

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 AGENCIES

A. This project is funded in part by the following agencies:

1. State of Idaho: Department of Parks and Recreation
2. United States: American Rescue Plan Act of 2021 (ARPA)

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to Site
4. Contractor's Responsibility
5. Work by Owner
6. Protection of Buildings, Contents and Grounds
7. Coordination with occupants
8. Work restrictions.
9. Permits
10. Waste Disposal
11. Testing and Inspection
12. Specification and drawing conventions.
13. Buy American Requirements
14. General Security Requirements

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.4 PROJECT INFORMATION

A. Project Identification: ARPA 330133, Kokanee Cove Development, Phase 3.

B. Project Location: **Ponderosa State Park, McCall, ID.**

- C. Owner: Idaho Department of Parks and Recreation; 5657 Warm Springs Avenue, Boise, ID 83716
 - a. Owner's Representative: Joel Halfhill, South Region Construction Manager; (208) 830-4745, joel.halfhill@idpr.idaho.gov
- D. Engineer (Design Professional): KM Engineering, LLP, Kevin McCarthy, (208) 639-6939; kevin@kmengllp.com
- E. Architect's or Engineer's (Design Professional's) Consultants: The Architect or Engineer has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - a. Architect: ALC Architecture; Jeff Likes; (208) 514-2713; jeff@alcarchitecture.com.
- F. Other Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - a. Structural Engineer: Vector Structural Engineers, LLC; Brendan Sines; (208) 996-0303; Brendan.sines@vectorse.com
 - b. Mechanical/Electrical Engineers: Musgrove Engineering; Thad Mason; (208) 384-0585; thadm@musgrovepa.com
 - c. Surveyor: KM Engineering, LLP; Aaron Ballard; (208) 639-6939; aballard@kmengllp.com
 - d. Landscape Architect: KM Engineering, LLP; Alyssa Yensen; (208) 639-6939; ayensen@kmengllp.com

1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Project includes construction of an access road and construction of rental cabin(s), refurbishment of an existing chapel (Event Center); demolition of an existing Dormitory/Shower House and new construction of a restroom facility. Landscaping and infrastructure including sewer, water and electrical are included.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract per the Department of Parks and Recreation Development Bureau.

1.6 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project, and by use of facility by building tenants in existing tenant improvement Projects.
- B. Use of Site: Limit use of Project site to areas indicated on the contract documents. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to areas indicated on the contract documents.
2. Driveways, Walkways and Entrances: Keep roadways and access to park facilities clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of roadways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - c. Contractor parking shall be limited to those areas indicated on the Contract Document and as designed by the Owner and Park management.
 - d. Maintain clear access to project at all times for firefighting equipment. Maintain exit ways from existing building required by authorities having jurisdiction.
 - e. Signs: Provide signs adequate to direct visitors.
 - 1) Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Any damage to the building, due to negligence on behalf of the contractor to not maintain a weather-tight condition, shall be the responsibility of contractors and they shall bear the burden for correction and/or repairs for any damage. Repair damage caused by construction operations.
- D. Security: The contractor shall maintain security of the building's roof areas and any staging areas throughout the project.
- E. Behavior and Dress: The Contractor and all Contractors representatives, to include subcontractors, consultants, vendors or other parties hired by the Contractor will maintain professional behavior and wear appropriate attire that always identifies their company while on the job site. Use of safety vests with reflective colors is highly suggested.

1.7 CONTRACTOR RESPONSIBILITY

- A. Determination and verification of materials including manufacturer catalog numbers.
- B. Determination and verification of field measurements and field construction criteria.
- C. Checking and coordinating information in submittals with requirements of the Work and of the Contract Documents.
- D. Determination of accuracy and completeness of dimensions and quantities.
- E. Confirmation and coordination of dimensions and field conditions of the Site.
- F. Construction means, methods, techniques, sequences, and procedures.
1. The Site is located adjacent and near Lake Payette. year. The Contractor is responsible for protecting the site and workload timeline if necessary.

2. The Contractor shall immediately notify the Construction Manager if groundwater is encountered during construction. Refer to geotechnical report from Allwest dated January 6, 2023.
3. Safety precautions
4. The Contractor shall be responsible for temporary power, communications, and irrigation fees and billing provided to the site. After substantial completion, billing will be transferred to applicable entities by the Owner or as directed by the Owner.

1.8 PROTECTION OF BUILDING, CONTENTS, AND GROUNDS

- A. Construction Site Laydown and Storage: As per plans.
- B. Verify with Agency for any specific requirements.
- C. SHPO

1.9 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and **existing** and **adjacent** building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing roads and trails, and other adjacent occupied or used facilities. Do not close or obstruct roadways paths or trails, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than **72** hours in advance of activities that will affect Owner's operations.
 3. The Owner will take special care not to damage materials or work completed by the contractor prior to final acceptance. If the contractor occurs any damages, prior to final acceptance, they need to notify the Owner and Architect immediately for verification of damages. If the contractor fails to notify the Owner and Architect within 24 hours of the incident, the contractor shall be responsible for the performance and shall bear the cost of correction.
- B. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
- C. Owner Limited Partial Use or Occupancy: Owner reserves the right to occupy and to place and install equipment or materials in portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such partial use, placement of equipment or materials, and limited occupancy shall not constitute acceptance of the total Work.

1. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed if requested.
2. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work, if Work in those areas has been accepted as complete by the Design Professional

1.10 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to normal business working hours of 7am to 6pm Monday through Friday, unless otherwise indicated.
 1. Weekend Hours: With prior permission from Owner.
 2. Early Morning or Late Evening Hours: With prior permission from Owner.
 3. Hours for Utility Shutdowns: With prior permission from Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify **Owner** not less than 7 days in advance of proposed utility interruptions.
 2. Obtain **Owner's** written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
- E. Hazardous Materials: Notify the IDPR Construction Manager immediately upon discovery of existing hazardous materials.
- F. Controlled Substances: Use of tobacco products and other controlled substances is not permitted per Section 72-1717, Idaho Code.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.
- H. Contractor Parking: To be discussed and approved by Owner.
- I. On Owner/Tenant occupied projects, maintain cleanliness in areas adjacent to and always surrounding the construction area to the satisfaction of the Owner.
- J. On Owner/Tenant occupied projects, ensure deliveries and contractor work access are in accordance with previous agreement with Owner and/or as indicated in the Contract Documents.

- K. Contractor shall be aware that Ponderosa State Park has various events in the area of construction such as cross country skiing and other activities. Construction operations may be adjusted accordingly with such events.

1.11 PERMITS

- A. The Contractor is responsible for following all Federal, State, and local laws and regulations pertaining to construction and completion of the Work.
- B. The Contractor is responsible for securing all required permits including but not limited to:

- 1. Building Permit(s)
- 2. Storm Water Pollution Prevention Plan (SWPPP), including creating, filing and coordination with the State of Idaho.
- 3. Dewatering Permits (if applicable)

C. Utilities

- 1. The Contractor shall not interrupt utility services unless the interruption is coordinated a minimum of ten (10) business days in advance, and approved by the Owner, utility service provider, and impacted business(es) or landowner(s).
- 2. The Contractor is responsible for coordinating with all utility companies for connections, shutoffs, and inspections.
- 3. Coordination includes installation of temporary systems including but not limited to power and communications.
- 5. The Contractor shall coordinate all work with the Owner and Design Professional.

