



**ADVERTISEMENT FOR
REQUEST FOR PROPOSALS (RFP)
Construction Manager/General Contractor (CM/GC)
State of Colorado**

University of Colorado Denver | Anschutz Medical Campus (GFE)
Notice Number: PN21-174016

Notice Status: OPEN
Publish Date: 3/10/2022
Notice Revisions: 0
Revision Publish Date: NA

Project No: 21-174016
Project Title: Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2
Estimated Construction Cost: \$700,000 FLCC Phase 1 and \$1,300,000 FLCC Phase 2

Settlement Notices

For all projects with a total dollar value above \$150,000 Notice of Final Settlement is required by C.R.S. 38-26-107(1).

Final Settlement, if required, will be advertised via: Electronic Media

Project Description

The purpose of the project is to replace aging equipment and improve reliability to the emergency chilled water system that serves critical spaces in the Fitzsimons (Q20 - Fitz) building and Vivarium Air Handling Units in Research 1 (P18 – R1), Research 2 (P15 – R2), and the new Anschutz Health Sciences Building (P12 - AHSB) for the University of Colorado – Denver | Anschutz Medical Campus (CU-Denver | AMC). The project will be broken into two (2) phases. Phase 1 is devoted to preparation, including piping distribution modifications, that will allow the distribution to be looped and provide circulation reliability without triggering emergency transfer. Phase 2 is devoted to the replacement of the existing emergency chiller plant's chillers located in the Fitzsimons building.

The successful CM/GC firm will be expected to provide services for Phase 1 and Phase 2. The anticipated FLCC is \$700,000 for phase 1 and \$1,300,000 for phase 2. Refer to the included Appendix G for the schematic design set and scope included in each phase. The current project scope, schedule, and phasing plan is based on approval of state funding for phase 2 that would be available beginning in July of 2022. In the event phase 2 is not funded this project may be cancelled, delayed, or altered including the work currently funded in Phase 1. A funding decision for Phase 2 is expected by end of May 2022. The shortlisted firms should provide a cost proposal based on the total of Phase 1 and 2 combined.

The University of Colorado Anschutz Medical Campus anticipates using a Construction Manager/General Contractor (CM/GC) approach to project delivery. A Guaranteed Maximum Price (GMP) and an updated project duration schedule will be established by the

Architect/Engineer and the Construction Manager/General Contractor in conjunction with the University of Colorado Anschutz Medical Campus. The CM/GC will evaluate, among other things, availability of materials and labor, project schedule, project costs as they relate to the established budget, constructability, and will work closely with the Architect/Engineer and the University of Colorado Anschutz Medical Campus throughout the planning, design and construction phases of the project. Construction is estimated to commence University of Colorado Anschutz Medical Campus.

The process to be used in the selection of the CM/GC is comprised of two steps. STEP I is the Submittal of Prequalification as described in Section II (D). STEP II is the Oral Interview/Cost Proposal as described in detail in Section III. A Jury Panel of individuals who will be involved in the project and/or understand the required services associated with Construction Management/General Contracting will evaluate responses to this RFP for both STEPS. Upon completion of the evaluation of the Submittals of Prequalification, a limited number of firms will be invited to the oral interviews. Sealed fee proposals will be required only from those firms who are interviewed and are to be submitted as indicated in this RFP. Both qualifications and cost will be considered in the final ranking of firms with qualifications given 70% of the value of the weighted criteria and fees for the Cost/ Proposal given 30%.

Selection and award of this project will be based on a combination of qualifications and costs that represents the best overall value to the State.

Scope of Services

The scope of services will include assistance to the State during the process of assessment, design, construction, and warranty period. Specific tasks to be performed by the Construction Manager/General Contractor (CM/GC) include those generally performed by the CM/GC construction community where the Construction Manager is also the Contractor. A sample copy of the State's CM/GC contract is contained within the RFP. A Guaranteed Maximum Price (GMP) will be required at the completion of Design Development phase.

A public construction project in the amount of five hundred thousand dollars or more shall be subject to the State prevailing wage rate, of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees to lawful welfare, pension, vacation, apprentice training, and educational funds in the State, for each employee needed to execute the contract. Payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors and subcontractors. Contractors are required to pay their employees at weekly intervals and shall comply with the enforcement provisions of C.R.S. §24-92-209

This agreement is anticipated to be in excess of the thresholds noted in this agreement regarding prevailing wages and apprenticeship utilization. The included Appendix E and F will be in force for this agreement.

Minimum Requirements

Notice is hereby given to all interested parties that all firms will be required to meet ALL of the minimum qualifications to be considered for these projects. To be considered as qualified, interested firms shall have, as a minimum:

1. Provided Construction Management/General Contracting services within the last three (3) years for at least two (2) projects each in excess of \$2,000,000 (hard costs), utilizing the expertise present in their Colorado Office; and
2. Demonstrated specific Construction Management/General Contracting experience in projects of similar scope and complexity; and
3. Demonstrated bonding capability up to \$2,000,000 for an individual project coincidentally with current and anticipated workloads; provide letter from surety that affirms this capacity.
- 4) Per C.R.S. §24-92-115 unless prohibited by applicable federal law, contract for any public project in the amount of one million dollars or more, that does not receive federal money, including shall require the general contractor to which the contract is awarded to submit, at the time the mechanical, electrical, or plumbing subcontractor is put under contract, documentation that identifies the contractors or subcontractors that will be used for all mechanical, sheet metal, fire suppression, sprinkler fitting, electrical, and plumbing work required on the project and certifies that all firms identified participate in apprenticeship programs registered with the United States department of labor's employment and training administration or state apprenticeship councils recognized by the United States department of labor and have a proven record of graduating a minimum of 15% of its apprentices for at least three of the past five years.

Firms meeting the minimum requirements may obtain the bidding documents on the website accompanying this advertisement.

University of Colorado Denver | Anschutz Medical Campus Facilities Projects – **Request for Proposal** website:

<https://www.cuanschutz.edu/offices/facilities-management/construction-projects/RFP>

Colorado CORE/ColoradoVSS:

<https://codpa-vss.cloud.cgifederal.com/webapp/PRDVSS2X1/AltSelfService>

Other Information

Preference shall be given to Colorado resident bidders and for Colorado labor, as provided by law.

Pre-Bid Meeting

Friday March 18, 2022

The RFP Pre-Submittal Conference will be held on 3/18/2022 at 10:00 AM in the Fitzsimons Building, 13001 East 17th Place, Aurora, CO 80045. All guests will meet at the flagpole on the south side of the Fitzsimons Building and will be escorted to the Bushnell Conference Room.

Schedule/Submission Details

1. The schedule of events for the RFP process and an outline of the schedule for the balance of the project is as follows:

Advertisement	March 10, 2022
Pre-submittal Conference and Tour	March 18, 2022 at 10AM
Date Email Questions Due	March 22, 2022 by 2PM
Date Email Answers Issued	March 25, 2022
Submittals Due (Prequalification: Step I)	March 31, 2022 by 2PM
Interview Short List Announced	April 6, 2022
Sealed Proposal Due (Evaluation and Award: Step II)	April 14, 2022 by 8AM
Oral Interviews (In-Person)	April 14, 2022
Selection Announced	April 15, 2022
Negotiation of CM/GC Contract	April 20, 2022
Contract Approval (projected)	April 29, 2022
Anticipated Design Start	Done
Anticipated CM/GC Start	May 2022
Anticipated Construction Start Phase 1	August 2022
Finish Phase 2	April 2023

2. Prequalification submittals shall be submitted ONE (1) electronic copy PDF received no later than Thursday March 31st at 2:00PM, and shall be submitted via email to Raeann.Gregory@cuanschutz.edu. Late submittals will be rejected without consideration. CU Anschutz and the State of Colorado assume no responsibility for costs related to the preparation of submittal.

3. The above schedule is tentative. Responding teams shall be notified of revisions in a timely manner by email. Respondents may elect to verify times and dates by email, but no earlier than 36 hours before the schedule date and time.

Point of Contact/Clarification

Name:	Daniel Miro
Agency:	University of Colorado Denver Anschutz Medical Campus (GFE)
Phone:	NA
Email:	daniel.miro@cuanschutz.edu

This Notice is also available on the web at:

Media of Publication(s):	University of Colorado Denver Anschutz Medical Campus Facilities Projects Website
Publication Dates:	3/10/2022
VSS	https://codpa-vss.cloud.cgifederal.com/webapp/PRDVSS2X1/AltSelfService

**NOTICE TO STATE CONTRACTORS
VACCINATION REQUIREMENTS**



NOTICE LETTER TO CONTRACTORS TEMPLATE

October 06, 2021

All Contractors Working within CU Denver/Anschutz Medical Campus Facilities

Subject: Vaccination Requirements

Dear Contractor:

On August 31, 2021, pursuant to the [Sixth Amended Public Health Order 20-38](#), Limited COVID Restrictions, all State Contractors and State Contractor Workers who physically enter a State Facility shall comply with the Vaccination Requirements included in Section III of the Order. All State Contractors and State Contractor Workers, including individuals who have been infected with and recovered from COVID-19, shall have received their first dose in a two dose COVID-19 series no later than September 30, 2021 and be Fully Vaccinated by October 31, 2021.

On September 30, 2021 the [Seventh Amended Public Health Order 20-38](#) (PHO or Order), allowed for State Contractor Workers to participate in twice weekly COVID-19 testing if they have an employer approved medical or religious exemption or are unvaccinated.

You are receiving this letter because your company has a contract with University of Colorado Denver/Anschutz Medical Campus and, as part of the performance of that contract, certain of your company's personnel (including any subcontractor personnel) are required to or likely will provide contracted goods or services in person and on-site. Therefore, as a contractor, your company is subject to the vaccination or testing requirements set forth in the Order.

As permitted by the Order, University of Colorado Denver/Anschutz Medical Campus State Contractors shall assume responsibility for verification of full COVID-19 vaccination, approving all exemptions for medical or religious beliefs and determining any accommodations needed for such exemptions.

State Contractors shall verify that each of the identified State Contractor Workers is Fully Vaccinated, or that each of the identified State Contractor Works that is unvaccinated or has a medical or religious exemption is participating in twice weekly COVID-19 testing.

Please be aware that the University of Colorado Denver/Anschutz Medical Campus retains the right to inquire into compliance with the Order's requirements at any time, to include requesting a State Contractor to provide proof of vaccination or a recent negative COVID-19 test.

The State of Colorado values your firm as a contract partner to deliver needed goods or services. Accordingly, we are hopeful that your company will comply with the Order and help the state reduce the spread of the virus. In the meantime, please see COVID-19 Vaccination Requirements for State Contractors FAQs. (<https://dhr.colorado.gov/covid-19-vaccination-requirements-for-state-contractors>)

University of Colorado Denver/Anschutz Medical Campus

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**



**REQUEST FOR PROPOSALS
FOR AN
INTEGRATED PROJECT DELIVERY METHOD
UTILIZING
CONSTRUCTION MANAGEMENT/GENERAL CONTRACTING (CM/GC)
SERVICES**

For The

University of Colorado Anschutz Medical Campus

For The

Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2 PN 21-174016

**REQUEST FOR PROPOSALS FOR AN
INTEGRATED PROJECT DELIVERY METHOD UTILIZING
CONSTRUCTION MANAGEMENT/GENERAL CONTRACTING (CM/GC) SERVICES**

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 - 1. Qualifications of the Firm(s)**
 - 2. Qualifications of the Management Team Members**
 - 3. Project Management Approach**

- 4. Prior Project Experience/Success
- 5. Miscellaneous Considerations

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- Appendix A: Prequalification Submittal/Evaluation Form**
(To be completed by Jury Panel)
- Appendix A1: Oral Interview /Evaluation Form**
(To be completed by Jury Panel)
- Appendix A2: Submittal and Interview Ranking Matrix**
(To be completed by Jury Panel)
- Appendix B: Construction Manager/General Contractor (CM/GC) Agreement (Sample) with CM/GC Designated Services and Method of Payment Matrix and CM/GC Certification (Form SC- 6.4)**
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- Appendix F: Apprenticeship Utilization Certifications (SBP-6.17)**
- Appendix G: Fitzsimons Building Chiller Replacement Phase 1 & 2, Schematic Design Documents , Narrative, and Design Schedule 1/20/2022**

**REQUEST FOR PROPOSALS FOR AN
INTEGRATED PROJECT DELIVERY METHOD UTILIZING
CONSTRUCTION MANAGEMENT/GENERAL CONTRACTING (CM/GC) SERVICES
University of Colorado Anschutz Medical Campus**

Settlement Notice

For all projects with a total dollar value above \$150,000 Notice of Final Settlement is required by C.R.S. §38-26-107(1). Final Settlement, if required, will be advertised in the same location as the original solicitation.

I. GENERAL INFORMATION

A. INTRODUCTION/DESCRIPTION OF PROJECT

The purpose of the project is to replace aging equipment and improve reliability to the emergency chilled water system that serves critical spaces in the Fitzsimons (Q20 - Fitz) building and Vivarium Air Handling Units in Research 1 (P18 – R1), Research 2 (P15 – R2), and the new Anschutz Health Sciences Building (P12 - AHSB) for the University of Colorado – Denver | Anschutz Medical Campus (CU-Denver | AMC). The project will be broken into two (2) phases. Phase 1 is devoted to preparation, including piping distribution modifications, that will allow the distribution to be looped and provide circulation reliability without triggering emergency transfer. Phase 2 is devoted to the replacement of the existing emergency chiller plant’s chillers located in the Fitzsimons building.

The successful CM/GC firm will be expected to provide services for Phase 1 and Phase 2. The anticipated FLCC is \$700,000 for phase 1 and \$1,300,000 for phase 2. Refer to the included Appendix G for the schematic design set and scope included in each phase. The current project scope, schedule, and phasing plan is based on approval of state funding for phase 2 that would be available beginning in July of 2022. In the event phase 2 is not funded this project may be cancelled, delayed, or altered including the work currently funded in Phase 1. A funding decision for Phase 2 is expected by end of May 2022. The shortlisted firms should provide a cost proposal based on the total of Phase 1 and 2 combined.

The University of Colorado Anschutz Medical Campus anticipates using a Construction Manager/General Contractor (CM/GC) approach to project delivery. A Guaranteed Maximum Price (GMP) and an updated project duration schedule will be established by the Architect/Engineer and the Construction Manager/General Contractor in conjunction with the University of Colorado Anschutz Medical Campus. The CM/GC will evaluate, among other things, availability of materials and labor, project schedule, project costs as they relate to the established budget, constructability, and will work closely with the Architect/Engineer and the University of Colorado Anschutz Medical Campus throughout the planning, design and construction phases of the project. Construction is estimated to commence University of Colorado Anschutz Medical Campus.

The process to be used in the selection of the CM/GC is comprised of two steps. STEP I is the Submittal of Prequalification as described in Section II (D). STEP II is the Oral Interview/Cost Proposal as described in detail in Section III. A Jury Panel of individuals who will be involved in the project and/or understand the required services associated with Construction Management/General Contracting will evaluate responses to this RFP for both

STEPS. Upon completion of the evaluation of the Submittals of Prequalification, a limited number of firms will be invited to the oral interviews. Sealed fee proposals will be required only from those firms who are interviewed and are to be submitted as indicated in this RFP. Both qualifications and cost will be considered in the final ranking of firms with qualifications given 70% of the value of the weighted criteria and fees for the Cost/ Proposal given 30%.

Selection and award of this project will be based on a combination of qualifications and costs that represents the best overall value to the State.

B. MINIMUM QUALIFICATIONS

Notice is hereby given to all interested parties that all firms will be required to meet ALL of the minimum qualifications to be considered for these projects. To be considered as qualified, interested firms shall have, as a minimum:

1. Provided Construction Management/General Contracting services within the last three (3) years for at least two (2) projects each in excess of \$2,000,000 (hard costs), utilizing the expertise present in their Colorado Office; and
2. Demonstrated specific Construction Management/General Contracting experience in projects of similar scope and complexity; and
3. Demonstrated bonding capability up to \$2,000,000 for an individual project coincidentally with current and anticipated workloads; provide letter from surety that affirms this capacity.
- 4) Per C.R.S. §24-92-115 unless prohibited by applicable federal law, contract for any public project in the amount of one million dollars or more, that does not receive federal money, including shall require the general contractor to which the contract is awarded to submit, at the time the mechanical, electrical, or plumbing subcontractor is put under contract, documentation that identifies the contractors or subcontractors that will be used for all mechanical, sheet metal, fire suppression, sprinkler fitting, electrical, and plumbing work required on the project and certifies that all firms identified participate in apprenticeship programs registered with the United States department of labor's employment and training administration or state apprenticeship councils recognized by the United States department of labor and have a proven record of graduating a minimum of 15% of its apprentices for at least three of the past five years.

C. SCOPE OF SERVICES

The scope of services will include assistance to the State during the process of assessment, design, construction, and warranty period. Specific tasks to be performed by the Construction Manager/General Contractor (CM/GC) include those generally performed by the CM/GC construction community where the Construction Manager is also the Contractor. A sample copy of the State's CM/GC contract is contained within the RFP. A Guaranteed Maximum Price (GMP) will be required at the completion of 50% Construction Document phase.

A public construction project in the amount of five hundred thousand dollars or more shall be subject to the State prevailing wage rate, of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees to lawful welfare, pension, vacation, apprentice training, and educational funds in the State, for each employee needed to execute the contract. Payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors and subcontractors. Contractors

are required to pay their employees at weekly intervals and shall comply with the enforcement provisions of C.R.S. §24-92-209

This agreement is anticipated to be in excess of the thresholds noted in this agreement regarding prevailing wages and apprenticeship utilization. The included Appendix E and F will be in force for this agreement.

II. PREQUALIFICATION SUBMITTALS (STEP I)

A. SCHEDULE

1. The schedule of events for the RFP process and an outline of the schedule for the balance of the project is as follows:

Advertisement	March 10, 2022
Pre-submittal Conference and Tour	March 18, 2022 at 10AM
Date Email Questions Due	March 22, 2022 by 2PM
Date Email Answers Issued	March 25, 2022
Submittals Due (Prequalification: Step I)	March 31, 2022 by 2PM
Interview Short List Announced	April 6, 2022
Sealed Proposal Due (Evaluation and Award: Step II)	April 14, 2022 by 8AM
Oral Interviews (In-Person)	April 14, 2022
Selection Announced	April 15, 2022
Negotiation of CM/GC Contract	April 20, 2022
Contract Approval (projected)	April 29, 2022
Anticipated Design Start	Done
Anticipated CM/GC Start	May 2022
Anticipated Construction Start Phase 1	August 2022
Finish Phase 2	April 2023

2. One (1) electronic copy of the submittal is due March 31, 2022 and shall be received no later than 2:00 PM (MD/ST), at the following email address:

RAEANN.GREGORY@CUANSCHUTZ.EDU

3. The above schedule is tentative. Responding firms shall be notified of revisions in a timely manner by email. Respondents may elect to verify times and dates by email, but no earlier than 36 hours before the schedule date and time.

B. MANDATORY PRE-SUBMITTAL CONFERENCE

1. To ensure sufficient information is available to firms preparing submittals, a mandatory pre-submittal conference has been scheduled. The intent of this conference is to have University of Colorado Anschutz Medical Campus staff able to discuss the project. Firms preparing submittals must attend and sign-in in order to have their submittals accepted. The pre-submittal conference will be held at the Fitzsimons building:

Friday March 18, 2022

The RFP Pre-Submittal Conference will be held on 3/18/2022 at 10:00 AM in

the Fitzsimons Building, 13001 East 17th Place, Aurora, CO 80045. All guests will meet at the flagpole on the south side of the Fitzsimons Building and will be escorted to the Bushnell Conference Room.

C. CLARIFICATIONS

1. Owner initiated changes to this RFP will be issued under numerically sequenced email addenda. Addenda generally consist of the following items:
 - a. Clarifications
 - b. Scope Changes
 - c. Time and/or Date Changes

Respondents must acknowledge all issued addenda in their submittal and proposal.

2. Respondent initiated email requests for clarification will be received any time on or before to March 22, 2022 by 2PM. All State responses will be issued by email addenda on or before March 25, 2022.

D. GENERAL INFORMATION

1. All respondents accept the conditions of this RFP, including, but not limited to, the following:
 - a. All submittals shall become the property of the State of Colorado and will not be returned.
 - b. Late submittals shall not be evaluated. Facsimile submittals shall not be accepted.
 - c. Any restriction as to the use of submitted materials must be clearly indicated as proprietary. The requested limitation or prohibition of use or release shall be identified in writing on a cover sheet. Blanket claims of proprietary submittals will not be honored. Fee proposals will be considered proprietary.
 - d. The State reserves the right to reject any or all proposals on the basis of being unresponsive to this RFP or for failure to disclose requested information.
 - e. The State shall not be liable for any costs incurred by respondents in the preparation of submittals and proposals nor in costs related to any element of the selection and contract negotiation process.
 - f. The respondent has reviewed Appendix B and by responding has agreed that the terms and conditions of the sample Construction Management/General Contracting Agreement are expressly workable without reservation.
 - g. Submittals shall be less than 25MB.

E. PREQUALIFICATION SUBMITTALS (STEP I)

1. Respondent must comply with the following items, a through f. The State retains the right to waive any minor irregularity or requirement should it be judged to be in the best interest

of the State. **(Note that the primary focus of the Prequalification evaluation will be the firm(s)' capabilities).**

- a. Submit One (1) electronic complete copy of all material.
- b. Submittals shall be formatted and tabbed in the exact form and numeric sequence of the Evaluation Form (1 through 5) in Appendix A. A two-sided single page cover letter addressed to the University of Colorado Anschutz Medical Campus outlining the firm(s) qualifications is required at the front of the submittal. Not counting the cover letter and required Acknowledgement and Attestation form, the entire submittal is to be no more than 25 pages in portrait format, at least 10 font, and in electronic PDF Format not to exceed 25MB.
- c. Submittals shall be evaluated in accordance with criteria as indicated in SECTION IV. A. PREQUALIFICATION SUBMITTAL CRITERIA and ranked on the corresponding Evaluation Form in Appendix A.
- d. Response to all items shall be complete.
- e. All references shall be current and relevant.
- f. Complete and execute the appropriate Acknowledgment and Attestation Form as provided in Section VI and submit at the back of the Prequalification Submittal.

III. ORAL INTERVIEWS/COST PROPOSALS (STEP II)

A. SHORT LIST

From the submittals received, a short list of qualified respondents shall be identified using the scoring indicated on the enclosed Evaluation Form, Appendix A.

Firms failing to meet the minimum required qualifications will not receive further consideration.

B. ORAL INTERVIEW

1. Mandatory oral interviews shall be conducted for the short listed firm(s) only. Interview times and location, will be arranged by the University of Colorado Anschutz Medical Campus and all short listed firms will be notified in advance. At the option of the State, a visit to the short listed firm(s) managing home office and/or representative field office may be required. **(Note that the primary focus of the Oral Interview evaluation in addition to the Cost Proposal will be the proposed Project Management Team members' capabilities).** The oral interviews for this project are anticipate to be done in person at the Campus Services Building on the Anschutz Medical Campus.

C. COST PROPOSALS

1. Only those firms short listed for interview are required to submit their sealed proposals. (Only one copy is required on the scheduled submission date.) Cost Proposals will remain sealed until after the qualitative scoring and will then be opened. The Cost Proposal will then be considered (equivalent to 30 percent of the weighted criteria) in conjunction with the qualitative score from the response and interview (equivalent to 70 percent of the weighted criteria).

2. Cost Proposals shall be submitted on the form provided in Section VII, without modification. A Cost Proposal shall be accompanied with sufficient detail to clearly identify the fee for service and include a detailed schedule of estimated (not-to-exceed) reimbursable and non-reimbursable costs. Percentage of the cost of work is not an acceptable value. The Cost Proposal should be prepared independently in accordance with the following:
 - a. Any specific services requested in the RFP and its appendices that are not included should be clearly identified. Exclusion of any required service may result in the proposal being found non-responsive.
 - b. Provide a CM/GC staff schedule with staff by name, position and man-hours (assume 8 hour days) per month estimated on the project.
 - c. Provide a detailed estimate of reimbursable costs including breakdown of direct salaries and payroll fringes (DPE) for on-site CM/GC personnel associated with the services. Not-to-exceed reimbursable expenses shall be provided at direct cost.
 - d. Provide a detailed estimate of non-reimbursable expenses (included in fee).
 - e. The State reserves the right to reject any Cost Proposal not prepared in the above manner. Proposals that exceed the available funds may be rejected outright but the State reserves the right to negotiate a reasonable fee for service within the available funds. The CM/GC contract will be a bonded lump sum contract including not-to-exceed reimbursables with a Guaranteed Maximum Price to encompass all construction work; some not-to-exceed allowances may be included as directed by the State.
3. This Fee Proposal is a binding offer to perform the services associated with the Scope of Services described in this RFP and the Designated Services and Method of Payment Matrix in Appendix B. The State reserves the right to negotiate a cost adjustment based on scope clarification subsequent to selection and prior to contract execution.

D. METHOD OF SELECTION AND AWARD

The Jury Panel shall complete a combined evaluation of qualifications and fee in accordance with the criteria as indicated in SECTION IV, B. ORAL INTERVIEWS/COST PROPOSALS/EVALUATION CRITERIA. Numerical ranking and selection of the most qualified firm (including fee) will then occur on the corresponding evaluation forms in Appendix A1.

The final fee amount and scope of services may be negotiated at the State's discretion. Award and contract will be contingent on availability of key proposed Project Management Team staff.

IV. EVALUATION CRITERIA

A. PREQUALIFICATION SUBMITTAL CRITERIA

(Note that the primary focus of the Prequalification evaluation will be the Firm(s) capabilities).

1. QUALIFICATIONS OF THE FIRM(S)

- Provide a description of the composition and management structure of your firm. Identify the firm's roles and responsibilities and relevant experience with projects of similar scope and complexity and similar fast track project delivery methods. Describe how the firm's experience will relate to the success of this project.
- Provide a description and separate graphic organizational chart complete with working titles identifying the lines of authority, responsibility and coordination.
- Provide a detailed description of the process of how your firm selects qualified sub-contractors and manages them effectively on complex multi-phased projects.
- Provide a detailed description of how your firm will maximize the Colorado construction work force on this project.
- Provide your firms' safety record over the last ten years and describe your firms' efforts to retain and support employees.

2. QUALIFICATIONS OF THE MANAGEMENT TEAM MEMBERS

- Describe the qualifications and relevant experience of the superintendent including demonstrated experience working on projects of similar scope and complexity and time commitment for this project.
- Describe the qualifications and relevant experience of other key in-house staff and time commitments for this project.
- Identify all current office locations of the assigned staff and any other resident expertise intended to be provided under this RFP.

3. PROJECT MANAGEMENT APPROACH

- Provide a strategic project approach summary: Include discussion of your firm's approach in providing successful Construction Management/General Contracting services based on prior experience in cost, schedule and quality effectiveness. Include specific examples (1-2 page excerpts) of actual products (estimates, progress reports, schedules, constructability reviews, value engineering studies, forms, general conditions budgets, organizational structures, etc.).
- Provide a description of construction work Project Management Team has capability to competitively bid and self-perform, including qualifications to do such. It is the perception of the University of Colorado Anschutz Medical Campus subcontracting CM/GC construction work is in the State's best interest in terms of price competition. The University of Colorado Anschutz Medical Campus may, at its discretion, limit the types and amount of work Project Management Team bids and self-performs.

4. PRIOR PROJECT EXPERIENCE/SUCCESS

Select your three (3) most relevant projects and provide, at a minimum, the following:

- The project/contract name
- Description of services provided
- Overall construction cost of project, as applicable, including initial contract value and change orders including reasons for change orders
- Organizational structure of service delivery under the contract (include the owner's organization as it interfaced with the respondent's contract)
- Key assigned in-house staff (name and title)
- Subcontracts (service) used in the performance of the contract
- Schedule history
- Reference(s) for Owner and Architect as described in IV.E

- Continuing services, if any

a. Timeliness

In general, Construction Management/General Contracting work is seen as successful if it is on time, on budget, and of high quality of workmanship. Timeliness is generally based on completion by the originally scheduled date and is indicated by a Certificate of Occupancy. Please demonstrate for each of the above projects how timely delivery occurred.

b. Budget Considerations

Similar to timeliness, being on budget historically means the work was completed within the originally identified available budget. For purposes of this RFP, the State is interested not only in being within budget but also in the respondent's ability to address and implement the following issues as well:

1. Conceptual estimating
2. Value analysis
3. Alternate solutions
4. Scope reduction that maintains project function
5. Cost/benefit analysis

Demonstrate for the above projects examples of how you accomplished the above cost control services.

c. Quality

Construction quality has the obvious traditional connotations (workmanlike, in compliance with the specifications, normal standard of care, etc.). Demonstrate for the above project examples how a high quality of workmanship was achieved.

d. Services Disruption

Demonstrate how your services on the above project examples dealt with issues of disruption at existing facilities, etc. if applicable.

e. Project Acceptability

Please discuss how your Construction Management/General Contracting services helped achieve owner satisfaction with regard to project quality and acceptability on your project examples.

f. Compliance

Provide information on how compliance with industry standards of care, building codes, etc. was achieved.

5. MISCELLANEOUS CONSIDERATIONS

a. Claims/Litigation History of Firm

Provide information on any past, current or anticipated claims (i.e., knowledge of pending claims) on respondent contracts; explain the litigation, the issue, and its outcome or anticipated outcome.

b. Apprenticeship Training Program

Where an Apprentice Training Program certified by the Office of Apprenticeship located in the Employment and Training Administration in the United States Department of Labor exists in the State, or a comparable program for the training of apprentices is available in the State:

1. Each submitter shall demonstrate access to the certified program or a comparable alternative (Note that it is the responsibility of the submitter to demonstrate the comparability of a non-certified program) and,
2. Each submitter's subcontractor at any tier with a contract value of two hundred fifty thousand dollars or more shall demonstrate access to the certified program or a comparable alternative.

c. Self-Performed BIM/3D Modeling Qualifications

Describe your firm's experience with 3D modeling and coordination. Please describe how you have utilized these tools to increase value on utility work. Describe the services provided by your firm.

