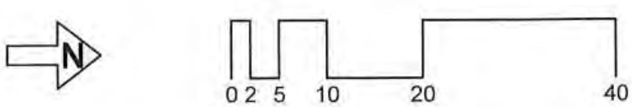


SYMBOLS KEY

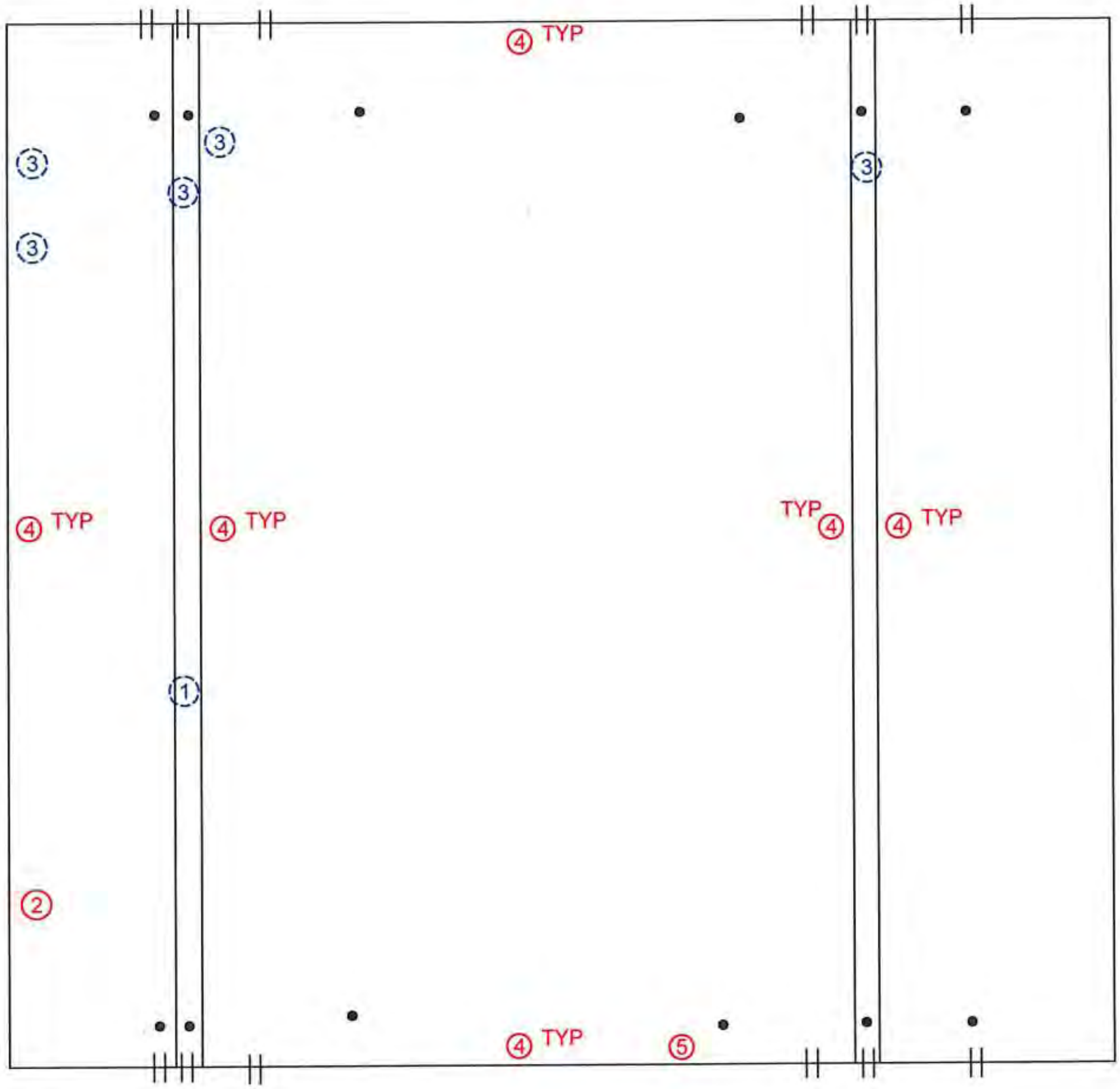
- ● ROOF DRAIN
- ╫ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

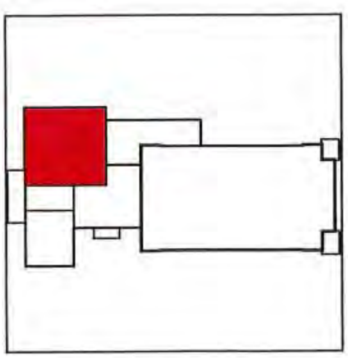
DEFECT KEY

1. BLISTER BASE FLASHING
2. OPEN FLASHING JOINT
3. EROSION OF AGGREGATE SURFACING



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS SECTION SC4, SC8, SC9	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



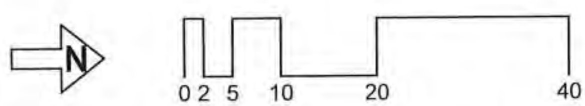


SYMBOLS KEY

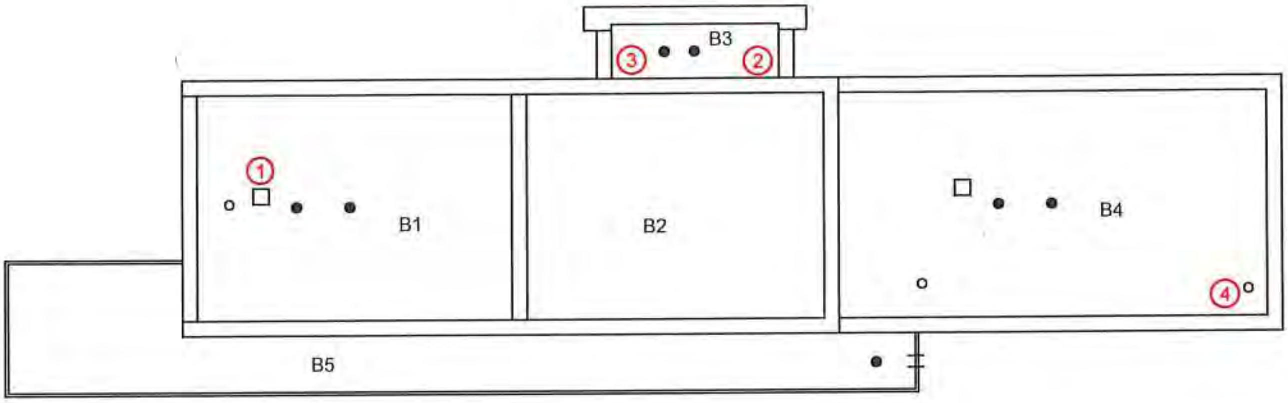
- ● ROOF DRAIN
- ‡ SCUPPER
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY

1. BLISTER BASE FLASHING
2. DISPLACED METAL FLASHING
3. EROSION OF AGGREGATE SURFACING
4. OPEN FLASHING JOINT
5. LOOSE / MISSING FASTENER



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS SECTION SC5	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

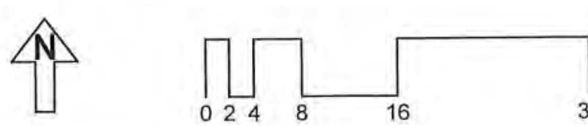


SYMBOLS KEY

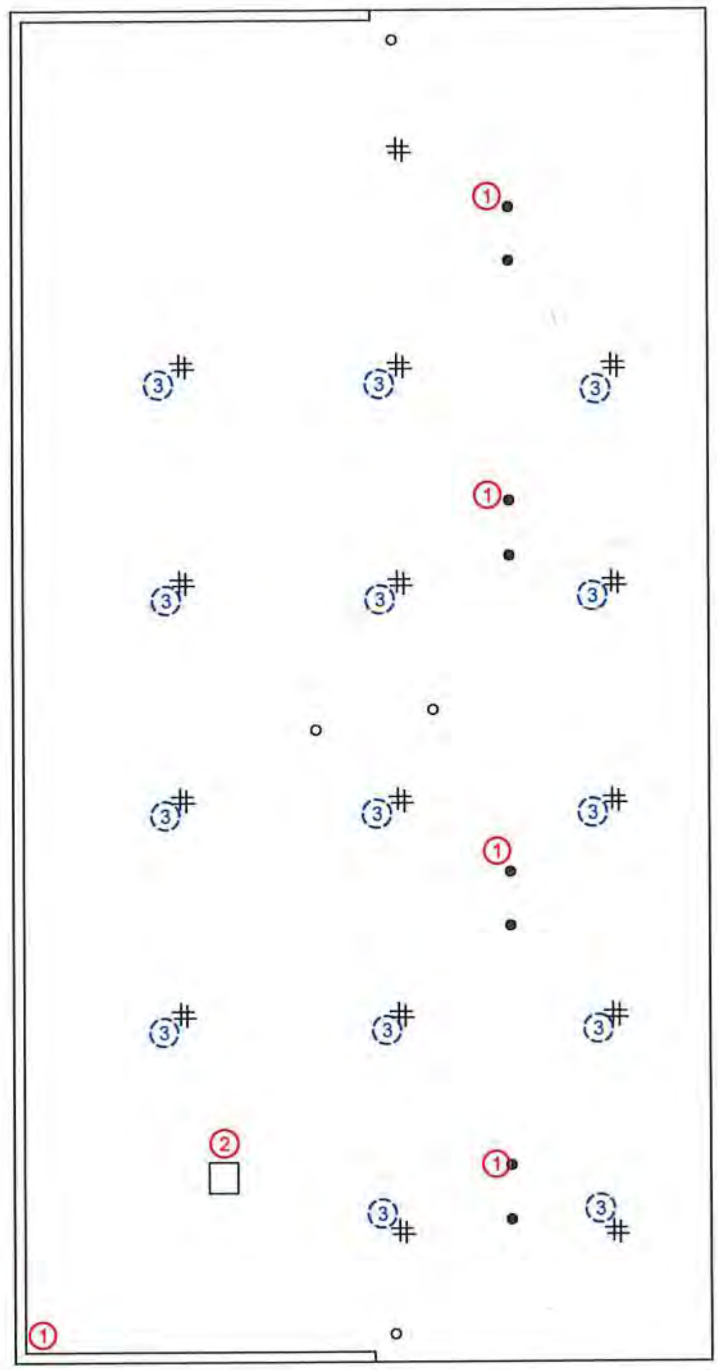
- □ ROOF CURB
- ● ROOF DRAIN
- ╫ SCUPPER
- o VENT STACK
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

DEFECT KEY

1. MISSING COUNTERFLASHING
2. VEGETATION / DEBRIS
3. MISSING / DETERIORATED SEALANT
4. MISSING DRAIN STRAINER



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS ENTRANCE BLDG SECTION B1-B5	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



SYMBOLS KEY

- ROOF CURB
- ROOF DRAIN
- PITCH PAN
- VENT STACK
- DEFECT-REPAIR
- DEFECT-MONITOR

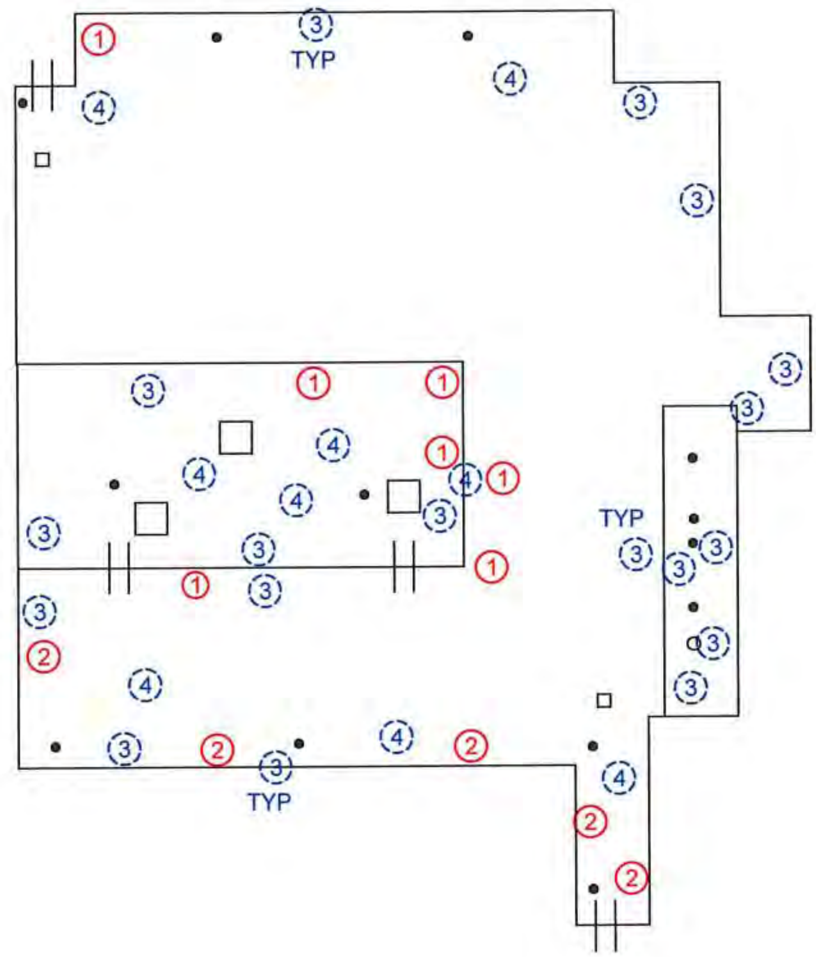
DEFECT KEY

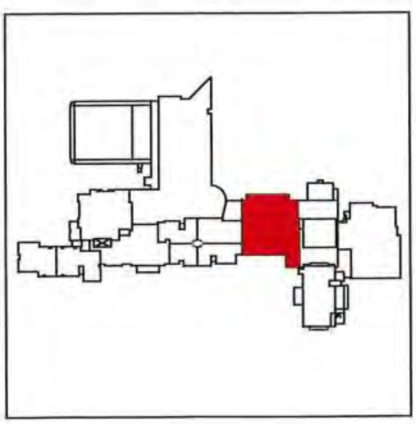
1. VEGETATION / DEBRIS
2. MISSING COUNTERFLASHING
3. LOW FLASHING HEIGHT

N

0 2 4 8 16 32

CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	REGIONAL SPORTS CONCESSION BLDG SECTION A1	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



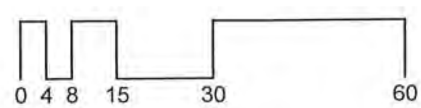


SYMBOLS KEY

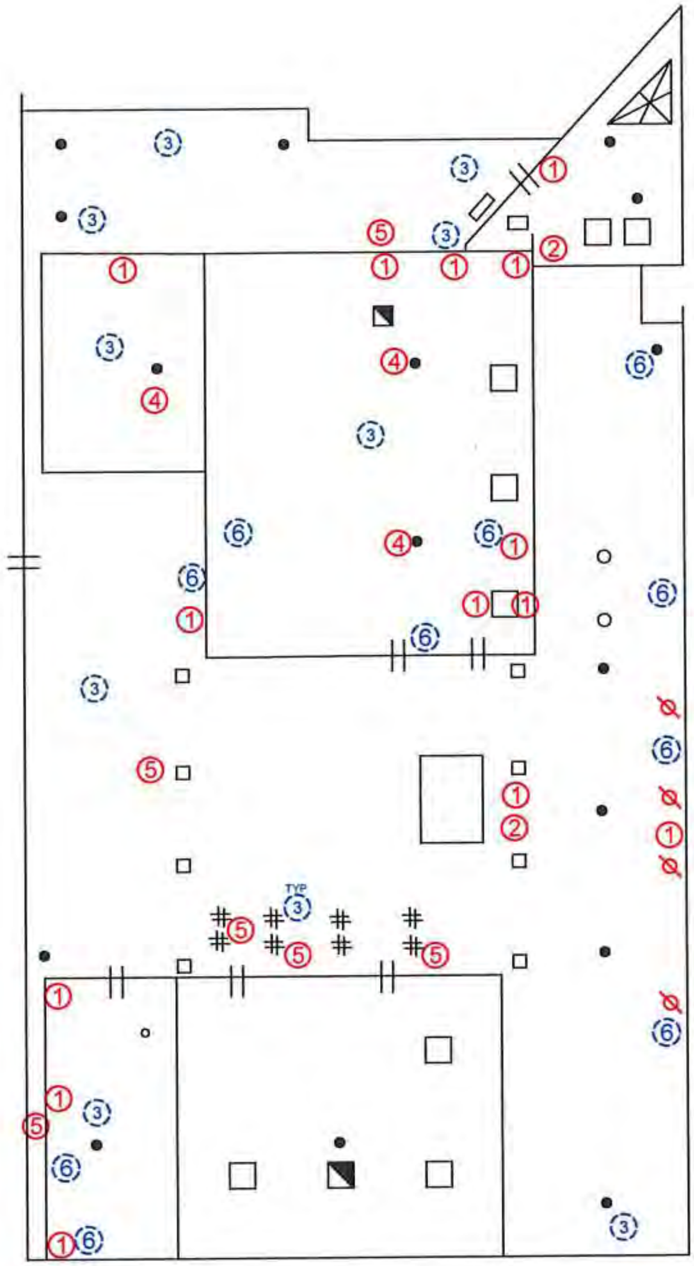
- ☐ ROOF CURB
- ● ROOF DRAIN
- ○ VENT STACK
- SCUPPER
- PITCH PAN
- CHIMNEY
- (#) DEFECT-REPAIR
- (#) DEFECT-MONITOR

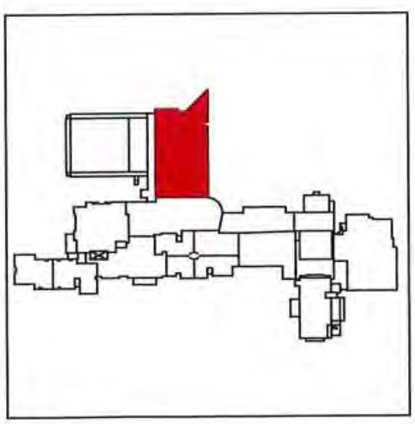
DEFECT KEY

- (1) OPEN SEAM FLASHING
- (2) VEGETATION / DEBRIS
- (3) MEMBRANE BRIDGING
- (4) BROKEN / DETERIORATED PAVERS



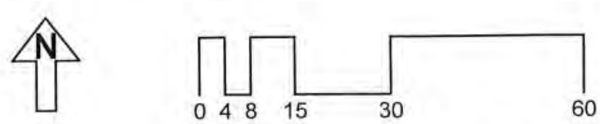
CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	STUDENT SERVICES SECTION SS	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



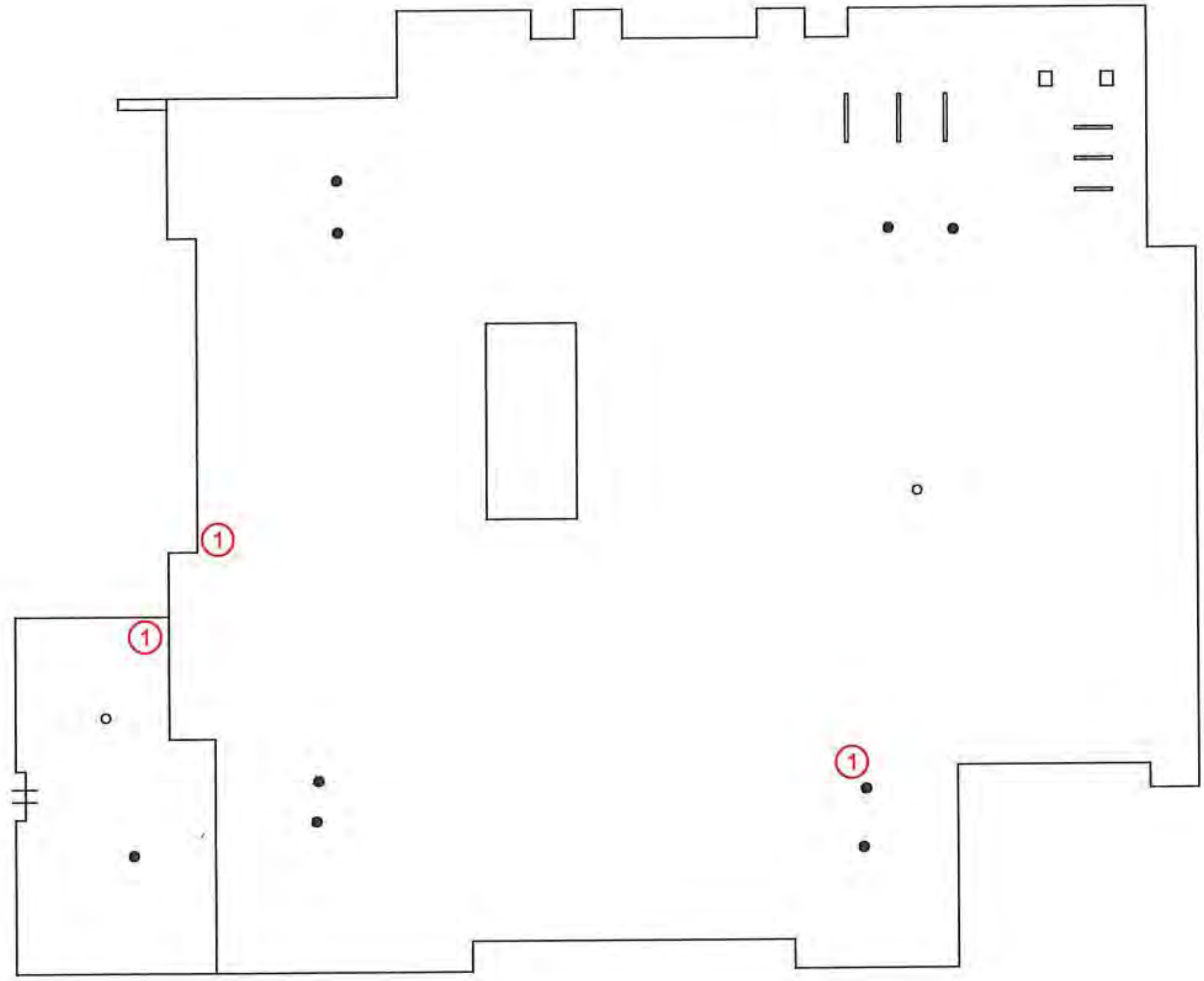


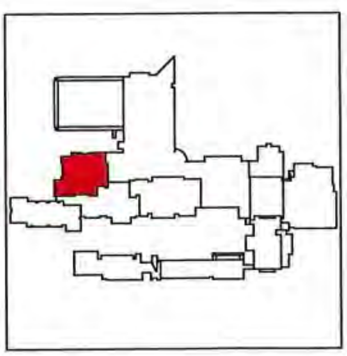
SYMBOLS KEY
□ ROOF CURB
● ROOF DRAIN
o VENT STACK
SCUPPER
PITCH PAN
CHIMNEY
(#) DEFECT-REPAIR
(#) DEFECT-MONITOR
LEAK LOCATION

DEFECT KEY
1 OPEN SEAM / FLASHING
2 MISSING / DETERIORATED SEALANT
3 BROKEN / DETERIORATED PAVERS
4 BROKEN / MISSING DRAIN STRAINER
5 VEGETATION / DEBRIS
6 MEMBRANE BRIDGING



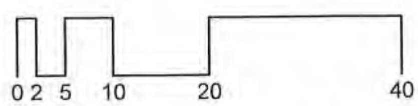
CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	SCIENCE AND TECHNOLOGY	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01
	SECTION			DATE
	ST			10/14/2019



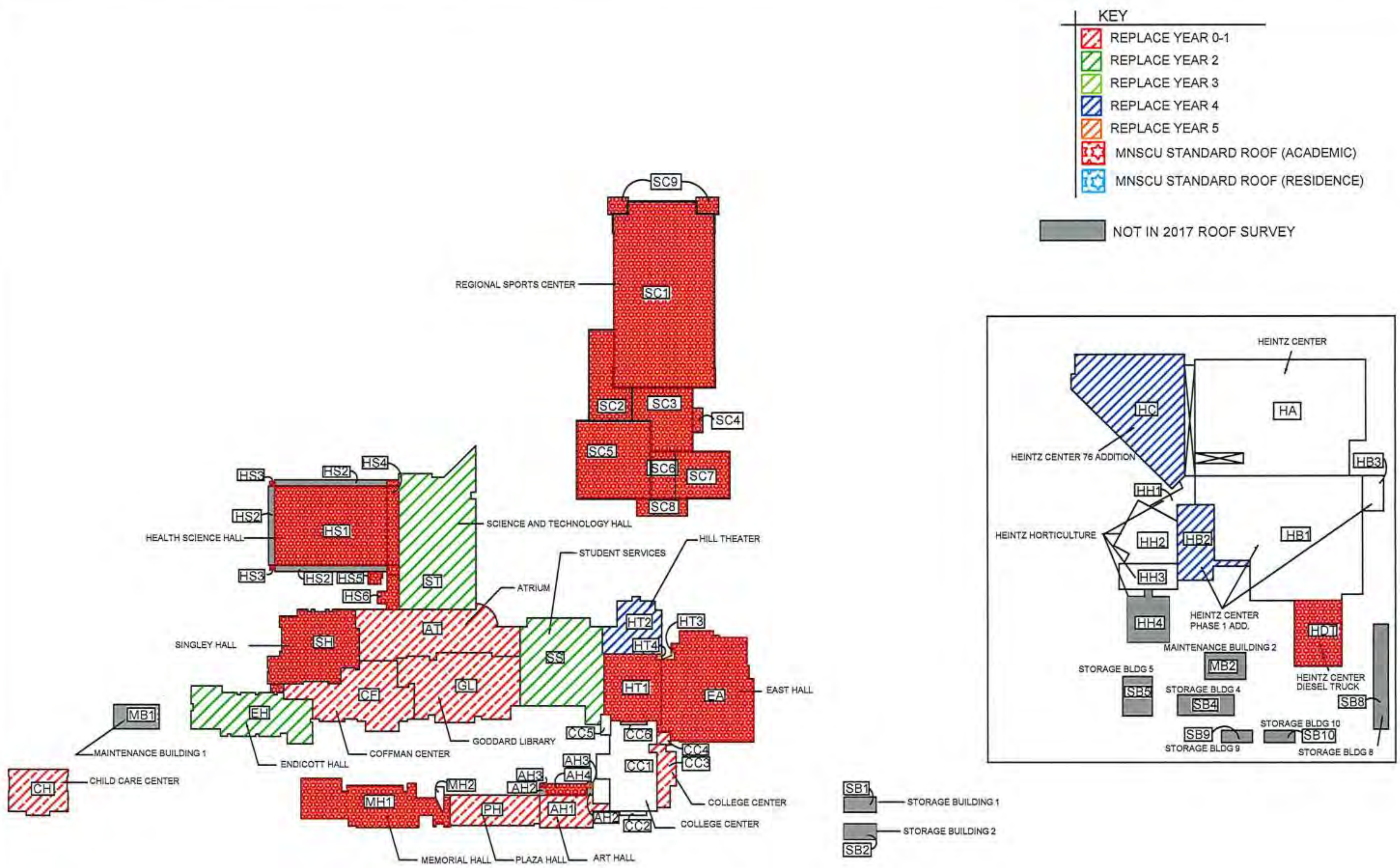


SYMBOLS KEY	
●	ROOF DRAIN
⧺	SCUPPER
o	VENT STACK
□	ROOF CURB
‖	SLEEPER
(#)	DEFECT-REPAIR
(#)	DEFECT-MONITOR

DEFECT KEY	
(1)	VEGETATION / DEBRIS



CAMPUS	BUILDING	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	SINGLEY HALL SECTION A	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019



CAMPUS MAP
NO SCALE

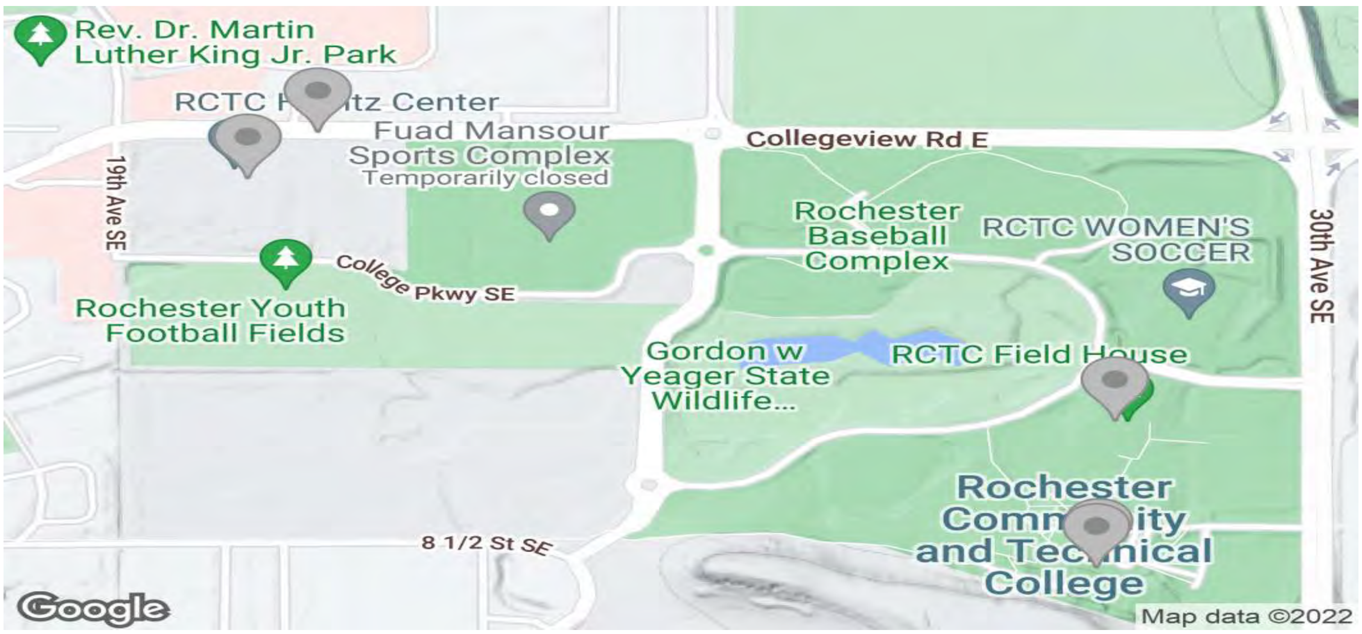
NORTH

CAMPUS	CLIENT		RSI PROJECT NUMBER
ROCHESTER COMMUNITY AND TECHNICAL COLLEGE	MINNESOTA STATE	500 WELLS FARGO PLACE 30 EAST 7TH STREET ST. PAUL, MINNESOTA 55101	19-9779-01 DATE 10/14/2019

B3 BENCHMARKING

Report for

Rochester Community and Technical College



Contents

Rochester Community and Technical College

Organization Properties

Organization properties based on each site's most recent energy usage period.

Gross Building SF	871,028 Gross Bldg SF
Occupants	400
Total Sites	8
Total Buildings	39
Total Meters	55
Annual CO2e	5,510.48 metric tons
Annual CO2e/SF	0.0063 metric tons/SF
Annual CO2e/Occupant	13.7762 metric tons/occupant
Annual CO2e Pounds	12,148,514 pounds
Annual CO2e/SF	13.95 pounds/SF
Annual CO2e/Occupant	30,371.28 pounds/occupant
Annual Cost	$1,585,169
Annual Cost/SF	$1.72/SF
Annual Cost/Occupant	$3,743.55/occupant
kBtu	56,458,674 kBtu/year
kBtu/SF (aka EUI)	64.82 kBtu/sf/year

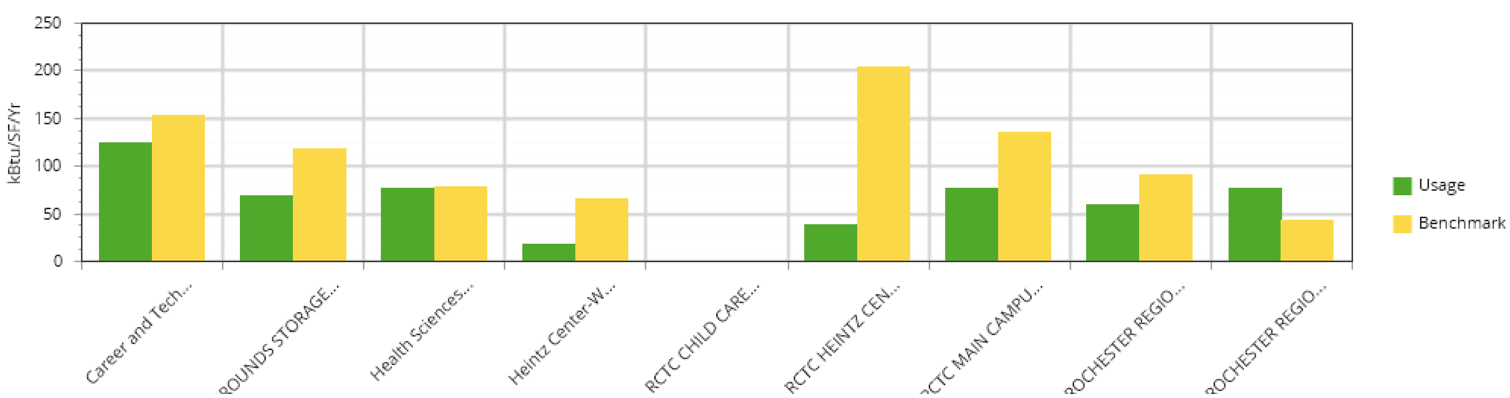
Organization properties based on period October 2021 to September 2022.

Annual CO2e	5,510 metric tons
Annual CO2e Pounds	12,148,514 pounds
Energy Cost	$1,497,422
Total Cost	$1,497,422
kBtu	56,458,674 kBtu/year
kBtu/SF (aka EUI)	64.82 kBtu/sf/year

Benchmark

The current B3 Benchmark for this organization is 5 stars. Some of the buildings have a lower benchmark and some a higher. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on those sites with the greatest savings potential and links to help realize the savings.

Name	Gross SF	Actual kBtu/SF	Benchmark kBtu/SF	Actual over Benchmark	Annual Pot. Savings	B3 Benchmark
Career and Technical Education Center at Heintz (CTECH)	19,117	124.75	153.51		$1,000	
GROUNDS STORAGE GARAGE	4,000	68.30	118.26		-	
Health Sciences (SB 2030 Project)	41,000	76.69	78.21		$32,000	
Heintz Center-Workforce Center Addition (SB 2030 Project)	24,480	16.80	65.48		-	
RCTC CHILD CARE CENTER	0	0.00	0.00		-	
RCTC HEINTZ CENTER	202,350	38.62	203.58		-	
RCTC MAIN CAMPUS	367,695	76.99	134.84		-	
ROCHESTER REGIONAL SPORTS CENTER	115,220	58.68	90.22		-	
ROCHESTER REGIONAL SPORTS STADIUM	97,166	75.76	42.44		$33,000	

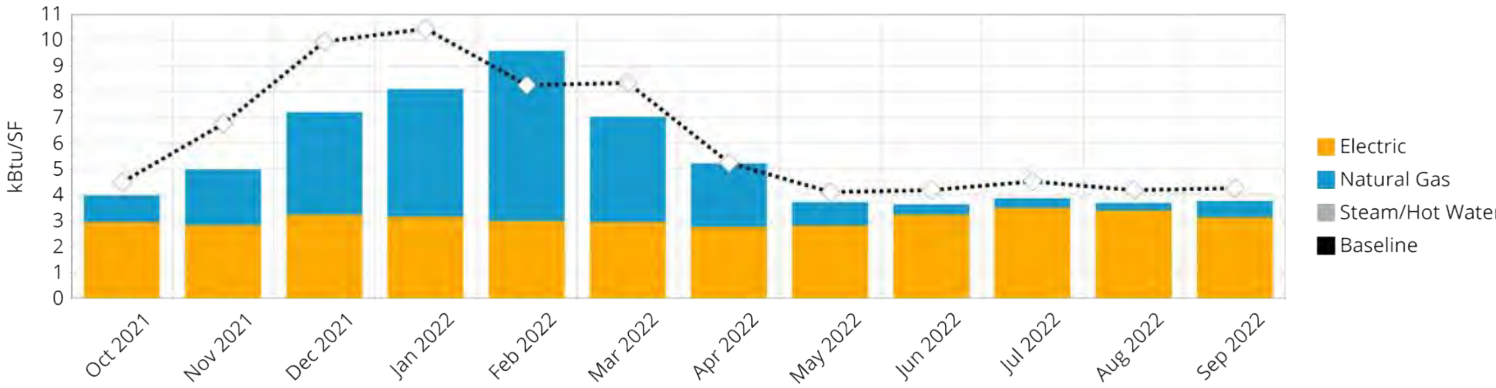


Energy Code: ASHRAE 90.1-2016

Baseline

Comparing each site's most recent 12-month period to the baseline period Jan 2017 - Dec 2017

3 BENCHMARKING

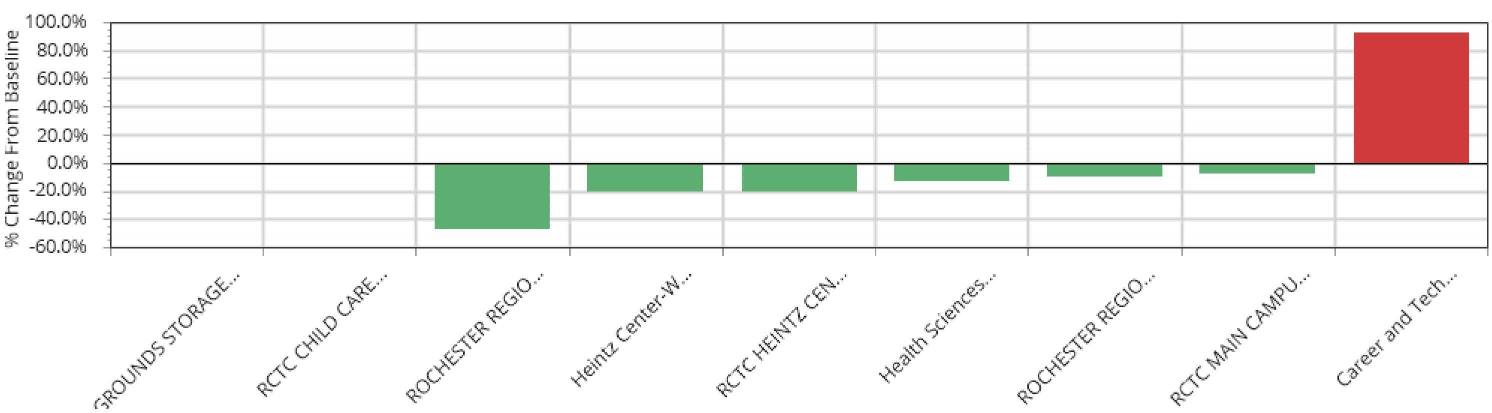


Name	Current (kBtu/SF)	Baseline (kBtu/SF)	Consumption % Change	Current CO2e (Metric Tons)	Baseline CO2e (Metric Tons)	CO2e % Change
GROUNDS STORAGE GARAGE	68.30	0.00	N/A	14.51	0.00	N/A
Career and Technical Education Center at Heintz (CTECH)	124.75	65.88	+89.37%	160.75	109.63	+46.62%
RCTC CHILD CARE CENTER	0.00	0.00	N/A	0.00	0.00	N/A
Heintz Center-Workforce Center Addition (SB 2030 Project)	16.80	20.88	-19.51%	47.56	72.11	-34.04%
ROCHESTER REGIONAL SPORTS CENTER	58.68	62.97	-6.81%	581.20	721.33	-19.43%
RCTC MAIN CAMPUS	76.99	83.06	-7.31%	3,003.16	4,279.68	-29.83%
RCTC HEINTZ CENTER	38.62	47.98	-19.51%	903.67	1,370.01	-34.04%
Health Sciences (SB 2030 Project)	76.69	85.61	-10.42%	333.62	475.45	-29.83%
ROCHESTER REGIONAL SPORTS STADIUM	75.76	123.29	-38.55%	466.01	765.71	-39.14%

3 BENCHMARKING

Name	Current (kBtu/SF)*	Baseline (kBtu/SF)*	Consumption % Change*	Current CO2e (Metric Tons)*	Baseline CO2e (Metric Tons)*	CO2e % Change*
Career and Technical Education Center at Heintz (CTECH)	113.79	58.73	+93.75%	149.62	102.38	+46.14%
GROUNDS STORAGE GARAGE	58.48	0.00	N/A	12.43	0.00	+999.99%
Health Sciences (SB 2030 Project)	74.13	85.22	-13.02%	324.86	475.69	-31.71%
Heintz Center-Workforce Center Addition (SB 2030 Project)	16.29	20.48	-20.48%	46.89	71.59	-34.50%
RCTC CHILD CARE CENTER	0.00	0.00	N/A	0.00	0.00	0.00%
RCTC HEINTZ CENTER	37.81	47.45	-20.31%	895.03	1,364.31	-34.40%
RCTC MAIN CAMPUS	75.47	82.47	-8.49%	2,973.51	4,267.81	-30.33%
ROCHESTER REGIONAL SPORTS CENTER	55.41	61.86	-10.43%	557.06	711.89	-21.75%
ROCHESTER REGIONAL SPORTS STADIUM	65.02	124.33	-47.70%	404.25	771.60	-47.61%

**Weather normalized*

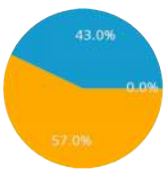


ENERGY STAR® Scores

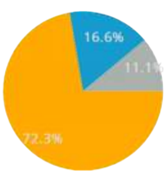
Name	Building Type	ENERGY STAR Score
Career and Technical Education Center at Heintz (CTECH)	College Classroom	-
GROUNDS STORAGE GARAGE	Vehicle Storage Building	-
Health Sciences (SB 2030 Project)	College Classroom	-

Heintz Center-Workforce Center Addition (SB 2030 Project)	College Classroom	-
RCTC CHILD CARE CENTER	Decommissioned	-
RCTC HEINTZ CENTER	College Classroom	-
RCTC MAIN CAMPUS	College Laboratory	-
ROCHESTER REGIONAL SPORTS CENTER	Gymnasium	-
ROCHESTER REGIONAL SPORTS STADIUM	Sports Arena	-

Total Energy Consumption & Cost



	Total Consumption	Total Consumption (kBtu)	kBtu/SF	CO2e Metric Tons
Electric	9,436,046 kWh	32,195,788	36.96	4,221.68
Natural Gas	242,566 Therms	24,256,617	27.85	1,288.39
Steam/Hot Water	6 MMBTu	6,269	0.01	0.42
Total		**56,458,674**	**64.82**	**5,510.48**



	Total Energy Cost ($)	$/SF
Electric	$1,083,133	$1.24
Natural Gas	$248,666	$0.29
Steam/Hot Water	$165,622	$0.19
Total	**$1,497,422**	**$1.72**

BENCHMARKING

Rochester Community and Technical College

Career and Technical Education Center at Heintz (CTECH)

2130 College View Road E
Rochester, MN 55904

Built 6/24/2016
19,117 Gross Bldg SF
1 Electric Meter
1 Natural Gas Meter
1 Water - Indoor Only Meter
1 Water - Irrigation Only Meter

✔ Site has proper information for energy analysis

B3 Benchmark

★★★☆☆

This site is using less energy than the B3 Benchmark.

B3 Peer Rating

61

This site is ranked in the upper 61st percentile amongst 2,945 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

+93.75%

This site is using more energy than the baseline period.

B3 Benchmark

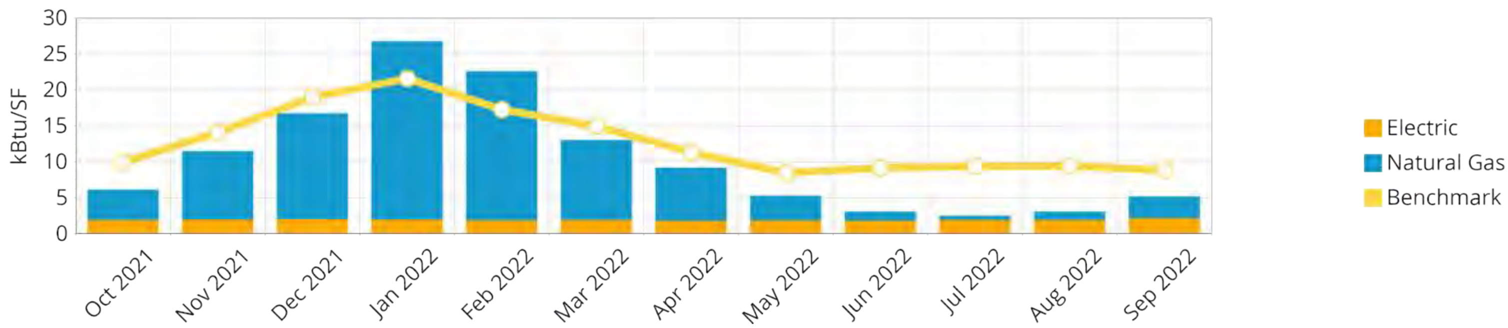
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★★★☆☆

Actual:	124.75 kBtu/SF (October 2021 to September 2022)
Benchmark:	153.51 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.81

This site is using less energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

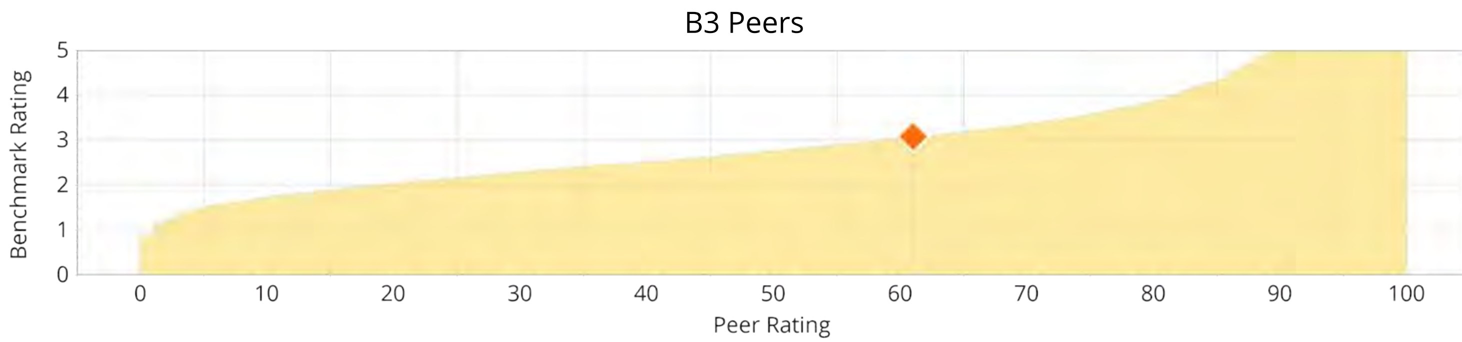


B3 Peer Rating

61

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 61st percentile amongst 2,945 similar sites.



ENERGY STAR

ENERGY STAR Portfolio Manager is an online tool funded by the Department of Energy that allows users to measure and track energy and water consumption, as well as GHG emissions. If eligible, properties entered into ENERGY STAR can receive a 1-100 score, based on statistical data from CBECS.

B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

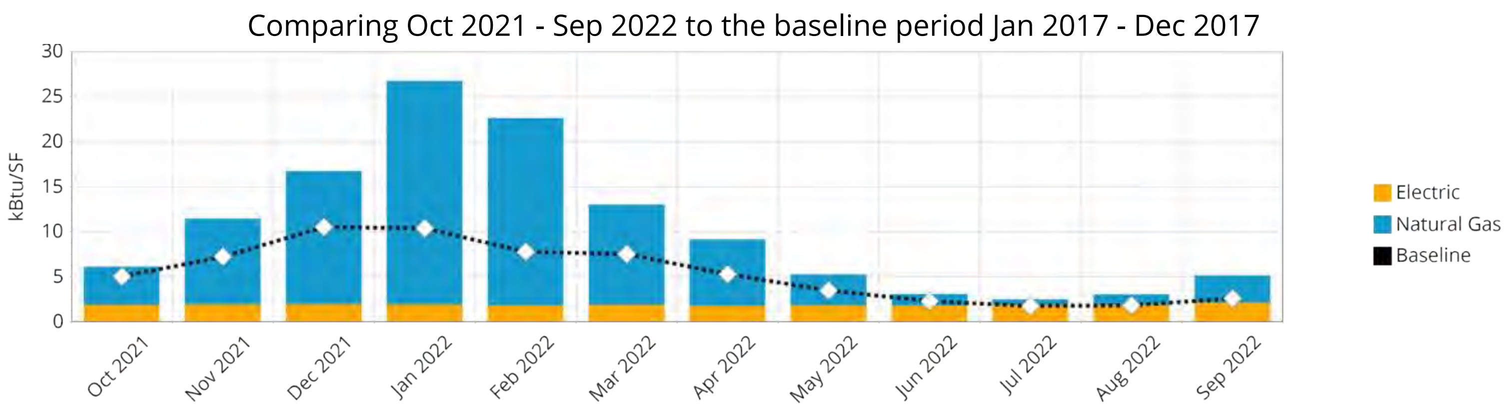
Baseline

Baseline comparison is a comparison of a site to itself over time.

+93.75%

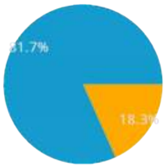
*Actual:	113.79 kBtu/SF (October 2021 to September 2022)
*Baseline:	58.73 kBtu/SF (January 2017 to December 2017)

*Weather normalized

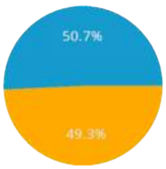


3 BENCHMARKING

Energy Usage by Meter Source Type

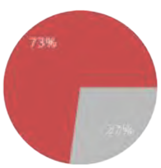


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	128,022 kWh	436,812	22.85	1,097.52
Natural Gas	19,480 Therms	1,948,039	101.90	4,894.57
Total		**2,384,852**	**124.75**	**5,992.09**



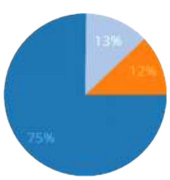
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$16,138	$0.84	$40.55	0.14
Natural Gas	$16,629	$0.87	$41.78	0.26
Total	**$32,767**	**$1.71**	**$82.33**	**0.40**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
27% Baseload	34.00	$0	0	0.00
73% Heating	90.75	$1,000	234,000	12.41
0% Cooling	0.00	$0	0	0.00

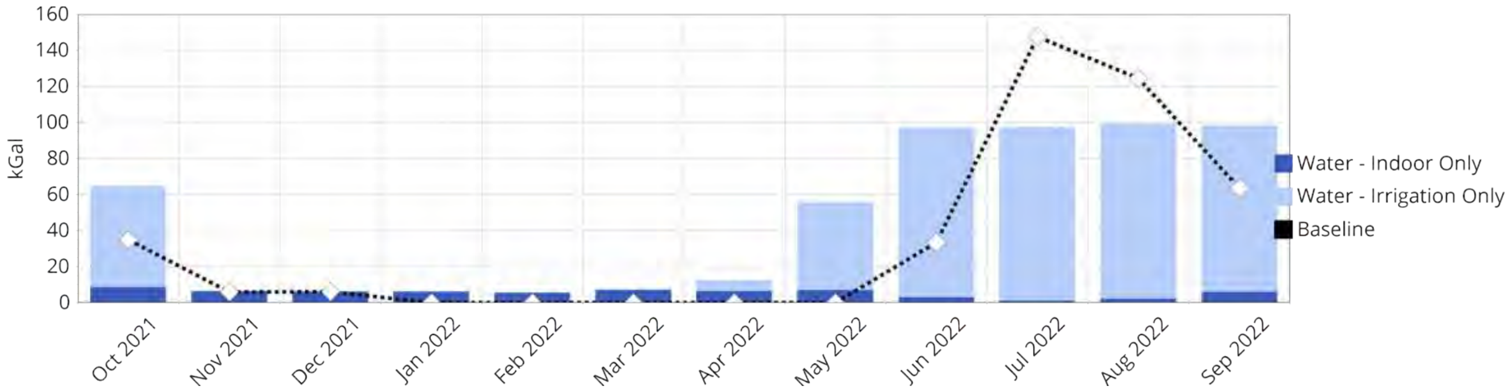
Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Classrooms	10 hrs/day	5 days/wk	12 months/yr	Heated And Cooled
Educational Laboratory	10 hrs/day	5 days/wk	12 months/yr	Heated And Cooled
Kitchen	6 hrs/day	5 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	555.68 (kGal/year)
Baseline Water Consumption:	416 (kGal/year)
Percent Change:	+33.50%
Current Annual Water Dollars:	$1,878
Baseline Annual Water Dollars:	$802
Annual Water Usage Per Occupant:	1.3962
Annual Water Usage Per Square Foot:	0.0291



Miscellaneous Properties

Total Sites:	1
Total Buildings:	1
Total Meters:	4
Annual CO2e Metric Tons:	160.75 metric tons
Annual CO2e/SF:	0.0084 metric tons/SF
Annual CO2e/Occupant:	0.4039 metric tons/occupant
Annual CO2e Pounds:	354,386 pounds
Annual CO2e/SF:	18.54 pounds/SF
Annual CO2e/Occupant:	890.42 pounds/occupant
Annual Cost:	$34,645
Annual Cost/SF:	$1.81/SF
Annual Cost/Occupant:	$87.05/occupant
kBtu:	2,384,852 kBtu/year
kBtu/SF (aka EUI):	124.75 kBtu/sf/year
Date Created:	3/27/2017
First Building Name:	CAREER AND TECHNICAL EDUCATION CENTER AT HEINTZ (CTECH)
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

GROUNDS STORAGE GARAGE

2900 College Pl SE
Rochester, MN 55904

Built 2019

4,000 Gross Bldg SF

1 Natural Gas Meter
1 Water - Mixed Use Meter
1 Sanitary Sewer Meter

Warning. No electric meters defined.

B3 Benchmark

This site is using significantly less energy than the B3 Benchmark.

B3 Peer Rating

42

This site is ranked in the lower 42nd percentile amongst 50 similar sites.

ENERGY STAR® Score

N/A

Problem: The time weighted value for Number of Workers on Main Shift in your Non-Refrigerated Warehouse is 0

Baseline Comparison

N/A

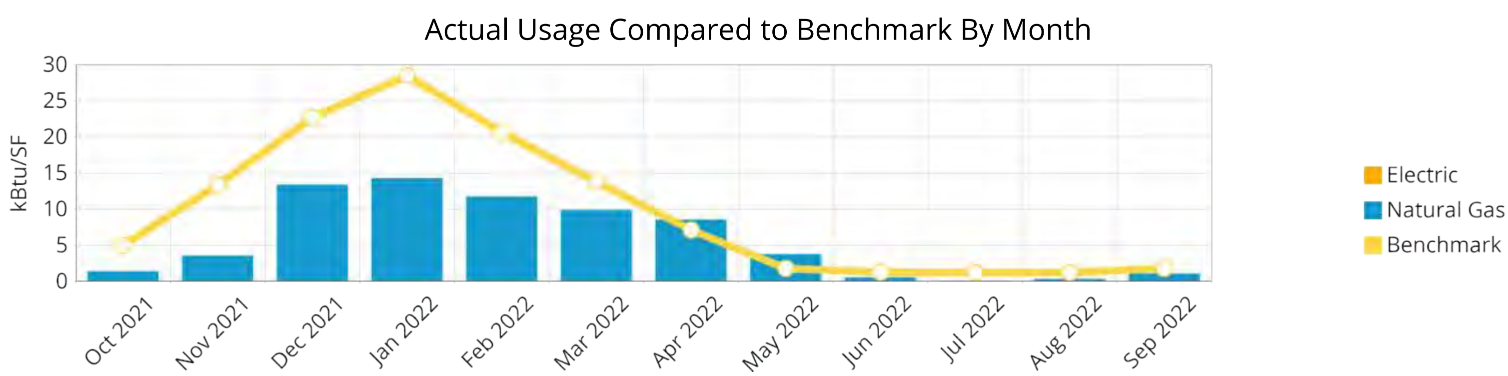
This site has insufficient information to calculate a proper energy baseline.

B3 Benchmark

B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

Actual:	68.30 kBtu/SF (October 2021 to September 2022)
Benchmark:	118.26 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.58

This site is using significantly less energy than the B3 Benchmark.

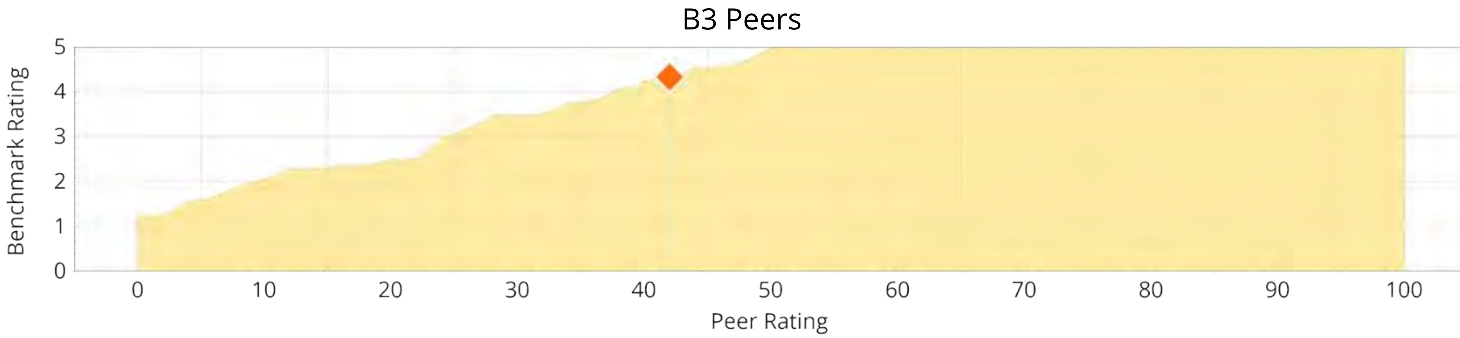


B3 Peer Rating

42

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the lower 42nd percentile amongst 50 similar sites.



ENERGY STAR

ENERGY STAR Portfolio Manager is an online tool funded by the Department of Energy that allows users to measure and track energy and water consumption, as well as GHG emissions. If eligible, properties entered into ENERGY STAR can receive a 1-100 score, based on statistical data from CBECS.

B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: The time weighted value for Number of Workers on Main Shift in your Non-Refrigerated Warehouse is 0

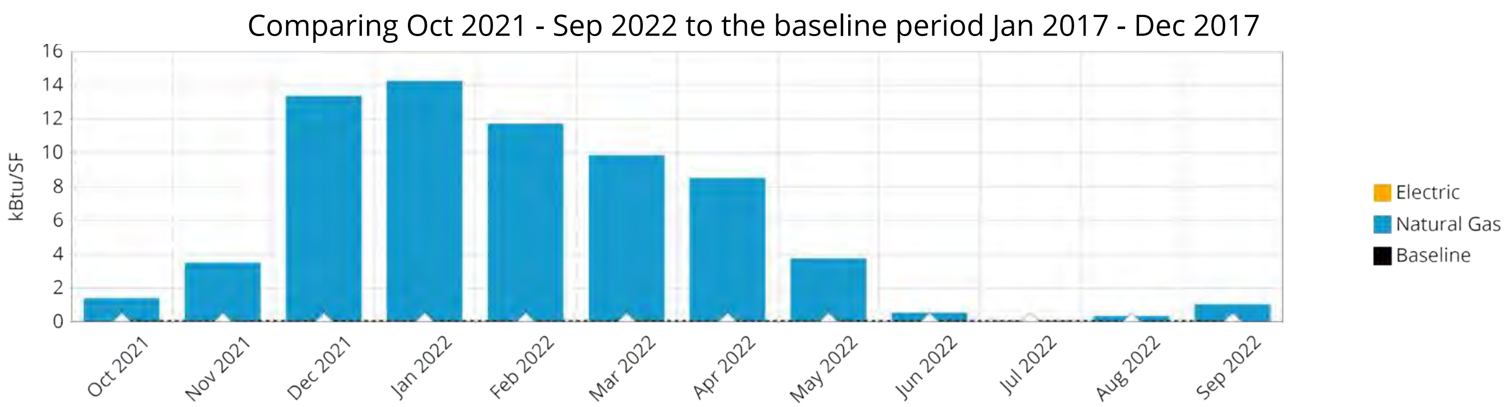
Baseline

Baseline comparison is a comparison of a site to itself over time.