1.12 WASTE DISPOSAL

- A. The contractor is responsible for any and all demolition and/or removal as necessary and required to fulfill the requirements of the Contract Documents.

1.13 TESTING AND INSPECTION

- A. Notify Owner/Engineer at least 24 hours prior to commencement of Work requiring special inspection(s).

1.14 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information.
3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 - B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
 - C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
4. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
5. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.15 BUY AMERICAN REQUIREMENTS

- A. All materials furnished on, or for this project are subject to Buy American requirements per 49 Code of Federal Regulations (CFR) Part 661.
- B. Contractor shall be responsible for all certification submittals ensuring Buy American requirements are met.
- C. American Iron and Steel (AIS) certifications do not meet and are not a substitute for Buy American certification.

1.16 GENERAL SECURITY REQUIREMENTS

- A. This Section specifies:
 1. Security Program
 2. Entry Control
 3. Miscellaneous Restrictions

1.17 WARRANTIES

- A. Warranties specified in other Section shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirement of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

- a. Provide manufacturer's standard warranties for materials or equipment installed in the project to the Owner at the completion of the project.
- B. The Contractor warrants to the Owner and Design Professional that all labor furnished on this Project shall be competent to perform the tasks undertaken; materials and equipment furnished under the Contract will be new and of high quality unless otherwise required or permitted by the Contract Documents; that the Work will be complete, of high quality and free from defects not inherent in the quality required or permitted; and that the work will strictly conform to the requirements of the Contract Documents. Any work not strictly conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse by Owner or its representatives, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty shall survive the completion of the Contract and final payment to the Contractor.
- C. In addition to any other warranty obligations in this contract, the contractor shall be specifically obligated to correct, upon written direction from the Owner, any and all defective or non-conforming work for a period of twelve (12) months following substantial completion.

1.18 IDAHO SPECIFICATIONS FOR PUBLIC WORKS (ISPWC)

- A. All work is based on and shall conform to the 2020 edition of the Idaho Standards for Public Works Construction (ISPWC) document and modifications made herein.
- B. In case of conflict between the Project Specifications, Construction Drawings, or referenced supplemental information and Design Standards, the Specifications shall govern unless otherwise indicated in the Project Documents or by Engineer.
- C. The Contractor shall take no advantage of any apparent error or omission in the Construction Drawings, Specifications, or other Contract Documents. In the event that the Contractor discovers such an error or omission, he/she shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Construction Drawings and other Contract Documents.
- D. Missing specifications or reference sections to the ISPWC, Contract Documents, or Industry Standards, does not relieve the Contractor from following the applicable Contract Documents, Industry Standards and ISPWC sections.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01100

SECTION 012300 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract and other Division 1 Specification Sections apply to this section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost for each alternate is the net addition to the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.
 - 3. Alternates can be accepted or rejected in any order. The order of alternates in the bid schedule are not the order in which alternates will be accepted or rejected.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modification to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate Bid #1 – Cabin No. 3

All materials associated with the construction of Cabin No. 3. Sewer: All materials associated with the construction of new sewer line. All grading, drainage and associated storm drains as shown on the plans. Landscape features: All materials associated with landscape including but not limited to pavers, walls, pathways, lights, boulders, plantings, trees, hydroseed and patch back per plans. Trees and stump removal: Removal and haul-off of all trees and stumps as determined during the mandatory pre-bid walk. Water: All materials associated with the construction of the new domestic and fire sprinkler water lines. Boulder Retaining Walls: All materials associated with the construction of cabin retaining wall(s) per plans.

Base Bid: No work.

B. Alternate Bid #2 – Cabin No. 4

All materials associated with the construction of Cabin No. 4. Sewer: All materials associated with the construction of new sewer line. All grading, drainage and associated storm drains as shown on the plans. Landscape features: All materials associated with landscape including but not limited to pavers, walls, pathways, lights, boulders, plantings, trees, hydroseed and patch back per plans. Trees and stump removal: Removal and haul-off of all trees and stumps as determined during the mandatory pre-bid walk. Water: All materials associated with the construction of the new domestic and fire sprinkler water lines. Boulder Retaining Walls: All materials associated with the construction of cabin retaining wall(s) per plans.

Base Bid: No work.

C. Alternate Bid #3 – Cabin No. 5

All materials associated with the construction of Cabin No. 5. Sewer: All materials associated with the construction of new sewer line. All grading, drainage and associated storm drains as shown on the plans. Landscape features: All materials associated with landscape including but not limited to pavers, walls, pathways, lights, boulders, plantings, trees, hydroseed and patch back per plans. Trees and stump removal: Removal and haul-off of all trees and stumps as determined during the mandatory pre-bid walk. Water: All materials associated with the

construction of the new domestic and fire sprinkler water lines. Boulder Retaining Walls: All materials associated with the construction of cabin retaining wall(s) per plans.

Base Bid: No work.

D. **Alternate Bid #4 - Cabin No. 6**

All materials associated with the construction of Cabin No. 6. Sewer: All materials associated with the construction of new sewer line. All grading, drainage and associated storm drains as shown on the plans. Landscape features: All materials associated with landscape including but not limited to pavers, walls, pathways, lights, boulders, plantings, trees, hydroseed and patch back per plans. Trees and stump removal: Removal and haul-off of all trees and stumps as determined during the mandatory pre-bid walk. Water: All materials associated with the construction of the new domestic and fire sprinkler water lines. Boulder Retaining Walls: All materials associated with the construction of cabin retaining wall(s) per plans.

Base Bid: No work.

E. **Alternate Bid #5 – Additional Landscape**

All grading, drainage and associated storm drains as shown on the plans. Landscape features: All materials associated with landscape including but not limited to pavers, walls, pathways, lights, boulders, plantings, trees, hydroseed and patch back per plans. Trees and stump removal: Removal and haul-off of all trees and stumps as determined during the mandatory pre-bid walk.

Base bid: No work.