B. ORAL INTERVIEWS/COST PROPOSALS EVALUATION CRITERIA

(Note that the primary focus of the Oral Interview evaluation in addition to the Cost Proposal will be the proposed project management team members' capabilities).

1. QUALIFICATIONS OF THE FIRM

- Explain the composition and structure of your project management team and how the firm will support their efforts in the field throughout this project.
- Are the lines of authority, responsibility and coordination clearly identified?

2. QUALIFICATIONS OF THE MANAGEMENT TEAM MEMBERS

- Explain the prior experience with projects of similar scope and complexity and similar fast track project delivery methods of the superintendent and all other project management team members. Explain their roles and responsibilities and authority and why they are the right team members for this project.
- Explain anticipated project management team staff current and projected workload.
- Identify all current office locations and the resident expertise intended to be provided under this RFP. Identify the location of the staff for the performance of this contract, their expertise, and generic equipment that will be located in Colorado and act in support of the anticipated contract.

3. PROJECT MANAGEMENT APPROACH

- Explain the strategic project approach for this project in summary: Include discussion of your team's approach in providing successful CM/GC services based on the needs

of this specific project utilizing the team's prior past experience including cost, schedule, and quality control.

- Explain the construction work the project management team has the capability to competitively bid and self-perform including qualifications to do such work.
- Provide a detailed description of how your project management team will select qualified sub-contractors and manage them effectively on this project.

4. PRIOR PROJECT EXPERIENCE/SUCCESS

- Explain the most relevant projects the superintendent and the team members have completed together and/or separately and what their role was. University of Colorado Anschutz Medical Campus at its discretion contact references and/or conduct independent performance analysis on projects on which the team member has worked).
- Provide descriptions of other related experience of superintendent and other project management team members.

5. MISCELLANEOUS CONSIDERATIONS

- Craft Labor Capabilities**
Describe the availability of resources that will be utilized to successfully complete the project.
- Apprenticeship Training Program**
Describe access to federal or state-approved apprenticeship programs, as available.
- Self-Performed BIM/3D Modeling Qualifications**
Describe your firms experience with 3D modeling and coordination. Please describe how you have utilized these tools to increase value on utility work. Describe the services provided by your firm.

V. CM/GC CONTRACT INFORMATION

- A.** Carefully review the CM/GC Contract sample (Appendix B) before initiating your response submittal. Any exceptions to the contract must be communicated formally in accordance with the written questions schedule in II.A.
- B.** Appendix C of this RFP is the Certification and Affidavit Regarding Illegal Immigrants, a mandatory portion of the contract agreement.
- C.** Appendix E and F of this RFP includes mandatory State apprenticeship and prevailing wage requirements based on the construction value of the project. The first phase is not anticipated the reach the value limit for these requirements. However, in anticipation of Phase 2 funding and continued work with the CM/GC under the same contract the CM/GC shall be required to comply with the State apprenticeship and prevailing wage requirements outlined in this RFP for both phases of work.
- D.** The State reserves the right to make non-material changes to the appended model agreement, including additions and /or modifications that may be necessary to more completely describe the services defined or implied herein.
- E.** Any approved reimbursable expenses made under the terms of the final agreement shall be a direct pass-on cost with no adjustment to the fee described therein.

- F. Any and all products, systems, methods, and procedures developed, as a result of this agreement shall remain the exclusive property of the State.

VI. ACKNOWLEDGEMENT AND ATTESTATION FORM

- A. Several versions of the Acknowledgment and Attestation Form follow this section. Proper completion of the appropriate form is a mandatory requirement for a respondent to be considered responsive to this RFP Prequalification Submittal.
- B. Qualifications made by a respondent in executing this form may render a submittal non-responsive as determined by the State.

VII. COST PROPOSAL FORM

- A. Immediately following the Acknowledgement and Attestation Form is a Cost Proposal Form to be utilized to summarize the fee proposal for the services. Only those firms short-listed will be required to submit fee proposals as directed by University of Colorado Anschutz Medical Campus.
- B. This RFP document, it's appendices, and any written addenda issued prior to the submittal of proposals, and written clarifications prior to the interview shall serve as the only basis for proposals.
- C. The respondent, by submitting this proposal, does hereby accept that minor changes by the State to the exhibited contract and its exhibits, which do not adversely affect the respondent, shall not be cause for withdrawal or modification of the amounts submitted herein. Exceptions to the RFP documents and/or modification of the proposal may render the proposal non-responsive.
- D. Upon due consideration and review of this document along with its appendices, written addenda, and written clarifications prior to the interview, the respondent does hereby submit the following proposal for Construction Management/General Contracting fees, consistent with the schedules provided in the Scope of Services. Respondents are hereby advised that it is the State's desire to accelerate design and construction schedules where reasonably possible, without adverse cost impact.
- E. Respondent should complete the Cost Proposal Form by filling in all blanks on the form that follows.
- F. Respondents should include a separate detailed not-to-exceed reimbursable estimate

End of RFP

**ACKNOWLEDGEMENT AND ATTESTATION FORM
(Partnership Format)**

Date: _____

Page 1 of 1

By responding to this RFP, the respondent(s) certify that he/she has reviewed the Construction Management/General Contracting sample contract, and its exhibits contained herein, and is familiar with their terms and conditions and finds them expressly workable without change or modification.

We certify and declare that the foregoing is true and correct.

Subscribed on _____ at _____
Date City

_____, State of _____
County State

1) _____
Partner Signature

Typed Name: _____

2) _____
Partner Signature

Typed Name: _____

Notary: _____ Date _____

Commission Expires: _____

Note: Add additional signatures if there are more than two partners.

**ACKNOWLEDGEMENT AND ATTESTATION FORM
(Joint Venture Format)**

Date: _____

Page 1 of 1

By responding to this RFP, the respondent(s) certify that he/she has reviewed the Construction Manager/General Contractor sample contract, and its exhibits contained herein, and is familiar with their terms and conditions and finds them expressly workable without change or modification.

We certify and declare that the foregoing is true and correct.

Subscribed on _____ at _____,
Date City

_____, State of _____
County State

1) _____
Venture Partner Binding Signature Date

Type of Business Typed Name: _____
Title: _____

Witness Date

Typed Name: _____

2) _____
Venture Partner Binding Signature Date

Type of Business Typed Name: _____
Title: _____

Witness Date

Typed Name: _____

Note:

1. Add additional venture partners as necessary.
2. Witnesses of venture partners shall be corporate secretary for corporations, partners for partnerships, and notaries for sole proprietorships.
3. Attach venture agreement
4. Type of business shall identify the venture partner as a corporation, venture, partnership, sole proprietorship, or other legal entity.

**ACKNOWLEDGEMENT AND ATTESTATION FORM
(CORPORATE FORMAT)**

Date: _____

Page 1 of 1

By responding to this RFP, the respondent(s) certify that he/she has reviewed the Construction Management/General Contracting sample contract, and its exhibits contained herein, and is familiar with their terms and conditions and finds them expressly workable without change or modification.

We certify and declare that the foregoing is true and correct.

Subscribed on _____ at _____,
Date City

_____, State of _____
County State

Corporate Officer Signature Date

Secretary Date

Note: Use full corporate name and attach corporate seal here.

(SEAL)

ACKNOWLEDGEMENT AND ATTESTATION FORM
(Sole Proprietorship Format)

Date: _____

Page 1 of 1

By responding to this RFP, the respondent(s) certify that he/she has reviewed the Construction Management/General Contracting sample contract, and its exhibits contained herein, and is familiar with their terms and conditions and finds them expressly workable without change or modification.

We certify and declare that the foregoing is true and correct.

Subscribed on _____ at _____,
Date City

_____, State of _____
County State

Respondent Date

Typed Name: _____

Notary: _____
Date

Commission Expires: _____

**COST PROPOSAL FORM
CONSTRUCTION MANAGER/GENERAL CONTRACTING (CM/GC) SERVICES**

Date: _____

Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2 PN 21-174016
Project Title

1.	CM/GC Preconstruction Fee	\$ _____
2.	CM/GC Construction Fee	\$ _____
3.	General Conditions On-Site CM/GC Staff	\$ _____
4.	Other Reimbursable General Conditions (NTE)	\$ _____
	Total CM/GC Fee	\$ _____

Fees are to be calculated per Exhibit A (SC-6.5), CM/GC Designated Services and Method of Payment.

Please provide a detailed breakdown to adequately describe the CM/GC staff provided, term of their services, and associated anticipated reimbursable costs so as to demonstrate as complete an understanding as possible of the services provided.

Reimbursable general condition expenses are generally confined to the on-site CM/GC construction phase staff reimbursed at direct personnel expense, plus those on-site materials, equipment and facilities to support the work of the CM/GC staff and construction subcontractors.

Acknowledge receipt of Addendum Nos. _____

Anticipates Services outside the United States or Colorado* Yes No

If the respondent anticipates services under the contract or any subcontracts will be performed outside the United States or Colorado, the respondent shall provide in a written statement which must include, but need not be limited to the type of services that will be performed at a location outside the United States or Colorado and the reason why it is necessary or advantageous to go outside the United States or Colorado to perform such services. (Does not apply to any project that receives federal moneys)

Will comply with 80% Colorado Labor Yes No

For State Public Works Project per C.R.S 8-17-10, Colorado labor shall be employed to perform at least 80% of the work. "Colorado Labor" means any person who is a resident of the state of Colorado at the time of the Public Works project. Respondents indicating that their bid proposal will not comply with the 80% Colorado Labor requirement are required to submit written justification along with the bid submission. A governmental body that allows a waiver shall post notice and justification for the waiver on its web site. (Does not apply to any project that receives federal moneys)

Bidder is a Service-Disabled Veteran Owned Small Business* Yes No

A Service-Disabled Veteran Owned Small Business (SDVOSB) per C.R.S. 24-103-905, means a business that is incorporated or organized in Colorado or maintains a place of business or has an office in Colorado and is officially registered and verified by the Center for Veteran Enterprise within the U.S. Department of Veteran Affairs. Attach proof of certification along with the proposal submission.

**Does not apply to projects for Institutions of Higher Education that have opted out of the State Procurement Code.*

Applicant or Corporate Officer Signature

Title

Appendix A

STATE BUILDINGS PROGRAM PREQUALIFICATION SUBMITTAL/EVALUATION FORM CONSTRUCTION MANAGEMENT/GENERAL CONTRACTING (CM/GC) SERVICES

Name of Firm: _____

Name of Project: Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2 PN 21-174016

Evaluator No: _____ Date: _____

RFP REFERENCE

MINIMUM REQUIREMENTS

Y ____ N ____

If the minimum requirements (including letter from surety) have not been met, specify the reason(s):

Acknowledgement and Attestation included:

Y ____ N ____

SCORE

Weight² x Rating³ = Score

1. QUALIFICATIONS OF THE FIRM(S)¹

<input type="checkbox"/> Qualifications of the firm	4	x	_____	=	_____
<input type="checkbox"/> Organizational structure/lines of authority	4	x	_____	=	_____
<input type="checkbox"/> Subcontractor selection and management	4	x	_____	=	_____
<input type="checkbox"/> Colorado workforce	4	x	_____	=	_____
<input type="checkbox"/> Safety/employee support	5	x	_____	=	_____

2. QUALIFICATIONS OF THE MANAGEMENT TEAM MEMBERS¹

<input type="checkbox"/> Qualifications and relevant experience of superintendent	5	x	_____	=	_____
<input type="checkbox"/> Qualifications and relevant experience of in-house staff	5	x	_____	=	_____
<input type="checkbox"/> Location/Access	4	x	_____	=	_____

3. PROJECT MANAGEMENT APPROACH¹

<input type="checkbox"/> Approach to successful CM/GC Services					
a. Cost effectiveness	5	x	_____	=	_____
b. Schedule effectiveness	5	x	_____	=	_____
c. Quality effectiveness	5	x	_____	=	_____
<input type="checkbox"/> Competitively Bid/Self Performed Work	5	x	_____	=	_____

Appendix A1

STATE BUILDINGS PROGRAM ORAL INTERVIEWS/COST PROPOSALS EVALUATION FORM CONSTRUCTION MANAGEMENT/GENERAL CONTRACTING (CM/GC) SERVICES

Name of Firm: _____
Name of Project: Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2 PN 21-174016
Evaluator No: _____ Date: _____

SCORE

Score	Weight ²	x	Rating ³	=
1. <u>QUALIFICATIONS OF THE TEAM</u> ¹	5	x	_____	= _____
2. <u>QUALIFICATIONS OF THE MANAGEMENT TEAM MEMBERS</u> ¹	5	x	_____	= _____
3. <u>PROJECT MANAGEMENT APPROACH</u> ¹	5	x	_____	= _____
4. <u>PRIOR PROJECT EXPERIENCE/SUCCESS</u> ¹	5	x	_____	= _____
5. <u>MISCELLANEOUS</u> ¹				
<input type="checkbox"/> Craft Labor Capabilities	3	x	_____	= _____
<input type="checkbox"/> Apprenticeship Training Program	3	x	_____	= _____
<input type="checkbox"/> Self-Performed BIM/3D Modeling Qualifications	3	x	_____	= _____
TOTAL SCORE:				_____ ⁴

NOTES:

1. **Criteria:** Agencies/Institutions are encouraged to include additional criteria that reflect unique characteristics of the project under each category to help determine the submitter's overall qualifications.
2. **Weights:** Agency/Institutions to assign weights, using whole numbers, to all criteria on evaluation forms for inclusion into RFQ document and prior to evaluations.
3. **Ratings:** Evaluator to assess the strength of each firms qualifications and assign a numerical rating of 1 to 5 with 5 being the highest rating. (Use whole numbers)
4. **Total Score:** Includes the sum of all criteria. Note: a passing score (as a percentage of the total points available) is optional and should be assigned by the agency/institution prior to evaluation.

Appendix A2

**STATE BUILDINGS PROGRAM
SUBMITTAL AND ORAL INTERVIEW RANKING MATRIX**

QUALIFICATIONS 70%/FEE 30%

FIRM	QUALIFICATIONS ¹						AVERAGE QUALS ²	QUALS SCORE ³	FEE SCORE ⁴	QUALS & FEE SCORE ⁵	RANK ⁶
	EVAL #1	EVAL #2	EVAL #3	EVAL #4	EVAL #5	EVAL #6					

NOTES:

1. Insert total score from each evaluator's PREQUALIFICATION SUBMITTAL or ORAL INTERVIEW/ COST PROPOSALS/EVALUATION FORMS. (Note that the use of the Matrix for the PREQUALIFICATION SUBMITTAL EVALUATION does not consider cost proposals only qualifications). DO NOT combine the scores of the two evaluation forms.
2. Add all evaluators' total scores and divide by the number of evaluators to determine the average score for each firm's qualifications.
3. The highest score for qualifications on the evaluation form is to receive 70 points and the other team scores are to be determined as a percentage of the 70 points. To score each average qualification score, use the example formula.

Assume the highest score is 700.

SCORING OF QUALIFICATIONS

FIRM B: $\frac{700}{700} \times 70 \text{ points} = 70 \text{ points}$

FIRM C: $\frac{600}{700} \times 70 \text{ points} = 60 \text{ points}$

FIRM A: $\frac{500}{700} \times 70 \text{ points} = 50 \text{ points}$

4. Determine score for each firm's sealed cost proposal with the lowest fee being equivalent to a score of 30 points. To score each fee, use the example formula.

Assume the lowest fee was \$100,000.

SCORING OF FEES

FIRM A: $\frac{\$100,000}{\$100,000} \times 30 \text{ points} = 30 \text{ points}$

FIRM B: $\frac{\$100,000}{\$125,000} \times 30 \text{ points} = 24 \text{ points}$

FIRM C: $\frac{\$100,000}{\$150,000} \times 30 \text{ points} = 20 \text{ points}$

5. Add the average qualification score to the fee score to determine cumulative qualifications and fee score.
6. Numerically rank all firms with the highest scoring firm being the most qualified.

Appendix B

CONSTRUCTION MANAGER/GENERAL CONTRACTOR (CM/GC) AGREEMENT (FORM SC-6.5) AND GENERAL CONDITIONS OF THE CONSTRUCTION MANAGER/GENERAL CONTRACTOR (CM/GC) AGREEMENT (FORM SC-6.51)

[HTTPS://OSA.COLORADO.GOV/STATE-BUILDINGS/PROJECT-MANAGEMENT-POLICIES-
GUIDELINES/CONTRACT-FORMS](https://osa.colorado.gov/state-buildings/project-management-policies-guidelines/contract-forms)

(Sample)

**UNIVERSITY OF COLORADO DENVER | ANSCHUTZ MEDICAL CAMPUS CONSTRUCTION
MANAGER/GENERAL CONTRACTOR – SUPPLEMENTARY GENERAL CONDITIONS**

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONSTRUCTION MANAGER/GENERAL CONTRACTOR (CM/GC) AGREEMENT
(STATE FORM SC-6.5)**

EXHIBIT P

**UNIVERSITY OF COLORADO DENVER | ANSCHUTZ MEDICAL CAMPUS CONSTRUCTION
MANAGER/GENERAL CONTRACTOR – SUPPLEMENTARY GENERAL CONDITIONS**

The Construction Manager/General Contractor Agreement shall be amended as follows:

Article 3.4.2.2 Change language to: The construction contingency for the Work shall be equal to three percent (3.0%) of the initial Guaranteed Maximum Price.

The terms University, University of Colorado, University of Colorado Denver, University of Colorado Anschutz Medical Campus, CU Denver, CU Anschutz, Principal Representative, are the interchangeable for this replacement of Article 11.

ARTICLE 11 INSURANCE - Replace Article 11 as follows:

For purposes of this supplement “Contractor” as used herein shall mean, as appropriate to the State Contract form being used, Contractor, Standing Order Contractor, Construction Manager/General Contractor, or Design/Build Entity.

The Contractor shall obtain and maintain, at its own expense and for the duration of the contract including any warranty periods under the Contract are satisfied, the insurance coverages set forth below.

By requiring such insurance, the Principal Representative shall not be deemed or construed to have assessed the risk that may be applicable to the Contractor its agents, representatives, employees or subcontractors under this contract. The insurance requirements herein for this Contract in no way limit the indemnity covenants contained in the Contract. The Principal Representative in no way warrants that the limits contained herein are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under this Contract by the Contractor, its agents, representatives, employees, or subcontractors. The Contractor shall assess its own risks and if it deems appropriate and/or prudent, maintain higher limits and/or broader coverages. The Contractor is not relieved of any liability or other obligations assumed or pursuant to the Contract by reason of its failure to obtain or maintain insurance in sufficient amounts, duration, or types.

COVERAGES AND LIMITS OF INSURANCE - - Contractor shall provide coverage with limits of liability not less than those stated below.

1. **Commercial General Liability – ISO CG 0001 or equivalent. Coverage to include:**
 - Premises and Operations
 - Explosions, Collapse and Underground Hazards
 - Personal / Advertising Injury
 - Products / Completed Operations

3. **Workers Compensation**

- Statutory Benefits (Coverage A)
 - Employers Liability (Coverage B)
- a. Policy shall contain a waiver of subrogation in favor of the Principal Representative.
- b. This requirement shall not apply when a contractor or subcontractor is exempt under Colorado Workers' Compensation Act., **AND** when such contractor or subcontractor executes the appropriate sole proprietor waiver form.

Minimum Limits:

Coverage A (Workers' Compensation)	Statutory
Coverage B (Employers Liability)	
Each accident	\$ 100,000
Disease each employee	\$ 100,000
Disease policy limit	\$ 500,000

4. **Contractors Pollution Liability**

- Coverage shall apply to sudden and gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). Policy shall cover the Contractor's completed operations.
- If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this Contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning from the time that work under this contract is completed.
- **The policy shall be endorsed to include the following as Additional Insureds: The Regents of the University of Colorado, a Body Corporate, named as an additional insured with respect to liability and defense of suits arising out of the activities performed by, or on behalf of the Construction Manager, including completed operations.**
- Endorsements CA9948 and MCS-90 are required on the Automobile Liability Coverage if the Contractor is transporting any type of hazardous materials.
- **Contractors Pollution Liability policies must be kept in effect for up to three (3) years after completion of the project.**

Minimum Limits (Projects at or under \$500,000):

Per Loss	\$ 1,000,000
Aggregate	\$ 1,000,000

Minimum Limits (Projects over \$500,000):

Per Loss	\$ 2,000,000
Aggregate	\$ 2,000,000

5. **Professional Liability (Errors and Omissions)**

(This Professional Liability requirement applies only to Design/Build Entity SC-8.0 and 9.0.)

- The Contractor shall maintain Errors and Omissions Liability covering negligent acts, errors and/or omissions, including design errors of the Contractor for damage sustained by reason of or in the course of operations under this Contract. The policy/coverages shall be amended to include the following:

Amendment of any Contractual Liability Exclusion to state: "This exclusion does not apply to any liability of others which you assume under a written contract provided such liability is caused by your negligent acts."

- In the event that any professional liability insurance required by this Contract is written on a claims-made basis, Contractor warrants that any retroactive date under the policy shall precede the effective date of this Contract; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning at the time work under this Contract is completed.
- Policy shall contain a waiver of subrogation against The Regents of the University of Colorado, a Body Corporate.

Wrongful Act	\$2,000,000
General Aggregate	\$2,000,000

6. **Builder's Risk/ Installation Floater**

Unless otherwise provided or instructed by the Principal Representative, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the project is located, Builder's Risk Insurance in the amount of the initial contract amount as well as subsequent modifications for the entire project at the site on a replacement cost basis without optional deductibles. This coverage is required for new buildings or additions to existing buildings and for materials and equipment to be installed in existing structures.

- Covered Cause of Loss: Special Form
 - Include Theft and Vandalism
 - Labor costs to repair damaged work
 - Shall be written for 100% of the completed value (replacement cost basis)
 - Deductible maximum is \$50,000.00
 - Waiver of Subrogation is to apply
 - The Regents of the University of Colorado, a body corporate, shall be added as **Additional Named Insured on Builders Risk.**
1. Policy must provide coverage from the time any covered property becomes the responsibility of the Contractor, and continue without interruption during construction, renovation, or installation, including any time during which the covered property is being transported to the construction installation site, or awaiting installation, whether on or off site.
 2. The Policy shall be maintained, unless otherwise provided in the contract documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Principal Representative has insurable interest in the property to be covered, whichever is later.
 3. The Builder's Risk insurance shall include interests of the Principal Representative, and if applicable, affiliated or associated entities, the General Contractor, subcontractors and sub-tier contractors in the project.
 4. Builders' Risk Coverage shall be on a **Special** Covered Cause of Loss Form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and debris removal including demolition, increased cost of construction, architect's fees and expenses, flood (including water damage), earthquake, and if applicable, all below and above ground structures, piping, foundations including underground water and sewer mains, piling including the ground on which the structure rests and excavation, backfilling, filling, and grading. Equipment Breakdown Coverage (a.k.a.

Boiler & Machinery) shall be included as required by the Contract Documents or by law, which shall specifically cover insured equipment during installation and testing (including hot testing, where applicable). Other coverages may be required if provided in contract documents.

5. The Builders' Risk shall be written for 100% of the completed value (replacement cost basis) of the work being performed. The Builders' Risk shall include the following provisions:
 - a. Replacement Cost Basis - including modification of the valuation clause to cover all costs needed to repair the structure or work (including overhead and profits) and will pay based on the values figured at the time of rebuilding or repairing, not at the time of loss
 - b. Modify or delete exclusion pertaining to damage to interior of building caused by an perils insured against are covered; also provide coverage for water damage
Note, if the addition, or renovation is to an existing building, The Principal Representative requires that the Contractor provide as an option to include the existing building into the Builders' Risk Policy. The Principal Representative shall provide the replacement cost value of the existing building
6. At the option of the Principal Representative, the Principal Representative may include Soft Costs (including Loss of Use)/Delay in Opening Endorsement under the builder's risk policy. The Principal Representative agrees to provide the necessary exposure base information for quotation by the Builder's Risk carrier. The Principal Representative agrees to pay the premium associated with the Soft Costs coverage, the Principal Representative decides to purchase this coverage.
7. The Builders' Risk Policy shall specifically permit occupancy of the building during construction. Partial occupancy or use of the work shall not commence until the insurance company or companies providing insurance have consented to such partial occupancy or use. The Principal Representative and Contractor shall take reasonable steps to obtain consent of the insurance company or companies and delete any provisions with regard to restrictions within any Occupancy Clauses within the Builders' Risk Policy. The Builders' Risk Policy shall remain in force until acceptance of the project by the Principal Representative.
8. The deductible shall not exceed \$50,000 and shall be the responsibility of the Contractor except for losses such as flood (not water damage), earthquake, windstorm, tsunami, volcano, etc. Losses in excess of \$50,000 insured shall be adjusted in conjunction with the Principal Representative. Any insurance payments/proceeds shall be made payable to the Principal Representative subject to requirements of any applicable mortgagee clause.

The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner.

The Principal Representative shall have the authority to adjust and settle any losses in excess of \$50,000 with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Principal Representative exercise of this power. It is expressly agreed that nothing in this section shall be subject to arbitration and any references to arbitration are expressly deleted.

9. The Contractor is responsible for providing 45 days' notice of cancellation to the Principal Representative. The policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to the Project.

If the Contractor does not intend to purchase such Builder's Risk Insurance required by the Contract and with all of the coverages in the amount described above, the Contractor shall so inform the Principal Representative as stated in writing prior to commencement of the work. The Principal Representative may then affect insurance that will protect the interests of the Principal Representative, the General Contractor, Subcontractors and sub-tier contractors in the project. Coverages applying shall be the same as stated above including other coverages that may be required by the Principal Representative. The cost shall be charged to the Contractor. Coverage shall be written for 100% of the completed value of the work being performed, with a deductible not to exceed \$50,000 per occurrence for most projects.

All deductibles will be assumed by the Contractor. Waiver of Subrogation is to apply against all parties named as insureds, but only to the extent the loss is covered, and Beneficial Occupancy Endorsements are to apply.

If the Principal Representative is damaged by the failure or neglect of the Contractor to purchase or maintain insurance as described above, without so notifying the Principal Representative, then the Contractor shall bear all reasonable costs properly attributable thereto.

ADDITIONAL INSURANCE REQUIREMENTS

1. All insurers must be licensed or approved to do business within the State of Colorado, and unless otherwise specified, all policies must be written on a per occurrence basis.
2. Contractor's insurance carrier should possess a minimum A.M. Best's Insurance Guide rating of A- VI.
3. On insurance policies where the Principal Representative are named as additional insureds, the Principal Representative shall be additional insureds to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Contract.
4. Contractor shall furnish the Principal Representative with certificates of insurance (ACORD form or equivalent approved by the Principal Representative) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.
All certificates and any required endorsements are to be received and approved by the Principal Representative before work commences.
Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.
5. Upon request by the Principal Representative, Contractor must provide a copy of the actual insurance policy effecting coverage(s) required by the contract.
6. The Contractor's insurance coverage shall be primary insurance and non-contributory with respect to all other available resources.
7. The Contractor shall advise the Principal Representative in the event any general aggregate or other aggregate limits are reduced below the required per occurrence limit. At their own expense, the Contractor will reinstate the aggregate limits to comply with the minimum requirements and shall furnish to the Principal Representative a new certificate of insurance showing such coverage is in force.
8. Provide a minimum of thirty (30) days advance written notice to the Principal Representative for cancellation, non-renewal, or material changes to policies required under the Contract (45 days for builders' risk coverage).
9. Certificate Holder: The Regents of the University of Colorado, Project Management, 1945 North Wheeling Street, Campus Mail stop F-418, Aurora, CO 80045.

Failure of the Contractor to fully comply with these requirements during the term of the Contract may be considered a material breach of contract and may be cause for immediate termination of the Contract at the option of the Principal Representative. The Principal Representative reserves the right to negotiate additional specific insurance requirements at the time of the contract award.

Subcontractors

Contractor's certificate(s) shall include all subcontractors as additional insureds under its policies or subcontractors shall maintain separate insurance as determined by the Contractor, however, subcontractor's limits of liability shall not be less than \$1,000,000 per occurrence / \$2,000,000 aggregate.

Non-Waiver

The parties hereto understand and agree that The Principal Representative is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, et seq., as from time to time amended, or otherwise available to the Principal Representative or its officers, employees, agents, and volunteers.

Mutual Cooperation

The Principal Representative and Contractor shall cooperate with each other in the collection of any insurance proceeds which may be payable in the event of any loss, including the execution and delivery of any proof of loss or other actions required to effect recovery.

(Revised 12/09/2019)

ARTICLE 21. MISCELLANEOUS. PROVISIONS

Delete the following section except for Projects that are ARRA funded:

21.22 STATEWIDE CONTRACT MANAGEMENT SYSTEM

Add the following:

21.24 UNIVERSITY OF COLORADO DENVER | ANSCHUTZ MEDICAL CAMPUS POLICY ON SEXUAL HARASSMENT

- .1 The Contractor shall vigorously pursue to the greatest extent possible, adherence to the university Policy on Sexual Harassment and also require all employees, and employees of all professional consultants of any kind, working on this project to adhere to this Policy.
- .2 Statement of Policy: It is the policy of the university to maintain the community as a place of work, study, and residence free of sexual harassment or exploitation of students, faculty, staff, and administrators. Sexual harassment is prohibited on campus and in the university programs. The university is committed to taking appropriate action against any of its officials, employees or students who violate the policy prohibiting sexual harassment.
- .3 Definition of Sexual Harassment: For purposes of this Policy, sexual harassment is defined as conduct which is unwelcome and consists of:

1. sexual advances; 2. requests for sexual favors; or 3. other verbal or physical conduct of a sexual nature when submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic decisions affecting the individual; or when such conduct has the purpose or effect, of unreasonably interfering with an individual's work or academic performance by creating an intimidating, hostile, or offensive working or educational environment.