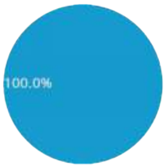
N/A

*Actual:	58.48 kBtu/SF (October 2021 to September 2022)
*Baseline:	0.00 kBtu/SF (January 2017 to December 2017)

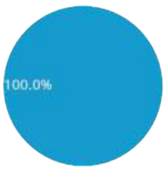
*Weather normalized



Energy Usage by Meter Source Type

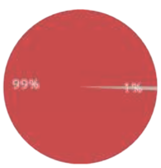


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	0 kWh	0	0.00	0.00
Natural Gas	2,732 Therms	273,212	68.30	136,605.77
Total		**273,212**	**68.30**	**136,605.77**



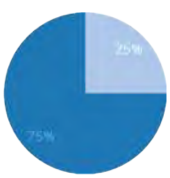
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$0	$0.00	$0.00	0.00
Natural Gas	$3,334	$0.83	$1,667.08	7.26
Total	**$3,334**	**$0.83**	**$1,667.08**	**7.26**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
1% Baseload	0.46			
99% Heating	67.84			
0% Cooling	0.00			

Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Vehicle Garage	12 hrs/day	5 days/wk	12 months/yr	Heated Only
Warehouse	1 hrs/day	5 days/wk	12 months/yr	Heated Only

Water

Current Water Consumption:	4.88 (kGal/year)
Baseline Water Consumption:	(kGal/year)
Percent Change:	0.00%
Current Annual Water Dollars:	$421
Baseline Annual Water Dollars:	
Annual Water Usage Per Occupant:	2.4391
Annual Water Usage Per Square Foot:	0.0012

Miscellaneous Properties

Total Sites:	1
Total Buildings:	1
Total Meters:	3
Annual CO2e Metric Tons:	14.51 metric tons
Annual CO2e/SF:	0.0036 metric tons/SF
Annual CO2e/Occupant:	7.2558 metric tons/occupant
Annual CO2e Pounds:	31,993 pounds
Annual CO2e/SF:	8.00 pounds/SF
Annual CO2e/Occupant:	15,996.26 pounds/occupant
Annual Cost:	$3,756
Annual Cost/SF:	$0.94/SF
Annual Cost/Occupant:	$1,877.82/occupant
kBtu:	273,212 kBtu/year
kBtu/SF (aka EUI):	68.30 kBtu/sf/year
Date Created:	12/10/2019
First Building Name:	GROUNDS STORAGE GARAGE
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

Health Sciences (SB 2030 Project)

851 30th Ave SE
Rochester, MN 55904

Built 2007
41,000 Gross Bldg SF
2 Electric Meters
1 Natural Gas Meter
2 Water - Mixed Use Meters
4 Water - Irrigation Only Meters
1 Sanitary Sewer Meter

✓ Site has proper information for energy analysis

B3 Benchmark

★★½☆☆

This site is using slightly less energy than the B3 Benchmark.

B3 Peer Rating

54

This site is ranked in the upper 54th percentile amongst 171 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

-13.02%

This site is using less energy than the baseline period.

B3 Benchmark

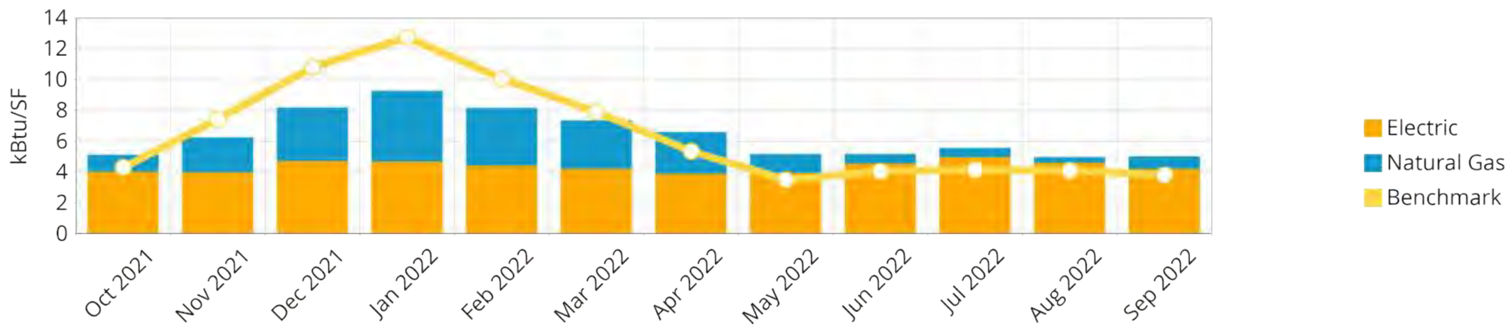
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★★½☆☆

Actual:	76.69 kBtu/SF (October 2021 to September 2022)
Benchmark:	78.21 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.98

This site is using slightly less energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

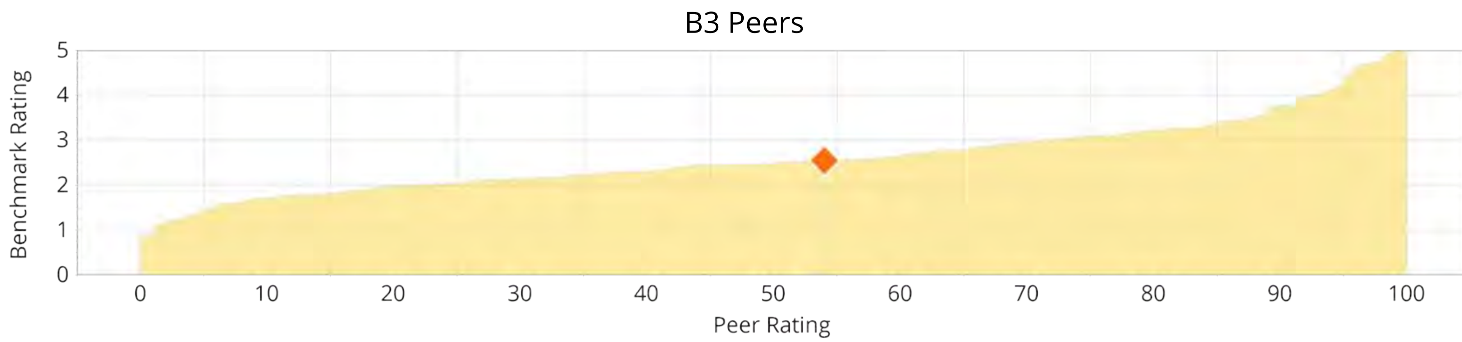


B3 Peer Rating

54

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 54th percentile amongst 171 similar sites.



ENERGY STAR

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B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

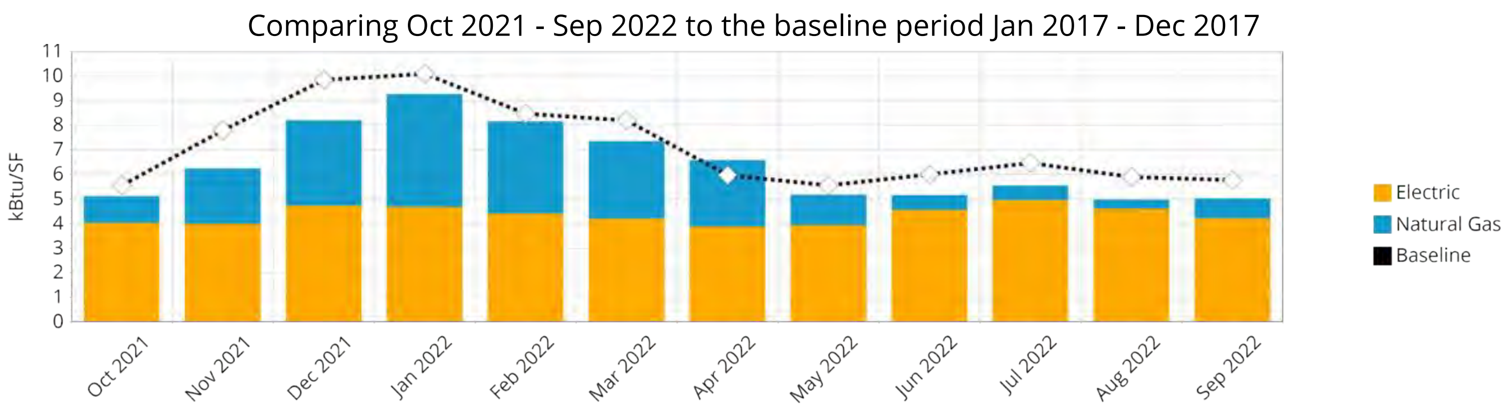
Baseline

Baseline comparison is a comparison of a site to itself over time.

-13.02%

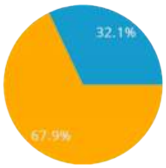
*Actual:	74.13 kBtu/SF	(October 2021 to September 2022)
*Baseline:	85.22 kBtu/SF	(January 2017 to December 2017)

*Weather normalized

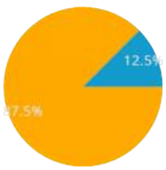


3 BENCHMARKING

Energy Usage by Meter Source Type

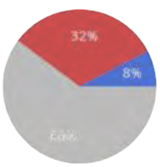


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	625,977 kWh	2,135,833	52.09	0.00
Natural Gas	10,084 Therms	1,008,401	24.60	0.00
Total		**3,144,233**	**76.69**	**0.00**



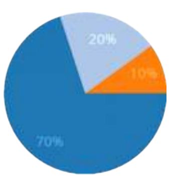
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$71,863	$1.75	$0.00	0.00
Natural Gas	$10,239	$0.25	$0.00	0.00
Total	**$82,103**	**$2.00**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
60% Baseload	46.13	$30,900	928,800	121.81
32% Heating	24.70	$0	0	0.00
8% Cooling	5.85	$1,100	34,200	4.49

Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Classrooms	8 hrs/day	5 days/wk	12 months/yr	Heated And Cooled
Office	8 hrs/day	5 days/wk	12 months/yr	Heated And Cooled
Dining	8 hrs/day	5 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	440.90 (kGal/year)
Baseline Water Consumption:	673 (kGal/year)
Percent Change:	-34.51%
Current Annual Water Dollars:	$2,702
Baseline Annual Water Dollars:	$2,742
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	0.0108

Miscellaneous Properties

Total Sites:	1
Total Buildings:	1
Total Meters:	10
Annual CO2e Metric Tons:	333.62 metric tons
Annual CO2e/SF:	0.0081 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	735,511 pounds
Annual CO2e/SF:	17.94 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$84,805
Annual Cost/SF:	$2.07/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	3,144,233 kBtu/year
kBtu/SF (aka EUI):	76.69 kBtu/sf/year
Date Created:	4/1/2015
First Building Name:	Health Sciences (SB 2030 Project)
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

Heintz Center-Workforce Center Addition (SB 2030 Project)

851 30th Ave SE
Rochester, MN 55904

Built 8/1/2014
24,480 Gross Bldg SF
1 Electric Meter
1 Natural Gas Meter
1 Steam/Hot Water Meter

Site has proper information for energy analysis

B3 Benchmark
★★★★★
This site is using significantly less energy than the B3 Benchmark.

B3 Peer Rating
93
This site is ranked in the upper 92nd percentile amongst 80 similar sites.

ENERGY STAR® Score
☆ N/A
Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison
-20.48%
This site is using less energy than the baseline period.

B3 Benchmark

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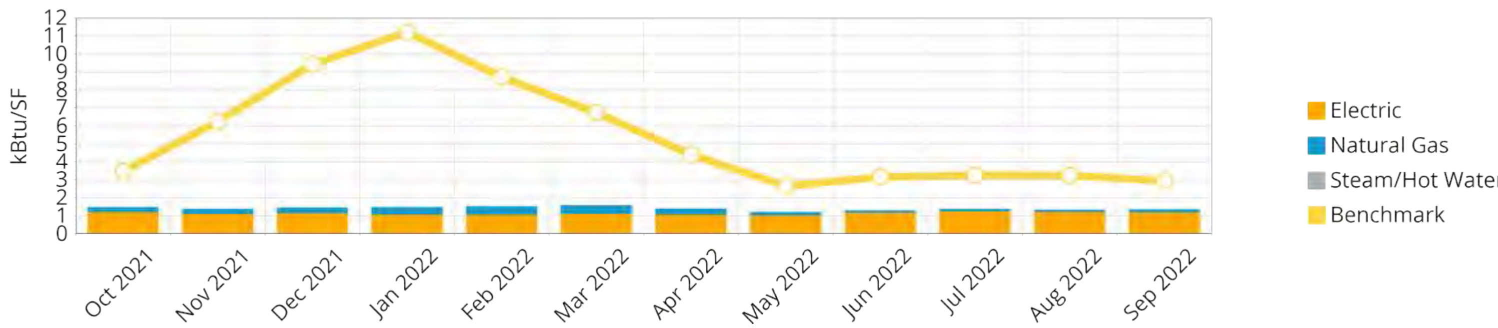
★★★★★

Actual:	16.80 kBtu/SF (October 2021 to September 2022)
Benchmark:	65.48 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.26

This site is using significantly less energy than the B3 Benchmark.

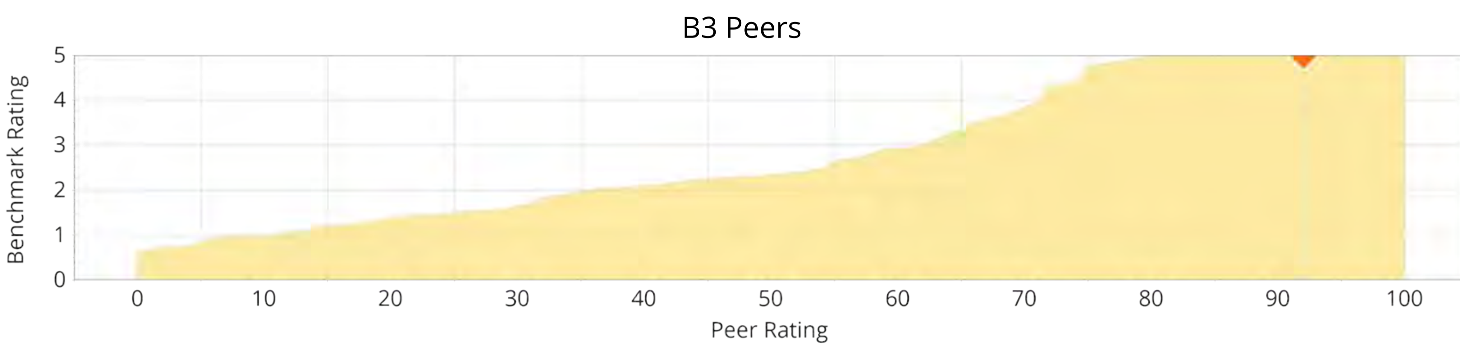
Actual Usage Compared to Benchmark By Month



B3 Peer Rating

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 92nd percentile amongst 80 similar sites.



ENERGY STAR

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B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

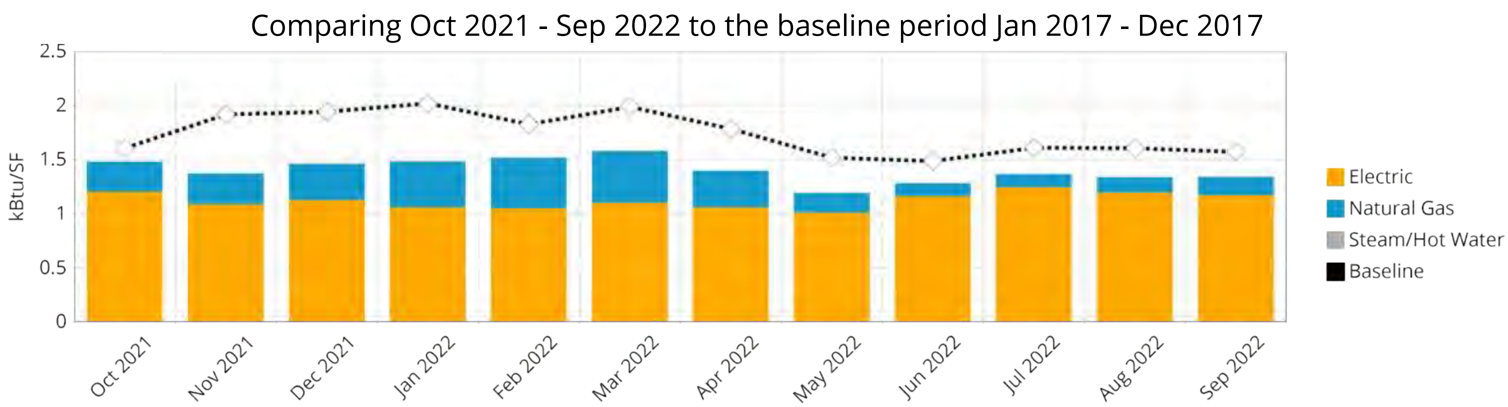
Baseline

Baseline comparison is a comparison of a site to itself over time.

-20.48%

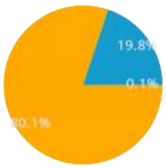
*Actual:	16.29 kBtu/SF	(October 2021 to September 2022)
*Baseline:	20.48 kBtu/SF	(January 2017 to December 2017)

*Weather normalized

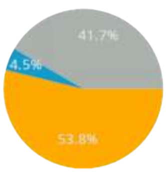


3 BENCHMARKING

Energy Usage by Meter Source Type

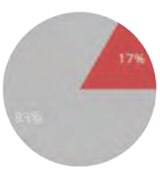


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	96,598 kWh	329,593	13.46	0.00
Natural Gas	814 Therms	81,391	3.32	0.00
Steam/Hot Water	0 MMBTu	313	0.01	0.00
Total		**411,297**	**16.80**	**0.00**



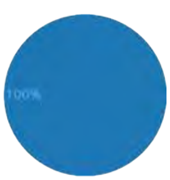
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$10,701	$0.44	$0.00	0.00
Natural Gas	$900	$0.04	$0.00	0.00
Steam/Hot Water	$8,281	$0.34	$0.00	0.00
Total	**$19,882**	**$0.81**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
83% Baseload	14.02			
17% Heating	2.78			
0% Cooling	0.00			

Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Classrooms	8 hrs/day	5 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	(kGal/year)
Baseline Water Consumption:	(kGal/year)
Percent Change:	
Current Annual Water Dollars:	
Baseline Annual Water Dollars:	
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	

Miscellaneous Properties

Total Sites:	1
Total Buildings:	1
Total Meters:	3
Annual CO2e Metric Tons:	47.56 metric tons
Annual CO2e/SF:	0.0019 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	104,856 pounds
Annual CO2e/SF:	4.28 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$19,882
Annual Cost/SF:	$0.81/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	411,297 kBtu/year
kBtu/SF (aka EUI):	16.80 kBtu/sf/year
Date Created:	5/11/2015
First Building Name:	Heintz Center-Workforce Center Addition (SB 2030 Project)
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

Built 1989

RCTC CHILD CARE CENTER

851 30th Ave SE
Rochester, MN 55904

1 Electric Meter
1 Water - Mixed Use Meter
1 Sanitary Sewer Meter

Site is decommissioned/demolished

B3 Benchmark

This site is unable to calculate a B3 Benchmark

B3 Peer Rating

N/A

Peer comparison not available

ENERGY STAR® Score

N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

N/A

This site has insufficient information to calculate a proper energy baseline.

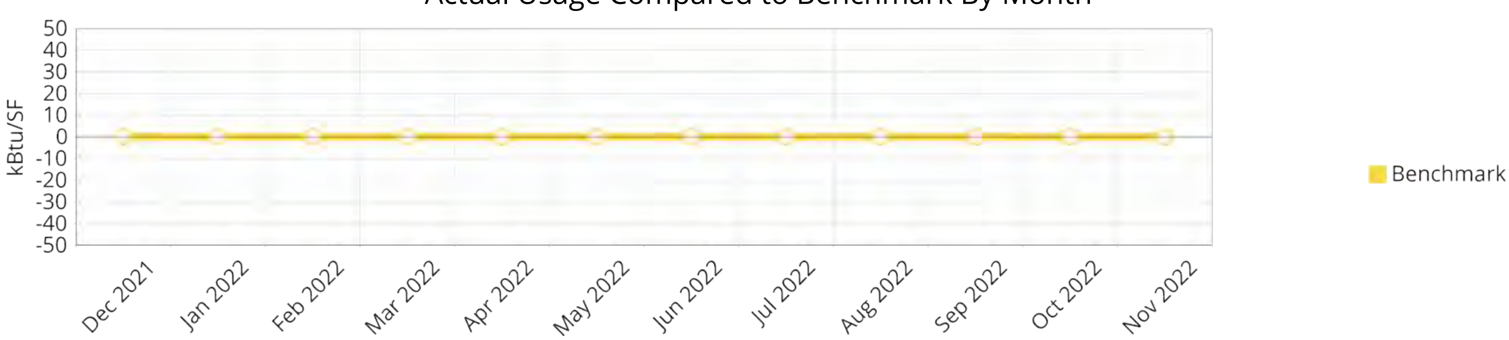
B3 Benchmark

B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

Actual:	0.00 kBtu/SF	(December 2021 to November 2022)
Benchmark:	0.00 kBtu/SF	(ASHRAE 90.1-2016)
Ratio:	-	

This site is unable to calculate a B3 Benchmark

Actual Usage Compared to Benchmark By Month



B3 Peer Rating

N/A

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

Peer comparison not available

B3 Peers

There is no or empty series

ENERGY STAR

ENERGY STAR Portfolio Manager is an online tool funded by the Department of Energy that allows users to measure and track energy and water consumption, as well as GHG emissions. If eligible, properties entered into ENERGY STAR can receive a 1-100 score, based on statistical data from CBECS.

B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

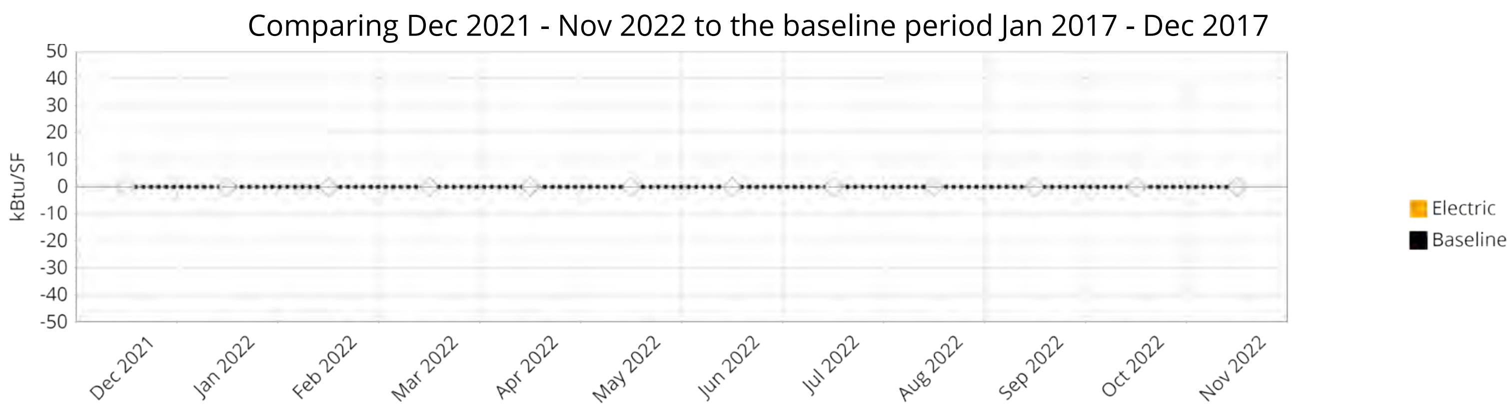
Baseline

Baseline comparison is a comparison of a site to itself over time.

N/A

*Actual:	0.00 kBtu/SF	(December 2021 to November 2022)
*Baseline:	0.00 kBtu/SF	(January 2017 to December 2017)

*Weather normalized



Energy Usage by Meter Source Type

No data available

	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	0 kWh	0	0.00	0.00
Total		**0**	**0.00**	**0.00**

No data available

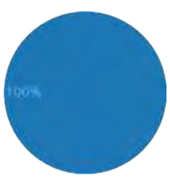
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$0	$0.00	$0.00	0.00
Total	**$0**	**$0.00**	**$0.00**	**0.00**

End Use Breakdown

No data available

End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
0% Baseload	0.00			
0% Heating	0.00			
0% Cooling	0.00			

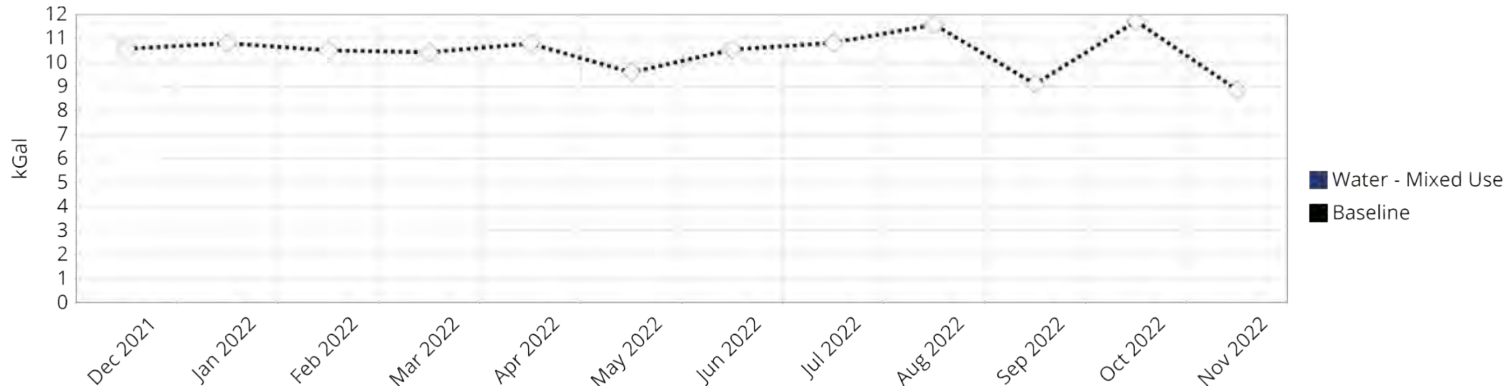
Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Classrooms	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	(kGal/year)
Baseline Water Consumption:	125 (kGal/year)
Percent Change:	0.00%
Current Annual Water Dollars:	$0
Baseline Annual Water Dollars:	$761
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	



Miscellaneous Properties

Total Sites:	1
Total Buildings:	0
Total Meters:	0
Annual CO2e Metric Tons:	0.00 metric tons
Annual CO2e/SF:	0.0000 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	0 pounds
Annual CO2e/SF:	0.00 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$0
Annual Cost/SF:	$0.00/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	0 kBtu/year
kBtu/SF (aka EUI):	0.00 kBtu/sf/year
Date Created:	
First Building Name:	RCTC CHILD CARE CENTER
Energy Usage Period:	December 2021 to November 2022
Water Usage Period:	December 2021 to November 2022
Total Usage Period:	December 2021 to November 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

RCTC HEINTZ CENTER

2070 College View Road E
Rochester, MN 55904

Built 1969
202,350 Gross Bldg SF
3 Electric Meters
1 Natural Gas Meter
1 Steam/Hot Water Meter
2 Water - Mixed Use Meters
1 Water - Irrigation Only Meter
2 Sanitary Sewer Meters

✔ Site has proper information for energy analysis

B3 Benchmark

★★★★★

This site is using significantly less energy than the B3 Benchmark.

B3 Peer Rating

96

This site is ranked in the upper 96th percentile amongst 24 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

-20.31%

This site is using less energy than the baseline period.

B3 Benchmark

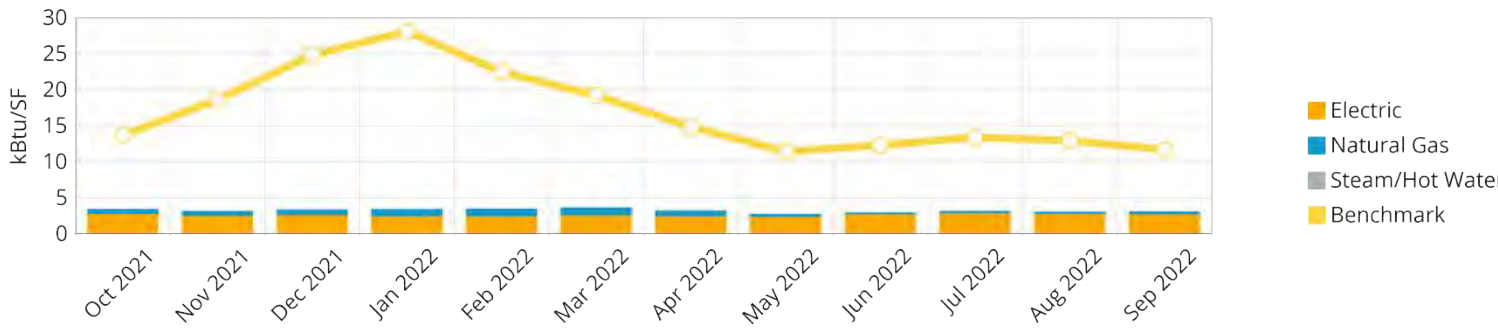
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★★★★★

Actual:	38.62 kBtu/SF (October 2021 to September 2022)
Benchmark:	203.58 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.19

This site is using significantly less energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

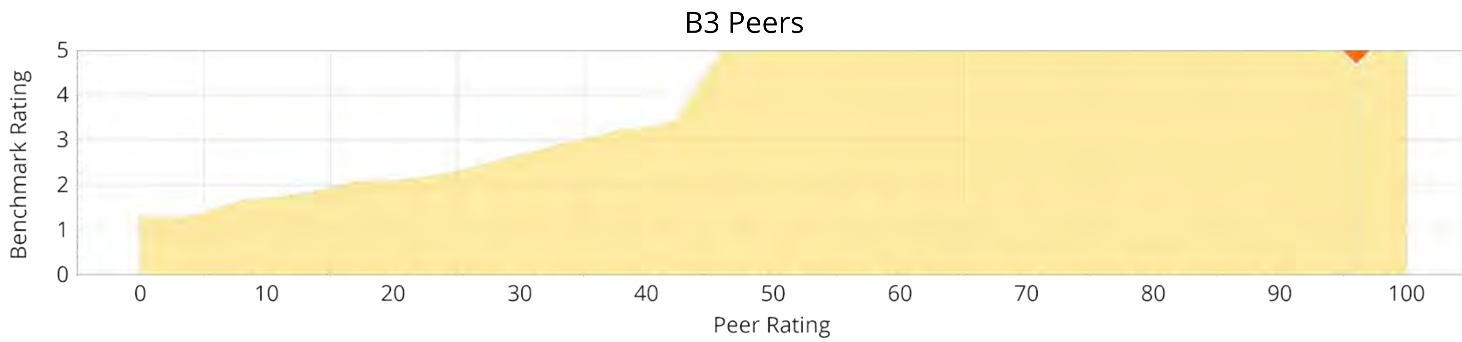


B3 Peer Rating

96

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 96th percentile amongst 24 similar sites.



ENERGY STAR

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B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

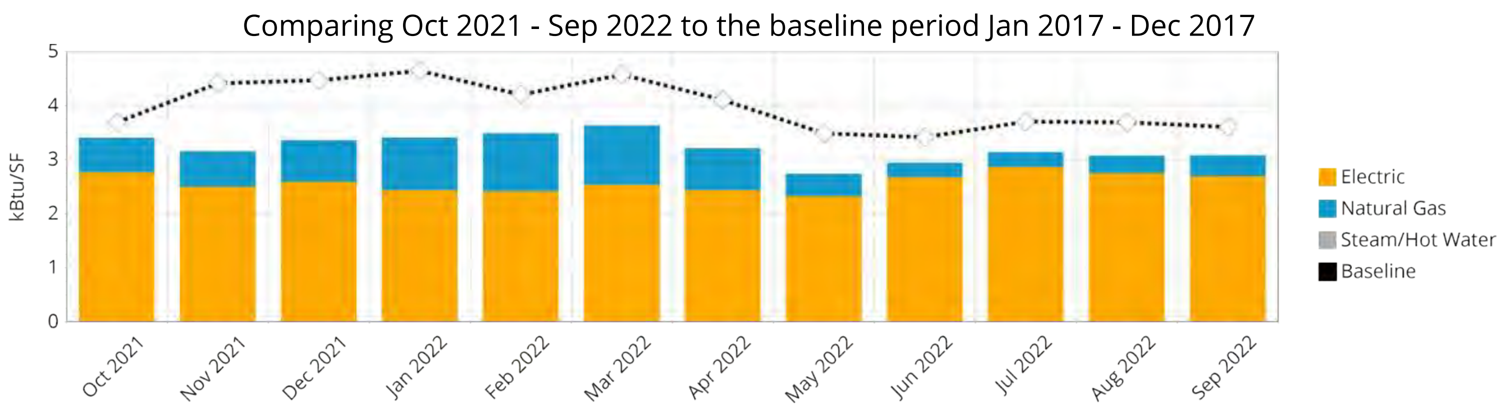
Baseline

Baseline comparison is a comparison of a site to itself over time.

-20.31%

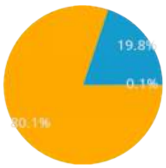
*Actual:	37.81 kBtu/SF (October 2021 to September 2022)
*Baseline:	47.45 kBtu/SF (January 2017 to December 2017)

*Weather normalized

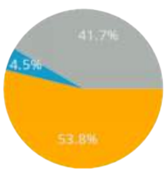


3 BENCHMARKING

Energy Usage by Meter Source Type

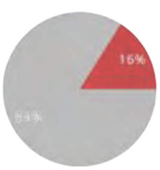


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	1,835,363 kWh	6,262,259	30.95	0.00
Natural Gas	15,464 Therms	1,546,426	7.64	0.00
Steam/Hot Water	6 MMBTu	5,956	0.03	0.00
Total		**7,814,641**	**38.62**	**0.00**



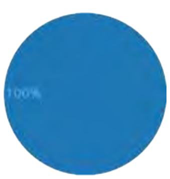
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$203,319	$1.00	$0.00	0.00
Natural Gas	$17,095	$0.08	$0.00	0.00
Steam/Hot Water	$157,341	$0.78	$0.00	0.00
Total	**$377,754**	**$1.87**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
84% Baseload	32.44			
16% Heating	6.18			
0% Cooling	0.00			

Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Office	9 hrs/day	5 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	2,094.73 (kGal/year)
Baseline Water Consumption:	1,236 (kGal/year)
Percent Change:	+69.53%
Current Annual Water Dollars:	$16,530
Baseline Annual Water Dollars:	$6,512
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	0.0104

Miscellaneous Properties

Total Sites:	1
Total Buildings:	14
Total Meters:	10
Annual CO2e Metric Tons:	903.67 metric tons
Annual CO2e/SF:	0.0045 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	1,992,256 pounds
Annual CO2e/SF:	9.85 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$394,285
Annual Cost/SF:	$1.95/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	7,814,641 kBtu/year
kBtu/SF (aka EUI):	38.62 kBtu/sf/year
Date Created:	
First Building Name:	*HEINTZ CENTER: WORKFORCE CENTER ADDITION
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

RCTC MAIN CAMPUS

851 30th Ave SE
Rochester, MN 55904

Built 1968
367,695 Gross Bldg SF
4 Electric Meters
3 Natural Gas Meters
2 Steam/Hot Water Meters
3 Water - Mixed Use Meters
7 Water - Irrigation Only Meters
2 Sanitary Sewer Meters
1 Stormwater Fee Meter

✔ Site has proper information for energy analysis

B3 Benchmark

★★★★½

This site is using significantly less energy than the B3 Benchmark.

B3 Peer Rating

80

This site is ranked in the upper 80th percentile amongst 147 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

-8.49%

This site is using less energy than the baseline period.

B3 Benchmark

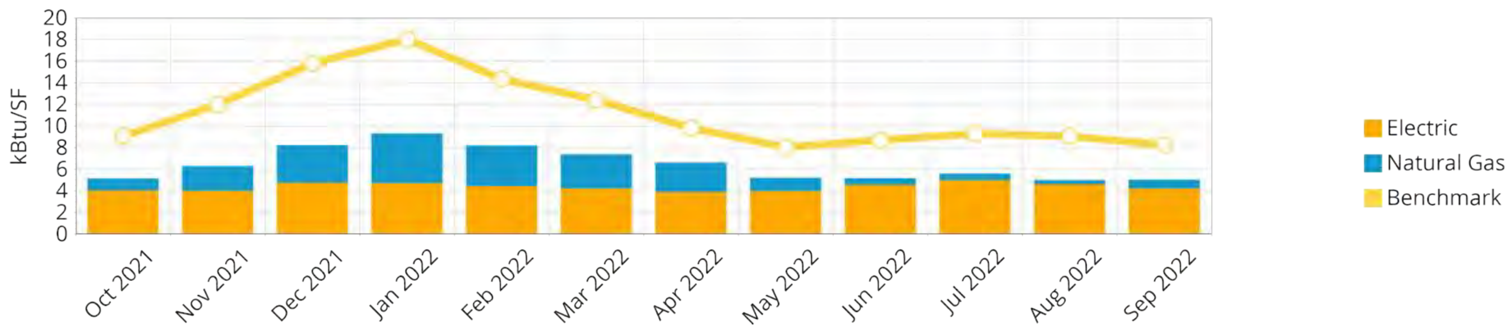
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★★★★½

Actual:	76.99 kBtu/SF (October 2021 to September 2022)
Benchmark:	134.84 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.57

This site is using significantly less energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

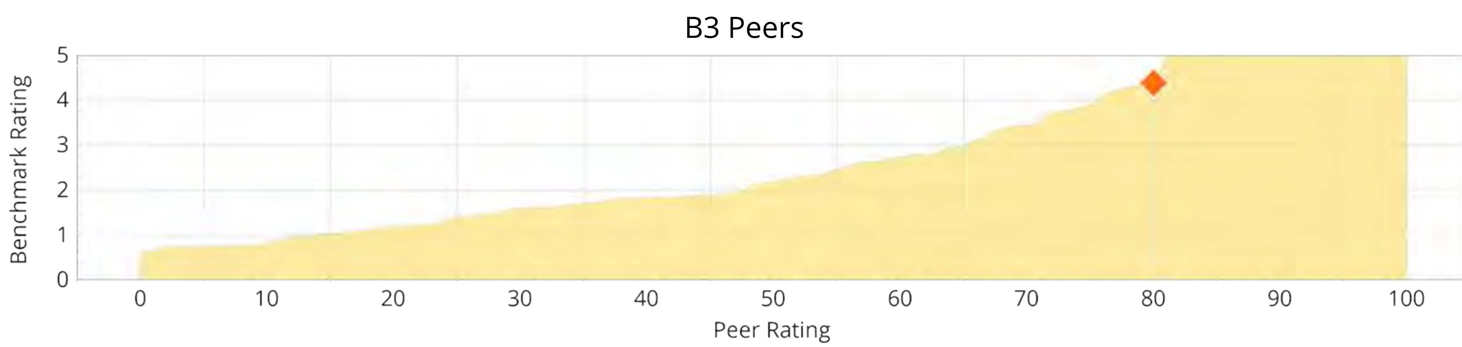


B3 Peer Rating

80

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 80th percentile amongst 147 similar sites.



ENERGY STAR

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B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

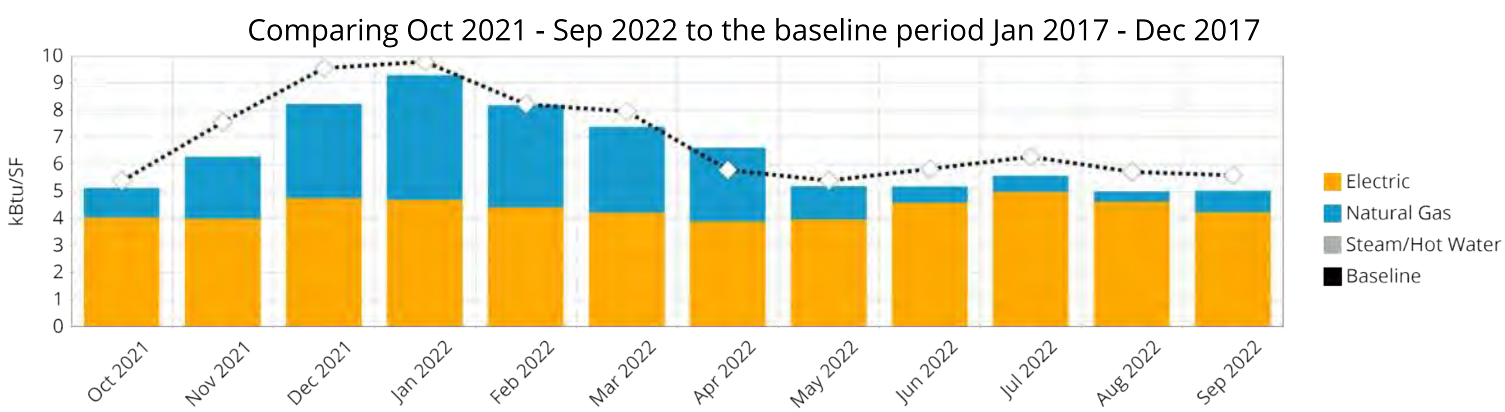
Baseline

Baseline comparison is a comparison of a site to itself over time.

-8.49%

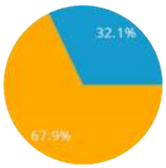
*Actual:	75.47 kBtu/SF	(October 2021 to September 2022)
*Baseline:	82.47 kBtu/SF	(January 2017 to December 2017)

*Weather normalized

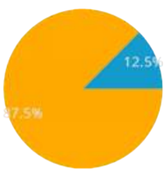


3 BENCHMARKING

Energy Usage by Meter Source Type

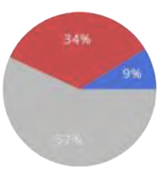


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	5,633,790 kWh	19,222,493	52.28	0.00
Natural Gas	90,861 Therms	9,086,090	24.71	0.00
Steam/Hot Water	0 MMBTu	0	0.00	0.00
Total		**28,308,583**	**76.99**	**0.00**



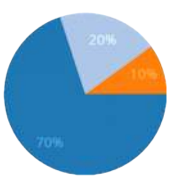
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$646,771	$1.76	$0.00	0.00
Natural Gas	$92,492	$0.25	$0.00	0.00
Steam/Hot Water	$0	$0.00	$0.00	0.00
Total	**$739,263**	**$2.01**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
57% Baseload	43.74			
34% Heating	26.53			
9% Cooling	6.72			

Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Classrooms	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Office	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Dining	12 hrs/day	7 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	4,409.02 (kGal/year)
Baseline Water Consumption:	7,634 (kGal/year)
Percent Change:	-42.25%
Current Annual Water Dollars:	$57,820
Baseline Annual Water Dollars:	$47,113
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	0.0120

Miscellaneous Properties

Total Sites:	1
Total Buildings:	16
Total Meters:	12
Annual CO2e Metric Tons:	3,003.16 metric tons
Annual CO2e/SF:	0.0082 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	6,620,823 pounds
Annual CO2e/SF:	18.01 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$797,082
Annual Cost/SF:	$2.17/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	28,308,583 kBtu/year
kBtu/SF (aka EUI):	76.99 kBtu/sf/year
Date Created:	
First Building Name:	*RCTC HEALTH SCIENCE HALL
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

BENCHMARKING

Rochester Community and Technical College

ROCHESTER REGIONAL SPORTS CENTER

2900 College Pl SE
Rochester, MN 55904

Built 8/1/2002
115,220 Gross Bldg SF
1 Electric Meter
1 Natural Gas Meter
1 Steam/Hot Water Meter
1 Water - Mixed Use Meter
1 Water - Irrigation Only Meter
1 Sanitary Sewer Meter

✔ Site has proper information for energy analysis

B3 Benchmark

★★★★☆

This site is using significantly less energy than the B3 Benchmark.

B3 Peer Rating

62

This site is ranked in the upper 62nd percentile amongst 76 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

-10.43%

This site is using less energy than the baseline period.

B3 Benchmark

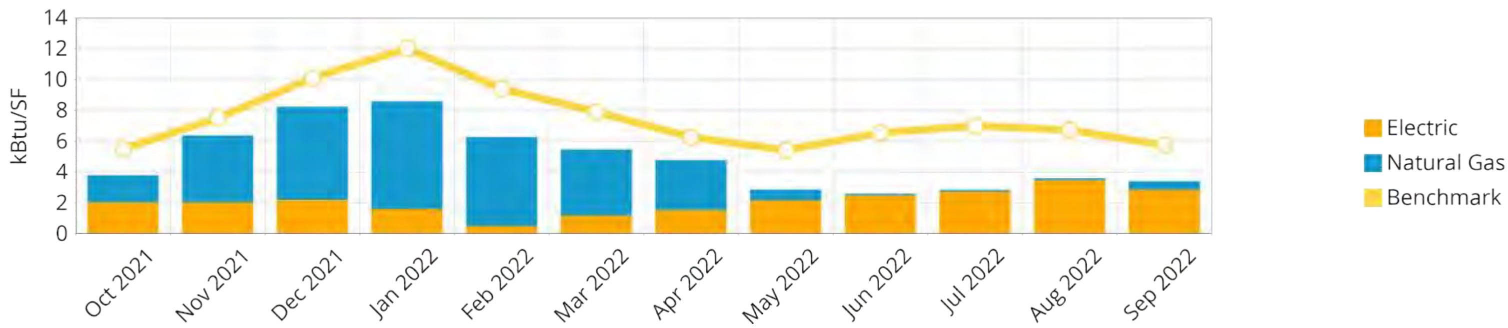
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★★★★☆

Actual:	58.68 kBtu/SF (October 2021 to September 2022)
Benchmark:	90.22 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	0.65

This site is using significantly less energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

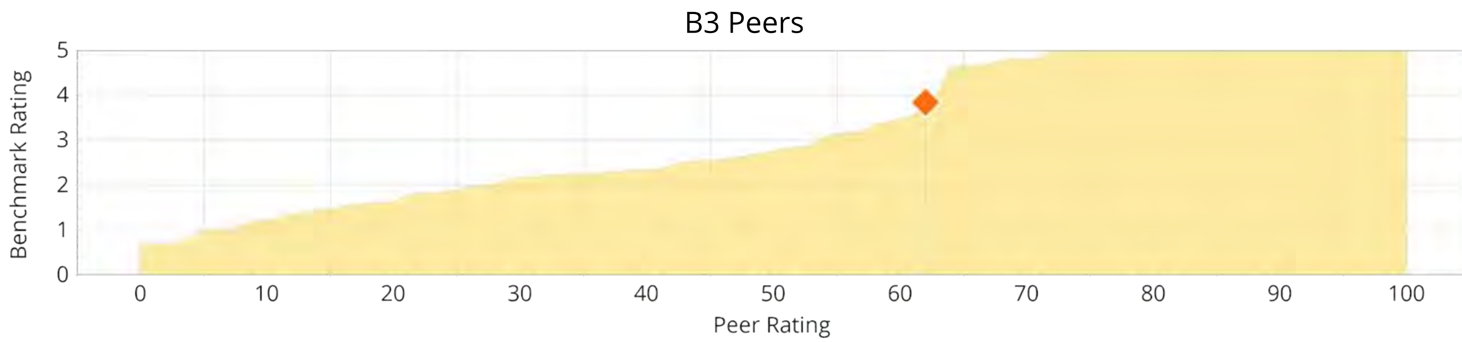


B3 Peer Rating

62

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the upper 62nd percentile amongst 76 similar sites.



ENERGY STAR

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B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

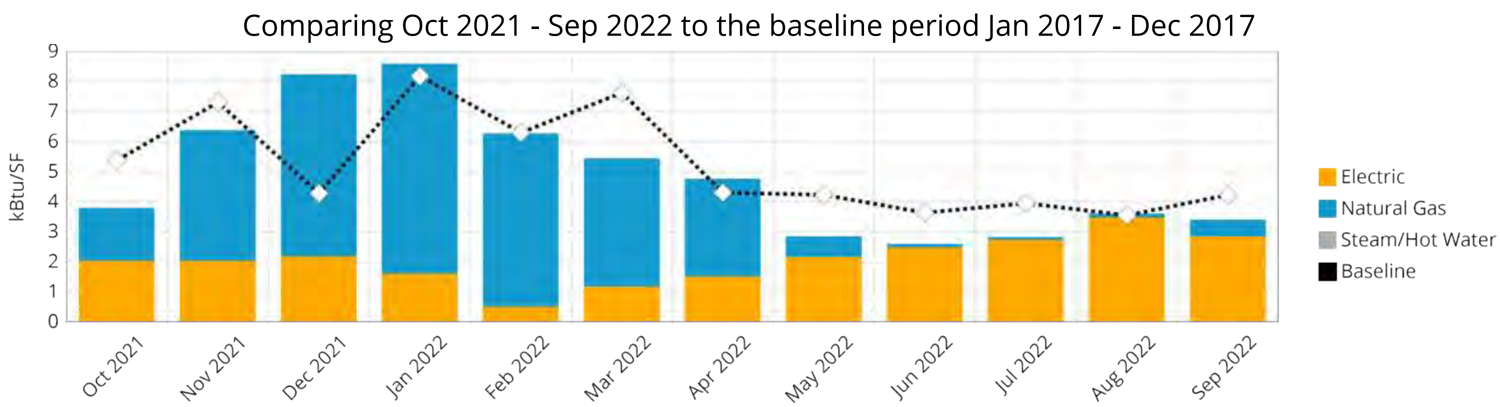
Baseline

Baseline comparison is a comparison of a site to itself over time.

-10.43%

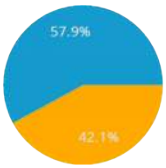
*Actual:	55.41 kBtu/SF (October 2021 to September 2022)
*Baseline:	61.86 kBtu/SF (January 2017 to December 2017)

*Weather normalized

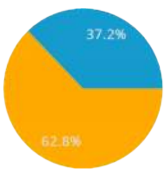


3 BENCHMARKING

Energy Usage by Meter Source Type

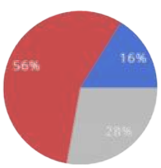


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	834,442 kWh	2,847,116	24.71	0.00
Natural Gas	39,136 Therms	3,913,559	33.97	0.00
Steam/Hot Water	0 MMBTu	0	0.00	0.00
Total		**6,760,675**	**58.68**	**0.00**



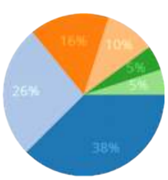
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$69,024	$0.60	$0.00	0.00
Natural Gas	$40,865	$0.35	$0.00	0.00
Steam/Hot Water	$0	$0.00	$0.00	0.00
Total	**$109,889**	**$0.95**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
28% Baseload	16.34			
56% Heating	32.84			
16% Cooling	9.49			

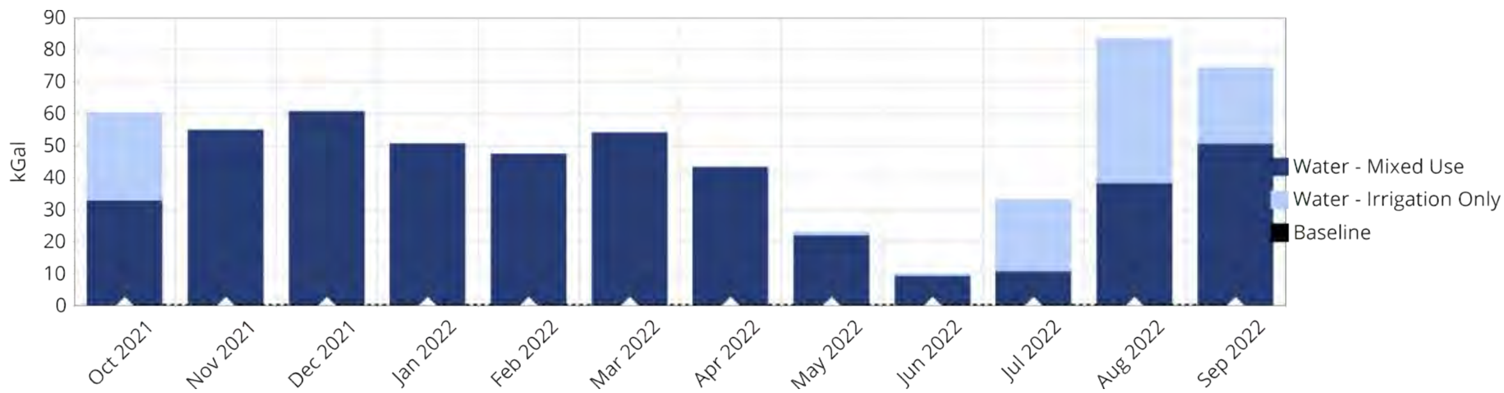
Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Gymnasium	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Fitness	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Locker Rooms	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Office	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Classrooms	14 hrs/day	6 days/wk	12 months/yr	Heated And Cooled
Dining	12 hrs/day	7 days/wk	12 months/yr	Heated And Cooled

Water

Current Water Consumption:	596.29 (kGal/year)
Baseline Water Consumption:	(kGal/year)
Percent Change:	0.00%
Current Annual Water Dollars:	$6,102
Baseline Annual Water Dollars:	
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	0.0052



Miscellaneous Properties

Total Sites:	1
Total Buildings:	1
Total Meters:	5
Annual CO2e Metric Tons:	581.20 metric tons
Annual CO2e/SF:	0.0050 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	1,281,317 pounds
Annual CO2e/SF:	11.12 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$115,991
Annual Cost/SF:	$1.01/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	6,760,675 kBtu/year
kBtu/SF (aka EUI):	58.68 kBtu/sf/year
Date Created:	3/26/2015
First Building Name:	ROCHESTER REGIONAL SPORTS CENTER
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

BENCHMARKING

Rochester Community and Technical College

ROCHESTER REGIONAL SPORTS STADIUM

2900 College Pl SE
Rochester, MN 55904

Built 12/31/2005
97,166 Gross Bldg SF
2 Electric Meters
3 Natural Gas Meters
1 Water - Mixed Use Meter
1 Water - Irrigation Only Meter
1 Sanitary Sewer Meter

✔ Site has proper information for energy analysis

B3 Benchmark

★½☆☆☆

This site is using significantly more energy than the B3 Benchmark.

B3 Peer Rating

11

This site is ranked in the lower 11th percentile amongst 19 similar sites.

ENERGY STAR® Score

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

Baseline Comparison

-47.70%

This site is using less energy than the baseline period.

B3 Benchmark

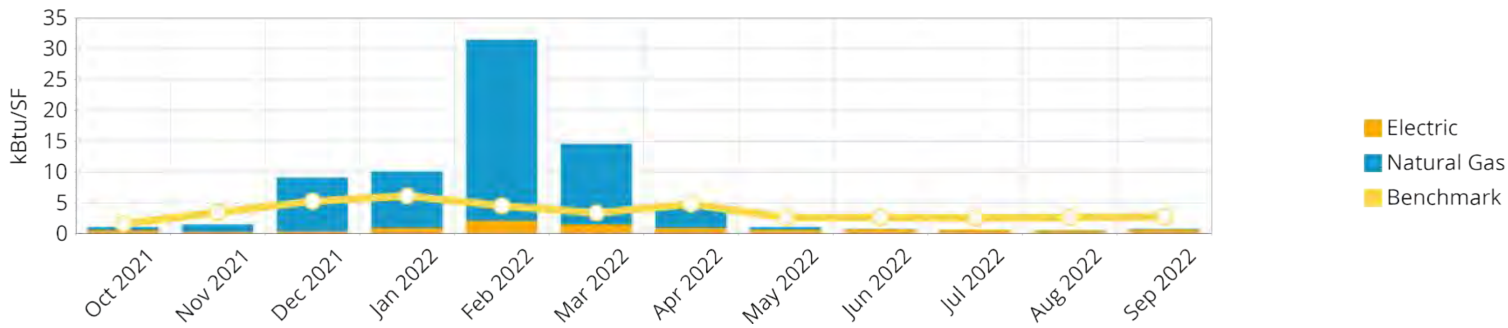
B3 Benchmark usage predictions are generated by an engineering model of a site based on entered building data. The engineering model predicts the usage of a site as if it were built to the program's chosen energy code using typical weather conditions. The more accurate the building data is, the more accurate the model will be.

★½☆☆☆

Actual:	75.76 kBtu/SF (October 2021 to September 2022)
Benchmark:	42.44 kBtu/SF (ASHRAE 90.1-2016)
Ratio:	1.79

This site is using significantly more energy than the B3 Benchmark.

Actual Usage Compared to Benchmark By Month

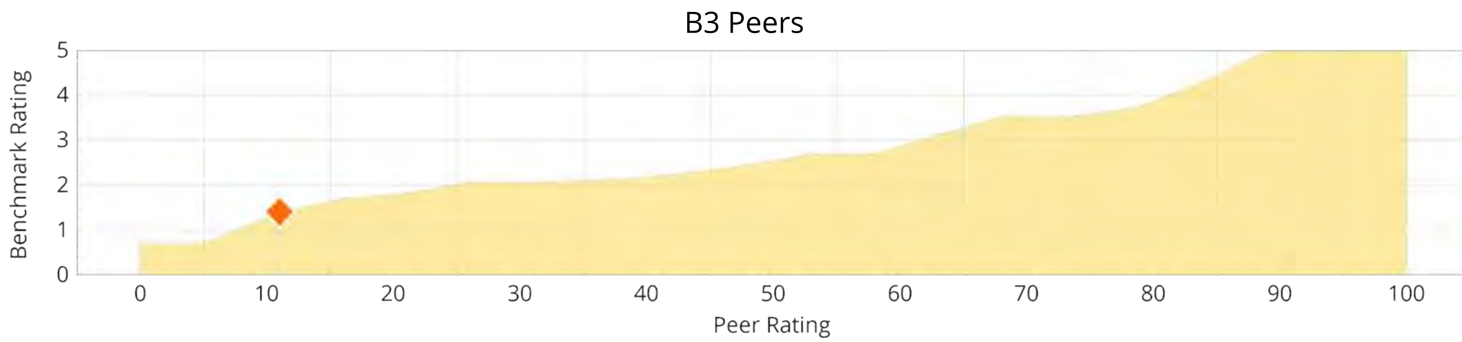


B3 Peer Rating

11

The B3 Peer Rating is a comparison of how a site is doing compared to similar building types based on the actual to benchmark ratio.

This site is ranked in the lower 11th percentile amongst 19 similar sites.



ENERGY STAR

ENERGY STAR Portfolio Manager is an online tool funded by the Department of Energy that allows users to measure and track energy and water consumption, as well as GHG emissions. If eligible, properties entered into ENERGY STAR can receive a 1-100 score, based on statistical data from CBECS.

B3 integrates with ENERGY STAR Portfolio Manager to gather scores automatically.