END OF SECTION 01230

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. Design Professional will issue through IDPR Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, as “Architect’s Supplemental Instructions”.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: IDPR Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by IDPR Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to IDPR Construction Manager.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, the IDPR Construction Manager will issue a Change Order for signatures of the Design Professional and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Design Professional and or IDPR Construction Manager may issue a Construction Change Directive on AIA Document G714. Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 SCHEDULE OF VALUES (SOV)

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Correlate line items in the Schedule of Values with items required administrative forms and schedules, including the following:
 - a. Application for Payment Forms with Continuation Sheets
 - b. Submittals Schedule
 - 2. Submit the Schedule of Values to the IDPR Construction Manager at earliest possible date but no later than seven (7) days before the submittal of initial Application for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location
 - b. Name of Design Professional
 - c. IDPR Project Number
 - d. Contractor's name and address
 - e. Date of submittal
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section of Division
 - b. Description of the Work
 - c. Name of Subcontractor
 - d. Name of manufacturer or fabricator
 - e. Name of supplier
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the Schedule of Values for initial cost of material, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total costs and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payments when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 PAYMENT APPLICATIONS

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the IDPR Construction Manager and Design Professional and paid for by the Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Payment Application is the period indicated in the Agreement.
- C. Payment Application Forms: Use forms provided by the Owner for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Owner will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amount of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmit: Submit one (1) signed original to Owner by a method ensuring receipt.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - a. List of Subcontractors
 - b. Schedule of Values
 - c. Contractor's Construction Schedule (preliminary if not final)
 - d. Submittals Schedule (preliminary if not final)
 - e. List of Contractor's staff assignments
 - f. List of Contractor's principal suppliers and fabricators
 - g. Products list
- G. Payment Application at Substantial Completion: After issuance of the Certificate of Substantial Completion, submit a Payment Application showing 100 percent completion for portion of the Work claimed as substantially complete. Retainage will still be held by the Owner.
- H. Final Payment Application: Submit final Payment Application with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements
 - a. Transmittal of required project construction records to IDPR Construction Manager
 - 2. Updated final statement, accounting for final changes to the Contract Sum.
 - 3. AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims Form.
 - 4. AIA Document G707, "Consent of Surety to Final Payment".
 - 5. Release of Claims form, Exhibit H (IDPR Form RC-1). Evidence that claims have been settled.
 - 6. Public Works Contract Tax Release from the Idaho Tax Commission. (See Exhibit G for form to be submitted to the Idaho Tax Commission)
 - 7. Removal of temporary facilities and services
 - 8. Removal of surplus materials, rubbish, and similar elements.
 - 9. Final liquidated damages settlement statement.
 - 10. Warranties and Guarantees

END OF SECTION 012900

SECTION 013100 – PROJECT MANAGEMENT & COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract and other Division 1 Specification Sections, apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to the following:
 - 1. General project coordination procedures
 - 2. Administrative and supervisory personnel
 - 3. Project Meetings
 - 4. Requests for Interpretation (RFI's)
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

- A. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Coordinate construction operations to comply with Preservation Procedures outlined in the construction drawings where required.
 - 4. Make adequate provision to accommodate items scheduled for later installation.

5. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule
 2. Preparation of the schedule of values
 3. Installation and removal of temporary facilities and controls
 4. Delivery and processing of submittals
 5. Progress meetings
 6. Preinstallation conferences
 7. Project closeout activities
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 KEY PERSONNEL

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including office and cellular telephone numbers and email addresses. Provide names, addresses and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 1. Post copies of list in designated location. Always keep list current.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 1. Content: Project specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of Design Professional, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Design Professional indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
 1. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 2. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 3. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Design Professional determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will so inform Contractor, who shall make changes as directed and resubmit.
 4. Coordination Drawing Prints: Prepare coordination drawings according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Preparation Format: **DWG**, Version, operating in **Microsoft Windows** operating system.
 3. File Submittal Format: Submit or post coordination drawings using **CAD** and **PDF** format.
 4. Design Professional will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Design Professional makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify IDPR Construction Manager and Design Professional of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including IDPR Construction Manager and Design Professional, within 3 days of the meeting.
- B. **Historic Preservation Briefing:** The Tribal Historic Preservation Officer (THPO) and or State Historical Preservation Office (SHPO) **may** present a mandatory briefing.
 - 1. Attendees: Authorized representatives of Owner & Facility, THPO, SHPO, Architect, all construction staff.
 - 2. Attendance will be recorded and is a prerequisite to being on-site.
 - 3. Agenda: The briefing will present the importance of the structure in relation to tribal history and archeology as well as how to protect the National Historic Landmark and surrounding site.
- C. Preconstruction Conference: The IDPR Construction Manager will schedule a preconstruction conference before the start of construction, at a time convenient to the Contractor, Owner, and Architect after execution of the Agreement. The conference will be held at Project site or another convenient location. The IDPR Construction Manager will conduct the meeting and provide minutes to all attendees.
 - 1. Attendees: Authorized representatives of Owner, Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference.
 - 2. Agenda: Discuss items of significance that could affect progress.
- D. Pre-Installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction. IDPR Construction Manager, Design Professional and Contractor to agree upon pre-installation conferences required at Preconstruction Conference.
 - 1. Attendees: Design Professional, IDPR Construction Manager and Installers.
 - 2. Agenda: Review progress of other construction activities and preparations for the activity under consideration, including requirements for the following:
 - a. Contract Documents
 - b. Related Change Orders
 - c. Purchases
 - d. Deliveries
 - e. Submittals
 - f. Possible conflicts
 - g. Time Schedules
 - h. Acceptability of substrates
 - i. Temporary facilities and controls
 - j. Space and access limitations
 - k. Required performance results.
 - l. Protection of construction and personnel
 - 3. Record significant conference discussions, agreements, and disagreements in the meeting minutes.

4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- E. Progress Meetings: IDPR Construction Manager will conduct progress meetings at monthly intervals and provide minutes to Design Professional, Contractor, and applicable parties.
 1. Attendees: In addition to representatives of Owner and Design Professional, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings.
 2. Agenda: Review and correct or approve minutes of previous progress meetings. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of the Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractors Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed with the Contract Time.
 - b. Review present and future need of each entity present, including the following:
 - 1) Interface requirements
 - 2) Sequence of operations
 - 3) Status of submittals
 - 4) Deliveries
 - 5) Access
 - 6) Work Hours
 - 7) Quality and work standards
 - 8) Change Orders
 - 9) Documentation of information for payment requests.
 3. Reporting: IDPR Construction Manager will take and distribute minutes of the meeting to each party present and to parties who should have been present. Include a summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INTERPRETATION (RFI's)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI on a form acceptable to Owner and Design Professional.
 1. RFI's shall originate with Contactor. RFI's submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFI's in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project Number
 2. Project name and location

3. Date
 4. Name of Contractor
 5. RFI number, numbered sequentially.
 6. RFI subject
 7. Specification Section number and title and related paragraphs, as appropriate
 8. Drawing number and detail references, as appropriate
 9. Field dimensions and conditions, as appropriate
 10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. Design Professional Action: Design Professional will review each RFI, determine action required, and return it. Allow seven calendar days for Design Professional's response for each RFI. RFI's received after 1:00 p.m. will be considered as received the following working day.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 013200 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract and other Division 1 Specification Sections, apply to this Section as applicable.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports.
 - 5. Field condition reports.
 - 6. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish dates.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Major Area: A story of construction, a separate building, or a similar significant construction element.
- C. Milestone: A key or critical point in time for reference or measurement.