Conduct prohibited under this policy may occur between persons of the same sex or of different sexes and may manifest itself in different ways. For example, sexual harassment may be as undisguised as a direct solicitation of sexual favors, or arise from behavior which has the effect of creating an intimidating, hostile, or offensive educational or working environment. In this regard, the following types of acts, if pervasive and continuous, are more likely than not to be considered sexual harassment: unwelcome physical contact, sexual remarks about a person's clothing, body, or sexual relations, conversation of a sexual nature or similar jokes and stories, and the display of sexually explicit materials in the workplace or their use in the classroom without defensible educational purpose.

- .4 Consequence of Sexual Offenses: The university may require the Architect/Engineer to remove from the university property any individual or individuals who violate the policy prohibiting sexual harassment.
- .5 Contractor acknowledges that all Contractor employees, agents and representatives providing services to the University of Colorado Denver | Anschutz Medical Campus are responsible for complying with University policies and procedures. This includes, without limitation, policies related to professional conduct, sexual misconduct (including non-consensual sexual intercourse, non-consensual sexual contact, sexual exploitation, sexual harassment, intimate partner abuse, and stalking), and discrimination and harassment based on protected characteristic identity (including race, color, national origin, pregnancy, sex, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation, or political philosophy). Please see <http://equity.ucdenver.edu/policies-procedures/>.
- .6 Contractor agrees that its employees, agents and representatives who engage in conduct prohibited by University policies, including related retaliation or failure to report, as determined in the University's sole discretion, will be subject to disciplinary action, up to and including termination by Contractor consistent with Contractor's policies and procedures
- .7 Further, as Contractor recognizes and agrees that its selection and hiring of individuals who possess expertise and professional skills to carry out Contractor's obligations in an appropriate and non-discriminatory manner that reflects positively on the University's goodwill and reputation is an essential condition to inducing the University to enter into the Agreement, Contractor agrees to remove or replace any individual whose work or performance under this Agreement is considered by the University as acting inappropriately, unprofessionally, or violating any University policy, in the University's sole discretion, including, without limitation, the aforementioned policies.

- .8 Contractor acknowledges that Contractor's activities involve heightened risks as a result of access or exposure by Contractor's employees or agents to one or more security sensitive environments. Contractor expressly acknowledges that Contractor shall take all commercially reasonable measures to mitigate any such risks, which measures shall include but are not limited to conducting criminal history checks, financial background checks when appropriate, and reference checks on all employees or agents who will be performing work at the University. Upon University request, Contractor shall certify in writing that it has complied with this provision and that all employees, agents, and subcontractors performing work hereunder have satisfactorily completed Contractor's background check.

21.25 UNIVERSITY OF COLORADO DENVER | ANSCHUTZ MEDICAL CAMPUS POLICY ON SECURITY BADGING

- 1) All costs and time associated with obtaining a University security badge for Contractor employees working on campus shall be borne by the Contractor.

Appendix C

CERTIFICATION AND AFFIDAVIT REGARDING Unauthorized Immigrants (Form UI-1)



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CERTIFICATION AND AFFIDAVIT REGARDING UNAUTHORIZED IMMIGRANTS

Institution/Agency: University of Colorado Anschutz Medical Campus / GFE

Project No./Name: 21-174016 / Fitzsimons 2021-049M21 Replace Chiller Ph 1 of 2

A. CERTIFICATION STATEMENT CRS 8-17.5-101 & 102 (HB 06-1343, SB 08-193)

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an unauthorized immigrant to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an unauthorized immigrant.
2. The Vendor certifies that it does not now knowingly employ or contract with an unauthorized immigrant who will perform work under this contract, and that it will participate in either (i) the "E-Verify Program", jointly administered by the United States Department of Homeland Security and the Social Security Administration, or (ii) the "Department Program" administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired to perform work under this contract.
3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for damages to the State.

Or

B. SOLE PROPRIETOR AFFIDAVIT CRS 24-76.5-101 (HB 06S-1023)

1. If the Vendor is a **sole proprietor**, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):

- I am a United States citizen, or
- I am a Permanent Resident of the United States, or
- I am lawfully present in the United States pursuant to Federal law.

I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq. and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of _____, 20____.

VENDOR:

Enter vendor legal name here
Vendor Full Legal Name

BY _____
:
Signature of Authorized Representative

Enter Title here

Title

Appendix D

DIRECT LABOR BURDEN (SBP-6.18)



STATE OF COLORADO
 OFFICE OF THE STATE ARCHITECT
 STATE BUILDINGS PROGRAM

DIRECT LABOR BURDEN CALCULATION

Institution/Agency: University of Colorado Anschutz Medical Campus / GFE

Project No./Name: 21-174016 / Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2

This form is required to be submitted for review prior to execution of a construction agreement.

List items below by the percentage of what makes up the total labor burden; Items include benefits that a contractor pays to employees on their payroll. Examples include taxes, pension cost, health and dental insurance etc. The Labor Burden amount must be agreed to by both the contractor and Principal Representative and will be included in the contract as part of Exhibit A and will be used in the calculation of any future Change Order Proposals (SC-6.312) Line 2.

Major sub-contractors defined as electricians, plumbers, mechanical contractors, excavators, millwork, concrete, block layers etc. Please provide one (1) Labor Burden Calculation Sheet per contractor and for each sub-contractor. These labor burdens shall be used in the calculation of any future Change Order Proposals (SC-6.312) Line 10.

State reserves the right to require back-up confirmation of all information included in this calculation.

	Percent of Salary Paid	
Payroll Taxes		
Pension Costs		
Health Insurance		
Dental Insurance		
Life Insurance		
Other (Specify)		Description: _____
Other (Specify)		Description: _____
Total Labor Burden:	0%	

Appendix E

APPLICABLE PREVAILING WAGE RATES

"General Decision Number: C020210015 11/05/2021

Superseded General Decision Number: C020200015

State: Colorado

Construction Type: Building

County: Adams County in Colorado.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021
1	01/15/2021
2	03/05/2021
3	07/23/2021
4	10/29/2021
5	11/05/2021

CARP0055-004 11/01/2019

Rates Fringes

CARPENTER (Includes Acoustical Ceiling Installation and Drywall Hanging; Excludes Metal Stud Installation).....	\$ 29.95	10.99
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CARP1607-001 06/01/2020

Rates Fringes

MILLWRIGHT.....	\$ 35.50	14.68
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ELEC0068-012 06/01/2020

Rates Fringes

ELECTRICIAN (Includes Low Voltage Wiring).....	\$ 38.00	16.97
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ELEV0025-001 01/01/2021

Rates Fringes

ELEVATOR MECHANIC.....	\$ 48.09	35.825
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FOOTNOTE:

- a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.
- b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

* ENGI0009-017 05/01/2021

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Crane)		
141 tons and over.....	\$ 35.17	12.35
50 tons and under.....	\$ 31.70	12.35
51 to 90 tons.....	\$ 31.97	12.35
91 to 140 tons.....	\$ 33.05	12.35

IRON0024-009 11/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 32.00	12.01

IRON0024-010 11/01/2020

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 32.00	12.01

PAIN0079-006 08/01/2017

	Rates	Fringes
PAINTER (Brush, Roller and Spray; Excludes Drywall Finishing/Taping).....	\$ 20.50	8.41

PAIN0419-001 07/01/2016

	Rates	Fringes
SOFT FLOOR LAYER (Vinyl and Carpet).....	\$ 20.00	10.83

PAIN0930-002 07/01/2019

	Rates	Fringes
GLAZIER.....	\$ 31.92	10.49

* PLUM0003-009 06/01/2021

	Rates	Fringes
PLUMBER (Excludes HVAC Duct, Pipe and Unit Installation).....	\$ 39.53	18.52

PLUM0208-008 01/01/2021

	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe and Unit Installation; Excludes HVAC Duct Installation).....	\$ 37.55	17.88

SFC00669-002 04/01/2021

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 39.59	25.30

SHEE0009-004 07/01/2021

	Rates	Fringes
SHEET METAL WORKER (Includes HVAC Duct Installation; Excludes HVAC Pipe and Unit Installation).....	\$ 36.45	20.15

SUC02013-001 07/31/2015

	Rates	Fringes
BRICKLAYER.....	\$ 21.96	0.00
CARPENTER (Metal Stud Installation Only).....	\$ 17.68	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 20.33	6.76
DRYWALL FINISHER/TAPER.....	\$ 18.77	6.37

INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation).....	\$ 21.49	5.20
LABORER: Common or General.....	\$ 14.93	4.24
LABORER: Mason Tender - Brick...	\$ 15.99	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 16.00	0.00
LABORER: Pipelayer.....	\$ 16.96	3.68
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 20.78	5.78
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 19.10	3.89
OPERATOR: Grader/Blade.....	\$ 21.50	0.00
ROOFER.....	\$ 16.96	0.00
TRUCK DRIVER: Dump Truck.....	\$ 17.34	0.00
WATERPROOFER.....	\$ 16.94	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate

changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

EMPLOYEE RIGHTS

FOR EMPLOYEES ON APPLICABLE STATE OF COLORADO CONSTRUCTION PROJECTS

Prevailing Wage For Public Projects

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Prevailing wage and apprenticeship contract clauses allow contract termination and debarment of contractors from future State contracts per C.R.S. §24-109-105. A violation of C.R.S. §24-92-204 is subject to a private right of action as defined in C.R.S. §24-92-210. Enforcement of rules by the Colorado Department of Labor & Employment are defined in C.R.S. §24-92-209.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved State apprenticeship programs for projects in the amount of \$1M dollars or more. This pertains to the contractors or subcontractors that will be used for all mechanical, sheet metal, fire suppression, sprinkler fitting, electrical and plumbing work required on the project. The provisions of this requirement do not apply to the Colorado Department of Transportation, regardless of the amount of funding source of the public project. The provisions of this requirement do not apply to any county, city and county, city, municipality, town, school district, special district, or any other political subdivision of the state.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

Insert by Agency/Institution Division if applicable
Contact phone number • Contact email address

Employees can contact the Division of Labor Standards and Statistics
by calling 303-318-8441 (888-390-7936 toll free) or
by emailing cdle_labor_standards@state.co.us.



COLORADO

Office of the State Architect

Department of Personnel & Administration

Appendix F

APPRENTICESHIP CERTIFICATION (SBP-6.17)



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM

**APPRENTICESHIP UTILIZATION CERTIFICATION
(Public Projects of \$1 million or more)**

Institution/Agency: University of Colorado Anschutz Medical Campus / GFE

Project No./Name: 21-174016 / Fitzsimons 2021-049M21 Replace Chiller, Ph 1 of 2

For each trade listed below attach documentation that all firms identified participate in apprenticeship programs as described in the Certification Statement below.

TRADE	SUBCONTRACTOR
Mechanical	
Sheet Metal	
Fire Suppression	
Sprinkler Fitting	
Plumbing	
Electrical	

CERTIFICATION STATEMENT § 24-92-115, C.R.S. (SB 19-196)

The above named General Contractor certifies and agrees as follows:

That all firms identified above participate in apprenticeship programs registered with the United States Department of Labor's Employment and Training Administration or state apprenticeship councils recognized by the United States Department of Labor and have a proven record of graduating apprentices at a minimum of fifteen percent of its apprentices for at least three of the past five years. The General Contractor shall supply supporting documentation from the United States Department of Labor's office of apprenticeship verifying the certification.

The above documentation shall be made publicly available by the contracting agency through its website within thirty (30) days from when it is submitted.

The General Contractor shall agree to provide additional documentation to the contracting agency regarding affected apprenticeship training programs relating to the requirements above. If a contracting agency determines that a subcontractor has willfully falsified documentation or willfully misrepresented their qualifications, the agency shall direct the General Contractor to terminate the subcontractor contract immediately and the subcontractor will be immediately removed from the public project. At the discretion of the Director of the Department of Personnel, the State may initiate the process to debar the General Contractor pursuant to § 24-109-105, C.R.S., and may pursue any other remedy provided by law.

CERTIFIED and AGREED to this _____ day of _____, 20____.

GENERAL CONTRACTOR:

Full Legal Name

BY: _____
Signature of Authorized Representative

Title

Appendix G

**Fitzsimons Building Chiller Replacement Phase 1 & 2, Schematic Design Documents ,
Narrative, and Design Schedule 1/20/2022**

UNIVERSITY OF COLORADO – DENVER | ANSCHUTZ MEDICAL CAMPUS FITZSIMONS BUILDING – CHILLER REPLACEMENT, PHASE 1 & 2 13001 E 17TH PLACE, AURORA, CO 80045 SCHEMATIC DESIGN PHASE, JANUARY 20, 2022



MECHANICAL:
Shaffer-Baucom Engineering & Consulting
3900 S. Wadsworth Blvd., Suite 600
Lakewood, CO 80225
303-986-8200

ELECTRICAL:
Shaffer-Baucom Engineering & Consulting
3900 S. Wadsworth Blvd., Suite 600
Lakewood, CO 80225
303-986-8200

ARCHITECT:
ARCHITECTURAL WORKSHOP
2 KALAMATH ST.
DENVER, CO 80223
303-788-1717

STRUCTURAL:
MARTIN/MARTIN CONSULTING ENGINEERS
12499 W. COLFAX AVE.
LAKEWOOD, CO 80215
303-431-6100

PROJECT TEAM

OWNER: UNIVERSITY OF COLORADO – DENVER | ANSCHUTZ MEDICAL CAMPUS
FACILITIES PROJECT DIVISION

CAMPUS SERVICE BUILDING
1945 WHEELING STREET
AURORA, CO 80045
MIKE VIGIL – PROJECT MANAGER
T: 303-921-0415
EMAIL: MIKE.VIGIL@CUANSCHUTZ.EDU

MECHANICAL & ELECTRICAL ENGINEER: SHAFFER BAUCOM ENGINEERING & CONSULTING
3900 WADSWORTH BLVD., SUITE 600
LAKEWOOD, CO 80235
T: 303-986-8200

GARY SHAFFER, P.E. – PRINCIPAL-IN-CHARGE
EMAIL: GSHAFFER@SBENGR.COM
CODY JOHNSON, P.E. – PROJECT MANAGER / SR. MECHANICAL ENGINEER
EMAIL: CJOHNSON@SBENGR.COM
JASON ENGLE, P.E. – ELECTRICAL DEPARTMENT HEAD
EMAIL: JENGL@SBENGR.COM

ARCHITECT: ARCHITECTURAL WORKSHOP
2 KALAMATH ST
DENVER, CO 80223

JOE MARSHAL, A.I.A. – ASSOCIATE PRINCIPAL
EMAIL: JMARSHALL@ARCHSHOP.COM
T: 303-788-1717

STRUCTURAL ENGINEER: MARTIN/MARTIN CONSULTING ENGINEERS
12499 W. COLFAX AVE.
LAKEWOOD, CO 80215

BEN BROMIEL, PE – PRINCIPAL
EMAIL: BBROMIEL@MARTINMARTIN.COM

DAVID HALL, P.E. – SENIOR ENGINEER
EMAIL: DHALL@MARTINMARTIN.COM
T: 303-431-6100

PROJECT DESCRIPTION

THE SCOPE OF WORK IS AS FOLLOWS:

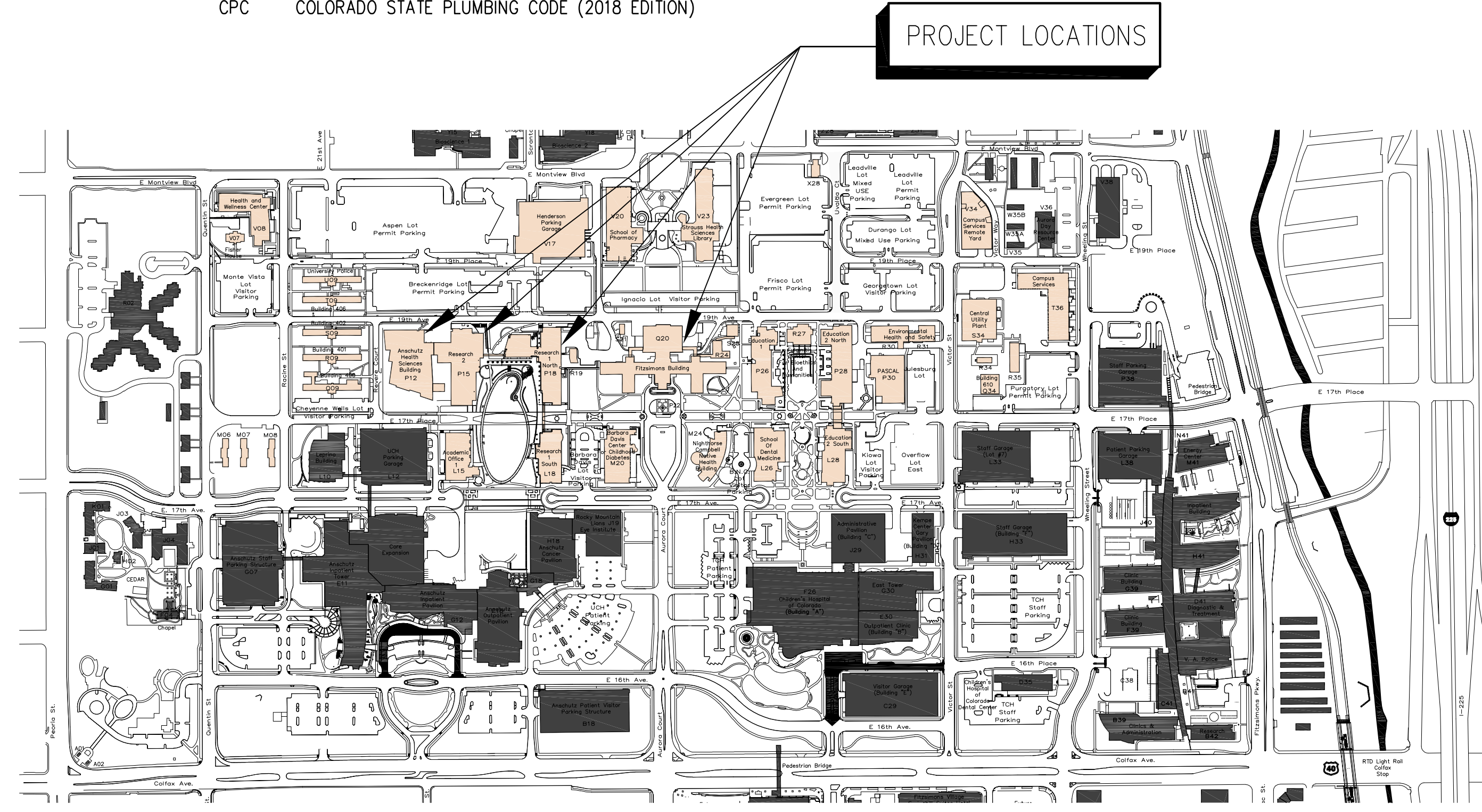
1. PIPING AND CONTROL MODIFICATIONS TO THE EMERGENCY CHILLED WATER PLANT.
2. REMOVE AND REPLACE THE EXISTING WATER COOLED CHILLERS.
3. ELECTRICAL, ARCHITECTURAL AND STRUCTURAL WORK AS REQUIRED TO SUPPORT THE ABOVE REFERENCED MECHANICAL WORK.
4. BELOW IS THE FOLLOWING BUILDING NAMES, ABBREVIATIONS, AND BUILDING IDENTIFICATION NUMBERS FOR REFERENCE:
FITZSIMONS – FITZ – Q20
RESEARCH COMPLEX 1 – R1 – P18
RESEARCH COMPLEX 2 – R2 – P15
ANSCHUTZ HEALTH SCIENCE BUILDING – AHSB – P12

BUILDING CODE REFERENCES

IBC INTERNATIONAL BUILDING CODE (2018 EDITION)
IFC INTERNATIONAL FIRE CODE (2018 EDITION)
IEBC INTERNATIONAL EXISTING BUILDING CODE (2018 EDITION)
NEC NATIONAL ELECTRIC CODE (2020 EDITION)
IMC INTERNATIONAL MECHANICAL CODE (2018 EDITION)
IFGC INTERNATIONAL FUEL GAS CODE (2018 EDITION)
IECC INTERNATIONAL ENERGY CONSERVATION CODE (2018 EDITION)
CPC COLORADO STATE PLUMBING CODE (2018 EDITION)

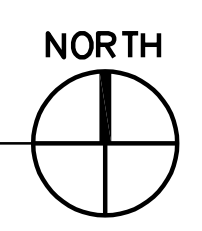
DRAWING INDEX

COVER SHEET		MECHANICAL	
G0.0	COVER SHEET	M-001	MECHANICAL GENERAL NOTES AND LEGENDS
		M-002	MECHANICAL SCHEDULES
ARCHITECTURAL		MD-401	CHILLED WATER SYSTEM (Q20-FITZ) DEMOLITION SCHEMATIC
(NOT ISSUED)		MD-402	EMERGENCY CHILLED WATER SYSTEM (P18, P15, P12) DEMO SCHEMATICS
		MD-403	CHILLED WATER RISER (Q20-FITZ) DEMO SCHEMATIC
		MD-404	CONDENSER WATER SYSTEM (Q20-FITZ) DEMOLITION SCHEMATIC
STRUCTURAL		M-401	CHILLED WATER SYSTEM (Q20-FITZ) SCHEMATIC
(NOT ISSUED)		M-402	EMERGENCY CHILLED WATER SYSTEM (P18, P15, P12) SCHEMATICS
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ELECTRICAL		E-001	ELECTRICAL GENERAL NOTES AND LEGENDS
		E-002	ELECTRICAL ONE-LINE DIAGRAM



CU-DENVER | AMC - VICINITY MAP

SCALE: NONE



NOT FOR CONSTRUCTION
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UNIVERSITY OF COLORADO - DENVER | ANSCHUTZ MEDICAL CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT PHASE 1 & 2
13001 E 17TH PLACE, AURORA, CO 80045

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By:
Designed By:
Checked By:

Issued For: SCHEMATIC DESIGN
Date: 01-20-2022

COVER SHEET
G0.0
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GENERAL HVAC NOTES

- COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCE TO ALL EQUIPMENT, CONTROLS, VALVES, DAMPERS, ETC.
- MAINTAIN ACCESS CLEARANCE TO ALL DAMPERS, CONTROL DAMPERS, FIRE/SMOKE DAMPERS, DUCT ACCESS DOORS, AND OTHER EQUIPMENT WHERE THE REMOVAL OF LAY-IN CEILING TILES DOES NOT PROVIDE SUFFICIENT ACCESS. ACCESS DOORS FOR INSTALLATION IN FIRE RATED CONSTRUCTION SHALL HAVE APPROPRIATE FIRE RATINGS.
- IF MANUFACTURER'S MATERIAL OR EQUIPMENT IS LISTED IN SCHEDULES OR ON DRAWINGS, THEY ARE TYPES TO BE PROVIDED FOR ESTABLISHMENT OF SIZE, CAPACITY, GRADE, AND QUALITY. IF OTHER ACCEPTABLE MANUFACTURERS ARE USED, COST OF ANY CHANGE IN CONSTRUCTION REQUIRED BY THEIR USE SHALL BE BORNE BY CONTRACTOR.
- EQUIPMENT SHALL CONFORM TO STATE AND/OR LOCAL ENERGY CONSERVATION STANDARDS AS WELL AS THE IECC.
- IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO RESULT IN A COMPLETE MECHANICAL INSTALLATION IN COMPLETE ACCORDANCE WITH ALL APPLICABLE LOCAL CODES AND ORDINANCES.
- DRAWINGS ARE DIAGNOSTIC IN CHARACTER AND DO NOT NECESSARILY INDICATE EVERY REQUIRED DUCT, OFFSET, TRANSITION, ETC. ITEMS NOT SPECIFICALLY MENTIONED IN THE SPECIFICATION OR NOTED ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE WORKING INSTALLATION, SHALL BE INCLUDED.
- DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY. WHATEVER IS CALLED FOR IN EITHER IS BINDING AS THOUGH CALLED FOR IN BOTH. IF THERE IS A CONFLICT IN THE CONTRACT DOCUMENTS, THE MORE DEMANDING AND COSTLY DESIGN SHALL BE SELECTED FOR BIDDING PURPOSES. UPON NOTICING CONFLICT IN THE DOCUMENTS, THE CONTRACTOR SHALL IMMEDIATELY PRESENT THE CONFLICT FOUND IN THE CONTRACT DOCUMENTS TO THE ARCHITECT/ENGINEER FOR RESOLUTION. IF THE RESOLUTION FAVORS A LESS COSTLY DESIGN, THE CONTRACTOR WILL BE REQUIRED TO REIMBURSE THE DIFFERENCE IN COST.
- DRAWINGS SHALL NOT BE SCALED FOR ROUGH-IN MEASUREMENTS OR USED AS SHOP DRAWINGS. WHERE DRAWINGS ARE REQUIRED FOR THESE PURPOSES OR HAVE TO BE MADE FROM FIELD MEASUREMENTS, THE CONTRACTOR SHALL TAKE THE NECESSARY MEASUREMENTS AND PREPARE THE DRAWINGS.
- BEFORE ANY WORK IS INSTALLED, DETERMINE THAT EQUIPMENT WILL PROPERLY FIT THE SPACE, THAT REQUIRED CLEARANCES CAN BE MAINTAINED AND THAT EQUIPMENT CAN BE LOCATED WITHOUT INTERFERENCES BETWEEN SYSTEMS, WITH STRUCTURAL ELEMENTS, OR WITH THE WORK OF OTHER TRADES.
- CONFERENCE, COOPERATE, AND COORDINATE WORK WITH OTHER TRADES. COORDINATE CEILING CAVITY SPACE CAREFULLY WITH ALL TRADES. IN EVENT OF CONFLICT, INSTALL MECHANICAL AND ELECTRICAL SYSTEMS WITHIN CAVITY SPACE IN FOLLOWING ORDER OF PRIORITY:
 - PLUMBING WASTE, VENT PIPING, AND ROOF DRAIN MAINS & LEADERS
 - SUPPLY RETURN, EXHAUST DUCTWORK
 - FIRE SPRINKLER MAINS AND LEADERS
 - ELECTRICAL CONDUIT AND LIGHTING
 - DOMESTIC HOT AND COLD WATER PIPING AND GAS PIPING
 - FIRE SPRINKLER BRANCH PIPING AND SPRINKLER RUNOUT PIPING
- ALL EXISTING HVAC EQUIPMENT AND DEVICES TO REMAIN UNLESS NOTED OTHERWISE.
- COORDINATE REPLACEMENT/REPAIR OF CEILING AND WALLS WITH GENERAL CONTRACTOR. MATCH EXISTING BUILDING STANDARDS.

GENERAL HVAC PIPING NOTES

- INSTALL ALL (N) PIPING, EQUIPMENT AND ACCESSORIES, TO MAINTAIN AND ALLOW FOR ACCESS TO SERVICE ALL EQUIPMENT AND SHUT-OFF VALVES.
- PROVIDE ADDITIONAL PIPING FITTINGS AND OFFSETS TO MAINTAIN MAXIMUM HEADROOM AND CEILING CLEARANCE.
- INSULATE ALL (E) PIPING WHICH HAS UNINSULATED SURFACES FROM DEMOLITION OR (N) TO (E) CONNECTIONS.
- ALL SUPPLY AND RETURN BRANCH PIPING TO TERMINAL EQUIPMENT SHALL BE 3/4" UNLESS NOTED OTHERWISE. ALL PIPING TAKE-OFFS FROM MAIN SHALL BE BOTTOM TAKE-OFFS WITH SWING JOINTS. SADDLE TYPE FITTINGS ARE NOT ALLOWED.
- SEAL ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS AND CEILING WITH APPROVED FIRE PROOF MATERIALS AS SPECIFIED.
- COORDINATE REPLACEMENT/REPAIR OF CEILING AND WALLS WITH GENERAL CONTRACTOR. MATCH EXISTING BUILDING STANDARDS.
- DRAWINGS ARE DIAGNOSTIC IN CHARACTER AND DO NOT NECESSARILY INDICATE EVERY REQUIRED PIPE, OFFSET, TRANSITION, ETC. ITEMS NOT SPECIFICALLY MENTIONED IN THE SPECIFICATION OR NOTED ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE WORKING INSTALLATION, SHALL BE INCLUDED.
- MAINTAIN ACCESS CLEARANCE TO ALL BALANCE VALVES, SHUT-OFF VALVES, CONTROL VALVES, AND OTHER EQUIPMENT. PROVIDE ACCESS DOORS WHERE THE REMOVAL OF LAY-IN CEILING TILES DOES NOT PROVIDE SUFFICIENT ACCESS. ACCESS DOORS FOR INSTALLATION IN FIRE RATED CONSTRUCTION SHALL HAVE APPROPRIATE FIRE RATINGS.
- REPORT ANY (E) TO REMAIN PIPING THAT IS LEAKING TO THE ARCHITECT AND OWNER (CU-DENVER | AMC). REPAIR LEAKING PIPING AS DIRECTED.
- ALL (E) FLOW RATES SHOWN ON THE DRAWINGS IN LIGHT LINE WEIGHT ARE BASED ON (E) CONDITIONS AND ARE FOR REFERENCE ONLY, UNLESS NOTED OTHERWISE.
- THE LOCATION OF ALL PIPE PENETRATIONS AND ROUTING THROUGH THE BUILDING SHALL BE COORDINATED BY THE MECHANICAL CONTRACTOR WITH THE (E) STRUCTURAL FRAMING/SYSTEM.
- EQUIPMENT SHALL BE SET OR MOUNTED ON A LEVEL BASE CAPABLE OF SUPPORTING AND DISTRIBUTING THE WEIGHT CONTAINED THEREON. CHILLERS, TANKS, AND EQUIPMENT SHALL BE SECURED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL UTILITY OUTAGES AND PROVIDE ANY TEMPORARY FACILITIES REQUESTED BY OWNER TO MAINTAIN OPERATION OF CRITICAL SPACES AS IDENTIFIED BY OWNER. EXTREME CARE SHALL BE EXERCISED BY CONTRACTOR FOR ALL WORK IN AND SURROUNDING AREAS OF CRITICAL SPACES IDENTIFIED BY OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE INCURRED TO EQUIPMENT, ETC. AS A RESULT OF CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PENETRATIONS AND POST INSTALLED ANCHORS WITH (E) STRUCTURAL SYSTEM. DO NOT DAMAGE (E) STRUCTURAL REINFORCING DURING INSTALLATION. COORDINATE WITH STRUCTURAL ENGINEER FOR ALL PENETRATIONS.
- CONTRACTOR IS RESPONSIBLE FOR DRAINING THE ENTIRE CHILLED WATER SYSTEM TO COMPLETE THE SCOPE OF WORK. CHILLED WATER SYSTEM SHALL BE FILLED, FLUSHED AND ALL AIR VENTED UPON RETURNING THE CHILLED WATER SYSTEM TO SERVICE.