☆ N/A

Problem: In order to receive a score, more than 50% of the Gross Floor Area must be made up of a single Property Type that is eligible to receive a score (in your country)

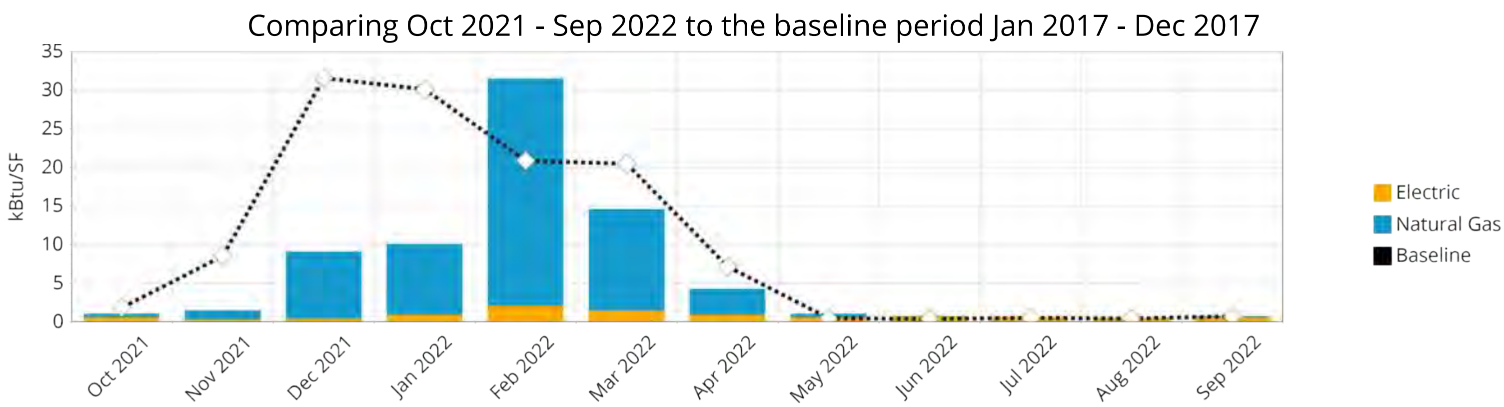
Baseline

Baseline comparison is a comparison of a site to itself over time.

-47.70%

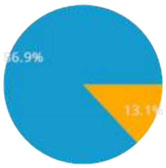
*Actual:	65.02 kBtu/SF (October 2021 to September 2022)
*Baseline:	124.33 kBtu/SF (January 2017 to December 2017)

*Weather normalized

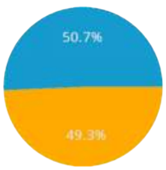


3 BENCHMARKING

Energy Usage by Meter Source Type

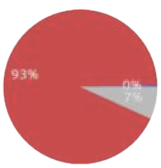


	Total Usage	Total Usage (kBtu)	kBtu/SF	kBtu/Occupant
Electric	281,853 kWh	961,683	9.90	0.00
Natural Gas	63,995 Therms	6,399,499	65.86	0.00
Total		**7,361,181**	**75.76**	**0.00**



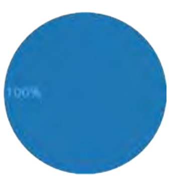
	Total Energy Cost ($)	$/SF	$/Occupant	CO2E/Occupant
Electric	$65,318	$0.67	$0.00	0.00
Natural Gas	$67,113	$0.69	$0.00	0.00
Total	**$132,431**	**$1.36**	**$0.00**	**0.00**

End Use Breakdown



End Use	Usage (kBtu/SF)	Potential Savings $	Potential Savings kBtu	Potential Savings CO2E
7% Baseload	5.10	$0	0	0.00
93% Heating	70.42	$33,000	3,927,000	208.57
0% Cooling	0.24	$0	0	0.00

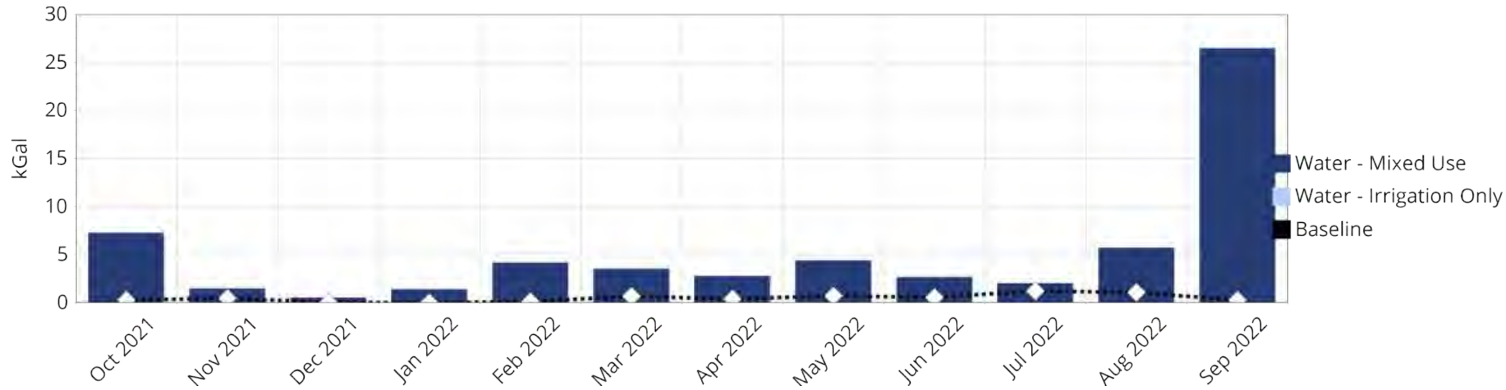
Space Asset Areas



SpaceUsage	Hours/Day	Days/Wk	Months/Yr	Conditioning
Warehouse	12 hrs/day	5 days/wk	12 months/yr	Heated Only

Water

Current Water Consumption:	62.32 (kGal/year)
Baseline Water Consumption:	6 (kGal/year)
Percent Change:	+941.44%
Current Annual Water Dollars:	$2,293
Baseline Annual Water Dollars:	$233
Annual Water Usage Per Occupant:	
Annual Water Usage Per Square Foot:	0.0006



Miscellaneous Properties

Total Sites:	1
Total Buildings:	4
Total Meters:	8
Annual CO2e Metric Tons:	466.01 metric tons
Annual CO2e/SF:	0.0048 metric tons/SF
Annual CO2e/Occupant:	0.0000 metric tons/occupant
Annual CO2e Pounds:	1,027,372 pounds
Annual CO2e/SF:	10.57 pounds/SF
Annual CO2e/Occupant:	0.00 pounds/occupant
Annual Cost:	$134,724
Annual Cost/SF:	$1.39/SF
Annual Cost/Occupant:	$0.00/occupant
kBtu:	7,361,181 kBtu/year
kBtu/SF (aka EUI):	75.76 kBtu/sf/year
Date Created:	
First Building Name:	ROCHESTER REGIONAL SPORTS STADIUM AIR-LOCK GARAGE
Energy Usage Period:	October 2021 to September 2022
Water Usage Period:	October 2021 to September 2022
Total Usage Period:	October 2021 to September 2022
Baseline Period:	January 2017 to December 2017

Rochester Community and Technical College

BENCHMARKING
advanced metrics for rating buildings

B3 Benchmark

★★★★★

This organization is using significantly less energy than the B3 Benchmark.

The current B3 Benchmark for this organization is 5 stars. Some of the buildings have a lower benchmark and some a higher. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on those sites with the greatest savings potential and links to help realize the savings.

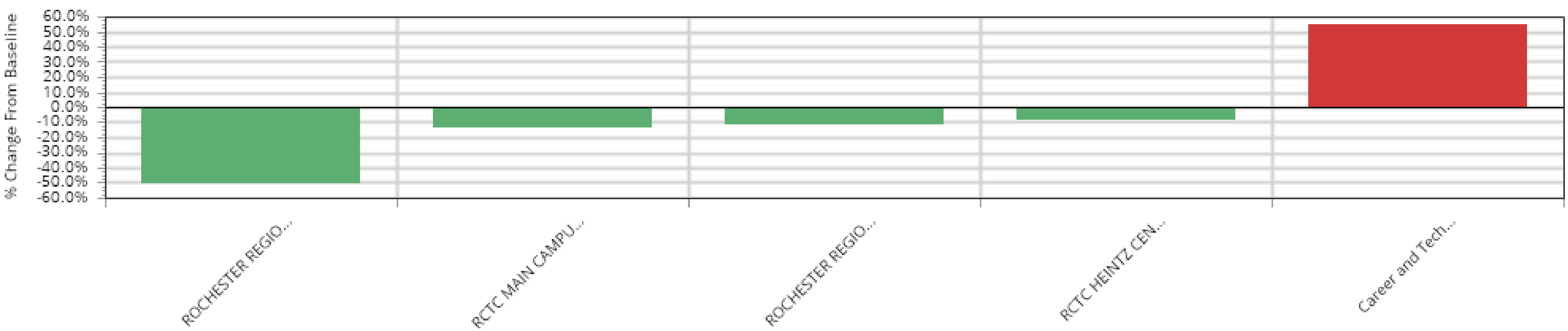
Energy Savings Opportunities

No potential savings calculated

Energy Savings Opportunities

Improvement Potential by Fuel Source

How are your sites performing over time?

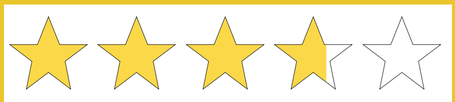


Rochester Community and Technical College

BENCHMARKING
advanced metrics for rating buildings

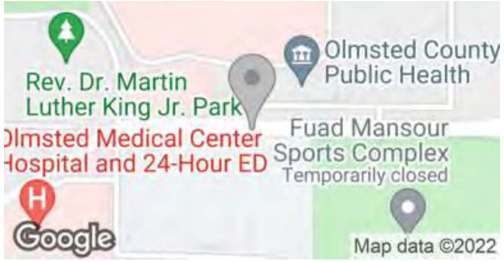
Career and Technical Education Center at Heintz (CTECH)

B3 Benchmark



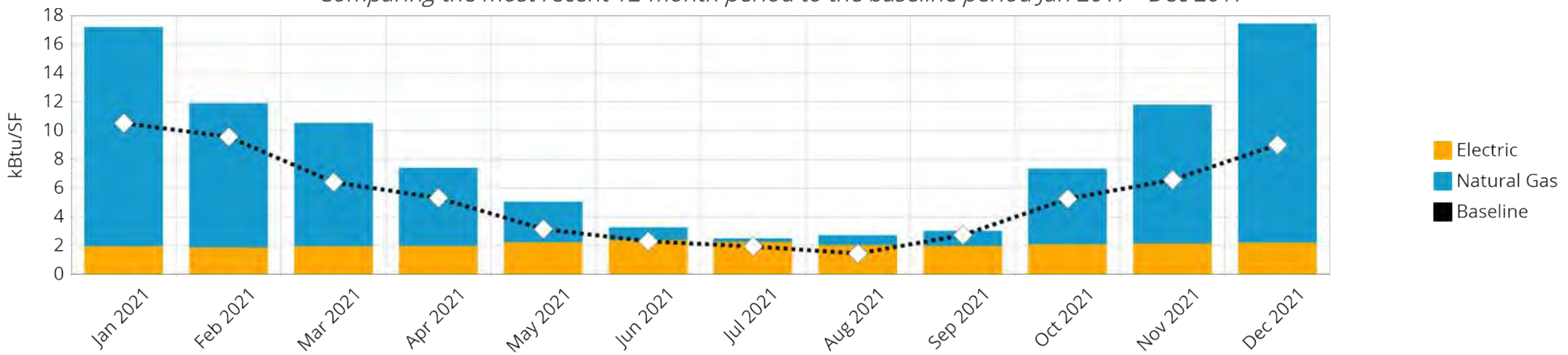
This site is using significantly less energy than the B3 Benchmark.

The current B3 Benchmark for this 17,466 sf College Classroom is 3.7 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.



How is this site performing over time?

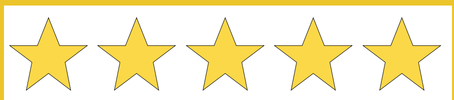
Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



Rochester Community and Technical College

GROUNDS STORAGE GARAGE

B3 Benchmark

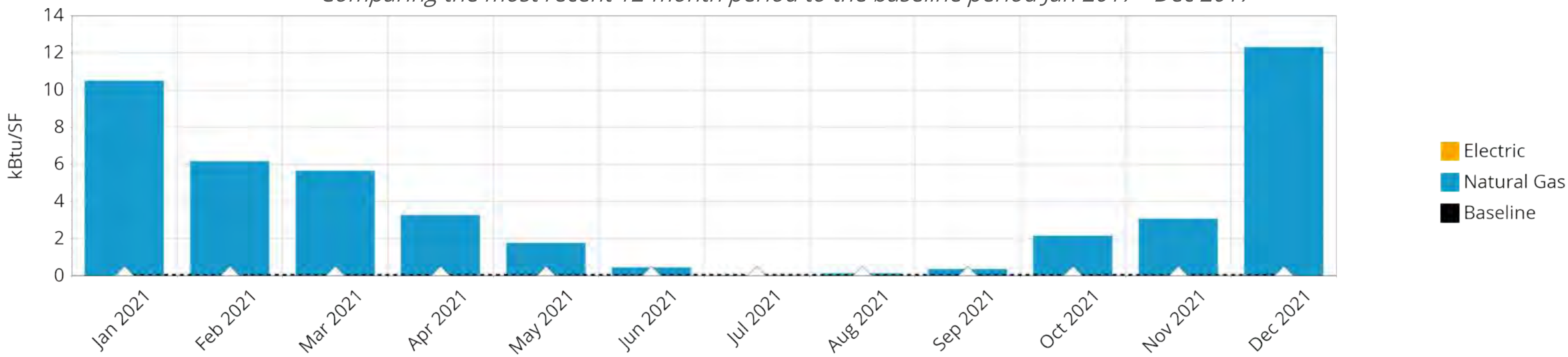


This site is using significantly less energy than the B3 Benchmark.

The current B3 Benchmark for this 4,000 sf Vehicle Storage Building is 5 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

How is this site performing over time?

Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



Rochester Community and Technical College

BENCHMARKING
advanced metrics for rating buildings

RCTC CHILD CARE CENTER

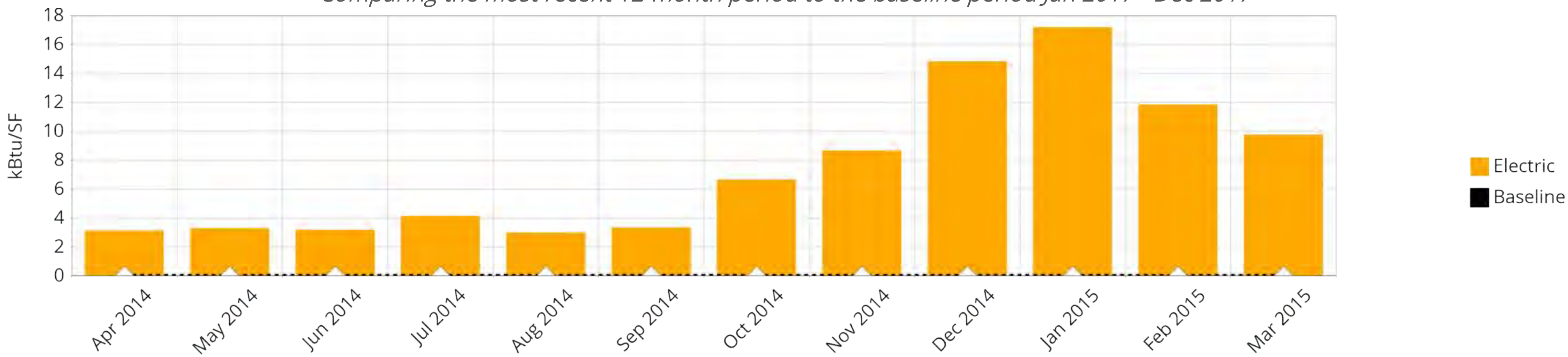
B3 Benchmark

This site is using more energy than the B3 Benchmark.

The current B3 Benchmark for this 0 sf Decommissioned is 1.8 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

How is this site performing over time?

Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



Rochester Community and Technical College

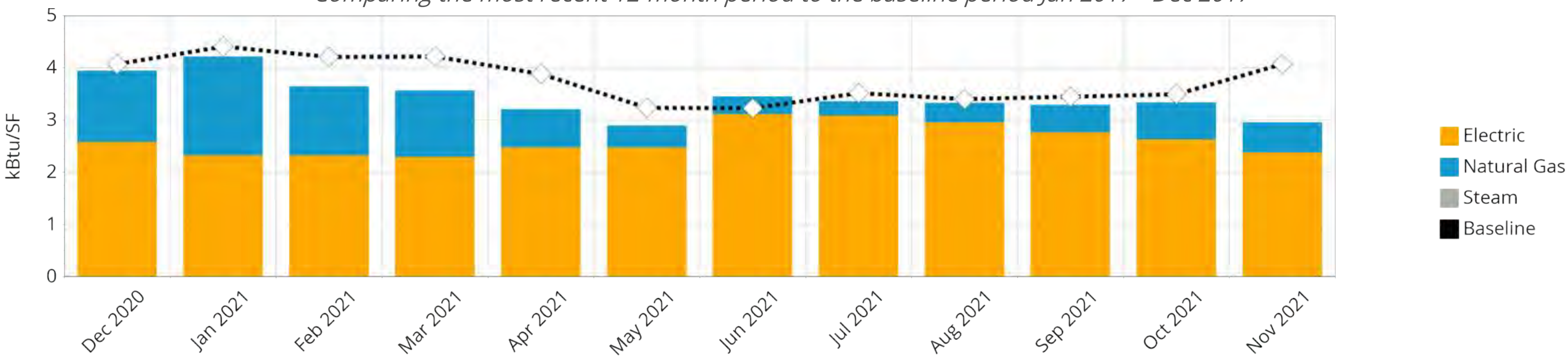
BENCHMARKING
advanced metrics for rating buildings

RCTC HEINTZ CENTER

The current B3 Benchmark for this 224,360 sf College Classroom is 5 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

How is this site performing over time?

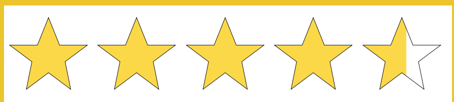
Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



Rochester Community and Technical College

RCTC MAIN CAMPUS

B3 Benchmark

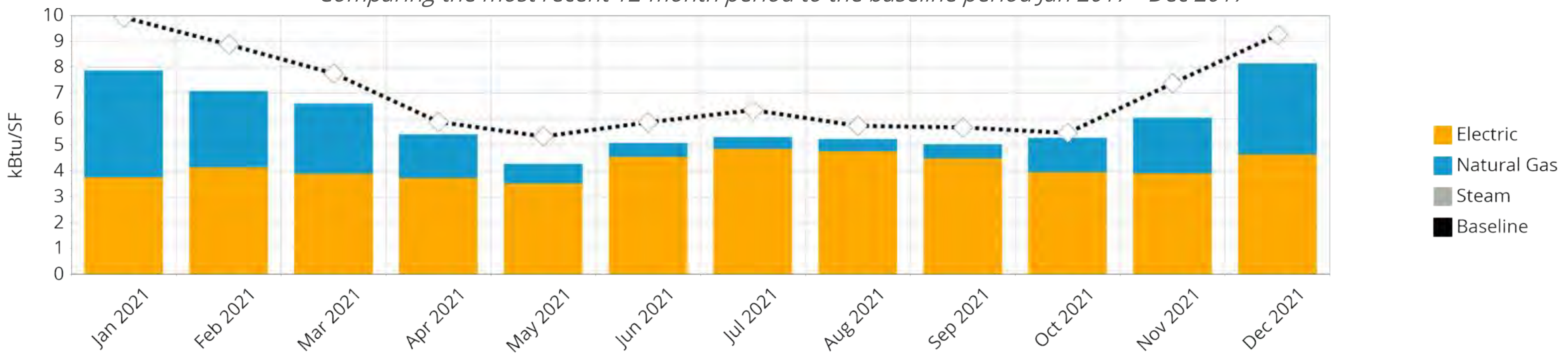


This site is using significantly less energy than the B3 Benchmark.

The current B3 Benchmark for this 418,457 sf College Laboratory is 4.5 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

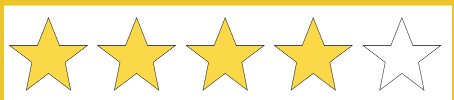
How is this site performing over time?

Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



ROCHESTER REGIONAL SPORTS CENTER

B3 Benchmark

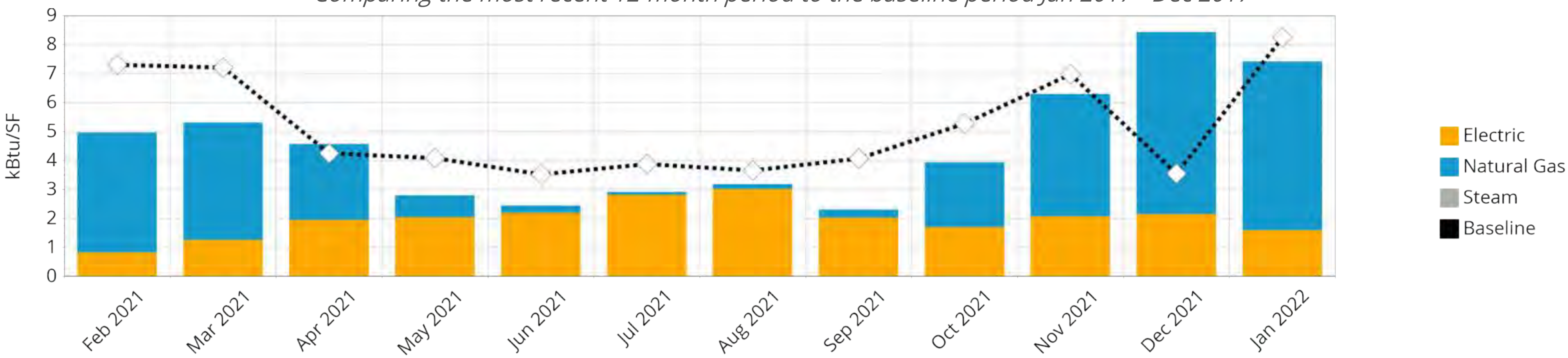


This site is using significantly less energy than the B3 Benchmark.

The current B3 Benchmark for this 115,220 sf Gymnasium is 3.9 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

How is this site performing over time?

Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017



BENCHMARKING
advanced metrics for rating buildings

ROCHESTER REGIONAL SPORTS STADIUM

B3 Benchmark

This site is using more energy than the B3 Benchmark.

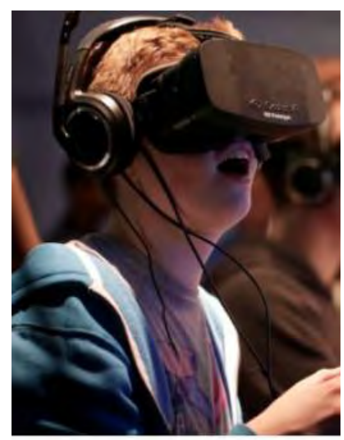
The current B3 Benchmark for this 97,166 sf Sports Arena is 1.8 stars. The B3 Benchmark shows potential savings relative to the current energy code, with 2.5 stars equivalent to code performance. This report provides additional information on this site performance, savings potential and links to help realize the savings.

How is this site performing over time?

Comparing the most recent 12-month period to the baseline period Jan 2017 - Dec 2017

Master Technology Plan

2021 – 2025



ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

Table of Contents

Acknowledgement

This plan could not be developed without the input and support of various groups and individuals at Rochester Community and Technical College (RCTC). Input was provided by students, faculty and staff, the Cabinet members, the IT Division staff, and through research of various external sources. A special thanks goes to the College IT Advisory Council (CITAC), who spent all of 2021 calendar year helping to fine tune this plan through input and reviews, as one of three core goals for the Council; the members involved in the planning process include:

- Aaron Shannon
- Ajay Mehra
- Alicia Zeone
- Anthony Rostvold
- Brenda Frame
- Brian Steele
- Jim Ma
- Kelly Pyfferoen
- Matt Bissonette
- Melanie Callister
- Mirwais (Mir) Qader
- Shelly Danielson

Executive Summary

The Rochester Community and Technical College (RCTC) Technology Master Plan articulates **a common vision** for technology and provides a **framework for future investments (in people, process, and technology)**, that are aligned with institutional goals, and that complies with Minnesota State Colleges and Universities policies and direction. To start, a summary of the key strategies that are representative of various issues and needs in this plan are defined.

7 Core Information Technology (IT) Strategies

1. ***Increase Organizational Alignment***: Expand integrative technology governance, collaboration, buy-in across all areas of the College, from requesters to managers and the Cabinet to ensure that what is being asked for is planned, resourced, funded, and aligned to College goals, and is not reactive or a distraction for both the staff and the institution.

2. ***Improve Customer Service***: Improve customer service through increased agility/ speed and responsiveness to priorities. Also, promote an environment of increased self-service capabilities for staff. Establish key customer service principles and live by them.

3. ***Evolve to Service Management***: Clearly define IT service offerings aligned to institution customers' demanded needs (through a Service Catalog) and IT resources capacity. Make service management process consistent, complete, and transparent.

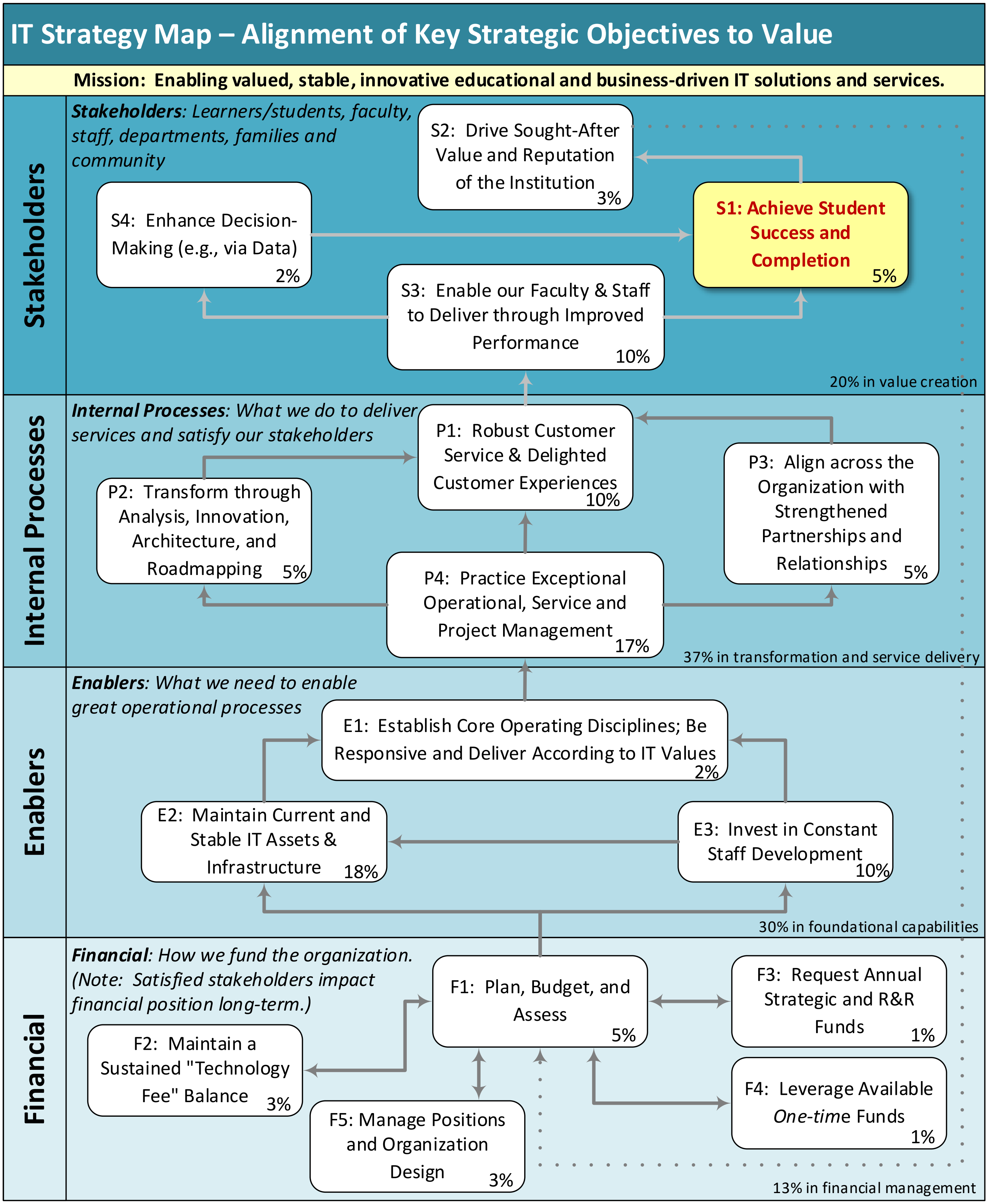
4. ***Transform IT***: Shift, as much as possible, IT services and staff from operations and commodity-type activities (basic, interchangeable goods) towards higher valued capabilities, projects, and management of platforms (e.g., Cloud, Office365, SharePoint, etc.). Develop increased utilization of Student Workers to cover "Level 1" support needs (*see Appendix D[1] for more information on the IT Operational Support Model)*.

5. ***Manage Architecture and Assets***: Identify, understand, document, and manage IT architecture and $6.5 million+ current assets across the institution to ensure sustainability (funded) and responsiveness (to uses/users). Improve efficiencies through elimination of manual and outdated services, removal of duplications, simplification and reengineering, automation, delegation or outsourcing to third parties. Manage true costs of services and maintain a modernized infrastructure.

6. ***Roadmap the Future***: Define the key IT Roadmaps for the core College functions (Academic, Student, Administrative) and key IT Infrastructure that defines current capabilities against 1, 3, and 5-year timetables, to constantly innovate and modernize the technology environments in support of the College's mission.

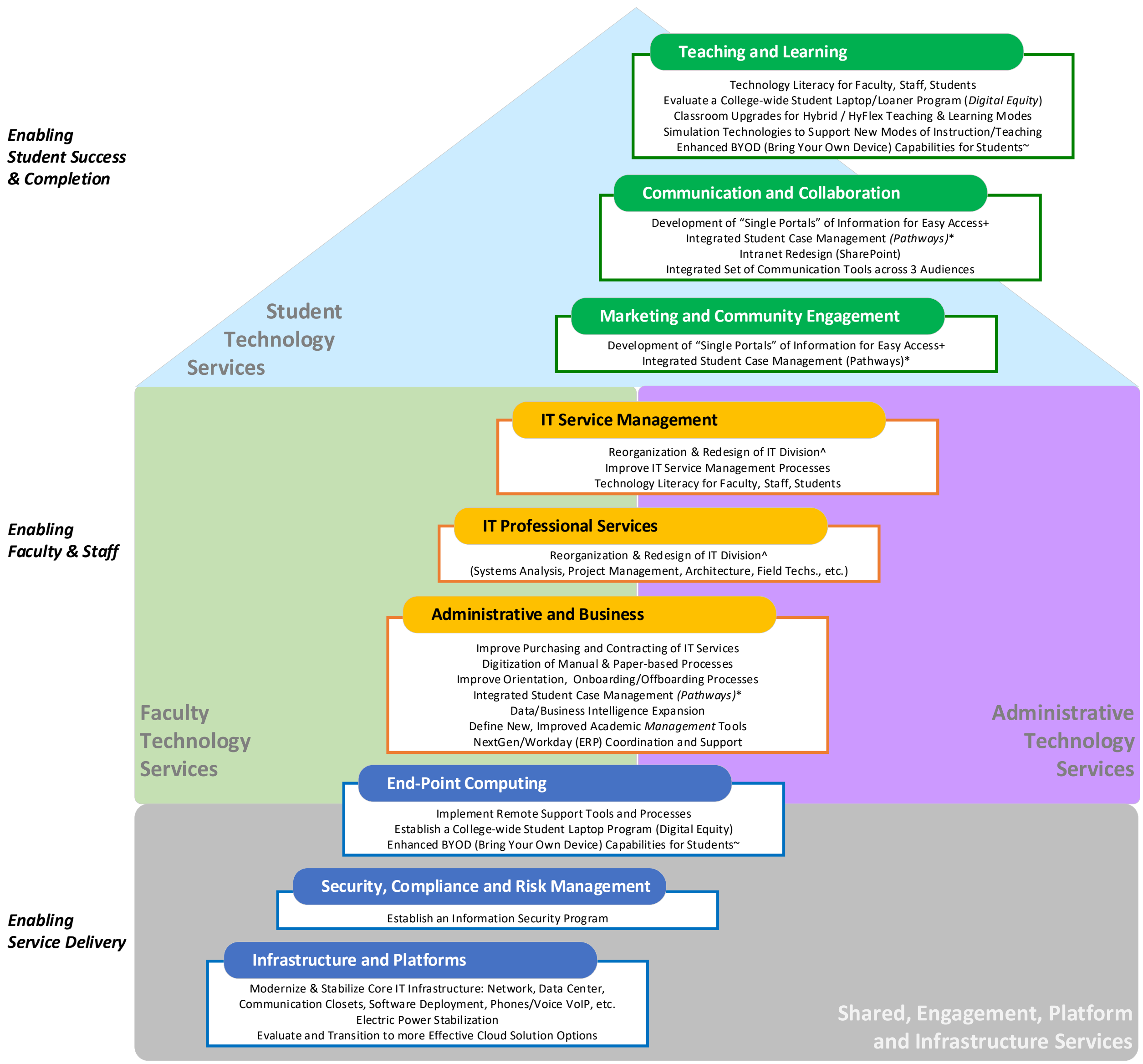
7. ***Enhance Organization Decision-Making***: Increase effective, simple means to use data and business intelligence capabilities to support organization-wide modeling, forecasting and decision-making.

IT Strategy Map



IT Initiatives Aligned to IT Service Portfolios

The below structure summarizes all the IT initiatives that were identified and synthesized during this plan's data gathering process. The initiatives are mapped to the Service Portfolios (*see Appendix E*[1] *for more details on the IT Service Portfolios*) that IT currently supports. Also, for more understanding about dependencies, the initiatives are mapped into a structure that depicts a 'house' – *foundational elements* that allows for everything else to be built upon and which holds all other services together; *main internal uses elements* by key institution stakeholders; leading up to the *end service goals* of delivering on our Mission and meeting student needs and outcomes. Since this plan represents a long-term horizon (i.e., multiple years), priorities and resources for the initiatives listed will have to be defined annually. An initial priority list is provided in the section titled, "Key Initiatives' Feasibility Analysis Matrix"; however, these priorities will likely change with shifts in the operating climate of the College, budget availability and the internal maturity of the institution itself.



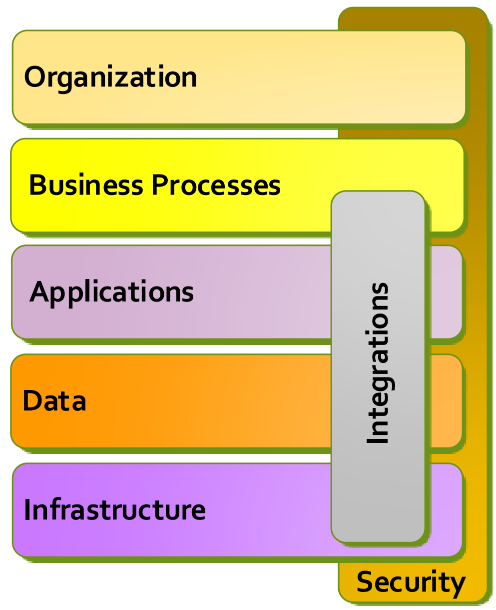
Note: Symbols like: *, +, ^, ~ or others, indicate repetitive initiative in multiple portfolios.

IT Strategic Planning

By its definition, actions that are of a ***strategic*** nature are dramatic events that require significant change in thinking and process; require investment of capital, time, and human resources; demand extended commitment from the organization; and determine the character of an organization, providing value across all core activities. Things that can be quickly conceived of and executed are ***tactical*** actions. The goal of strategic planning is to provide direction, concentration of effort, constancy of purpose, long-term maturity, and flexibility, as an organization continually strives to improve its position in all strategic areas.

The **highest valued IT asset to an organization is Data ("Data is king!")**, and more importantly, data that is transformed into **useful information for decision-making purposes**. Processes change, software comes and goes, and hardware is becoming a commodity, but Data is constant over time as it relates to an organization's core activities.

IT Architectures



An architecture is a framework to help us manage and apply Information Technology. The IT Architecture is made up of seven (7) elements: Organization, Business Processes, Applications, Data, Infrastructure (or Technology), Integrations and Security.

1. The **Organization Architecture** is concerned with how we govern and how staff resources are allocated to support and use IT efficiently and effectively.
2. The **Business Process Architecture** is comprised of activities that support the running of the organization's mission-critical services – the work that we do.
3. The **Applications Architecture** is the translation of key operational functions and activities/processes into *automated* processes to meet our goals in an efficient, reliable, and consistent manner.
4. The **Data (or Information) Architecture** describes the data needed, used, and created to support the business processes of the organization. It provides a clear definition of how data is structured, collected, shared, maintained, and stored from both the IT and functional perspectives.
5. The **Infrastructure (or Technology) Architecture** encompasses our overall computing and communications environments. It includes all the computers and related devices, such as, communications equipment, networks and software, operating systems, printers, etc.
6. The **Integrations Architecture** defines how various technologies *together* can solve complex problems where independent technologies on their own could not do so.
7. The **Security Architecture** overarches across the entire IT environment to ensure all transactions, especially our data, is securely received, used, and transmitted.

Environmental Scan

Strategic Plans are developed from a wide array of information that is collected, assessed, and synthesized into general statements of direction and strategy. This is the 'Environmental Scan' that was conducted to create this plan. Since information creation and flow is never ending and changes constantly, key sources of information have been included that impacts the RCTC; however, the list can never be exhaustive.

Key Sources of Information for this Plan

- IT Division SWOT (Strengths, Weaknesses, Opportunities, Threats) Assessment.
- IT Division Risk Analysis.
- IT Assets Inventory Assessments.
- IT Capabilities Model Assessment.
- IT Service Portfolios and Service Catalog (*see Appendices E^1 and E^2 respectively*).
- IT goals and direction from the Minnesota State System Office (*see Appendix H*).
- Vision Statements from the College's senior leaders, namely, the Cabinet members.
- Student Senate input.
- Student surveys.
- Industry trends as defined by Educause, Gartner Inc. and other key IT thought leaders.
- Survey of all Staff and Faculty across the College.
- The College Information Technology Advisory Council (CITAC).
- General, day-to-day, end-user and customer feedback, especially via interactions and support activities handled through the Technology Service Center (TSC).

RCTC Broad Statements of Need for Technology

President's Office:

- Establish capabilities for finance and budget to **link funding to strategic plans**.
- Rearchitect and enhance our **Intranet (SharePoint)** so that all employees have easy, timely and accurate access to information whenever they need it. [Repeated]

Academic Affairs:

- Our focus on 'education' should highlight – ***delivery to anyone, anywhere, anytime, within our College's Mission responsibilities.***
- Paradigm shift towards increased **online expansion**.
  - Formal Organization Change Management (OCM) strategies to increase faculty engagement, awareness and promote and transition to the new paradigm/culture of the future.

- **Digital equity** – ensure each student has the tools they need both in school and at home, to participate in their education fully. [Repeated]
- **Academic management tools** – workflow tools for curriculum and course management, scheduling, assessment, syllabi development and program review.
- **Simulation technologies** to facilitate both in-person and immersive online learning.
- Enhanced **data and business intelligence/analytics** capabilities to support data-based decision-making. [Repeated]
- **Staffing and skills** needed for sustainability of critical technology services we require to further our work. (*See Enterprise Architecture in Appendix C – Sustainable Support – "Rule of 2"*.)

Student Affairs:

- Put students first, adapt to them, **shift the culture** to achieve this.
- **Digital equity** – ensure each student has the tools they need both in school and at home, to participate in their education fully. [Repeated]
- Communication is key – well-defined portfolio of means and **tools to communicate with 100% of students**, in a timely manner, to ensure that *action* is taken to address needs and issues.
- Extensive/integrated student **Case Management** (contact, notes, documents, etc.), from interest/prospect students to separation (i.e., graduation) and alumni services.
- Enhanced **data and business intelligence/analytics** capabilities to support data-based decision-making. [Repeated]
- **Training and skills development** in the tools we already have, to improve efficiency and effectiveness. [Repeated]

Human Resources:

- Rearchitect and enhance our **Intranet (SharePoint)** so that all employees have easy, timely and accurate access to information whenever they need it. [Repeat]
- Migrate existing paper-based approaches towards utilization of **more digital approaches**.
- Enhance **employee orientation, onboarding and offboarding** through automation.
- Knowledge management and sharing through **training and skills development** in the tools we already have, to improve efficiency and effectiveness. [Repeated]

RCTC Community Themes of Needs for Technology

While continuing to support the College's on-going operational needs, these additional considerations are also desired by the broader college community.

- **TRANSPARENCY:** Make **IT service expectations and outcomes clear and consistent, and IT support processes more transparent** so we know what's going on. E.g., "Status of my ticket/project", "Completion of tickets", etc.

- **OPERATIONAL EXCELLENCE:** Make the **internal operations of IT** more efficient and effective to better meet the demands and future needs of all stakeholders. These activities include, but are not limited to: (a) Demand/Request Management, (b) Service Management, (c) Project Management, (d) Governance, (e) Technical Architecture, (e) Asset and Contracts Management, (f) Security Management, (g) Service Continuity Management, (h) Change Management, (i) Knowledge Management and Staff Development, etc.

- **ACCESS:** Improve **Faculty/Staff and Student onboarding and offboarding processes** - make them more efficient and complete e.g., **getting access to all required accounts**; **removal of all access when people leave**, etc. (*Note: this must be coordinated with Human Resource processes and Student Services for Student orientation.*)

- **ACCESS:** **Efficient remote support** capabilities for administrative permissions to systems and **Student access to shared (e.g., lab) devices**.

- **ACCESS:** Improve simplified and relevant **access to resources and communication effectiveness** through the establishment of **"Single Portals"** for tools and training information for both Faculty/Staff and Students.

- **LITERACY:** Technology literacy for Faculty and Students.

- **TRAINING:** Provide **training/help develop skills** in the tools we have, including 'Enterprise' software e.g., ISRS/NextGen, D2L, classroom technologies, etc.

- **ARCHITECTURE/TRAINING:** Specifically: design, re-architect and train college community in the effective use of the **Office365 tools**:
  - MS SharePoint – redesign it!
  - MS Teams – how should we effectively use it?

  - Content Management – which tools and repositories should we use to store various kinds of data and information for different purposes?

- **ARCHITECTURE:** Make collaboration technologies **consistent** in each classroom and meeting spaces.

- **EQUITY:** Develop "**Digital Equity**" solutions, such as, a **laptop program** for Students, a **Student loaner program**, etc. [Some considerations: pivot from traditional lab devices towards increased loaner devices and financial aid/fee payment options to cover costs.]

- **REFRESH:** Keep software and technology **up to date,** current (and affordable).

- **DIGITIZATION:** Establish more means to **digitize** work that we do, for instance, fillable forms, workflow automation, eSignatures, PDF editors, etc.

- **SUPPORT:** Establish capabilities to provide **specialty labs support**, for instance, to CAD labs, to Music labs, etc.

- **CONTRACTING:** Make the process for **purchasing and contracting** for technology services within the college, with Procurement and the System Office, more efficient.

- **SECURITY:** Establish a **security program** to continuously keep faculty, staff, and students aware of security issues and prevent cyber-attacks through **proactive** steps to monitor and mitigate risks.

Gaps in Technology Implementation Fully Aligned to Functional Needs

Technology implementation at RCTC has been going on as long as it has been viable. The success of implementing solutions to effectively address functional needs, at times, has not been well aligned. Throughout the College's history, there have been many examples of implementing crude or incomplete solutions. Partly this is because: (a) the paradigm to implement technology effectively is not clearly understood, and (b) given the College's size and budget, the College is not positioned well to be able to commit the level of resources necessary to support a complete implementation for a complex endeavor.

> *In fact, the most viable **scope** and **type of projects** for the College to pursue are ones that are **three (3) to five (5) months in duration**, performed by a maximum of **two (2) to three (3) technical staff**. The College has a **maximum threshold of 'failure' of around $1 million**, which will strain the College substantially; therefore, smaller, and incremental developments should be pursued versus large, all-at-once implementations. **Planned risk-taking** of research, development and innovative solutions should not be budgeted beyond **$50,000** and a **decision should be made within a year (ideally a semester)** to continue or forego the investment.*

The **People, Process, Technology Framework** provides a good understanding on why the gap in alignment mentioned above exists and a method to address it.

Many IT initiatives focus on the *technology* that is needed to solve the problem at hand or to take advantage of an opportunity. However, by focusing on technology, we start from the end rather than from the beginning. Over time, the effectiveness of any technology solution is determined by how people use it, as they work through processes. Therefore, to make an impact within the institution:

1. First, we must address **PEOPLE** issues – who are they, do they understand the vision, are they bought in, what are their job roles, are they organized appropriately, what is needed for effective collaboration, etc.

2. Second, we must establish well-defined **PROCESSES** that create consistent, efficient, and effective activities to support the service delivery models of programs and the College.

    a. One key sub-deficiency in this area is that the College has no explicitly defined roles for **'Business Analysts[1]'**. Moreover, the competency of '**Process Management[2]'** is not common within the institution. With these kinds of deficits, it is very difficult to effectively plan, reengineer, continuously improve, or utilize automation in a timely and cost-effective manner, which leads to waste, costs and distraction/opportunity loss.

3. Last comes **TECHNOLOGY**, where we determine what efficiencies can be gained through the deployment of automation across effectively established processes, used by capable and motivated people.

The <u>sequence</u> of this framework is important to achieving success. If this framework is not used in the proper order/sequence, then there will always be issues with technology not meeting expectations (or meeting it in a minimal form) and people will be frustrated with their inability to perform their work as they would like.

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[1] A **Business Analyst (BA)** is a person who has effective facilitation skills and is able to analyze and document (using both narratives and visual models) the market environment, processes, or systems of an organizational entity.

[2] **Business Process Management (BPM)** is a disciplined approach to: (a) designing (process architecture), (b) analyzing and modeling (for understanding and communication), (c) data governance (data stewardship designation), (d) process ownership designation, (e) roles & responsibilities definitions, (f) policies, procedures (including business rules) and standards definitions, (g) execution – piloting, prototyping, testing and validation, (h) performance definitions (Key Performance Indicators [KPIs]) and monitoring, (i) optimization – continuous monitoring and improvement.

IT as an Enabling Service

Nowadays, Information Technology (IT) is a critical part of the operating environment of RCTC and any organization. IT is an enabling service to further the mission and purpose of RCTC, in providing its primary product – teaching and learning.

IT Vision

To be recognized by our customers (the College and our Students) as a trusted, best value, strategic partner in delivery of Information Technology (IT) solutions, enabling their work and learning.

IT Mission

Enabling valued, stable, innovative educational and business-driven IT solutions and services.

IT Values

Integrity Teamwork Problem-Solving Service Excellence

(*for a detailed description of these values, please see Appendix A.*)

IT Values Statement

"We strive to…with integrity, working as a team, solve problems through the delivery of excellent service."

Architectural Principles

Architectural Principles are the defining statements of design that instills consistency, reliability, and sustainability in our services. RCTC has defined the following summary principles to identify and implement solutions in support of its IT Mission. [*A full list of Enterprise Architecture Principles is provided in the Appendix C.*]

I. All solutions should take a **'Universal Design'** perspective, whenever possible.
II. Affordable **'Cloud 1st'** options should be considered before hosting solutions locally.
III. All solutions should take a **'Mobile 1st'** perspective whenever possible.
IV. **'Data, Analytics and Business Intelligence'** capabilities should be utilized to the fullest to support decision-making.
V. Solutions should be designed for as much **'Self-Service'** as possible, to increase and distribute knowledge more widely, to reduce the dependence and need for resources for various 'hand-holding' service options and to reduce overall costs.
VI. **'Speed, Agility and Rapid Turnaround'** are key to staying current with the market, meeting needs in a timely manner, and avoiding obsolescence.

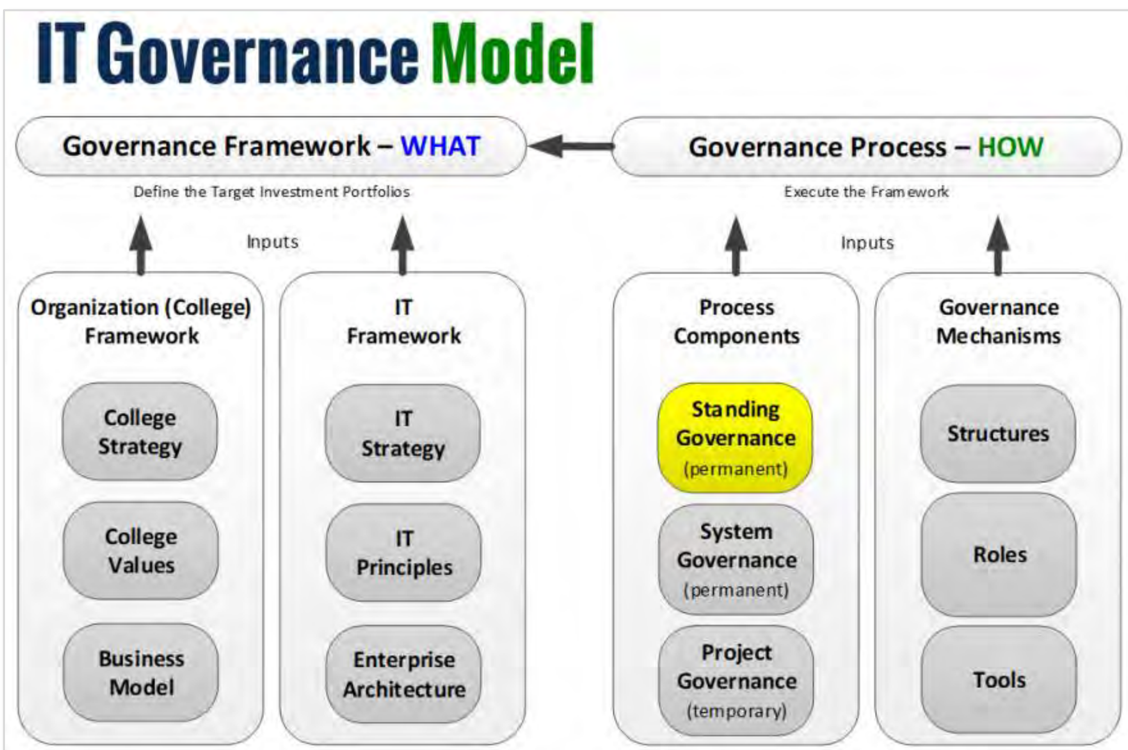
IT Investment and Governance

Governing investments in technology is a necessary enterprise-wide function for both creating new value and minimizing risk, through defining priorities, ensuring alignment to College goals and strategies, and allocating the right resources to accomplish goals and objectives. IT investments are dynamic and constantly changing, but it is safe to say that RCTC has an annual investment of about **$6.5 million+ in current usable IT equipment and services**. (*For more detailed information on IT Investment Process, please see Appendices* K^1, K^2, K^3 *and* K^4)

Governance ≡ Maximizing the value of our <u>portfolio</u> of investments while managing/minimizing <u>risk</u>.

Governance is about making better, well-informed, and collaborative decisions i.e., increasing the <u>quality</u> of our decisions.

A typical IT governance model, as depicted in the image below, has several components. It **links/aligns** the organization's strategy, values and business model to IT strategies and architectural principles. Accomplishment of this alignment occurs through several operating processes, through advisory and steering committees for both permanent services and one-time projects, and through the definition of structures, roles, and tools to manage, assess and prioritize initiatives and projects.



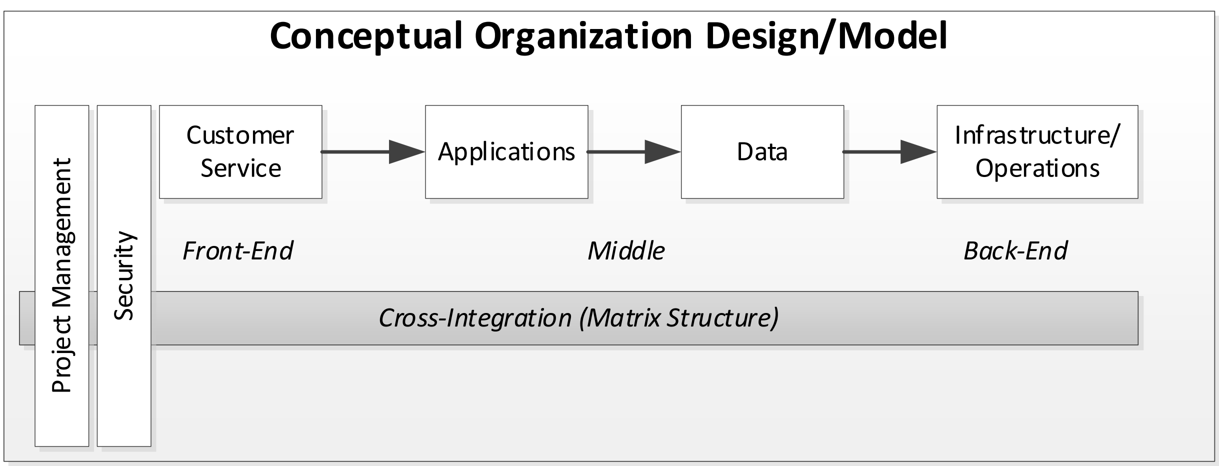
Source: Gartner Inc.

For RCTC, the IT Governance model consists of:

1. The IT Division (ITD) is responsible for defining the IT Governance model.
2. The **external-facing** (i.e., facing outward from the IT Division) IT Governance structure and responsibilities consists of the following (*for details please see Appendix M*[1]):
    a. The Cabinet serves as the IT Investment Council (ITIC).
    b. The Chief Information Officer (CIO) is responsible for setting up and administering the IT Steering Committee or College IT Advisory Committee (CITAC) of various college stakeholders and representatives.
    c. Several operational structures will be used to manage architecture, project management, funding, and risk management.
3. In addition to the external-facing or institution governance structures noted above, IT has several **internal-facing**, operational management governance structures to assist the Division in managing its day-to-day work activities (*for details please see Appendix M*[2]).

IT Services Structure and Flow

The overall IT services flow can be summed up as depicted in the image below. **Customer service** drives the need for **applications and solutions** that both consume and generate **data**, all inter-operating on a robust and reliable **infrastructure**. Supporting these key domains are disciplines of **project management** (execution) and **security** administration (risk management).

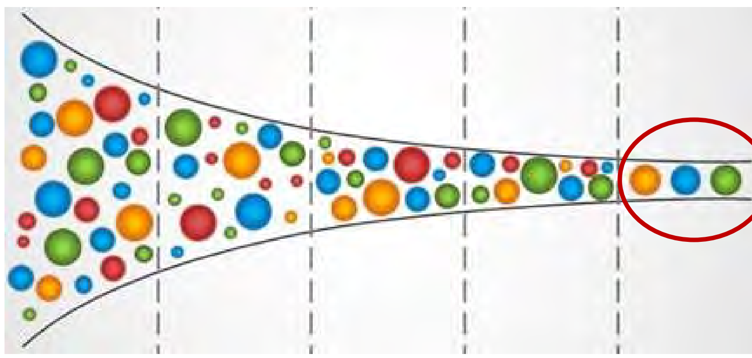


Details of services being provisioned by the IT Division, either partially or wholly, are defined in Appendices E[1] and E[2], in the Service Portfolio and Service Catalog (respectively).

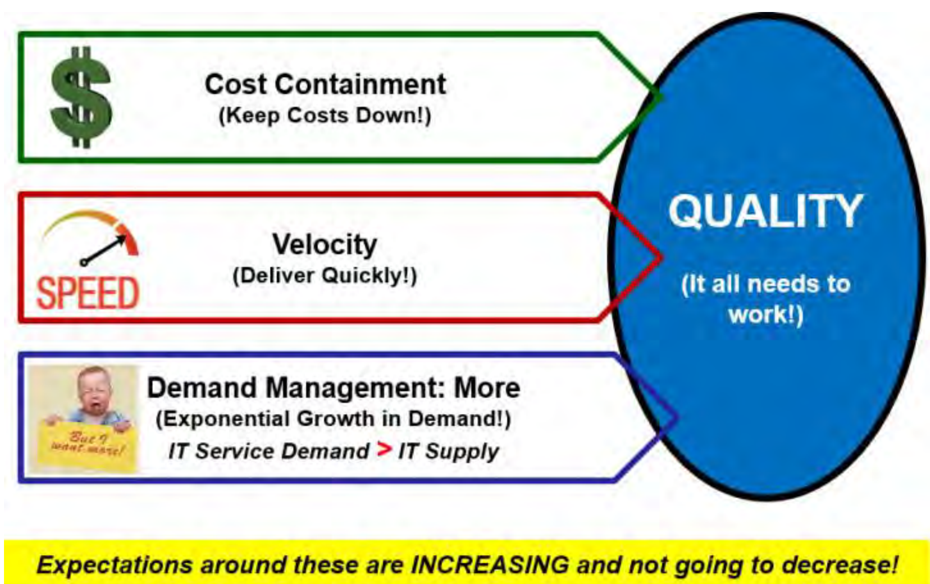
IT Service Expectations

IT service expectations can be summed up using four broad themes:

1. Everything that is done in IT MUST BE **sustainable**. Funding needs to be adequate, and **costs** need to be contained.
2. The delivery of solutions must be done **quickly and timely** to reap full benefits and avoid obsolescence.
3. There is an ongoing, never-ending increase in **demand** for more services, hence, prioritization, at the organization level is key. The 'funnel' of ideas and expectations coming in needs to be managed to the select few that truly adds value to the institution.



4. Regardless of what services and how they are provided, the **quality** of services must be stable, reliable, consistent – always!



[3]

[3] Note: "Velocity" has two elements, speed AND direction.

Source: Gartner Inc.

Customer Experience (CX) = Customer Service

The core of what we do as an IT organization (and institution) is to meet the needs of those that depend on us for services.

Customer Experience (CX) ≡ Delivering value to the end service recipient as they would expect it. *[Our end-customer is the Student; however, there are intermediary customers, such as, parents, faculty, staff, the next person/group in a process, etc.]*

To best meet and align to the expectations for Customer Service, IT has developed the following Engagement Model:

Customer Service Engagement Model

- Understand that all transactions are about “Relationships”.
- Position ourselves as a “Trusted Advisor/Broker”.
- Shift from being a “Builder” to an “Enabler”, a “Possibility or Solutions” agent, an “Integrator”, through partnerships.
- Communicate often and become everyone’s “Best Friend”.
- Develop internal management/solution consultancy competency.
- Move from a perceived “**No**” organization to “**Know**” – ask “What is possible?”.
- Present “Options and Alternatives” vs. manage to standards.
- Sell ideas while empowering people.
- Facilitate decision-making, not make the decision for them.
- Focus more on the “Future State” / “To-Be” don’t get too bogged down in the “As-Is”, which may be ineffective already.
- Bring in the “Integrated, Birds-Eye View” of the organizations vs. silo-thinking.
- Use “Roadmaps” to tie together ideas, projects and reduce fragmentation.
- Figure out their strategy and validate it.
- Use design thinking – controlled, fast failure – celebrate learnings from failings.
- Learn to focus on “Minimum Viable Product (MVP)” = must haves, not all possible options = nice to haves!

Operational Principles and Metrics of Success

The key operational principles that guide day-to-day activities of IT are summarized as:

I. Customer satisfaction should be 90% or greater.

II. Productivity improvements for staff and faculty at RCTC should be 5% or better annually.

III. Operations:

- Number of "Priority 1[4]" incidents per month should be one (1) or less.
- Mission-critical[5] system uptime should be 99.5% (~4σ; "2 nines") or better.
- Mission-critical systems should be supportable by at least 2 staff members.
- Projects should be completed within 10% of timeline & budgets.
- Projects should target completion within 3 to 5 months maximum duration.
- Hardware/Software purchases should be processed within 5 business days.
- Entire IT work backlog should be achievable within 6 months timeframe.
- 100% of data should be backed up to within 3 business days of a failure event.
- 100% of mission-critical systems should have disaster recovery plans that are updated and tested.
- Zero (0) security infiltrations should occur into mission-critical systems and datasets.
- Maintain less than 5% permanent staff vacancy rate (*current level is ~23%).*
- Target at least two (2) weeks (80 hours) of development/training per staff member, per year.