1.4 SUBMITTALS

- A. Submittals Schedule: Submit one copy of schedule via email to the IDPR Construction Manager and Design Professional. Arrange the following information in a tabular format:
 - 1. Schedule date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action of informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for IDPR Construction Manager/Design Professionals final release or approval.
- B. Preliminary Construction Schedule: Submit one copy via email to the IDPR Construction Manager.
- C. Contractor's Construction Schedule: Submit one copy of initial schedule, large enough to show entire schedule for entire construction period.
- D. Daily Construction Reports: Submit one report for each day of the project even if Contractor performs no work. Weekends and holidays where work was not scheduled does not require a report. It is permissible to provide reports weekly.
- E. Field Condition Reports: Submit one copy to IDPR Construction Manager at time of discovery of differing conditions.
- F. Special Reports: Submit one copy to IDPR Construction Manager at time of unusual event.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values and Contractor's Construction Schedule.
2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling".
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
- C. Activities: Treat story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 2. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 3. Substantial Completion: Indicated completion in advance of date established for Substantial Completion and allow time for Design Professional's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Seasonal variations.
 3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.

- f. Deliveries.
- g. Installation.
- h. Adjusting.
- i. Curing.

- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within 7 days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating, and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify fist workday of each week with a continuous vertical line.

2.5 REPORTS

- A. Daily Construction Reports: Prepare daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions.
 - 7. General description of work undertaken.
 - 8. Accidents.
 - 9. Meetings and significant decisions.
 - 10. Unusual events (refer to special reports).
 - 11. Stoppages, delays, shortages, and losses.
 - 12. Emergency procedures.
 - 13. Orders and requests of authorities having jurisdiction.

14. Change Orders received and implemented.
15. Coordinate with photo documentation and descriptive records as required by Specification Section 01160 Preservation Procedures.

- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for the changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to IDPR Construction Manager within one day of an occurrence.
1. Refer to Division 1 Section “Preservation Procedures” for the following:
 - a. Historic Discovery.
 - b. Damage to Historic Fabric.

PART 3 - EXECUTION

3.1 CONTRACTOR’S CONSTRUCTION SCHEDULE

- A. Contractor’s Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly schedule progress meeting.
1. Revise schedule immediately after each meeting or other activity where revision shave been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to IDPR Construction Manager, Design Professional, separate contractors, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract and other Division 1 Specification Sections, apply to this Section as applicable.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section “Payment Procedures” for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section “Project Management and Coordination” for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 1 Section “Quality Requirements” for mockup requirements.
 - 4. Division 1 Section “Project Closeout” for submitting warranties.
 - 5. Division 1 Section “Project Record Documents” for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 6. Divisions 2 through 46 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Design Professional’s responsive action.
- B. Informational Submittals: Written information that does not require Design Professional’s responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Design Professional for Contractor’s use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section “Construction Progress Documentation” for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Design Professional’s receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittal enough in advance of the Work to permit processing, including resubmittal.
 1. Initial Review: Allow 5 workdays for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 5 workdays for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Design Professional’s consultants, Owner, or other parties is indicated, allow 7 workdays for initial review of each submittal.
- E. Identification: Place a permanent label or title block on each submittal for identification.
 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 3x4 inches on label or beside title block to record Contractor’s review and approval marking and action taken by Design Professional.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Design Professional.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

- G. Additional Copies: Unless additional copies are required for final submittal, and unless Design Professional observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - 1. Submit one copy of submittal to concurrent review in addition to specified number of copies to Design Professional.
 - 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Design Professional will return submittals, without review, received from sources other than the Contractor.
 - 1. Transmittal Form: Use AIA Document G810 or similar.
 - 2. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:)
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks,
 - m. Signature of transmitter.
 - 3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or tile block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with the approval notation from Design Professional's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use of Construction: Use only final submittals with mark indication approval from Design Professional's action stamp.

1.5 CONTRACTOR’S USE OF DESIGN PROFESSIONAL’S CAD FILES

- A. General: At Contractor’s written request, copies of Design Professional’s CAD files will be provided to Contractor for Contractor’s use in connection with Project, subject to the following conditions:
 - 1. CAD files are only to be used for the express purpose of preparing submittals for this project.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Submit electronic submittals via email.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options as applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer’s written recommendations.
 - b. Manufacturer’s product specifications.
 - c. Manufacturer’s installation instructions.
 - d. Standard color charts.
 - e. Manufacturer’s catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves,
 - h. Operations range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.
 - 5. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Design Professional will return two copies. Mark up and retain one returned copy as a Project Record Document. (For paper submittal, electronic is acceptable).
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Don not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of Design Professional’s CAD Drawings are otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Document. Include the following information, as applicable:
 - a. Dimensions.

- b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Shopwork manufacturing instructions.
 - f. Templates and patterns.
 - g. Schedules.
 - h. Design calculations.
 - i. Compliance with specified standards.
 - j. Notation of coordination requirements.
 - k. Notation of dimensions established by field measurement.
 - l. Relationship to adjoining construction clearly indicated.
 - m. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 22 by 34 inches.
 3. Number of copies: Submit three opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit 5 copies where copies are required for operation and maintenance manuals. Design Professional will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing. (For paper submittal, electronic is acceptable).
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that include the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparison throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated in the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Design Professional will return submittal with options selected.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with materials or product proposed for use, and that show full range of color and texture varieties expected. Samples include, but are not limited to, the

following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range set; and components used for independent testing and inspection.

- a. Number of Samples: Submit three sets of Samples. Design Professional will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variation.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Design Professional will return two copies. (For paper submittal, electronic is acceptable).
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation".
- G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation".
- H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures".
- I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures".
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Design Professional will return two copies. (For paper submittal, electronic is acceptable).
 - a. Mark up and retain one returned co as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of copies: Submit two copies of each submittal, unless otherwise indicated. Design Professional will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by and officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section “Quality Requirements”.
- B. Coordination Drawings: Comply with requirements specified in Division 1 Section “Project Management and Coordination”.
- C. Contractor’s Construction Schedule: Comply with requirements specified in Division 1 Section “Construction Progress Documentation”.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Design Professionals and owners, and other information specified.
- E. Installer Certificates: Prepare written statements on manufacturer’s letterhead certifying that Installer complies with requirements in the Contract Documents and, where required is authorized by manufacturer for this specified Project.
- F. Manufacturer Certificates: Prepare written statements on manufacturer’s letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer’s letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer’s letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency’s standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.

3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- L. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operation a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- M. Material Safety Data Sheets (MSDSs): Submit information to IDPR Construction Manager.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordinate with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Design Professional.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION

- A. General: Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. Reviewed.
 2. Reviewed with changes noted.
 3. Revise and resubmit.
 4. Rejected.

- C. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional will forward each submittal to appropriated party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Document may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Design Professional, Owner or authorities having jurisdiction are not limited by provision of this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Design Professional.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirements. Refer uncertainties and requirements that are different, but apparently equal, to Design Professional for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Design Professional for a decision before proceeding.

1.5 SUBMITTALS

- A. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material design, and extent to that indicated for this Project whose work has resulted in construction with a record of successful in-service performance.
- F. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Design Professional.
 - 2. Notify Design Professional ten days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain Design Professional's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in a undisturbed condition as a standard for judging the completed Work.
6. Mockup may remain as part of the Work.