GENERAL DEMOLITION NOTES

- TAG AND GIVE OWNER FIRST RIGHT OF REFUSAL FOR ALL (E) EQUIPMENT, VALVES, INSTRUMENTATION, AND CONTROLS IN GOOD WORKING CONDITION OR AS OTHERWISE INSTRUCTED BY THE OWNER. ALL ITEMS TAGGED BY OWNER SHALL BE CAREFULLY REMOVED, PROTECTED FROM DAMAGE AND STORED AS DIRECTED. ALL ITEMS NOT RE-USED OR WANTED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES.
- RETAIN EXISTING EQUIPMENT TO BE DEMOLISHED UNTIL RECEIPT OF REPLACEMENT EQUIPMENT, TYP.
- REPORT ANY (E) DAMAGED EQUIPMENT AND/OR DEVICES TO THE OWNER IN WRITING PRIOR TO STARTING ANY WORK.
- COORDINATE EXTENT OF DEMOLITION WITH NEW WORK. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO DEMOLITION.
- ALL INFORMATION SHOWN ON THESE DRAWINGS INCLUDING LOCATIONS AND SIZES ARE BASED ON THE BEST INFORMATION AVAILABLE. INFORMATION SHOWN IS TO INDICATE THE INTENT OF THE MECHANICAL SYSTEM WORK BUT MAY NOT REFLECT THE EXACT ROUTING AND LOCATION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY EXISTING EQUIPMENT, PIPING, DUCTWORK, STRUCTURE, ELECTRICAL, LIGHTING AND ARCHITECTURAL INFLUENCES PRIOR TO INSTALLATION OF THE NEW WORK TO AVOID ANY CONFLICTS WITH SYSTEMS REQUIRING MODIFICATIONS. NOTIFY ARCHITECT/ENGINEER OF ANY CONFLICTS PRIOR TO PERFORMING WORK.
- DEMOLITION OF MECHANICAL PIPING, CONTROLS, EQUIPMENT, OR DEVICES MEANS TO REMOVE IN ITS ENTIRETY. REMOVE ALL ABANDONED PIPING, HANGERS, CONTROLS, ACCESSORIES, ETC. ASSOCIATED WITH (E) MECHANICAL SYSTEMS OR NOT REQUIRED FOR (N) MECHANICAL SYSTEMS. RETURN UNUSED MECHANICAL EQUIPMENT TO FACILITY MANAGEMENT FOR STORAGE AND/OR REMOVAL FROM SITE AS DIRECTED BY PROJECT MANAGER.
- IF SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED, DO NOT DISTURB. IMMEDIATELY NOTIFY OWNER AND ARCHITECT. HAZARDOUS MATERIALS SHALL BE REMOVED BY OWNER UNDER A SEPARATE CONTRACT.
- M.C. SHALL RECOVER ALL USED REFRIGERANT IN PROPERLY LABELED D.O.T. APPROVED REFRIGERANT CYLINDER(S) PER E.P.A. REQUIREMENT, SECTION 608 OF THE CLEAN AIR ACT AND ARI STANDARD 700. RECOVERED REFRIGERANT SHALL BE RETURNED TO OWNER.
- ALL EXISTING HVAC EQUIPMENT AND DEVICES TO REMAIN UNLESS NOTED OTHERWISE.
- COORDINATE REPLACEMENT/REPAIR OF CEILING AND WALLS WITH GENERAL CONTRACTOR. MATCH EXISTING BUILDING STANDARDS.

HVAC LEGEND					
(Not all symbols listed below are used on these drawings)					
ABBR.	SYMBOL	DESCRIPTION	ABBR.	SYMBOL	DESCRIPTION
LPS		LOW PRESSURE STEAM SUPPLY PIPING	EDMD		END OF MAIN DRIP
LPR		LOW PRESSURE CONDENSATE RETURN PIPING	FS		FLOW SWITCH
MPS		MEDIUM PRESSURE STEAM SUPPLY PIPING			SUPPLY DUCT UP / SUPPLY DUCT DOWN
MPR		MEDIUM PRESSURE CONDENSATE RETURN PIPING			RETURN DUCT UP / RETURN DUCT DOWN
HPS		HIGH PRESSURE STEAM SUPPLY PIPING	A.L.		ACOUSTICALLY LINED DUCTWORK
HPR		HIGH PRESSURE CONDENSATE RETURN PIPING	BDD		BACKDRAFT DAMPER
PD		PUMP DRAIN DISCHARGE PIPING			FLEXIBLE DUCT CONNECTION
HS		HEATING WATER SUPPLY PIPING			TURNING VANES IN DUCT ELBOW
HR		HEATING WATER RETURN PIPING			SPIN-IN FITTING W/ MANUAL VOLUME DAMPER
OH		CHILLED WATER SUPPLY PIPING			ROUND FLEXIBLE DUCTWORK
CHR		CHILLED WATER RETURN PIPING	MVD		MANUAL VOLUME DAMPER
CS		CONDENSER WATER SUPPLY PIPING	DFD		DUCT FIRE DAMPER
CR		CONDENSER WATER RETURN PIPING	FSD		COMBINATION DUCT SMOKE & FIRE DAMPER
CN		COOLING COIL DRAIN PIPING	SD		DUCT SMOKE DAMPER
RL		REFRIGERANT LIQUID PIPING	O.B.D.		OPPOSED BLADE DAMPER
RS		REFRIGERANT SUCTION PIPING	P.B.D.		PARALLEL BLADE DAMPER
EMCH		EMERGENCY CHILLED WATER SUPPLY PIPING	TCO		TEMPERATURE CONTROL DAMPER
EMCHR		EMERGENCY CHILLED WATER RETURN PIPING	TODAD		TEMPERATURE CONTROL OUTSIDE AIR DAMPER
RHS		RADIANT HEATING WATER SUPPLY PIPING	TORAD		TEMPERATURE CONTROL RETURN AIR DAMPER
RHR		RADIANT HEATING WATER RETURN PIPING	TCEAD		TEMPERATURE CONTROL EXHAUST AIR DAMPER
CIFS		COOLING TOWER FILTER SUPPLY PIPING	DSO		DUCT SMOKE DETECTOR
CIFR		COOLING TOWER FILTER RETURN PIPING	EP		ELECTRIC-PNEUMATIC CONTROL SWITCH
PCS		PROCESS COOLING WATER SUPPLY PIPING	PE		PNEUMATIC-ELECTRIC CONTROL SWITCH
PCR		PROCESS COOLING WATER RETURN PIPING			WALL MOUNTED THERMOSTAT
FOS		FUEL OIL SUPPLY PIPING			UNIT MOUNTED THERMOSTAT
FOR		FUEL OIL RETURN PIPING			HUMIDISTAT
FOV		FUEL OIL VENT PIPING	CO		CARBON MONOXIDE DETECTOR
D		INDIRECT DRAIN PIPING	CO2		CARBON DIOXIDE DETECTOR
NPW		NON-POTABLE DOMESTIC COLD WATER PIPING			UNDERCUT DOOR
TT		THERMOSTATIC STEAM TRAP			LOUVER
F&T		FLOAT AND THERMOSTATIC STEAM TRAP	SP IN WC		STATIC PRESSURE IN INCHES WATER COLUMN
IBT		INVERTED BUCKET STEAM TRAP	MAV		MANUAL AIR VENT
TCV		(2 OR 3-WAY) TEMPERATURE CONTROL VALVE	AAV		AUTOMATIC AIR VENT
BFV		2-POSITION BUTTERFLY CONTROL VALVE			PUSHBUTTON
RSV		REFRIGERANT SERVICE VALVE			EMERGENCY POWER OFF
DPS		DIFFERENTIAL PRESSURE SWITCH			EMERGENCY VENTILATION OVERRIDE
DPT		DIFFERENTIAL PRESSURE TRANSMITTER	(+)		SINGLE POSITIVE ROOM PRESSURE
		ROOM DIFFERENTIAL PRESSURE SENSOR	(++)		DOUBLE POSITIVE ROOM PRESSURE
		ROOM DIFFERENTIAL PRESSURE CONTROLLER	(-)		SINGLE NEGATIVE ROOM PRESSURE
GX		GENERAL EXHAUST VAV DAMPER	(--)		DOUBLE NEGATIVE ROOM PRESSURE
HZ		FUME EXHAUST VAV DAMPER	(0)		NEUTRAL PRESSURE
TB-XXX	TB-301	TERMINAL BOX ON 3RD FLOOR #1 BOX			
SBFX-X	SBF4-1	SUPPLY BOOSTER FAN ON 4TH FLOOR #1			RECTANGULAR DUCT DIMENSIONS
XYF	2BF12	26" x 12" SPIRAL FLAT OVAL DUCT			FLAT OVAL DUCT DIMENSIONS
DAD		DUCT ACCESS DOOR			* BASED ON SPECIFIED REFERENCE

REFERENCE SYMBOLS	
(Not all symbols listed below are used on these drawings)	
	KEY NOTE DESIGNATION
	REVISION TAG DESIGNATION
	ELECTRICALLY POWERED MECHANICAL EQUIPMENT DESIGNATION
	MECHANICAL EQUIPMENT DESIGNATION
	EXISTING CONDITION LINEWEIGHT
	NEW WORK LINEWEIGHT
	RISER DIAGRAM NUMBER
	SHEET RISER IS DRAWN ON
	SECTION DESIGNATION
	SECTION DRAWN ON THIS SHEET
	SECTION CUT ON THIS SHEET
SUPPLEMENTARY SYMBOLS	
(Not all symbols listed below are used on these drawings)	
	EXISTING CONDITION LINEWEIGHT
	NEW WORK LINEWEIGHT

SINGLE/DOUBLE LINE DUCT LEGEND			
(Not all symbols listed below are used on these drawings)			
SINGLE LINE	DOUBLE LINE	SINGLE LINE	DOUBLE LINE

SINGLE/DOUBLE LINE PIPING LEGEND			
(Not all symbols listed below are used on these drawings)			
SINGLE LINE	DOUBLE LINE	SINGLE LINE	DOUBLE LINE

NOT FOR CONSTRUCTION

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ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	GC	GENERAL CONTRACTOR	(R)	RELOCATED
AFG	ABOVE FINISHED GRADE	IE	INVERT ELEVATION	RA	RETURN AIR
AVTR	ACID RESISTANT VENT THRU ROOF	KEC	KITCHEN EQUIPMENT CONTRACTOR	RH	RADIOISOTOPE FUME HOOD
BOD	BOTTOM OF DUCT	KW	KILOWATTS	(RR)	REMOVE & RELOCATE
BOP	BOTTOM OF PIPE	MC	MECHANICAL CONTRACTOR	SA	SUPPLY AIR
BSC	BIOSAFETY CABINET	MH	MANHOLE	SS	STAINLESS STEEL
CB	CATCH BASIN	(N)	NEW	TOC	TEMPERATURE CONTROLS CONTRACTOR
CFH	CHEMICAL FUME HOOD	NC	NORMALLY CLOSED	(TYP.)	TYPICAL
CI	CAST IRON	NIC	NOT IN CONTRACT	UF	UNDER FLOOR
(D)	DEMOLISH & REMOVE	NO	NORMALLY OPEN	UG	UNDER GROUND
DAD	DUCT ACCESS DOOR	NTS	NOT TO SCALE	V	VOLTS
(E)	EXISTING	OA	OUTSIDE AIR	VCP	VITRIFIED CLAY PIPE
EA	EXHAUST AIR	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED	VFD	VARIABLE FREQUENCY DRIVE
EC	ELECTRICAL CONTRACTOR	PC	PLUMBING CONTRACTOR	VTR	VENT THRU ROOF
(F)	FUTURE	PVC	POLYVINYL CHLORIDE	WAD	WALL ACCESS DOOR

GENERAL LEGEND

(Not all symbols listed below are used on these drawings)

ABBR.	SYMBOL	DESCRIPTION	ABBR.	SYMBOL	DESCRIPTION
		CAP END OF PIPE	EJ		EXPANSION JOINT
		SLOPED PIPE IN DIRECTION OF ARROW	BJ		BALL JOINT EXPANSION COMPENSATOR
		PIPE ANCHOR			SOLENOID VALVE
		PIPE ALIGNMENT GUIDE			HOSE END DRAIN VALVE
		UNION OR FLANGE	P/T		PRESSURE/TEMPERATURE TAP
		CONCENTRIC PIPE REDUCER			STRAINER
		ECCENTRIC PIPE REDUCER			STRAINER W/ BLOWDOWN VALVE
PRV		PRESSURE REDUCING VALVE			FLEXIBLE PIPE CONNECTOR
PRVR		PRESSURE AND/OR TEMP. RELIEF VALVE			THERMOMETER
BC		BALANCING VALVE			CEILING ACCESS PANEL
GV		GATE VALVE			PUMP
QV		GLOBE VALVE			PRESSURE GAUGE
BFV		BUTTERFLY VALVE	TB		THRUST BLOCK
BV		BALL VALVE			DIRECTION OF FLOW IN PIPE
CV		CHECK VALVE			DIAMETER
FM		FLOW METER			POINT OF CONNECTION, NEW TO EXISTING
CBV		CALIBRATED BALANCE VALVE			(E) MECHANICAL TO BE REMOVED
		PIPE UP AND PIPE DN.			VALVE IN RISER (UP/DN.)
		BRANCH TEE TOP TAKE-OFF			BRANCH TEE BOTTOM TAKE-OFF

MECHANICAL DRAWING INDEX

SHEET NO.	SHEET TITLE
M-001	MECHANICAL GENERAL NOTES AND LEGENDS
M-002	MECHANICAL SCHEDULES
MD-401	CHILLED WATER SYSTEM (Q20-FITZ) DEMOLITION SCHEMATIC
MD-402	EMERGENCY CHILLED WATER SYSTEM (P18, P15, P12) DEMO SCHEMATICS
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SINGLE/DOUBLE LINE PIPING LEGEND

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303-431-6105

UNIVERSITY OF COLORADO - DENVER | ANSCHUTZ MEDICAL
CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
PHASE 1 & 2
13001 E 17TH PLACE, AURORA, CO 80045

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By:
Designed By:
Checked By:

Issued For: SCHEMATIC DESIGN
Date: 01-20-2022

MECHANICAL GENERAL NOTES AND LEGENDS

M-001

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THE ORIGINAL OF THIS DRAWING IS 30" X 42". IF THIS COPY IS ANY OTHER SIZE, IT HAS EITHER BEEN REDUCED OR ENLARGED.

CU-DENVER - AMC - FITZSIMONS EMERGENCY CHILLER PLANT - CHILLER COMPARISON

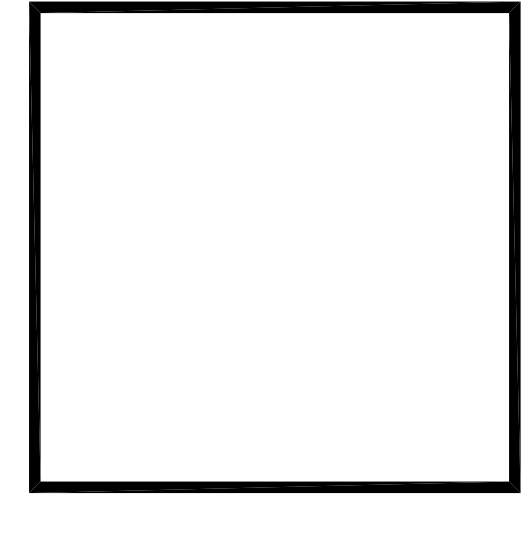
OPTION #	MANUFACTURER	MODEL	LEAD + DELIVERY TIME (WEEKS)	NOMINAL TONNAGE	CHILLER QUANTITY	COMPRESSOR TYPE	# OF COMP. (PER CHILLER)	# OF REFRIG. CIRCUITS (PER CHILLER)	COMPRESSOR TYPE	DESIGN EVAPORATOR FLOW (GPM)	MIN EVAPORATOR FLOW (GPM)	TURNDOWN TO (TONS)	% COMPRESSOR TURNDOWN TO (PER CHILLER)	REFRIGERANT TYPE	VSD COOLING TYPE	SITE CONDITIONS FULL LOAD EFFICIENCY (KW/TON)	SITE CONDITIONS IPLV EFFICIENCY (KW/TON)	DIMENSIONS (LxWxH)	WEIGHT (LBS)	MCA	COMPLIES WITH XCEL REBATE PROGRAM	BUDGET PRICE (EACH)	TOTAL BUDGET PRICE	ANTICIPATED XCEL ENERGY REBATE	TOTAL EQUIPMENT COST LESS XCEL REBATES	TOTAL COST \$/TON	TOTAL COST \$/TON	REMARKS
A	SMART	WE100.2H	26	300	3	CENTRIFUGAL	2	2	OIL-FREE MAG. BEARING	599	247	39.0	13%	R-134a	REFRIGERANT	0.5282	0.2963	145 x 56 x 91	12,500	259.0	YES	\$261,000	\$783,000	\$39,565	\$743,435	\$826	\$970	1-6
B	SMART	WE100.2H	26	300	3	CENTRIFUGAL	2	2	OIL-FREE MAG. BEARING	599	247	39.0	13%	R-513a	REFRIGERANT	0.5565	0.3037	145 x 56 x 91	12,500	271.0	NO	\$301,000	\$903,000	\$0	\$903,000	\$1,003	\$1,003	1-6
C	JCI	YMC2	25	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	598	186	43.9	15%	R-134a	EVAPORATOR WATER	0.4897	0.3254	145 x 68 x 80	14,000	241.0	YES	\$312,000	\$936,000	\$35,658	\$900,342	\$1,000	\$1,040	1-6
D	JCI	YZ	33	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	598	166	30.0	10%	R-1233a(E)	EVAPORATOR WATER	0.4815	0.3324	150 x 70 x 92	16,000	265.0	YES	\$307,000	\$921,000	\$34,715	\$886,285	\$985	\$1,023	1-6
E	TRANE	RTHD	17	300	3	SCREW	1	1	OIL-LUBRICATED	598	411	60.0	20%	R-134a	AIR COOLED	0.5307	0.3723	148 x 77 x 88	22,000	269.0	YES	\$228,000	\$684,000	\$34,004	\$649,996	\$722	\$760	9
F	TRANE	HDWA	28	450	2	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	896	345	45.0	10%	R-134a	HYBRID (AR + REFRIG.)	0.5276	0.3206	157 x 82 x 78	17,000	386.0	YES	\$306,000	\$912,000	\$35,316	\$876,684	\$641	\$980	1-6
G	TRANE	HDWA	28	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	598	202	45.0	15%	R-134a	HYBRID (AR + REFRIG.)	0.4997	0.3303	157 x 82 x 78	15,500	246.0	YES	\$273,000	\$819,000	\$33,920	\$785,080	\$872	\$910	1-6
H	TRANE	HDWA	28	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	598	205	45.0	15%	R-513a	HYBRID (AR + REFRIG.)	0.5291	0.3327	157 x 82 x 78	15,500	251.0	YES	\$299,000	\$897,000	\$33,630	\$863,370	\$959	\$997	1-6
I	DAIKIN	WVWVNSA	19	298	3	SCREW	1	1	OIL-LUBRICATED	594	284	75.0	25%	R-134a	AIR COOLED	0.5928	0.3563	169 x 62 x 100	13,800	318.0	YES	\$209,000	\$627,000	\$35,910	\$591,090	\$661	\$701	9
J	TRANE	CVM	26	300	3	CENTRIFUGAL	1	1	OIL-LUBRICATED	597	180	30.0	10%	R-514a	REFRIGERANT	0.4515	0.3054	169 x 91 x 81	19,500	229.0	YES	\$325,000	\$975,000	\$37,186	\$937,814	\$1,042	\$1,083	1-6
K	DAIKIN	WME092SC	33	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	599	230	75.0	25%	R-134a	REFRIGERANT	0.5091	0.3713	172 x 56 x 98	14,500	337.0	YES	\$353,000	\$1,059,000	\$29,458	\$1,029,542	\$1,144	\$1,177	1-6
L	DAIKIN	WME092SC	N/A	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	599	230	75.0	25%	R-513a	REFRIGERANT	0.5121	0.3688	172 x 56 x 98	14,000	320.0	YES	\$447,000	\$1,341,000	\$29,795	\$1,311,205	\$1,457	\$1,490	1-6, 7
M	DAIKIN	WMC060D	19	300	3	CENTRIFUGAL	2	1	OIL-FREE MAG. BEARING	599	163	75.0	25%	R-134a	REFRIGERANT	0.5136	0.3310	172 x 59 x 95	13,500	259.0	YES	\$352,000	\$1,056,000	\$34,888	\$1,021,112	\$1,135	\$1,173	1-6, 8
N	DAIKIN	WSC079LB	33	300	3	CENTRIFUGAL	1	1	OIL-LUBRICATED	599	161	75.0	25%	R-134a	REFRIGERANT	0.5165	0.3424	172 x 74 x 84	15,500	268.0	YES	\$299,000	\$777,000	\$33,308	\$743,692	\$826	\$963	1-6
O	JCI	YZ	33	300	3	CENTRIFUGAL	1	1	OIL-FREE MAG. BEARING	598	166	30.0	10%	R-1233a(E)	EVAPORATOR WATER	0.5097	0.3075	174 x 74 x 96	18,200	238.0	YES	\$328,000	\$984,000	\$38,071	\$945,929	\$1,051	\$1,093	1-6
P	JCI	YK	25	300	3	CENTRIFUGAL	1	1	OIL-LUBRICATED	598	213	56.2	19%	R-134a	EVAPORATOR WATER	0.5039	0.3695	196 x 71 x 96	18,000	243.0	YES	\$263,000	\$789,000	\$29,702	\$759,298	\$944	\$977	1-6

SELECTIONS BASED ON THE FOLLOWING PARAMETERS:

- CHLED WATER: EWT = 56F / LWT = 42F
- CONDENSER WATER: EWT = 80F / LWT = 90F
- (E) CHILLER FOOTPRINT (144" x 66"), (E) CHILLER WEIGHT (16,800 LB), (E) CHILLER MCA = 268.
- ORDER OF CHILLER SECTION PRIORITY:
 - DIMENSIONS
 - NPLV
 - CHILLER TURNDOWN
 - \$/TON

REMARKS:

- TOTAL COST INCLUDES EQUIPMENT ONLY, ANCILLARY EQUIPMENT COST WILL BE THE SAME REGARDLESS OF CHOSEN CHILLER. CHILLER CONTROLS COSTS IS NOT INCLUDED IN THIS COMPARISON.
- UNIT TO BE PROVIDED WITH FACTORY MOUNTED AND WREID, INTEGRAL VFD.
- FACTORY MOUNTED VSD TO BE PROVIDED WITH INTEGRAL HARMONIC FILTER TO LIMIT TOTAL DEMAND DISTORTION (TDD) TO NO MORE THAN 5% AT THE CHILLER.
- UNIT AHRV CERTIFIED RATINGS, INCLUDING EFFICIENCY, MUST REFLECT ALL LOSSES ASSOCIATED WITH VFD AND INTEGRAL HARMONIC FILTER.
- VFD TO BE PROVIDED WITH INTEGRAL CIRCUIT BREAKER WITH SCOR OF 65,000 AMPS RMS.
- PROVIDE UNIT WITH HINGED BELL ACCESS ON OPPOSITE SIDE OF CHILLER FROM STANDARD PIPING CONNECTION POINTS.
- R-513a CHILLERS ARE NOT AVAILABLE FOR ORDER AT THIS TIME. DATE TBD.
- WMC MODEL NOT CURRENTLY AVAILABLE WITH R-513a. DATE TBD.
- XCEL REBATE PROGRAM FOR ROTARY SCREW CHILLERS APPLIED.



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**UNIVERSITY OF COLORADO - DENVER | ANSCHUTZ MEDICAL
CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
PHASE 1 & 2
13001 E 17TH PLACE, AURORA, CO 80045**

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By:
Designed By:
Checked By:

Issued For: SCHEMATIC DESIGN
Date: 01-26-2022

MECHANICAL SCHEDULES
M-002

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- PHASE 1 BASE SCOPE OF WORK DENOTED WITH ①.
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH ②.
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH ③.
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH ④.

KEY NOTES

- ① (E) VALVE TO REMAIN, REMOVE PNEUMATIC ACTUATOR AND PREPARE (E) VALVE FOR (N) MOTORIZED ACTUATOR FOR EMERGENCY CHILLED WATER TRANSFER.
- ② REMOVE (E) VALVE HANDLE, (E) VALVE TO REMAIN. PREPARE (E) VALVE FOR (N) MOTORIZED ACTUATOR FOR ADDING N+1 PUMPING REDUNDANCY TO EMERGENCY-CHILLED WATER OPERATION FOR CRITICAL LOOP.
- ③ REMOVE (E) SECONDARY CHILLED WATER PUMP (CRITICAL LOOP) VARIABLE FREQUENCY DRIVE. (E) PUMP AND (E) PUMP MOTOR SHALL REMAIN.
- ④ REMOVE (E) 10x10x6 TEE IN MAIN CHILLED WATER PIPING.
- ⑤ REMOVE (E) SECTION OF 8" EMCH/EMCHR PIPING.
- ⑥ REMOVE (E) EMERGENCY CHILLED WATER PUMP AND INERTIA BASE, (E) HOUSEKEEPING PAD TO REMAIN.
- ⑦ REMOVE (E) CHILLER, (E) HOUSEKEEPING PAD TO REMAIN.
- ⑧ REMOVE (E) PRIMARY CHILLED WATER PUMP AND INERTIA BASE, (E) HOUSEKEEPING PAD TO REMAIN.
- ⑨ REMOVE (E) CHILLED WATER AIR SEPARATOR.
- ⑩ REMOVE (E) CHILLED WATER SIMPLEX BASKET STRAINER.

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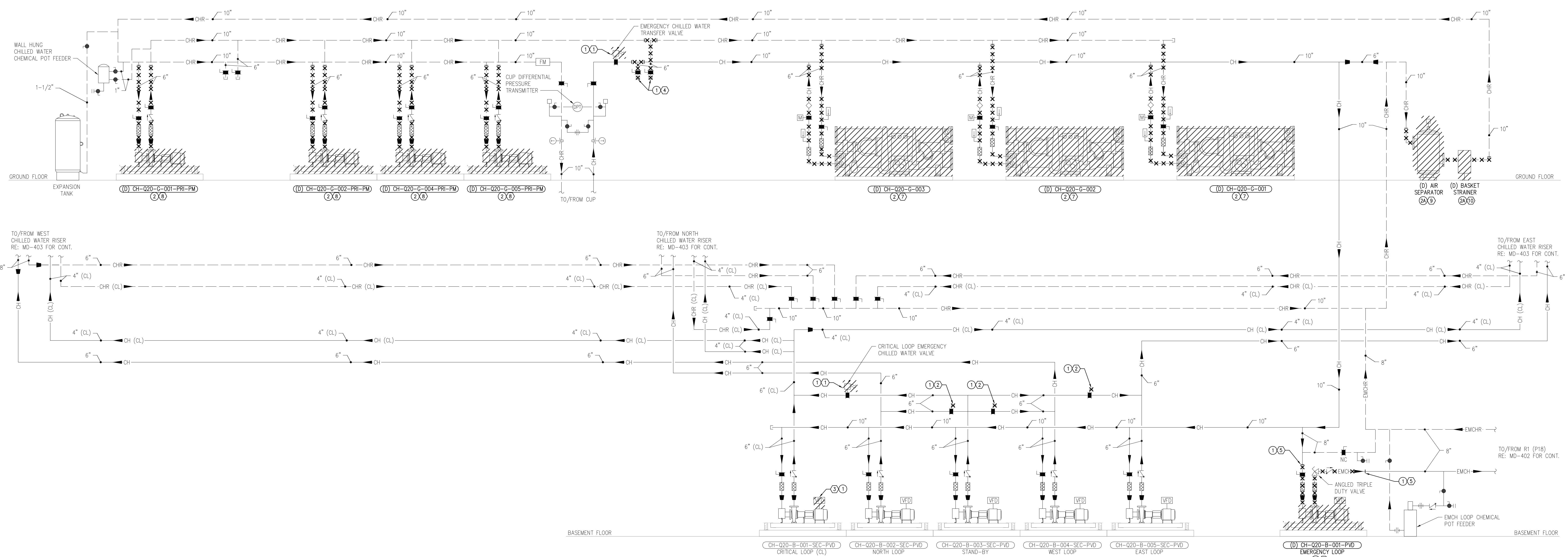
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CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
PHASE 1 & 2
13001 E 17TH PLACE, AURORA, CO 80045**

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By:
Designed By:
Checked By:

Issued For: SCHEMATIC DESIGN
Date: 01-25-2022

**CHILLED WATER SYSTEM
(Q20-FITZ) DEMOLITION
SCHEMATIC
MD-401**

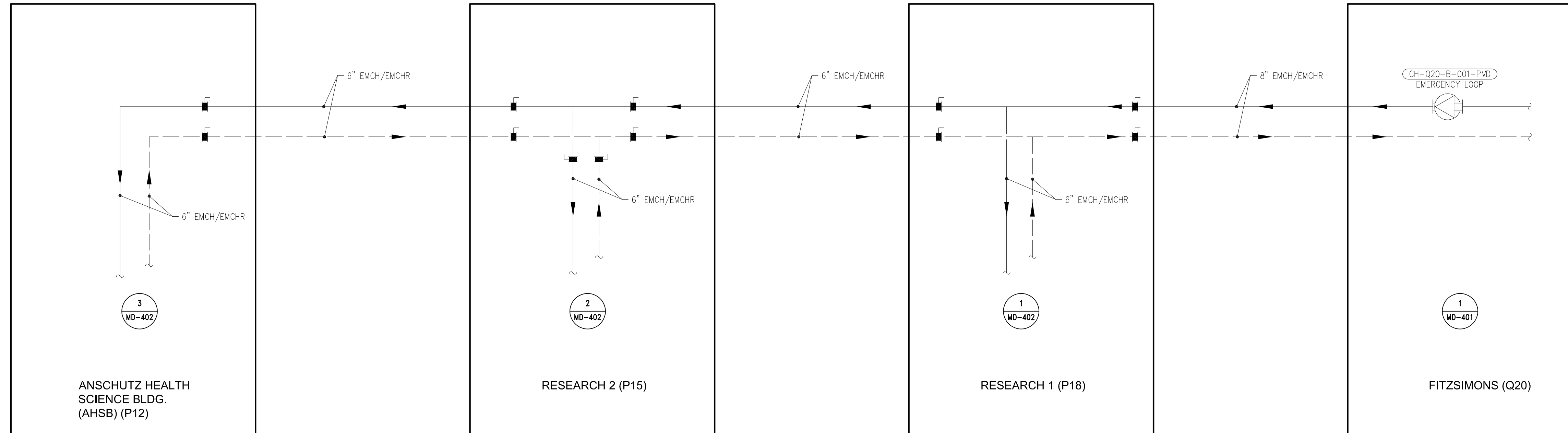


1 CHILLED WATER SYSTEM (Q20-FITZ) DEMOLITION SCHEMATIC
SCALE: NONE

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GENERAL NOTES

- FOR GENERAL NOTES, REFER TO SHEET M-001.
- PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

KEY NOTES

- (1) REMOVE (E) SECTION OF 6" EMCH/EMCHR PIPING TO INSTALL (N) ISOLATION VALVES. (OPTION: FREEZE (E) 6" EMCH/EMCHR PIPING (100% WATER) AND PROVIDE (N) 6" R1 (P18) ISOLATION VALVES ON MAIN TO VIVARIUM AHUs.)