[4] Priority 1 is an industry term referring to "mission-critical" systems and services being down/not functioning.
[5] Mission-critical are key organization systems that run the key functions and operations of the institution, such as, the network, D2L, ISRS, etc. where the organization cannot tolerate the loss of these services for even one day.

Funding of IT

Technology investments (funding) in Higher Education is in the range of 3.5% up to 11%, out of Total Revenue, with an overall average of about 5%, depending on the institution type and how management sets their priorities. (Source: Gartner Inc.) Technical colleges tend to spend more on IT than, for example, liberal arts institutions.

All technology has a lifetime, some, such as laptops, have a life of between 3 and 5 years, while others, such as, a data center's HVAC systems, might last 15 to 20 years. (*See Appendix L for RCTC's standards for various refresh time periods, based on the RCTC Technology Assets Refresh Policy #5.13.1.*) The first year of any technology's implementation includes, (a) the acquisition cost, and (b) the implementation and roll-out costs. After year one, continued licensing, maintenance, upkeep, and support are the primary costs. RCTC currently has an investment of about $6.5 million+ in total technology assets and services that need to be constantly supported and maintained for the duration of their lifetime.

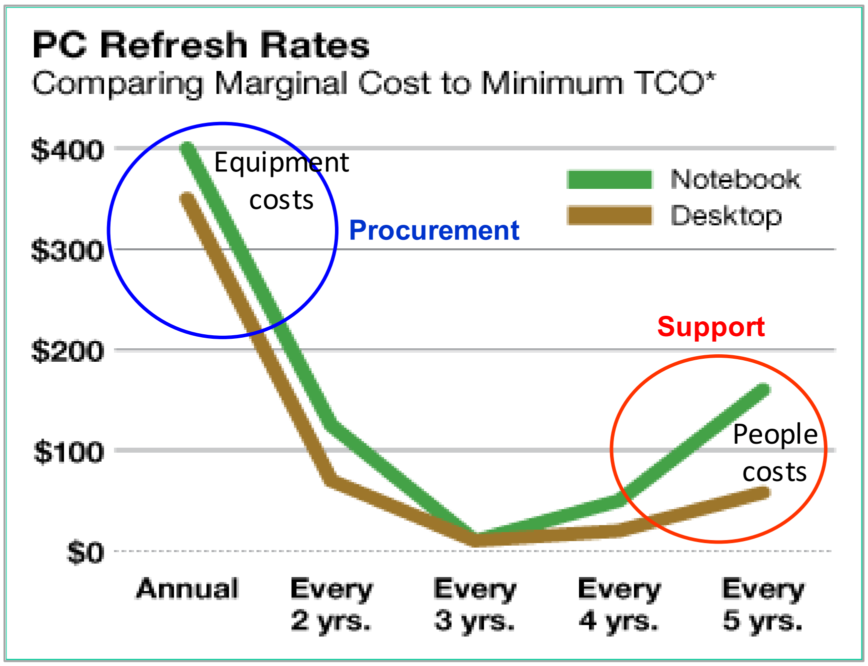
RCTC-IT has the following funding model:

A. Sources of **Revenue**
    a. Operating funds
    b. Student Technology Fee
    c. Sometimes, one-time project or grant funds.
B. Key **Costs**
    a. Personnel expenses
    b. Equipment expenses
    c. On-going licensing expenses
    d. Miscellaneous: supplies, training, travel, etc.

The **Student Technology Fee (TechFee)** has been $10 per credit for the past 13 years (since 2009). This fee should have been raised by now and must be raised soon to cover the expanded footprint of technology that is in the College. However, even with a maximum increase (to $12 per credit), the level of revenue generated is not sufficient to meet current and future demands. Over the past several years, the TechFee has been declining in available dollars because of the drop in enrollments; however, our investment in technology has been increasing.

FY23 Budget Scenarios					
			FY23 Enrollment Scenarios		
Year:	**FY2021**	**FY2022**	3,000 Enroll	2,900 Enroll	2,500 Enroll
TechFee	$1,000,593	$995,000	$891,000	$861,300	$742,500

We have postponed and drawn-out certain technology updates, beyond their End of Life (EOL) or End of Support (EOS) or been more selective in what we invest so that the available funds could meet priority obligations. This type of strategy has other ramifications, for instance, it requires **more support personnel to handle constant break-fix issues** and impacts overall service performance and efficiencies, not to mention being more likely to be vulnerable to security concerns. For instance, in the below 'bathtub model', we can see that there are two times when IT costs are high: (1) when we first acquire the technology and invest in implementing it, then (2) when the technology ages, where we transfer costs into human/personnel costs more, to support, maintain the technology and keep it running. The latter costs start to take away available resources from working on projects and innovation needs.



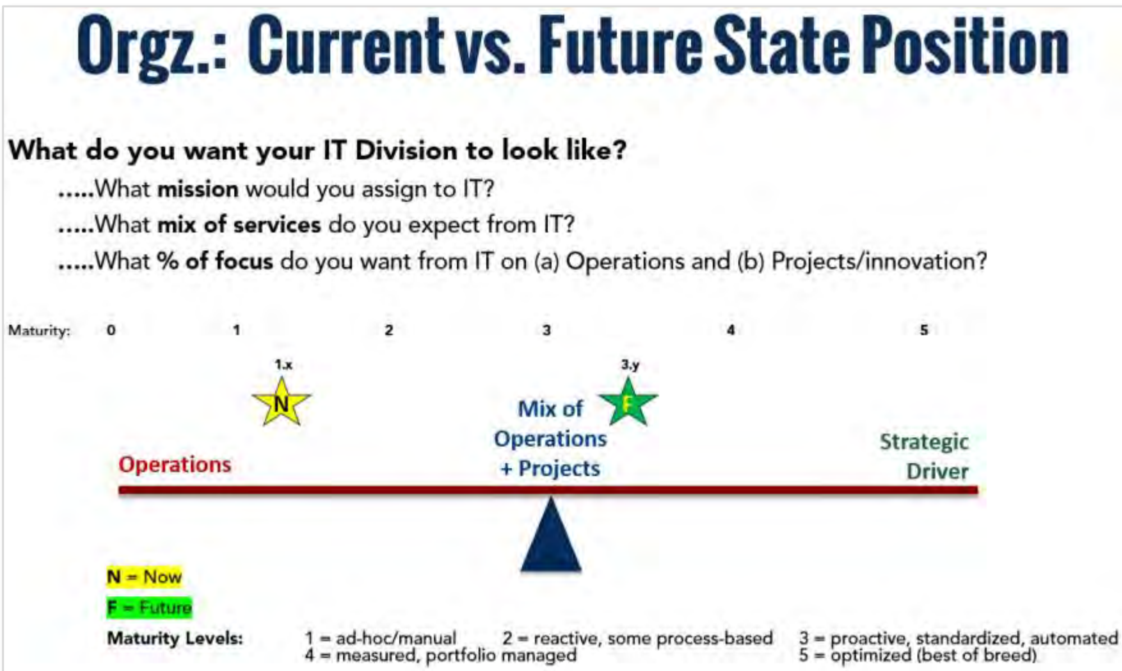
Note: Recent Federal COVID funds have helped to address some of the updates we have not been able to make over the years; however, we have also added about $2 million of *new* technology in our environment that will require decisions on whether to continue them or not, in four-to-five-year time period, because updating all of them will not be affordable for the College long-term.

About 11 IT positions are being funded either fully or partially by the TechFee. It would be ideal (a best practice) to keep personnel costs associated with the TechFee to about 1/3 or less of the total funds so that technology updates, new acquisitions and other needs could be effectively met. Also, using the TechFee to offset institution budget challenges will set the College in a precarious situation for addressing technology and automation obligations that the institution should meet.

Organization Design

Organization Structure

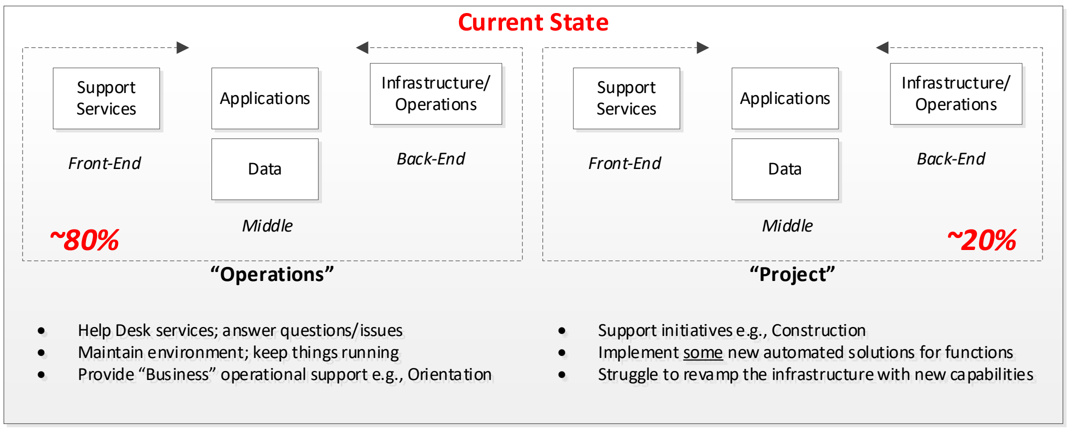
The past RCTC IT organization structures have primarily focused on **operational support**. The following image shows what the College's Cabinet expects IT to aspire to and mature to over time, specifically, to move from a larger **operations** focus to a **project-centric** focus of implementing new and innovative solutions to help support constant organization transformation (*see Appendix B for a more granular description of the Maturity Levels*).



'Right Size' ≡ What is Sustainable?

RCTC considers IT services from two perspectives: (1) from the perspective of **what people need** to support existing or future services and capabilities (including teaching and learning), and (2) from the perspective of **what is sustainable and affordable** to the institution. These two perspectives are not the same and clash at times, but the sustainability perspective tends to drive decisions and at times wins over, thereby impacting what can be effectively implemented; in other words, costs/budget tend to drive the type, degree, completeness, and quality of solutions we pursue. However, this is not always the right decision to make, for instance, the Nursing program in the College is more costly than most other programs (due to infrastructure and facilities needs), but it is also an important program that we need to have. The importance of the need arches over the costs.

This issue is primarily the reason that IT services at the college are **focused more on support** (support is 'demanded' more and is less costly) and **there is less focus on business value creation,** and why there are **gaps** in providing certain kinds of higher-level services to the key functional areas of the College (Student Services, Academic, Administrative), beyond day-to-day support needs, as depicted in the current state structure in the image below.

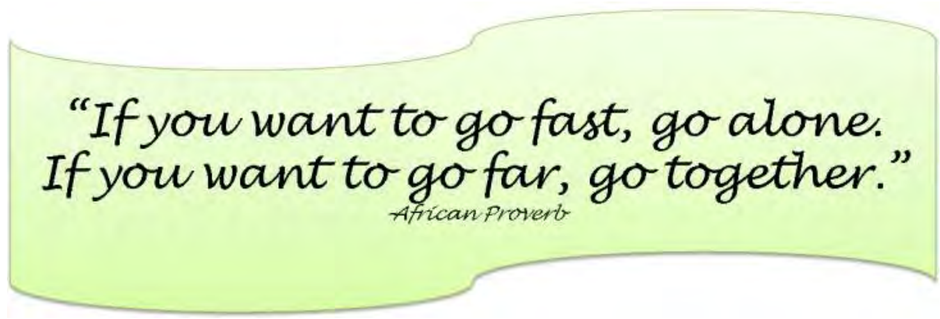


Secondly, a larger operational focus makes sense if the College operates with a mindset of 'Immediate Gratification' or 'Emergency' service needs, such as depicted in these statements or thoughts:

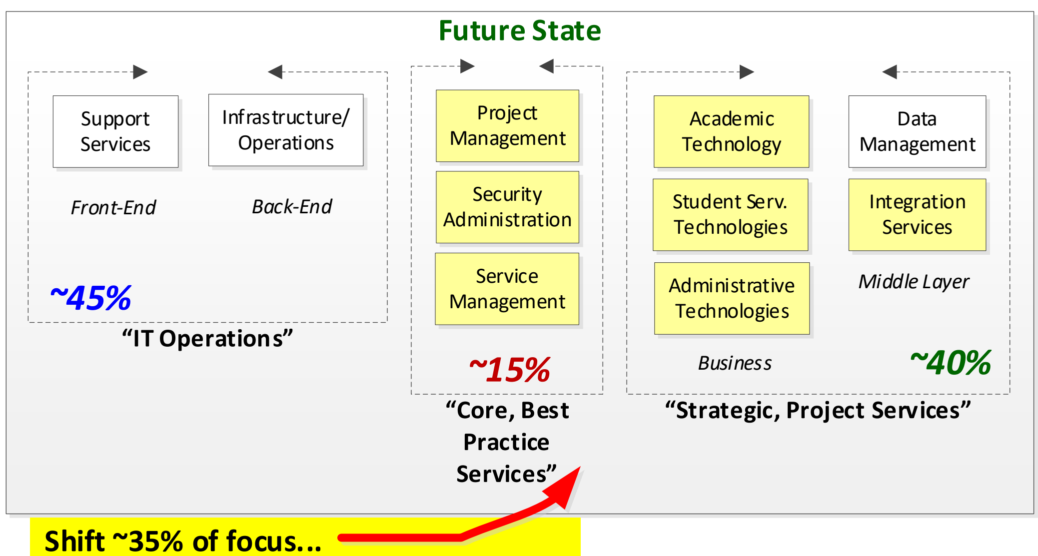
- "Can I get this by end of day?"
- "What happens if I need something in a rush/emergency?"
- "Can you fix this for me now?"
- "My classes have started; I need some things setup!"
- "We have a new request and must start on it soon, (overriding planned work)."
- Etc.

A good analogy of this type of service expectation, is the **first-responder model in healthcare, i.e., "911" services**, as depicted in Appendix Q. "911" services is a **reaction-based service, requiring immediate response**, but to a very acute set of needs/circumstances, with limited capabilities to solve *all* healthcare related problems. Escalation of needs must occur to emergency rooms (ERs) and/or hospitalization, for long-term problems/issues. Some services can never be solved through a "911" call, for instance, a transplant; these must be **proactively planned** and handled by more mature hospital processes and technical expertise. Also, **prevention is key**! It is more important to avoid calling "911" by being proactive and planful – getting routine checkups, being educated on dos and don'ts, exercising, having good nutritional habits, etc.

As the following African proverb mentions, if we want to achieve outcomes of a substantial nature, we must go forward together, in a planful, systematic manner and not be purely focused on ‘speed’, which can lead to limited understanding and missed considerations in our decisions.



Therefore, **value creation, innovation and business transformation require planning and a focus on addressing broader and integrated technology strategy and solution development**. Consequently, to achieve this shift, IT is intent on reducing/eliminating operational needs, *as much as possible*, so that <u>capacity</u> can be created to address broader strategic needs. Since growth through new allocation of resources/positions is almost impossible in the current budget/operational environment, part of our strategy must be to use **more student workers** to address basic operational needs, to the extent possible.



This will take time and will require...

- Leveraging more student workers
- Shifting staff over
- Shifting appropriate vacant positions over (as retirements occur)
- Re-skilling staff (if feasible)
- Looking at 3rd party services to offload commodity operations
- Governing through better priorities alignment with expectations

Staffing and Skills Enhancement Tactics

The tactics defined below are intended: (a) to reduce IT from being consumed with excessive commodity, operational support, or busy work; (b) to increase value-added services to key College functions, and (c) to ensure that our core IT infrastructure is understood, reliable/stable, and cost-effective. These tactics will shift our focus and create capacity to contribute to our intended outcome of creating value that supports the teaching and learning needs of our customers/our students.

- RCTC-IT intends to **shift as much of the front-line IT support staff** out of Help Desk functions **to the next "Tier" i.e., "Field Technician"** roles, to provide higher-end services to the College than performing basic, foundational support services.

- IT intends to **fill first-level support with Student Workers**, as much as possible and feasible. [*See Appendix D*[1] *and D*[2] *for more details on the Operational Support Model and Service Management.*]

- IT intends to establish a **core infrastructure service** area that ensures that all back-end services are **stable, reliable, and consistent**. Without a stable infrastructure, most other work cannot be easily accomplished.

- IT intends to build up **capabilities around project management** to allow it to deliver solutions more effectively and efficiently – costs, schedule, quality, maintainability, and sustainability.

- Making these changes will **free up some capacity** to allow for shifting of resources and buildup of services in the Academic, Student Services and Administrative areas, the core business service areas of the College.

- In the past, the **Education Technology** (EdTech) group was a larger team (between 3.0 – 5.0 FTEs), but it was reduced in size through attrition and due to funding issues. This area needs to be reconstituted, as much as possible, with permanent staffing to support an effective **Academic, Teaching and Learning environment**.

    - ***Note:*** In the campus survey conducted to gather input for this plan, "Technology Literacy/Training" came up as a major need by the community – learning how to use the tools we have. EdTech would be instrumental to achieving this outcome, especially for Faculty.
    - A more functional EdTech organization, that will better meet the desired expectations of the institution includes:

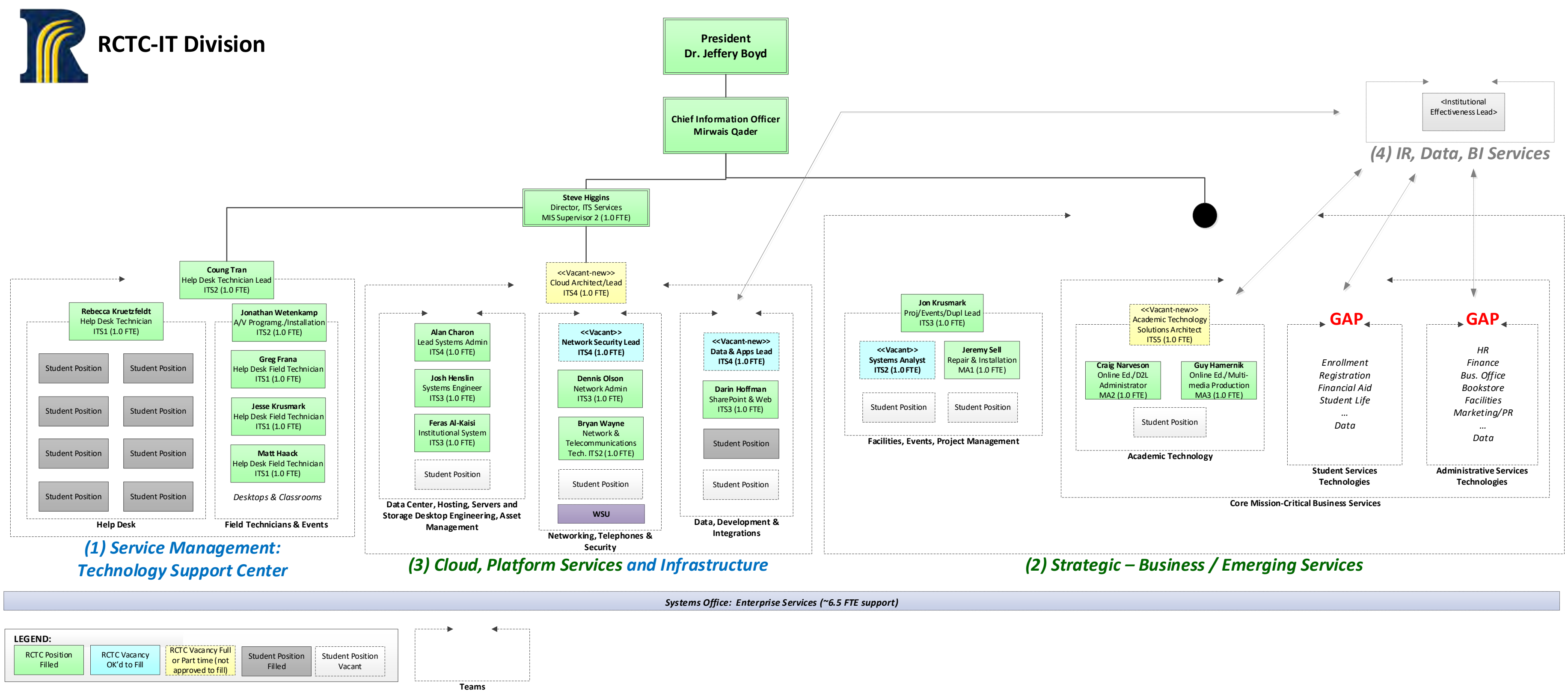
Staffing:	Leadership	**Governance**: Online Teaching and Learning Committee
	LMS/D2L Site Administrator	
	Technical Trainer (all tools, beyond LMS)	
	LMS/D2L Trainer	
	Instructional Designer	
	Faculty Peer Mentors (temporary assignments)	

- "**Service and Operational Excellence**", performing effective and efficient day-to-day and routine services, is a **critical success factor** to allowing for transformation to occur and for allowing focus to be more on strategic issues and needs.

- **New roles/positions** within IT need to be created over time to drive the desired changes and to implement the technologies of the future, these include: (a) a Cloud Architect role, (b) a Security Officer, (c) an Academic Technology Solutions Architect role, (d) a strong Project Management advocacy role (from current or future staff), (e) a strong Applications Development/Integration and Data/Analytics role, and (e) Systems Analysts to effectively work with customers and translate their needs into technical solutions.

- **Staff skills will need to be constantly developed** in current and emerging skills, both soft and technical skills. IT intends to set aside at least 2 weeks (80 hours) of training and development per person, per year (*through online eLearning, mentoring, shadowing, conferences, formal classes, memberships to resource providers, etc.*), to allow for continued growth and to meet the College's needs. Types of skills include:
  - Systems Analysis
  - Service Management
  - Project Management
  - Change Management
  - Technical skills in:
    - Cloud,
    - Networking,
    - Office 365 Platform,
    - Classroom Technologies,
    - Applications Development (Programming),
    - Data and Business Intelligence, and
    - Security.

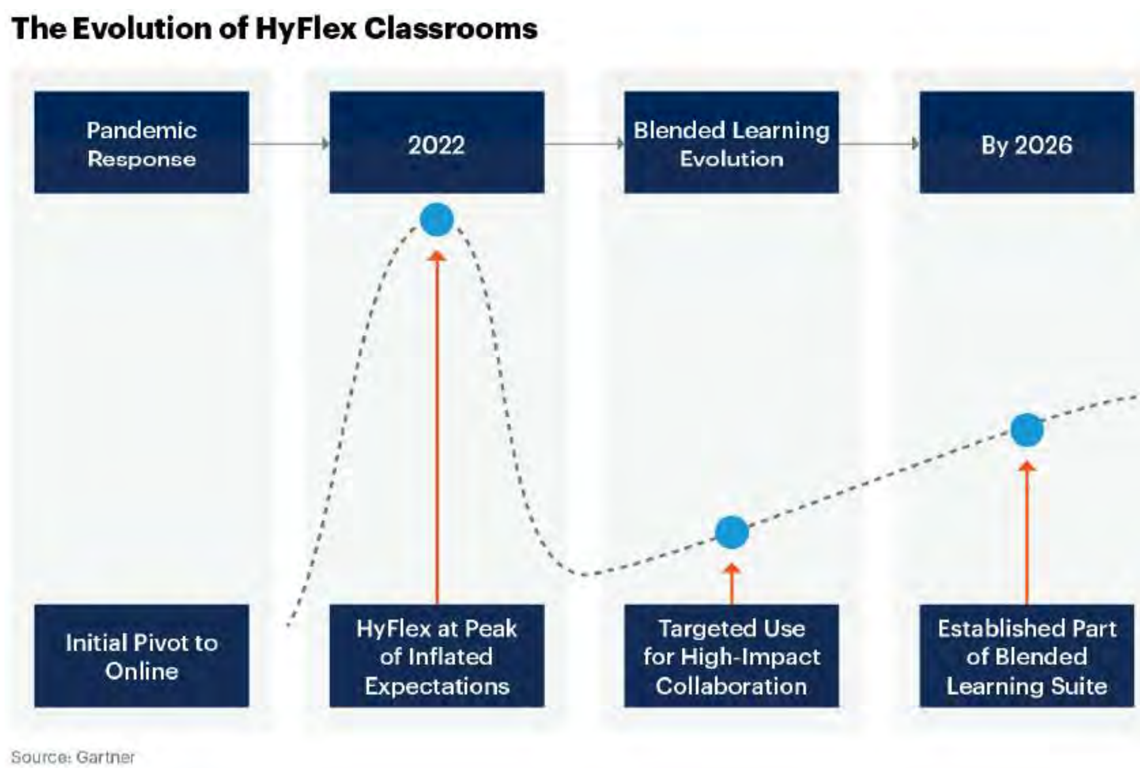
Note: most of the above points are reflected in the organization design depicted in the image below.



Note: This organization structure reflects an increase in student workers and a reduction in FTEs from the last Master Technology Plan developed (2017-2020), which had 27.7 FTEs, compared to 23.0 total positions now (including 5 current vacancies).

IT Industry Insights

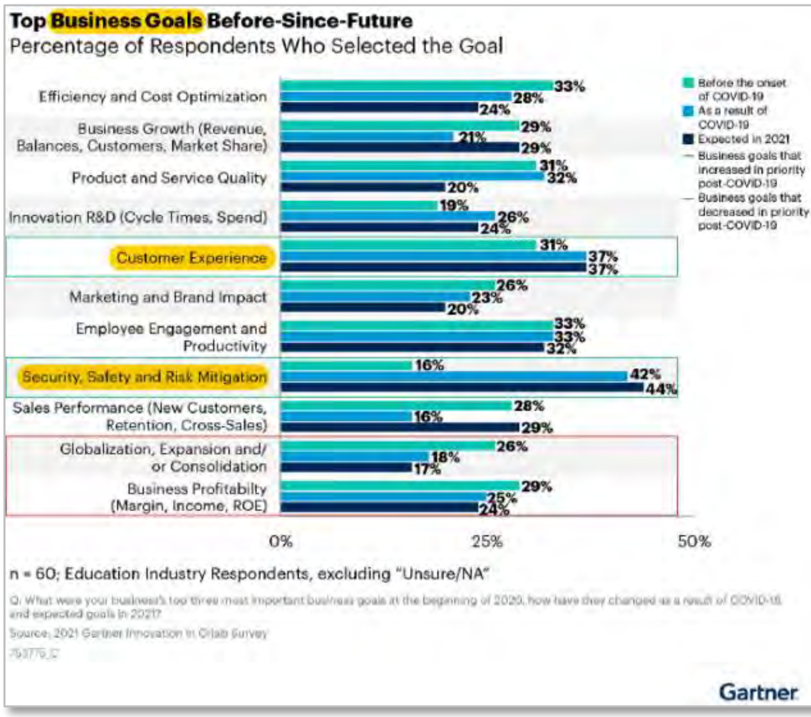
Industry insights, data, and trends suggest that there are several key areas in which organizations are investing their time and resources. The COVID-19 pandemic played a major role in accelerating and forcing transformation and change. However, the level and degree of changes impacted by COVID will not stay as 'normal' over time because some changes improved and worked well, while others did not. For instance, collaboration is much more effective in-person than online; nevertheless, online provides a lot of conveniences and reduced costs.

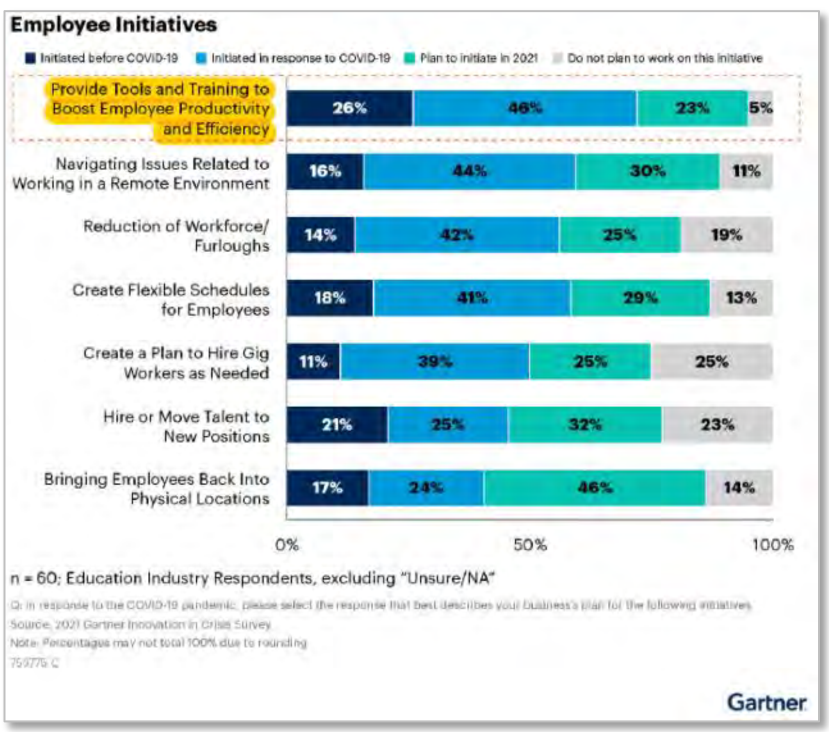


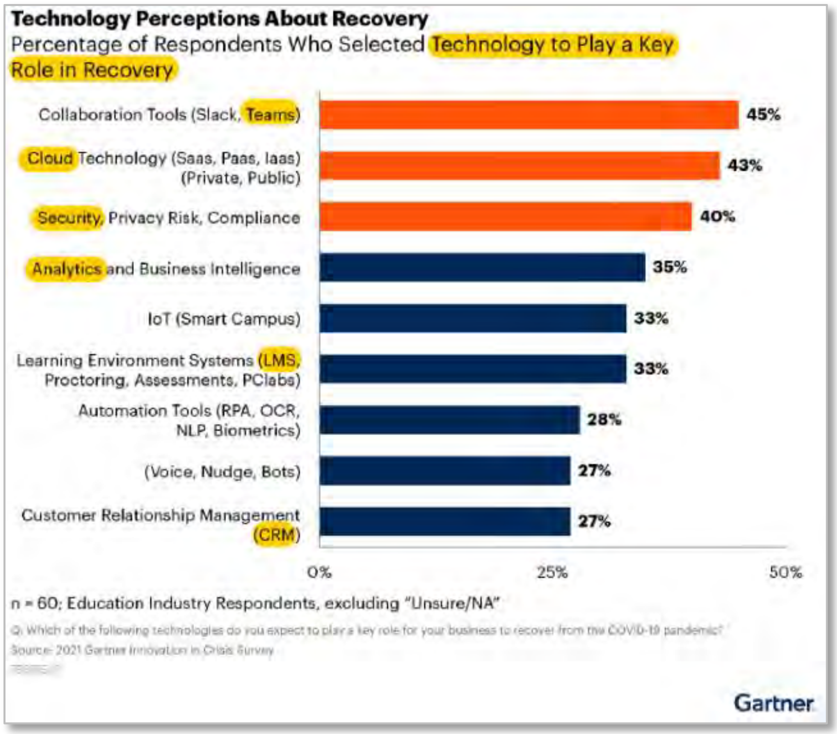
As seen in the survey results below from Gartner, and from Educause and Gartner top trends information in Appendices I and J (respectively), improving the **Customer Experience** (for Student, Faculty, Staff) is a key area of focus for most Higher Education institutions. In our case, this means how can we simplify, standardize, and make more reliable our services to our students, faculty, and staff so that they get the most value out of their **relationship** with us and amongst each other (i.e., **collaboration**), using all our services.

Since online teaching and learning is now mainstream and a lot of new technologies were deployed/used during the COVID pandemic time period, another major theme is how can **we train and develop people** to get the most out of the technologies they use, to improve productivity.

As we move towards more online services, many organizations are having to invest in **Security, Safety and Risk Mitigation**. We need to determine means to better manage and build a more effective security environment through preventative (including end user education and awareness), monitoring, and control tools and solutions.






Technology Perceptions About Recovery
Percentage of Respondents Who Selected Technology to Play a Key Role in Recovery
Collaboration Tools (Slack, Teams)
45%
Cloud Technology (Saas, Paas, Iaas) (Private, Public)
43%
Security, Privacy Risk, Compliance
40%
Analytics and Business Intelligence
35%
IoT (Smart Campus)
33%
Learning Environment Systems (LMS, Proctoring, Assessments, PClabs)
33%
Automation Tools (RPA, OCR, NLP, Biometrics)
28%
(Voice, Nudge, Bots)
27%
Customer Relationship Management (CRM)
27%
0%
25%
50%
n = 60; Education Industry Respondents, excluding "Unsure/NA"
Q: Which of the following technologies do you expect to play a key role for your business to recover from the COVID-19 pandemic?
Source: 2021 Gartner Innovation in Crisis Survey
Gartner

Key Initiatives' Feasibility Analysis Matrix

Note: Projects to be pursued will be dependent on the specific needs and currency of technology at that time, etc.

Pr[6].	Initiative *(Projects to be defined and prioritized based on these)*	RCTC Strategic Plan Alignment *(see Appendix F)*	Degree of Value[7] (H/M/L)	Degree of Difficulty[8] (H/M/L)	Within Existing Staffing Levels	Within Existing Budget Levels	Organizational Design & Capabilities
1	**NextGen/Workday (ERP) Coordination and Support** (mandated effort)	Goals 1, 2 All Strategies	High (major parts of all of the College's business and operations work)	High (project) Moderate (post-production)	No – during project timeframe Likely – post-project timeframe	Somewhat (Would have to reallocate funds; hence, change priorities.)	Need to re-skill staff (functional and IT) to work with new ERP system
2a	**Classroom Upgrades to Allow for Hybrid / HyFlex Teaching Modes** (active effort into FY23 due to COVID)	Goal 1, Strategies 2, 3 Goal 2, Strategies 1, 4 Goal 3, Strategies 2, 3 Goal 4, Strategies 2, 4	Moderate	Moderate	No (Using COVID funds to support one-time efforts)	Somewhat (Using COVID funds to support one-time efforts. Note: future upgrades WILL require budget/affordability assessment)	No
2b	**Improve Purchasing and Contracting of IT Services** (coordination w/ RCTC procurement and OGC)	Goal 1, Strategies 2, 3 Goal 2, Strategies 1, 4 Goal 4, Strategies 2, 4	High	High (Lately, due to Office of General Council (OGC) review, this process is slow and cumbersome)	Somewhat (Can't control OGC resources, these are tight)	Yes	System Office (SO) – we are not in control of them Procurement – need to think about alternative approaches
3	**Improve Orientation, Onboarding/Offboarding Processes (Faculty & Staff, & Students)** (Note: this initiative could benefit from other initiatives being completed, such as, "Single Portals of Information")	Goal 2, Strategy 2 Goal 3, Strategy 3	High (Universal Design plays a role, ties into retention)	Moderate (requires coordination across College)	Yes (all internal resources)	Yes	No
4	**Technology Literacy for Faculty, Staff, Students**	Goal 1, Strategy 3 Goal 2, Strategies 1, 4 Goal 3, Strategies 2, 3 Goal 4, Strategies 2, 4	High	Moderate (may have to require it)	No (Involves IT, EdTech, CTL, Faculty Online Learning, etc. but requires more integrated services across the entire college.)	No (Will need to add resources for training, reallocate resources or increase staffing levels)	Yes Requires investment in expansion of *EdTech* service group.

[6] **Pr**. = Priority (sequence). Considerations: mandate & compliance; low-hanging fruit requiring limited to no additional resources; *feasible* strategic breakthroughs for institution. Priorities that are related, that feed off or impact one another, or could happen in parallel are noted as #a, #b, #c, etc.

[7] **Value** = greatest impact on students and our institution's ability to deliver the service intended (e.g., teaching, support, etc.).

[8] **Difficulty** = how complex is the implementation and our ability to sustain it post-implementation.

Pr[6].	Initiative *(Projects to be defined and prioritized based on these)*	RCTC Strategic Plan Alignment *(see Appendix F)*	Degree of Value[7] (H/M/L)	Degree of Difficulty[8] (H/M/L)	Within Existing Staffing Levels	Within Existing Budget Levels	Organizational Design & Capabilities
5a	**Reorganization & Redesign of IT Division** (Service Management, creation of "Field Techs", increased staffing support in Academics & Student Services; Systems Analysis, Project Management, Architecture skills)	Goal 2, All Strategies Goal 4, Strategy 2, 4	High	Moderate	Somewhat (most yes, growth areas depend on attrition and reallocation of positions or new positions)	Somewhat (budget must keep pace with market and portfolio of current assets invested)	Yes Need to shift from operations to more value-added services.
5b	**IT Service Management** (Service Portfolio/Catalog, Customer Service, Request Intake, Request Status, Assets Management, Self-Service, Documentation, etc.)	Goal 2, All Strategies Goal 4, Strategies 2, 4	High	Moderate	Yes	Yes	Yes Need to mature existing processes and acquire some key tools to improve communication and transparency.
5c	**Remote Support Tools and Processes (including Administrative Account Management)**	Goal 1, Strategy 3 Goal 2, Strategies 1, 4 Goal 4, Strategies 2, 4	High	Moderate	Yes	Yes	Yes Need to be able to accommodate Administrative Rights and Routine updates to systems.
6a	**<u>Modernize & Stabilize</u> Core IT Infrastructure** (Network, Data Center, Communication Closets, Software/Package Deployment, Phones move to VoIP[9], Windows 11, etc.)	Goals 1, 2, All Strategies Goal 4, Strategies 2, 4	Very High (If core is not working, everything else is impacted)	Moderate	Yes	Somewhat (requires on-going investment through Strategic, R&R or TechFee funds)	Yes Need to modify existing staff PDs and realign to new Org. Design; also augment with additional skills.
6b	**Electrical Power Stabilization to Prevent Equipment Damage or Malfunction** (Due to lightning, surges from RPU, various line conditioning issues, etc.)	Goals 1, 2, All Strategies Goal 4, Strategies 2, 4	Moderate (major distraction for IT; causing functional impact & costs)	Moderate	No (will require partnership with Facilities and external vendor contractors)	Somewhat (will need to shift internal budgets to cover costs)	No
6c	**Evaluate and Transition to more effective Cloud Solution options** (Hosting/data/application services in the cloud e.g., databases, website, etc.)	Goals 1, 2, All Strategies Goal 4, Strategies 2, 4	Moderate (major distraction for IT; causing functional impact & costs)	Moderate	No (will require external vendor contractors)	Somewhat (will need to shift internal budgets to cover costs)	No
7a	**Integrated Set of Communication Tools**	All Goals All Strategies	High	Moderate (O365 in place, many others too)	Yes	Yes (if focus is on strategy and use of existing tools)	No

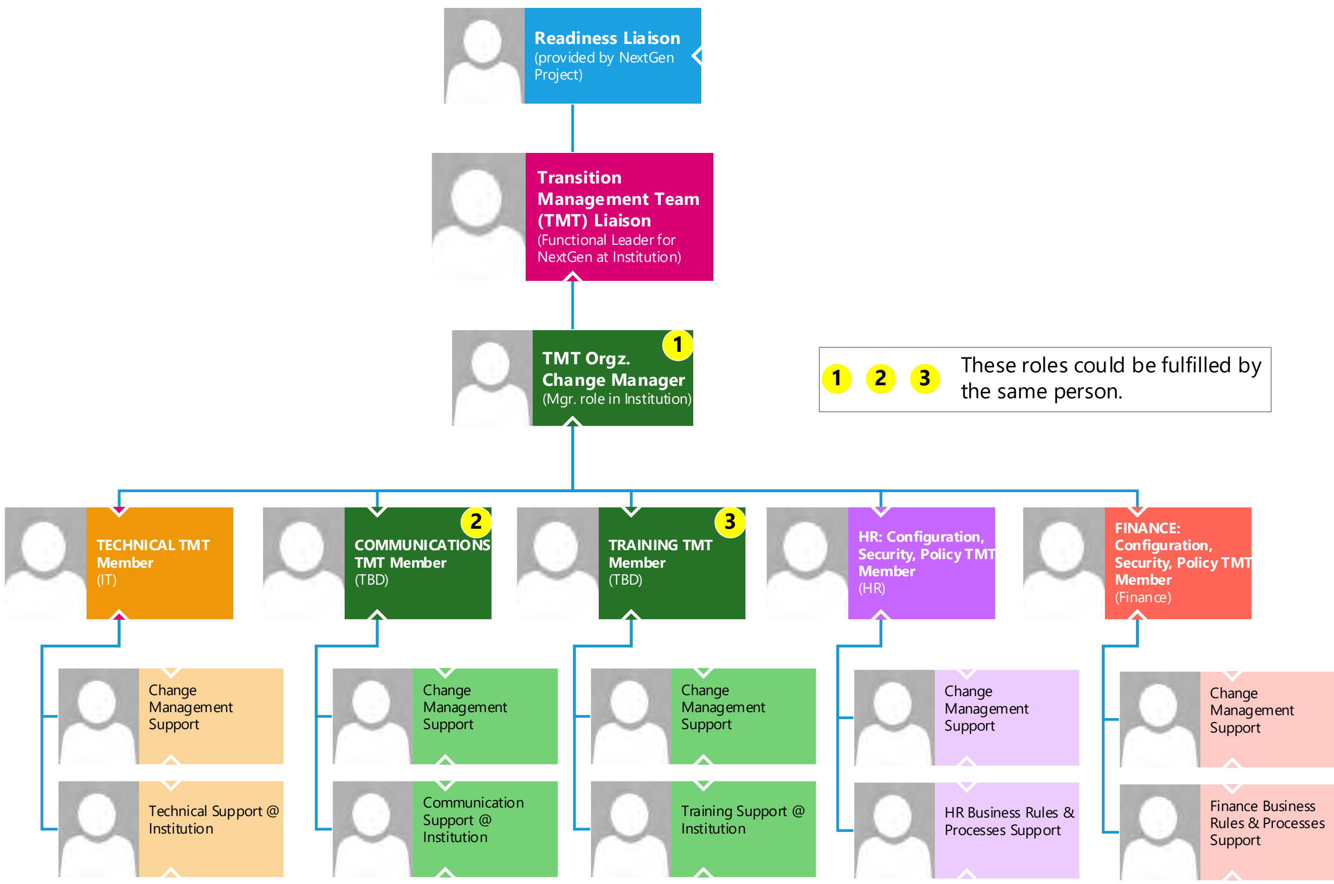
[9] VoIP = Voice over Internet Protocol i.e., telephones through an online/internet connection versus a land line.

Pr[6].	Initiative *(Projects to be defined and prioritized based on these)*	RCTC Strategic Plan Alignment *(see Appendix F)*	Degree of Value[7] (H/M/L)	Degree of Difficulty[8] (H/M/L)	Within Existing Staffing Levels	Within Existing Budget Levels	Organizational Design & Capabilities
	Across 3 Key Audiences (Students, Faculty, Staff)						
7b	**Intranet Redesign (SharePoint)**	Goal 4, Strategies 2, 4	High	High	No	No	Yes Need to establish an ongoing governance process.
7c	**Development of "Single Portals" of Information for Easy Access**	Goals 1, 2, 4, Various Strategies	High	Moderate	No	No	Yes Need to establish an ongoing governance process
8	**Data/Business Intelligence Expansion**	All Goals All Strategies	High	Moderate (leverage Precision Campus)	Somewhat (IR + IT)	Somewhat	No (for short-term)
9a	**Integrated Student Case Management** (including supporting tools – CRM, Mobile Apps, Workflow Automation, Forms Mgt. Solutions, "AdvisorVue" as an interim solution, etc.)	Goal 1 All Strategies	Very High	High	No	No (requires multi-year investments)	Need to expand capacity in Student Technology Service analysis, design, implementation.
9b	**Digitization of Manual & Paper-based Processes** (including fillable forms, workflow automation, eSignatures, PDF editors)	Goal 1, Strategy 2 Goal 2, Strategy 1, 2 Goal 3, Strategy 2, 3 Goal 4, Strategy 1, 2, 4	Moderate	Moderate	Yes (depends on if using simple approach e.g., PDF, or a DocuSign type services implementation – much more expansive)	Yes (depends on if using simple approach e.g., PDF or a DocuSign type service implementation – much more expansive)	No
10	**Establish an Information Security Program** (a matter of risk management)	Goal 2, Strategies 1, 4	Moderate	Moderate	Somewhat	Somewhat (would have to make reassignments within existing staffs' position descriptions)	Yes Need a functioning or partial *Chief Information Security Officer (CISO)* role.
11	**Simulation Technologies to Support New Modes of Instruction/Teaching**	Goal 1, Strategies 2, 3, 4 Goal 2, Strategies 1, 4	Moderate	Low (technically, assumed to be covered by vendor)	No	Yes	May have to consider different staffing mix to both run simulation and provide instruction to students
12	**Define New, Improved Academic *Management* Tools (e.g., assessment, curriculum development, etc.)** *[see Appendix P for a sample list of tools]*	Goals 1, 2 All Strategies	High	High	No	No	Need to expand capacity in Academic Technology Service analysis, design, implementation.

Pr[6].	Initiative *(Projects to be defined and prioritized based on these)*	RCTC Strategic Plan Alignment *(see Appendix F)*	Degree of Value[7] (H/M/L)	Degree of Difficulty[8] (H/M/L)	Within Existing Staffing Levels	Within Existing Budget Levels	Organizational Design & Capabilities
13a	**Evaluate a College-wide Student Laptop/Loaner Program (*Digital Equity*)** (research options effort)	Goal 1, Strategy 2, 3 Goal 3, Strategy 1, 2, 3	Moderate	Moderate	No Additional staff would have to be funded thru program	No Needs to be self-funding through a fee or other source (like Financial Aid)	Yes Need to expand existing capabilities + outsourced value-add services
13b	**Enhanced BYOD (Bring Your Own Device) Capabilities for Students** (including supporting components, such as, charging stations)	Goal 1, Strategy 2, 3 Goal 3, Strategy 1, 2, 3	Moderate	Moderate	Yes	Yes	No

NextGen – Statement on Project and Resource Needs

NextGen is a major, system-wide initiative to implement a new, modern Enterprise Resource Planning (ERP) system that replaces Minnesota State's, in-house and aging ISRS system. This project involves replacement of the Finance system, Human Resources system and ultimately, the Student system, as well as many other dependent components. As part of this initiative, across all 37 colleges and universities in Minnesota State, over a seven (7) year period (concluding in 2027[10]), at a cost of more than $150 million+, **each institution will also need to plan for <u>its own transition</u> to the system(s)**. Larger institutions will have an easier time meeting this expectation than smaller ones due to available funding and staffing levels. Regardless, each institution will need to plan for, out of its own resources, the following key roles/functions:



After the Finance and HR implementations are complete, the Student system will require a similar allocation of resources across IT, Student Services and Academic areas.

Given the magnitude of staffing support needs for the NextGen project, which has not been set aside/designated solely to the project, **the institution will likely feel some levels of resource shortages on *other* initiatives and projects,** from ALL areas of the College, over the course of this project's timeframe. In addition or alternatively, the College may incur augmented staffing costs of about $150,000 to $300,000 annually to support key work assignments for this project.

[10] NextGen *planning* efforts started in 2015; the project is expected to conclude in 2027.

Appendices

Appendix A – IT Division Values

IT DIVISION VALUES

VALUES STATEMENT

"With integrity, working as a team, we solve problems through excellent service."

INTEGRITY

- Be transparent, honest, fair, respectful, and inclusive in all interactions
- Fully own our responsibilities
- Honor the commitments we make / follow-through to completion / follow-up
- Always do what is right, even if it is not popular
- Be open to people's interests and different perspectives
- Communicate expectations; hold each other accountable for stated expectations
- Be reliable and dependable
- Partner and build relationships
- Be a trusted broker for the College
- Inspire independence and self-management
- Encourage open discussion and debate
- Treat others as they want to be treated
- Accept and give constructive feedback
- Listen to understand; suspend judgment; ask questions to learn

TEAMWORK

- We, the College, are one ("1") team
- Aspire to become a "High Performing Team"
- Work unified towards a common goal / a path forward
- Contribute talents equally
- Professionally communicate with each other
- Trust team members
- Hold self and teammates accountable to reasonable expectations
- Foster inclusivity
- Have each other's back and advocate for one another
- Once decisions are made, communicate with one voice
- Encourage crucial conversations – open discussion and debate of thoughts, ideas in a positive atmosphere to identify the best possible options and outcomes
- Communicate concerns in a timely manner; don't hold back issues
- Build and enhance relationships based on the essential dignity of each individual
- Respect work-life balance
- Treat people as valuable assets; make time for professional growth and development
- Create a work environment that is fun, enjoyable, and fulfilling
- Celebrate successes
- Be flexible and adaptable
- Be present and engaged

PROBLEM-SOLVING

- Use critical thinking and take a comprehensive, integrated (360º degree) view of issues
- Approach problems and decisions methodically and involve relevant stakeholders
- Solve for the long-term, focus on the future state, and forecast
- Communicate with customers to understand the situation
- Create a problem definition that is driven by customer expectations
- Design for the user's experience
- Facilitate the discussion to solve issues at the root level
- Provide customers and partners options and alternatives to problems
- Involve stakeholders in decisions
- Embrace creativity, strategic/forward-thinking, change management and promote learning and risk-taking
- Fail fast/learn fast; leverage continuous process improvement and iterative design

SERVICE EXCELLENCE

- Listen to customers – they are always right about the problem!
- Be open, friendly, and approachable
- Aim for a delighted customer who values returning to us again and again
- Understand the customer's needs; strive to exceed expectations
- Remedy issues quickly, effectively but don't sacrifice quality
- Provide accurate solutions and advice
- Define service management from request to long-term sustainability
- Hold ourselves accountable for customer expectations through Service Level Agreements (SLAs)
- Earn the customer's trust by being there for them and doing a good job
- Move from "No" to "Know"; ask "Is it possible?"
- Remember that all transactions are about relationships
- Lead by example, maintain a positive tone, assume positive intent
- Be clear, concise, and timely
- Aim for first time resolution; find and fix root causes
- Provide support and assistance outside normal business hours

Appendix B – IT Maturity Levels for Increased Operational Excellence

	Level 1-2	Level 2-3+	Level 3-5
	Operations Focus	Mix of Operations + Projects	Business Leadership & Strategic Driver
Focus	"Keep the Lights On"	Enhance operations and perform key projects	Drive the strategy of the organization through technology
Role of IT	Behind the scenes	Collaboration with functions as drivers	Proactive driver of change in use of IT
Activity Types	- Manage operations & support - Maintain the core of IT (for reliability & sustainability)	Build the core of business processes (align automation to business requirements)	Build the core of the business (lead business innovation and end-user experience and usability enhancements)
Business Conversation	Focus on IT performance, such as availability and quality of service	Solicit input and apply technology to transform business processes and activities	Business partner, use IT to create competitive differentiation and meet strategic goals
Technology	Stabilize the technical infrastructure	Build/integrate the application platform	Build/integrate technology for competitive advantage & business growth
Processes	Establish repeatable processes in IT; minimize risks	Establish effective IT governance and a Project Management Office (PMO); monitor risks	Evolve governance and the PMO towards strategic investments
People	Build and source required technical skills	Build business acumen and analytical skills (problem-solving)	Build business relationship, trusted broker and change management skills
Skills	Technical	Mix of Technical + Business Analysis and Project Management	IT Consultants, Strategy, Architecture, Solution Development
Organization	Support Services - Help Desk, Infrastructure, etc. Mostly in-sourced.	Minimal PMO, Development & Integration Teams, etc. Mix of In/Out-Source.	Comprehensive PMO, Architecture, Change, etc. Service-designed orgz. focused on value attainment

Appendix C – Enterprise Architectural Principles

BUSINESS ARCHITECTURE PERSPECTIVE	PRINCIPLE DETAIL
Primacy of principles	These principles of Enterprise Architecture apply to all departments within the enterprise/College.
Enterprise Architecture scope	Enterprise Architecture is intended to present options and alternative to problems and opportunities, to facilitate quality decision-making, while taking into consideration various constraints. EA is not about just managing to standards.
Enterprise Architecture is everyone's responsibility	Business requirements will drive the use of technology. Also, business units will participate in the information management decisions needed to accomplish business objectives.
Project Initiation	Successful project initiation resulting in quality outcomes requires (1) inclusivity and involvement upfront (2) prioritization by the highest level of governance, without it, the level of commitment and the desired results will always be in flux and questionable.
Enterprise value/view focus	Enterprise Architecture decisions are made for maximum benefit to the broader enterprise, as a whole, while minimizing total cost of ownership and risks.
Complete solutions available on "Day 1"	Solutions deployed across the College should be available on the 1st day they are needed e.g., academic/curriculum software on 1st day of class.
People, process knowledge, and skills are a vital asset	People, their process knowledge, and their skills are a vital asset and will be developed and managed accordingly.
Enabling business transformation	Flexibility will be incorporated into the Enterprise Architecture framework, so that it supports changing business needs, and enables transformation.
Business continuity	Business functions and technology operations are maintained despite process or system interruptions.
Process alignment to technology	To allow for flexibility and control costs, the organization will align processes to the technology needed, rather than match the technology to custom processes.
Compliance to laws and regulations	We will maintain and operate our environment in compliance to all applicable laws and regulations.
Simplicity (also refer to "Universal Design" below)	Choose the simplest solutions and aim for reduced operational complexity for the enterprise/College. Simple, effective solutions that are **configurable** and meet functional needs are recommended over highly complex and **customized** solutions.

INFORMATION ARCHITECTURE PERSPECTIVE	PRINCIPLE DETAIL
Information is a corporate asset	Information will be managed as a corporate asset. It is vital to all aspects of the enterprise and for decision-making.
There is only one primary source of data	There will be one authoritative Master definition of data. Data will be captured once and shared as a copy across dependent systems and applications. This master data, a.k.a. source system, will be referred to as the "system of record". Necessary, permanent modifications will only be made to the source/master data, not the copies.
Managed data	Data will be classified and managed, enabling the efficient administration and search of critical business information to support effective decision-making.

TECHNOLOGY ARCHITECTURE PERSPECTIVE	PRINCIPLE DETAIL
Reuse before Buy before Build	When new technology is required we should leverage existing investments prior to venturing to seek new ones. Next, investigation and evaluation of vendor products will be done before building it ourselves. Customization of purchased technology will be avoided when possible.
Invest in stable platforms	When purchasing technology, it is preferred that it be implemented after a point in its life cycle where it has become stable (in other words, we want to be "early followers" and avoid being at the "bleeding edge" of technology products, standards, and resulting implementations that have not been vetted effectively in the market).
Out of the box preference	Technology implementation will focus on "out of the box" implementation while meeting the core (e.g., 80%) of our needs; configuration is the next level of complexity we will consider; then, minimal, necessary customization, that create value and can be supported, will be considered versus major customizations, which should be avoided.
Obsolescence will be avoided	Technology will be replaced well before the time that it is no longer supported by the vendor, assuming proper notice is given. We want to avoid last minute migrations or operating under high degree of risk where we cannot recover from a failure.
Guided by total business impact	Total business impact (time, money, staff, skills, sustainability, etc.) and value, not just total cost of ownership, will be used in making technology decisions.
Controlled technical diversity	Control the variety of technology platforms to use, in the form of standards. Focus on 1 to 2 rather than a basket of options. Multi-tool solutions are okay when part of a well thought-out and integrated strategy that is designed to fill necessary gaps, with supported resources.
Sustainable support	"Rule of 2" – any mission-critical activity, both within the functional area and within IT needs to have at least two (2) people with the knowledge to ensure continued/ sustainable support in case of staff being on leave or attrition.

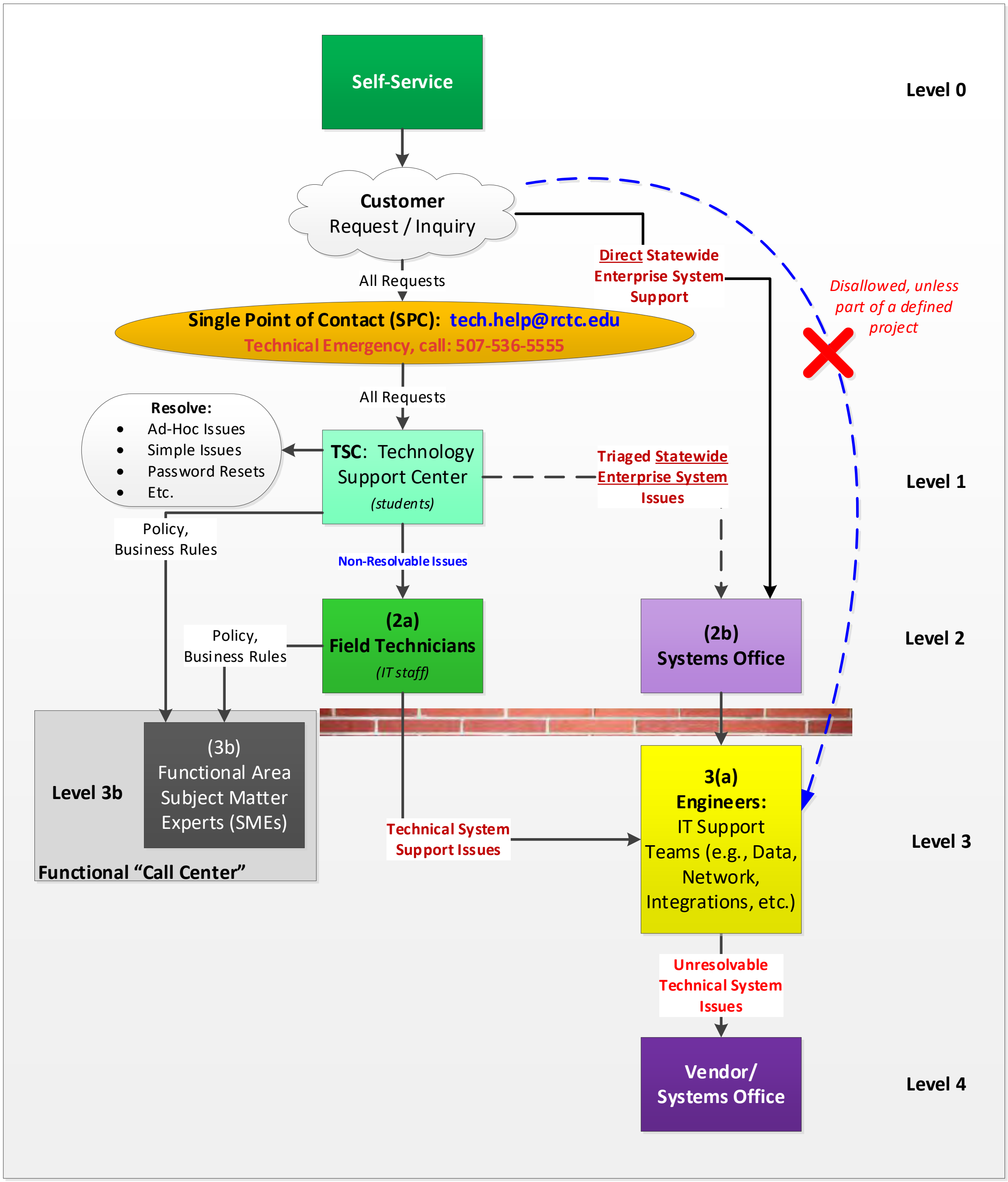
SECURITY ARCHITECTURE PERSPECTIVE	PRINCIPLE DETAIL
Security Ownership	Security is "everyone's responsibility" since it can occur at any part of the organization.
Managed security	Manage security enterprise-wide in compliance to current best security practices and security governance policies.
Provide adequate information security	Adequate security will be provided to protect our business information from inappropriate access or disruption, while assuring regulatory compliance and managing risk. Goal: zero (0) breaches in mission-critical systems & data.