1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and as required by authorities having jurisdiction.
 1. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 2. Testing and inspecting requested by Contractor and not required by the Contract Documents are contractor's responsibility.
 3. Submit additional copies of each written report directly to authorities having jurisdiction when they so direct.
- B. Retesting/Reinspecting: Regardless of whether original tests or inspection were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- C. Associated Services: Cooperated with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as required. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Preliminary design mix proposed for use for material mixes, as requested.
- D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspection, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.

3. Date test or inspection results were transmitted to Design Professional.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Design Professional's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other Specification Sections apply to this Section as applicable.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. “Approved”: When used to convey Architect’s action on Contractor’s submittals, applications, and requests, “approved” is limited to Architect’s duties and responsibilities as stated in the Conditions of the Contract.
- C. “Directed”: A command or instruction by Architect. Other terms including “requested”, “authorized”, “selected”, “required”, and “permitted” have the same meaning as “directed”.
- D. “Indicated”: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including “shown”, “noted”, “scheduled”, and “specified” have the same meaning as “indicated”.
- E. “Regulations”: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules conventions, agreements within the construction industry that control performance of the Work.
- F. “Furnish”: Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. “Install”: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. “Provide”: Furnish and install, complete and ready for the intended use.
- I. “Project Site”: Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly in the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations on the U.S."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract and other Division 1 Specification Sections apply to this Section as applicable.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 REGULATIONS

- A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to the following:
 - 1. Building code requirements
 - 2. Health and safety regulations
 - 3. Utility company regulations
 - 4. Police, fire department and rescue squad rules
 - 5. Environmental protection regulations
 - 6. Accessibility requirements

1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Design Professional, testing agencies, and authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices: A field office is **required** for this project.
- B. Lay-down area: Provide lockable fencing around lay-down area to secure materials or provide lockable storage containers. The Owner is not responsible for the loss or vandalism of unsecured materials.
 - 1. Store combustible materials apart from building.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of existing construction affecting the Work.
- B. Existing Utilities: The existence and locations of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities including sprinklers and other

construction affecting the Work. The Contractor is responsible for repair of damaged utilities and sprinklers.

- C. Acceptance of Conditions: Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a written request for information to the IDPR Construction Manager. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Provide sufficient protection to ensure safe passage of people around construction areas.

3.4 TEMPORARY UTILITY INSTALLATION

- A. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- B. Electrical Power Service: Use of Owner's existing electrical power service will be permitted, if facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- ~~C.~~ Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.5 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until IDPR Construction Manager and Design Professional schedule Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel:
 - 1. Coordinate location of parking with Park Manager
 - 2. The Motor Vehicle Entry Fee (MVEF) will be waived for contractor activities. Coordinate identification with Park Manager.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Do not place any construction waste in Owner's waste containers.
- E. Sanitary Facilities: Existing toilet facilities are not available for construction personnel. Coordinate which facilities are available for Contractor use with Park Manager. Owner restroom facilities are not to be used for the cleaning of materials or equipment.
- F. Temporary Use of Permanent Roads and Paved Areas: Locate temporary access road(s) to allow access to Park facilities at all time. Park offices and parking lots are to remain open at all times.
- G. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are always legible.

3.6 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to authorities having jurisdiction.
 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
- E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard(s). Where appropriate and needed, provide lighting, including flashing red or amber lights.
 1. Provide temporary 48” high orange safety fence around construction site to prevent people from easily entering site except by entrance gates.
- F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including any common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
- B. Site: Maintain Project site free of waste materials and debris.

- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
- D. Installed Work: keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- I. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- J. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- K. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deteriorations at time of Substantial Completion.
- B. Comply with manufacturer's written instructions.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- B. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- C. Repair components that do not operate properly. Remove and replace newly provided operating components that cannot be repaired.

3.10 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, or no later than Substantial Completion. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 015000

SECTION 017300 – EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other Specification Sections apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including but not limited to the following:
 - 1. General installation of products
 - 2. Cutting and Patching
 - 3. Progress Cleaning
 - 4. Protection of installed construction
 - 5. Correction of the Work

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operations life or safety. Operation elements include the following:
 - a. Primary operation systems and equipment
 - b. Control systems.
 - c. Electrical wiring systems
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in

reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers
 - b. Membranes and flashings
 - c. Sprayed fire-resistive material.
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually fully match in-place adjacent surfaces if possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Design Professional for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of existing construction affecting the Work.
- B. Existing Utilities: The existence and locations of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a written request for information to Design Professional. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Design Professional promptly.
- B. General: Lay out the Work using accepted practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Design Professional when deviations from required lines and levels exceed allowable tolerances.
- C. Lines and Levels: Locate and lay out control lines and levels for construction. Transfer survey markings and elevations for use with control lines and levels.
- D. Record Log: Maintain a log of layout control work.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
 - C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
 - D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading more than that expected during normal conditions of occupancy.
 - E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels without adequate personnel protection.
 - F. Shop Drawings: Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
 - G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Design Professional.
 2. Allow for building movement, including thermal expansion and contraction.
 - H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
 - I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair material and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 “Summary”.
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, grinding, and similar operations, using method least likely to damage elements retained or adjoining construction.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate or minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials

specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deteriorations at time of Substantial Completion.
- B. Comply with manufacturer's written instructions.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace newly provided operating components that cannot be repaired.

END OF SECTION 017300

SECTION 017700 – PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other Specification Sections apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection Procedures
 - 2. Reinspection
 - 3. Final Acceptance
 - 4. Closeout Procedures
- B. Related Sections include the following:
 - 1. Division 1, Section "Project Record Documents" for project record document requirements.
 - 2. Division 1, Section "Operation and Maintenance Data" for operating and maintenance manual requirements.
- C. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -46.

1.3 SUBSTANTIAL COMPLETION

- A. **Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. (List exceptions in the request).**
 - 1. Advise Owner/Agency of pending change-over requirements.
 - 2. Obtain and submit releases enabling the Owner/Agency unrestricted use of the Work and access to services and utilities.
 - 3. Submit record drawings, maintenance and operational manuals, and similar final record information.
 - 4. Deliver tools, spare parts, extra stock, and similar items, if any required in Divisions 2 through 16.
 - 5. Complete start-up testing of systems, and instruction of the Owner/Agency's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
 - 6. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Substantial Completion Inspection Procedures: On receipt by the IDPR Construction Manager of a written request from the Contractor for substantial completion inspection (punch list items),

the IDPR Construction Manager, Design Professional and Others as applicable will either proceed with inspection or advise the Contractor of unfilled requirements (paragraph A under 1.3 above). The IDPR Construction Manager will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The certificate of substantial completion will be issued when the project is substantially complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE TO MAKE FINAL PAYMENT

A. Procedures: Before requesting final inspection for certification of final acceptance and final payment the following must be completed. List exceptions in the request.