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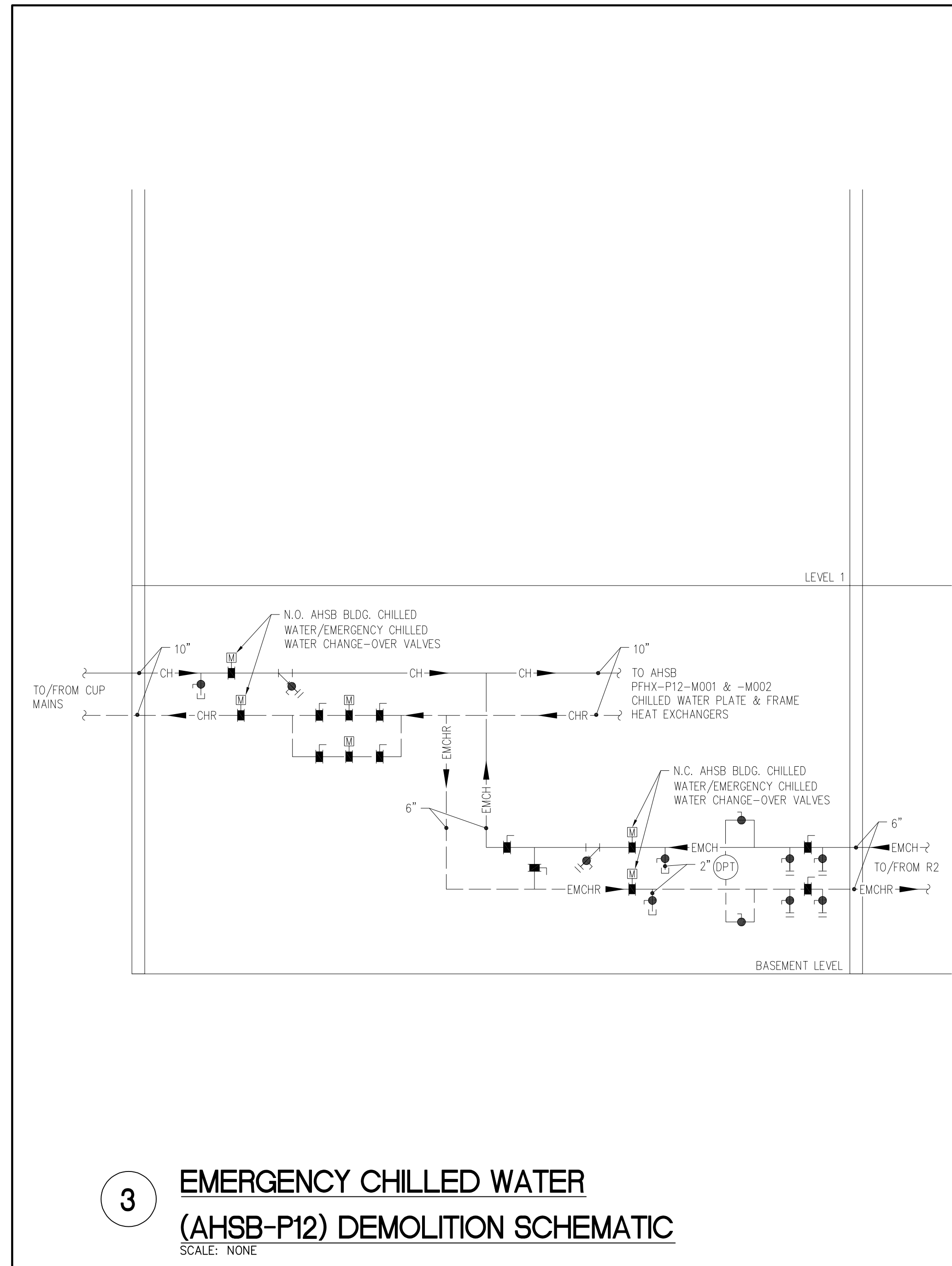
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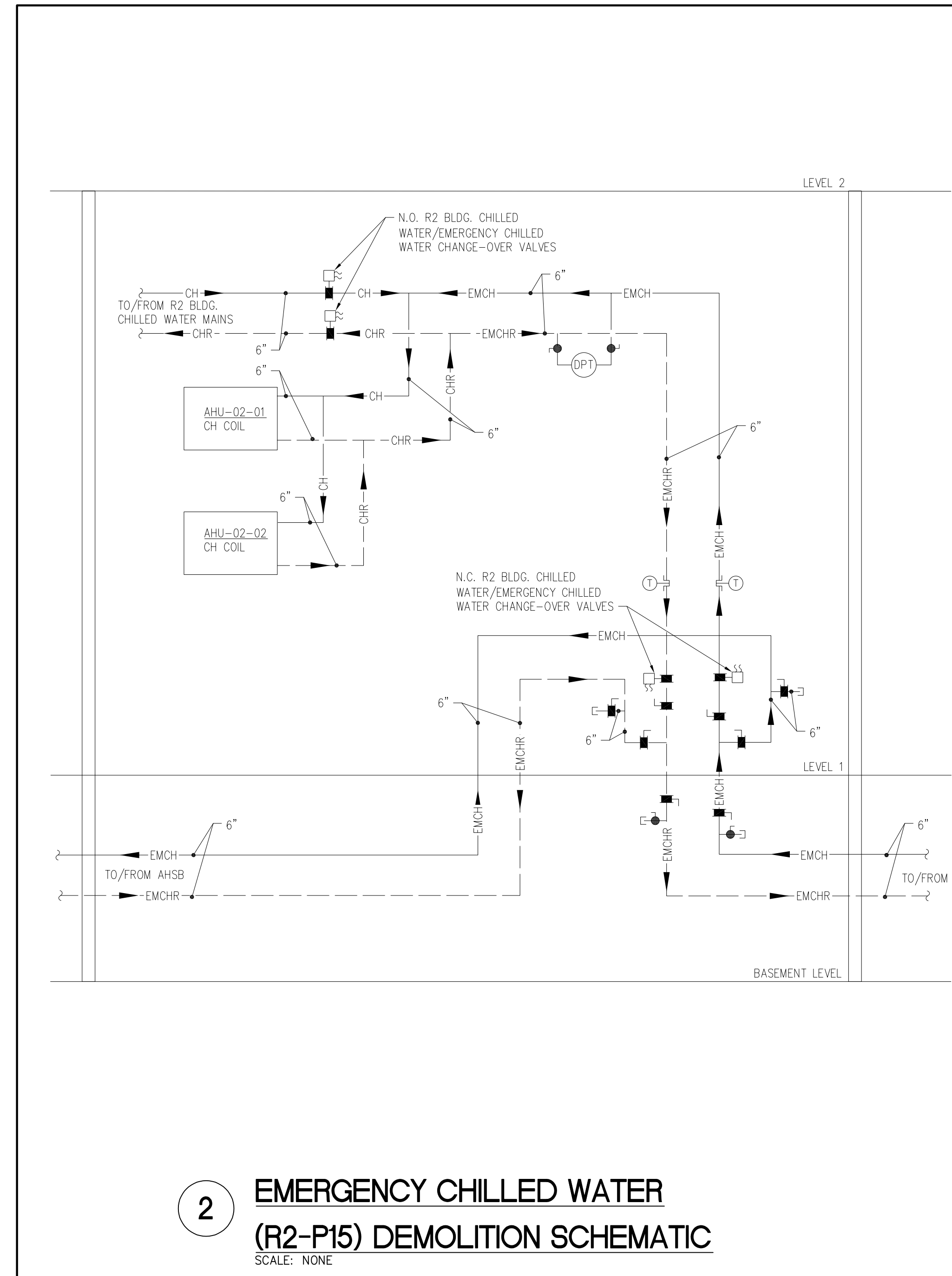
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EMERGENCY CHILLED WATER SITE DEMOLITION SCHEMATIC

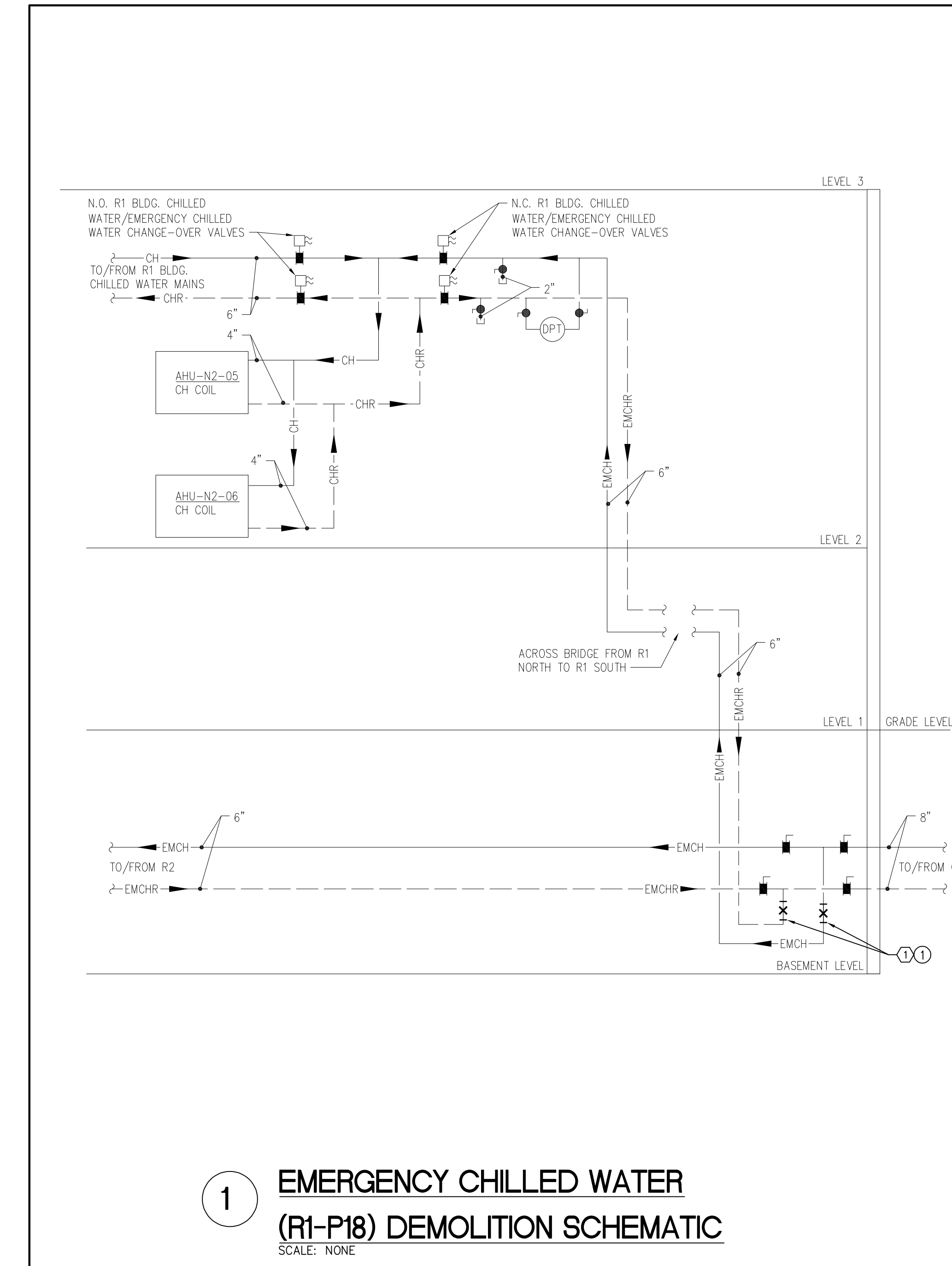
SCALE: NONE



3 EMERGENCY CHILLED WATER (AHSB-P12) DEMOLITION SCHEMATIC
SCALE: NONE



2 EMERGENCY CHILLED WATER (R2-P15) DEMOLITION SCHEMATIC
SCALE: NONE



1 EMERGENCY CHILLED WATER (R1-P18) DEMOLITION SCHEMATIC
SCALE: NONE

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NOTE:

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13001 E 17TH PLACE, AURORA, CO 80045

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By: TMH/DRP
Designed By: CJ
Checked By: GS

Issued For: SCHEMATIC DESIGN
Date: 01-25-2022

EMERGENCY CHILLED WATER SYSTEM (P18, P15, P12) DEMO SCHEMATICS
MD-402
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GENERAL NOTES

- FOR GENERAL NOTES, REFER TO SHEET M-001.
- PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

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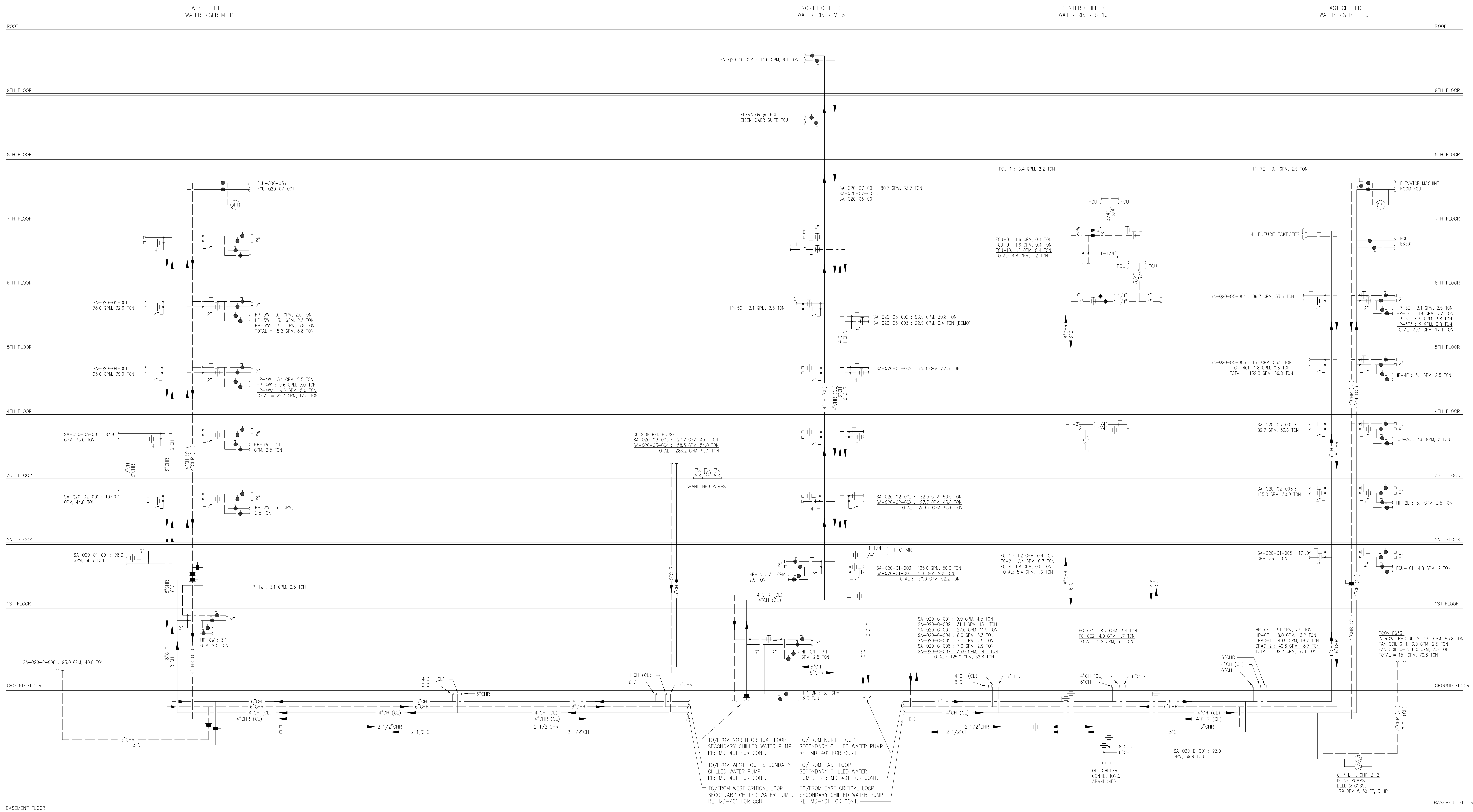
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CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
PHASE 1 & 2
13001 E 17TH PLACE, AURORA, CO 80045**

CU Anschutz #: 21-174016
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Date: 01-26-2022

CHILLED WATER RISER (Q20-FITZ) DEMOLITION SCHEMATIC
MD-403



CHILLED WATER RISER (Q20-FITZ) DEMOLITION SCHEMATIC
SCALE: NONE

NOT FOR CONSTRUCTION

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GENERAL NOTES

1. FOR GENERAL NOTES, REFER TO SHEET M-001.
2. PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
3. PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
4. PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
5. PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

KEY NOTES

- (1) REMOVE (E) CHILLER, (E) HOUSEKEEPING PAD TO REMAIN.
- (2) REMOVE (E) COOLING TOWER FAN MOTOR AND SPEED CONTROLLER. RESTORE (E) COOLING TOWER TO "LIKE NEW" CONDITION.
- (3) REMOVE (E) COOLING TOWER AND STEEL SUPPORT BEAMS, (E) CONCRETE PIERS TO REMAIN.
- (4) REMOVE (E) CONDENSER WATER PUMP AND INERTIA BASE, (E) HOUSEKEEPING PAD TO REMAIN.

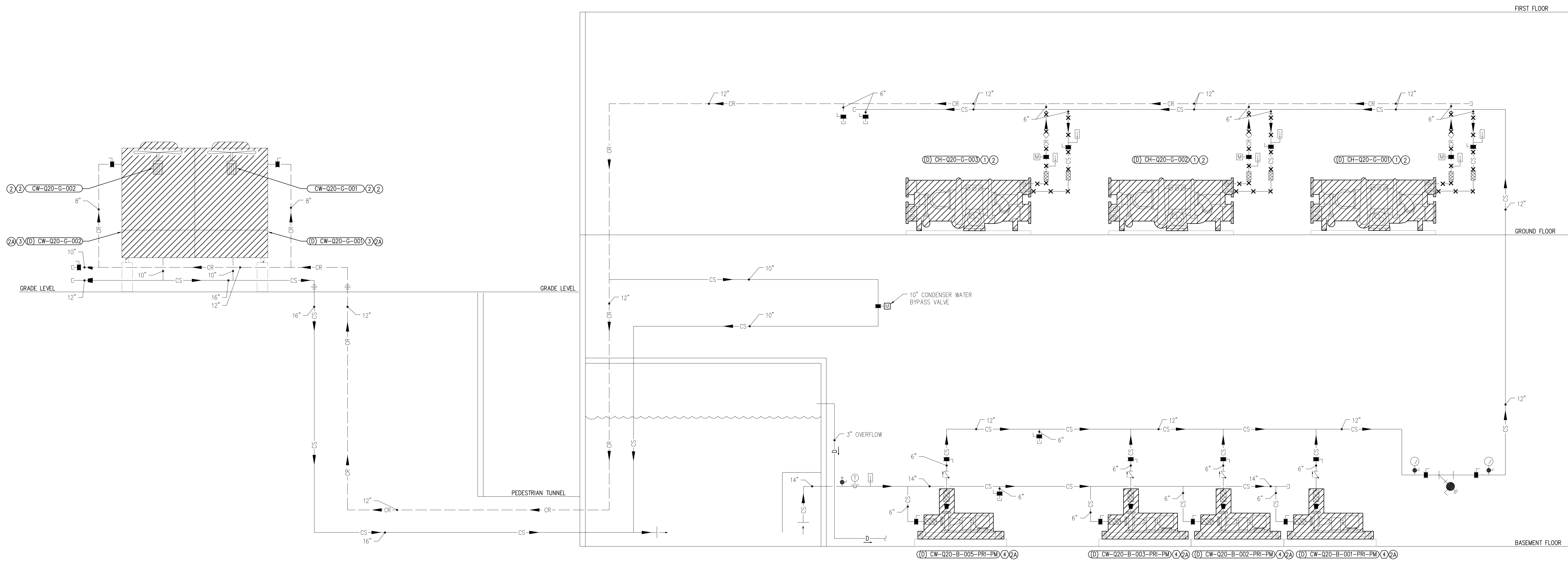
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 CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
 PHASE 1 & 2
 13001 E 17TH PLACE, AURORA, CO 80045



CONDENSER WATER SYSTEM (Q20-FITZ) DEMOLITION SCHEMATIC
 SCALE: NONE

CU Anschutz #: 21-174016
 SBEC Project #: 210031
 Scale: AS SHOWN
 Drawn By:
 Designed By:
 Checked By:

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CONDENSER WATER SYSTEM
 (Q20-FITZ) DEMOLITION
 SCHEMATIC
MD-404

GENERAL NOTES

- FOR GENERAL NOTES, REFER TO SHEET M-001.
- PHASE 1 BASE SCOPE OF WORK DENOTED WITH ①
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH ①A
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH ②
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH ②A

KEY NOTES

- PROVIDE (N) MOTORIZED ACTUATOR FOR EMERGENCY CHILLED WATER TRANSFER VALVE.
- PROVIDE (N) MOTORIZED ACTUATOR FOR ADDING N+1 PUMPING REDUNDANCY TO EMERGENCY CHILLED WATER OPERATION FOR CRITICAL LOOP.
- PROVIDE (N) SECONDARY CHILLED WATER PUMP (CRITICAL LOOP) VARIABLE FREQUENCY DRIVE. (E) PUMP AND (E) PUMP MOTOR SHALL REMAIN.
- PROVIDE (N) 10x10x10 TEE WITH DOUBLE FLANGED BUTTERFLY VALVE TO BE THE PERMANENT/TEMPORARY CHILLER CONNECTIONS.
- PROVIDE (N) 8x8 TEE WITH DOUBLE FLANGED BUTTERFLY VALVE TO BE THE LOCATION OF THE TEMPORARY EMERGENCY CHILLED WATER PUMP CONNECTIONS UNDER THE BASE PROJECT.
- EXTEND AND CONNECT (N) 8" EMCH/EMCHR PIPING TO THE DOUBLE FLANGED BUTTERFLY VALVES USED FOR THE TEMPORARY PUMP CONNECTIONS UNDER THE BASE PROJECT.
- PROVIDE (N) EMERGENCY CHILLED WATER PUMP AND INERTIA BASE ON (E) HOUSEKEEPING PAD TO REMAIN.
- PROVIDE (N) EMERGENCY CHILLED WATER PUMP FOR N+1 OPERATION ON INERTIA BASE ON (N) HOUSEKEEPING PAD.
- PROVIDE (N) CHILLER, (E) HOUSEKEEPING PAD TO REMAIN.
- PROVIDE (N) PRIMARY CHILLED WATER PUMP AND INERTIA BASE, (E) HOUSEKEEPING PAD TO REMAIN.
- PROVIDE (N) CHILLED WATER AIR SEPARATOR.
- PROVIDE (N) CHILLED WATER DUPLEX BASKET STRAINER.

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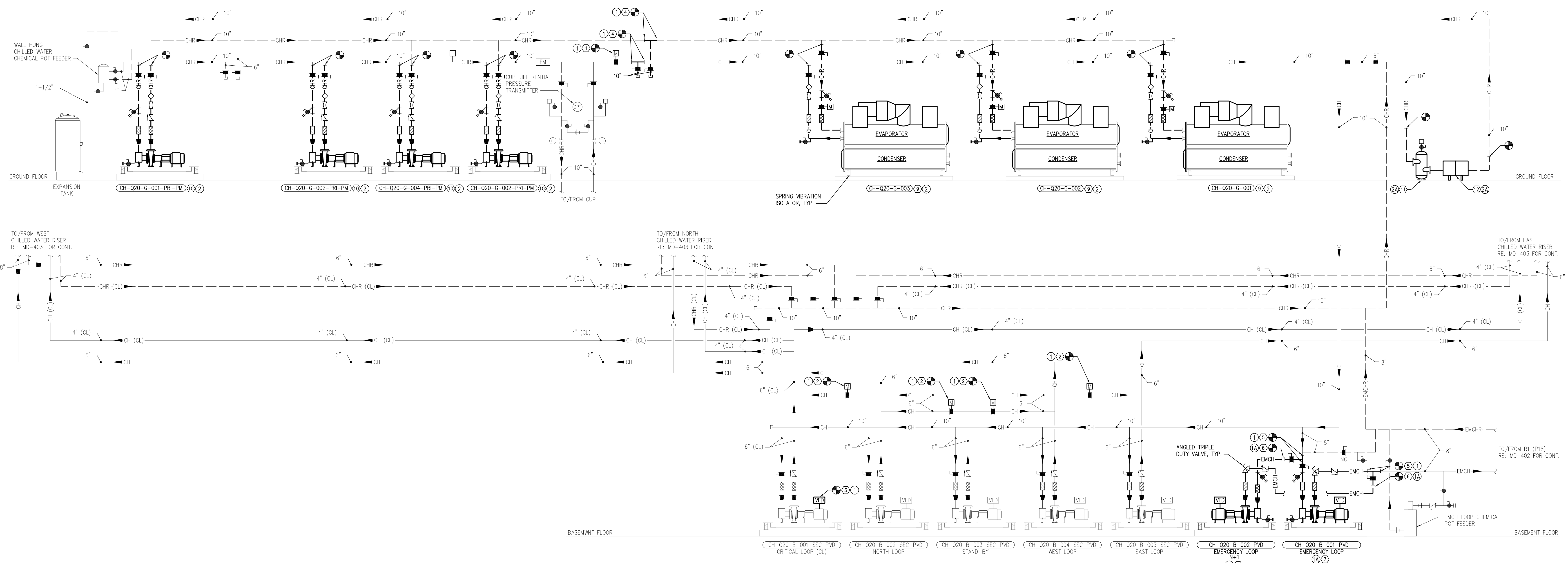
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CU Anschutz #: 21-174016
SBC Project #: 210031
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CHILLED WATER SYSTEM
(Q20-FITZ) SCHEMATIC
M-401

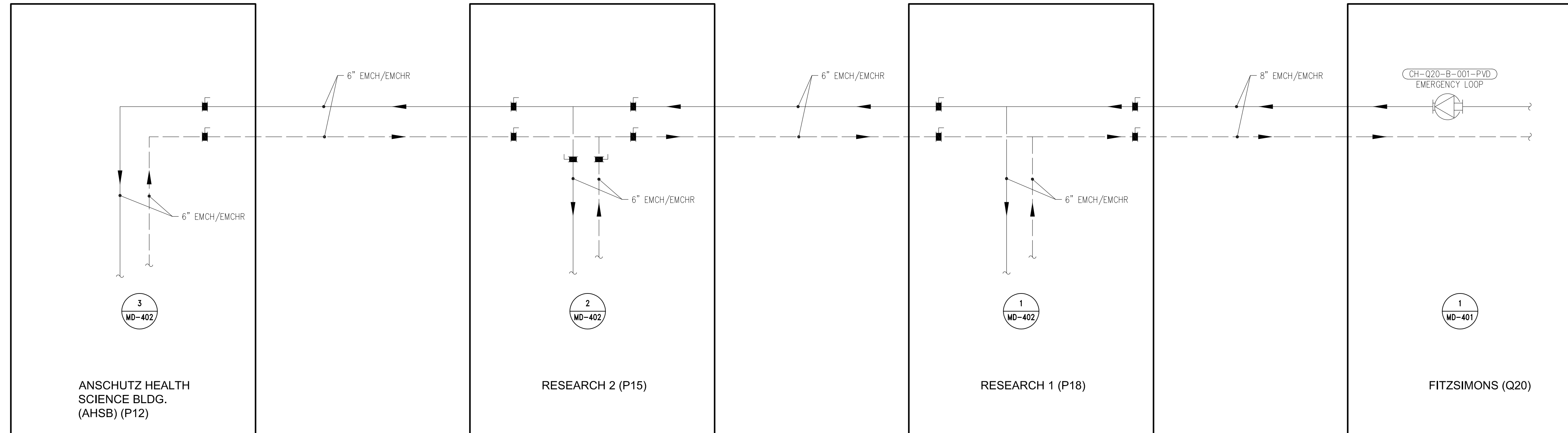


1 CHILLED WATER SYSTEM (Q20-FITZ) SCHEMATIC
SCALE: NONE

NOT FOR CONSTRUCTION
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NOTE:
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NEW WORK INCLUDED IN THIS CONTRACT IS SHOWN WITH HEAVY LINE WEIGHT.