SOLUTION/APPLICATION ARCHITECTURE PERSPECTIVE	PRINCIPLE DETAIL
Solutions are corporate assets	Applications and infrastructure will be managed as corporate assets throughout their lifecycle including selection, acquisition, operation and retirement.
Universal Design	Whenever feasible and not cost prohibitive, all solutions should consider the 7 universal design principles: 1. Equitable Use (for diverse users) 2. Flexibility in Use (preferences & abilities) 3. Simple and Intuitive Use (understanding & skills) 4. Perceptible Information (independent of senses) 5. Tolerance for Error (prevention) 6. Low Physical Effort (no fatigue) 7. Size and Space for Approach and Use (independent of physical form)

SOLUTION/APPLICATION ARCHITECTURE PERSPECTIVE	**PRINCIPLE DETAIL**
Design for scalability, change and reuse (Build for change (than to last))	Always architect, design, and implement solutions for the long-term, to change and reuse at the broadest level possible. Employ separation of concerns (SoC) design principles to separate code/modules/services into distinct sections and also separate stable from volatile services and code.
Integrated use preference	Solutions should be designed with an integrated, collective view of functional/business policies and processes (not silos). We should strive to eliminate redundancy.
Self-service	Solutions should be designed and implemented for increased ability by end-users to fully support themselves.
Fit for purpose	Maintain capability levels and create solutions that are fit for purpose without over-engineering them. Design solutions towards "Minimum Viable Product" (MVP), not maximum future potential, which may not be utilized due to the rapid change in IT.
Adhere to industry standards	Industry standards will be leveraged for solution development, to minimize technical diversity and complexity, improve interoperability and reduce the long-term total cost of ownership.
Current to existing environment	Solutions should be current to the existing times and environment in which we operate, which is defined as: **Mobile 1st. Cloud 1st. Data and Analytics Capable. Self-Service Oriented. Rapid Turnaround/Speed.**

Appendix D[1] – Operational Support Model/Framework and Triaging

A standardized process to managing support must be used to ensure consistent, effective, and efficient service delivery, to ensure issues are solved at the lowest cost possible, to ensure that work priorities are maintained and there is no 'favoritism' in handling issues, etc. ITs defined approach to addressing support issues involves: (0) allow end-users to solve their own problems, (1) contact the Technology Support Center/IT Help Desk to get assistance [intake of requests], (2 & 3) IT coordinate with either System Office or higher-level technical staff, who normally work on projects, (4) IT work directly with vendors to resolve complex issues.



Appendix D[2] – Service Management – Service Target Expectations Reference

SERVICE MANAGEMENT – Service Target Expectations Reference

IT has established the following expectations regarding how we calculate prioritization of bre (Ctrl) dent) issues, as well as the time allowed for response and resolution of these issues.

Priority Calculation Matrix

		IMPACT		
URGENCY		High(1)	Med(2)	Low(3)
	High(1)	1*	2	3
	Medium(2)	2	3	4
	Low(3)	3	4	5

Table 1: Priority Calculation

Priority Level	Team Response Time	Resolve Time
1 - Critical	15 Minutes	4 Hours
2 - High	1 Bus. Hour	8 Bus. Hours
3 - Medium	8 Bus. hours	2 Bus. Days
4 - Low	2 Bus. Days	7 Bus. Days
5 - Planning	5 Bus. Days	14 Bus. Days

Table 2: Response and Resolution Service Level Targets

(If no other work exists, lower priority requests may be resolved faster.)

Service Level Target Definitions

Impact: Impact is the effect that an incident has on the College. Impact can be determined by considering the number of users (e.g., college-wide, site/department/class/ multiple users, single user) that are influenced by the incident, with 1 representing the largest impact and 3 the least impact.

Urgency: Urgency is the extent to which the incident's resolution can bear delay until it presents a significant impact to the College, with 1 representing the highest urgency and 3 the lowest urgency.

Priority: Priority dictates the sequence in which an incident is addressed when evaluated against the landscape of all other open incidents. Priority is automatically calculated based on the Impact and Urgency settings.

***Note:** *All P1s require a Root-Cause Analysis presented to management/CAB. RCAs for P2…P5 are on case-by-case.*

Response: Response is measured as the time from when an Incident is created until the time the Incident is assigned to an individual team member and he/she responds to the customer.

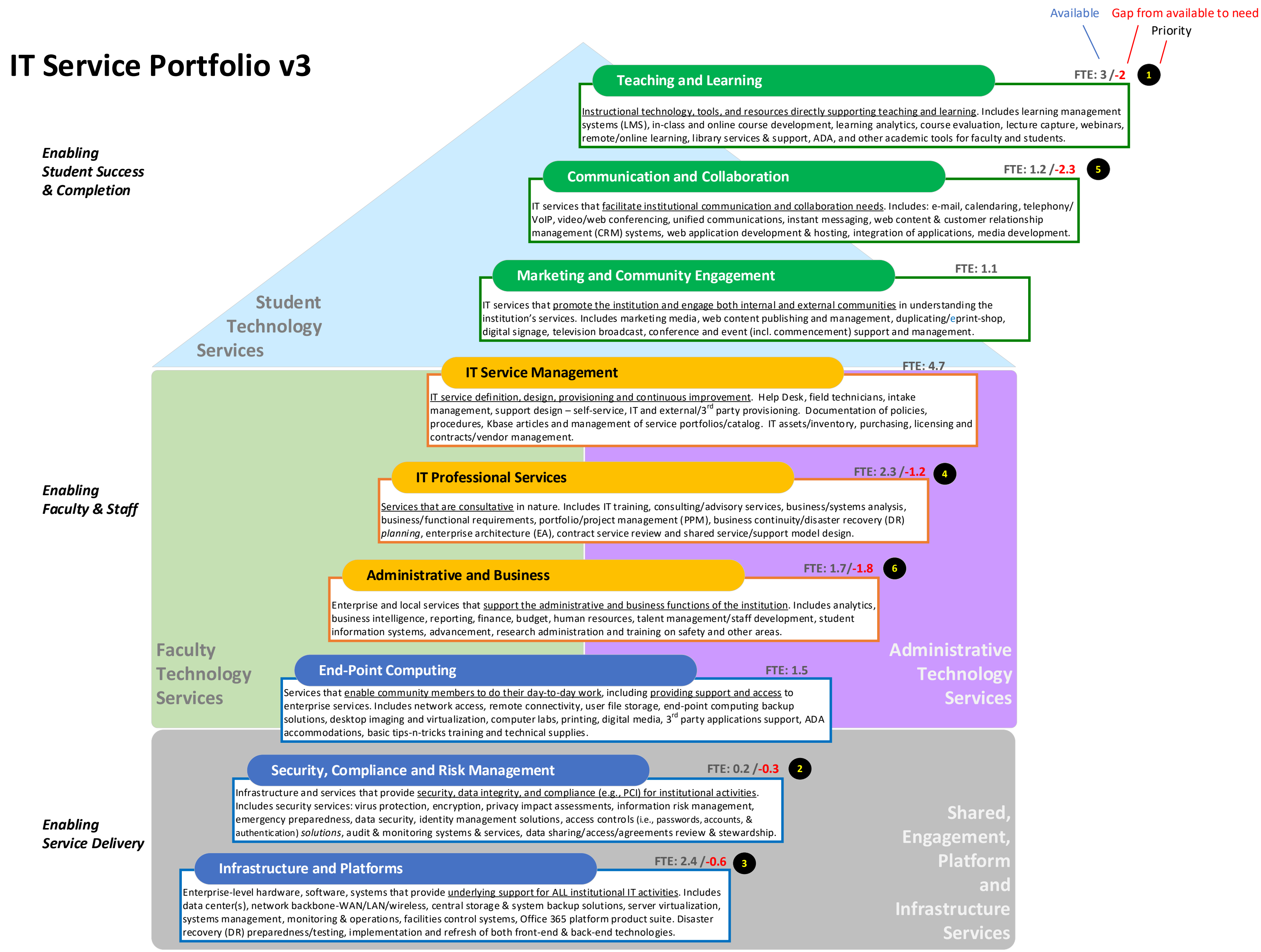
Resolution: Resolution is measured as the time from when an Incident is created until the time the incident reaches a "Resolved" state. Resolution requires customer feedback/validation for the service.

Note: *Pending an incident directly or via creation of Change or Problem record from the Incident will pause the Resolution 'timer' for the Incident.*

Priority Definitions and Examples

P1	**Business Impacting; Urgent & Important**	An unplanned outage/interruption sustained in a critical system, which directly affects the ability of the College to fulfill its Core Business functions across a large segment of Faculty, Students, and/or campuses. **"Disaster Declaration Decision (DDD)" can be made any time; must be made once Resolution Time threshold is exceeded.** Examples: * Complete network outage affecting a facility. * Regulatory/legal issue e.g., data breach. * Classroom interrupted & unable to function. * LMS outage.
P2	**Time Sensitive Issue**	Critical functionality interrupted, degraded or unusable, having a severe impact on services availability. No acceptable alternative is possible. *(Some P2s may become P1s!)* Examples: * A Security issue, VIP need or subset of the HR/Finance/Admissions teams cannot access the Internet. * Course scheduling application is running "very slow" during enrollment period.
P3	**Inconvenienced/ Low Impact**	Non-critical function or procedure, unusable or hard to use having an operational impact, but with no direct impact on services availability. A workaround is available. Examples: * Active Directory password reset for a single user. * Ticketing system portal navigation is "slow" for IT Department.
P4	**Very Low Impact to Business**	Application or personal procedure unusable, where a workaround or alternative is available, or a repair is possible. Examples: * Email not available from mobile device for single user; alternative modes working. * End-user desktop/laptop is "running slow" but operational.
P5	**Plannable; Nice to have fix**	Non-critical end-user inquiry or request for a future need/event. * Would like to know how to change a software's color theme. Schedulable work.

Appendix E[1] – IT Service Portfolios



Appendix E² – IT Service Catalog

Service Portfolios	Service Category	Front-Facing Services
Enabling Administration	End-Point Computing	End-User Accounts, Security Access & Home Drives
Enabling Administration	Marketing and Community Engagement	Events Support and Management (incl. commencement)
Enabling Administration	IT Service Management	(1 of 2) IT Help Desk
Enabling Administration	Marketing and Community Engagement	ePrint Shop *(Binding, Banners, Large Print/Copying Batches, Foamboards, Laminating, etc.)*
Enabling Administration	End-Point Computing	Printing & Copying Services (incl. paper)
Enabling Administration	End-Point Computing	Digital Media Services (CD, DVD, Jump Drives, Copying, etc.)
Enabling Administration	Marketing and Community Engagement	Digital Signage, Cable TV, Broadcast Services
Enabling Administration	IT Professional Services	IT Consulting, Solution Planning and Design
Enabling Administration	Marketing and Community Engagement	Web Content Access, Creation, Management
Enabling Administration	IT Service Management	IT Purchasing, Licensing & Contracts/Vendors
Enabling Administration	End-Point Computing	(1 of 2) 3rd Party Applications and Software Support
Enabling Administration	Administrative and Business	Data Integrations, Reports Consultation and Design
Enabling Administration	End-Point Computing	Remote Connectivity and Access to Campus Resources
Enabling Academics	End-Point Computing	Equipment Check-Out
Enabling Academics	Teaching and Learning	Educational, Instructional Technology Design, Build Management
Enabling Academics	Teaching and Learning	Audio/Visual, Classroom Design, Build and Support
Enabling Academics	Administrative and Business	Administrative Academic Technologies Support (need for accreditation)
Enabling Academics	Teaching and Learning	Lab Technology Support (Simulations, VR, Theatre, TV, Broadcast, etc.)
Enabling Academics	End-Point Computing	(2 of 2) 3rd Party Applications and Software Support
Enabling Academics	Teaching and Learning	Lecture Capture & Retrieval (online + on-prem services should be same)
Enabling Academics	IT Professional Services	IT Architecture Management
Enabling Student/Learning	Teaching and Learning	Library Services and Support
Enabling Student/Learning	IT Service Management	(2 of 2) IT Help Desk
Enabling Student/Learning	Teaching and Learning	(1 of 2) Student Onboarding/Orientation Support
Enabling Student/Learning	Teaching and Learning	Online Learning Management Systems (LMS) Support (D2L, other tools, etc.)
Enabling Student/Learning	Teaching and Learning	(1 of 2) ADA, Disability and Accomodations Services
Enabling Student/Learning	Infrastructure & Platforms	WiFi Connectivity and Access (on personal/BYOD devices)
Enabling Personal Productivity	Infrastructure & Platforms	Office 365
Enabling Personal Productivity	End-Point Computing	(2of 2) ADA, Disability and Accomodations Services
Enabling Personal Productivity	Communication and Collaboration	Workgroup, Teamwork, File Sharing and Collaboration (incl. SharePoint, Teams, etc.)
Enabling Personal Productivity	Communication and Collaboration	Email and Calendaring Management
Enabling Personal Productivity	End-Point Computing	File, Storage, Content/Document/Repository Management
Enabling Personal Productivity	Communication and Collaboration	Phones/Communication
Enabling Personal Productivity	Communication and Collaboration	Instant Messaging and Web/Video Conferencing (Zoom/Teams)
Enabling Personal Productivity	Infrastructure & Platforms	Database Design and Administration
Enabling Personal Productivity	Infrastructure & Platforms	Backup and Data Recovery Services
Enabling Personal Productivity	Administrative and Business	(2 of 2) Staff Onboarding/Offboarding/Orientation
Enabling Personal Productivity	End-Point Computing	Technology Store Front - Supplies (batteries, etc.)
Enabling Personal Productivity	End-Point Computing	Training & Communication on Technology & Software

Service Portfolios	Service Category	Back-End Services
Shared Services & Platforms	IT Service Management	IT Policies, Standards, Procedures (SOPs), Kbase articles
Shared Services & Platforms	Infrastructure & Platforms	System Monitoring
Shared Services & Platforms	Infrastructure & Platforms	Facilities Control Systems Administration (HVAC, etc.)
Shared Services & Platforms	Security, Compliance & Risk	Security, Compliance and Risk Management
Shared Services & Platforms	Infrastructure & Platforms	Routine System Maintenance and Upkeep
Shared Services & Platforms	IT Professional Services	Strategic IT Planning
Shared Services & Platforms	Infrastructure & Platforms	Data Center Administration
Shared Services & Platforms	Infrastructure & Platforms	Hosting Services
Shared Services & Platforms	Infrastructure & Platforms	Content Storage: Cloud + On-Premise
Shared Services & Platforms	IT Service Management	IT Service Operations Management
Shared Services & Platforms	Administrative and Business	IT Administration/Overhead (incl. personal development)
Shared Services & Platforms	IT Service Management	Process Improvement/Coordination
Shared Services & Platforms	Administrative and Business	Budget Management
Shared Services & Platforms	Infrastructure & Platforms	Network/Connectivity Services (incl. cabling, add/move/change, etc.)
Shared Services & Platforms	IT Professional Services	Partner Service Coordination (Systems Office/MinnState, WSU, UofM, MPOP, etc.)
Shared Services & Platforms	End-Point Computing	Desktop Management/Image Management
Shared Services & Platforms	End-Point Computing	Mobile Device Management (MDM)
Shared Services & Platforms	IT Service Management	Assets/Inventory Management
Shared Services & Platforms	Infrastructure & Platforms	Refresh Management

	Top Service Requests
1	Office 365
2	Star ID
3	Email
4	D2L Brightspace - LMS
5	Zoom - Video
6	PaperCut - Printing
7	WiFi
8	Classroom Support
9	Telephones and Mobile Devices
10	Data and Reports
11	Document and File Storage and Sharing
12	Software Help
13	Hardware Repair
14	Virus & Malware Removal
15	Events Support and Management

Technology Services for Students

- E-Mail
- D2L Brightspace
- One Drive File Storage
- Office365 / Adobe Software
- Computer Labs / Schedules
- WiFi Access
- Printing
- Technology Checkout
- Multi-factor Authentication
- Computer Recommendations
- Zoom / Video Collaboration
- Linkedin Learning
- Secure File Transfer
- Anti-Phishing Tips

Appendix F – RCTC Strategic Plan

A STRATEGIC PLAN FOR ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

STRATEGIC PLAN **2024**

Pathways to Success

GOAL ONE

STUDENT SUCCESS

Improve student retention and completion by increasing access to learning opportunities, leveraging educational technology, enhancing support services and resources, and strengthening pedagogy and curriculum.

- ***Strategy 1:*** STUDENT SUCCESS PLANNING: Create processes, structures, and opportunities for students to successfully plan and achieve their educational goals in a timely manner.
- ***Strategy 2:*** FLEXIBLE AND ACCESSIBLE EDUCATION: Expand access through high-quality online learning, flexible scheduling, and alternative pathways to fit the needs of students
- ***Strategy 3:*** SUPPORTING LEARNING: Implement integrated institutional practices, technology, and services aimed at supporting student learning and improving student outcomes.
- ***Strategy 4:*** ASSESSMENT OF STUDENT LEARNING: Further cultivate a culture of assessment to better understand how students learn and use assessment results to improve teaching and learning inside and outside of the classroom.

GOAL TWO

INSTITUTIONAL SUSTANABILITY

Ensure the College's offerings, functions, and processes are sustainable and responsive to the evolving needs of internal and external stakeholders.

- ***Strategy 1:*** ADVANCE A CULTURE OF CONTINUOUS IMPROVEMENT: Institution-wide commitment to foster systematic processes for assessing, evaluating, measuring, and communicating RCTC improvement efforts.
- ***Strategy 2:*** BOLSTER AN EXCEPTIONAL TEAM OF EMPLOYEES: Recruit talent and further develop staff and faculty to meet the changing needs of students and stakeholders.
- ***Strategy 3:*** EFFECTIVE PLANNING & ALIGNMENT: Realize RCTC's Mission through a meaningful planning process that aligns resources with the College's strategic priorities.
- ***Strategy 4:*** ENSURE INSTITUTIONAL CONTINUITY: Establish structures and processes that ensure continuity of services and processes that impact the ability to serve students and constituents.

GOAL THREE

DIVERSITY, EQUITY, & INCLUSION

Promote equity and inclusion across the institution by increasing cultural competency, culturally responsive pedagogy and service, and partnering with community organizations.

- ***Strategy 1:*** FOSTER A CULTURE OF EQUITY AND INCLUSION: Implement a dynamic equity and inclusion plan that integrates equity minded strategies across all institutional divisions.
- ***Strategy 2:*** EQUITY IN STUDENT OUTCOMES: Ensure equity in student experience and success by applying the lens of Diversity, Equity & Inclusion (DEI) to institutional academic and non-academic services and functions.
- ***Strategy 3:*** FURTHER DIVERSITY ENGAGEMENT: Expand resources, opportunities, and infrastructure to better understand and engage diversity, in efforts to impact the experiences of students and employees.

GOAL FOUR

CAMPUS AND COMMUNITY ENGAGEMENT

Promote campus and community engagement that fosters collaborative relationships which mutually benefit the College, our students, partnering organizations, and the economic vitality of the region.

- ***Strategy 1:*** GROW EXTERNAL COLLABORATIONS: Establish collaborations and relationships with external partners that bring value to the College and favorably impact the experiences of students, faculty, and staff.
- ***Strategy 2:*** GROW INTERNAL COLLABORATIONS: Establish internal collaborations that build collegial relationships in order to better serve the needs of students and employees.
- ***Strategy 3:*** PARTNER TO MEET THE NEEDS OF STAKEHOLDERS: Ensure the College's educational offerings serve the best interests of students and needs of the community through engagement of external constituents.
- ***Strategy 4:*** ADVANCE THE COLLEGE'S SERVICE TO, AND PRESENCE IN, THE COMMUNITY: Active engagement of faculty, staff, and students in the community.

MISSION | Rochester Community and Technical College provides accessible, affordable, quality learning opportunities to serve a diverse and growing community.

VISION | Rochester Community and Technical College will be a universal gateway to world-class learning opportunities.

https://www.rctc.edu/about/strategic-and-master-planning/

Appendix G – RCTC Master Academic Plan Strategic Priorities (2020)

I. Increase opportunities to enhance **student success**.

II. Enhance **teaching effectiveness** and promote **continuous quality improvement**.

III. Create state-of-the-art **teaching and learning environments**.

IV. **Align curricular portfolio** to meet the educational, economic, and workforce needs of the community we serve.

V. **Expand private partnerships** and create innovative business/industry alignments to generate greater synergies and alternative funding sources.

VI. Create a structure and support mechanisms to provide comprehensive **faculty and staff professional development** opportunities.

VII. **Expand community outreach**, communication, and marketing efforts and opportunities.

Appendix H – Minnesota State Information Technology (IT) Strategic Plan

Goal 1:

Develop an **enterprise IT organization** that anticipates our changing environment and facilitates quality of service and improved relationships with our customers.

Goal 2:

Develop and implement **enterprise IT architecture** that responds to changing conditions and new opportunities.

Goal 3:

Improve the organization’s (system office and campuses) capability to use **analytics** to help drive critical system/institutional decisions and outcomes.

Goal 4:

Enhance **risk management and information security practices** to protect system/institutional IT resources/data and respond to regulatory compliance mandates.

Goal 5:

Support **innovation** in teaching and learning

Appendix I – Educause – Top IT Issues 2021 (*Transitioning during COVID*)

RESTORE	EVOLVE	TRANSFORM
#1. Cost Management Reducing institutional costs and increasing workforce effciency	**#1. Student Success** Advancing student support services to help students attain academic and career goals	**#1. Institutional Culture** Contributing to a culture of transformation
#2. Online Learning Strengthening online and hybrid education	**#2. Equitable Access to Education** Providing technologies, support, and policies for diverse users	**#2. Technology Alignment** Identifying and applying sustainable digital strategies and innovations
#3. Financial Health Revising budget models and IT governance	**#3. Online Learning** Progressing from emergency remote teaching to online learning	**#3. Technology Strategy** Developing an enterprise architecture that keeps pace with strategic change
#4. Affordability & Digital Equity Providing increased support for students' technology needs and enabling technology availability	**#4. Information Security** Developing a cybersecurity operations strategy	**#4. Enrollment & Recruitment** Exploring and implementing creative holistic recruitment solutions
#5. Information Security Providing information security leadership	**#5. Financial Health** Partnering to develop new funding sources	**#5. Cost Management** Focusing on digital transformation

Appendix J – Gartner – Top Technology Trends 2021 and 2022

Top Higher Education Technology and Business Trends for 2021

Student Experience	Sustainability	Scaling the Change	New Normal
• Alternative Credentials	• Enigmas of Enrollment	• Changing Role of CIO	• Online Productification
• Corporate Collaboration	• Tuition Tensions	• Online Everywhere	• COVID-19 Campus
• Esports	• International Students	• Cloud Now	• Hybrid Everything
• Virtual Experiences	• Low-Code Applications	• Chatbots	• Remote Proctoring
• Cross-Life-Cycle CRM	• Cyberthreats	• Hybrid Classrooms	• Faculty Info. Systems

Top Strategic Technology Trends for 2021

People Centricity	Location Independence	Resilient Delivery
• Internet of Behaviors	• Distributed Cloud	• Intelligent Composable Business
• Total Experience	• Anywhere Operations	• AI Engineering
• Privacy-Enhancing Computation	• Cybersecurity Mesh	• Hyperautomation

Combinatorial Innovation

Top Strategic Technology Trends for 2022

Accelerating Growth	Sculpting Change	Engineering Trust
• Generative AI	• AI Engineering	• Cloud-Native Platforms
• Autonomic Systems	• Hyperautomation	• Privacy-Enhancing Computation
• Total Experience	• Decision Intelligence	• Cybersecurity Mesh
• Distributed Enterprise	• Composable Applications	• Data Fabric

Source: Gartner
757234_C

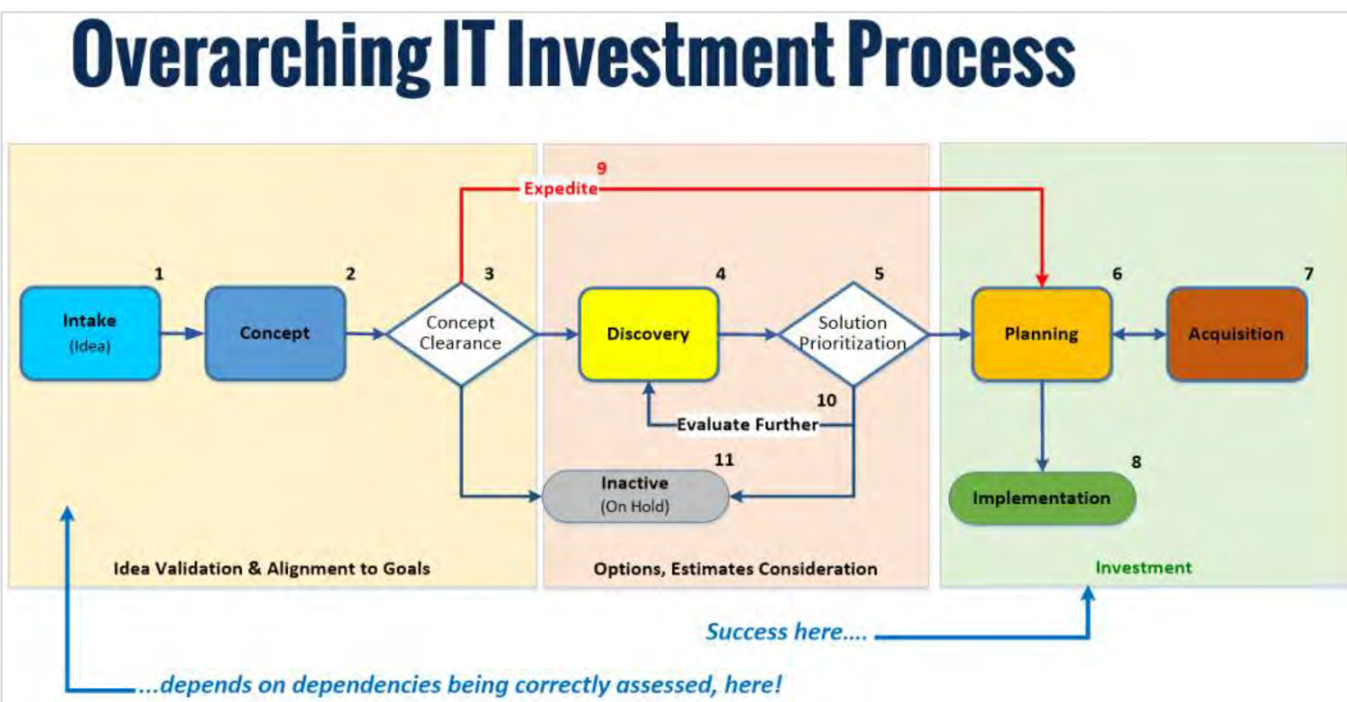
Gartner

Appendix K[1] – IT Investment Process

All IT investments must **follow a disciplined, rigorous process** to ensure that what we do is going to generate value and not be a waste of time, waste of funds and distract our employees. This type of process minimally involves: (a) developing an idea into a concept or business case that aligns to our overarching goals, strategies, architectural roadmaps and standards; (b) identifying key dependencies, such as, time, costs, people's involvement; (c) evaluating the information to make a decision; (d) conducting research or developing prototypes if necessary to assist with making the final decision; (e) prioritizing in the context of all other work, projects and initiatives that are underway; (f) developing a plan; (g) following approved procurement guidelines; (h) implementing using sound project management and change management approaches. The below image shows this approach in a simple flowchart.

Some of the key requirements for successfully executing IT investments include:

1. Projects and enhancements must be reviewed, approved, and prioritized by the IT Investment Committee, in the context of all active assignments, before they become a work item for IT.
2. Ownership of solutions must have both: (a) functional owners (including executive sponsorship) – those that need the solution to further their operational activities and will ensure the use of the solution long-term; and (b) technical owners – those that will ensure that the solution is up to date and fully functional/working technically.
3. Projects must have a start and end period. Projects cannot be in a 'continuous development' (never-ending) state; however, release cycles can be used to accommodate on-going need for enhancements.



Appendix K^2 – IT Investment Principles

All IT Principles are designed to help RCTC achieve its **mission** in a consistent and effective manner, increasing focus, reducing confusion with all stakeholders, and reducing waste (time and funds).

Principle 1: Information is a Strategic Asset, Owned by the Enterprise

RCTC's operations centers on knowledge. The College shall **manage information as a strategic, enterprise-wide asset and resource** (vs. silos), using best practices in architecture, data management, application design, security, and technology integration.

RCTC shall invest in IT assets necessary to **effectively communicate** with its varied stakeholder groups including students, families, faculty, staff, businesses, and other partners.

Principle 2: IT Investments will be based on the needs of the Enterprise

RCTC will evaluate potential IT investments with an **enterprise perspective**, seeking where possible to leverage investments to **avoid silos and redundant expenditures**, increase sharing and maximize the Return on Investments (ROI) and seek broader, integrated solutions.

RCTC will establish IT plans and evaluate IT investments within established best practices in **IT Architecture for educational institutions**, to promote coordination and enhance prospects for maximizing funding and standardize services and processes, while also addressing specialized requirements.

RCTC will assist staff **improve business operations** and effectively meet their client and stakeholder needs through well planned IT investments and services that includes an integrated solution of functional processes plus technology.

RCTC employs the "**Build Once, Reuse Often**" strategy, where application and data strategies and designs will, when feasible, follow an **encapsulated, component-based, interoperable, service-oriented architecture**, resulting in solutions being implemented/built once, reused often, and maintained efficiently and easily over time. Services are built on standard architecture and integrated with other core services for increased ability to exchange and share information.

To the extent possible, RCTC will leverage **shared, commercial, and existing** solutions and deploy technology using an "**Out of the Box**" configuration strategy; deviations, customizations and modifications will need business justifications with appropriate Return on Investment (ROI) analysis.

RCTC Budgets will not employ a "**Use-it or Lose-it**" approach. College functional areas will not be **penalized** for not using their allocated funds within a designated timeframe. Instead, functional areas will be incentivized to be stewards of their allocated funds and update and adjust plans, taking into consideration strategic needs and the associated funding required to support them.

Principle 3: IT Services are Coordinated through a Central Organization

The foundation for RCTC Information Technology operations is a comprehensive **central organization**, responsible for the College's IT Architecture, which works in close cooperation with individual business functions providing excellent customer service.

IT services provided shall be customer/**user friendly, reliable, flexible, accessible, secure, and responsive** to current and emerging needs.

To the extent possible, RCTC will implement technology with "**Self-Service**" capabilities to increase client, stakeholder, and functional areas' ability to **perform activities on their own** expediting operational changes and requiring minimal support.

Principle 4: IT Management Shall Foster Innovation through a Disciplined and Agile Process

RCTC shall operate within an **established, integrated, and collaborative governance process** for IT investments across all functional areas, divisions, departments and the college, with defined project identification, prioritization, and escalation processes.

All IT investments will be effectively managed through the **application of best practices in project management**, with the goal of increasing transparency, accountability and achieving project benefits on time and within budget.

As stewards of public resources, all IT investments will be carefully assessed to verify that expected benefits will be realized and are worth the costs i.e., **Total Cost of Ownership** (TCO) and **Return on Investment** (ROI) analysis.

Innovation and emerging technologies (R&D) are encouraged in a disciplined context, needing to be evaluated, piloted, and pursued as appropriate to ensure that RCTC's **workforce remains productive, nimble, and responsive** to changing needs while the **IT environment remains stable and supportable**.

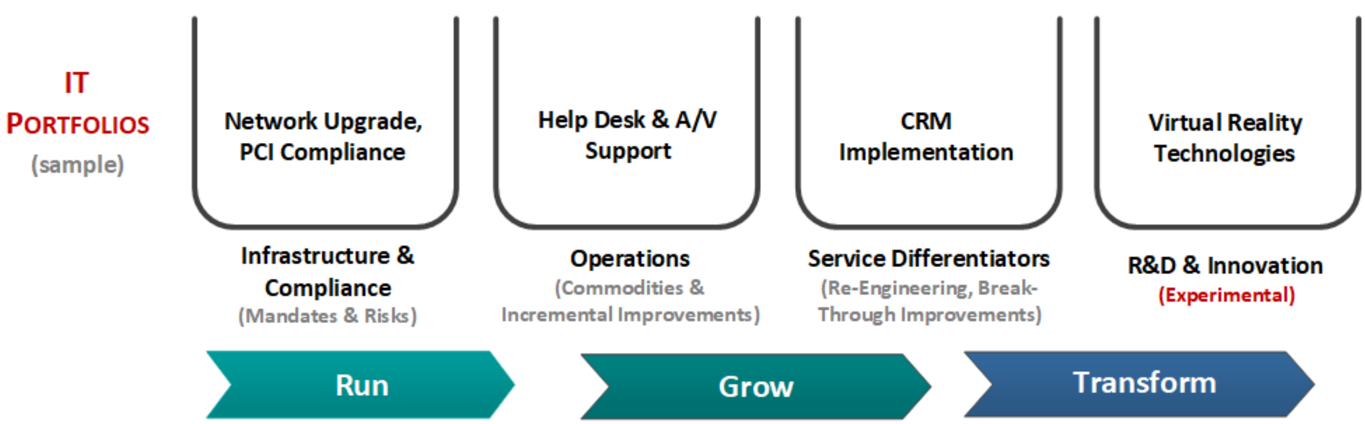
Appendix K3 – Run-Grow-Transform mapping to 4 IT Portfolios Management

Portfolios are groupings of work where the decision criteria between each portfolio is slightly different because of the nature and type of work. Also, each portfolio falls into different categories of activities and investment levels that must be supported by the organization, for instance, using the **Run-Grow-Transform** model, the **sequence** of thinking about technologies must follow this pattern:

1. Operational times must be maintained to keep the organization working – **Run**.
2. Existing capabilities may be expanded to enhance current service capabilities – **Grow**.
3. New capabilities may be implemented that create new, innovative approaches – **Transform**.

Within the Run-Grow-Transform model, there are four (4) primary governing portfolios of work assignments/projects that we must manage:

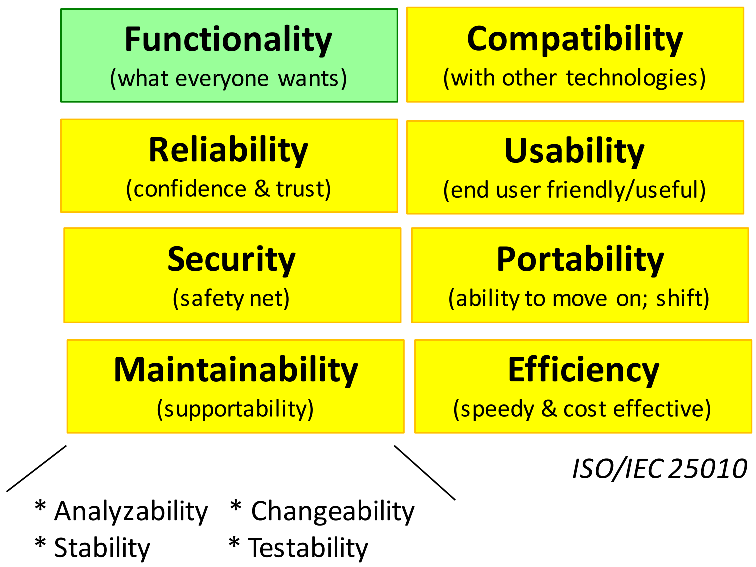
1. ***Infrastructure/Compliance/Mandates*** – what we HAVE to do; cannot ignore.
2. ***Operations*** – Keep the Lights On (KTLO), sustaining what we *already have.*
3. ***Service Differentiation*** – New/emerging/breakthrough improvements in core business services and functions; growing our ability to do *new* and better things.
4. ***Innovation/R&D*** – Experimental and high-risk efforts that are not proven, but are worth trying, to a limited degree, so that we can determine if they could meet our needs and bring in new ideas.



Appendix K[4] – Technical Debt

Definition: *"Technical debt is the deviation of a technology from <u>non-functional</u> requirements."*

- Nearly all the dissatisfaction and disappointment ("Pain") with current technology stems from failure to meet **non-functional requirements** – *the things we try to <u>skip and deal with later</u> (or never do) that <u>contribute</u> to the desired service <u>quality</u>.* (For instance, in the image[11] below, all the yellow highlighted components are non-functional requirements.)



- Hence, we must **balance functionality requirements** against **non-functional requirements**, <u>both</u> must be addressed to get the best experience and ensure sustainability.

[11] ISO/IEC = International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). Together, the two organizations work to develop, maintain, and promote standards in the fields of science and technology.

Appendix L – RCTC Refresh Period Standards based on Policy #5.13.1

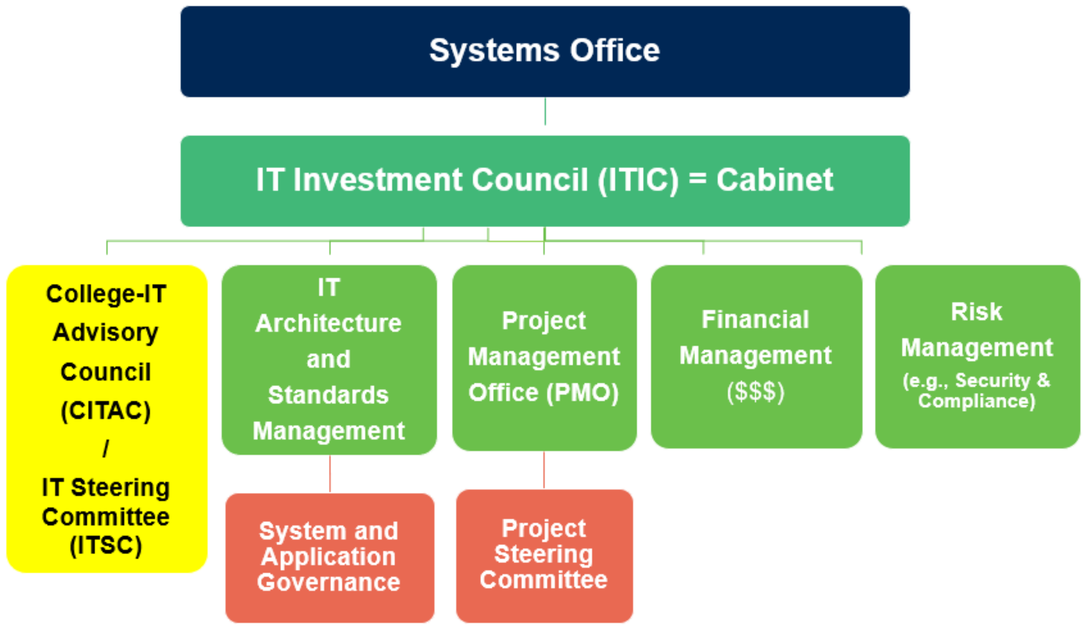
Device type	Refresh after (~period/~timeframe)
"Front-End" Devices	
Desktop Computers (Windows & Macs) (including any Thin Client/Cloud Computers/Dumb Computers)	5 years (~1/5 of inventory-20% per year)
Laptop/Notebook Computers (Windows & Macs)	4 years (~1/4 of inventory-25% per year)
Dual mode devices (hybrid tablets, iPads, etc.)	4 years
Printers/Copiers/Multi-Function Devices (MFD)	As needed, once device starts to break-down (7+ years). Currently on: 5-year lease, w/ 2-year extension.
Computer Monitors	As needed, when they fail. (or 6+ years)
Audio/Visual Equipment ("Room" upgrades)	6 years if required – less if they fail to meet defined business standards or dependent on vendor support
Digital Signage • Servers • Display Monitors	• 5 years • 7 years if required – less if they fail to meet defined business standards or dependent on vendor support
Telephones	As needed, once device starts to break-down (6+ years). Not part of refresh – covered out of individual department budgets.
Standard Productivity Software that typically come with any computer (e.g., Operating Systems, Browsers, MS Office Suite, etc.)	To current version of software implemented as standard. (Previous versions with approved justifications.)
"Back-End" Devices	
Infrastructure, VDI (virtual desktop infrastructure)	5-7 years
Servers / Storage Infrastructure	5-6 years
Load Balancers / Firewalls	5 years
Telephone Trunk Platform (Session Initiation Protocol-SIP)	5 years
Network Infrastructure (e.g., core, aggregation and edge switches, controllers)	5-6 years
Campus LAN (WAN): • Fiber • Copper	• 15 years • As needed, as part of a facility remodel/upgrade
Wi-Fi: Wireless Infrastructure (indoor & outdoor)	5-6 years
3-Phase <u>UPS</u> (Uninterruptible Power Supply) <u>Systems</u> (in Data Centers) – Comprehensive Upgrade 3-Phase UPS System (in Data Centers) – <u>Battery</u> Replacement 3-Phase UPS System (in Data Centers) – <u>Power Module</u> / Power Supply / Intelligence Module Replacement	10-12 years (Designed life is 10 years when operating at maximum specifications; well-maintained systems should continue to provide reliable protection well beyond 10 years) 3-5 years (under normal operating conditions) 7 years (under normal operating conditions)
Smart <u>UPS</u> (Uninterruptible Power Supply) <u>System</u> (in Communication/Data Closets) – Comprehensive Upgrade Smart UPS System (in Comm. Closets) – <u>Battery</u> Replacement Smart UPS System (in Comm. Closets) – <u>Power Module</u> / Power Supply / Intelligence Module Replacement	7-10 years 3 years (under normal operating conditions) 5-6 years
Data Center HVAC Systems	15-20 years (with regular maintenance)
Network Closet HVAC Systems	12-15 years (with regular maintenance)

Device type	Refresh after (~period/~timeframe)
Specialized Academic Program Labs, Peripherals and Technologies	
Lab Equipment (CAD, Music, Art, Nursing, etc.)	5 years – paid by programs
Simulation Technologies	5 years – paid by programs
Virtual Reality (VR) Equipment and Rooms	4 years – paid by programs
Production Studio	6 years – paid by programs
eSports (Gaming)	3 years – paid by program; as an option, could consider, cascading high-end computers down after 2 years
Facilities Dependencies (not part of IT's "Refresh")	
Backup Generator	20+ years
Building Automation – HVAC Controllers	5-7 years (with regular maintenance)

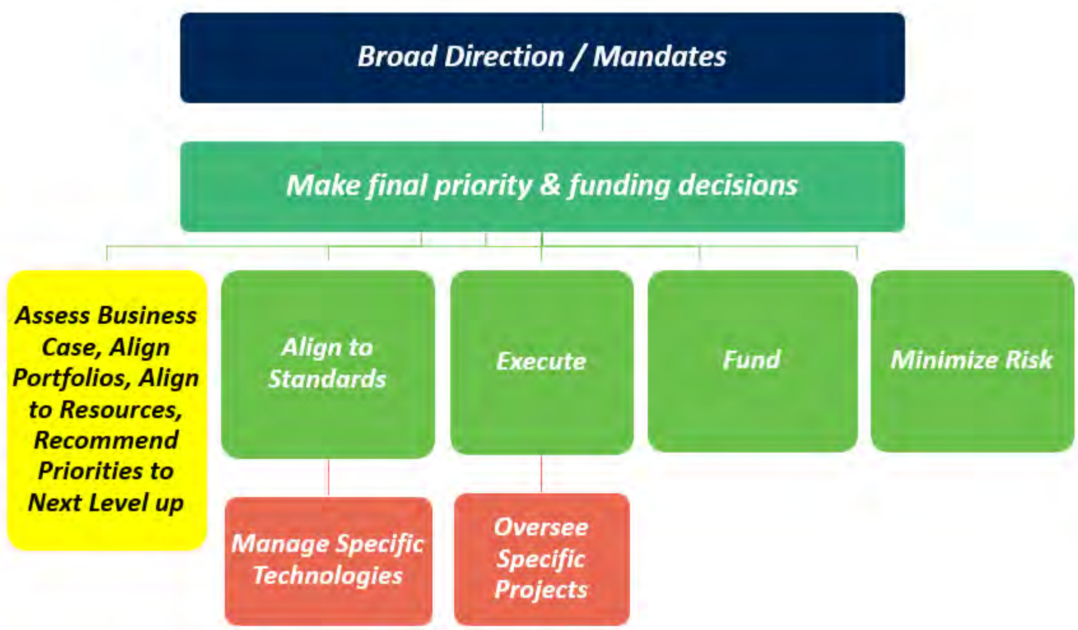
Physical Security Infrastructure
• Servers
• Storage
• Keycard Access
• Cameras:
  ○ Indoor
  ○ Outdoor
	
	• 5-6 years
	• 5-6 years
	• 5-7 years
	
	• 10 years
	• 5-7 years

Appendix M[1] – IT Governance Structure & Responsibilities (External Facing)

Structure:



Responsibilities:



1. The President's Cabinet, functions as an **IT Investment Council**, approves final business cases for projects and allocates funds to support them. This group's primary responsibilities are to: (a) set the College's priorities, (b) make better College-wide investment decisions, (c) ensure an integrated, cross-functional participation on key projects, (d) raise the awareness and increase the transparency on active or tentative projects.

2. The next layer is the operational advisory group called, the **College-IT Advisory Council (CITAC) or IT Steering Committee**, which evaluates project requests, compares and contrasts business cases for projects and recommends moving forward with investment decisions, stopping a low-value effort or putting a project on hold. Supporting the College-IT Advisory Council are a set of operational functions that perform key activities that enhance and provide information to the Council for assessment and decision.

2.1. **IT Architecture and Standards Management** ensures that the technical architectural issues surrounding projects has been considered.

2.2. **Project Management Office (PMO)** ensures that project requests have legitimate business cases, they are aligned to the College's goals, the technical assessment of the projects has been completed, tentative solutions follow established policies and standards, and information is available to the governance Councils to make an advisory or final decision.

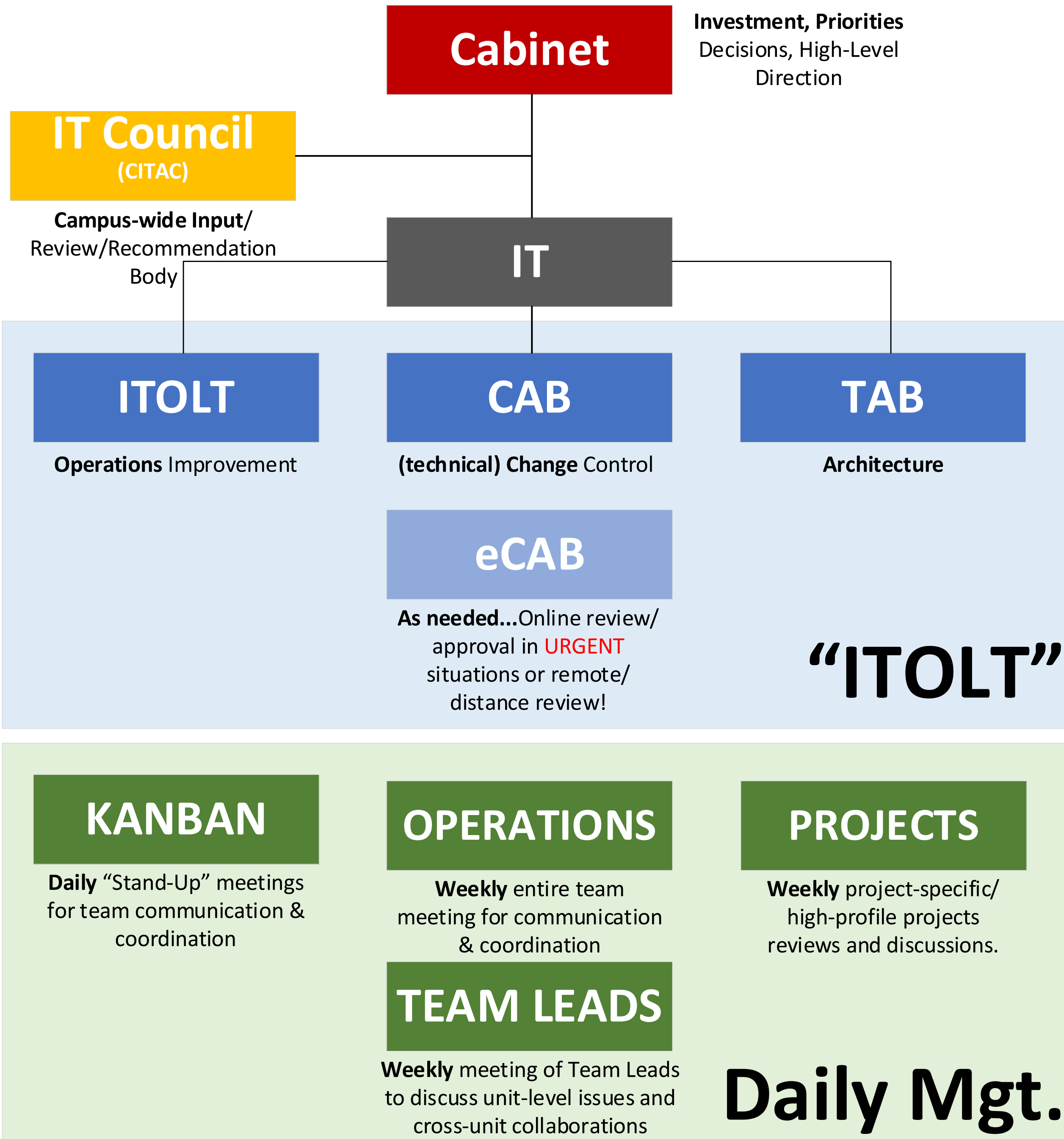
2.3. and 2.4 **Financial Management and Risk Management** are two other key functions for consideration, ensuring that projects are (a) funded and (b) any compliance and vulnerability issues for the project have been taken into consideration.

3. The last layer is the **day-to-day system or software application operational governance structures and project-specific steering committees** to support, large, multi-functional, mission-critical system, application or project. At this level, the focus is on the complex workings of a one particular system, platform or application across the stakeholder community e.g., the LMS.

Appendix M² – IT Governance Structure & Responsibilities (Internal Facing)

IT's internal governing structures consist of the **IT Operations Lead Team (ITOLT)**, which performs several functions: (1) operations improvements within IT, (b) acts as a technical **Change Advisory Board (CAB)**, and (c) as the **Technology Architecture Board (TAB)**.

In addition, IT has several operational management structures to ensure that day-to-day issues/ needs, communication, and coordination are occurring effectively. Some of these structures are invoked on an *as-needed* basis, depending on the circumstances.



Appendix N – Standard Resource Allocation Model

To effectively plan for work and project assignments, it is important to understand how a 1.0 IT FTE's staff time is distributed across 2,080 standard hours of pay per year.

Standard Resourcing Model

Factor	Permanent Staff		Notes
Total Hours in a Year	2,080		52 weeks x 40 hours
Vacation	-120		3 weeks
Holidays	- 80		10 days
Sick Leave	- 56		Estimated 7 days
Mandatory Meetings/Events	- 32		Estimated 4 days
Training & Professional Development	- 80		With rapid change of technology, need to develop people (2 weeks/year)
Continuous Process Improvements, Team Development & R&D	- 78		~ 1.5 hours per week of testing new ideas, fixing issues for the longer term; brainstorming...
Administrative Overhead	- 52		~ 1 hour per week (ad-hoc issues, time reporting, etc.)
Total Available Hours:	1,582		Available capacity of Staff
Percent of Total Hrs.:	76%		
Hours per week:	~30		
Available Work Weeks:	40		Full-Time (40 hours/wk)
Operations/Project %:	60%	40%	FTE time available over 52 week timeframe. *Project or Contractor time is as needed for staff augmentation.*
Total Available Hours Split:	949	633	
W/in 52-Week Partial Hours:	18	12	
W/in 40-Week Full-Time Equivalent Hours:	24	16	

Appendix O – Human-Factor Change Management using ADKAR Model

All organization projects, IT and non-IT, have to ultimately be adopted and used by the people of the organization. Without this adoption, the intended and desired outcomes will never be realized. Therefore, RCTC-IT will use the Prosci ADKAR Model as a guideline to ensure that all technologies implemented have the appropriate human-factor change management to increase adoption within the institution.

Prosci® ADKAR® Model solutions@prosci.com

	ADKAR element:	Definition:	What you hear:	Triggers for building:
A	Awareness	Of the need for change	"I understand why…"	Why? Why now? What if we don't?
D	Desire	To participate and support the change	"I have decided to…"	WIIFM Personal motivators Organizational motivators
K	Knowledge	On how to change	"I know how to…"	Within context (after A&D) Need to know *during* Need to know *after*
A	Ability	To implement required skills and behaviors	"I am able to…"	Size of the K-A Gaps Barriers/Capacity Practice/Coaching
R	Reinforcement	To sustain the change	"I will continue to…"	Mechanisms Measurements Sustainment

Change Management Tools	A Awareness	D Desire	K Knowledge	A Ability	R Reinforcement
1. Communication Plan	●				●
2. Sponsor Roadmap	●	●			●
3. Coaching Plan	●	●	●	●	●
4. Resistance Management		●			
5. Training Plan			●	●	
Documentation (knowledge base)	●		●	●	●

Appendix P – Sample Lists of Technologies per College Domain s

College-Wide *Sample* Technology List	Academic Technology *Sample* Technology List	Student Services Technology *Sample* Technology List
• Office365, Zoom, etc. • Classroom Emergency Call/Phone System – FreePBX • Print Services/Print Accounting (PaperCut) • Parking Lot Emergency Call System - Code Blue • Building Utility System – UHL • Automated Call Attendant – Nuance • Key Management System – KeyStone • Messaging System (Tightrope) • Eduroam, Airtame, AirMedia • Blackboard Emergency Alert system (all-campus alert) • Fire Alarm System - Custom Alarm • Building Access Control System/Physical Security System - RS2 • *For Foundation*: AwardsSpring (scholarships), Quickbooks (finance), ResultsPlus (donors)	• Academic Program Review (APR) • Faculty Assessment Rubric • ePortfolios for Assessment • Faculty Activity Report • Institutional Research (IR) Data Management (Precision Campus) • LMS-D2L Support • Early Alert (AdvisorVue) • Electrician program tools • GlowForge - 3D Printer for Art • TurnitIn • LinkedIn Learning • Lockdown Browser • Proctoring Monitor, etc. support • Labs Support: Simulation (B-Line), V/R, CAD, A&P (not part of vendor service contracts) • Closed Captioning Support • Eduroam, Airtame, AirMedia • Classroom Technologies and A/V Support • ISRS/NextGen Support • Production Studio Support • Training on Technology for Faculty • Automotive – Electude • PAIR Networks - Art & CS use for web development • LAWE – CrimeZone • TaskStream - Assessment & Accreditation Planning • 40+ Academic Technologies (see SCCM/Monkey for list) • Etc.	• uAchieve/DARS (Degree Review) • Maxient - student discipline management • Hobson’s CRM for Enrollment Management • AdvisorVue (Early Alert) • Proctoring Solution • ISRS/NextGen Support • Admissions Letter System • EMR Support • Book Deferment – FA • Chat • Disability Services/ADA-compliance tools • eForms Support • Document Imaging • ReadSpeaker Support for Disability Services • ID Card System • AdvisorVue/Early Alert System • TRIO Early Intervention Reports Support • Etc.

Appendix Q – Healthcare "First Responder" Analogy – Need for *Emergency* Services

"911" services require **immediate response**, but to a very acute set of needs/circumstances, with limited capabilities to solve all healthcare related problems. Escalation of needs must occur to emergency rooms (ERs) and/or hospitalization, for long-term problems/ issues. Some services can never be solved through a "911" call, for instance, an organ transplant, these must be planned and handled by more mature hospital processes and specialized doctors. Also, prevention is key! It is important to avoid calling "911" by being proactive and planful – getting routine checkups, being educated on dos/ don'ts, exercising, having good nutritional habits, etc.

Appendix R – IT Primer Guidelines for RCTC Staff to Use IT

IT PRIMER GUIDELINES – CHEAT SHEET v. 1.0 (5/6/2021)

PURPOSE: This document is created as a quick-reference guide to using technology services at the College. This document is intended to provide the key guidelines to ask for, get and use technology at the College – it is meant to reduce confusion and increase clarity. The topics here are important and are usually things that people either forget or do not know how to interpret.

HOW TO START A REQUEST FOR SERVICE I.E., GET THINGS?

SUBJECT:	INTAKE AND REQUESTS FOR SERVICE
GUIDELINE:	If you have a need, please **submit your request**, preferably in the form of a problem or need that you want to fulfill (rather than a specific tool or pre-defined solution) to IT at tech.help@rctc.edu or call **507-536-5555 (especially time-sensitive, urgent, and emergency needs)**. This will allow us to take in the request, prioritize, do some research or follow-up work, identify options including if we already have a tool or solution that meets the need, and then collaboratively, come to some conclusions.

SUBJECT:	PROJECT INITIATION *(Projects are more complex set of tasks that take up more time e.g., > 40 hours, money and people.)*
GUIDELINE:	All **ideas and projects** should be supported through a reasonably defined '**business case**' that defines: (a) what it is, (b) what value it provides, (c) what are the resourcing needs – time, people, money, (d) what are the one-time and on-going costs to both implement the project and keep it going operationally. DO NOT BUY FIRST, THEN PLAN! Also, **upfront,** you MUST **involve/include key areas and people who will enable and support** the work to ensure: (1) that they understand the need, (2) they can provide 'technical' input/feedback that ensures the quality and success of the solution, and (3) later on, there is buy-in and commitment for resource assignment & timeframes.

SUBJECT:	INNOVATION AND RESEARCH & DEVELOPMENT (R&D) PROJECTS
GUIDELINE:	Innovation projects are **like any other project**; however, they may be faster paced, the risks and benefits can be higher, they need to be segregated from operational environments due to risks, the investment of time and funding *could be* throwaway due to the increased likelihood of failure, learning is a key goal, there is a cost and level of effort required to transition from innovation to operations; it does not happen automatically!

SUBJECT:	EVENTS COORDINATION AND MANAGEMENT
GUIDELINE:	Events are small-scale projects: (1) ensure all **resource needs** for events are identified (space, technology, etc.); (2) make sure that service areas have enough **lead time** to schedule & provide the support, ideally 2-week notice; (3) make sure that any 3rd **party services provided** by anyone outside of RCTC has been coordinated – critical note: IT may need to know **technology specific information to allow equipment to connect** into the network, etc.

SERVICE LEVEL RESPONSE RATES TO EXPECT!

SUBJECT:	SERVICE LEVEL OBJECTIVES FOR RESPONSE AND RESOLUTION OF DEGREE OF PROBLEMS
GUIDELINE:	

Priority Calculation Matrix

URGENCY \ IMPACT	High(1)	Med(2)	Low(3)
High(1)	1*	2	3
Medium(2)	2	3	4
Low(3)	3	4	5

Table 1: Priority Calculation

Priority Level	Team Response Time	Resolve Time
1 - Critical	15 Minutes	4 Hours
2 - High	1 Bus. Hour	8 Bus. Hours
3 - Medium	8 Bus. hours	2 Bus. Days
4 - Low	2 Bus. Days	7 Bus. Days
5 - Planning	5 Bus. Days	14 Bus. Days

Table 2: Response and Resolution Service Level Targets

Note: IMPACT and URGENCY have definitions based on College-Wide impact, a Classroom, a Department, a single person, etc.

SUBJECT:	"PRIORITY 1" SERVICE-LEVEL PROCESS FOR OFF-HOURS SUPPORT
GUIDELINE:	**Priority 1 incidents** are mission-critical systems that are down, key services cannot be provided and there are no alternatives. **Only Priority 1 incidents warrant calling in people from home, at night or during the weekend to restore services.** Protocol for "P1"s are: (1) determine if the need is critical enough to warrant calling people in and if the delay in time either to the next business day or until the technician comes to campus (considering transportation delays) can be absorbed, (2) call your respective manager to confirm the need, (3) receive permission from your respective areas VP to call people in for support, (4) contact IT.

HOW TO BUY/USE THINGS LEGALLY AND WITHIN COMPLIANCE?

SUBJECT:	PURCHASING, LICENSING AND CONTRACTING
GUIDELINE:	As an institution, we are expected to **follow licensing requirements** that are established for us, through the State, MnSCU or via our own institution. We cannot use technologies that are not licensed to our institution. *Personal use* and *Business uses* are different things, that come under different licensing and terms of use requirements.