1. Submit the final payment request at the end of the final phase of work with required DPW releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit a certified copy of the Owner's substantial completion inspection list of items that were to be completed and corrected, stating that each item has been completed or otherwise resolved for acceptance.
3. Record Drawings must have been submitted to the IDPR Construction Manager and Design Professional and approved (paragraph A under 1.3, Item 3 above).
4. Maintenance and Operations manuals must have been submitted to the IDPR Construction Manager and Design Professional and approved (paragraph A under 1.3, Item 3 above).
5. Submit specific warranties, final certifications, and similar documents.
6. Any maintenance and operational training of Agency personnel must have been completed (paragraph A under 1.3, Item 3 above).
7. Consent of Surety (A.I.A. Form G707) Release of Claims (DPW Form following this Spec. Section) and Contractor's Affidavit of Payment of Debts and Claims (A.I.A. Form G706) must be executed by the contractor and submitted to the IDPR Construction Manager.
8. A final pay estimate must be submitted requesting 100% payment including retainage. The documents in item 7 must be attached to the Final Pay Request.
9. State of Idaho Tax Release. Request for Tax Release Form is included in the agreement and is to be submitted to the Idaho State Tax Commission. The Tax Release issued by the Tax Commission is to be submitted with Closeout Documents.

B. Final Inspection Procedure: The IDPR Construction Manager and Design Professional will reinspect the Work upon receipt of notice that the Work, including punch list items from earlier inspections, have been completed.

1. Upon completion of reinspection, the IDPR Construction Manager will prepare a letter of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner/Agency's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
 - 1. Maintenance manuals
 - 2. Record documents.
 - 3. Spare parts and materials (if any)
 - 4. Tools
 - 5. Lubricants
 - 6. Hazards
 - 7. Cleaning
 - 8. Warranties
 - 9. Maintenance and similar continuing commitments

3.2 FINAL ACCEPTANCE

- A. The Contractor is required to submit to the IDPR Construction Manager all required documents.
 - 1. The IDPR Construction Manager will not approve final payment until all items have been received, reviewed, and found to be acceptable and in compliance with the Contract Documents.

END OF SECTION 017000

SECTION 017810 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other Specification Sections apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes administrative provisions for Project Record Documents.
- B. Project Record Documents required include:
 - 1. Marked-up (red line corrected) copies of Contract Drawings.
 - 2. Marked-up (red line corrected) copies of Specifications, addenda, and Change Orders.
 - 3. Field records for variable and concealed conditions.
- C. Specific record copy requirements that expand requirements of this Section are included in the individual Sections of Divisions-2 through -46.
- D. General project closeout requirements are included in Division 1 Section "Project Closeout".
- E. Maintenance of Documents: Store record documents in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Always make documents available for inspection by the IDPR Construction Manager and Design Professional.

1.3 RECORD DRAWINGS

- A. Mark-up (red line corrected) Procedure: During the construction period, maintain a set of (1 copy) black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
 - 1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
 - a. Dimensional changes to the Drawings.
 - b. Revisions to details shown on the Drawings.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.

- g. Locations of concealed internal utilities.
 - h. Changes made by Change Order
 - i. Details not on original Contract Drawings.
 - 2. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 - 3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
 - 4. Mark important additional information which was either shown schematically or omitted from original Drawings.
 - 5. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.
 - 6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record Drawings.
 - a. Accurately record information in an understandable Drawing technique. Record drawings will be returned to the contractor to correct the information that is not understandable or not clearly annotated.
 - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
 - 7. At time of Substantial Completion, submit record Drawings to IDPR Construction Manager and Design Professional for Owner/Agency's records. Organize into sets, bind, and label sets for Owner/Agency's continued use.
- B. Copies and Distribution: After completing the preparation of record drawings bind each set with durable paper cover sheets, with appropriate identification, including titles, dates, and other information on cover sheets prior to submitting to IDPR Construction Manager for Owner/Agency's records.

1.4 RECORD SPECIFICATIONS

- A. During the construction period, maintain one (1) copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
- 1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to information on concealed installations that would be difficult to identify or measure and record later.
 - a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
 - b. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
 - 2. Upon completion of mark-up, submit record Specifications to the Design Professional for Owner/Agency's records.

- a. The Contractor for General Construction is responsible for submitting the complete set of record Specifications as specified.

1.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to other Specification Sections for miscellaneous record- keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records, and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the IDPR Construction Manager for the Owner/Agency's records.
 1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:
 - a. Locations and elevations of underground lines.
 - b. Certifications received in lieu of labels on bulk products.
 - c. Final inspection and correction procedures.
 - d. Inspections and certifications by governing authorities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The IDPR Construction Manager and Design Professional will periodically review record documents to assure compliance with this requirement.

END OF SECTION 017810

SECTION 017820 – OPERATIONS AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and other Specification Sections apply to this Section as applicable.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory
 - 2. Operation manuals for systems, subsystems, and equipment
 - 3. Maintenance manuals for the care and maintenance of systems and equipment
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Project Closeout" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 46 Sections for specific operation and maintenance manual requirements for products in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Initial Submittal: Submit (1) one draft copy of each manual at least (15) fifteen days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. IDPR Construction Manager and Design Professional will return (1 copy) of draft and mark whether general scope and content of manual are acceptable.
 - 1. Final Submittal: Submit (3) copies of each manual in final form prior to substantial completion inspection.

1.5 COORDINATION

- A. Where operation and maintenance documentation include information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATIONS AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents
 - 2. List of systems
 - 3. List of equipment
 - 4. Table of contents
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the Contract Documents.

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title Page
 - 2. Table of Contents
 - 3. Manual contents
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Project Number
 - 4. Name and address of Owner.
 - 5. Date of submittal
 - 6. Name, address, and telephone number of Contractor.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (115-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 - 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions
 - 2. Operating standards
 - 3. Operating procedures
 - 4. Wiring diagrams
 - 5. Piped system diagrams.
 - 6. Precautions against improper use
- B. Descriptions: Include the following:
 - 1. Product name and model number
 - 2. Manufacturer's name
 - 3. Equipment identification with serial number of each component
 - 4. Equipment function
 - 5. Operating characteristics
 - 6. Complete nomenclature and number of replacement parts
- C. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures
 - 2. Equipment or system break-in procedures
 - 3. Routine and normal operating instructions

4. Instructions on stopping.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number
 2. Manufacturer's name
 3. Color, pattern, and texture.
 4. Material and chemical composition
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and method of cleaning detrimental to product
 4. Schedule for routine cleaning and maintenance
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents".
- F. Comply with Division 1 Section "Project Closeout" for the schedule for submitting operation and maintenance documentation.

END OF SECTION 017820

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim, including non-fire-rated interior door frames.
2. Interior board paneling.
3. Shelving and clothes rods.

1.2 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.
- C. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber, mark grade stamp on end or back of each piece.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
- D. MDF: ANSI A208.2, Grade 130.
- E. Particleboard: ANSI A208.1, Grade M-2.

- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: White.

2.2 INTERIOR TRIM

- A. Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish):

1. Species and Grade:
 - a. Eastern white pine; NeLMA or NLGA Finish or 1 Common.
 - b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA C Select (Choice).
 - c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA C Select (Choice).
 - d. White woods; WWPA C Select.
2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
3. Finger Jointing: Allowed.
4. Face Surface: Surfaced (smooth).