NOTE:
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EMERGENCY CHILLED WATER SITE SCHEMATIC

SCALE: NONE

GENERAL NOTES

- FOR GENERAL NOTES, REFER TO SHEET M-001.
- PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

KEY NOTES

- PROVIDE (N) 6" BUILDING EMCH/EMCHR ISOLATION VALVES. (OPTION: FREEZE (E) 6" EMCH/EMCHR PIPING (100% WATER) AND PROVIDE (N) 6" R1 (P18) ISOLATION VALVES ON MAIN TO VIVARIUM AHUs.)
- PROVIDE (N) EMCH/EMCHR TEMPERATURE SENSORS ON THE EMERGENCY SIDE OF THE EMERGENCY CHILLED WATER LOOP. REFER TO SEQUENCE OF OPERATION.
- PROVIDE (N) EMCH BYPASS VALVE TO ALLOW PREVENTATIVE MAINTENANCE SEQUENCE OPERATIONS, MAINTAIN CHEMICAL TREATMENT, AND TO MAINTAIN TEMPERATURE OF EMERGENCY CHILLED WATER LOOP. REFER TO SEQUENCE OF OPERATION.

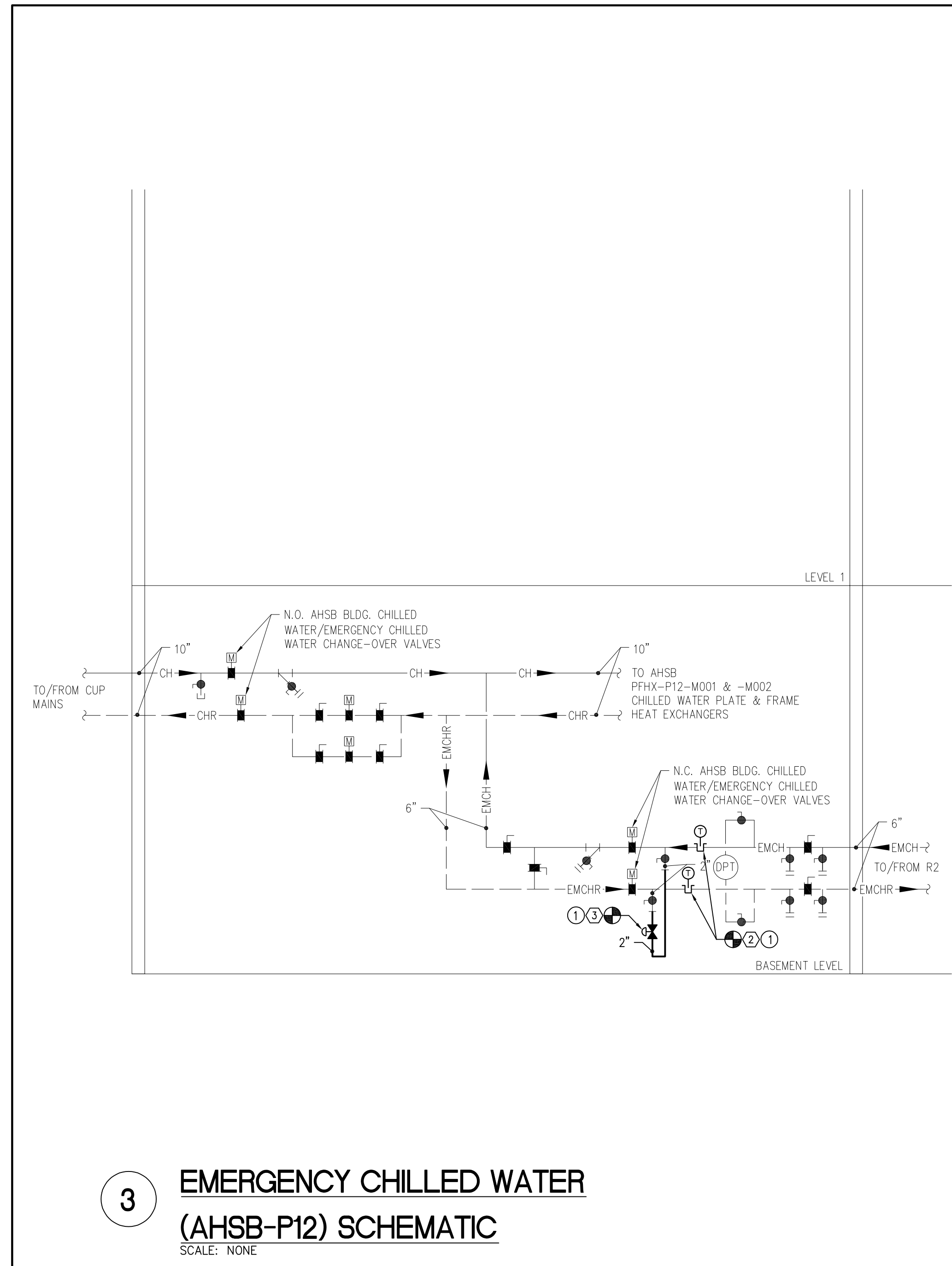


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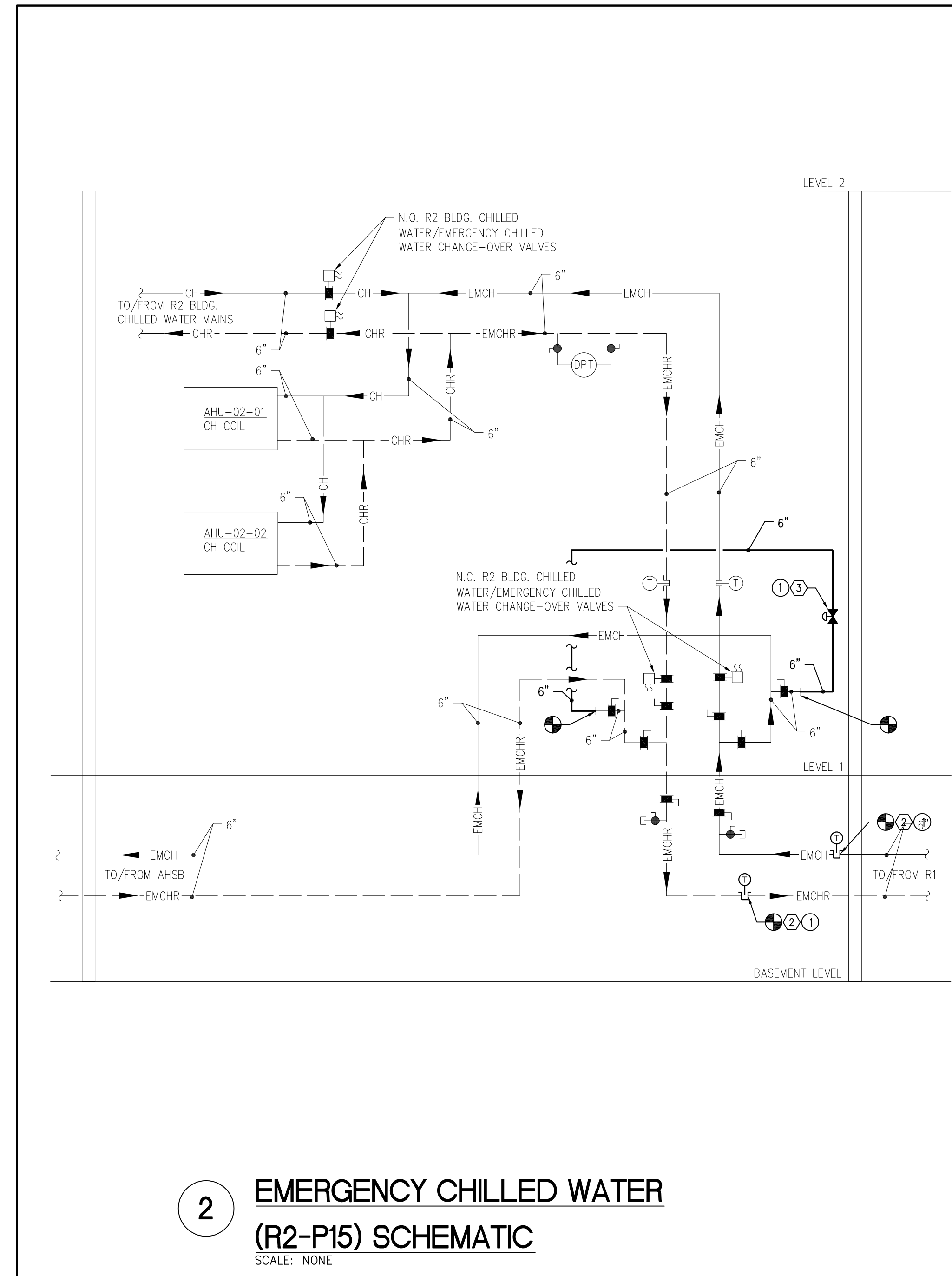
ELECTRICAL:
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ARCHITECT:
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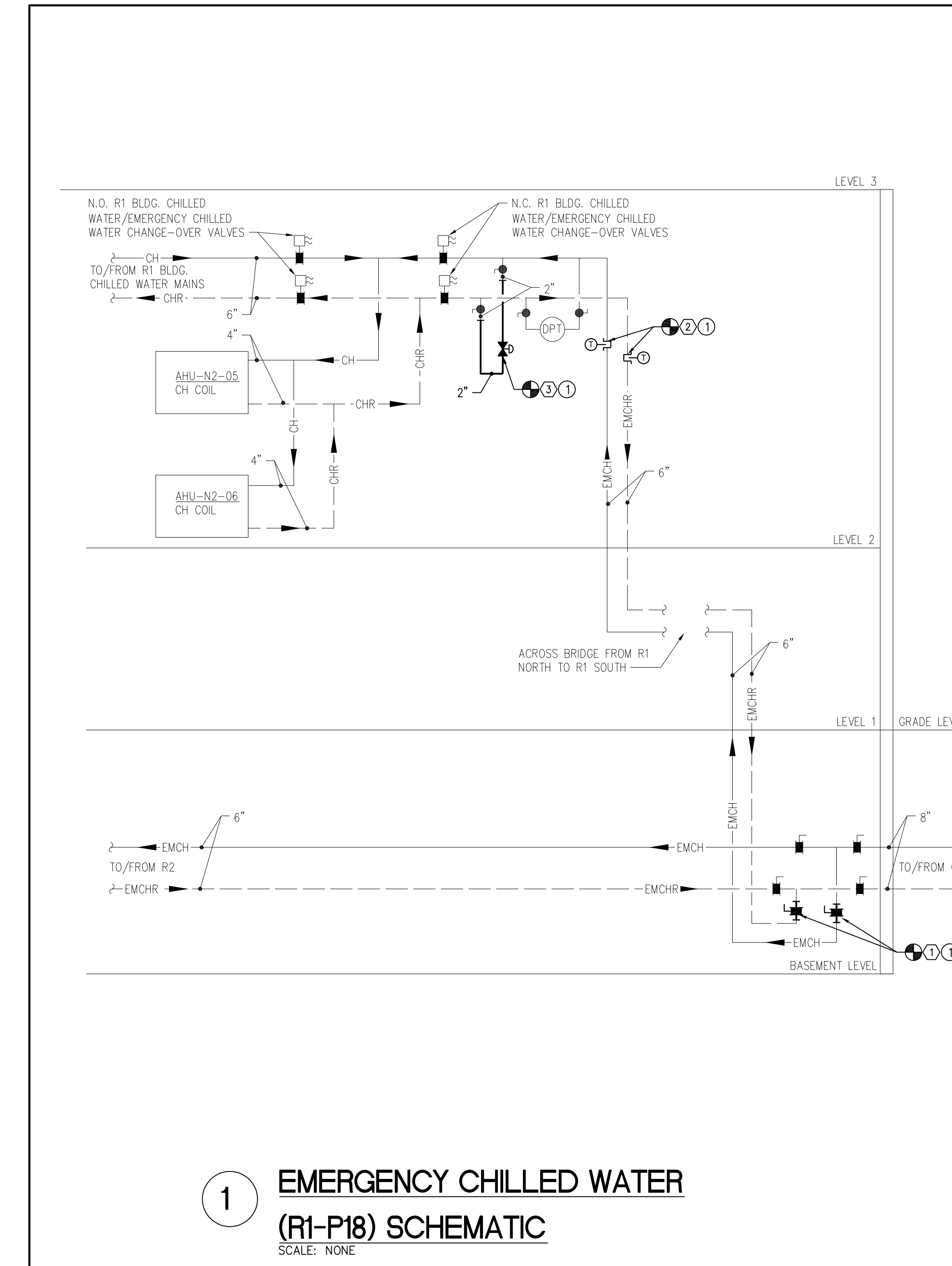
STRUCTURAL:
MARTIN+WATTS CONSULTING ENGINEERS
12499 W. COLFAX AVE.
LAKEWOOD, CO 80215
303-431-6105



3 EMERGENCY CHILLED WATER (AHSB-P12) SCHEMATIC
SCALE: NONE



2 EMERGENCY CHILLED WATER (R2-P15) SCHEMATIC
SCALE: NONE



1 EMERGENCY CHILLED WATER (R1-P18) SCHEMATIC
SCALE: NONE

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NOTE:

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NOTE:

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13001 E 17TH PLACE, AURORA, CO 80045

CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By: TMH/DRP
Designed By: CJ
Checked By: GS

Issued For: SCHEMATIC DESIGN Date: 01-25-2022

EMERGENCY CHILLED WATER SYSTEM (P18, P15, P12) SCHEMATICS

M-402

GENERAL NOTES

- FOR GENERAL NOTES, REFER TO SHEET M-001.
- PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
- PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
- PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
- PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

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ELECTRICAL: Shaffer-Balcom Engineering & Consulting
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ARCHITECT: ARCHITECTURAL WORKSHOP
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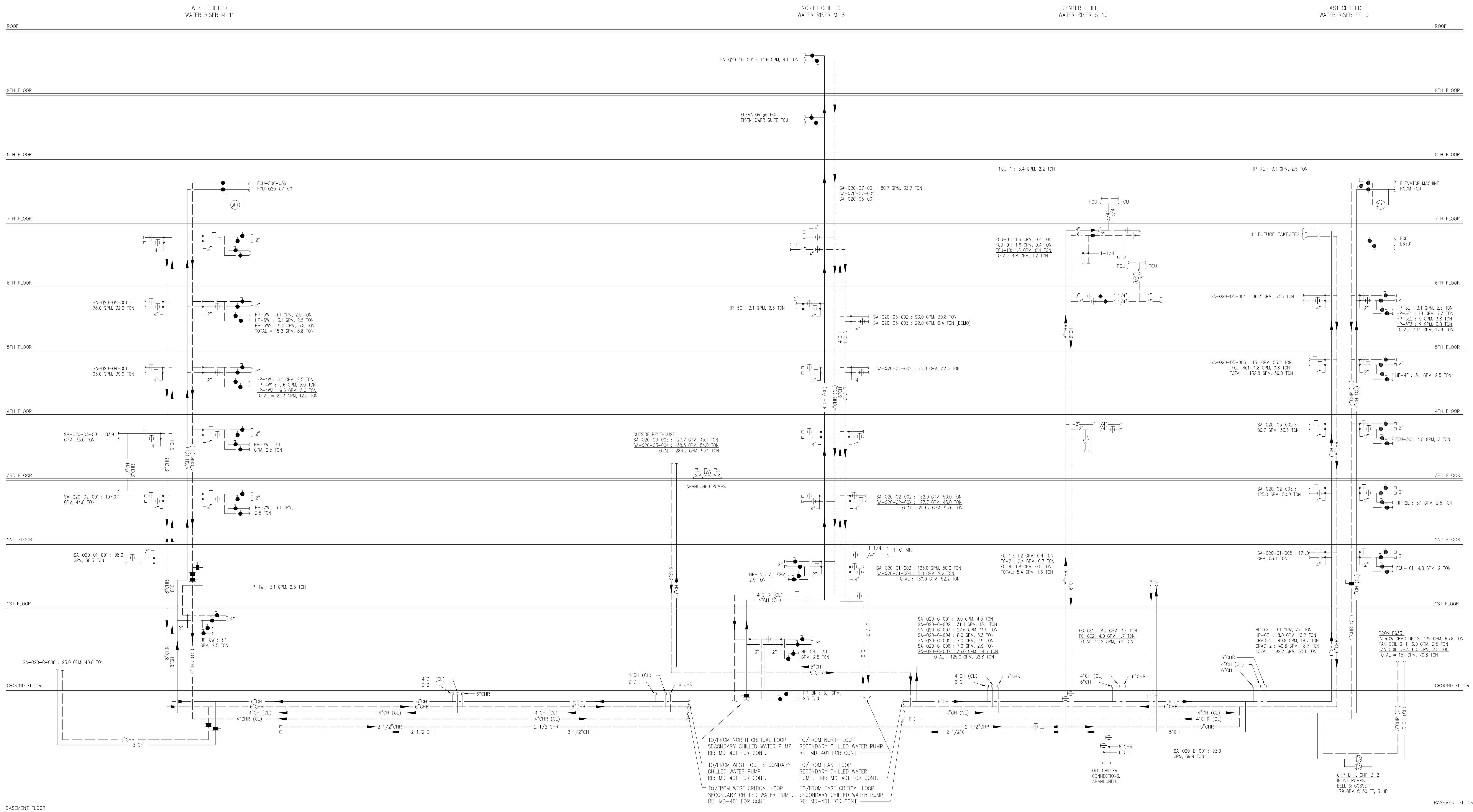
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PHASE 1 & 2
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CU Anschutz #: 21-174016
SBEC Project #: 210031
Scale: AS SHOWN
Drawn By:
Designed By:
Checked By:

Issued For: SCHEMATIC DESIGN
Date: 01-25-2022

CHILLED WATER RISER (Q20-FITZ) SCHEMATIC
M-403



NOTE:
 DP SENSORS TO CONTROL SECONDARY CHW PUMPS ARE LOCATED IN ROOMS: W0201, E7002T, N6203BM, E5329P, N7005M, AND W6105M.

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CHILLED WATER RISER (Q20-FITZ) SCHEMATIC
 SCALE: NONE

GENERAL NOTES

1. FOR GENERAL NOTES, REFER TO SHEET M-001.
2. PHASE 1 BASE SCOPE OF WORK DENOTED WITH (1)
3. PHASE 1 ALTERNATE SCOPE OF WORK DENOTED WITH (1A)
4. PHASE 2 BASE SCOPE OF WORK DENOTED WITH (2)
5. PHASE 2 ALTERNATE SCOPE OF WORK DENOTED WITH (2A)

KEY NOTES

- (1) PROVIDE (N) CHILLER, (E) HOUSEKEEPING PAD TO REMAIN.
- (2) PROVIDE (N) 25-HP COOLING TOWER FAN MOTOR AND SPEED CONTROLLER. RESTORE (E) COOLING TOWER TO "LIKE NEW" CONDITION.
- (3) PROVIDE (N) COOLING TOWER AND (N) STEEL SUPPORT BEAMS, (E) CONCRETE PIERS TO REMAIN.
- (4) PROVIDE (N) CONDENSER WATER PUMP AND INERTIA BASE, (E) HOUSEKEEPING PAD TO REMAIN.

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ARCHITECT: ARCHITECTURAL WORKSHOP
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STRUCTURAL: MARTIN-MARTIN CONSULTING ENGINEERS
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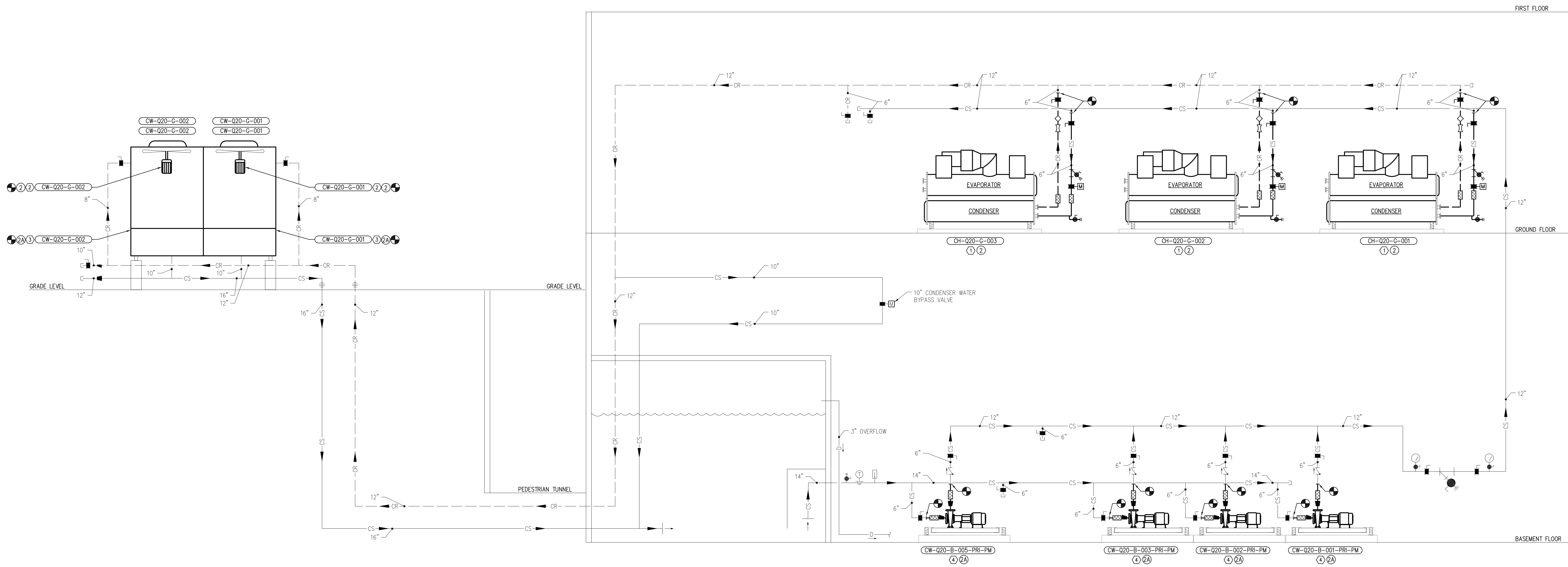
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PHASE 1 & 2
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CU Anschutz #: 21-174016
 SBEC Project #: 210031
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 Designed By:
 Checked By:

Issued For: _____ Date: 01-25-2022
 SCHEMATIC DESIGN

CONDENSER WATER SYSTEM
(Q20-FITZ) SCHEMATIC

M-404
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CONDENSER WATER SYSTEM (Q20-FITZ) SCHEMATIC
SCALE: NONE

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GENERAL DEMOLITION NOTES

- WORK SHOWN HATCHED IS TO BE REMOVED; WORK SHOWN WITH LIGHT LINE WEIGHT IS (E) TO REMAIN. MAKE MODIFICATIONS TO (E) BRANCH CIRCUITS TO RETAIN CONTINUITY, INCLUDING EQUIPMENT AND DEVICES OUTSIDE THE AREA OF WORK AND RELOCATED EQUIPMENT AND DEVICES.
- DEMOLITION DRAWINGS ARE INCLUDED TO GIVE A COMMON BASIS FOR BIDDING. CONTRACTOR IS TO VERIFY (E) CONDITIONS AND REQUIRED DEMOLITION WORK PRIOR TO BID.
- ALL WIRING, CONDUIT, BOXES AND SUPPORTS NO LONGER REQUIRED SHALL BE COMPLETELY REMOVED FROM THE AREA OF WORK.
- THE OWNER SHALL HAVE FIRST RIGHT TO REMOVED DEVICES AND EQUIPMENT. IF THE OWNER DOES NOT WANT THE REMOVED DEVICES OR EQUIPMENT, THEN THE CONTRACTOR SHALL DISPOSE OF PROPERLY.
- FIRE SEAL ALL FIRE RATED WALL AND FLOOR PENETRATIONS.
- THROUGHOUT THE BUILDING, NO MATTER THE EXTENT OF WORK IN THE PARTICULAR AREA, (E) CABLING, CONDUIT, LUMINAIRES, EQUIPMENT, ETC. SHALL BE PROPERLY SUPPORTED, JUNCTION BOXES COVERED, AND KNOCK OUT OPENINGS COVERED.
- PRIOR TO DEMOLITION COMPLETELY CIRCUIT TRACE ALL ELECTRICAL SYSTEMS IN THE AREA OF RENOVATION AND SUBMIT INFORMATION, INCLUDING MARKED UP PANELBOARD DIRECTORIES, TO THE ARCHITECT. ADJUST REUSED CIRCUITS AS REQUIRED.
- WHERE MECHANICAL EQUIPMENT IS REMOVED, REMOVE ASSOCIATED DISCONNECT SWITCH, STARTER, AND CIRCUITING IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- EQUIPMENT MOUNTED ON CEILING BEING REMOVED FOR ANY REASON SHALL BE TEMPORARILY SUPPORTED AND INSTALLED ON THE REPLACEMENT CEILING, UNLESS OTHERWISE NOTED.

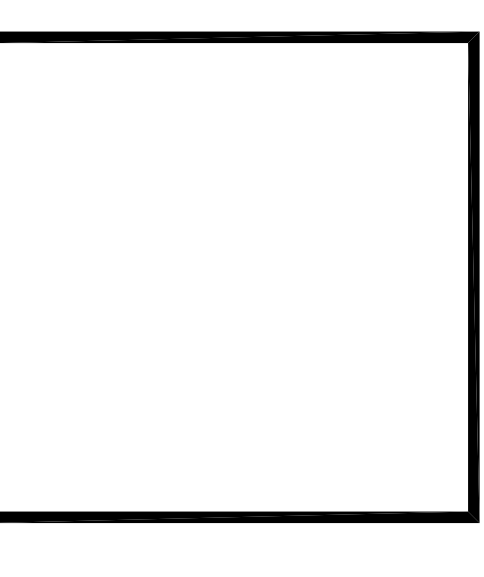
GENERAL NOTES

- ALL WORK SHALL COMPLY WITH REQUIREMENTS OF LOCAL JURISDICTIONAL AUTHORITY AND BASE BUILDING STANDARDS.
- WORK INCLUDED IN CONTRACT IS SHOWN WITH HEAVIER LINE WEIGHT; WORK SHOWN WITH LIGHT LINE WEIGHT IS (E) TO REMAIN. MAKE MODIFICATIONS TO (E) BRANCH CIRCUITS TO RETAIN CONTINUITY, INCLUDING EQUIPMENT OUTSIDE THE AREA OF WORK.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR LUMINAIRE LOCATIONS.
- COORDINATE LUMINAIRE LOCATIONS WITH MECHANICAL PIPING, DUCTWORK, ETC., TO AVOID CONFLICTS.
- ALL CONDUIT IS TO BE INSTALLED CONCEALED IN FINISHED AREAS UNLESS OTHERWISE NOTED.
- FIRE SEAL ALL FIRE RATED WALL AND FLOOR PENETRATIONS.
- EACH MULTI-WIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH A SEPARATE NEUTRAL FOR EACH BRANCH CIRCUIT.
- REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHT AND/OR LOCATION OF DEVICES PRIOR TO ROUGH-IN.
- COORDINATE REQUIREMENTS AND LOCATIONS OF MECHANICAL EQUIPMENT WITH MECHANICAL DRAWINGS AND MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
- MAKE ALL FINAL ELECTRICAL CONNECTIONS TO EQUIPMENT.