IT PRIMER GUIDELINES – CHEAT SHEET – 1.0 (5/6/2021)

	Please follow the statewide procurement procedures that requires security reviews, legal reviews, etc. which can take 2-6 weeks, before making contractual arrangements with a vendor. Also consider FERPA and MGPDA regulations. *Critical Note: 80% of IT costs occur after purchase! [source: Gartner Research]*

SUBJECT:	**STANDARD COMPUTER/HARDWARE SPECIFICATIONS TO CONSIDER BEFORE BUYING**
GUIDELINE:	Look on the Technology Internet site: https://www.rctc.edu/services/technology/computer-recommendations/

HOW TO FIND WHAT WE ALREADY HAVE?

SUBJECT:	**SOFTWARE LIBRARY: NEED SOFTWARE, DON'T KNOW WHAT'S AVAILABLE?**
GUIDELINE:	Look in "***Software Center***" for PCs and "***Managed Software Center***" for Macs... If you don't find what you need, follow the "Intake and Request for Service" guidelines above.

HOW TO STAY SAFE?

SUBJECT:	**SECURITY IS EVERYONE'S RESPONSIBILITY**
GUIDELINE:	Daily work, as well as any arrangements with third parties, requires that a **data/security/privacy assessment** be conducted to prevent potential data loss, theft, or breach. Ensure that you are conscious of **emails/phishing** approaches and attempts. **Contractual arrangements** should be mindful of student or employee data legalities.

IMPORTANT AWARENESS ISSUES – RULES TO LIVE BY!

SUBJECT:	**DATA OWNERSHIP a.k.a. "DATA STEWARDSHIP"**
GUIDELINE:	Data ownership is the responsibility we all have for the data that we create or access or use in the institution. **FUNCTIONAL OWNERSHIP: business or functional data** is owned by functional areas, for example, registration of students and records – is owned by the Registrar's Office; grades are owned by the faculty. **TECHNICAL OWNERSHIP: technical data** is owned by IT, for example, network IP addresses, system administration passwords, etc. *Note: a student's social security number or grade, in a database, does not make it technical data.*

SUBJECT:	**PROCESS OWNERSHIP**
GUIDELINE:	Process ownership is the responsibility we all have for the management and maintenance of certain key activities. **"WHAT": Functional/business areas** own and are responsible for the processes, needs and requirements related to the activities that they perform to support various services, e.g., registration process, book sales process, etc. **"HOW/DESIGN": IT** owns and is responsible for the technology or automation architecture to provision the required services in the most effective, efficient manner using technology or automation, e.g., a cloud database.

SUBJECT:	**SYSTEMS OF RECORD**
GUIDELINE:	A System of Record is an application, software, or database that stores the original form of transactions and data. A System of Record is the "master" source for current and updated information. If data is pulled from a System of Record for other uses, the data pulled must be refreshed on a regular basis for it to continue to be relevant. WARNING1: Do not modify data outside of the System of Record and create another "source" of data, unless it is for a "one-time" use e.g., for a report. WARNING2: If data is being collected via forms, surveys or other means, make sure consideration is given to whether the data should be stored/updated in the "System of Record", e.g., updating ISRS records for employees/students based on a survey of key performance metrics, for instance, assessment/diversity.

SUBJECT:	**EMPLOYEE IT ONBOARDING / IT OFFBOARDING**
GUIDELINE:	When possible, develop a plan with the employee, HR and IT before they start/leave: (a) develop a transition plan of key activities, (b) ensure information/documents are kept/backed up in central repositories, (c) define "auto-forwarding" and "out of office" criteria, (d) ensure ID badges, keys, equipment are logged/given/received.

SUBJECT:	**ACCESS TO RESTRICTED/SENSITIVE SPACES/AREAS**
GUIDELINE:	Access to Communication/Data Closets and the Data Center is restricted and requires: (a) IT to be made aware ahead of time that access is needed, (b) the time of entry must be scheduled, (c) in some instances the work required in these areas may have to be overseen/monitored by an IT staff person.

8 BAD DESIGNS:	(1) Manual Re-Keying of Data, (2) Collection of Single Solutions vs. Integrated Solutions, (3) Redundant Applications doing Similar Things, (4) Copies of Data Stored in Multiple Locations, (5) Too Many Interfaces, (6) Customization & Complex Integrations, (7) Workarounds and Shadow Systems, (8) Obsolete Technology.

MASTER 2017 2020 ACADEMIC PLAN

Mapping the Future of RCTC's Educational Offerings and Initiatives

RCTC Master Academic Plan
EXECUTIVE SUMMARY

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

EXECUTIVE VICE PRESIDENT'S MESSAGE

"The future belongs to those who prepare for it."
- RALPH WALDO EMERSON

Dear Colleagues,

For 100 Years Rochester Community and Technical College has provided high-quality educational and technical training opportunities for Rochester, the region, and beyond. As community, state and national educational needs continue to evolve, the skills gap between what is needed to drive the U.S. economy and the skills possessed by the available workforce continues to expand. This "Skills Gap" is a concern of epic proportion as it relates to the future economic prosperity of our nation. With the increasing demand for postsecondary education, RCTC's Master Academic Plan, Mapping the Future of RCTC's Educational Offerings and Initiatives, provides the direction for the College's programs and services to meet the community's educational and economic needs.

The following are excerpts taken from the Georgetown University, Center on Education and the Workforce report entitled Recovery: Job Growth and Education Requirements through 2020.

- By 2020, 65% of all jobs in the economy will require postsecondary education and training beyond high school.
  - In Minnesota, 74% of all jobs will require postsecondary education.
- At the current production rate, the U.S. will fall short by 5 million workers with postsecondary education by 2020.
- There will be 55 million job openings in the economy through 2020. Twenty four million from newly created jobs and 31 million due to baby boomer retirements.
- Job openings in healthcare, community services, and STEM will grow the fastest among all occupational clusters.

The strategic priorities identified in RCTC's Master Academic Plan (MAP) support the College's strategic plan, mission and vision. MAP strategic priorities communicate the direction for RCTC's instruction, academic support, student support, information technologies and educational technologies. Information and data provided in this plan are designed to guide the creation of the RCTC's Comprehensive Facility Plan and Master Technology Plan.

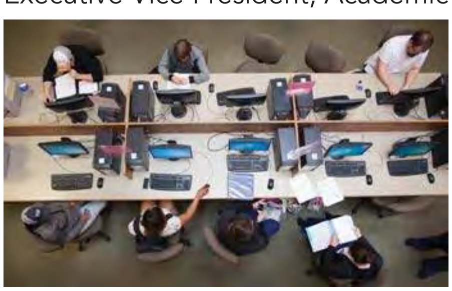
The creation of this document, RCTC's first comprehensive master academic plan, was shaped by the Master Academic Plan Steering Committee, a group of dedicated faculty, staff, and administration from across the campus over the course of the 2016 academic year, and finalized in the fall of 2016.

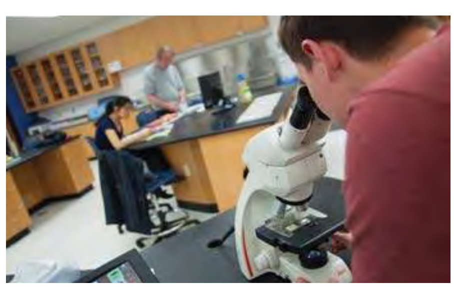
The results of the good work of the MAP Steering Committee and all the faculty and staff who dedicated significant time and effort in the development of this plan will be used in future program and services development, and annual program review processes. I would like to express my sincere appreciation to everyone who worked to create this plan over the past year and to their many years of commitment to student success, Rochester Community and Technical College, and its many stakeholders.

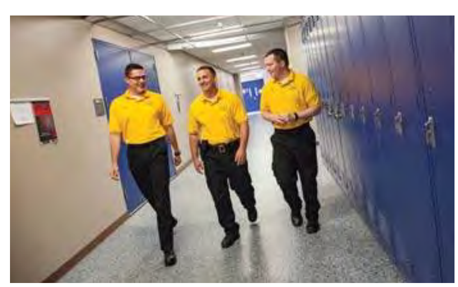
Sincerely,

Greg Mosier

Greg. A. Mosier, Ed.D.
Executive Vice President, Academic Affairs







CREATING THE MAP:

Designed to create the roadmap to advance RCTC's institutional mission, vision, and values for the next three years and beyond, the Master Academic Plan provides the foundation for intentional actions to ensure our academic programs and services meet the holistic needs of our students, workforce and community. Four primary goals of the MAP were to:

1. Identify external and internal demands to create a portfolio of programs and services to meet current and future student, community, and business and industry needs.
2. Develop strategies to increase student learning and success.
3. Identify needs for the creation of a comprehensive faculty and staff professional development program.
4. Identify campus and instructional technology needs to develop a comprehensive instructional delivery plan that supports innovation and enhances student success.

To begin the process, the MAP Steering Committee researched planning documents from colleges across the country, created the MAP Outline, an Academic Area Planning Tool, and a Student Support Planning Tool to assist faculty and staff across the institution in the creation of their Area MAPs. Campus wide informational sessions were held to answer questions and provide additional guidance about the use of the tools as people began work in their respective areas.

Over the course of the 12 month period, 55 program, discipline, and service Area MAPs were created, grouping areas of like offerings and services into joint reports. Those Area MAP Reports were then consolidated into five Division Summary Reports, which provided the data to create the Institutional Summary.

SIGNIFICANT FACTORS:

To support the creation of a comprehensive plan, all programs, disciplines, and academic support areas analyzed internal and external factors of significance. At the institutional level, the following factors arose as common themes:

INTERNAL FACTORS:

- Highly credentialed and recognized faculty
- Dedicated, long-term faculty and staff
- Multiple program and co-curricular opportunities for students
- Long-held partnerships with business and industry, and educational providers
- 518 acre campus provides opportunities for new programs and services
- Pressures on enrollment and tuition revenue
- Increased demands from developmental and English language learners
- Additional retention opportunities exist for all students and high-risk student populations
- Recent turnover in executive level leadership
- Opportunities to meet unmet institutional needs with realignment of academic divisions
- Opportunities exist for facility, classroom and technology updates

EXTERNAL FACTORS:

- Destination Medical Center (DMC) initiative to invest nearly $7 billion in downtown Rochester
- DMC anticipated to add 30,000 jobs to local economy, and double local population
- Regional, eight county, growth opportunities with Journey to Growth initiative: Advanced Healthcare, Computer Systems Design and Production, Food Manufacturing, Tourism, Transportation
- Rochester ranked #1 midsize city to live in U.S. (Livability.com)
- Rochester named one of best places for business and careers (Forbes)
- High demand on local workforce
- Rochester unemployment rate less than 3%; effective rate less than 1% (Summer 2016)
- Entry level positions paying $12-$17 per hour
- Decreased state funding for higher education

MAP STRATEGIC PRIORITIES:

During the creation of the five Division Summary Reports, the deans from the respective areas carefully examined and evaluated information provided in each Area MAP report and created short- and long-term division goals and deans' priorities. Reviewing this division-level information with the MAP Steering Committee, several overarching themes became evident. This information led to the development of eight Academic Strategic Priorities. Within these eight priorities, a total of 59 goals were identified.

RCTC Academic Strategic Priorities:

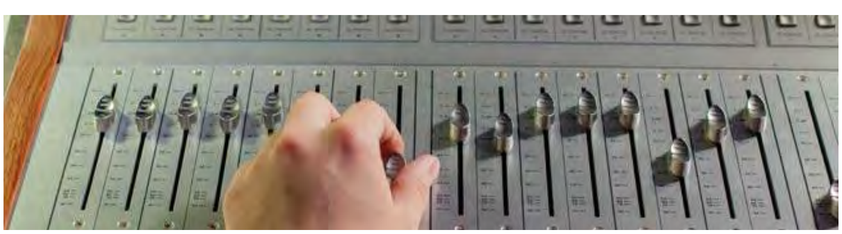
- Realignment of academic divisions
- Increase opportunities to enhance student success
- Enhance teaching effectiveness and promote continuous quality improvement
- Create state-of-the-art teaching and learning environments
- Align curricular portfolio to meet the educational, economic, and workforce needs of the community we serve
- Expand private partnerships and create innovative business/ industry alignments to generate greater synergies and alternative funding sources
- Create a structure and support mechanisms to provide comprehensive faculty and staff professional development opportunities
- Expand community outreach, communication, and marketing efforts and opportunities

NEXT STEPS:

To advance the strategic priorities and achieve the goals identified in our Master Academic Plan, RCTC faculty and staff have already moved towards implementation. The realignment of academic divisions is complete and many initiatives have been launched. The creation of this comprehensive plan has provided direction for the College's academic programs and services, and has generated a great deal of energy and excitement amongst the College community.

During the course of the next three years, RCTC will focus on the continued implementation of initiatives to move the concepts identified in this plan to reality. Maintaining a focus and purposeful alignment with the institutional strategic plan, MAP goals will be reviewed on an annual basis, integrated into the annual updating of strategic plan initiatives, and reported upon in annual program reviews.

As RCTC has entered its next Centennial, the College's Master Academic Plan enables the institution to continue its long-held heritage of providing rigorous and relevant educational and training opportunities to meet the ever-changing needs of the Rochester community and the region we serve. RCTC invites all our important stakeholders to read the plan in its entirety at www.rctc.edu/MasterAcademicPlan and help advance the Important work identified within its pages.



WWW.RCTC.EDU
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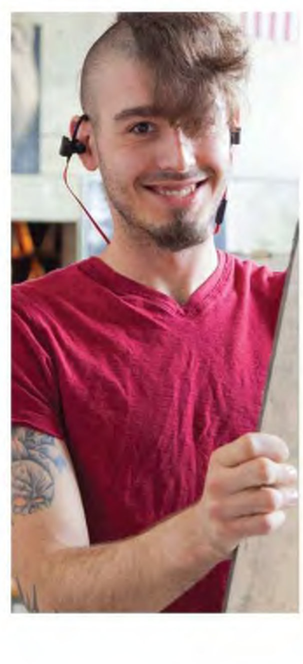
MASTER ACADEMIC PLAN 2017–2020

Mapping the Future of RCTC's Educational Offerings and Initiatives



ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
MASTER ACADEMIC PLAN:

Mapping the Future of RCTC's Educational Offerings and Initiatives

FY 2017 – 2020

OUR MISSION

Rochester Community and Technical College provides accessible, affordable, quality learning opportunities to serve a diverse and growing community.

OUR VISION

Rochester Community and Technical College will be a universal gateway to world class learning opportunities.

OUR CORE VALUES

Learner-Centered
Excellence
Respect
Teamwork
Innovation
Fun

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Faculty from all programs and disciplines, and staff from academic and student support departments contributed significant work and input into the creation of RCTC's Master Academic Plan (MAP). This work was led by the Master Academic Plan Steering Committee who created the overall structure of the plan as well as instructional and academic/student support planning tools to help lead the campus community in the development of their individual area MAPs.

Sincere gratitude is expressed to the faculty, staff, and deans who contributed to the development of this plan. Without the efforts put forth by each person in their area MAPs and divisional summaries, the creation of the Master Academic Plan would not have been possible.

A special thanks goes to the members of the Master Academic Plan Steering Committee:

Ginny Boyum, Ph.D. – Dean, Academic Effectiveness and Innovation
Jen Bruce – Librarian
Veronica Delcourt, Ed.D. – Dean, Liberal Arts and General Education
Brian Fors, Ph.D. – Interim Dean, Sciences and Health Professions
Safawo Gullo, DVM, Ph.D. – Dean, Sciences and Health Professions
David Hansen – RCTC Student
Jason Jadin – Chemistry Faculty
Lisa Mohr – Dean of Student Success
Greg Mosier, Ed.D. – Executive Vice President, Academic Affairs
Michelle Pyfferoen – Dean, Career and Technical Education & Business Partnerships
Scott Sahs – Chief Information Officer
Heather Sklenicka, Ph.D. – Chemistry Faculty
Brian Steele – Art/Photography Faculty

Thank you to all members of the RCTC community for your multiple and varied contributions to the development of this plan. With your efforts, RCTC is poised to continue to meet the needs of our students and community. Your time and energy dedicated to this project is recognized and greatly appreciated!

MESSAGE FROM THE PRESIDENT

With implementation of the Strategic Plan Vision 2020: The Next 100 Years underway, Rochester Community and Technical College is ensuring that we deliver the best possible education to our next generation of students. The framework created in the strategic plan facilitates the next steps of integrated planning to connect academic programming, student support, technology and facilities. The interconnected networks further enable student engagement in the learning process. To better navigate these complex systems that drive a successful higher education enterprise, the College has designed its first official Master Academic Plan, or MAP, to deliberately guide RCTC's path forward.

As a result of the dedicated work of the members of the MAP task force along with other internal and external contributors, I am confident that this plan targets academic goals and priorities to drive momentum for delivering on the long-range vision for our future. In addition, the finalization of our master academic plan positions RCTC to move forward with other major plans necessary to support our academic work - the Master Technology Plan and Comprehensive Facilities Plan. These other plans ensure the fiscal, facility, and human resources available at the College are used in alignment with the focus of our mission of providing accessible, affordable, quality learning opportunities to serve a diverse and growing community.

I'd like to thank Dr. Greg Mosier, Executive Vice President, Academic Affairs, for taking the lead on this important initiative; and to the members of the task force (found on page 4 of this plan). Through Dr. Mosier's leadership, and the commitment of the team, the results of their efforts have proven that collaboration is an essential part of any planning process.

As RCTC addresses the scope and complexities of today's students and society through higher education, "Alone we can do so little, together we can do so much." – Helen Keller.

Sincerely,

Mary Davenport

Mary Davenport, Ph.D.
Interim President

MESSAGE FROM THE EXECUTIVE VICE PRESIDENT, ACADEMIC AFFAIRS

For 100 Years, Rochester Community and Technical College has provided the citizens of Rochester, the region, and beyond high-quality educational and technical training opportunities. As community, state, and national educational needs continue to evolve, the skills gap between what is needed to drive the U.S. economy and the skills possessed by the available workforce continues to expand, the demand for postsecondary education continues to increase. This "Skills Gap" is a national concern of epic proportion as it relates to the future economic prosperity of our nation. RCTC's Master Academic Plan (MAP) provides the direction for the College's future educational offerings and initiatives to meet the community's educational and economic needs and help decrease the span of the local and national skills gap.

The following are excerpts taken from the Georgetown University, Center on Education and the Workforce report entitled *Recovery: Job Growth and Education Requirements through 2020.*

- By 2020, 65% of all jobs in the economy will require postsecondary education and training beyond high school.
    - In Minnesota, 74% of all jobs will require postsecondary education.
- At the current production rate, the U.S. will fall short by 5 million workers with postsecondary education by 2020.
- There will be 55 million job openings in the economy through 2020. Twenty four million from newly created jobs and 31 million due to baby boomer retirements.
- Job openings in healthcare, community services, and STEM will grow the fastest among all occupational clusters.

The strategic priorities identified in the MAP support the College's Strategic Plan, mission and vision. MAP strategic priorities communicate the direction for RCTC's instructional, academic support, student support, information technologies and educational technologies. Data provided in the Master Academic Plan is designed to guide the creation of the College's Comprehensive Facility Plan and Master Technology Plan.

The creation of this document was shaped by the Master Academic Plan Steering Committee, a group of dedicated faculty, staff, and administration from across the campus. The MAP was developed over the course of the 2016 academic year, and finalized in the fall of 2016.

The results of the good work of the MAP Steering Committee and all the faculty and staff who dedicated significant time and effort in the development of the plan will be used in future program and services development and annual program review processes. I would like to express my sincere appreciation to everyone who worked to create this plan over the past year and to their many years of commitment to student success, Rochester Community and Technical College, and its many stakeholders.

Sincerely,

Greg Mosier

Greg. A. Mosier, Ed.D.
Executive Vice President, Academic Affairs

RCTC STRATEGIC PLAN: *VISION 2020*

Strategic Priority 1:
Provide high-quality, affordable, learner-centered educational pathways, workforce training, support services, and resources to meet the diverse needs of students, the region, and the global community.

1.1: Advance programs and services that support student success through evidence-based systemic planning, assessment, and review.
1.2: Achieve excellence in teaching and learning through rigorous and relevant educational offerings, engaging and innovative instructional delivery, and superior support services.
1.3: Nurture a comprehensive, learner-centered culture to support student from inquiry through completion.
1.4: Advance educational, business, and community partnerships to create opportunities for students to attain their educational and career goals.

Strategic Priority 2:
Collectively develop strategic approaches to systemically plan, prioritize, and implement future-focused initiatives.

2.1: Implement continuous environmental scanning processes to strategically position the College for the future.
2.2: Engage college-wide stakeholders in the planning and allocation of resources to create innovative learning and working environments.
2.3: Create on-going employee professional growth and advancement opportunities.
2.4: Advance continuous quality improvement processes to ensure College-wide accountability.

Strategic Priority 3:
Cultivate a culture of collaboration and communication that values diversity and mutual respect.

3.1: Foster an environment to encourage collaboration across College units that embraces our Core Values.
3.2: Improve internal communication structures and processes.
3.3: Provide exemplary, engaging service to students, employees, alumni, and the greater community.
3.4: Expand community partnerships that focus on diversity and inclusiveness to encourage multi-cultural experiences.

Strategic Priority 4:
Enhance RCTC's image as the region's college and employer of choice.

4.1: Communicate the value of RCTC's high-quality, affordable, and accessible programs and services.
4.2: Heighten RCTC's reputation as a world-class educational institution.
4.3: Recruit and retain exceptional and diverse employees.
4.4: Improve the effectiveness and efficiency of hiring and onboarding processes.

MINNESOTA STATE COLLEGES AND UNIVERSITIES STRATEGIC INITIATIVES

Minnesota State colleges and universities play an essential role in growing Minnesota's economy and opening the doors of educational opportunity to all Minnesotans. To that end, in 2012, the Minnesota State system initiated Charting the Future, a system-wide initiative to help better prepare Minnesota students for success and achieving a more prosperous Minnesota.

To help reach the overarching goals of Charting the Future, specific work plans were developed. In 2016, those work plans involved the following areas: Academic and Student Affairs, Diversity and Equity, Finance and Facilities, Human Resources, and Information Technology Services.

The charge with Charting the Future relates to accomplishing the following Strategic Framework Initiatives:

Ensure access to an extraordinary education for all Minnesotans

- Our faculty and staff will provide the best education available in Minnesota, preparing graduates to lead in every sector of Minnesota's economy.
- We will continue to be the place of opportunity, making education accessible to all Minnesotans who seek a college, technical or university education; those who want to update their skills; and those who need to prepare for new careers.

Be the partner of choice to meet Minnesota's workforce and community needs

- Our colleges and universities will be the partner of choice for businesses and communities across Minnesota to help them solve real-world problems and keep Minnesotans at the leading edge of their professions.
- Our faculty and staff will enable Minnesota to meet its need for a substantially better educated workforce by increasing the number of Minnesotans who complete certificates, diplomas and degrees.

Deliver to students, employers, communities and taxpayers the highest value / most affordable option

- Our colleges and universities will deliver the highest value to students, employers, communities and taxpayers.
- We will be the highest value / most affordable higher education option.

In addition to meeting the College's local needs, the strategic priorities, goals, and action plans identified in RCTC's Master Academic Plan were also created to assist the Minnesota State system in meeting its Strategic Initiatives.

INSTITUTIONAL PROFILE

Mission:
Rochester Community and Technical College provides accessible, affordable, quality learning opportunities to serve a diverse and growing community.

Vision:
Rochester Community and Technical College will be a universal gateway to world class learning opportunities.

Value Proposition:
Improving Student Lives

College Values and Service Attributes:

- **Learner-Centered**: *Be approachable and attentive to students' and others' needs*
- **Excellence**: *Anticipate, create and recognize engaging experiences*
- **Respect**: *Demonstrate understanding and sensitivity when serving*
- **Teamwork**: *Collaborate and engage each other to better serve*
- **Innovation**: *Explore, empower and implement creative ideas to better serve*
- **Fun**: *Foster a pleasant, personable and enjoyable environment*

Core Outcomes:

- **Communication**: *Students will read, write, speak and listen professionally.*
- **Critical Thinking**: *Students will think systematically by integrating skills and using a variety of appropriate resources and methods.*
- **Global Awareness/Diversity**: *Students will demonstrate understanding of and respect for human diversity through their words and actions.*
- **Civic Responsibility**: *Students will understand larger social issues, demonstrate social responsibility, and contribute to positive community change through civic engagement.*
- **Personal and Professional Accountability**: *Students will take ultimate responsibility for achieving their education and personal goals.*
- **Aesthetic Response**: *Students will make and support personal judgments from an informed perspective.*

Established in 1915, Rochester Community and Technical College (RCTC) is the largest higher education provider in the fastest-growing city in Minnesota, serving more than 12,000 students per year; approximately 7,500 in credit courses and 4,500 in non-credit continuing and workforce education programs. RCTC combines the best in liberal arts, technical, and life-long learning with more than 70 credit-based programs and over 100 credential options.

RCTC's expansive 518-acre campus includes university partnerships, a diverse student body, and a vibrant student life program. RCTC provides a unique learning environment that offers the feel of a four-year university campus with the commitment to access and opportunity of a two-year college.

The College offers numerous services that support its diverse student population. RCTC has Student Health Services, Comprehensive Learning Center, Disability Support Services, Advising/Counseling Services, Multicultural Advising, Veteran's Advising, Veteran's Resource Center, International Advising, Sports Center, and TRIO. Student Life offers performing arts, sporting events, open gym, campus activities and multicultural events, a student newspaper and student leadership opportunities with 30+ student clubs and organizations. RCTC has 10 NJCAA athletic teams and extensive sports facilities.

RCTC is accredited by the Higher Learning Commission and participates in its Academic Quality Improvement Program (AQIP).

RCTC FACTS:

Enrollment: FY 2016

Unduplicated Annual Headcount: **12,060**
Unduplicated Credit Headcount: **7,515**
Unduplicated Hourly Student Headcount: **4,744**
Total (FYE) Full-year Equivalent: **3,948**
Percent Female: **60**
Percent Male: **40**
Percent Full-time: **40***
Percent Part-time: **60***

Demographics (FY 2016)

White/Caucasian:	**72%**
Black/African-American	**11%**
Hispanic:	**5%**
Asian:	**5%**
Two or More Races:	**3%**
Unknown:	**2%**

**Based on FYE*

MASTER ACADEMIC PLAN VISION AND GOALS:

RCTC's Master Academic Plan provides the roadmap to advance our institutional mission, vision, and values for the next three years and beyond. It will provide the foundation for intentional actions to ensure RCTC's academic programs and services meet the holistic needs of our students, workforce and community. It will provide data to inform decision-making processes for the development of RCTC's Comprehensive Facility Plan and Master Technology Plan.

The Master Academic Plan Goals are to:

1. Identify external and internal demands to create a portfolio of programs and services to meet current and future student, community, and business and industry needs.
2. Develop strategies to increase student learning and success. (IE: college level preparedness, persistence, retention and completion, assessment of student and program outcomes; developmental education and gateway courses)
3. Identify needs for the creation of a comprehensive faculty/staff professional development program.
4. Identify campus and instructional technology needs to develop a comprehensive instructional delivery plan that supports innovation and enhances student success.

MAP PROCESS:

Prior to the first meeting of the MAP Steering Committee, the Executive Vice President, Academic Affairs and the academic deans researched a variety of similar documents from colleges across the country. To begin the process, a draft of the MAP Outline and an Academic Area Planning Tool were created. The steering committee then took on the task of revising and ensuring the documents fit the needs of all areas involved. Through this review it was determined that a second planning tool should be created to meet the needs of the academic/student support areas.

The Academic Area Planning Tool was further revised with input from faculty. The goal was to ensure the tool was easy to understand, was parallel throughout, and had a focus on student learning which is aligned with the system and college mission statements. The final tool was shared with the campus community along with a video walk-though instructing faculty in how to complete the tool. Informational sessions were held to answer questions and give additional information about the tool.

The Academic Student Support Planning tool was developed to meet the diverse needs of the support areas by a subcommittee of the Steering Committee. The tool was developed in line with the Academic Area Planning Tool with similar sections and format. The data section of the tool allowed areas to provide and discuss any types of assessment of their area that they have developed. Meetings were held with leaders of MAP teams in the Student Support areas to answer questions and provide information about the tool.

To collect meaningful and relevant information at local levels across the institution, from the more than 70 different academic degree and discipline areas, and multiple academic support and student support services areas, nine primary reporting areas were created. Within those nine primary reporting areas, 55 program/discipline/service area clusters were created. Each of the 55 cluster areas submitted an Area MAP Report. Those Area MAP Reports were then consolidated into five Divisional Summaries. The five Divisional Summaries provided the data to create the Institutional Summary.

To ensure the creation of a successful and usable document, a five phase production timeline was created. The identified phases and timing for the creation of RCTC's Master academic plan were:

- Phase 1: Preplanning; September – October, 2015
- Phase 2: Plan Finalization and Soft Rollout; November – December, 2015
- Phase 3: Fall Kickoff and Area MAP Production; January – April, 2016
- Phase 4: Area MAP Production; May – August, 2016
- Phase 5: MAP Finalization and Submission; September – November, 2016

INSTITUTIONAL SUMMARY

The creation of RCTC's Master Academic Plan, chartered during the fall 2015 semester, was designed to collect and report multiple internal and external data points from departments across campus that contribute to the success of RCTC students. Following the Institution's Centennial year, the plan was designed to provide immediate direction for the College for the next three years and lead RCTC's long-term academic vision for the next 100 years.

The data-driven, evaluative design of the MAP is structured to provide the foundation for ongoing program evaluation and future program creation. Examining both internal and external factors that contribute to the growth or decline of academic programs and services best positions the institution to be able to forecast and respond to the community's needs. As a community and technical college founded to meet the needs of the community it serves, RCTC must continuously scan the environment in which it exists in order to be nimble and adapt to its ever-changing environment.

Pride Points:
RCTC has many points of pride for which it has been recognized and for which faculty and staff should be extremely proud. It is the contributions of the faculty and staff that has allowed the college to achieve these accolades. A sampling of RCTC pride points are identified below:

- As the largest provider of higher education in the Rochester region, and as the primary trainer and re-trainer of the local workforce, RCTC offers more than 70 credit-based programs and over 100 credential options, and a wide range of customized and continuing education opportunities.
- RCTC serves more than 12,000 unique students annually in both credit and noncredit offerings.
- RCTC offers more than 300 courses online.
- RCTC offers students learning opportunities from highly-educated, highly-qualified faculty, and award-winning faculty, locally and nationally recognized in their area of specialty.
- More than 45 RCTC faculty hold doctorate or terminal degrees in their field, and many hold nationally recognized industry credentials.
- RCTC offers joint programs with the Mayo School of Health Sciences.
- RCTC resides on a beautiful 518 acre campus, offering multiple co-curricular and extracurricular activities, and space for future expansion opportunities.
- RCTC's Omicron chapter of Phi Theta Kappa, charted in 1927, is one of the oldest PTK chapters in the country and is a recognized Five Star Chapter.
- RCTC has long-held, strong partnerships with the business community, secondary, and postsecondary educational providers.
- RCTC has a variety of highly-sophisticated, technology-enhanced classrooms and labs.
- RCTC maintains highly transferable programs and articulation agreements with colleges and universities both in and outside of Minnesota.

- The Goddard Library hosts a robust collection of resources that support undergraduate, graduate, and doctoral degree programs.
- Short term study abroad programs have provided students with global learning and service experiences in multiple countries.

Four-Year Enrollment Trend:
The following chart presents the four-year enrollment trend at both the division and institutional level. Similar to national and local economic and educational trends, RCTC has experienced a declining enrollment pattern over the past four years. The college experienced enrollment growth from 2008 through 2010. Since the peak of the recession in 2010, RCTC has experienced a continuous decline in enrollment. Efforts are underway to conduct comprehensive external environmental scans to determine current programmatic offerings alignment to educational and workforce needs, and to proactively plan for new offerings to meet forecasted labor market growth sectors.

Division	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	5-Year % Change
Career & Technical Education	908.00	910.06	892.47	855.23	793.77	-12.6%
Liberal Arts & General Education	2,366.63	2,340.37	2,185.93	2,142.17	2,053.83	-13.2%
Sciences & Health Professions	1,220.03	1,241.10	1,247.33	1,160.47	1,130.80	-7.3%
Institutional	4,494.67	4,491.53	4,325.73	4,157.86	3,978.40	-11.5%

Significant Internal Factors:
Mentioned above, RCTC has experienced declining enrollment over the last several years. Looking at enrollment factors of both recruitment and retention, the College has placed significant focus on enhancing services and processes to increase retention. In 2014, RCTC created the Strategic Enrollment Management Council (SEMC), a cross institutional council comprised of faculty, staff, administration, and students, to identify proactive measures to increase retention. In 2016, as part of an HLC Action Project, SEMC identified five high-risk student populations to place additional retention efforts.

As the demographic composition of the Rochester and surrounding community has changed, RCTC serves additional English language learners, and additional students not adequately prepared for college. To help this population be more successful, and as part of the college's retention strategy, additional efforts are underway to prepare these students to be successful in college level work.

With declining enrollment, fiscal resources, due to reduced tuition income, have also decreased. These reductions in revenue have impacted staffing levels and the institution's ability to invest as significantly in projects, facilities, and technology that would enhance the student learning environment. These reductions have also increased the demand and workload on faculty, staff, and administration. Additionally, the Minnesota state legislature decreased the amount colleges and universities can charge in tuition by 1% in fiscal year 2017. This decreased tuition revenue places additional financial burden on institutions. The challenge, therefore, is to maintain and increase the quality of education and services provided with fewer resources.

With many of the college's facilities being built in the 1960s, the age and condition of portions of campus no longer present as ideal learning conditions to meet the needs and expectations of today's students. RCTC was up for a $20 million state bonding project to begin in fiscal year 2017 that would replace and renovate some of the college's most out-of-date facilities and those most in need of improvement. The State was not able to come to agreement related to bonding during the legislative session, therefore the bonding bill was not passed. RCTC will continue its efforts to receive bonding in the next funding cycle.

Additionally, RCTC has experienced considerable change at the executive leadership level and in other key personnel positions during the past five years. During these times of change, focus and follow through on critical institutional projects wavered. Where previously key initiatives were created by and housed out of a single administrator's office, now key initiatives are being created and co-chaired by faculty, staff, and administration so that if a member of the executive leadership team departs the institution forward movement on initiatives can continue.

Significant External Factors:
The City of Rochester and the regional economy is heavily influenced by the health and well-being of the Mayo Clinic, with its home office located in downtown Rochester. A world-renowned provider of healthcare services, the Mayo Clinic has embarked on a *"20 year economic development initiative to position Rochester, Minnesota as the world's premier destination for health and wellness.*" This nearly $7 billion project, called Destination Medical Center (DMC), *"represents the largest economic development initiative in Minnesota and one of the largest in the United States.*" The combined synergies of private investment, city, and state investment is anticipated to significantly grow the overall population of Rochester, and add more than 30,000 jobs to the local economy over the next 20 years. (http://dmc.mn)

In alignment with the growth projected in DMC, which focuses on the Rochester downtown environment, the eight county region adjacent to Rochester has created an economic development plan entitled Journey to Growth (J2G). This five-year plan is focused to grow the economic viability of the region *"beyond healthcare by focusing resources on other growth sectors, leveraging existing regional assets, and developing the regional talent base."* (http://j2gmn.com) The eight counties included in the J2G initiative include: Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Steele, Wabasha, and Winona. The J2G initiative targets six industry sectors. Those sectors are: Advanced Healthcare, Computer Systems Design and Production, Food Manufacturing and Processing, Tourism, and Transportation Equipment. As Rochester Community and Technical College directly serves the Southeast Minnesota region, the College needs to remain diligent to meet the needs of the region.

In addition to the significant economic development initiatives currently in place for the city of Rochester, and the surrounding region, Rochester, Minnesota has been named the Number One best midsized city to live in the United States for 2016 by Livability.com. Rochester ranked number two in 2015 and number seven and 2014. In 2016, Forbes magazine also named Rochester number 59 in its list for best small places for businesses and careers.

These, and other factors, have placed a high demand on the local workforce. According to Minnesota Department of Employment and Economic Development data, July 2016, the unemployment rate for Olmsted County was 3.0%. The unemployment rate for the City of Rochester was 2.7%. When calculating, and removing, individuals determined as unemployable, the effective unemployment rate for the city of Rochester remains at less than 1%. Local advertisements promoting starting pay for entry-level positions at grocery stores, home improvement stores, and fast food restaurants is $16 – $17 per hour.

While the above growth provides tremendous long-term opportunities for the city and region, the same growth, demand on the local workforce, and high starting salaries introduces additional challenges for institutions of higher education. As history has proven, college enrollments are reverse cyclical to the local economy. With the recent growth of the local economy, the college is experiencing a somewhat expected decline in enrollment.

The following table presents data on High Demand/High Pay Occupations for Southeast Minnesota (2012-2022)

Occupation	Estimated Employment 2012	Percent Change 2012 - 2022	2012 - 2022 Total Openings	Median Annual Salary 2016
Total, All Occupations	262,725	6.40%	80,880	$36,964
Registered Nurses	10,186	21%	4,120	$60,870
Licensed Practical and Licensed Vocational Nurses	1,813	20.60%	810	$42,405
Carpenters	1,941	22.80%	680	$40,596
Accountants and Auditors	1,581	1.50%	490	$57,379
Electricians	923	19.40%	350	$61,383
Plumbers, Pipefitters, and Steamfitters	930	24.30%	350	$67,318
Machinists	992	11.20%	340	$41,594
Industrial Machinery Mechanics	711	17.90%	330	$45,050
Medical and Health Services Managers	678	20.80%	300	$102,909
Sales Representatives, Services, All Other	738	11.20%	280	$57,442
Welders, Cutters, Solderers, and Brazers	821	8.40%	270	$41,291
Police and Sheriff's Patrol Officers	784	-4.10%	250	$54,353
Radiologic Technologists	587	25.90%	230	$67,480
Medical Records and Health Information Technicians	434	23.30%	220	$47,814
Medical Assistants	581	19.40%	220	$37,516
First-Line Supervisors of Mechanics, Installers	708	3.80%	220	$60,840
Postal Service Mail Carriers	617	-23.30%	220	$55,584

Medical and Clinical Laboratory Technicians	376	29.80%	210	$44,397
Pharmacists	613	10.30%	210	$131,812
Physical Therapists	401	24.20%	200	$82,957
Medical Equipment Repairers	285	40%	190	$73,910
Physician Assistants	298	42.60%	180	$115,282
Computer Occupations, All Other	556	16.50%	180	$65,154
Community and Social Service Specialists, All Other	480	12.50%	180	$39,938
Dental Hygienists	425	13.60%	170	$70,194
Food Batchmakers	405	5.20%	150	$41,077
Heating, Air Conditioning, and Refrigeration Mechanic	343	15.50%	140	$49,821
Clinical, Counseling, and School Psychologists	360	11.10%	140	$75,269
Cost Estimators	265	18.90%	130	$54,632
Computer Systems Analysts	377	18.30%	130	$72,013
Police, Fire, and Ambulance Dispatchers	299	15.10%	130	$46,292
First-Line Supervisors of Housekeeping and Janitor	358	8.40%	120	$39,936
Computer Network Architects	388	15.70%	120	$106,157
Graphic Designers	372	5.10%	120	$39,661
Life Scientists, All Other	269	19.70%	110	$52,384
Respiratory Therapists	279	25.40%	110	$69,080
Payroll and Timekeeping Clerks	320	10.90%	110	$42,311
Dispatchers, Except Police, Fire, and Ambulance	288	5.60%	100	$45,359

Minnesota Department of Employment and Economic Development Employment Outlook: June, 2016

Reviewing the data presented in the Minnesota Department of Employment and Economic Development (MNDEED) *High Demand/High Pay Occupations* chart and other MNDEED sources, it is evident that a majority of the future occupational needs of the region encompass healthcare professions and supporting services to a region heavily based on the growth of the healthcare sector. RCTC and its programming must remain cognizant of the region’s forecasted growth patterns in the identified sectors in order to be proactive in maintaining an educational portfolio of programs and services that meet the community’s needs.

MAP Themes:

In creating the five Divisional Summary Reports, the Deans from the respective areas carefully examined and evaluated the information and data provided in each Area MAP Report. This information was used to create the Division Summary Reports for the creation of short- and long-term Overarching Division Goals and the Deans' Strategic Priorities. Information provided in Area MAP Reports also provided important information that confirmed the need to examine the current structure within academic affairs to better align programs and services to meet the needs of faculty, staff, and students, and to create a functional structure that would fill identified voids that have occurred within the institution over the last several years.

Examples of such voids include: re-implementing an institutional professional development structure for faculty and staff to help them be more successful in their areas of responsibility, reinstituting and providing institutional support for a campus-wide Assessment of Student Learning committee and an Institutional Assessment Plan, reforming and providing institutional support for an Institutional Quality Council, re-engaging and providing institutional support for an Online Learning and Educational Technology structure and plan, and other critical areas that will promote greater student success.

The outcome of this analysis resulted in the reshaping of the assignments and responsibilities of the existing four academic deans.

The previous structure for the academic deans was as follows:

- Dean of Health Sciences
- Dean of Career and Technical Education
- Two Deans of Liberal Arts and General Education

With the realignment of academic programs/disciplines into a more functional configuration and creating a new formal structure to support areas of need not previously addressed, the new academic structure is as follows:

- Dean of Sciences and Health Professions
- Dean of Career and Technical Education and Business Partnerships
- Dean of Liberal Arts and General Education
- Dean of Academic Effectiveness and Innovation

Organizational Charts for the new Academic Affairs structure is provided in Appendix A.

Additional reoccurring themes were identified in the individual Area MAP Reports. Those themes fell into seven overarching categories. Within those categories, 59 key strategic priorities emerged.

I. **Increase opportunities to enhance student success.**
   a. Provide additional tutoring services; in the physical classroom, in structured tutoring environments (such as: Comprehensive Learning Center, Goddard Library, and informal learning environments), and in online class and resource rooms.
   b. Adopt and implement an English language proficiency placement exam and courses to support the growing number of English language learners.
   c. Partner with four-year institutions of higher education, business and industry, and civic organizations to expand tutoring services.
   d. Research and implement academic planning models aligned to "meta-majors".
   e. Enhance and expand articulation agreements with four-year partners to create seamless academic pathways for transfer students.
   f. Fully engage and promote the new Minnesota State Transfer Pathways Curricula.
   g. Conduct needs analysis to identify best times to offer general education courses that align with the needs of students seeking degrees in program areas.
   h. Expand course/program offerings to include flexibility in time/location/delivery options, including experiential learning such as internships, credit for prior learning, online and flipped classrooms, and cohort/learning communities.
   i. Expand practice of program orientations and/or application processes to create 'early and often' student engagement opportunities.
   j. Leverage faculty involvement in academic advising.
   k. Leverage relationships with the co-located Workforce Center and/or other strategic partners to provide enhanced career services for RCTC students.
   l. Grow and expand cultural learning opportunities through International Study Abroad.
   m. Expand services for online tutoring, advising, and counseling.
   n. Increase retention activities and services for targeted student populations.
   o. Develop mentoring program for students identified at risk.

II. **Enhance teaching effectiveness and promote continuous quality improvement.**
   a. Finalize the creation of the Institutional Assessment Plan and create formal assessment plans for all academic programs, disciplines, and academic/support services.
   b. Acquire assessment tracking software to input, track, and report assessment plans, activities, and progress for all academic programs, disciplines, and academic/student support services.
   c. Explore the use of interdisciplinary instruction to provide greater real-life scenarios.
   d. Create greater consistency across curriculums, with foundational information necessary in the online learning platform.

e. Revise the faculty evaluation process to include teaching effectiveness measures and student learning assessment.
f. Review and revise general education and developmental education curricular inventory.
g. Establish and implement the RCTC Institutional Quality Council to promote continuous quality improvement.
h. Develop an Online Strategic Plan that incorporates multiple forms of learning technologies and addresses: student success, professional development needs, instructional expectations, and necessary infrastructure.
i. Create a process for faculty to explore e-learning technologies and a structure for technology adoption and support.

III. Create state-of-the-art teaching and learning environments.

a. Provide students high-quality and up-to-date learning environments.
b. Renovate and furnish general classrooms with current, state-of-the-art, instructional technology that meets the needs of 'standard' classroom delivery modes, while promoting active-engaged student learning.
c. Renovate and furnish specialized classrooms with current, state-of-the-art, instructional technology that meets the custom needs of programs requiring additional technological infrastructure.
d. Introduce additional simulation equipment and environments into the learning arena.
e. Renovate and create flexible, high-engagement, high-impact classrooms that promote active-engaged student learning.
f. Renovate, redesign, and build learning environments that replicate real-world work environments.
g. Implement best practices for creating inviting and comfortable learning environments that enhance student learning.

IV. Align curricular portfolio to meet the educational, economic, and workforce needs of the community we serve.

a. Establish active advisory committees for all RCTC programs and disciplines.
b. Update curriculum development and review process to include examination and measurement of curricular proposals' alignment with economic and workforce needs.
c. Conduct regular comprehensive reviews of program viability, based on labor market information, to ensure curricular alignment with educational and workforce demands.
d. Develop Liberal Arts focus areas to assist students in their academic planning processes, and for better alignment with four-year transfer opportunities.
e. Obtain additional program accreditations and industry certification opportunities for students.
f. Develop program offerings to meet the high-demand of a growing Information Technology (IT) workforce.
g. Rebrand the Automotive Mechanic Technology and Building Utility programs for better alignment with job titles in high-demand occupations.

h. Expand programming in Building Maintenance and Repair to meet new skill requirements, including alternative energy management.
i. Develop new programming to meet the high-demand, high-growth occupations including hospitality and construction management.
j. Conduct further needs analysis to assess demand for possible liberal arts degree in the performing arts.

V. **Expand private partnerships and create innovative business/industry alignments to generate greater synergies and alternative funding sources.**
   a. Create win-win partnership models to increase opportunities for private business and industry to become more involved with the buildout and enhancement of class and lab environments.
   b. Construct a simulation house for law enforcement skills training to be jointly used by partners of the Regional Public Safety Training Center.
   c. Explore opportunities to retain a shared grant writer with Rochester Public Schools, other local school districts, or sister Minnesota State institutions.
   d. Expand opportunities to promote and attract students for RCTC/Mayo joint programs.
   e. Explore opportunities to create additional RCTC/Mayo joint programs.
   f. Explore feasibility of shared instructional spaces.
   g. Explore partnerships with community organizations to attract and retain diverse students.

VI. **Create a structure and support mechanisms to provide comprehensive faculty and staff professional development opportunities.**
   a. Create a year-round schedule and infrastructure to develop, promote, and deliver faculty and staff professional development.
   b. Develop an on boarding structure and process for new faculty and staff.
   c. Improve opportunities for faculty and staff to engage in meaningful professional development activities, on and off-campus.
   d. Create topic specific professional development opportunities related to curricular planning, mapping, assessment, and student learning outcome measurement.
   e. Develop a process and structure to pilot new and emerging instructional technologies and pedagogy.
   f. Increase collaborative efforts in programming related to diversity and civility.
   g. Create and deliver professional development related to the needs and challenges of RCTC targeted and at risk student populations.
   h. Create and deliver professional development opportunities related to civility.

VII. **Expand community outreach, communication, and marketing efforts and opportunities.**
   a. Increase outreach and communication to prospective traditional and adult learner populations.
   b. Communicate the value and grow Concurrent Enrollment and Postsecondary Enrollment Option programs.
   c. Develop a “cluster-based" program and discipline marketing strategy.

Divisional Summaries and Individual Area MAPs:
The five Divisional Summary Reports (Liberal Arts and General Education, Sciences and Health Professions, Career and Technical Education and Business Partnerships, Academic Effectiveness and Innovation, and Student Support Services) that follow, and the individual Area MAPs located in RCTC's SharePoint **here**, provide greater detail as to the current status, goals and aspirations of each area. In total, 55 individual Area MAPs were created that provided the data and information necessary to create the Divisional and Institutional Summaries.

To help guide the creation of the individual Area MAPs, the steering committee created a nine-step template for departments to follow, however areas were allowed flexibility to somewhat vary from the template to ensure the reports were meaningful locally and provided an appropriate fit for services provided in each area. A full listing of all programs/disciplines/departments reported on in the Area MAPs is included in the Master Academic Plan Outline provided in Appendix B.

The template had nine reporting areas:

- Mission
- Vision
- Pride Points and Long-Range Aspirations
- Internal Data Scans
- External Factors
- Current Outcomes and Assessment
- Specific Goals
- Resource Needs
- Action Plan

LIBERAL ARTS AND GENERAL EDUCATION

Programs:

Associate of Art: Liberal Arts

Associate of Fine Art:

- *Art + Design: Art*
- *Music Studies*
- *Music Creative Technology*

Associate of Science

- *Computer Information Systems*
- *Computer Science*
- *Graphic Design*
- *Individualized Studies*
- *Web Design*

Certificate:

- *Communication Studies*
- *Computer Programming Skills*
- *Dance*
- *Digital Art*
- *Mobile Applications Development*
- *Motion Graphics*
- *Music Technology*
- *Photography*

Disciplines:

- *Anthropology*
- *Art*
- *Communication*
- *Computer Science*
- *Dance*
- *English*
- *History*
- *Humanities*
- *Mass Communication*
- *Mathematics*
- *Music*
- *Philosophy*
- *Psychology*
- *Sociology*
- *Theatre*
- *World Languages*

MAP Division Summary: *Liberal Arts and General Education*

Introduction:

The Liberal Arts and General Education division (the division) offers programming including an Associate of Art in Liberal Arts. The Association of American Colleges & Universities (AACU) defines liberal education as follows:

> *Liberal Education is an approach to learning that empowers individuals and prepares them to deal with complexity, diversity, and change. It provides students with broad knowledge of the wider world (e.g. science, culture, and society) as well as in-depth study in a specific area of interest. A liberal education helps students develop a sense of social responsibility, as well as strong and transferable intellectual and practical skills such as communication, analytical and problem-solving skills, and a demonstrated ability to apply knowledge and skills in real-world settings. (https://www.aacu.org/leap/what-is-a-liberal-education)*

In addition, the Division offers eight associate degree programs and eight certificate programs in disciplines including computer science, music technology, and art & design. The division also oversees the institution's general education courses in the areas of English, math, humanities, and social science. With over 120 highly qualified faculty members, the division provides required, recommended, and elective general education courses to over 70 programs college-wide.

The division is committed to high quality programming, excellence in instruction, and student retention, persistence, and success. The division primarily focuses on transfer programming, workplace skills development, and the transferability of general education courses. The Division also oversees the disciplines responsible for developmental education: Reading, English, and Math. In 2015, the following enrollments in developmental classes were reported with the following success rates (success defined as A, B, or C grades).

English:	635 enrollments	64.69% success
Math:	1310 enrollments	61.41% success
Reading:	508 enrollments	63.50% success

The English, Math, and Reading department MAPs all address developmental education with plans to employ several strategies such as communication with program faculty, instructor led study sessions, and bundling READ, ENGL, and MATH courses in the academic schedule to increase student success.

In academic year 2015-2016, the departments wrote Master Academic Plan (MAP) documents resulting in several emerging goals that are discussed in this document, such as examine program effectiveness, develop Liberal Arts emphases and explore new programming that can lead to jobs in demand. Per the computer science MAP, jobs are outnumbering skilled workers and colleges are not keeping up with the demand.

Programs/Disciplines/Services:
The Liberal Arts division includes the programs and disciplines shown in the table below. In addition, the division oversees specialized programming such as: A.S. Individualized Studies, First Year Experience, and Study Skills. In addition, the division oversees specialized programming such as: A.S. Individualized Studies, First Year Experience, and Study Skills.

Programs:	**Disciplines:**
Associate of Art: Liberal Arts Associate of Fine Art: Art + Design: Art Music Studies Music Creative Technology Associate of Science Computer Information Systems Computer Science Graphic Design Individualized Studies Web Design Certificate: Communication Studies Computer Programming Skills Dance Digital Art Mobile Applications Development Motion Graphics Music Technology Photography	Anthropology Art Communication Computer Science Dance English History Humanities Mass Communication Mathematics Music Philosophy Psychology Sociology Theatre World Languages

Mission/Purpose:
The Division of Liberal Arts and General Education provides programming that leads to a strong liberal education preparing students for transfer to four-year institutions and develops valuable skills for the workplace that prepares students to compete in a global economy. The division's general education courses serve institutional program requirements that meet Minnesota Transfer Course goal areas and broaden student awareness of the world and themselves.

Pride Points:
The Liberal Arts and General Education faculty and staff have contributed their expertise internally, regionally, statewide, and nationally in curriculum development, programming, discipline specific publications and exhibitions, and services. The faculty included in the division programs and general education disciplines are proud to offer the following accomplishments:

- Highly qualified and award winning faculty who are recognized for their contributions, publications, and exhibits locally and nationally;
- Transferable programs to four-year institutions inside and outside of the Minnesota State system;
- Programming that develops skills for the workplace, such as computer science and workplace communication, with plans to expand offerings based on industry needs;
- Short term study abroad programs that have seen hundreds of RCTC students gain global awareness and service learning experiences;
- Collaborations with program faculty to develop and deliver MnTC general education for programs through required, recommended, or elective courses;
- Collaborations with other areas of the college, such as student life, admissions, and advising;
- Leadership and collaboration on a retention and engagement project to address the needs of student athletes;
- Identification of curriculum and teaching strategies that address low reading and writing skills and students with limited English language proficiency; and
- Hosted regional and statewide professional development in English and Reading from grant funded opportunities.

The contributions and accomplishments of the faculty are much more numerous than this list can provide. Thanks to the hard work of the departments, programs and courses provide depth and breadth of learning leading to a quality foundational education. Courses also fulfill valuable general education requirements for programs institution-wide, and students gain knowledge and skills in areas including global and cultural awareness; personal and professional ethics; logical reasoning, data analysis and evaluation for problem solving; various forms of communication; research; critical and creative thinking; and technology to embrace a changing world. Courses are delivered as online, hybrid, and on-campus offering various teaching strategies such as flipped classrooms, group activities, as well as through hands-on experiences in computer labs and studios. Faculty work with four-year institutions and Minnesota State transfer pathways to ensure transferability of courses and programs.

Significant Internal Factors:
Every RCTC degree program includes general education courses that satisfy Minnesota Transfer (MnTC) requirements based on ten core goal areas (*see: http://www.mntransfer.org/students/plan/s_mntc.php*). Though some courses are required by programs, such as ENGL 1117 Reading and Writing I, other courses are recommended to satisfy specific program curricular needs. To better understand student performance in general education courses, the Academic Affairs Standards Councils (AASC) conducted a study of ten gateway courses, which examined over 18,000 enrollments. Results show that 74.88% of students are successfully completing the general education gateway courses with an A, B, or C grade. While the college celebrates the success of these students, it is responding to the 25.12% of students, who are not succeeding by examining expanded services in academic support, conducting studies to determine retention issues and student needs, and identifying professional development needs of faculty in working with a diverse student demographic.

The Division is examining additional factors that affect general education disciplines. A minimum 60-credit limit on programming offers limited exploration of general education courses for interest or skills building. For example, language classes are not required by any RCTC programs, which resulted in scheduling challenges. Unable to run intermediate or advanced languages classes resulted in a faculty layoff and graduates with little to no language experiences. Creative problem solving of this issue has resulted in positive efforts that focus on providing bilingual learning opportunities for students, such as the development of Liberal Arts emphases in Spanish, French, and Arabic.

Additional internal factors that impact programming of general education courses include:

- Programs dependent on updated technology,
- Classrooms and labs need to be redesigned for optimal learning environments,
- Need for tutoring in online courses,
- English language proficiency placement testing,
- Communication with programs on general education requirements,
- Gateway course analysis next steps (direction, compensation),
- Address policy and planning conflicts in establishing program advisory boards, and
- Developing new programming to meet workforce demands in computers/IT.

In the last year, faculty participated in a developmental education workgroup that included math for the first time. The workgroup studied important topics including placement testing, academic support, and students with English language barriers. Results from the work of this group include the approval of a halftime CLA position dedicated to academic support for low skilled readers and English language learners. In addition, plans to propose a new accelerated reading curriculum for READ 0800 are in place for this fall. The new curriculum will expand credits, embed learning outcomes from READ 0900 and prepare students, through an immersion learning environment, for ENGL 1117.

Three-Year Enrollment Trend:
Three-year enrollment trend data, reported in Full Year Equivalents (FYE) is provided in the following table. One FYE is equal to 30 credit hours.

FYE Comparisons 2012 to 2015*

Student FYE: Total Credits/30						
Program/ Discipline	2011-12	2012-13	2013-14	2014-15	2015-16 (To date)	% change
Arabic	2.53	4.80	2.13	0.13	2	-20.95%
Art	162.03	152.90	156.57	170.13	155.27	-4.17%
American Sign Language	6.70	8.70	8.70	7.80	5.9	-11.94%
Anthropology	13.30	10.90	8.90	4.90	2	-84.96%
Communication Studies	115.80	110.27	127.33	139.13	126.7	9.41%
Computer Science	32.77	36.67	33.27	32.47	36.33	10.86%
Dance	13.40	14.70	7.60	10.20	11.2	-16.42%

English	545.13	495.50	478.73	485.70	461.07	-15.42%
First Year Experience	19.57	16.30	15.00	13.47	9.23	-52.84%
French	9.77	5.73	6.40	7.60	7.93	-18.83%
Geography	15.50	20.80	17.20	19.70	17.8	14.84%
History	83.20	83.10	81.80	81.30	79.3	-4.69%
Humanities	56.73	42.47	36.33	37.93	35.13	-38.08%
Mass Communications	32.43	36.60	29.60	27.57	21.57	-33.49%
Math	467.87	461.43	429.10	365.37	346.27	-25.99%
Music	69.80	78.10	67.17	62.77	69.6	-0.29%
Philosophy	104.50	104.00	80.70	98.80	106.3	1.72%
Political Science	33.00	38.20	35.70	36.90	36.2	9.70%
Psychology	184.77	224.63	218.97	227.30	234.9	27.13%
Reading	104.07	104.60	88.50	76.47	60.13	-42.22%
SOC	144.60	147.80	126.60	126.80	125.2	-13.42%
Spanish	25.21	26.39	25.93	21.42	17.17	-31.89%
Study Skills	4.20	4.67	3.40	5.63	7.47	77.86%
Theatre		16.30	14.70	13.50	12.1	-25.77%

**Student FYE: Total Credits/30*

Significant External Factors:

The Liberal Arts disciplines, at the two-year level are not typically categorized as high-demand, high-growth job areas and are often classified by the Bureau of labor Statistics as "below average" industry demand. Instead, they are disciplines that offer courses or programs designed for transfer to 4-year institutions. Faculty work to ensure the transferability of courses to create seamless pathways for students, saving them time and money. The Liberal Arts disciplines provide paths to careers through continued education as well as provide the unique skills gained from a liberal arts education that develop soft-skills and abilities needed and valued in the workplace. These skills, such as writing, problem solving, communication, critical thinking, analyzing and evaluating, are highly sought after by all sectors of the business and industry community. For example, the communication department's MAP reports that "Minnesota employers are looking for, but not finding, communication training in the following areas: interpersonal communication skills, team/group communication skills, conflict management skills, presentation skills, and interviewing skills (*source: http://www.iseek.org/careers/workforce*).

Additionally, the division programs in music creative technology, art & design, and computer science. The Minnesota Employment and Economic Development website (*source: https://mn.gov/deed/data/data-tools/oid/*) shows high demand in areas such as health, energy, manufacturing, data centers, computers and banking. As the division does include programming that can lead to jobs at the associate degree level, or transferability into bachelor degrees that can lead to jobs, the following table provides a sample of current and projected Minnesota jobs that satisfy areas within the division.