ELECTRICAL LEGEND (Not all symbols listed below are used on these drawings)			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
FIRE ALARM			
[FACP]	FIRE ALARM CONTROL PANEL	[S]	SMOKE DETECTOR (* INDICATES DEVICE)
[FAA]	FIRE ALARM ANNUNCIATOR PANEL	P	PHOTOELECTRIC IONIZATION
[EVAC]	VOICE EVACUATION CONTROL UNIT	BT	BEAM TRANSMITTER
[MIC]	REMOTE VOICE EVACUATION MICROPHONE	BR	BEAM RECEIVER
[GAP]	GRAPHIC ANNUNCIATOR PANEL	UF	BELOW RAISED ACCESS FLOOR
[ECCU]	EMERGENCY COMMUNICATIONS CONTROL UNIT	AS	AIR SAMPLING SINGLE STATION
[FSCP]	FIRE SUPPRESSION CONTROL PANEL	SS	DUCT SMOKE DETECTOR (* INDICATES DEVICE)
[ARCM]	AREA OF REFUGE EMERGENCY COMMUNICATION SYSTEM/MASTER UNIT	S	SUPPLY
[ARCR]	AREA OF REFUGE EMERGENCY COMMUNICATION SYSTEM/REMOTE UNIT	R	RETURN
[ESR]	ELEVATOR STATUS/RECALL	P	PHOTOELECTRIC IONIZATION
[DACT]	DIGITAL ALARM COMMUNICATOR TRANSMITTER	I	IONIZATION
[HVAC]	CONTROL PANEL FOR VENTILATION, PRESSURIZATION	[H]	HEAT DETECTOR/SENSOR (* INDICATES DEVICE)
[KB]	KNOX BOX	F	FIXED TEMPERATURE RATE OF RISE
[M]	MANUAL PULL STATION	[V]	FLAME DETECTOR (* INDICATES DEVICE)
[AM]	ADDRESSABLE INPUT MODULE	UV	ULTRAVIOLET INFRARED
[ADM]	ADDRESSABLE OUTPUT MODULE	[CO]	CARBON MONOXIDE DETECTOR
[WF]	SPRINKLER FLOW SWITCH	[SD]	SMOKE/HEAT DETECTOR/SENSOR COMBINATION
[VS]	VALVE SUPERVISORY SWITCH	[S]	AUDIBLE NOTIFICATION HORN
[PS]	PRESSURE SWITCH	[S]	AUDIBLE NOTIFICATION SPEAKER
[DH]	DOOR HOLDER, MAGNETIC	[H]	COMBINATION AUDIBLE/VISIBLE NOTIFICATION HORN/STROBE
[DCL]	DOOR CLOSER	[H]	COMBINATION NOTIFICATION SPEAKER/STROBE
[DRTS]	DUCT SMOKE DETECTOR REMOTE INDICATOR/TEST STATION	[H]	VISIBLE FIRE ALARM STROBE (CEILING & WALL MOUNTED)
[A]	AIR SAMPLING DETECTOR PIPING AND PORT	cd	— CANDELA RATING (IF SHOWN)
[C]	FIRE SERVICE OR EMERGENCY PHONE (* INDICATES DEVICE)	[H]	VISIBLE MASS NOTIFICATION STROBE (CEILING & WALL MOUNTED)
A	ACCESSIBLE	cd	— CANDELA RATING (IF SHOWN)
J	JACK	[H]	REMOTE INDICATOR LIGHT (CEILING & WALL MOUNTED)
H	HANDBELT	cd	— CANDELA RATING (IF SHOWN)
[M]	MANUAL PULL STATION	[M]	ABORT SWITCH
[M]	MANUAL PULL STATION	[M]	MANUAL RELEASING STATION
COMMUNICATION			
[W]	TELEPHONE TERMINAL BOARD	[D]	DATA DEVICE
[W]	VOICE DEVICE	[D]	DATA DEVICE, FLOOR MOUNTED
[W]	WALL	[D]	COMBINATION TELEPHONE/DATA DEVICE
[W]	PAY	[D]	COMBINATION TELEPHONE/DATA DEVICE, FLOOR MOUNTED
[W]	VOICE DEVICE FLOOR MOUNTED	[D]	COMMUNICATION/POWER FLOOR BOX, DEVICES AS INDICATED
[W]	TELEVISION DEVICE	[D]	COMMUNICATION/POWER POLE, DEVICES AS INDICATED
[W]	BELL/CLOCK DEVICE	[D]	COMMUNICATION/POWER POLE, DEVICES AS INDICATED
[W]	WIRELESS ACCESS POINT	[D]	COMMUNICATION/POWER POLE, DEVICES AS INDICATED
SECURITY AND PUBLIC ADDRESS			
[SCP]	SECURITY CONTROL PANEL	[S]	SECURITY DEVICE (* INDICATES DEVICE)
[PAMC]	PUBLIC ADDRESS MASTER CONTROL	AC	ACCESS CONTROL
[PAA]	PUBLIC ADDRESS AMPLIFIER	C	CAMERA
[P]	PUBLIC ADDRESS (* INDICATES DEVICE)	CR	CARD READER
[P]	FLOOR MOUNTED	DR	DOOR RELEASE PUSHBUTTON
B	BELL	DS	DOOR SENSOR
BZ	BUZZER	ED	ELECTRIC DOOR STRIKE
I	INTERCOM STATION	EL	ELECTRIC DOOR LATCH
MC	MICROPHONE	GL	GLASS BREAK SENSOR
PB	PUSHBUTTON	H	HORN
S	SPEAKER	HP	KEY PAD
V	VOLUME CONTROL	M	MONITOR
		MD	MOTION DETECTOR INFRARED
		MDU	MOTION DETECTOR ULTRASONIC
		PB	PANIC PUSHBUTTON
NURSE CALL			
[NCP]	NURSE CALL CONTROL PANEL	EF	EMERGENCY CALL STATION WITH FOOT SWITCH
[NCP]	NURSE CALL CONSOLE	EL	ELAPSE TIMELOCK
[N]	NURSE CALL: CEILING, WALL MOUNTED (* INDICATES DEVICE)	EP	EMERGENCY CALL STATION WITH PULL CORD
CB	CORE ZERO (CODE BLUE)	ES	EMERGENCY CALL STATION WITH PULL CORD, SHOWER
CC	CALL CANCEL	LSD	SLAVE MASTER STATION DISPLAY
DL	DOME LIGHT	M	MASTER STATION
DLZ	DOME LIGHT ZONE	P	PATIENT STATION
DS	DUTY STATION	PB	PUSH BUTTON
EB	EMERGENCY CALL STATION WITH PUSHBUTTON	PS	PRESSENCE STATION
		R	REMOTE TIMELOCK CONTROL
		SL	STAFF LOCATOR STATION
		SS	STAFF STATION
GROUNDING AND LIGHTNING PROTECTION			
[I]	INSPECTION WELL	[A]	AIR TERMINAL
[R]	GROUND ROD	[E]	EXOTHERMIC CONNECTION
[T]	GROUND BAR	[LP]	LIGHTNING PROTECTION BARE CONDUCTOR
REFERENCE SYMBOLS			
[X]	KEY NOTE REFERENCE (DEMOLITION, WHERE APPLICABLE)	[Δ]	REVISION DELTA
[//]	INDICATES DEMOLITION (DASHED OR HATCHED)	[A-1,3,5]	BRANCH CIRCUIT HOME RUN: (ALL CIRCUITS HAVE A DEDICATED NEUTRAL)
[X]	FEDER REFERENCE	[A]	ARROWS INDICATE NUMBER OF CIRCUITS
[XXXX]	EQUIPMENT REFERENCE (REFER TO EQUIPMENT SCHEDULE)	[A]	TEXT INDICATES PANELBOARD CIRCUIT
[XX]	DETAIL REFERENCE	[A]	CIRCUIT INDICATION FOR ALL DEVICES WITHIN AN AREA OR ROOM, OCCASIONALLY A CIRCUIT NUMBER IS ADJACENT FOR CLARITY. (ALL CIRCUITS HAVE A DEDICATED NEUTRAL.)

ELECTRICAL LEGEND (Not all symbols listed below are used on these drawings)			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
LIGHTING			
[S]	SURFACE LUMINAIRE	[R]	RECESSED WALL WASH LUMINAIRE
[R]	RECESSED LUMINAIRE	[S]	SURFACE WALL WASH LUMINAIRE
[E]	EMERGENCY OPERATION	[D]	DARKROOM SAFE LIGHT, AS INDICATED
[C]	CRITICAL OPERATION	[B]	EMERGENCY BATTERY PACK UNIT
[S]	STRIP LUMINAIRE	[E]	SINGLE FACE EXIT SIGN WITH DIRECTIONAL ARROWS
[S]	SURFACE CEILING MOUNTED LUMINAIRE	[E]	DOUBLE FACE EXIT SIGN WITH DIRECTIONAL ARROWS
[R]	RECESSED CEILING MOUNTED LUMINAIRE	[P]	POLE MOUNTED LUMINAIRE
[W]	WALL MOUNTED LUMINAIRE	[L]	FLOOD LIGHT
[C]	COVE LIGHT/UNDERCOUNTER LUMINAIRE	[T]	TRACK LIGHTING
[R]	RECESSED WALL LUMINAIRE	A	UPPER CASE DESIGNATES LUMINAIRE TYPE
		o	SUBSCRIPT INDICATES SWITCH/LEG
POWER			
[S]	SINGLE RECEPTACLE	[B]	BUSWAY
[D]	DUPLEX RECEPTACLE (ESSENTIAL POWER)	[M]	MULTI-OUTLET ASSEMBLY
[IG]	ISOLATED GROUND	#	# INDICATES DEVICE SPACING ON-CENTER
[D]	DOUBLE DUPLEX RECEPTACLE (ESSENTIAL POWER)	[P]	EXISTING PANELBOARD
[D]	DUPLEX RECEPTACLE, CEILING MOUNTED (ESSENTIAL POWER)	[N]	NEW PANELBOARD OR NEW LOCATION
[D]	DOUBLE DUPLEX RECEPTACLE, CEILING MOUNTED (ESSENTIAL POWER)	[T]	TRANSFORMER
[D]	DUPLEX RECEPTACLE, FLOOR MOUNTED (ESSENTIAL POWER)	[M]	UTILITY METER
[D]	DOUBLE DUPLEX RECEPTACLE, FLOOR MOUNTED (ESSENTIAL POWER)	[D]	NON-FUSED DISCONNECT SWITCH
[D]	DUPLEX RECEPTACLE, WITH GFCI PROTECTION	[F]	FUSED DISCONNECT SWITCH
[W]	WEATHER PROOF (WEATHERPROOF WHILE IN-USE)	[C]	CIRCUIT BREAKER
[S]	SPECIAL DUPLEX RECEPTACLE	[V]	VARIABLE FREQUENCY DRIVE
[S]	TWO INTEGRAL USB PORTS	[M]	MOTOR STARTER
[S]	HALF SWITCHED	[C]	COMBINATION STARTER/DISCONNECT
[S]	SPECIAL RECEPTACLE: WALL, FLOOR, CEILING	[M]	MOTOR
[C]	COMMUNICATION/POWER FLOOR BOX, DEVICES AS INDICATED	[T]	PAD MOUNTED TRANSFORMER
[C]	COMMUNICATION/POWER POKE THROUGH, DEVICES AS INDICATED	[E]	DISTRIBUTION EQUIPMENT
[C]	COMMUNICATION/POWER POLE, DEVICES AS INDICATED		
SWITCHING			
[S]	SINGLE POLE SWITCH (LOW VOLTAGE SWITCH)	[S]	OCCUPANCY SENSOR (VACANCY SENSOR)
o	SWITCHING ZONE	A	UPPER CASE DESIGNATES TYPE
2	TWO POLE SWITCH	o	SUBSCRIPT INDICATES SWITCH LEG
3	THREE-WAY SWITCH	[P]	PUSHBUTTON
4	FOUR-WAY SWITCH	[EPO]	EMERGENCY POWER OFF
K	KEY OPERATED SWITCH	[OHD]	POWER ASSIST DOOR OVERHEAD DOOR
M(TO)	MOTOR RATED SWITCH (THERMAL OVERLOAD)	[L]	LIGHTING CONTACTOR (REFERENCE SCHEDULE)
D	DIMMER SWITCH	[P]	PHOTOCELL CONTROL
EP	EXPLOSION PROOF SWITCH	[T]	TIMELOCK
MC	MOMENTARY CONTACT SWITCH		
OS	OCCUPANCY SENSOR		
P	SWITCH WITH ILLUMINATED HAND (LOAD OFF)		
PI	SWITCH WITH PILOT LIGHT (LOAD ON)		
VS	VARIABLE SPEED SWITCH		
RACEWAYS			
[C]	CONDUIT	[C]	CONDUIT TURNED DOWN OR UP
[U]	CONDUIT, UNDERGROUND(UG) OR UNDERFLOOR(UF)	[F]	FLEXIBLE CONNECTION
[H]	J-HOOK SYSTEM	[B]	BUSHED CONDUIT
[T]	CABLE TRAY	[C]	CONDUIT CAP OR BUSHED CONDUIT WITH CONDUCTOR
[PB]	PULL BOX	[S]	SEAL-OFF
[X]	INDICATES DEMOLITION	[C]	JUNCTION BOX, WALL OR CEILING MOUNTED (FLOOR MOUNTED)
ONE-LINE DIAGRAM SYMBOLS			
[S]	DISCONNECT SWITCH	[T]	PAD MOUNTED TRANSFORMER
[S]	DISCONNECT SWITCH, FUSED	[A]	PANELBOARD
[C]	CIRCUIT BREAKER	[DM]	DIGITAL METER
[F]	FUSE	[V]	VOLTMETER TEST SWITCH
[G]	GROUND	[A]	AMMETER TEST SWITCH
[CT]	CURRENT TRANSFORMER	[V]	VOLTMETER
[PT]	POTENTIAL TRANSFORMER	[A]	AMMETER
[W]	WEATHERHEAD	[F]	FEDDER REFERENCE
[X]	SHORT CIRCUIT CURRENT NODE	[E]	ENGINE GENERATOR
[H]	CONTACT, NORMALLY OPEN	[S]	TRANSFER SWITCH AUTOMATIC MANUAL
[F]	CONTACT, NORMALLY CLOSED	[GFP]	GROUND FAULT PROTECTION
[T]	TERMINATIONS	[SPD-X]	SURGE PROTECTIVE DEVICE (REFERENCE SCHEDULE)
LB	LOAD BREAK	[EGAP]	ENGINE GENERATOR ANNUNCIATOR PANEL
NLB	NO LOAD BREAK	[M]	METER
[P]	ANSI PROTECTIVE DEVICE	[C]	COMBINATION STARTER/DISCONNECT
[D]	DRAW-OUT DEVICE	[M]	MOTOR STARTER
[C]	DISCONNECT SWITCH, F INDICATES FUSED	[M]	MOTOR
[C]	ENCLOSED CIRCUIT BREAKER	[E]	EQUIPMENT ENCLOSURE
[V]	VARIABLE FREQUENCY DRIVE		
[T]	TRANSFORMER		

ELECTRICAL DRAWING INDEX			
SHEET NO.	SHEET TITLE		
E-001	ELECTRICAL GENERAL NOTES AND LEGENDS		
E-002	ELECTRICAL ONE-LINE DIAGRAM		
ABBREVIATIONS			
A	AMPERES	NC	NOT IN CONTRACT
ac	AC	NTS	NOT TO SCALE
AFF	ABOVE FINISHED FLOOR	(N)	NEW
AFG	ABOVE FINISHED GRADE	NC	NORMALLY CLOSED
ATS	AUTOMATIC TRANSFER SWITCH	NO	NORMALLY OPEN
BFG	BELOW FINISHED GRADE	NL	NIGHT LIGHT
C	CONDUIT	OC	ON CENTER
CATV	CABLE TELEVISION	OHD	OVERHEAD DOOR
CCTV	CLOSED CIRCUIT TELEVISION	OHP	OVERHEAD PROJECTOR
CB	CIRCUIT BREAKER	PVC	POLY VINYL CHLORIDE
(D)	DEMOLISH & REMOVE	(R)	RELOCATED
(E)	EXISTING	(RR)	REMOVE & RELOCATE
E/G	ENGINE GENERATOR	RAF	RAISED ACCESS FLOOR
EM	EMERGENCY	RMC	RIGID METAL (STEEL) CONDUIT
EMT	ELECTRICAL METALLIC TUBING	ROS	RIGID GALVANIZED STEEL CONDUIT
EP	EXPLOSION PROOF	SB	STAND-BY
EW	ELECTRIC WATER COOLER	SPD	SURGE PROTECTIVE DEVICE
(F)	FUTURE	TP	TAMPER PROOF
FA	FIRE ALARM	TYP	TYPICAL
G	GROUND	UF	UNDER FLOOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	UG	UNDER GROUND
GFI	GROUND FAULT INDICATION	UND	UNLESS NOTED OTHERWISE
GFP	GROUND FAULT PROTECTION	UPS	UNINTERRUPTED POWER SUPPLY
HOA	HAND "OFF" AUTOMATIC	V	VOLTS
IG	ISOLATED GROUND	VA	VOLTS AMPERES
KVA	KILOVOLT AMPERES	VFD	VARIABLE FREQUENCY DRIVE
KW	KILOWATTS	W/	WITH
MCB	MAIN CIRCUIT BREAKER	W/O	WITHOUT
MCC	MOTOR CONTROL CENTER	WG	WIREGUARD
MLO	MAIN LUGS ONLY	WP	WEATHER PROOF
MV	MEDIUM VOLTAGE	XFMR	TRANSFORMER



MECHANICAL: Sharro-Baucom Engineering & Consulting
 3900 S. Wadsworth Blvd, Suite 600
 Lakewood, CO 80226
 303-986-8200

ELECTRICAL: Sharro-Baucom Engineering & Consulting
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 Lakewood, CO 80226
 303-986-8200

ARCHITECT: ARCHITECTURAL WORKSHOP
 2 KALAMATH ST.
 DENVER, CO 80202
 303-758-1717

STRUCTURAL: MARTIN/MARTIN CONSULTING ENGINEERS
 12499 W. COLFAX AVE.
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 303-431-6105

UNIVERSITY OF COLORADO - DENVER | ANSCHUTZ MEDICAL
 CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT
 PHASE 1 & 2
 13001 E 17TH PLACE, AURORA, CO 80045

CU Anschutz #: 21-174016
 SBEC Project #: 210031
 Scale: AS SHOWN
 Drawn By:
 Designed By:
 Checked By:

Issued For: SCHEMATIC DESIGN
 Date: 01-25-2022

ELECTRICAL GENERAL NOTES AND LEGENDS
E-001

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UNIVERSITY OF COLORADO - DENVER | ANSCHUTZ MEDICAL

CAMPUS - FITZSIMONS BUILDING - CHILLERS REPLACEMENT

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 Scale: AS SHOWN

 Drawn By:

 Designed By:

 Checked By:

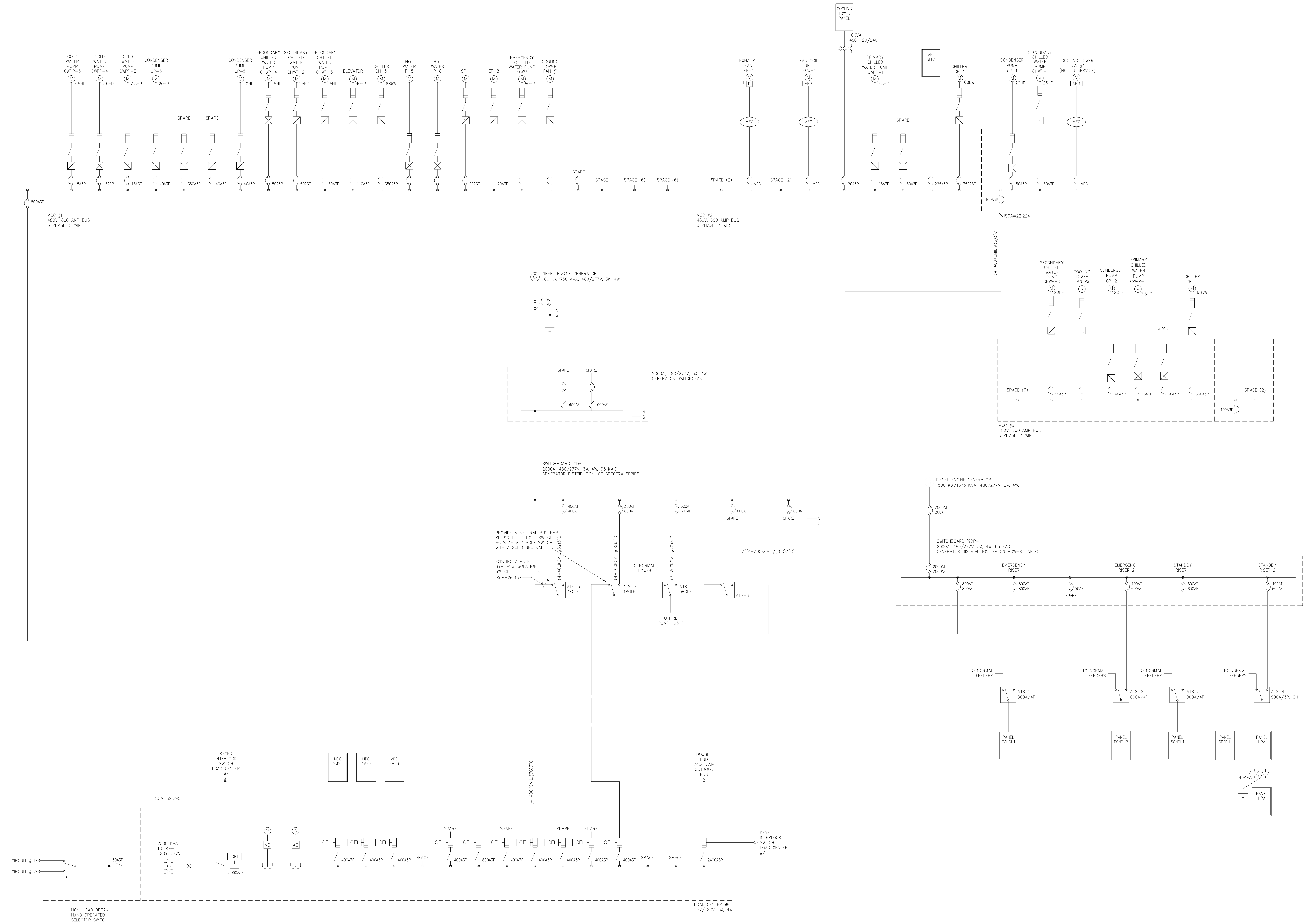
Issued For: _____ Date: _____

 SCHEMATIC DESIGN 01-25-2022

ELECTRICAL ONE-LINE DIAGRAM

E-002

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ELECTRICAL ONE-LINE DIAGRAM

 SCALE: NONE

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ShafferBaucom

Engineering & Consulting

University of Colorado – Denver | Anschutz Medical Campus
Fitzsimons Chiller Replacement
Phase 1 & 2
Schematic Narrative
CU Anschutz #: 21-174016
SBEC #: 210031
January 20, 2022

SCHEMATIC NARRATIVE

I. Project Purpose and Objectives

The purpose of the project is to replace aging equipment and improve reliability to the emergency chilled water system that serves critical spaces in the Fitzsimons (Q20 - Fitz) building and Vivarium Air Handling Units in Research 1 (P18 – R1) and Research 2 (P15 – R2), and the new Anschutz Health Sciences Building (P12 - AHSB) for the University of Colorado – Denver | Anschutz Medical Campus (CU-Denver | AMC). The project will be broken into two (2) phases. Phase 1 is devoted to preparation, including piping distribution modifications, that will allow the distribution to be looped and provide circulation reliability without triggering emergency transfer. Phase 2 is devoted to the replacement of the existing emergency chiller plant’s chillers located in the Fitzsimons building.

II. Project Scope of Work and Work Execution

For the purposes of this document, “Mechanical” shall include heating, ventilation, and air-conditioning (HVAC), plumbing, temperature controls and fire protection systems. “Electrical” shall include electrical distribution system upgrades, egress lighting and exit signage, lighting circuiting, branch power, and fire alarm systems.

Within this narrative, the following systems and characteristics are addressed:

- a. Project Purpose and Objectives
- b. Project Scope of Work and Work Execution
- c. Design Parameters
- d. Mechanical Existing Systems Overview
- e. Proposed Mechanical Work
- f. Mechanical Sustainable Design Concepts
- g. Electrical Existing Systems Overview
- h. Proposed Electrical Work
- i. Constructability & Project Requirements

The project must be completed while portions of the building remain occupied and University functions continue. Minimal disruption to operations is desired by the Owner.

III. Design Parameters

A. Codes and Standards:

1. General

- a. International Building Code (IBC), 2018
- b. International Existing Building Code (IEBC), 2018
- c. International Mechanical Code (IMC), 2018
- d. International Energy Conservation Code (IECC), 2018
- e. NFPA 70, National Electrical Code (NEC), 2020
- f. State of Colorado Plumbing Code (CPC), 2018
 - *Based on the International Plumbing Code (IPC), 2018*
- g. State of Colorado State Fuel Gas Code (CFGFC), 2018
 - *Based on the International Fuel Gas Code (IFGC), 2018*
- h. NFPA 13, Installation of Sprinkler Systems, 2018
- i. International Fire Code (IFC), 2018
- j. ASHRAE Standard 15 – 2019 – Safety Standard for Refrigeration Systems.

- k. ASHRAE Standard 34 – 2019 – Designation and Safety Classification of Refrigerants.
 - l. ASHRAE Standard 90.1 – 2016 – Energy Standard for Buildings Except Low-Rise Residential.
2. Authorities Having Jurisdiction (AHJ):
- a. University of Colorado – Denver Guidelines and Standards for Design and Construction Projects (2020)
 - b. State of Colorado Plumbing Inspector for Plumbing
 - c. State of Colorado Electrical Inspector for Electrical
 - d. State of Colorado third party assigned Mechanical Inspector for Mechanical
 - e. All applicable state and local codes and amendments

B. University of Colorado – Denver Guidelines and Design Standards:

(As applicable to the scope of this project.)

1. Outdoor Design Conditions:

- a. Summer ambient design conditions:
 - i. Cooling Towers Systems: 95°F (DB) / 64°F (WB)
 - ii. All other systems: 95°F (DB) / 63°F (WB)
- b. Summer Wind Speed: 8 MPH
- c. Winter ambient design conditions:
 - i. All other Systems: -10°F (DB)
- d. Winter Wind Speed: 15 MPH
- e. Project Site Elevation: 5,380 feet

2. Central Utility Plant (CUP) – Chilled Water Systems:

- a. The Central Utility Plant (CUP) produces chilled water at 40°F and through a variable flow primary distribution system, provides chilled water to the buildings for cooling. There is an assumed heat pickup during distribution of approximately 1°F.
- b. CUP provided chilled water supply and supply temperature reset is as shown in the schedule below:
 - i. If Outside Air Temperature (OAT) > 45°F, then Chilled Water Supply (CH) = 41°F (Typical Operation)
 - ii. If OAT < 45 F, then CHS = 46°F (Free Cooling Mode)
- c. Chilled Water Return (CHR) should be returned to the CUP at 56°F.
- d. The campus chilled water distribution system operates in a de-coupled manner. A primary-secondary bridge connection and building circulation pumps is designed for building cooling. The CUP provision of chilled water is designed for variable-flow primary pumping to the building infrastructure connection.
- e. Campus buildings are designed for internal secondary loops with variable flow pumping to distribute chilled water to the cooling loads.
- f. The primary-secondary pumping interface is designed for a two-way, modulating control valve installed on the return leg back to the CUP to maintain a chilled water return of 56°F.

- g. Flow meters will be used on both the primary loop and the secondary loop to facilitate Building Automation System (BAS) control logic to approximate flow matching.
 - h. The control valve and actuator assembly must have an approximate 100:1 turn-down ratio. The control valve will need to be able to close against the possible 100 psi differential pressure from the central plant pumps and have 3-5 psid across the valve at full flow.
3. Chilled Water Systems:
- a. Chiller Plant: The chilled water plant will have a minimum of two chillers that will supply the load and provide sufficient capacity reduction to permit continuous operation at minimum loads. Variable frequency drives (VFDs) will be provided on chillers. Chillers will be designed for a 14°F temperature differential or match the building's existing design temperatures.
 - b. Cooling Towers: Towers will be sized for heat rejection at a 64°F entering air wet bulb temperature. A three-way valve configuration will be provided to allow for constant condenser water temperature to return to the chiller. The design team may review the benefits of condenser water relief for the proposed new chilled water system.
4. Equipment Identification:
- a. The new mechanical equipment for this project will be based on CU Denver standard 230553-3.2-B for the mechanical equipment naming strategy. The existing mechanical equipment naming/numbering scheme does not appear to have been followed to match the current CU Denver naming strategy.
 - b. Equipment identification numbers may be up to 32 characters. Equipment naming strategy is as follows:
System – Building – Number
A A A – A/# A/# A/# A/# - A/# A/# - # # # - (BAS point name when required)
 - c. The first three placeholders are reserved for the system designation (alpha characters)
 - d. The fourth character is a hyphen.
 - e. The fifth through ninth placeholders are reserved for the building designation (alpha and/or numeric)
 - f. The tenth character is a hyphen
 - g. The eleventh through sixteenth placeholders are a “smart number.” It is composed of a two-digit, alpha or numeric, floor location designator followed by a hyphen and a three-digit numeric sequential indicator.
 - h. The seventeenth character is a hyphen
 - i. In some instances, the point name will be followed by a hyphen and a sub-point name
 - j. All device and point names will be assigned by the Facilities Operations, Building Operations Department.
 - k. All references to equipment and devices in drawings, labels, equipment tags, BAS system, etc., must use this naming convention.
 - l. Equipment designation, for prints may exclude the building designator.
Example:
The new chiller located in the ground floor mechanical room:
CH-Q20-G-001
5. Direct Digital Control (DDC):

- a. The University of Colorado – Denver utilizes a central Building Automation System (BAS) for control of HVAC functions. The Anschutz Campus updates during this project will incorporate new BAS controls tying into the existing Siemens DDC management level network.
- b. Pre-programmed, stand-alone single or multiple loop controllers will be used on HVAC subsystems.

IV. Mechanical Existing Systems Overview

A. Cooling System

1. The three (3) existing York chillers are water-cooled, screw chillers with a nominal capacity of 280 Tons each and installed in 1995 utilizing R-22 refrigerant. All three chillers are connected in parallel to a 10-inch primary chilled water loop. Additionally, there is an existing equipment pad with capped connections for a future chiller.
2. The existing chillers were designed in 1995 for a 45°F chilled water supply (CH), 55°F chilled water return (CHR) water temperatures (10°F temperature differential) with a 100% water solution.
 - a. The Fitzsimons building is connected to the Central Utility Plant's chilled water system with 10-inch mains. The CUP's chilled water mains connect to the primary chilled water loop and are used as the primary source of cooling to the Fitzsimons building. Refer to the design parameters above, the CUP typically provides 41°F chilled water supply, 56°F chilled water return (15°F temperature differential) with a 100% water solution.

Existing Chillers					
Chiller Tag	Capacity (Tons)	MCA	KW/TON	R-22 Charge (LBs)	Approx. Equip Age (Years)
CH-1 (CH-Q20-G-001)	280	268	0.56	910	26
CH-2 ** (CH-Q20-G-002)	280	268	0.56	910	26
CH-3 (CH-Q20-G-003)	280	268	0.56	910	26

** CH-2 was not operational during the site visit on October 12, 2021; and was confirmed during the project kickoff meeting on November 29, 2021, that the chiller is currently inoperable.

3. There are four (4) primary chilled water pumps that provide primary pumping on the evaporator side of the three (3) chillers. These pumps are base mounted, end suction models designed for 100% flow for each pump with redundant (N+1), primary-standby operation.

Existing Primary Chilled Water Pumps				
Pump Tag	Flow (GPM)	Pressure (FT. HD.)	Motor (HP)	Approx. Equip Age (Years)
CWPP-1 (CH-Q20-G-001-PRI-PM)	670	33	7.5	26
CWPP-2 (CH-Q20-G-002-PRI-PM)	670	33	7.5	26
CWPP-4 (CH-Q20-G-004-PRI-PM)	670	33	7.5	26
CWPP-5 (CH-Q20-G-005-PRI-PM)	670	33	7.5	26

4. There are five (5) secondary chilled water pumps located in the basement level of the mechanical room that provide pumping distribution to the Fitzsimons building. These pumps are base mounted, end suction models designed for 100% flow for each pump with redundant (N+1), primary-standby operation.
 - a. In 2014, variable frequency drives and motors were replaced for all the secondary chilled water pumps except CWSP-1, which serves the Critical Loop. The CWSP-1, pump motor was recently replaced in October 2021; however, the VFD is still original.