The following table shows employment data in the areas of Art, Music, and Computers (*source: DEED's Employment Outlook Data Tool).*

Art, Music, and Computer Employment

Job Title	2012 Employment	Projected 2022 Employment	Percent Change	Replacement Openings	Total Openings	Median Wage
Minnesota - Art						
Craft Artists	96	98	2.1%	20	20	$22.39
Fine Artists	192	193	.5%	50	50	$25.75
Multimedia Artists and Animators	959	986	2.8%	230	260	$31.52
Commercial and Industrial Designers	653	661	1.2%	170	2180	$29.10
Graphic Designers	6,596	6,725	2.0%	1,740	1,870	$23.61
Set and Exhibit Designers	266	273	2.6%	70	80	$26.58
Southeast Minnesota - Art						
Multimedia Artists and Animators	71	70	-1.4%	20	20	$33.81
Commercial and Industrial Designers	38	35	-7.9%	10	10	$32.84
Graphic Designers	372	391	5.1%	100	120	$20.31
Minnesota - Computer						
Computer and Information Systems Mgrs	9,852	10,491	9.5%	1,330	2,240	$59.19
Computer and Information Research Scientists	320	363	13.4%	50	90	$58.98
Computer Systems Analysts	13,085	15,312	17.0%	2,060	4,290	$41.36
Database Administrator	2.560	2.858	11.6%	480	780	$43.94
Network and Computer Systems Administrator	8,683	9,054	4.3%	1,360	1,730	$37.42
Computer Network Architects	3,748	3,977	6.1%	590	820	$45.88
Computer Occupations All Other	7,260	7,949	9,5%	1,140	1,830	$35.38
Southeast Minnesota - Computer						

Computer and Information Systems Mgrs	630	668	6.0%	90	130	$56.71
Computer Systems Analysts	377	446	18.3%	60	130	$30.92
Database Administrator	129	142	10.1%	20	30	$41.46
Network and Computer Systems Administrator	511	578	13.1%	80	150	$34.14
Computer Network Architects	388	449	15.7%	60	120	$49.55
Computer Occupations All Other	556	648	16.5%	92	180	$31.65
Minnesota – Music						
Music Directors/ Composers	1,718	1,767	2.9%	460	510	$23.32
Musicians and Singers	3,452	3,505	1.5%	930	980	$18.34
Performers, etc.	353	365	3.4%	40	50	$11.16
Southeast Minnesota - Music						
Music Directors/ Composers	176	175	-.06%	50	50	$21.81

Due to high employment demand projections, the computer science MAP includes a plan to examine industry needs in IT fields, such as networking. The Minnesota Department of Employment and Economic Development (DEED) reports thousands of projected job vacancies in areas such as networking, computer support specialists, computer systems analysts, and more.

The performing arts MAP reports plans to administer surveys to the internal and external community to learn how theatre and dance can serve the planned Rochester expansion. With projected expansion projected for the region, dance studios and academies may be able to meet needs of families to teach children interpersonal skills, collaboration, and wellness, while the theatre department seeks to determine how acting training and role-playing can be useful for training health, education, and service professionals.

Curriculum Relevance to Meet Community Needs:
As previously mentioned, the performing arts (theatre and dance) and computer science MAPs have indicated plans to conduct a needs assessment in business and industry for their respective disciplines. Results will assist the division and college in determining next steps for programming in these areas.

The RCTC academic programs and Minnesota State System 4-year institutions are two other communities that the division serves by providing and scheduling needed MnTC goal general education courses. Departments within the division have plans to align curriculum for transfer through the Minnesota State System Transfer Pathways or through individual articulation agreements. Computer science currently works annually with Winona State University (WSU) to examine their articulation agreement and the math department recently worked with WSU to ensure course needs for math were met in the WSU Teacher Education program. The philosophy department works closely with health programs for Bioethics in meeting the needs of MnTC Goal 4 in the Logic course.

The English MAP reports plans to review literature and humanities course curriculum for transferability. The department also works closely with READ and MATH courses to create bundled courses for students, who need additional class time prior to becoming college ready.

Program/Course Delivery Trends:
The Division is exploring the placement of students in developmental education classes. Anecdotal information from faculty suggests that some students may be placed into classes beyond their skill level. To better understand this phenomena, the Division is planning on conducting a study in the fall 2016 semester that examines Accuplacer and ACT scores, and if students signed placement score waivers in random first-semester classes. Results can guide a collaboration between academic and student affairs and even policy for placing incoming students.

Currently, the Liberal Arts program includes approximately 1,300 matriculated students. However, the program has challenges that prohibit dedicated focus to student success. For example, the division currently is unable to identify the interests of the students, track their progress, develop faculty/student relationships based on disciplines, or have a vehicle to establish faculty mentoring/advising discipline specific needs. To meet these concerns, the departments have expressed interest in developing Liberal Arts emphases as well as participate in the Minnesota State Transfer Path initiative, which will:

- Identify majors in a given discipline
- Provide opportunities for departments to develop and market specific 4- and 6-semester program plans
- Provide a means for faculty and students to intentionally discuss discipline related careers and pathways to further their education
- Provide data for 4-year institutions when developing articulation agreements
- Provide departments with student plans to help ensure the retention, persistence, and completion of their program students through advising
- Provide data for scheduling needs of 1,300 students

Currently, departments report assessing class fill rates to determine ideal course scheduling. The division is taking additional measures by conducting outreach to programs college-wide to identify best times to offer general education courses that satisfy program needs. For first year program students, the division plans to develop tutor embedded classes (librarians or tutors) to work with faculty, particularly within online courses. While departments have identified their delivery through online, hybrid, and on-campus, faculty have also identified assessment on delivery effectiveness is needed.

In addition, a growing international student demographic has become a focus and instructors have reported as much as 15% of their class being filled with students who may have limited English proficiency. The division has responded by exploring an English proficiency placement exam and developing cohort based classes for English language learners at the developmental level, as well as funding a half-time tutor position to focus on low level readers and English language learners.

The College supports D2L Brightspace as a learning management system to deliver online and the online portion of hybrid classes, as well as enhance classroom courses. Though it is not known how faculty use D2L to enhance their on-campus classes, a recent study on gateway courses showed that 85% of the faculty use D2L to communicate grades to students. Faculty reports that new students require a transition period to become comfortable with D2L but are able to use the platform with skill as they progress in their program. The college recognizes that consistency in offering foundational information in D2L shells that support on-campus courses is needed institution-wide (syllabus, schedule of assignments and assessment, contact information, etc.).

Assessment Accomplishments/Opportunities/Needs:
The College has experienced changes in leadership at the administrative level and also in college committees during the last three years. This change has disrupt the assessment process, resulting in a lack of consistency of assessment practices across the division. The creation of an institutional assessment plan, and the acquisition of a platform to input and track assessment initiatives and results will provide needed resources to generate greater faculty involvement.

The following table provides an overview of various assessment tools currently being used in departments:

Assessment Accomplishments

Assessment Tool	Courses Assessed	Outcome level (Course, Program, Institutional)
PLACEMENT TEST SCORES		
Accuplacer Placement Test	All MATH courses	Institutional
PRE- and POST TESTS		
Pre and Post	MATH 0093	Course
Pre and Post	Theatre Appreciation	Course

RUBRICS (various)		
Core Outcome Rubrics (critical thinking and Communication)	MATH 2350, MATH 2208, MATH 1111, MATH 0098, MATH 1115	Course, Institutional
ASL Responsive Rubrics	ENGL 1118	Course
Rubrics (unspecified)	MUSC-1601, MUSC-1602, MUSC-1621, MUSC-1622	Course and Program
Communication Rubric	COMM 1114	Institutional Level
RCTC Computer Science Assessment Rubrics	COMP2243 and COMP2247	Course and Program
Paper Rubrics	All except PHIL 1145	Course
Discussion Board Grading Rubrics	PHIL Online sections	Course
PORTFOLIOS		
Portfolio Development	MUSC-1002, MUSC-1003, MUSC -1005,	Course
Portfolio Development	MUSC-1601, MUSC-1602, MUSC-1621, MUSC-1622	Course and Program
Portfolio (ART)	ART Portfolio	Program
SUMMATIVE TESTS (MID & FINAL)		
End of semester and Midterm Student Self-Assessments	All PHIL sections	Course
Midterm and Final	MATH 0990/1090 Statway	Course
POWER OF ONE		
Power of One Assessment Tool – specifically, organizational strategies that appropriate to topic, audience, occasion and purpose within an intro/body/conclusion	Fundamentals of Public Speaking, COMM 1114	Program Level
COMPARISON STUDY		
Comparison Study	MATH 0099 (flipped vs. trad.)	Course
VARIETY OF COURSE & PROGRAM LEVEL ASSESSMENT		
PRCA-24 (Personal Report of Communication Apprehension)	COMM 1114, 1130, 2130, 2100	Program Level
Calibrated information speech assignment	COMM 1114	Program Level
Intercultural Competent Communicator	COMM 2100	Program Level

Various assessment tools	All ART courses	Course
Dance uses project-based learning, competency-based instruction, collaborative learning	All	Course
Aplia Homework System	PHIL 1145	Course
Quizzes and Exams	All PHIL sections	Course

Overarching Division Goals:
The department MAP goals suggest several emerging themes that will drive the division goals for the coming years. In addition, organization of the new Liberal Arts and General Education division at the division and department level is crucial. Goals for the division include:

- Develop emphases in Liberal Arts disciplines;
- Establish advisory boards for all programs;
- Continue to study and address the needs of the college's growing ELL population;
- Review and revise general education and developmental education curriculum inventory;
- Create a database to document institutional program general education needs,
- Collect data on classroom learning environment needs to provide input for Facilities Master Plan;
- Collaborate with IT to communicate program technology needs;
- Participate in system Seamless Transfer and develop articulation agreements; and
- Explore new program opportunities in computer technology fields.

Dean's Strategic Priorities and Resources Needed to Achieve Division Goals: The following division goals are driven by department MAP documents, the college's strategic plan, and academic affairs goals.

Area	Goal/Alignment	Action Step	Outcome	Resources
English, Philosophy, Psychology, Sociology, History, Math, Spanish, French, Arabic, Theatre, Dance	Assist 3 to 5 Liberal Arts departments with proposals to establish a Liberal Arts emphasis in a discipline. (Strategic Plan: P1: 1.2, 1.3)	**Year 1** * Develop proposals with identification of a 4-yr institution for an articulations agreement, develop a 4- and 6-semester education completion plan and identify steps to establish an advisory board. **Year 2** *Approve proposals, secure articulation agreements **Year 3** *Matriculate students and schedule according to emphasis plan per semester.	*Identified pathways for Liberal Arts students in specific disciplines; *Faculty advising model; and *Articulation agreements with 4-year institutions in specific Liberal Arts disciplines. *Advisory boards	*Faculty release to develop emphasis *Develop promotional materials *Develop a social media campaign
General	*Conduct outreach	**Year 1**	*Schedules and	*At least one credit

Education Disciplines	to collect data on at least two program area (e.g. health, business, career & technical education) general education scheduling and course offering needs per semester. (Strategic Plan: P1: 1.2, 1.3	*Conduct outreach to program faculty to document program general education needs **Year 2** *Adjust schedules or develop curriculum as requested **Year 3** *Assess effectiveness of revised scheduling and curriculum, celebrate successes or make changes accordingly.	offerings are redesigned for student access to promote completion.	faculty release to support time needed to meet with program faculty and revised schedule and one faculty release to develop new curriculum as needed by business and industry.
PL/DCs, Department Faculty	*Develop and document assessment plans that measure student learning outcomes *Develop assessment plan to measure department effectiveness toward goals. (Strategic Plan: P1: 1.2, 1.3 Strategic Plan: P2: 2.2, 2.3)	**Year 1** *Establish and document department structure and annual plan for assessment of student learning outcomes for at least 2 courses. *Develop at least 3 departmental strategies to collaborate with the CLC tutors *Implement and document assessment plan during spring semester. **Year 2** *Assemble department assessment structure and determine goals for academic year. *Study results of student performance from prior year and document. *Continue collaboration with CLC to study effectiveness of Year 1 and continue efforts. *Implement changes to teaching methods as needed, document, revise teaching as appropriate. **Year 3** *Repeat year 2. Spring semester, measure effectiveness and progress toward goals.	Faculty have a documented process to align with budget for assessment professional development. Teaching methods are studied and improved as necessary. Students benefit from faculty focus on the learning environment.	Software to document assessment process, including inventory and effectiveness of assessment tools, student learning, department goals, curriculum, and any teaching method changes.
Dean, OAS, PL/DCs	Structure Liberal Arts and General Education disciplines to meet individual MAP and college related goals. (Strategic	**Year 1** * Review program effectiveness and sustainability, identify at least 2 new program growth areas *PLDC meetings	At least 2 new program growth areas and cost savings will be identified. Division and departments will be	Need data to drive review of program effectiveness, faculty need time to establish advisory boards. Faculty will also need time to implement

	Plan P1: 1.1, 1.4)	2x/month to advance goals through examination of division data. * Establish departmental assessment plans to measure effectiveness *Explore, establish, and document student placement and retention efforts **Year 2** * Establish first advisory board meetings for all program offerings *Collaborate with student affairs for at least two retention strategies **Year 3** *Evaluate program effectiveness and sustainability model	accountable for operations through data driven decision making. Advisory boards will be established for all programs leading to better opportunities for students.	strategies to meet MAP goals.
Dean, PL/DC, Department Faculty	Remodel and expand facilities to improve safety and increase capacity, efficiency and student learning (Strategic Plan: P1: 2.2)	**Year 1** *Evaluate classrooms and studios for capacity and learning environment (including technology) *Develop a plan to remodel or expand space to accommodate growth *Submit for master facilities plan **Year 2** Secure resources to expand/remodel facility **Year 3** Facility construction	Begin planning process to reorganize classroom and studio facilities	Collaboration with facilities, architects, IT, etc.
Dean, Department Faculty	Examine developmental education curriculum for effectiveness; and design an accelerated, immersion model for READ 800 and ENGL 0950. (Strategic Plan P1: 1.1, 1.2, 1.3)	**Year 1** *Identify developmental target groups through placement and design curriculum to meet needs of students *Propose new curriculum to AASC for approval *Develop collaborations with student affairs for admissions/advising/academic support **Year 2** *Schedule fall semester offerings and document effectiveness of assessment aligned to learning outcomes. **Year 3** Assess effectiveness of	Students with low reading skills, English language barriers, or low writing skills are placed into an immersion, accelerated one semester learning environment that prepares them for college ready courses. Potential is that students can be college ready in one semester rather than two.	Collaborations among READ and ENGL departments, Proctoring Center, Academic Support Center, Counseling/Advising, IR

		accelerated developmental first semester experience and implement changes as needed.		

SCIENCES AND HEALTH PROFESSIONS

Programs and Disciplines:

Associate of Art: Liberal Arts

Associate of Science

ALLIED HEALTH:

- Emergency Medical Technology
- Health Unit Coordinator
- Surgical Technology

NURSING

- Associate Degree Nursing
- Practical Nursing
- Nursing Assistant

BEHAVIORAL SCIENCES

- Alcohol and Drug Counseling
- Human Services

DENTAL ASSISTANT

DENTAL HYGIENE

HEALTH INFORMATION MANAGEMENT CAREERS

- Cancer Registry Management
- Coding Specialist
- Healthcare Informatics
- Health Information Technology

NATURAL SCIENCE

- Biology
- Biotechnology
- Broad Field Health Sciences
- Earth Science
- Environmental Science
- Laboratory Science
- Science Foundations A & B

PHYSICAL SCIENCES

- Chemistry
- Engineering
- Physics

RCTC/MAYO JOINT PROGRAMS

- Cardiovascular Invasive Specialist
- Clinical Neurophysiology Technology
- Emergency Medicine Paramedic
- Histology Technician

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

MAP Division Summary: *Sciences and Health Professions*

Introduction:
The Sciences and Health Professions division provides science transfer courses and programs as well as programs related to the healthcare professions. The division historically serves the needs of the regional healthcare community, collaborating closely with numerous facilities in all discipline and program areas. In addition, the division has aligned curriculum and programming with area universities and has developed a mutually beneficial relationship with the Mayo Clinic, resulting in the creation of four joint programs offered in collaboration with RCTC and the Mayo Clinic School of Health Sciences.

Programs/Disciplines/Services:

- Allied Health (Emergency Medical Technology, Health Unit Coordinator, Surgical Technology)
- Nursing (Associate Degree Nursing, Practical Nursing, Nursing Assistant)
- Behavioral Sciences (Alcohol and Drug Counseling, Human Services)
- Dental Assistant and Dental Hygiene
- Health Information Management Careers (Cancer Registry Management, Coding Specialist, Healthcare Informatics, Health Information Technology)
- Natural Science (Biology, Biotechnology, Broad Field Health Sciences, Earth Science, Environmental Science, Laboratory Science, Science Foundations A & B)
- Physical Sciences (Chemistry, Engineering, Physics)
- RCTC/Mayo joint programs: Cardiovascular Invasive Specialist, Clinical Neurophysiology Technology, Emergency Medicine Paramedic, and Histology Technician.

Mission/Purpose:
The Sciences and Health Professions division offers high quality transfer courses that give students a strong foundation in the sciences as well as prepares competent health professionals serving the community.

Pride Points:
As the faculty and staff continue to identify opportunities to improve, the division already maintains high quality and accessible instruction serving a growing diverse population. As a result, there are a number of achievements the division is proud to highlight:

- RCTC programs in the Health Professions have exceptionally high success rates on professional national certification examinations.
- The Nursing program has been fully accredited since 1972, the Dental Assistant and Dental Hygiene programs have been accredited since their inception in 1971 and 1991 respectively, the Surgical Technology program has existed since 1974, the Health Unit Coordinator program has existed since 1979, and the Child, Youth, and Family Studies program is over forty years old.
- RCTC maintains unique program collaborative partnerships with the Mayo Clinic School of Health Science, as well as many long-held partnerships with Olmsted Medical Center and other healthcare facilities in the region. Dental Hygiene has partnerships with the

Federal Medical Center, Mayo Periodontology Department, Apple Tree Dental, Periodontal Specialists, and Good Samaritan Dental.

- The Science program area offers courses to meet the needs of students in three academic tracks—liberal arts, allied health, and science/engineering.
- Science faculty work closely with the programs in the Health Professions as well as align programs and courses with majors at various state universities and the University of Minnesota.
- The Cancer Registry Management program is one of six certificate programs in the country.
- The programs have exceptionally high job placement rates, in some cases 100% in recent years.
- The division offers study abroad programming combining cultural immersion and professional skill development.
- The Nursing program began an Alpha Delta Nu Nursing Honor Society chapter for the College.
- The Sciences annually host regional science fair activities.

Three-Year Enrollment Trend:
The following chart provides three-year student enrollment trend data, reported in Full Year Equivalents (FYE). One FYE equals 30 credit hours.

FYE Comparisons 2012 to 2015

Program/Discipline	2011-12	2012-13	2013-14	2014-15	3 year % Change
Biology	315.43	326.77	329.19	302.53	-4%
Chemistry	141.32	144.59	144.97	120.85	-14%
Child Development	52.54	22.95	–	–	-30%
Child, Youth, and Family Studies	–	–	23.46	32.14	9%
Dental Assistant	33.83	31.28	29.18	28.24	-17%
Dental Hygiene	23.26	23.13	22.79	22.79	-2%
Emergency Medical Technology	15.13	14.8	14.1	11.13	-26%
Engineering	4.02	3.8	3.12	3.16	-21%
Health Information Technology	114	126.21	159.05	140.4	23%
Health Unit Coordinator	22.98	30.48	30.25	26.88	17%
Human Services	44.56	47.99	48.98	39.12	-12%
Nursing Assistant	69.93	61.64	67.72	59.1	-15%
Associate Degree Nursing	143.83	135.48	136	130.85	-9%
Practical Nursing	30.63	31.77	28.57	45.27	60%
Surgical Technology	24	25.46	24.06	26.59	11%
Nutrition	16.16	15.30	16.10	15.70	-3%
Earth Science	33.01	33.51	24.62	27.57	-16.5%
Emergency Medical Care	6.40	5.0	3.90	2.20	-65.6%
Occupational Skills Program	13.11	10.48	10.91	5.37	-59%

Significant Internal Factors:
Constrained budgets provide the greatest challenge to the programs as they work to maintain facilities, update technology and anticipate changes and demands from external stakeholders. The programs play a crucial role in serving the community needs while requiring extensive resources to do so. In particular, maintaining laboratory facilities in all the programs and integrating updated technology is necessary to offering a rigorous curriculum that attracts new students and retains current students.

Attention to these factors also increases the marketability of the programs and their attractiveness to a diverse and savvy student body. Students understand there are numerous options for them and the faculty and administration are looking to make the program curriculum attractive and engaging for them. Options are being explored for new programming and coursework, new delivery methods, new teaching models, and new opportunities for students to connect to the workplace. This innovation will keep the academic offerings in the division relevant while operating within the current budget structure.

Current facilities, technology, equipment and staffing:
While the programs in the division are excelling in their ability to meet stakeholder needs with current facilities, technology and staffing, the demand to plan for innovative initiatives and upgrading equipment remains. In highly technical, professional programs and disciplines as those residing in the division, the need to stay current in technology, equipment and materials is a constant challenge.

In order to address the community's Destination Medical Center goals and objectives, the division will need to continuously update and expand offerings in a manner that is fiscally responsible. This will require expanding the use of technology, examining unique delivery options, and expanding partnerships with the healthcare community.

The division looks to remain relevant in the rapidly changing scientific and healthcare world in an environment where facilities and learning resources for the division range from acceptable to exceptional. As a result, the division is exploring opportunities to introduce new technology into the curriculum, particularly with experiential learning activities. This includes the need to expand smart classrooms, maintain and upgrade lab equipment and facilities, and expand simulation options. Supporting these efforts through leveraged partnerships and identifying alternative resources is a priority, meets the strategic goals of the division and programs, and meets the needs of the community.

The division will need to integrate technology in the classroom, engage students with changes in technology in the professional fields, and work to invest in the college facilities in order to maintain high quality educational programming in these fields.

Significant External Factors:
The Mayo Clinic, private partners and funders, and the State of Minnesota are undertaking a significant 20-year project known as Destination Medical Center (DMC). The estimated cost is more than $6.5 billion dollars and is projected to double the population of Rochester. It will create more than 30,000 new jobs, many of which will be in healthcare areas. This provides a tremendous opportunity for RCTC to work with Mayo Clinic and other community partners and stakeholders to prepare healthcare and other professionals. The Sciences and Health Professions division will play a very important role in training students and preparing competent graduates that will contribute to the growth created by DMC initiatives.

The DMC will impact all programs in the division. There already is significant growth projected in the Alcohol and Drug Counseling, Surgical Technology, and other healthcare related fields such as programs related to medical records, emergency health services, and dentistry. In addition, there will be increased demands on the Science professions that support the programs as well as lead into other science-based professions such as laboratory scientists, biotechnologists, engineers, and field researchers.

The Dental Hygiene and Dental Assistant programs maintain an on-campus dental clinic that serves the preventive needs of people from the surrounding communities. The Dental Assistant program partners with dentists across the region to offer internships for students completing the program. Both Dental Hygiene and Dental Assistant programs contribute dental health education services to numerous schools, agencies, and healthcare facilities to enrich the program curricula.

Occupational demand data for careers served by programs within the Sciences and Health Professions Division:

Job Title	2012 Employment	Projected 2022 Employment	Percent Change	Replacement Openings	Total Openings	Median Wage
Alcohol and Drug Counseling	1,956	2,445	25.0%	420	910	$22.04
Child, Youth and Family Studies	2,837	3,094	9.1%	257	830	$10.02
Dental Assistant	5,149	5,390	4.7%	241	1,070	$21.08
Dental Hygiene	4,601	5,131	11.5%	530	1,180	$34.67
Emergency Med. Tech.	4,404	5,053	14.7%	649	1,200	$17.68
Health Unit Coordinator	2,965	3,523	18.9%	559	570	$17.32
Licensed Practical Nurse	17,422	20,661	18.6%	3,239	4,250	$20.36
Registered Nurse	55,953	65,430	16.9%	9,477	10,850	$34.63
Social and	1,615	1,840	13.9%	225	420	$14.58

Human Services						
Surgical Technician	1,795	2,130	18.7%	335	180	$24.67
Healthcare Support Occupations	91,474	107,588	17.6%	16,114	36,230	$13.93
Healthcare Technicians	163,612	183,754	12.3%	56,370		$32.34

Curriculum Relevance to Meet Community Needs:
Program faculty and advisory committees review program curricula annually and make the necessary adjustments. Curriculum updates and adjustments are based on several factors such accreditation mandates, employer's requirements, articulation agreements, and transferability of programs to 4-year colleges. Dental Hygiene faculty and the advisory committee updated program goals and outcomes in spring 2016.

On an annual basis, an advisory committee reviews and provides feedback on the curriculum for each program. In order to maintain the quality of programs and meet requirements set by their respective accrediting organizations, the Dental Assistant, Dental Hygiene, Emergency Medical Technology, Nursing, Surgical Technology, and Health Information Management Careers follow specific accreditation guidelines. For example, the Surgical Technology program curriculum is set by the Association of Surgical Technologists. The sixth edition core curriculum was implemented in August 2013. The curriculum was mapped to all the required courses for the graduates receiving an AAS degree. The next curriculum revision release is scheduled for 2018 and at that time the curriculum will need to be re-mapped by the next accreditation visit in 2019.

The transferability of courses or programs are taken into account when conducting curriculum reviews. In some cases, necessary program adjustments must be made before articulation agreements are signed.

Program/Course Delivery Trends:
There are a mix of delivery methods throughout the programs that include hybrid, online, simulation and other experiential learning activities, and traditional lecture-based options. Currently no unified divisional focus exists regarding delivery trends. While programs develop curriculum changes and retention plans based on assessment practices, there will be an opportunity to identify common practices where appropriate.

Faculty in all of the programs have introduced alternative delivery options for students to achieve their academic goals. The alternatives have been prompted by occasional initiatives, however, and the programs and the students might be served by a comprehensive approach. As the strategic priorities are addressed over the next three years, such coordinated planning could emerge.

Assessment Accomplishments/Opportunities/Needs:

Assessment practices across the division vary significantly. The accredited programs have clearly delineated course and program learning outcomes tied to the professions. As the Minnesota State system develops transfer pathways that RCTC Science programs can align to, there will be clearly defined statewide course and program learning outcomes.

In anticipating the transfer pathway structure and a visit by the Higher Learning Commission in 2017, student learning outcome assessment plans are currently underway to conduct assessment at the course level which then will be tied to the program level assessment. Assessment efforts are a strategic priority for the division as is supported by the data available through the program trend analysis sheets and by the data being integrated into the annual program review process.

Divisional Strategic Priorities:
The following are top strategic priorities to improve the quality of programs within the Sciences and Health Professions:

Area	Strategic Plan Goal	Action Step	Outcome	Resources
All Programs	Develop and implement retention plans and initiatives. (Strategic Plan: 1.3)	**Year 1:** Research and develop holistic retention plans and develop strategies to implement. **Year 2:** Implement identified strategies after prioritizing them. **Year 3:** Reassess to determine effectiveness of the plan.	Increase fall to fall retention rates by 10% in area programs.	Data to establish benchmarks and research to determine best practices.
Dental Hygiene, Nursing Assistant, Surgical Technology, Behavioral Sciences, Healthcare Informatics/ CRM/HIT, Sciences	Examine curriculum for effectiveness and develop and revise new programming options to meet community needs. (Strategic Plan: 1.1, 1.2, 1.3, 1.4)	**Year 1** Review curriculum and identify areas for revision and program development connected to changing needs of students and employers. **Year 2** Develop new programs and courses and begin to implement them. **Year 3** Preliminary review of the new programs and courses.	Revise and update curriculum, including new courses and programming.	Potential release time for new programming options.

All Programs	Develop and implement marketing strategies to attract students to the programs and raise awareness about employment opportunities. (Strategic Plan: 4.1)	**Year 1** Development and implement a comprehensive marketing & recruitment plan. **Year 2** Implement identified initiatives. **Year 3** Make recommendations for adjustments for improvement.	Develop and implement targeted marketing plans for all the programs.	Collaboration with marketing department, data, and guidance regarding new marketing approaches.
Behavioral Sciences Mayo/RCTC Joint Programs Sciences	Create assessment map for programs that aligns course, program, and institutional level assessment, and implement initiatives based on the assessment process. Strategic Plan: 2.1.	**Year 1:** Faculty develop assessment maps that model best practice. **Year 2:** Gather the assessment data aligned with the mapping, review data and initiate opportunities for improvement. **Year 3:** Review collected data regarding initiatives and recommend adjustments in the process.	Complete one assessment process iteration for the noted programs.	Data, best practices in assessment processes, and technological support.
All Programs	Establish priorities for facilities upgrades and integrating new technology into the curriculum.	**Year 1:** Faculty develop list of equipment and software upgrades and new technology to be integrated in the curriculum. **Year 2:** Map out specifically how new technology will be integrated and establish first, second and third year purchase and integration priorities. Identify alternative resources and partnerships to support implementation. **Year 3:** Begin developing alternative resources in order to purchase priority items and begin implementation.	Integration of new technology in the classroom.	New partnerships, collaboration and fiscal resources.

CAREER AND TECHNICAL EDUCATION & BUSINESS PARNERSHIPS

Programs and Disciplines:

Associate of Art: Liberal Arts

Associate of Science

BUSINESS:

- Accounting
- Business
- Economics
- Supervisory Leadership

MEDICAL/ADMINISTRATIVE ASSISTANT

- Administrative Assistant
- Administrative Clinic Assistant
- Customer Service Specialist
- Healthcare Documentation Specialist
- Medical Administrative Assistant

TECHNICAL/SKILLED TRADES

- Building Utilities Mechanic
- Carpentry
- Computer Aided Design
- Precision Manufacturing
- Welding

LAW ENFORCEMENT

- Criminal Justice
- Law Enforcement

BUSINESS AND WORKFORCE EDUCATION

SCIENCES

- Equine Science
- Horticulture
- Veterinary Technology

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

MAP Division Summary: *Career and Technical Education & Business Partnerships*

Introduction:
The Business, Career, Technical and Workforce Education division includes academic transfer, occupational and non-credit programs in which faculty and/or staff serve in leadership roles for their respective areas. Specific details of each area are included in Appendix A.3

Programs/Disciplines/Services:
- Accounting
- Administrative Assistant/Administrative Clinic Assistant/Customer Service Specialist
- Automotive Mechanic
- Building Utilities Mechanic
- Business
- Business and Workforce Education
- Carpentry
- Computer Aided Design
- Criminal Justice
- Economics
- Equine Science
- Horticulture
- Law Enforcement
- Medical Administrative Assistant/ Healthcare Documentation Specialist
- Precision Manufacturing
- Supervisory Leadership
- Veterinary Technology
- Welding

Mission/Purpose:
Programs within this division meet the diverse needs of learners serving students who are pursuing entry into career paths, re-skilling for career change or advancement or for lifelong learning opportunities. In addition, this division includes programs serving entrepreneurs in the Southeast Minnesota region. Programs and services range from credit based Associate Degree, Diploma and Certificate programs to short-term, non-credit programs for customized training and continuing education and consulting services. Educational content focuses on specialized technical skill attainment, but also addresses the critical workplace skills of analytical and critical thinking, communication and ethics that support the current and future workforce needs of employers throughout the region.

Pride Points:
In planning for the next 3-5 years, programs look to build upon many strengths to continually improve the educational opportunities for students and align with regional workforce demands. Within the representative programs the following pride points provide a foundation for which to grow programming and enrollment:
- Strong interdepartmental and cross discipline collaborations

- External accreditation that validates program quality and learner outcomes
- Increased alternative course offerings (web, hybrid, face-to-face, and accelerated to meet student's needs)
- Faculty members, both full-time and adjunct, are well-qualified and maintain industry experience and specialized certifications
- Active and engaged advisory committees
- Specialized facilities with indoor and outdoor lab environments that support application-based learning
- Support of industry partners that provide program resources, experiential learning opportunities and job placement
- Hands-on, fast-paced demanding programs
- High career placement rates
- Multiple industry-recognized certifications and licensures
- Strong collaborations with business and community partners for incumbent workforce education
- Success in securing grant resources for course and program development that leads to sustainable college offerings

Three-Year Enrollment Trend:
The following chart provides three-year enrollment trend data, reported in Full Year Equivalents (FYE). One FYE equals 30 credit hours.

FYE Comparisons 2012 to 2015

Program/Discipline	2011-12	2012-13	2013-14	2014-15	3-Year % Change
Accounting	98.66	98.45	83.65	85.39	-13%
Automotive Mechanic	41.02	39.92	38.26	44.96	13%
Adm. Asst./Customer Service	174.52	113.19	141.47	137.4	21%
Building Utility Mechanic	94.05	94.89	87.85	84.23	-11%
Business	123.72	126.99	120.81	126.14	0%
Computer Aided Design	23	23.71	24.13	24.2	2%
Carpentry	17.05	18.65	15.61	19.71	6%
Criminal Justice	13.1	15.1	15.26	7.8	-48%
Economics	75.39	72.95	69.43	63.87	-12%
Equine Science	23.45	22.34	17.4	16.3	-27%
Horticulture	26.88	21.6	17.08	20.21	-6%
Law Enforcement	63.86	51.2	48.53	41.8	-18%
Law Enforcement – Skills	24.1	21.98	15.65	17.37	-21%
Medical Adm. Asst.; Documentation Specialist		81.03	67.27	62.73	-23%
Precision Manufacturing Technology			8.64	5.87	-32%
Supervisory Leadership	3.78	3.68	.93	.41	-89%
Veterinary Technology	49.56	56.58	64.45	55.78	-1%
Welding			24.22	18.25	-25%

Student FYE: Total Credits/30

Significant Internal Factors:

The ability to continuously improve and advance programming relies heavily on institutional prioritization and focus. Within the division, the following internal factors influence the capacity of programs to fully execute the proposed strategies to achieve goals.

- Overall enrollment decline similar to national, state and institutional trends
- Declining state investment in higher education and pressure to reduce costs for students
- Due to enrollment, some programs have limited UFT faculty to effectively support and grow the program by developing partnerships, co-curricular activities, outreach and involvement in institutional initiatives
- Declining and competition for scarce resources do not allow for programs to keep pace with the changing technology
- Student projects support institutional initiatives, programs and services including grounds and vehicle maintenance and marketing and promotion
- Disparities in student abilities and access to technology off campus

Significant External Factors:
Regional economic development initiatives position RCTC to build new and expand existing programs to meet the labor market demands. Employers value the knowledge and skills of graduates and seek opportunities to provide experiential learning that supports the application of these skills. Based on Labor Market Information (LMI) provided by the Department of Employment and Economic Development (DEED) occupational demand providing the most significant gainful employment opportunities in the southeast Minnesota region for graduates of programs within this division include the following:

Program	Job Title	2012 Employment	Projected 2022 Employment	Change		Replacement Openings	Total Openings	Median Wage
				Percent change	Numeric Change '12-'22			
Accounting	Billing and Account Clerk	757	879	16.10%	122	140	260	$17.01
Administrative Assistant	Secretaries/ Admin. Assistants	1,747	1,884	7.80%	137	210	350	$16.88
Automotive	Automotive Service Tech	1,310	1,358	3.70%	48	330	380	$17.21
Building Utility	Maintenance and Repair Workers	1,761	1,820	3.40%	59	340	400	$18.63
Business	General Operations Manager	2,697	2,832	5.70%	153	500	650	$36.45
Carpentry	Carpenter	1,941	2,383	22.80%	442	240	680	$19.61
Customer Service Specialist	Customer Service Rep.	3,545	3,686	3.90%	138	960	1,100	$14.36

Law Enforcement	Police and Sheriff's Patrol Officers	784	752	-4.10%	-32	250	250	$25.89
Medical Administrative Assistant	Medical Secretaries (statewide)	7,893	9,807	24.20%	1914	950	2860	$19.18
Precision Manufacturing Technology	Computer Numerically Controlled Machine Technology	93	134	44.10%	41	30	70	$21.10
Welding	Welding, Soldering, Brazing	258	346	34.10%	88	60	150	$19.42

While new growth within some of the occupations is flat or declining, replacement hiring due to retirement, as well as the limit of program offerings within the region, are contributing factors in program prioritization. In addition to occupational demand, wage data is a key factor to ensure employment opportunities in the prioritized programs provide good earning potential and advancement opportunities for students. Finally, in many of these fields the demand was greater in Southeast Minnesota than the projected growth statewide.

Occupational demand that is stable or declining or is limited in the total number of job openings in southeast Minnesota within this division include the following:

Program	**Job Title**	**2012 Employment**	**Projected 2022 Employment**	**Change**		**Replacement Openings**	**Total Openings**	**Median Wage**
				Percent change	Numeric Change ’12-‘22			
Computer Aided Design	Mechanical Drafters	18	18	0.00%	0	10	10	$38.34
Equine Science	Animal Trainers	60	64	6.70%	4	30	30	$20.90
Horticulture	Pesticide handlers, sprayers and applicators	126	125	-0.80%	-1	30	30	$15.49
Software Application Specialist	Desktop Publishers	37	36	-2.70%	-1	10	10	$21.17
Veterinary Technology	Veterinary Technologists and Technician	216	246	13.40%	29	20	50	$17.62

Employment growth in both percentage and total openings provide data to support program prioritization and investment. RCTC has identified specific goals to develop or expand programming to serve the workforce needs for occupations with significant projected growth.

Curriculum Relevance to Meet Community Needs:
Curriculum content is largely determined by external licensure bodies and advisory boards. Regular review and updates gauge the relevancy of content and the degree to which programs meet the relevant learning objectives. A comprehensive review of program viability, based on labor market demands, will ensure that the education level attained by students is necessary and results in gainful employment for students. The current economic climate, labor shortage and projected growth of the region, has increased the demand for all occupations for which RCTC offers educational programs. However, in some cases employment opportunities are not significantly better for graduates than for job seekers without similar education.

Program/Course Delivery Trends:
Courses in Accounting, Administrative Assistant, Business, Economics and Healthcare Documentation are offered in multiple formats including hybrid, on-line and face to face. Programs that have courses with significant lab components have limited or no on-line offerings. Delivery methods must be responsive to the demographic and societal changes of students served. National, state and local trends indicate that students enrolled in college are:

- More likely to enroll part-time
- Have family and work responsibilities
- Less likely to be prepared adequately for rigors of higher education

Program courses need to offer flexibility by providing, experiential learning through internships, credit for prior learning, on-line and flipped classrooms, learning communities, etc.

Assessment Accomplishments/Opportunities/Needs:
Programs within the division determine learning outcomes through national skill standards and advisory board and employer input. Accredited programs are more structured in the process of assessment and data collection. Due to content structure, most programs are offered in a cohort model that allows faculty to regularly assess student learning. The college is in the process of developing a comprehensive Institutional Assessment Plan that will provide clarity and consistency in the process. Programs within the divisions will need to collect data on the relevance of program learning outcomes and measure the extent to which graduates of the program meet those outcomes. Efforts to improve the assessment of student learning in highly demanded workplace skills needs to be implemented.

Division Goals:
The collective goals of programs within the division align with the institutional strategic priorities of student success, teaching and institutional effectiveness and program alignment with economic and workforce needs.

Student Success: Engaging with students early and often is critical to ensure student success. The following engagement efforts will be implemented to improve student retention and completion:

- Implement program orientation and/or application process
- Faculty involvement in academic advising

Teaching Effectiveness: Improvement in teaching effectiveness will be achieved through the following area strategies:

- New program accreditation
- Curriculum mapping and student learning outcomes assessment
- Explore the feasibility of alternative delivery formats including simulation, experiential education and shared facilities
- Evaluate the facility needs for technical programs to expand and centralize labs and improve teaching effectiveness and efficient scheduling
- Flexible offerings through strategic scheduling
- Expand on-line programming with established quality standards
- Align professional development and evaluation with program and student learning

Program Alignment with Economic and Workforce Needs: Collaborative partnerships will be explored to develop new programs, expand experiential learning opportunities and increase opportunities for leveraged funding to financially support investment in facilities, equipment and professional development.

- Rebrand the Automotive Mechanic Technology and Building Utility programs for better alignment with job titles in high demand occupations
- Expand programming to meet new skill requirements in Building Maintenance and Repair including alternative energy management
- Develop new programming to meet the demand of high growth occupations including hospitality and construction management
- Develop secondary education and Baccalaureate degree career pathways
- Increase awareness of career and technical education through the use of social media
- Secure NATEF certification that will lead to the development of state of the art automotive technology center
- Construct a simulation house for the law enforcement skills training program that will be utilized by partners of the Regional Public Safety Training Center
- Increase alignment with business and industry to expand experiential learning partnerships to meet the changing workforce needs

Dean's Strategic Priorities and Resources Needed:

Given the significant internal and external factors identified, a realignment within Academic Affairs is necessary to achieve these goals. To increase our visibility in the community and meet the rapidly changing needs of the workforce, a newly created Associate Dean of Career and Technical Education will support the efforts of the division.

Based on the analysis of individual area reports and program goals that were developed through this planning process the following strategies and initiatives have been identified as strategic priorities that will require investment in the next 3 years and beyond.

Area	Goal/Alignment	Action Step	Outcome	Resources
Automotive	Achieve NATEF certification (Strategic Priority 1.2)	**Year 1** *Draft application and supporting documents *Identify gaps in processes, data, assessment *Solicit feedback from advisory board *Visit other automotive programs for best practices **Year 2** *Plan for space reorganization that will allow for more learning labs and additional equipment *Submit recommendations for inclusion in master facility plan *Secure funding to remodel space including fund raising campaign and leveraged equipment **Year 3** *Begin space reconfiguration	Certification will allow the program to receive donations from large dealers that will provide the latest technology to prepare students for the career within this field.	Initial certification and annual reaffirmation expenses Faculty release for application development and on-site evaluation Facility remodeling costs include design and construction
Accounting/ Business/ Marketing	Increase enrollment by 2% annually through partnerships with businesses, community organizations, educational partners and active promotion (S.P.: 1.4) Collaborate with the Business Technology department to create a hospitality emphasis within the management degree that includes customer service focused courses (1.4)	**Year 1** * Develop hospitality career pathways and articulations with K-12 and partner with businesses for awareness and promotion * Partner with businesses to develop and execute an awareness and promotion campaign **Year 2** *Develop university articulations for Bachelor degree completion **Year 3** *Program/course evaluation for alignment with relevant program learning outcomes	Hospitality pathway from CTECH to Bachelor's degree that results in enrollment growth and program sustainability	*Develop promotional materials *Develop a social media campaign
Admin. Assistant	Collaborate with the Business department to offer customer	**Year 1** *Develop hospitality career pathways and articulations with K-	Hospitality pathway that meets the	*Promotional materials

	service courses in the Management - Hospitality Emphasis degree (Strategic Priority: 1.4)	12 and partner with businesses for awareness and promotion * Partner with businesses to develop and execute an awareness and promotion campaign **Year 2** Evaluate results and make adjustments	occupational demand	
	Create a Hospitality with Concierge emphasis and onsite customer service training (Strategic Priority: 1.4)	**Year 1** * Meet with area hospitality businesses to explore opportunity to offer a customer service courses on-site that would *Develop new or revise existing courses to meet identified need that may include on-site and on-line courses. **Year 2** * Partner with businesses to schedule and promote on-site course offerings **Year 3** *Evaluate program effectiveness and sustainability model		
Building Utilities/ Welding	Implement Programming in Alternative Energy Maintenance program (Strategic Priority:1.2)	**Year 1** *Survey employers *Conduct full needs and sustainability analysis *Revise curriculum *Determine facility/technology needs and develop plan **Year 2** *Identify resources for implementation **Year 3** Implement plan	Provide continued learning opportunities for incumbent workers that addresses the skill gap	Internal resources for survey development; travel to explore best practices in facility and curriculum development. Facility reorganization and remodeling; Equipment purchases Additional faculty and lab assistant

	Remodel and expand facilities to improve safety and increase capacity, efficiency and student learning (Strategic Priority:1.2)	**Year 1** *Evaluate model programs and facilities *Develop a plan to remodel or expand space to accommodate growth *Submit for master facilities plan **Year 2** Secure resources to expand/remodel facility **Year 3** Facility construction	Begin planning process to reorganize lab/lecture facilities	Travel Facility/space/ lab/technology needs will be determined through the planning process
Carpentry	Expand programming in construction management (Strategic Priority: 1.2)	**Year 1** *Review 2-4 year program models *Identify curriculum that may include components from the Building Utility and Carpentry programs. *Solicit input for local employers, and advisory boards *Determine facility and staffing needs to accommodate growth **Year 2** *Submit curriculum through AASC *Plan for space reorganization that will allow for more learning labs and additional equipment *Submit recommendations for inclusion in master facility plan *Secure funding to remodel space including fund raising campaign and leveraged equipment **Year 3** *Begin space reconfiguration	Establish a collaborative program that meets the workforce needs of a growing community.	Travel Facility/space/lab /technology needs will be determined through the planning process
Law Enforcement	Build a simulation structure to accommodate Law Enforcement Skill program needs (Strategic Priority: 1.4)	**Year 1** *Develop site plan *Solicit support contributions from local agencies and/or building supply companies **Year 2** *Work with Carpentry program to build facility	Follow through with commitment to regional public safety training center to construct a shared facility Promote the LAWE program with building signage	Design and construction costs assuming a student based project

ACADEMIC EFFECTIVENESS AND INNOVATION

Programs and Disciplines:

Associate of Art: Liberal Arts

Associate of Science

PHYSICAL EDUCATION:

- Health
- Physical Education
- Recreation
- Sport Management

ACADEMIC EFFECTIVENESS AND INNOVATION

- Assessment Methods
- Evidence-based Decision Making
- Classroom Management for Safety
- Curriculum Mapping
- Teaching Excellence

ALTERNATIVE LEARNER PATHWAYS

- Credit for Prior Learning
- Concurrent Enrollment
- Honors/Phi Theta Kappa
- Postsecondary Enrollment Options (PSEO)

ACADEMIC SUPPORT SERVICES

- Career Planning Services
- Comprehensive Learning Center
- Library

INSTITUTIONAL QUALITY COUNCIL

INTERNATIONAL STUDY ABROAD

ONLINE EDUCATION AND EDUCATIONAL TECHNOLOGY

MAP Division Summary: *Academic Effectiveness and Innovation*

Introduction:
The Academic Effectiveness and Innovation division covers a range of responsibilities, initiatives and academic support services that seek to promote teaching excellence and alternative learner pathways, enhance the student learning experience, improve student success, and promote a culture of continuous quality improvement. The Master Academic Planning data suggest the need to expand professional development activities which promote a culture of assessment, inclusion, safety, continuous quality improvement, and alignment to the College mission. In addition, the (SEMC, 2016) data suggest a need to align academic support services and limited resources with those students most at risk. Both alignments will require a coordinated, comprehensive, collective, and collaborative effort across all divisions and departments and provide the resources necessary for advance the institution.

Programs/Disciplines/Services:

- Academic Effectiveness and Innovation - Professional development that provides: effective models of teaching excellence (learning communities, Integrated Instruction, team teaching, Fastrac); evidenced based decision making to improve instruction and learning; classroom management techniques that promote safety; curriculum mapping; developing and implementing assessment methods that accurately measure learning, prior learning, and competence.
- Expanding alternative learner pathways: Credit for Prior Learning (CPL); Honors/Phi Theta Kappa; Concurrent Enrollment; Postsecondary Enrollment Options (PSEO).
- Academic support services that promote student success: Comprehensive Learning Center; Library; Career Planning Services.
- Institutional Quality Council: provides direction, support, resources, and reporting of work directly associated with institutional quality; development, implementation and reporting of an integrative assessment system that promotes continuous quality improvement.
- International Study Abroad
- Online Education and Educational Technology
- Physical Education, Health, and Recreation; Sport Management

Purpose:
To support quality education to a diverse and growing community of learners by highly trained faculty and staff, assist RCTC to fulfill its mission of teaching excellence and student learning, and demonstrate accountability to our stakeholders. All educational pathways and teaching must holistically provide relevant, inclusive curriculum, and academic support services that engage the learner and promote success.

Pride Points:

There are a number of impressive accomplishments from areas within this division that offer foundational support for future innovation necessary for improving instruction, student learning and success. The accomplishments are as follows.

- Increased collaboration across disciplines resulted in the creation of innovative course curriculum and delivery, including team teaching, learning communities, integrated instruction and accelerated formats.
- Faculty who incorporate active, engaged, or project based learning that resulted in improved learning or retention presented best practices to the college community at "Lunch and Learns".
- Interdepartmental collaboration at PLDC meetings to enhance course scheduling to better meet program needs and student success.
- Continued promotion of quality online education through Quality Matters and hosting of regional professional development workshops for on campus and online faculty.
- RCTC and the southeast region is leading the Minnesota State system in faculty professional development on credit for prior learning (CPL) and competency based assessment (CBE), and increasing the number of courses available for CPL or CBE.
- The institutional response to the Higher Learning Commission 2015 feedback report has been collaborative, comprehensive, and thorough. The resultant work and outcomes include the formation of the Institutional Quality Council and development of an Institutional Assessment Plan.
- The RCTC library supports Winona State University and hosts a robust collection of resources that support undergraduate, graduate, and doctoral degree programs.
- Newly remodeled classroom and meeting space provide the resources necessary for literacy instruction, collaboration, and innovation.
- The Phi Theta Kappa (PTK) chapter received Five Star Status and the chapter advisor received national recognition in 2016. The chapter assisted in the reinstatement of an Honors Program that will begin fall of 2017.
- Post-Secondary Enrollment Option (PSEO) has record high enrollment over the past two years and these students overall maintain high persistence rates and GPA.

Instructional Areas:

Academic Excellence; Assessment; Curriculum; and Faculty, Staff, and Student Worker Professional Development: Data from Area MAPs, HLC Feedback Report (2015), and course schedules identify a number of innovative instructional approaches, grounded and supported in literature, that were incorporated within a variety of departments since 2012 to improve courses success and retention. While there is increasing awareness of national best practices, the College is somewhat limited due to the current technology software. For example, learning communities are extremely valuable with student retention and engagement, however the process for coding and course registration is limited by the student records system. The Minnesota State system is working to address these limitations. A summary of the innovative pedagogy approaches are listed in the following table.

Table: Innovative Pedagogical Approaches utilized:

Sections Offered	FY12	FY13	FY14	FY15	FY15
LCOM	X	X	X	X	X
Accelerated Learning Program (ENGX)				X	X
Statway					X
Flipped Classrooms				X	X
Integrated Instruction			X	X	X
Action/Project Based Learning	X	X	X	X	X
Competence Based Instruction				X	X
Team Teaching			X	X	X
Internships	X	X	X	X	X
Simulation	x	X	X	X	X

The College has expanded the application of learning modalities and incorporated innovative approaches to promote student success. Opportunities exist to enhance and maximize discussion, review, and promotion of national best practices. In addition, opportunities exist for training on data informed decision making, classroom management, and assessment activities. While there is a dedicated RCTC committee and council for curriculum development and revision, the process can be made clearer. The curriculum review process needs to be better documented and transparent, encouraging discussion and continuous improvement.

Due to our changing student demographic, additional training related to diversity and equity as it relates to classroom management and curriculum would benefit both faculty and students. This training would help advance learning environments of inclusion and safety, and be responsive to the growing diversity of our students, faculty, and staff. A documented process of continued quality improvement for these areas will continue to moving the College forward.

Curriculum is largely determined by RCTC faculty and managed in Academic Affairs and Standards Committee (AASC) in collaboration with administration. Members of AASC are working to document the process and standards in which curriculum is reviewed. In addition, RCTC uses Program Navigator when offering new programs or making changes to existing ones. While a number of departments work with programs to create courses that will address specific content, there is no formal process to assure transferability of general education or Liberal Arts supported courses or structured time for faculty to collaborate on curriculum.

Professional Development Goals:

- Create and provide professional development opportunities that support student engagement, a culture of inclusion, assessment, and high quality curriculum development that increases student success in at risk populations.
- Develop a process to pilot new and emerging teaching models and practices that promote student success.
- Revise the faculty evaluation process to include participation in student learning assessment, evidence of data informed decision making, and classroom management.

- Mentor and support faculty as they design new courses and upgrade existing ones.
- Recognize and promote outstanding achievements.
- Develop an onboarding process for new faculty and academic staff.
- Provide professional development on curriculum mapping and curriculum development.
- Develop a resource kit to document AASC procedures and help new faculty better understand committee processes.

Alternative Learning Pathways:
This area includes concurrent enrollment, Post-Secondary Enrollment Option, Credit for Prior Learning and Honors/Phi Theta Kappa.

Three Year Enrollment Trends specific to this Instructional Area

Area	2011-12	2012-13	2013-14	2014-15	4-Year % Change
Concurrent Enrollment	265	247	301	33	-80%
PSEO (Students Enrolled Fall and Spring)	392/410	369/388	450/484	523/540	+46%
CPL Awarded (Credits Awarded)	246	291	119	297	+20%
International Study Abroad (number of student enrolled)	18	42	25	38	+77%
Online Education (percent of students taking one online class)	17%	18%	22%	23%	+35%

The data suggest several opportunities for enrollment growth. Growth will require a commitment of resources over the next three years.

- RCTC Concurrent Enrollment (CE) offerings is down significantly due to Minnesota Department of Education and HLC clarification on faculty qualifications required to teach at the post-secondary level, and RCTC's response to a CE review. Current faculty and mentors meet credentialing requirements. The lack of processes and procedures to assure high quality, rigor, and student feedback will be addressed in the NACEP accreditation process. The advisory board for this program will begin this work August, 2016. Area secondary school districts are requesting RCTC concurrent enrollment courses at their schools.
- PSEO enrollment continues to grow. The students overall demonstrate higher persistence and GPA in comparison to the general student population. This is a cost effective and productive program that creates pathway to promote and increase enrollment.
- Grant opportunities exist for programs that promote secondary learner pathways to degree completion. While individuals have written grants on behalf of RCTC, a Grant Writer, shared with local school districts or other Minnesota State institutions, would have the dedicated time to seek the necessary financial resources needed to create and pilot innovative initiatives for CE and PSEO, and other collaborative initiatives.
- While faculty report a growth in the number of CPL credits awarded, the data collection, recording, and process of coding and transcribing these credits remains cumbersome and inconsistent across the system. Professional development and Charting the Future

initiatives are key to faculty creating and promoting these accelerated pathway opportunities for adult learners.

- Data from the 2016 PTK Honors in Action project supported the reestablishment of an Honors Program and will attract new students and provide the rigor and challenge desired.

Academic Support Service:

- There is a need to re-imagine the CLC and develop a new student support model that is responsive to our changing demographics and resource availability. Faculty, staff, volunteers and administration must determine what services will be provided and to whom, develop a process for all tutors to access assignments; explore the notion of "success centers" across campus, identify and implement a sustainable leadership and supervision model for this area, identify and measure meaningful data, and determine an assessment tool for these services.
- The Library seeks to be the center of student and faculty success by promoting a variety of library services, offering informational literacy curriculum, updating their website, promoting a variety of resources for teaching and assessment, and identifying a tool to assess student learning.
- A number of student surveys over the past five years reflect a gap in assistance with career planning and placement. In addition, research suggests a clear academic plan within the first semester as essential to student success and engagement. While several programs offer employment strategy curriculum, this is often taken toward the end of one's program. RCTC has the ability to leverage our relationship with the co-located Workforce Center at Heintz to enhance career services for our students. There is a need to create a realistic and sustainable career orientation and planning process for all students who are uncertain of their major, explore and implement academic planning aligned to "meta majors", and assure students have an academic (career) plan that is accurate and realistic.
- Academic Support Services can enhance the promotion of their services, resources, measurable outcomes, and continuous quality improvement through professional development activities.

Institutional Quality Assurance:

The College has a longstanding history of promoting high quality learning experiences that are routinely evaluated and revised. From 2009-2014, data input and documentation of the overall process resided within the Integrated Planning Process (IPP). During this time, the Strategic Operations Committee reviewed and promoted activities to advance continuous quality improvement. While extensive data was available, faculty and staff had questions related to data integrity and the lack of specific and meaningful data necessary to make informed program or curriculum changes. Due to changes in institutional leadership and the complexity of the process, the use of IPP for annual program review and continuous quality improvement was suspended in 2014. The annual program review process then transitioned to a more manual mode. While the current process does capture department and program information, it does not afford a way to collect continuous quality improvement activities across the campus.

Under current leadership, the College has completed a comprehensive academic program review and attended HLC academies. Data from these activities suggest the establishment of an Institutional Quality Council (IQC) with collaborative leadership from both academic and student affairs. This committee will provide leadership, guidance and direction for projects or continuous quality improvement initiatives such as: strategic planning, HLC Action Projects, Charting the Future initiatives, and stakeholder survey feedback. The IQC will also establish methods to effectively and efficiently communicate and promote this work to all stakeholders.

International Study Abroad:
With a growing need for global awareness and equity, the College is positioned to grow and expand cultural learning opportunities through study abroad. RCTC faculty, staff and administration spent the past year designing and developing a Study Abroad Procedure Manual that meets College, State, and Federal policy and legal requirements. During this time, study abroad was suspended. The new procedure manual will provide faculty and those traveling the safety and protection needed for a high quality, global learning experience. Given the growing diversity of the Rochester community and the value recognition of global awareness and understanding from area employers, this program is now positioned to align with current programs and courses and further expand its offerings. The following are key actions for this area:

- Review with faculty and implement the Study Abroad Procedure Manual fall, 2016. Schedule related curriculum when appropriate per the procedure.
- Assemble a Global Education Advisory Committee to oversee and provide feedback.
- Promote this learning option and explore ways to promote study abroad across the system options.
- Create a process for documentation and recordkeeping that is efficient and in compliance with college, state and federal regulations.

Online Education:
The last online strategic plan was created by the Distance Education Committee in 2010 and completed in 2013. The committee changed the name to Academic Technology Committee (ATC) in 2013, to reflect the role and significance of various technology tools to support student learning. Later for efficiency, the ATC merged into the Technology Committee. While faculty are represented on this committee, the focus is comprehensive.

Educational technology maintains the technology and provides training for D2L Brightspace. The Technology Support Center provides students the help they need and repeatedly receives high satisfaction ratings from students, faculty, and staff (SSI, 2012). RCTC utilizes a variety of technology and resources in its online offerings. To enhance the utilization of these resources and to ensure compliance with ADA requirements and other policy, procedures and best practices, a formal process to review, implement and inventory technology and resources used in classes is needed.

Recent student feedback data suggest students desire access to grades and expect high quality faculty interaction in all learning formats. While Quality Matters (QM) standards are promoted and training provided to RCTC faculty in a variety of formats, a small number of faculty have completed the training, and less have completed the external review process. Faculty who have completed QM training report significant improvement in student learning and satisfaction. To date, a formal professional development process does not exist to ensure consistent training for faculty new to teaching online. Finally, national data suggest students at community colleges are taking fewer credits and working more hours. As a result, the need for courses necessary for graduation or progression are a growing concern and this new factor impacts course scheduling. A review of the data provided in this division MAP's suggest the following:

- Fully online course delivery has decreased in the past five years by 10%, however the use of technology enhanced delivery (hybrid) has increased by 10%. According to faculty, hybrid models provide greater student learning opportunities and the opportunity for students to learn the use of technology or software with direct help from faculty.
- RCTC has a number of fully online programs, however online support services are limited. Data from national and institutional surveys suggest students desire more online tutoring, online advising, and online counseling (SEMC, 2016; Student Satisfaction Inventory, 2016).
- Fully face to face offerings are not consistent in the use of LMS (D2L) to post syllabi, schedules, communication updates, or grades.
- Educational Technology host a variety of training sessions for faculty throughout the year, however, faculty generally seek one on one training when questions arise. Faculty learn the basics of D2L through D2L 101. Short tutorials that support managing functions within the course are available for faculty to share with students. Awareness of resources available for both students and faculty within Educational Technology vary. There is a need to develop a professional development process for faculty new to teaching online.
- There is a need to develop a process for faculty to explore e-learning technologies for possible adoption and use in RCTC courses. Opportunities also exist to create a repository for e-learning technologies and resources.
- The number of faculty participating in Quality Matters trainings averages 16 per year over the past five years. However, there is no requirement for QM training prior to teaching online. Faculty feedback from this training within the College, system and nationally suggest a strong positive relationship between the process and application of the QM rubric within the course and student satisfaction.
- Strategic Enrollment Management Academic Affairs (SEM AA) analyzes course success within different delivery modes, and develops and implements interventions to increase student success in the classroom. There is a need to identify and support related professional development in this area to achieve planned outcomes.