Existing Secondary Chilled Water Pumps				
Pump Tag	Flow (GPM)	Pressure (FT. HD.)	Motor (HP)	Approx. Equip Age (Years)
CWSP-1 (CH-Q20-B-001-SEC-PVD) Critical Loop/Risers	800	60	20	26
CWSP-2 (CH-Q20-B-002-SEC-PVD) North Loop/Riser	800	60	20	26
CWSP-3 (N+1) (CH-Q20-B-003-SEC-PVD) Stand-By	800	60	20	26
CWSP-4 (CH-Q20-B-004-SEC-PVD) West Loop/Riser	800	60	20	26
CWSP-5 (CH-Q20-B-005-SEC-PVD) East Loop/Riser	800	60	20	26

- During an emergency transfer of chilled water from the CUP to the emergency chiller plant located in the Fitzsimons building, pneumatic isolation valves close on the Fitzsimons (Q20) primary chilled water in main pipe to force water through the emergency chillers. A second pneumatic transfer valve closes on the secondary pump to force water only to the Critical Loop secondary pump to serve existing stacking telecom rooms, elevator machine rooms, and the Fitzsimons Communication Center located on Ground Floor – East. Refer to the table below for existing chilled water capacities.
- The existing two (2), induced draft, crossflow cooling towers are located to the west of the Fitzsimons building located within a fenced enclosure (not for visible screening). The cooling towers are raised above grade on a steel structure resting on square concrete piers. The piping and piers have been extended and poured to accommodate a future cooling tower.
- The existing condenser water system is designed for an 80°F condenser supply (CS), 89°F condenser return (CR) water temperatures (9°F temperature differential). There is an existing condenser water bypass valve located in the basement mechanical room to control the condenser water temperatures for the existing chiller's operation.

Existing Cooling Tower				
Cooling Tower Tag	Flow (GPM)	Motor (HP)	Motor Type	Approx. Equip Age (Years)
CT-1 (CW-Q20-G-001)	1,260	20	2-SPEED	26
CT-2 (CW-Q20-G-002)	1,260	20	2-SPEED	26

- The main condenser water supply from the cooling tower equipment yard is 16-inch main piping that is routed below grade and below the Fitzsimons Building underground ground pedestrian walkway into the remote sump located in the Fitzsimons building basement level mechanical room.
- The main condenser water return line from chillers to the equipment yard is a 12-inch main pipe that routed below grade along a similar route as the condenser water supply piping. Per existing drawings this existing underground piping is indicated to be PVC.

10. The remote cooling tower sump is built into the existing building walls. The approximate volume of the remote cooling tower sump is approximately 14,130 Gallons. The remote sump is equipped with a skid mounted packaged, pumped sand filtration system and cooling tower sump chemical treatment equipment that is located in the basement mechanical room north of the main condenser water pumps. The remote sump and existing mechanical and chemical treatment equipment shall remain for purposes of this project.
11. Four (4) condenser water pumps provide circulation from the chiller's condenser to the cooling tower's remote sump located in the basement level mechanical room. These pumps are base mounted, end suction models designed for 100% flow each with redundant (N+1), primary-standby operation.

Existing Condenser Water Pumps				
Pump	Flow (GPM)	Pressure (FT. HD.)	Motor (HP)	Approx. Equip Age (Years)
CP-1 (CW-Q20-G-001-PRI-PM)	840	66	20	26
CP-2 (CW-Q20-G-001-PRI-PM)	840	66	20	26
CP-3 (CW-Q20-G-001-PRI-PM)	840	66	20	26
CP-5 (CW-Q20-G-001-PRI-PM)	840	66	20	26

B. Emergency Chilled Water Pump & Distribution (R1 – P18; R2 – P15; AHSB – P12)

1. The emergency chilled water pump and connections located in the basement mechanical room of the Fitzsimons Building (Q20) have distribution that is routed to Research Center 1 (R1 – P18); Research Center 2 (R2 – P15); and Anschutz Health Science Building (AHSB – P12). This 8-inch connection to the primary chilled water loop is pumped by one (1) base mounted, end suction pump with a VFD.

Existing Emergency Chilled Water Pump				
Pump Tag	Flow (GPM)	Pressure (FT. HD.)	Motor (HP)	Approx. Equip Age (Years)
EMCHW-500-1 (CH-Q20-B-001-PVD)	980	125	50	18

2. R1 – P18's air handling unit (AHU) chilled water coils are tagged "AHU-N-205" and "AHU-N-206". These units are redundant to each other and serve vivarium type spaces. Additionally, these AHUs also utilize an atomizing type evaporative cooler to provide additional cooling capacity when conditions are achievable. Refer to the table below for existing chilled water capacities. The emergency chilled water piping continues to the west to Research Center 2.
3. R2 – P15's air handling unit (AHU) chilled water coils are tagged "AHU-201" and "AHU-202". These units are redundant to each other and serve vivarium type spaces. Mode 1 has each unit operating at 100% of the total capacity for the building as constructed in 2008; Mode 2 has each unit's future capacity +50% of the total vivarium's 2008 capacity. Additionally, these AHUs also utilize a wetted media type evaporative cooler to provide some additional cooling capacity when outdoor conditions are achievable. Refer to the table below for existing chilled water capacities. The emergency chilled water piping continues to the west to Anschutz Health Science Building.

4. ASHB – P12 has dedicated air handling units (AHU) that serve vivarium spaces; however, the current emergency chilled water piping is currently only routed to the basement mechanical room upstream of the main building’s chilled water plate and frame heat exchangers. To get chilled water to the building’s Konvekta heat recovery skid that provides chilled water to the vivarium air handling units, a load shedding strategy is in place to direct chilled water to the critical load. Additionally, these AHUs also utilize an atomizing type evaporative cooler to provide additional cooling capacity when outdoor conditions are achievable. Refer to the table below for existing chilled water capacities.

C. Emergency Chilled Water Connected Cooling Load Capacities

1. The table below illustrates, based on the provided information below, a list of the current capacities and parameters at each location.

Existing Emergency Chilled Water Connected Cooling Capacities				
Building	System / Load	Capacity (TONS)	Flow Rate (GPM)	CH Temp. Diff. (ΔT)
Fitzsimons – Q20	Critical Loop – E, W, N Bldg. Risers	~56 - 67	134	10-12°F ΔT ⁽¹⁾
Fitzsimons – Q20	Critical Loop – Comm Center	122	244	12°F ΔT
Fitzsimons – Q20	Critical Loop – TOTAL	~178 - 189	378	12°F ΔT
R1 – P18	AHU-N-205 & AHU-N-206	138 ⁽²⁾	236	14°F ΔT
R2 – P15	AHU-02-01 & AHU-02-02	251 ⁽³⁾	430	14°F ΔT
AHSB – P12	PFHX-P12-M001 & PFHX-P12-M002	185 ⁽⁴⁾	273	16°F ΔT
TOTAL		~752 – 763 TONS	1,317 GPM	13.6°F ΔT ⁽⁵⁾

- (1) Original building and chilled water temperature was designed at a 10°F ΔT; however, current chilled water temperatures from the CUP allow the building to operate at 12°F ΔT.
- (2) Capacity is based on a single AHU in operation due to N+1 configuration and assumes a full chilled water coil load.
- (3) Capacity is based on a single AHU in operation due to N+1 configuration and assumes the future full chilled water coil scheduled load.
- (4) Capacity is based on information provided by Owner for chilled water capacities required to match Konvetka coil cooling load for respective AHUs
- (5) Difference in CH supply and return temperatures is based on a weighted average of their respective flow rates at each location where chilled water is utilized.

D. Control System

1. The University of Colorado – Denver utilizes a central Building Automation System (BAS) for control of HVAC functions. The Anschutz campus updates during this project will incorporate tying into an existing Siemens DDC backbone management level control.
2. The current general control strategy for the Fitzsimons, R1, R2, and AHSB building is that the campus utility plant provides chilled water to those buildings under “normal” operation of the majority of the year/time.
 - a. The chiller plant located in the Fitzsimons building is utilized for “emergency” operation for times when campus’s CUP is not available to provide chilled water to the buildings and due to the critical spaces/operations in these four (4) buildings, there is a need to provide chilled water from the Emergency Chilled Water plant located in the Fitzsimons building.

- b. While the CUP is operation, the Fitzsimons chiller plant, primary chilled water pumps, and the Emergency Chilled Water pump are in standby mode. The secondary chilled water pumps located in Fitzsimons provide chilled water to Fitzsimons building whether the CUP or the Emergency Chiller Plant is in operation.
 - c. During the Emergency Chilled Water operation, the secondary pumps shed the Fitzsimons chilled water load so that only the Critical Loop secondary pump (CWSP-1) operates to provide emergency chilled water to the Critical Loop's three (3) building risers and the Communication Center located on the Ground Floor – East.
 - d. During the Emergency Chilled Water operation, the main Emergency Chilled Water Pump is energized to provide chilled water to the Emergency Chilled Water piping distribution to AHU coils at R1 and R2. At those respective locations where emergency chilled water is required, their respective normally open, building's chilled water transfer valves close and the normally closed, emergency chilled water valves open to provide emergency chilled water to those AHU coils. A similar scenario occurs at AHSB; however, emergency chilled water is routed to the building's main plate and frame heat exchanger rather than directly at the AHU chilled water coil.
3. Currently the two (2) existing emergency chilled water transfer valves located in Fitzsimons are pneumatically operated, normally closed valves and receive pneumatic control signals from existing control panels.

V. Proposed Mechanical Work

A. Chilled Water Plant

1. Refer to the accompanying mechanical schedule sheet for a list of potential chiller selections that could be utilized to serve as a replacement options for the Fitzsimons Emergency Chilled Water Plant. These selections should be noted as being preliminary and will continue to be refined to better match the connected loads and goals of the Owner.
 - a. The new chillers will be specified to limit harmonics to 5% total demand distortion (TDD) for compliance with IEEE 519. VFDs that are rated 20HP or higher will include a harmonic filter or active front end to limit harmonics to comply with IEEE 519 and to limit total demand distortion to 3% per Campus standards.
2. The new emergency chilled water system will be designed for a 14°F temperature differential; 42°F supply, 56°F return to better match the connected emergency chilled water coil/equipment design temperatures.
3. The existing chilled water primary distribution pumps will be replaced with base-mounted, end-suction models, each sized for 100% flow providing N+1 redundancy (primary/standby) in accordance with University Design Standards. Suction diffusers may be utilized on pump inlets. The primary pumps will be controlled to operate in a constant volume operation and matched with each chiller's operation based on the Emergency Chilled Water distribution demand.

New Replacement Primary Chilled Water Distribution Pumps			
Pump	Design Flow (GPM)	Design Pressure (FT. HD.)	Design Motor (HP)
CHPP-1 (CH-Q20-G-001-PRI-PM)	570	50	10
CHPP-2 (CH-Q20-G-002-PRI-PM)	570	50	10
CHPP-4 (CH-Q20-G-004-PRI-PM)	570	50	10
CHPP-5 (CH-Q20-G-005-PRI-PM)	570	50	10

4. The existing secondary chilled water pumps serving the Fitzsimons building shall remain as is with exception of the Critical Loop secondary chilled water pump. The Critical Loop pump's existing VFD shall be replaced with a new VFD and be controlled by the existing differential pressure transmitters.
5. Valve and piping modifications shall be implemented to allow the current standby secondary chilled water pump CWSP-3 to operate as a redundant pump in an emergency chilled water transfer by providing the existing manual valves with automatic control valves.
6. The Induced Draft, Cross Flow, Open-circuit, Cooling Tower has a couple of recommendation options to track with the new chilled water plant's size and heat rejection capacities.
 - a. Cooling Tower Option A: If the cooling load is reduced (upon direction from the Owner) or stays at the current chiller plant size, the existing cooling tower will have sufficient heat rejection capacity for up to ~840 Tons of Chiller Plant. Recommendation for the existing cooling tower would include a refurbishment to restore the cooling tower to "like new" condition which includes replacement of fan motor, speed controller (potentially VFD upgrade), replacement of cooling tower fill material, and sealing of cold-water basin.

- b. Cooling Tower Option B: If the cooling load stays at the same capacity and a new chiller is selected that can benefit from reduced or lower condenser water temperatures, the existing cooling tower will need to be upgraded to achieve more condenser water capacity. Recommendation for the upgraded cooling tower would include replacement of the existing 20-HP fan motor to 25-HP fan motor with VFD speed control and a restoration of the existing tower to “like new” condition as described above.
 - c. Cooling Tower Option C: Either scenario of reducing the load or keeping existing load; due to the age of the equipment, replace existing cooling tower with a new cooling tower with more efficient heat rejection cooling tower fill and utilize variable speed fan control (reuse the existing remote sump and distribution). Existing concrete piers will be attempted to be reused with new support steel.
 - d. Cooling Tower Option D: If the cooling load needs to increase above the current 840 Tons, the cooling tower does not have enough capacity to maintain the heat rejection capacities from an enlarged chiller plant. Recommendation for the cooling tower will be a complete replacement of the cooling tower with more efficient cooling tower fill design and utilize variable speed fan control (reuse the existing remote sump and distribution). Existing concrete piers will be attempted to be reused with new support steel.
7. New condenser water circulation pumps will be base-mounted, end-suction models, each sized for 100% flow providing N+1 redundancy (primary/standby) in accordance with University Design Standards. The condenser water pumps will be controlled to operate in a constant volume operation and matched with each chiller’s operation based on the Emergency Chilled Water distribution demand. Condenser water pumps replacement will depend on the chiller plant and cooling tower option selected above.

New Replacement Condenser Water Distribution Pumps			
Pump	Design Flow (GPM)	Design Pressure (FT. HD.)	Design Motor (HP)
CP-1 (CW-Q20-G-001-PRI-PM)	855	70	20
CP-2 (CW-Q20-G-001-PRI-PM)	855	70	20
CP-3 (CW-Q20-G-001-PRI-PM)	855	70	20
CP-5 (CW-Q20-G-001-PRI-PM)	855	70	20

B. Emergency Chilled Water Pump & Distribution

- 1. SBEC recommends that the existing Emergency Chilled Water pump be replaced and sized for the new AHSB that has been added to the Emergency Chilled Water distribution with respect to pressure and flow requirements. Additionally, this Emergency Chilled Water pump also represents a potential single point of failure in the Emergency Chilled Water Distribution system for R1, R2, and AHSB and SBEC recommends that it be replaced with a similar sized pump to provide N+1 redundancy for the distribution system. Due to the limited space in the basement mechanical room, options will need to be reviewed with regard to pump type and potential remote locations. The emergency chilled water pumps will be controlled to operate in a variable volume operation and controlled with VFDs to respond to existing differential pressure transmitters located at each building’s emergency chilled water coil/equipment locations.

New Replacement Emergency Chilled Water Distribution Pumps			
Pump	Design Flow (GPM)	Design Pressure (FT. HD.)	Design Motor (HP)
EMCHP-Q20-1 (CH-Q20-B-001-PVD)	950	140	50
EMCHP-Q20-2 (CH-Q20-B-002-PVD)	950	140	50

2. It was observed that an existing chemical pot feeder has been installed to serve the emergency chilled water distribution; as well as locations with valves and caps for distribution emergency chilled water bypass for flushing/circulating the system.
 - a. This existing equipment shall remain in operation and the points that are currently installed for future bypass location will be utilized to circulate the emergency chilled water system to maintain chemical treatment of the distribution system. These bypass points will also serve as locations to help circulate the chilled water to allow chilled water temperatures to be lowered to their design supply temperatures prior to transferring over to serve their respective emergency cooling loads. Refer to the accompanying chilled water schematics.
 - b. Temperature sensors will also need to be located at these emergency chilled water bypass control valves to provide feedback on the emergency chilled water distribution.

C. Mechanical System Piping Materials

1. Chilled and Condenser water piping:
 - a. 2.5-inch and larger pipe: ASTM A56-96, Schedule 40, black steel, flanged and welded.
 - i. Flanged joints shall only be provided at equipment or valve connections. All other joints shall be welded.
 - ii. Anschutz Health Science Building (P12 – AHSB) Only: Grooved Couplings and Mechanical Fittings: ASTM A536-84 ductile or ASTM A47-90 malleable iron, with enamel finish and grooves or shoulders designed to accept grooved couplings. Synthetic-rubber gasket, with central-cavity, pressure-responsive design, and ASTM A183-83 carbon-steel bolts and nuts.
 - b. 2.0-inch and smaller pipe: ASTM B 88 Type L hard drawn copper, wrought copper fittings, soldered.
2. Mechanical Equipment Drain and Overflow piping:
 - a. 1.25-inch and larger pipe: ASTM B 306 Type DWV copper, soldered
 - b. 1.0-inch and smaller pipe: Type M copper, soldered

D. Direct Digital Controls (DDC)

1. The current sequence of operations will need to be revised and updated to reflect the new equipment and operation of the Emergency Chilled Water Plant and its associated equipment.
2. It is also recommended that certain “modes” be programmed and graphically represented at the BAS front end as “buttons” to cycle pre-programmed control routines for the following:
 - a. Preventative maintenance.
 - i. Stroking of the emergency chilled water valves to verify operation with valve/actuator feedbacks for verification.

- ii. Stroking of bypass valves to verify operation with valve actuator feedbacks for verification and chemical treatment of emergency chilled water distribution.
 - b. Equipment exercising/cycling.
 - i. Operating the emergency chilled water plant equipment.
 - ii. Operating the emergency chilled water pumps to cycle circulate water through distribution.
 - c. Temporary equipment.
 - i. A sequence of operation to override (silence alarms, etc.) and keep certain pieces of equipment off-line as well as override “normal” operation of the chilled water equipment to facilitate temporary chillers/cooling if needed.
- 3. Chilled water plant optimizing sequences and/or programs will be required to obtain and maximize equipment efficiencies and operation conditions.
- 4. New power circuits to accommodate the new loads will be provided (either 24V control voltage or 120V line voltage). Transformers will be required.
- 5. Siemens-based control system architecture will be outlined during design. Siemens will be providing design assistance throughout the design.

VI. Mechanical Sustainable Design Concepts

A. Sustainable Design Concepts

1. Commissioning is required by current energy codes and is required per University of Colorado – Denver | Anschutz design standards. Commissioning should include LEED Energy and Atmosphere minimum of fundamental commission prerequisite and should consider LEED Enhanced Commissioning work with the University Project Manager. Coordinate the level of commissioning required for this project with the CU Denver | Anschutz Project Manager. This project is not trying to achieve LEED points or accreditation; however, these LEED commissioning requirements allow a base level of commissioning that will be required for this complex chilled water system operation.
2. Some chiller options have been selected to include what is being called in the HVAC industry as “Next Generation” refrigerants. These refrigerants are intended to be replacements as HFC (Hydrofluorocarbons, i.e., R-134a, R-407c, R-410A) and HCFC (Hydrochlorofluorocarbons, i.e., R-22, R-123) will eventually be phased out and equipment will no longer be manufactured with these types of refrigerants according to phase out governmental acts and protocols. “Next Generation” refrigerants will be HFO (Hydrofluoro-olefins) and are designed to have lower global warming potential (GWP) and be non-ozone depleting, very low atmospheric life spans. However, new technologies, including refrigerants, have different impacts to equipment efficiencies, capacities, and safeties.

VII. Electrical Existing Systems Overview

A. Electrical Distribution

1. Three existing Motor Control Centers (MCCs) feed the chiller plant. Each is provided with both normal and generator power via an Automatic Transfer Switch (ATS).
 - a. MCC-1 is fed via ATS #6. It is provided with normal power from Load Center #8 via an existing 800A fused disconnect. Emergency power is provided from a 1500 kW diesel engine generator set via an 800A circuit breaker.
 - b. MCC-2 is fed via ATS #5, which is 3-pole with bypass isolation. It is provided with normal power from Load Center #8 via an existing 400A fused disconnect. Emergency power is provided from a 600 kW diesel engine generator set via a 400A circuit breaker.
 - c. MCC-3 is fed via ATS #7, which is 4-pole with configured as to have a solid neutral. It is provided with normal power from Load Center #8 via an existing 400A fused disconnect. Emergency power is provided from the same 600 kW diesel engine generator set as MCC-2 via a 400A circuit breaker.
2. The three (3) existing chillers are served from the existing Motor Control Centers in the mechanical room where the chillers are located. Chiller #1 is fed from a 350A3P breaker inside MCC-2. Chiller #2 is fed from a 350A3P breaker inside MCC-3. Chiller #3 is fed from a 350A3P breaker inside MCC-1.
3. There are four (4) 7.5HP primary chilled water pumps that are fed from the Motor Control Centers inside the mechanical room. CWPP-1 is fed from an existing 15A3P breaker inside MCC-2. CWPP-2 is fed from an existing 15A3P breaker inside MCC-3. CWPP-4 and CWPP-5 are fed from existing 15A3P breakers inside MCC-1.
4. There are five (5) 20HP secondary chilled water pumps that are fed from the Motor Control Centers inside the mechanical room. The pumps have been relabeled from CWSP to CHWP. CHWP-1 is fed from an existing 50A3P breaker inside MCC-2. CHWP-3 is fed from an existing 50A3P breaker inside MCC-3. CHWP-2, CHWP-4, and CHWP-5 are fed from existing 50A3P breakers inside MCC-1.
5. The 50HP emergency chilled water pump (ECWP) is fed from an existing breaker inside MCC-1.
6. There are (2) existing cooling towers that are fed from the Motor Control Centers inside the mechanical room. Cooling tower CT-1 is fed from MCC-1, and CT-2 is fed from MCC-3. There is also a cooling tower panelboard that is fed from MCC-2.
7. There are (4) existing 20HP condenser pumps that are fed from the Motor Control Centers inside the mechanical room. CP-1 is fed from an existing 50A3P breaker inside MCC-2. CP-2 is fed from an existing 40A3P breaker inside MCC-3. CP-3 and CP-5 are fed from existing 40A3P breakers inside MCC-1.

VIII. Proposed Electrical Work

A. Electrical Distribution

1. The three (3) new chillers will be served from the existing Motor Control Centers in the mechanical room. Chiller #1 will be fed from a new 400A3P breaker inside MCC-2. Chiller #2 will be fed from a new 400A3P breaker inside MCC-3. Chiller #3 will be fed from a new 400A3P breaker inside MCC-1. New feeders and conduit will be installed to each chiller.
2. The four (4) new 10HP primary chilled water pumps will be fed from the Motor Control Centers inside the mechanical room. CWPP-1 will be fed from a new 20A3P breaker inside MCC-2. CWPP-2 will be fed from a new 20A3P breaker inside MCC-3. CWPP-4 and CWPP-5 will be fed from new 20A3P breakers inside MCC-1. New feeders and conduit will be installed for each chilled water pump.
3. The VFD for the existing secondary chilled water pump CHWP-1 will be replaced and remain fed from a 50A3P breaker inside MCC-2.
4. The two (2) new 50HP emergency chilled water pumps (EMCHP-01, -02) will be fed from new 125A3P breakers inside MCC-1.
5. Cooling Tower:
 - a. Cooling Tower Option A: The existing equipment feeders will remain for re-use with new components.
 - b. Cooling Tower Option B: The two (2) new cooling tower fans will be fed from the Motor Control Centers inside the mechanical room. Cooling tower CT-1 will be fed from a new 50A3P breaker inside MCC-1. CT-2 will be fed from a new 50A3P breaker inside MCC-3.
 - c. Cooling Tower Option C: The existing equipment feeders will remain for re-use with new components.
 - d. Cooling Tower Option D: The two (2) new cooling tower fans will be fed from the Motor Control Centers inside the mechanical room. Cooling tower CT-1 will be fed from a new breaker inside MCC-1. CT-2 will be fed from a new breaker inside MCC-3. The existing conduits will be reused if large enough to accommodate the new equipment.
6. To improve redundancy, the Cooling Tower Panel will be moved from MCC-2 to MCC-1, which will also feed CT-1, EMCHP-01, and EMCHP-02 as described above.
7. The four (4) new 20HP condenser pumps will be fed from the Motor Control Centers inside the mechanical room. CP-1 will be fed from a new 50A3P breaker inside MCC-2. CP-2 will be fed from a new 50A3P breaker inside MCC-3. CP-3 and CP-5 will be fed from new 50A3P breakers inside MCC-1.
8. General item: where new circuit breakers are described above will serve pumps with VFDs, the existing MCC starter and overload protection will be removed and replaced with a circuit breaker only.

IX. Constructability & Project Requirements

A. Phasing Strategy

1. Effective communication between the Owner, Consultants, and Contractors will facilitate sequencing and opportunities for reduced impact to operations.
2. Prior to construction activities, the Engineer, Architect, Owner's Representative, and Contractor shall walk the site, reviewing each step for potential impacts and unforeseen obstacles.
3. Due to the project's funding and structure, it is intended that primarily all necessary piping and distribution revisions will be completed under Phase 1. Phase 1 will be balanced and commissioned prior to Phase 2 commencing. Phase 2 will primarily be all necessary equipment replacements associated with the emergency chilled water plant. Refer to "Temporary Systems for Occupied Building" section below for the requirement for temporary equipment and power during this project.
4. See the following "Scope & Phasing" table as a list of scope items with its associated phase identified as well as potential alternate due to budget limitations.

CU-Denver - Fitzsimons Chiller Replacement Scope & Phasing			
Scope ID	Scope Item	Phase	Potential Alternate
1	Provide Bypass Valve & Temp Sensor at (P12 - AHSB)	1	
2	Provide Bypass Valve & Temp Sensor at (P15 - R2)	1	
3	Provide Bypass Valve & Temp Sensor at (P18 - R1)	1	
4	Relocate/Replace Critical Loop Emergency Change Over Valve (Q20 – Fitz)	1	
5	Replace Critical Loop Pump VFD Only (CWSP-1) (Q20 – Fitz)	1	
6	Revise Sequence of Operation (SOO) For Emergency Chilled Pumping	1	
7	Create Preventative Maintenance (PM) Program for Critical Loop	1	
8	Create PM Program for (P12 - AHSB)	1	
9	Create PM Program for (P15 - R2)	1	
10	Create PM Program for (P18 - R1)	1	
11	Permanent/Temporary Chiller Connections (Q20 – Fitz)	1	
12	Temporary Emergency Chilled Water Pump Connections (Q20 – Fitz)	1	
13	Create Temporary Chiller SOO Program	1	
14	Flush and Fill EMCH Loop	1	
15	Isolation Valve at (P18 - R1)	1	
16	Add Emergency Chilled Water Isolation Valves to Critical Loop for Communication Center (Q20 – Fitz)	1	Y
17	Add N+1 To Emergency Chilled Water Pump & VFD (EMCHWP-2) (Q20 – Fitz)	1	Y
18	Permanent Side-Stream Filter Added to EMCH Loop (Q20 – Fitz)	1	Y
19	Replace Emergency Chilled Water Pump & VFD (EMCHWP-1) (Q20 – Fitz)	2	
20	Replace Chillers (CH-1, -2, -3) (Q20 – Fitz)	2	
21	Replace Primary Chilled Water Pumps (CWPP-1, -2, -3, -4) (Q20 – Fitz)	2	
22	Revise SOO for Emergency Chilled Water Plant	2	
23	Replace Cooling Towers Fan Motors & Refurbish Cooling Tower (Q20 – Fitz)	2	
24	Replace Air Separator (Q20 – Fitz)	2	Y
25	Replace Chilled Water Basket Strainer (Q20 – Fitz)	2	Y
26	Replace Condenser Water Pumps (CP-1, -2, -3, -4) (Q20 – Fitz)	2	Y
27	Replace Cooling Towers (Q20 – Fitz)	2	Y
28	Replace Refrigerant Monitor (Q20 – Fitz)	2	Y

B. Temporary Systems for Occupied Building

1. Temporary Pumping

- a. The contractor will be responsible for supporting the chilled water pumping flows for the duration of the project during Phase 1 and Phase 2. All building pumping outages must be coordinated with the Owner a minimum of 14 working days prior, and a detailed Method of Procedure must be submitted to the Owner and Engineer a minimum of 14 working days prior to commencement of work. Off-hours work may be required to minimize disruption to the occupied building.

2. Temporary Cooling

- a. The contractor will be responsible for supporting the cooling loads for the duration of the project during Phase 2. All building cooling outages must be coordinated with the Owner a minimum of 14 working days prior, and a detailed Method of Procedure must be submitted to the Owner and Engineer a minimum of 14 working days prior to commencement of work. Off-hours work may be required to minimize disruption to the occupied building.

3. Temporary Power

- a. Provisions will be installed to accommodate two temporary 250 ton air-cooled chillers with integral pumps. It is assumed that having generator backup for the temporary chillers is preferred, both for this project and for future use. We anticipate that MCC-1 can accommodate a single temporary chiller, but that will need to be confirmed with meter data. Neither MCC-2 nor MCC-3 are able to provide the minimum circuit ampacity that is anticipated (523 Amps). As a result, one chiller will be provided with normal power only, and is anticipated to be fed from Load Center #8. A docking station located on the exterior of the building is anticipated for easy connection to the chillers via cam lock receptacles in a locked NEMA 3R enclosure.
- b. The contractor will be responsible for supporting the equipment and applicable building loads with temporary power for the duration of the project as required. All building outages must be coordinated with the Owner a minimum of 14 working days prior, and a detailed Method of Procedure must be submitted to the Owner and Engineer a minimum of 14 working days prior to commencement of work. Off-hours work may be required to minimize disruption to the occupied building.

X. ATTACHMENTS

A. SCHEMATIC DESIGN – ROUGH ORDER OF MAGNITUDE COST OPINION

B. SCHEMATIC DESIGN – DRAWING PACKAGE

C. PROJECT SCHEDULE

University of Colorado Denver (CU Denver - Anschutz Medical Campus (AMC) - Fitzsimons Bldg. Emergency Chiller Replacement

Project Schedule, Rev. 3 (SD Deadline Update)