Given these findings, the institution would benefit from developing a comprehensive Online Education Strategic Plan that will incorporate many forms of learning technologies and address: student success, instructional expectations, professional development needs, and infrastructure. There needs to be a comprehensive inventory of all current technologies being incorporated for instruction and develop a site to maintain such inventory. The plan must address the great disparity in digital literacy and success of students identified in the opportunity gap. Finally, work done on the assessment of student learning must also work in the online learning environment.

Physical Education, Health, Recreation; Sport Management

Three-Year Enrollment Trends:

Program/Discipline	2011-12	2012-13	2013-14	2014-15	4-Year % Change
Health	78.59	83.48	87.06	76.66	-2.4%
Physical Education	80.3	76.72	80.73	64.08	-20%
Recreation	3.8	3	2.3	3.2	-15%
All College Enrollment	4490.77	4488.01	4321.86	4154.31	-7.4%
Awards	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**Total**
Sport Management AAS	1	4	3	1	9
Personal Trainer Certificate	0	0	0	1	1
Coaching Certificate	0	1	0	1	2
Coaching Diploma	1	2	4	1	8
Personal Trainer Diploma	2	1	3	8	14
Group Fitness Instructor Diploma	1	0	1	3	5

Enrollment in Health courses remains strong as several of courses in this area are required in health related programs. While there has been a significant decrease in physical education enrollment, the decrease occurred after the introduction of FYEX and may be related to a reduction in number of physical education credits required by our transfer institutions. There is need to evaluate course scheduling to improve fill rates and course success. While there was a significant amount of common course outlines updated during FY16, a number of courses remain to be updated this year.

Occupational Data:

Job Title	2012 Employment	Projected 2022 Employment	Percent Change	Replacement Openings	Total Openings	Median Wage
Fitness Trainers and Aerobics Instructors	358	377	5.3%	40	60	$15.24
Recreation Workers	401	432	7.7%	50	80	$11.15

Changes in degree requirements and wages suggest a bachelor degree is key to employment in this sector. While employment options exist for the AAS, Diploma, and Certificate in Sport Management degree pathways as recreation workers, these pathways are limited with small projected growth and do not provide a livable wage. Employment, graduate data, and instructional cost data suggests the need to explore the creation of an AS degree pathway, articulated to vibrant bachelor degree programs. Health courses also support a number of allied health, nursing programs, and licensure requirements.

Significant Internal Factors:
The following factors are relevant to this entire instructional area, and were taken into consideration while forming divisional goals:

- Declining overall enrollment consistent with national and state trends.
- Requests from faculty for training that addresses ongoing challenges with classroom management, assessment, student engagement, Quality Matters, and curriculum development.
- Not all areas supportive to the awarding of credit for Credit for Prior Learning.
- Multiple Minnesota Transfer Curriculum (MnTC) course options compete for scarce resources, resulting in reduced fill rates and institutional efficiency.
- There is increased diversity in our community and student population.
- A need exist for a process and tool to capture and measure assessment activities at an institutional level.
- Academic support service areas promote student and institutional success with reduced resources.
- Reduction in staffing impacts work volume and capabilities to meet priorities.
- Technology and technology related tools are rapidly growing and changing.
- Required physical or health credits align to our community emphasis on wellness and reinforce the importance of personal responsibility.
- Students are requesting more accelerated degree pathways and Credit for Prior Learning options (ALI, 2015)

Significant External Factors:
A variety of external factors exist that impact actions necessary to be taken within the division. Key external factors are identified below.

- **Need for Educated Workforce:** The Mayo Clinic, Rochester's largest employer, and other local employers require an associate degree for advancement or promotion. Much of the planned growth through Destination Medical Center (DMC) will require an educated workforce with some form of post-secondary credential.
- **Online Learning:** Students are requesting consistency in the online learning experience and more local higher educational institutions are promoting courses and faculty that have achieved the Quality Matters Seal of Excellence.
- **Cost of College:** PSEO enrollment at RCTC has exceeded 500, and remains a high quality and affordable option for area high school students.
- **Accreditation requirements:** the RCTC 2015 Higher Learning Commission Feedback Report notes the need for the creation of an Institutional Assessment Plan – providing evidence of student learning, organizational effectiveness, and continuous quality improvement.
- **Instructor Credentialing Requirements.** Local school districts want to grow concurrent enrollment with RCTC. HLC clarification on instructor credentials levels the playing field for post-secondary institutions offering concurrent enrollment. The

Minnesota State system now requires all post-secondary institutions to be National Alliance for Concurrent Enrollment Partners (NACEP) accredited by 2021.

- **Alternative Learning Pathways.** Potential students and employers are requesting assessment of business and industry training obtained outside the traditional classroom and are requesting CPL or Credit Certification (CC).
- **Minnesota State Charting the Future #3:** Directive to certify student competencies and capabilities, expand pathways to accelerate degree completion through credit for prior learning, and foster the award of competency-based credit and degrees.

Assessment Needs:
The college is in the process of developing an Institutional Assessment Plan. The College recently completed the learning outcomes for the Liberal Arts and Science degree. The disciplines and courses that make up general education and the Liberal Arts Degree will undertake curriculum mapping and related assessment to the degree outcomes this academic year. This activity will provide a collective and comprehensive review of course offering and learning objectives and will identify and reduce duplication within major so effectiveness and efficiencies can be achieved.

There is a less developed understanding and approach to assessment within the academic support areas including the Library, Online Education, and Educational Technology, Counseling, Advising, and the Comprehensive Learning Center. National data suggest academic support services are essential to student success, yet how to measure these services at RCTC has remained elusive. Each of the above areas have noted a need for clear and consistent assessment tools.

Overarching Division Goals:

This instructional division supports teaching excellence, effectiveness, and advancing pathways to degree completion by promoting student success for all students and at risk populations. Success in this area will require intentional focus on developing the necessary processes for continuous quality improvement and professional development activities that promote classroom management, inclusion, equity, curriculum development and assessment. Division goals align to RCTC and Charting the Future strategic initiatives. Below are the overarching goals identified within this division's MAPs.

- Promote student success, equity, and inclusion through high quality curriculum, global learning opportunities, and professional development. (MnSCU Goal 1, 3; RCTC 1.2, 1.3, 2.3, 4.3).
- Increase enrollment through the promotion of alternative learner pathways (CTF 2.2.2; RCTC 1.4).
- Create a culture of continuous quality improvement (RCTC 2.1, 2.4).
- Align academic support services to increase student success in identified at risk populations.
- Align programming in Health, Physical Education, Recreation and Sport Management

Resources Needed to Achieve Division Goals:
There were two striking outcomes associated with achieving goals identified in the divisional MAPs. First, there is a need to realign Academic Affairs divisions in order to provide the necessary support and resources to grow initiatives that provide greater student success and academic effectiveness. Second, an institutional culture of continuous quality improvement is necessary if we seek to remain relevant and responsive to local, regional, and national demands. The following resources were identified to reflect these outcomes:

- Input and involvement from faculty and staff to plan, implement, and assess faculty professional development, and assure alignment to academic affairs and institutional strategic priorities.
- Defined process and system for curriculum mapping, evaluation, and assessment.
- Dedicated focus and attention to determine and implement assessment of the library and related services.
- Input and involvement from faculty and staff to create a new comprehensive strategic plan for online learning.
- Enhanced process and structure to increase CPL options, advising, and promoting of such options.
- Faculty and staff engagement in the re-designing of the Comprehensive Learning Center, supplemental instruction, and tutoring.
- Faculty and staff engagement to build and promote a robust Honors Program that will attract new students.
- Technology solution for the planning, tracking, and reporting of assessment initiatives.
- Current e-learning technologies to promote and enhance student success.

STUDENT SUPPORT SERVICES

Programs and Services:

- ADMISSIONS AND RECORDS
- ADVISING/COUNSELING
- CAMPUS SAFETY AND SECURITY
- DISABILITY SUPPORT SERVICES
- FINANCIAL AID
- OFFICE OF STUDENT CONDUCT
- STUDENT EMPLOYMENT
- STUDENT HEALTH SERVICES
- STUDENT LIFE & ATHLETICS
- STUDENT SUPPORT SERVICES (TRIO)
- UPWARD BOUND (TRIO)
- VETERANS SERVICES

MAP Division Summary: *Student Support Services*

Programs/Disciplines/Services:

- Admissions and Records
- Advising/Counseling
- Campus Safety and Security
- Disability Support Services
- Financial Aid
- Office of Student Conduct
- Student Employment
- Student Health Services
- Student Life & Athletics
- Student Support Services (TRiO)
- Upward Bound (TRiO)
- Veterans Services

Introductory Comments:

Student Affairs is responsible for long-range planning, policy development, implementation and the general administration of student affairs programs (listed above). The vision of Student Affairs is to support and encourage students to achieve their goals and navigate pathways to success by providing comprehensive student services. The divisional mission is to deliver consistent, quality services which support the college and empower students for life and work in a global community.

Pride Points:

- Admissions and Records staff are knowledgeable, experienced professionals that serve as the "go-to" place for answers, strive for excellent customer service, have strong working relationships with area partners including local high schools, and through a partnership with Winona State University-Rochester have shared staff to facilitate transfer.
- Advising and Counseling provided over 17,000 contacts to students through appointments, walk-ins, classroom presentations, workshops and new student registration.
- Advising and Counseling received a grant from Great Lakes Higher Educational Authority to provide startup funds for a student emergency fund totaling $52,000 over two years. Advising and Counseling received a $10,000 grant from the Minnesota State system inclusion grant to fund *Moving Forward*, a project aimed at creating greater awareness about poverty and the needs of low-income students. Part of the grant assisted low-income students to be retained in college.
- Counselors began the Career Workshop series with transfer options for students entirely in Rochester. This was presented with Mayo School of Health Sciences and the University of Minnesota Rochester.
- Disability Support Services (DSS) was ranked number one with the Minnesota State system for overall percentage of students served with disabilities compared to total enrollment. Nearly eight percent of students enrolled at RCTC have identified themselves to DSS and are eligible to receive accommodations.
- Financial Aid team disburses $45 million+ in financial aid annually and maintains a consistent low default rate.
- Student Employment provides positions both on campus and through the community through off-campus work agreements for approximately 600 students per year.

- Student Life offers 29 clubs and programs; a Welcome Day for first-year and transfer students; an award winning Student Senate; Visual and Performing Arts programs in collaboration with faculty and a food cupboard. Athletics has a legacy of champions with more than 191 All-Americans. Athletics offers men's baseball, football, and wrestling; women's soccer, softball and volleyball; and men's and women's basketball and golf.
- TRiO has been at RCTC for over 30 years. The Student Support Services grant has received an exemplary rating in their annual performance report for the last five years in a row.
- Upward Bound has a graduate that went on to attend Yale University. Upward Bound serves 60 students annually and has been successful in meeting their program objectives with their participants since the beginning of the grant program in 1994.
- Veterans Services provides an orientation, Veterans Resource room, Veterans club, hosts a regional benefits coordinator and provides enrollment certification services to 242 Veteran students in FY2016.

Significant Internal Factors:
The new student orientation process was identified as an area that needed attention. Fall 2015, Student Affairs was charged with evaluating and assessing RCTC's student orientation and registration processes. A group of individuals from Admissions, Counseling/Advising, Academic Affairs and Testing met regularly to work on this project. Based on past practice and survey data, we decided to separate assessment/placement testing from orientation/registration for new students. As such we have created a new assessment testing schedule which you will find **here.** As a result of testing being separated, we are able to reduce the number of orientations while offering a more robust orientation program for new students. Being separate also helps students better focus on the placement assessment on the day of their test. The format has moved from one-on-ones with advisors in the Welcome Center to meeting with advisors in a lab environment. Our goal is that students will be better equipped to navigate e-services for their online registration. We will still provide individualized attention to those who need it with the assistance of Admissions personnel in the labs. The new student orientation (revised) commenced in spring 2016.

The Advising/Counseling department is working on initiatives to increase retention through the use of data collection and analysis, enhancing customer service, the use of student learning outcomes, and targeted outreach and support to students in need.

Disability Support Services reported the number of students served is up 12% since 2011.

Financial Aid is exploring financial literacy education and outreach in collaboration with Student Life.

Student Health Services reported the number of student visits is up 8% since 2011.

Student Life facilities have shown age for those built in the 1970s, e.g., theater, music, student life and athletic facilities due to usage and wear over the last 15 years. Student classrooms in the Regional Sports Center do not meet current academic needs.

The Office of Student Conduct was previously staffed by a .20 position. Over the last year it was determined of the need for a 1.0 position. A new Director of Student Conduct, 1.0 FTE, was hired and began in the summer of 2016. The Director's role includes managing the code of student conduct, coordinating the behavioral intervention team and providing training for faculty, staff and students regarding the code of conduct, students of concern and Title IX related concerns.

Staffing was reported as a key internal issue in a number of departments including Admissions, Academic Advising and Counseling and Student Life.

Significant External Factors:
For the past 3 years, and through year 2020, the number of high school graduates will be declining nationally, regionally, and in Minnesota. Though the decline in Minnesota graduates is not as dramatic as other states, we will begin to see a change in the ethnicity of the students who are graduating from MN high schools, particularly in Southeast MN and Rochester. The changing demographics will force Admissions and recruitment strategies to align with the needs of our changing community.

Over the past ten years there has been an increase in first generation, diverse, underrepresented and low income students. Consequently, the need for Advising and Counseling department services has never been greater. In particular, the increased numbers of students: living in poverty; dealing with depression, anxiety and other mental health issues; single parents; children of helicopter parents; academically (I.Q.) and emotionally (E.Q.) underprepared for the rigors of the college experience; and older adult students. Advisors and Counselors are uniquely qualified, because of their extensive preparation and background experiences, to holistically assist students who might be at-risk for withdrawal and assist them to maintain their academic progress while dealing with extraordinary barriers.

Advisors and Counselors must be more aware of diversity issues and the ways to serve these students of diverse backgrounds. This includes students in financial need and students who are homeless. Other factors that have impacted advising services is the underprepared student that is taking developmental sequencing of classes. This segment of the population has become a target for more individualized services and Advising Services has the background and knowledge to help them through the process and work to maintain academic excellence.

Last year's Minnesota Campus Sexual Assault Legislation, which went into effect on August 1, 2016, requires mandatory sexual violence training within the first 10 days of their first semester for all incoming students.

Implementation of the two-year Minnesota State system occupational grant has an impact on admissions, financial aid, advising and counseling as well as faculty, staff and students. Employees are viewing a webinar to learn more information about the mentoring program.

Veteran's services saw a marked increase in the number of students served, up 64% since 2011, with no increase in staffing. As the military draw down preceded, the number of returning service members increased. Additionally, the change in DOD policy allowing service members to transfer eligibility to family members increased the use of VA benefits. The number of international students has doubled and both populations are served by the same advisor (1.0 FTE).

Rochester is experiencing a very low unemployment rate. As more community residents are employed full-time, the bigger challenge it will be to recruit those for a change of career or to better equip students for professional promotions. RCTC will need to offer courses and programs at varying times to meet the demands of full-time working students.

Assessment Accomplishments/Opportunities/Needs:

- Student Affairs created four Assessment Liaison positions in April 2016. Three training sessions were held in the summer of 2016 to create student learning outcomes and methods of assessment across student affairs. Student Affairs collaborated with Academic Affairs to provide training on methods of assessment for student affairs leaders.
- Path to Purple Academic Advisor (shared with WSU-R), will serve as the co-chair of the Institutional Quality Council.
- All Student Affairs units will implement one student learning outcome and methods of assessment during fall semester 2016 and spring semester 2017.
- The creation of a student affairs assessment plan will be implemented fall 2016.
- All assessment efforts, including student learning outcomes and methods of assessment, will be tracked in one database, in collaboration with the rest of the College.
- Definitions for co-curricular and extracurricular activities were developed and student learning outcomes will be developed and implemented fall 2016 and spring 2017.

Overarching Division Goals

These goals support the College's, mission, strategic priorities and outcomes:

- Increased outreach and communication to prospective traditional and adult student populations;
- Increased retention activities and services for targeted population of students;
- Assessment of student learning outcomes and the creation of an assessment plan;
- Increase collaborative efforts and programming on diversity and civility;
- Exploration of students' off-campus housing concerns and options.

Resources Needed to Achieve Division Goals:

- Input and involvement from student affairs leaders, faculty, administration, and other staff members;
- Technology tools to better serve student affairs with recruitment and retention efforts. We are waiting for the Minnesota State system to finalize their CRM RFP process to implement a new CRM tool in July 2017;
- Additional internal and external funding resources to scale up retention initiatives;
- Additional community partnerships to attract and retain diverse students;
- Professional development to educate employees on needs and challenges of targeted populations;
- Additional licensure for appropriate personnel to support student outcomes;
- Staff time devoted to assessment of student learning outcomes.

Budgetary Needs to Achieve Division Goals:

Student support requires intrusive advising and creating a high touch culture within each of our departments. The staffing in the division is lean in some areas, specifically Student Life, Advising and Counseling, and Financial Aid. External funding and institutional funding will need to be secured and/or re-evaluated to meet the goals outlined in this MAP.

Vice President of Student Affairs and Enrollment Management's Strategic Priorities:

Area	Goal/Alignment	Action Step	Outcome	Resources
Student Success; Admission and Records	Create a comprehensive plan to best identify and address opportunities to advance student recruitment, retention, and completion. (Strategic Plan: 1.1.D)	**Year 1** * Identify which initiatives are currently working using current data reports and metrics. **Year 2** * Design retention interventions with faculty and staff input. **Year 3** *Assess interventions using various quantitative and qualitative measures.	*Increase in enrollment of new students and returning students.	* Staff time and professional development. * Seed funding for new recruitment and retention initiatives.
Student Success; Student Life	Develop mentoring program for students at-risk as a check-in process for navigating the College's procedures, information, etc. (Strategic Plan: 1.3.C)	**Year 1** * Research at-risk population mentoring programs. **Year 2** *Design pilot program(s). **Year 3** *Assess and expand pilot program to additional populations.	*Increase in retention, persistence, and success of at-risk student populations.	*Resources for professional development. *Staff time and/or faculty release time to develop and assess outcomes.
Advising / Counseling Staff	Implement strategies to assist students in achieving student learning outcomes. (Strategic Plan: 1.3.D)	**Year 1** * Attend NACADA Assessment Institute and define learning outcomes and road ma **Year 2** * Define measures of assessment **Year 3** * Implement and track measures set	*Increased student success as measured by involvement, retention, and persistence.	*Resources for professional development. *Staff time and/or faculty release time to develop and assess outcomes.
Campus Safety and Security;	Create neighborhood coalition with	**Year 1** * Invite members from the campus and	*Increased retention for students living in	*Meeting space, and professional development about

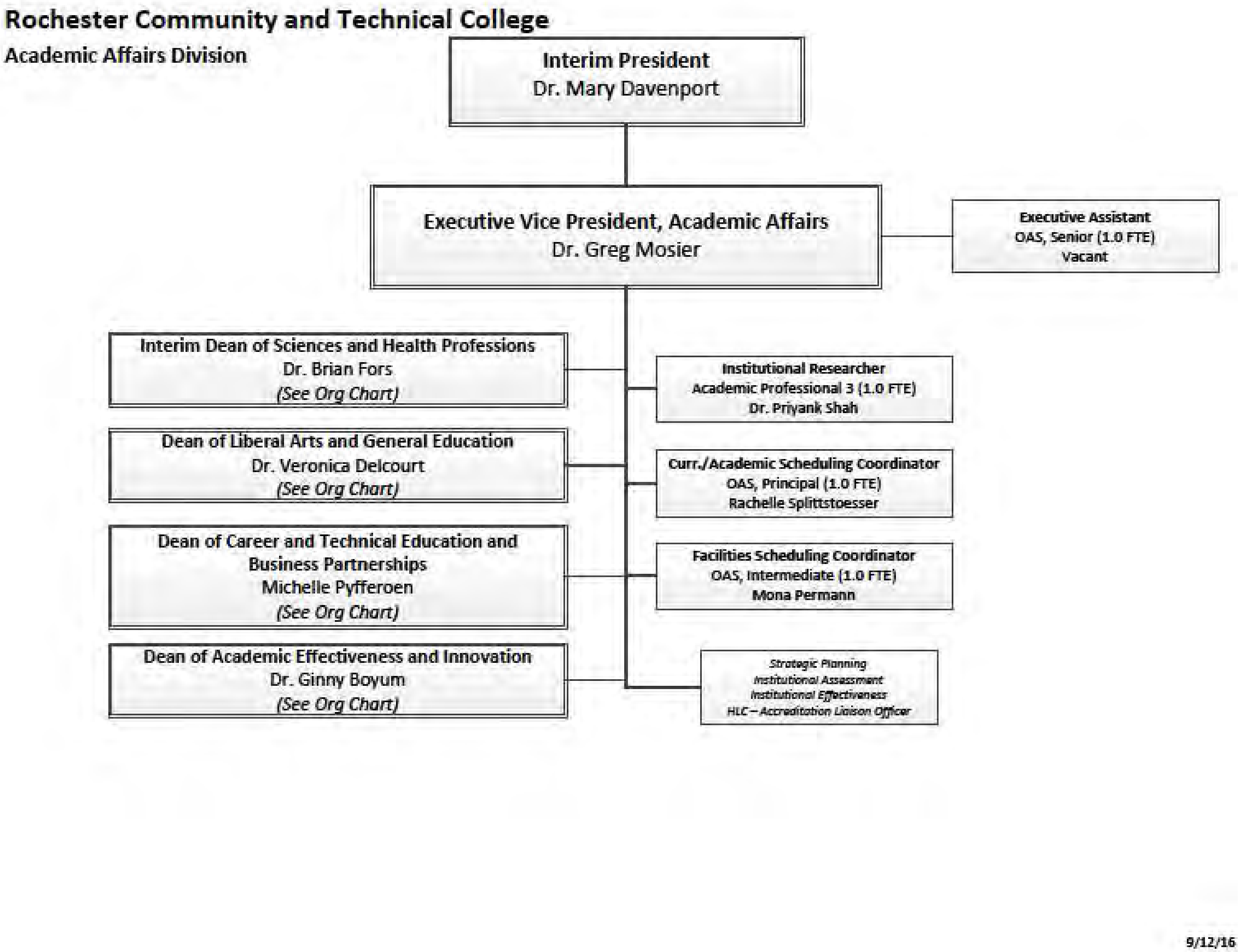
Student Conduct; Business and Finance	Landlords, local law enforcement, and college to address safety and security needs of students, employees and neighbors. (Strategic Plan 1.4.B)	community to join the coalition. **Year 2** * Develop resources to share with students and employees. **Year 3** *Expand the coalition and resources.	surrounding properties. *Increased involvement from students in the local community.	building community coalitions.
Academic and Student Affairs	Explore a process by which students commit to RCTC's goals and core values (Strategic Plan: 3.1.C)	**Year 1** * Research benchmark institution's tools. **Year 2** *Design a tool(s) to utilize with students to increase commitment to goals and core values. **Year 3** *Implement/share the tool(s) and resources to increase student commitment to core values and goals.	*Students report greater knowledge, commitment and satisfaction with the College's mission as reported through institutional surveys.	*Research on benchmark institutions and best practices.
Advising / Counseling Staff	Prepare for the implementation of a system wide student services technology tool that engages academic advisors, counselors, faculty, and staff to create comprehensive academic plans for all students. (Strategic Plan 3.3.A)	**Year 1** * Select product through the Minnesota State system RFP process. **Year 2** * Internal Needs assessment of proper use on campus. **Year 3** * Implement and communicate changes to RCTC community.	*Selection and Implementation of CRM tool.	*Resources for purchase of CRM system.
Campus Safety and Security; Student Conduct; Student Life	Create a campus wide initiative to promote a culture of civility. (Strategic Plan: 3.4.B)	**Year 1** * Assemble a team to research civility models and launch the campaign. **Year 2** * Expand the campaign across campus and the community. **Year 3** * Assess the effectiveness	*Student and employee report of civility and empathy as measured on climate surveys will improve year-to-year.	* Best practice research, marketing materials, and staff time to manage the campaign.

		of the campaign through campus surveys and focus groups.		
Admissions and Records; SEMC	Review and evaluate recruitment and outreach initiatives and develop a comprehensive recruitment plan. (Strategic Plan: 4.1.A)	**Year 1** * Establish simple communication flow to relay services and ways to become involved at RCTC. **Year 2** * Develop and implement segmented, targeted communication flow to various audiences such as non-traditional, veterans, international, PSEOP, etc. **Year 3** * Review for outcomes (yield) and revise communication flow as necessary.	* Accepted enrolled yield will rise with a greater awareness of services offered at RCTC.	* Functioning CRM system to integrate with ISRS and communicate with students at all stages in the enrollment cycle.
Admissions and Records; SEMC	Research educational needs of adult learners, establish recruitment plan, and foster community relationships to achieve strategic goals. (Strategic Plan: 4.1.B)	**Year 1** * Research and establish non-traditional recruitment plan, focusing on delivery methods and resources needed to effectively recruit non-traditional students. **Year 2** * Hire Adult Outreach Coordinator to engage with non-traditional recruitments and to execute recruitment plan. **Year 3** * Evaluate effectiveness of recruitment plan.	*Enrollment yield of non-traditional students will increase by 2% by the end of year 3.	* Functioning CRM system to Integrate with ISRS and communicate with students at all stages in the enrollment cycle. * Additional 1.0 FTE staff member to recruit non-traditional students; staffing to help with increased student needs in Admissions and Records counter. *Will need workspace for additional recruiter as well as workspace for the Lead Registration Specialist, whose tasks cannot be performed at the

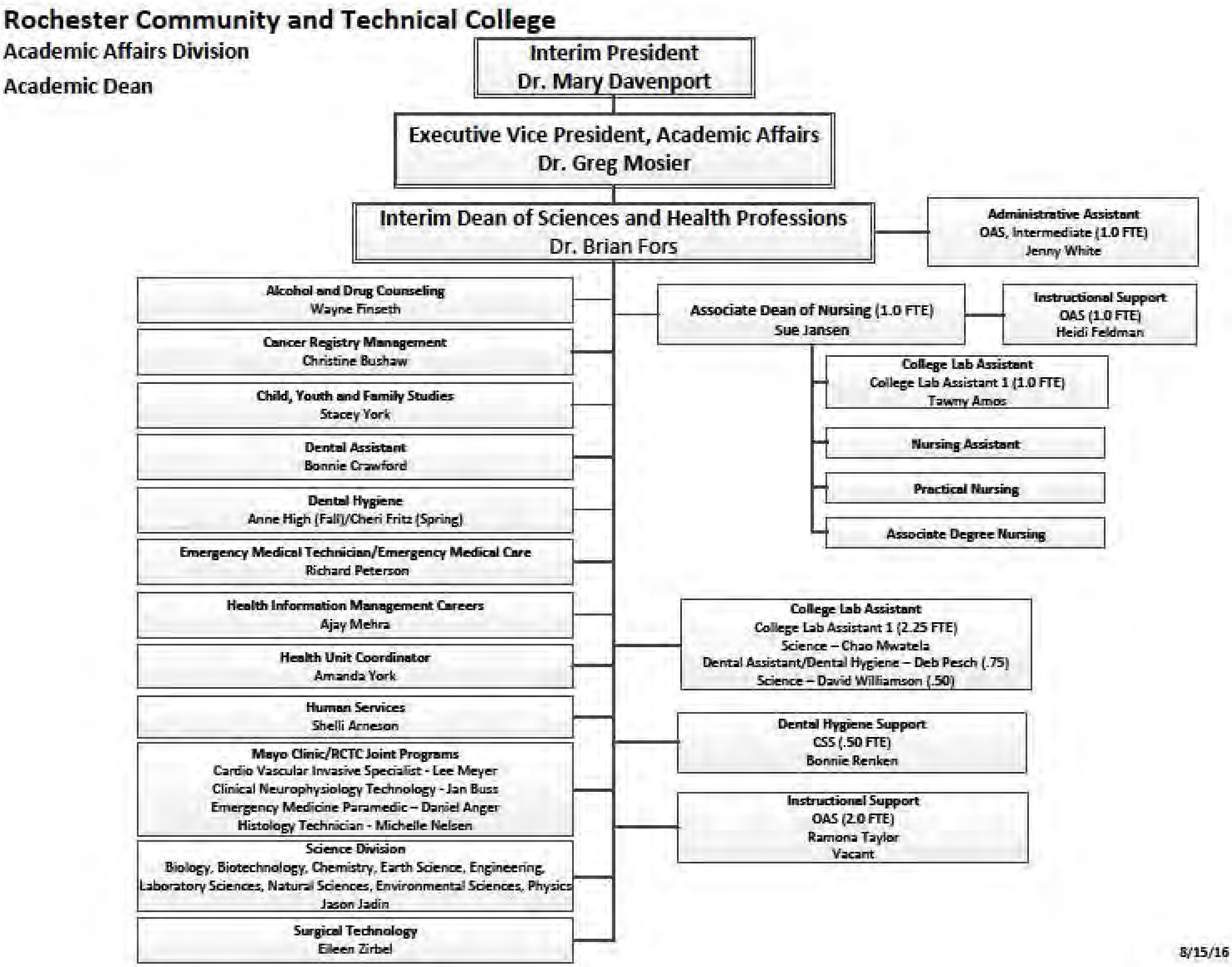
				counter workstation. * Time and allowance for internal professional development during working business hours. Seminars, webinars, structured meetings to discuss tasks at length is necessary to achieve cross-collaboration. *External professional development opportunities for all staff to learn more about higher education and enrollment management to enhance their knowledge and skills.

APPENDICIES

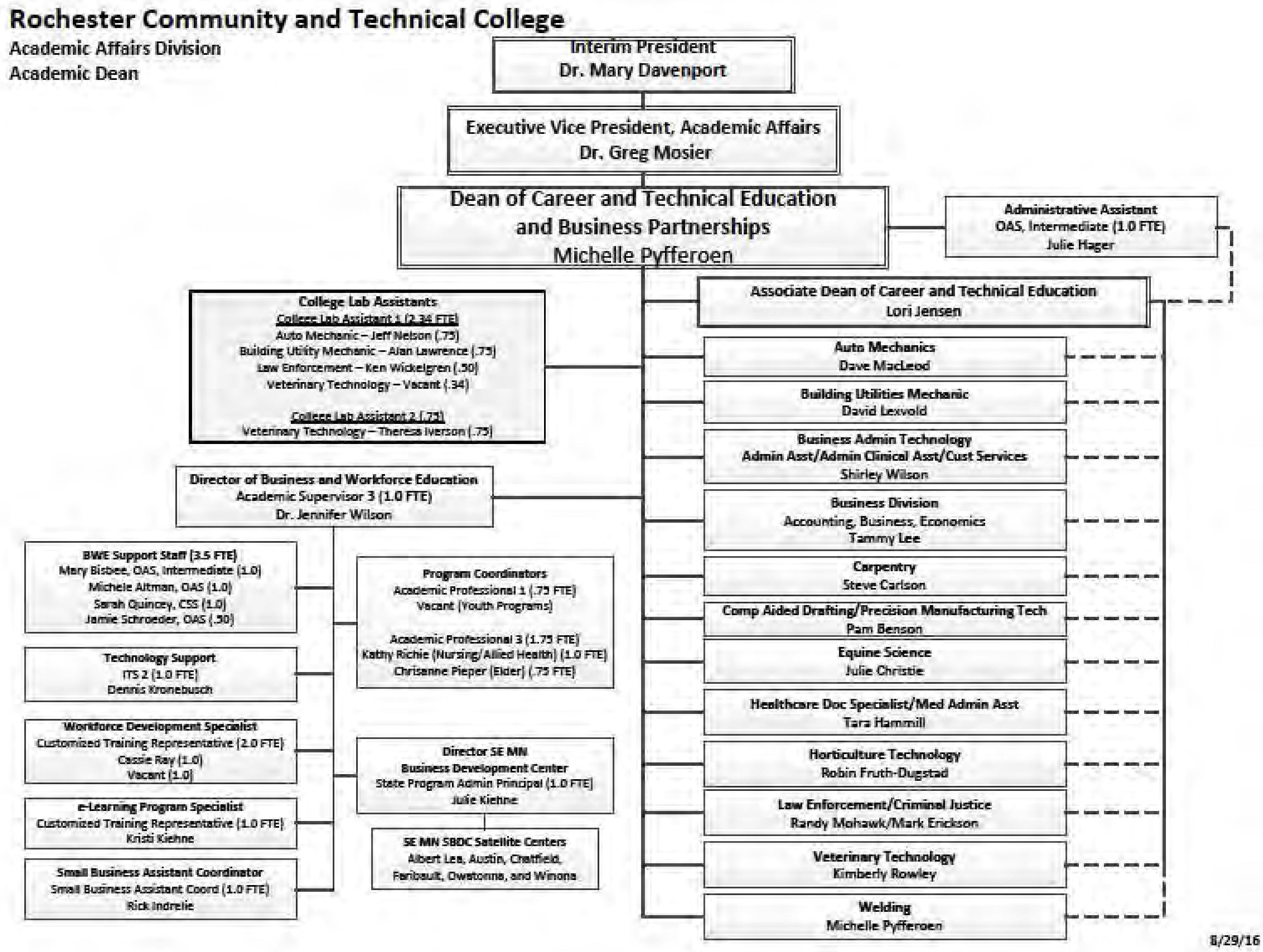
Appendix A.1—Executive Vice President, Academic Affairs



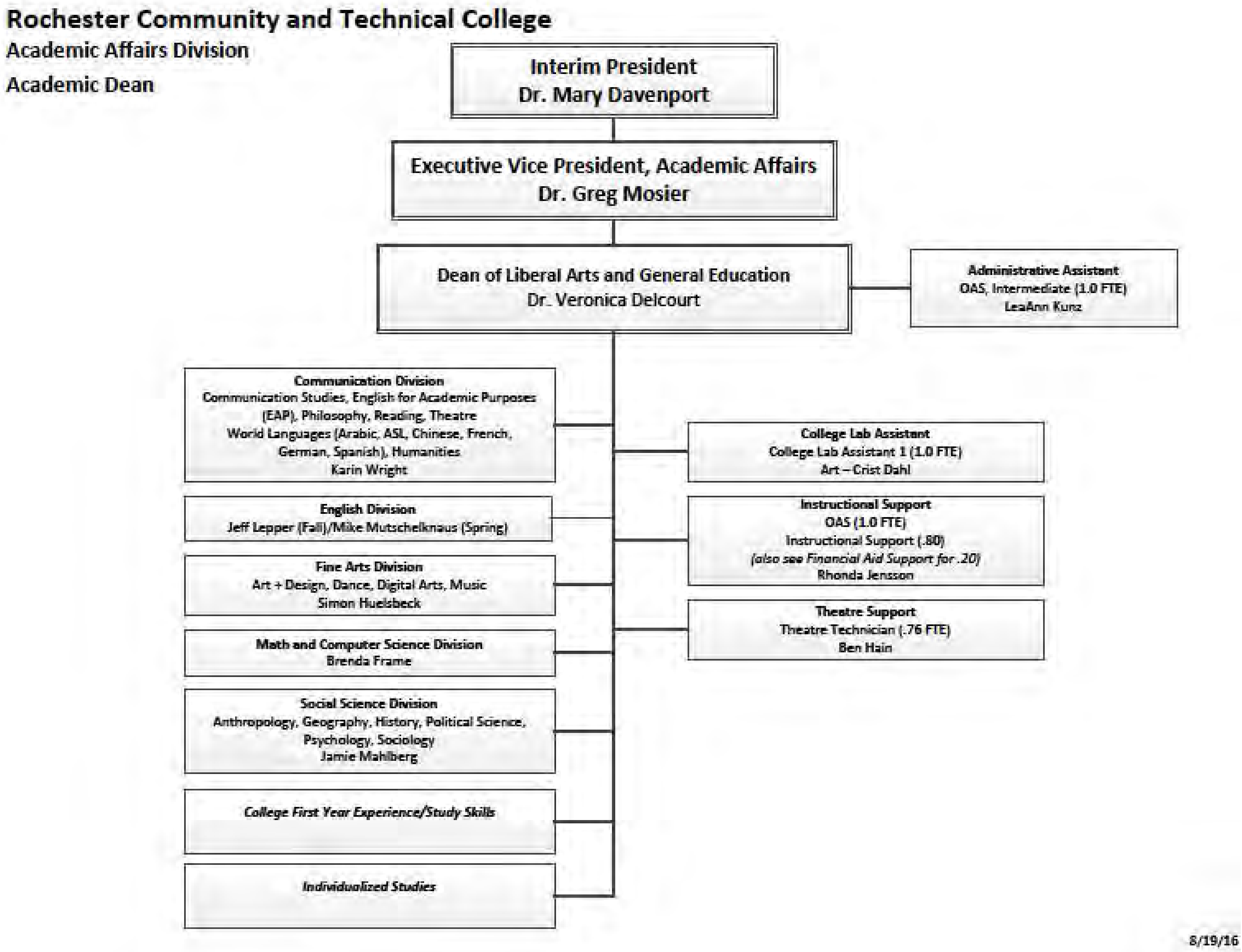
Appendix A.2—Dean of Sciences and Health Professions



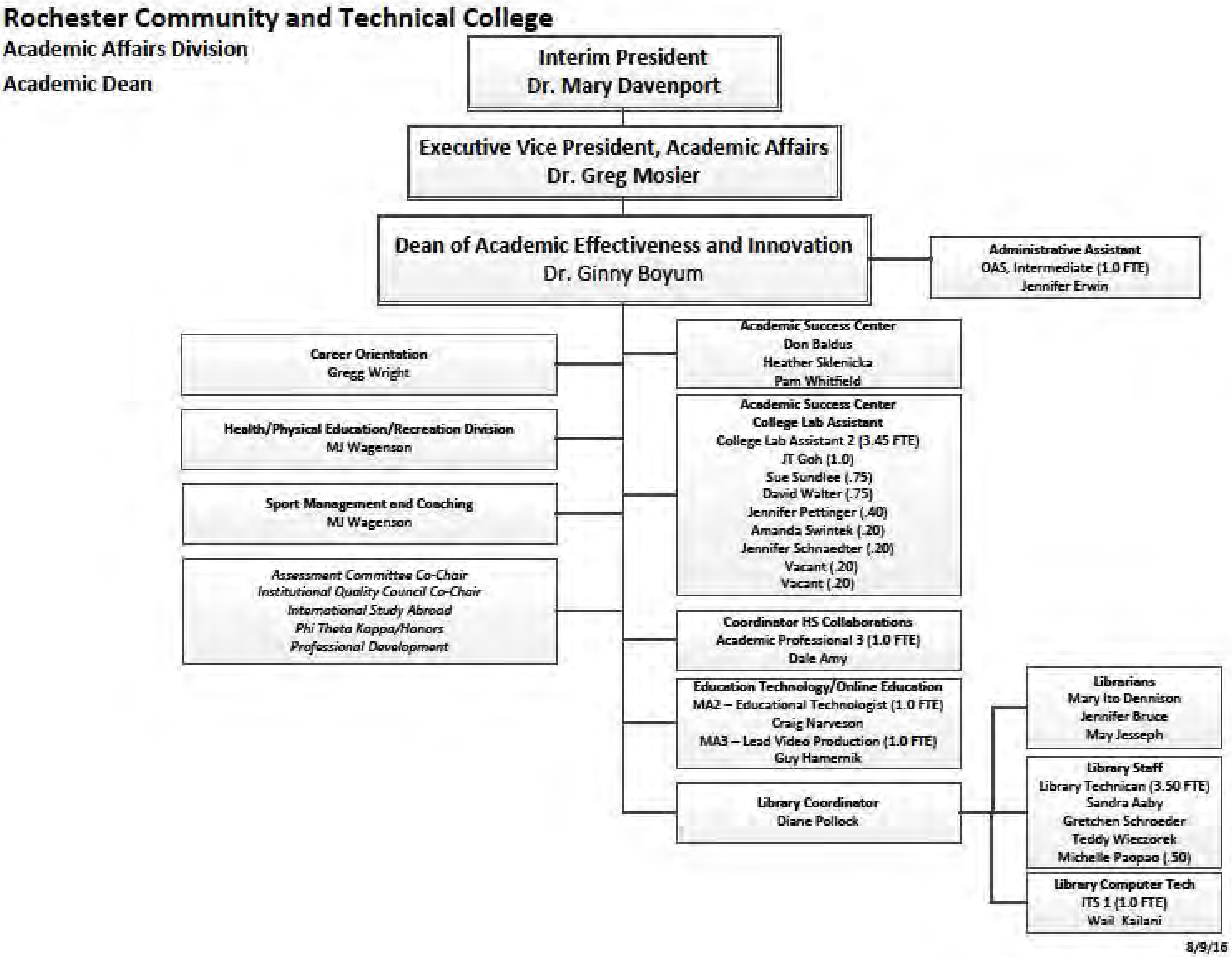
Appendix A.3—Dean of Career and Technical Education and Business Partnerships



Appendix A.4—Dean of Liberal Arts and General Education



Appendix A.5—Dean of Academic Effectiveness and Innovation



Appendix B

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE
MASTER ACADEMIC PLAN:

Mapping the Future of RCTC's Educational Offerings and Initiatives

1. **Introduction**
    a. President's Letter and VPAA Message
    b. Purpose/Overview
    c. Historical Narrative
    d. Minnesota State system Strategic Framework
    e. Minnesota State *Charting The Future* Initiatives
    f. RCTC Mission, Vision, Values and Outcomes
    g. RCTC Institutional Strategic Priorities
2. **RCTC Today: Institutional Profile & Current Status**
    a. Institutional Demographics
    b. Student Demographics
    c. Current Academic Programming
    d. Current Student Support Services
    e. Current Campus/Instructional Technology
    f. Facilities
    g. Current alignment with Minnesota State Goals/National Benchmarks
3. **The MAP Process and Goals**
    a. MAP Vision:
    b. MAP Teams:
    c. MAP Process: *(Explaining the process of creating the Master Academic Plan)*
       (Utilizing/Promoting/Supporting evidence-based decision making.)
    d. MAP Goals: The development of a comprehensive Master academic plan will provide the roadmap to advance our academic vision, mission and values for the next three-years and beyond. It will provide the foundation for intentional actions to ensure RCTC's academic programs and services meet the holistic needs of our students, workforce and community. It will provide data to inform decision-making processes for RCTC's Information Technology and Facilities Plans. Desired outcomes will be to:
        5. Identify external and internal demands and needs to create a portfolio of programs and services to meet current and future student, community, business and industry needs.

6. Develop strategies to increase student learning and success. (IE: college level preparedness, persistence, retention and completion, assessment of student and program outcomes; ABE/developmental education/gateway courses)

7. Identify needs and create a comprehensive faculty/staff professional development program.

8. Identify needs and develop comprehensive offering of resources to assist students with career exploration, job placement and transfer opportunities.

9. Identify campus and instructional technology needs to develop a comprehensive instructional delivery plan that supports innovation and enhances student success.

10. Meet Higher Learning Commission Criteria for Accreditation, 5.C.

4. ***Area Reports:***
*(**NOTE:** Each instructional and academic support area will address the following Core Reporting Areas. Additional guidance and resources are provided in a MAP Academic Planning Tool and a MAP Instructional Support Planning Tool.)*

1. Mission
2. Vision
3. Pride Points and Long-Range Aspirations
4. Data Scans (Internal)
5. External Factors
6. Current Outcomes and Assessment
7. Specific Goals (Aligned with MAP Goals)
8. Resource Needs
9. Action Plan

5. **Instructional and Academic Support Areas:** *[Area Planning Teams (APT) identified by Roman numerals. Each area identified with a Roman numeral will create a combined MAP.]*

a. General Education
    i. Career Exploration/Study Skills/First Year Experience – Michelle Cochran, Taresa Tweeten, co-leads
    ii. English – Jeff Lepper, lead
        1. Developmental English
        2. College level English
    iii. Health/Physical Ed/Recreation – MJ Wagenson, lead
        1. Coaching (Cert, Dipl)
        2. Group Fitness Instructor (Cert, Dipl)
        3. Personal Trainer (Cert, Dipl)
        4. Sport Management (AAS, Dipl)
    iv. Mathematics – Brenda Frame, lead
        1. Developmental Math
        2. College level Math
    v. Reading – Annie Clement, lead

        1. Developmental Reading
        2. College level Reading

b. Liberal Arts
    i. Communications and Mass Communications – Annie Clement, lead
        1. Communication Studies (Cert)
        2. Workplace Communications (Cert)
    ii. Fine Art and Design – Jeff Jacobsen, lead
        1. Art (AFA)
        2. Digital Art (Cert)
        3. Graphic Design (AS)
        4. Mobile Application Development (Cert)
        5. Motion Graphics (Cert)
        6. Photography (Cert)
        7. Web Design (AS)
    iii. Foreign Languages – Annie Clement, lead
        1. American Sign Language
        2. Arabic
        3. French
        4. Spanish
    iv. Humanities – Annie Clement, lead
    v. Individualized Studies (AS) – Deb Vang and Gregg Wright
    vi. Liberal Arts and Sciences (AA) – Ginny Boyum and Veronica Delcourt, co-leads
    vii. Performing Arts (Music, Theatre, Dance) – Kevin Dobbe, lead
        1. Dance (Cert)
        2. Music (AFA)
        3. Music Creative Technologies (AFA)
        4. Music Industry (AFA)
        5. Music Technologies (Cert)
    viii. Philosophy – Annie Clement, lead
    ix. Social Sciences – Jamie Mahlberg, lead
        1. Anthropology
        2. Geography
        3. History
        4. Political Science
        5. Psychology
        6. Sociology

c. Sciences
    i. Agriculture – Julie Christie, lead
        1. Equine Science Horse Husbandry (Cert)
        2. Equine Science Riding/Training (AAS, Dipl)
        3. Equine Studies (Cert)
        4. Horticulture Science (AS)
        5. Horticulture Technology (AAS, 2 Dipl)
        6. Veterinary Technician (AAS)
    ii. Behavioral Sciences – Wayne Finseth, Stacey York, Shelli Arneson leads

1. Alcohol and Drug Counseling (AS, Cert)
2. Chemical Health Assistant (Cert)
3. Child Development (Cert, Dipl)
4. Child Youth and Family Studies (4 AAS)
5. Developmental Disability Assistant (Cert)
6. Human Service Specialist (AS)
7. Human Services Technician (Dipl)
8. Mental Health Assistant (Cert)
9. Youth Work (Cert)

iii. Computer Science – Brenda Frame, lead
1. Bioinformatics Foundations (AS)
2. Computer Information Systems (AS)
3. Computer Programming Skills (Cert)
4. Computer Science (AS)

iv. Health Sciences Broad Field (AS) - Safawo Gullo, lead

v. Natural – Jaime Tjossem, lead
1. Biology
2. Biotechnology (AS)
3. Earth Science
4. Environmental Science (AS)
5. Laboratory Science (AS)
6. Natural Science (AS)

vi. Physical – Rod Milbrandt, lead
1. Chemistry
2. Engineering (AS)
3. Physics
4. Science Foundations A & B – Jason Jadin, lead

d. Health Sciences

i. Allied Health – Eileen Zirbel/Amanda York/Rick Peterson, co-leads
1. Health Unit Coordinator (Cert)
2. Surgical Technology (AAS)
3. Emergency Medical Technology (Cert)

ii. Dental Assistant/Dental Hygiene – Anne High/Bonnie Crawford, co-leads
1. Dental Assistant (AAS, Dipl)
2. Dental Assistant Expanded Functions (Cert)
3. Dental Hygiene (AAS)

iii. Health Information Management Careers – Ajay Mehra, lead
1. Cancer Registry Management (Cert)
2. Coding Specialist (Dipl)
3. Healthcare Informatics (Cert)
4. Health Information Technology (AAS)

iv. Mayo Joint Programs – Safawo Gullo, lead
1. Cardiovascular Invasive Specialist (AAS)
2. Clinical Neurophysiology Technology (AAS)
3. Emergency Medicine Paramedic (AS)
4. Histology Technician (AS)

v. Nursing – Sue Jansen, lead
  1. Advanced Hospital Nursing Assistant (Cert)
  2. Nursing Associate Degree (AS)
  3. Practical Nursing (Dipl)

e. Career and Technical Education
  i. Accounting/Business/Economics - Tammy Lee, lead
    1. Accounting (AS)
    2. Accounting Clerk (Dipl)
    3. Business Administration (AS, Cert)
    4. Business Analysis (Cert)
    5. Business Management (AAS, Cert)
    6. Business Management Marketing Emphasis (AAS)
  ii. Administrative Assistant/Administrative Clinic Assistant/Customer Service Specialist, Shirley Wilson, lead
    1. Administrative Assistant (AAS, AS, Cert, Dipl)
    2. Administrative Assistant – Legal (Cert)
    3. Administrative Assistant Refresher (Cert)
    4. Administrative Clinic Assistant (AAS, Dipl)
    5. Customer Service Administrative Specialist (Dipl)
    6. Customer Service Office Assistant (Cert)
    7. Software Application Specialist (Cert)
  iii. Automotive Mechanic (Dipl) - Dave MacLeod, lead
  iv. Carpentry/Building Utilities Mechanic/Welding - Dave Lexvold, lead
    1. Building Utilities Mechanic (AAS, Dipl)
    2. Carpentry (Dipl)
    3. Welding Technology (Cert)
  v. Healthcare Documentation Specialist/Medical Administrative Assistant – Tara Hammill, lead
    1. Healthcare Documentation Specialist (Cert)
    2. Medical Administrative Assistant (AAS, AS, Dipl)
  vi. Law Enforcement/Criminal Justice - Randy Mohawk, lead
    1. Criminal Justice (AS)
    2. Law Enforcement (AAS, AS, Cert)
  vii. Manufacturing CAD/Precision Manufacturing - Pam Benson, lead
    1. Cad (Computer Aided Drafting) Technology (AAS, Dipl)
    2. Precision Manufacturing Technology (Dipl)

f. Business and Workforce Education - Abbey Hellickson, lead
  i. Community Services
  ii. Economic Development and Entrepreneurship
  iii. Workforce Training and Development
    1. Community Health Worker (Cert)
    2. Supervisory Management

g. Early College/Learner Pathways
  i. Pre-Admission – Dale Amy, Lead
    1. Concurrent Enrollment,
    2. PSEO, CTECH, ALC, Articulation, Etc.…

3. Upward Bound
ii. Learner Pathways - Tara Hammill, Jamie Mahlberg, Michelle Pyfferoen co-leads
1. Adult Learners/CPL
2. Honors/PTK
3. Perkins/Pathways

h. Academic Support Services
i. Academic Excellence/Assessment/Curriculum/ Faculty, Staff, Student Worker Professional Development – Ginny Boyum, lead
ii. Advising/ Counseling – Lisa Mohr, lead
iii. Comprehensive Learning Center - Heather Sklenicka, lead
iv. Instructional Delivery and Online Learning/ Educational Technology - Craig Narveson, lead
v. Integrated Instruction (LCOMS/Co-instruction/Accelerated) Ginny Boyum/Michelle Pyfferoen, co-leads
vi. Library - Jen Bruce, lead
vii. Placement Testing/Proctoring – Veronica Delcourt, lead

i. Student Support Services
i. Admissions - Alicia Zeone, lead
ii. Disability Support Services – DSS - Travis Kromminga, lead
iii. Financial Aid - Beth Diekmann, lead
iv. Health Services - Katie Swegarden, lead
v. Information Technology/TSC Steve Higgins, lead
vi. Student Conduct – Othelmo da Silva, lead
vii. Student Employment Opportunities – Natasha Boe, lead
viii. Student Life (Athletics/Clubs/Co-curricular/Etc.) - Scott Krook, lead
ix. Student Support Services Program (SSSP) - Jason Bonde, lead
x. Veteran's Services – Glen Saponari/ Lisa Mohr, lead

TIMELINE:

Phase 1: Pre-Planning

September-October:

- VPAA and Deans research academic master plans and create draft outline
- Identify MAP Steering Committee
- Gather Steering Committee - Introduce project/outline/timeline, gather and include committee input

Phase 2: Plan Finalization and Soft Roll-Out

November:

- Introduce MAP process/outline/timeframe to PLDC, gather and include input
- MAP Steering Committee works on Outline/Goals/Timeline
    - (Meeting after Nov. PLDC)
- MAP Steering Committee creates Academic Planning Tool
- MAP Steering Committee creates Instructional Support Planning Tool

December:

- Introduce MAP process/outline/timeframe to FSGC & Student Senate, gather and include input
- Campus-wide informational session to introduce MAP process
  - December 8, 2015
- Create MAP Steering Committee Assignments
- Deans-Directors identify Area Planning Teams (APT)
  - December 15, 2015
- MAP Steering Committee finalizes Academic Planning Tool
  - December 15, 2015
- MAP Steering Committee finalizes Instructional Support Planning Tool
  - December 15, 2015
- MAP Steering Committee members begin meeting with respective APT Leads; deliver/discuss Planning Tools.
- APTs: Internal & external data collection begins

Phase 3: Full Kick-Off and Area MAPs Production

January:

- Campus-wide informational sessions and small group work sessions
  - One - First week in January: Focus on non-instructional areas
  - One - Second or third week of academic semester: Academic
  - Small group work sessions led by Deans/Directors/ MAP Committee
- **January**: MAP Steering Committee members meet with respective APT
  - Deliver/discuss Planning Guides
- APTs: Internal & external data collection continues
- APT's solicit input from advisory committees

February:

- Campus-wide informational sessions and small group work sessions
- MAP Steering Committee begins writing section I, II, and III narratives
- APT's solicit input from advisory committees

  ***** NOTE: Annual Program Reviews are due End of February***

March:

- Small group work sessions led by Deans/Directors/ MAP Committee
- **March 1:** RCTC Staff Development Day Work Sessions
- **March MAP Committee Meeting:** Deans/Directors Status Updates
- Present MAP at Group Advisory Committee Meeting **(Date: March 22)**
- APT's solicit input from advisory committees
- APT Leads write Area MAPs

April:

- **April MAP Committee Meeting:** Deans/Directors Status Updates
- **April 15, 2016:** MAP Steering Committee finalize section I, II, and III narratives
- APT's share Area MAPS with advisory committees and gather feedback
- **April 29, 2016:** APT Leads finalize and submit Area MAPs

Phase 4: Area Plans Production

May:

- Deans/Directors review and organize Area MAPs into final document layout
- **May MAP Committee Meeting:** Deans/Directors Status Updates

June: (Specific dates TBD)

- Campus-wide update sessions
- Deans/Directors review and organize Area MAPs into final document layout
- **June MAP Committee Meeting:** Deans/Directors Status Updates

July: (Specific dates TBD)

- **July MAP Committee Meeting:** Deans/Directors Status Updates
- MAP Steering Committee begins to finalize document
- MAP Steering Committee begins executive summary

August: (Specific dates TBD)

- **August MAP Committee Meeting:** Deans/Directors Status Updates

Phase 5: Master Academic Plan Finalization and Submission

September:

- **September 2, 2016:** MAP Steering Committee shares preliminary document with stakeholders and gathers input to prepare final document.
- **September 30, 2016:** MAP Steering Committee finalizes Master Academic Plan

October:

- **October 21, 2016:** MAP Steering Committee finalizes executive summary

November:

- **November 18, 2016:** Master Academic Plan submitted to Minnesota State

Phase 6: Master Academic Plan Completed and Celebration

November:

Phase 7: Implement Master Academic Plan and Evaluate Achievement

August 2016 – May 2019

MAP Steering Committee:

Ginny Boyum, Ph.D. – Dean, Academic Effectiveness and Innovation
Jen Bruce – Librarian
Veronica Delcourt, Ed.D. – Dean, Liberal Arts and General Education
Brian Fors, Ph.D. – Interim Dean, Sciences and Health Professions
Safawo Gullo, DVM, Ph.D. – Dean, Sciences and Health Professions

David Hansen – RCTC Student
Jason Jadin – Chemistry Faculty
Lisa Mohr – Dean of Student Success
Greg Mosier, Ed.D. – Executive Vice President, Academic Affairs
Michelle Pyfferoen – Dean, Career and Technical Education & Business Partnerships
Scott Sahs – Chief Information Officer
Heather Sklenicka, Ph.D. – Chemistry Faculty
Brian Steele – Art/Photography Faculty

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STRATEGIC PLAN **2024**
Pathways to Success

GOAL ONE
STUDENT SUCCESS

Improve student retention and completion by increasing access to learning opportunities, leveraging educational technology, enhancing support services and resources, and strengthening pedagogy and curriculum.

- ***Strategy 1:*** STUDENT SUCCESS PLANNING: Create processes, structures, and opportunities for students to successfully plan and achieve their educational goals in a timely manner.
- ***Strategy 2:*** FLEXIBLE AND ACCESSIBLE EDUCATION: Expand access through high-quality online learning, flexible scheduling, and alternative pathways to fit the needs of students
- ***Strategy 3:*** SUPPORTING LEARNING: Implement integrated institutional practices, technology, and services aimed at supporting student learning and improving student outcomes.
- ***Strategy 4:*** ASSESSMENT OF STUDENT LEARNING: Further cultivate a culture of assessment to better understand how students learn and use assessment results to improve teaching and learning inside and outside of the classroom.

GOAL TWO
INSTITUTIONAL SUSTAINABILITY

Ensure the College's offerings, functions, and processes are sustainable and responsive to the evolving needs of internal and external stakeholders.

- ***Strategy 1:*** ADVANCE A CULTURE OF CONTINUOUS IMPROVEMENT: Institution-wide commitment to foster systematic processes for assessing, evaluating, measuring, and communicating RCTC improvement efforts.
- ***Strategy 2:*** BOLSTER AN EXCEPTIONAL TEAM OF EMPLOYEES: Recruit talent and further develop staff and faculty to meet the changing needs of students and stakeholders.
- ***Strategy 3:*** EFFECTIVE PLANNING & ALIGNMENT: Realize RCTC's Mission through a meaningful planning process that aligns resources with the College's strategic priorities.
- ***Strategy 4:*** ENSURE INSTITUTIONAL CONTINUITY: Establish structures and processes that ensure continuity of services and processes that impact the ability to serve students and constituents.

GOAL THREE
DIVERSITY, EQUITY, & INCLUSION

Promote equity and inclusion across the institution by increasing cultural competency, culturally responsive pedagogy and service, and partnering with community organizations.

- ***Strategy 1:*** FOSTER A CULTURE OF EQUITY AND INCLUSION: Implement a dynamic equity and inclusion plan that integrates equity minded strategies across all institutional divisions.
- ***Strategy 2:*** EQUITY IN STUDENT OUTCOMES: Ensure equity in student experience and success by applying the lens of Diversity, Equity & Inclusion (DEI) to institutional academic and non-academic services and functions.
- ***Strategy 3:*** FURTHER DIVERSITY ENGAGEMENT: Expand resources, opportunities, and infrastructure to better understand and engage diversity, in efforts to impact the experiences of students and employees.

GOAL FOUR
CAMPUS AND COMMUNITY ENGAGEMENT

Promote campus and community engagement that fosters collaborative relationships which mutually benefit the College, our students, partnering organizations, and the economic vitality of the region.

- ***Strategy 1:*** GROW EXTERNAL COLLABORATIONS: Establish collaborations and relationships with external partners that bring value to the College and favorably impact the experiences of students, faculty, and staff.
- ***Strategy 2:*** GROW INTERNAL COLLABORATIONS: Establish internal collaborations that build collegial relationships in order to better serve the needs of students and employees.
- ***Strategy 3:*** PARTNER TO MEET THE NEEDS OF STAKEHOLDERS: Ensure the College's educational offerings serve the best interests of students and needs of the community through engagement of external constituents.
- ***Strategy 4:*** ADVANCE THE COLLEGE'S SERVICE TO, AND PRESENCE IN, THE COMMUNITY: Active engagement of faculty, staff, and students in the community.

MISSION | Rochester Community and Technical College provides accessible, affordable, quality learning opportunities to serve a diverse and growing community.

VISION | Rochester Community and Technical College will be a universal gateway to world-class learning opportunities.