- B. Lumber Trim for Opaque Finish (Painted Finish):

1. Species and Grade:
 - a. Eastern white pine; NeLMA or NLGA Finish or 1 Common.
 - b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA D Select (Quality).
 - c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA D Select (Quality).
 - d. White woods; WWPA D Select.
 - e. Species and Grade: Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPA Superior or C & Btr finish.
 - f. Spruce-pine-fir; NeLMA, NLGA, WCLIB, or WWPA 1 Common.
 - g. Alder, aspen, basswood, cottonwood, gum, magnolia, soft maple, sycamore, tupelo, or yellow poplar; NHLA A Finish.
2. Maximum Moisture Content for Softwoods: 15 percent with at least 85 percent of shipment at 12 percent or less.
3. Maximum Moisture Content for Hardwoods: 10 percent.
4. Finger Jointing: Allowed.
5. Face Surface: Surfaced (smooth).
6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

- C. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Softwood Moldings: MMPA WM 4, P grade.
 - a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
 - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 2. Hardwood Moldings: MMPA WM 4, P-grade.
 - a. Species: Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.
 - b. Maximum Moisture Content: 9 percent.
 3. Finger Jointing: Allowed.
 4. Optional Material: Primed MDF, PVC.
 5. Base Pattern: 9/16-by-5-1/4-inch.
 6. Shoe-Mold Pattern: 7/16-by-11/16-inch quarter-round shoe mold.
 7. Casing Pattern: 11/16-by-2-1/4-inch clamshell casing.
 8. Mull-Casing Pattern: 3/8-by-1-3/4-inch beaded-edge casing.
 9. Stop Pattern: 3/8-by-1-3/8-inch ranch stop.
 10. Chair-Rail Pattern: 11/16-by-3-inch chair rail.
- D. Closet Shelving and seating: Made from one of the following materials, 3/4 inch thick:
1. Particleboard with radiused and filled or solid-wood front edge.
 2. MDF with radiused or solid-wood front edge.
 3. MDO softwood plywood with solid-wood edge.
 4. Melamine-faced particleboard with radiused and filled front edge.
 5. Wood boards as specified above for hardwood lumber trim for transparent finish.
 6. Softwood Boards:
 - a. Kiln-dried eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA Finish or 1 Common (Colonial).
 - b. Kiln-dried Douglas fir-larch, Douglas fir south, or hem-fir; SPIB Superior or C & Btr finish; NLGA, WCLIB, or WWPA; or southern pine; B & B finish.
- E. Shelf Cleats: 3/4-by-5-1/2-inch boards with hole and notch to receive clothes rods, as specified above for shelving lumber trim for opaque finish.
- F. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.
- G. Shelf Brackets without Rod Support: BHMA A156.16, B04041; prime-painted formed steel.
- H. Standards for Adjustable Shelf Brackets: BHMA A156.9, B04102; powder-coat-finished steel.
- I. Adjustable Shelf Brackets: BHMA A156.9, B04112; powder-coat-finished steel.
- J. Standards for Adjustable Shelf Supports: BHMA A156.9, B04071; powder-coat-finished steel.
- K. Adjustable Shelf Supports: BHMA A156.9, B04081 or B04091; powder-coat-finished steel.
- L. Wood Clothes Rods: 1-1/2-inch- diameter, clear, kiln-dried hardwood.

- M. Wood Rod Flanges: Clear, kiln-dried, Douglas fir or southern pine turnings.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- C. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.
- D. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. Install to tolerance of **1/8 inch in 96 inches** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch** maximum offset for flush installation and **1/16-inch** maximum offset for reveal installation.
 - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.3 INSTALLATION OF STANDING AND RUNNING TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than **24 inches** long, except where necessary.
2. Stagger joints in adjacent and related standing and running trim.
3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
7. Install trim after gypsum-board joint finishing operations are completed.
8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
9. Fasten to prevent movement or warping.
10. Countersink fastener heads on exposed carpentry work and fill holes.

3.4 INSTALLATION OF SHELVING, SEATING AND CLOTHES RODS

- A. Cut shelf cleats at ends of shelves about **1/2 inch** less than width of shelves and sand exposed ends smooth.
 1. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled.
 2. Space fasteners not more than **16 inches** o.c. Use two fasteners at each framing member or fastener location for cleats **4 inches nominal** in width and wider.
 3. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing.
 4. Remove adhesive that is squeezed out after fastening shelf cleats in place.
- B. Install shelf brackets according to manufacturer's written instructions, spaced not more than **32 inches** o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
- C. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners not more than **12 inches** o.c.
- D. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than **36 inches** o.c. and within **6 inches** of ends of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
- E. Cut shelves and seating to neatly fit openings with only enough gap to allow shelves or seating to be removed and reinstalled.
 1. Install shelves, fully seated on cleats, brackets, and supports.
 2. Fasten shelves to cleats with finish nails or trim screws, set flush.
 3. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.
- F. Install rod flanges for rods as indicated.

1. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
2. Install rods in rod flanges.

END OF SECTION 062023

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Modified bituminous sheet waterproofing.
 - 2. Protection course.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
 - 1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet Waterproofing: Minimum **60-mil** nominal thickness, self-adhering sheet consisting of **56 mils** of rubberized asphalt laminated on one side to a **4-mil-** thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
1. Physical Properties:
 - a. Tensile Strength, Membrane: **250 psi** minimum; ASTM D412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at **minus 20 deg F**; ASTM D1970/D1970M.
 - d. Crack Cycling: Unaffected after 100 cycles of **1/8-inch** movement; ASTM C836/C836M.
 - e. Puncture Resistance: **40 lbf** minimum; ASTM E154/E154M.
 - f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at **70 deg F**; ASTM D570.
 - g. Water Vapor Permeance: **0.05 perm** maximum; ASTM E96/E96M, Water Method.
 - h. Hydrostatic-Head Resistance: **200 feet** minimum; ASTM D5385.
 2. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.2 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Metal Termination Bars: Aluminum bars, approximately **1 by 1/8 inch**, predrilled at **9-inch** centers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing applications.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

3.2 INSTALLATION OF MODIFIED BITUMINOUS SHEET-WATERPROOFING

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform **2-1/2-inch**- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between **25 and 40 deg F**, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than **60 deg F**.
- D. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.
- E. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- F. Seal edges of sheet-waterproofing terminations with mastic.
- G. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fish mouths and blisters. Patch with sheet waterproofing extending **6 inches** beyond repaired areas in all directions.
- I. Immediately install protection course with butted joints over waterproofing membrane.

3.3 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is

subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.

1.3 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

1. Sign, date, and post the certification in a conspicuous location on Project site.

B. Product test reports.

C. Research reports.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type IV ASTM C578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced.

1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
2. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Foil Faced: ASTM C665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
 - 1. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches (305 mm)** and wider in width.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of **24 inches (610 mm)** below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. If not otherwise indicated, extend insulation a minimum of **24 inches (610 mm)]** in from exterior walls.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.

- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain **3-inch (76-mm)** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For metal-framed wall cavities where cavity heights exceed **96 inches (2438 mm)**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 6. For wood-framed construction, install blankets according to ASTM C1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
 - 7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings and seal each continuous area of insulation to ensure airtight installation.
 - a. Exterior Walls: Set units with facing placed toward exterior of construction.
 - b. Interior Walls: Set units with facing placed toward areas of high humidity.
 - c. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 8. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately **2.5 lb/cu. ft. (40 kg/cu. m)**.
 - 9. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF CURTAIN-WALL INSULATION

- A. Install board insulation in curtain-wall construction according to curtain-wall manufacturer's written instructions.
 - 1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
 - 2. Install insulation to fit snugly without bowing.

END OF SECTION 072100

SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closed-cell spray polyurethane foam.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 1.5 lb/cu. ft. (24 kg/cu. m) and minimum aged R-value at 1-inch (25.4-mm) thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F (25 mm of 43 K x sq. m/W at 24 deg C).
 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.

- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer.
Do not spray into rising foam.

END OF SECTION 072119

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed roof-drainage sheet metal fabrications.
 - 2. Formed steep-slope roof sheet metal fabrications.
 - 3. Formed wall sheet metal fabrications.

1.2 ACTION SUBMITTALS

- A. Product Data: For each of the following
 - 1. Underlayment materials.
 - 2. Elastomeric sealant.
 - 3. Butyl sealant.
 - 4. Epoxy seam sealer.
- B. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
 - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - 4. Include details for forming, including profiles, shapes, seams, and dimensions.
 - 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 6. Include details of termination points and assemblies.
 - 7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 - 8. Include details of roof-penetration flashing.
 - 9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
 - 10. Include details of special conditions.
 - 11. Include details of connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long by actual width.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved.

- B. Evaluation Reports: For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.
- C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Special warranty.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.6 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.7 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, **G90 (Z275)** coating designation; prepainted by coil-coating process to comply with ASTM A755/A755M.
 - 1. Surface: Smooth, flat.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for seacoast and severe environments.
 - b. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for seacoast and severe environments.
 - c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than **0.2 mil (0.005 mm)** for primer and **0.8 mil (0.02 mm)** for topcoat.
 - 3. Color: To match roof color.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of **0.5 mil (0.013 mm)**.
- C. Lead Sheet: ASTM B749 lead sheet.

1.8 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over **220 deg F (111 deg C)**; and complying with physical requirements of ASTM D226/D226M for Type I and Type II felts.
- C. Self-Adhering, High-Temperature Sheet Underlayment: Minimum **30 mils (0.76 mm)** thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
 - 1. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus **20 deg F (29 deg C)** or lower.
- D. Slip Sheet: Rosin-sized building paper, **3 lb/100 sq. ft. (0.16 kg/sq. m)** minimum.

1.9 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Copper Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.
 - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 4. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
 - 5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
- E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

1.10 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of **1/4 inch in 20 feet (6 mm in 6 m)** on slope and location lines indicated on Drawings and within **1/8-inch (3-mm)** offset of adjoining faces and of alignment of matching profiles.
 - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams:
 - 1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
 - 3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

1.11 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend **4 inches (100 mm)** beyond wall openings. Form head and sill flashing with **2-inch- (50-mm-)** high, end dams. Fabricate from the following materials:
 - 1. Galvanized Steel: **0.022 inch (0.56 mm)** thick.
 - 2. Aluminum-Zinc Alloy-Coated Steel: **0.022 inch (0.56 mm)** thick.
- B. Wall Expansion-Joint Cover: Fabricate from the following materials:
 - 1. Galvanized Steel: **0.028 inch (0.71 mm)** thick.
 - 2. Aluminum-Zinc Alloy-Coated Steel: **0.028 inch (0.71 mm)** thick.

PART 2 - EXECUTION

2.1 INSTALLATION OF UNDERLAYMENT

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lap joints not less than **2 inches (50 mm)**.
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, in accordance with manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
 - 1. Lap horizontal joints not less than **4 inches (100 mm)**.
 - 2. Lap end joints not less than **12 inches (300 mm)**.
- C. Self-Adhering, High-Temperature Sheet Underlayment:
 - 1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
 - 2. Prime substrate if recommended by underlayment manufacturer.
 - 3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
 - 4. Apply in shingle fashion to shed water, with end laps of not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses.
 - 5. Overlap side edges not less than **3-1/2 inches (90 mm)**. Roll laps and edges with roller.
 - 6. Roll laps and edges with roller.
 - 7. Cover underlayment within 14 days.
- D. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lapp joints not less than **4 inches (100 mm)**.

2.2 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than **12 inches (300 mm)** o.c.
 6. Space individual cleats not more than **12 inches (300 mm)** apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of **10 feet (3 m)** with no joints within **24 inches (600 mm)** of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than **1-1/4 inches (32 mm)** for nails and not less than **3/4 inch (19 mm)** for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.

- a. Embed hooked flanges of joint members not less than **1 inch (25 mm)** into sealant.
- b. Form joints to completely conceal sealant.
- c. When ambient temperature at time of installation is between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way.
- d. Adjust setting proportionately for installation at higher ambient temperatures.

1) Do not install sealant-type joints at temperatures below **40 deg F (4 deg C)**.

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. Pretin edges of sheets with solder to width of **1-1/2 inches (38 mm)**; however, reduce pretinning where pretinned surface would show in completed Work.
2. Do not solder metallic-coated steel and aluminum sheet.
3. Do not pretin zinc-tin alloy-coated copper.
4. Do not use torches for soldering.
5. Heat surfaces to receive solder, and flow solder into joint.
 - a. Fill joint completely.
 - b. Completely remove flux and spatter from exposed surfaces.
6. Stainless Steel Soldering:
 - a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
 - b. Promptly remove acid-flux residue from metal after tinning and soldering.
 - c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
7. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

H. Rivets: Rivet joints in uncoated aluminum zinc where necessary for strength.

2.3 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered **3-inch (75-mm)** centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
 - a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at **16-inch (400-mm)** centers.
 - b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at **24-inch (600-mm)** centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of **4 inches (100 mm)** over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
2. Extend counterflashing **4 inches (100 mm)** over base flashing.
3. Lap counterflashing joints minimum of **4 inches (100 mm)**.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

2.4 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend **4 inches (100 mm)** beyond wall openings.

2.5 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of **1/4 inch in 20 feet (6 mm in 6 m)** on slope and location lines indicated on Drawings and within **1/8-inch (3-mm)** offset of adjoining faces and of alignment of matching profiles.

2.6 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

2.7 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Factory priming flush wood doors and frames.
 - 2. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 - 1. Door core materials and construction.
 - 2. Door edge construction
 - 3. Door face type and characteristics.
 - 4. Door trim for openings.
 - 5. Door frame construction.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 - 1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
 - 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 - 3. Details of frame for each frame type, including dimensions and profile.
 - 4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 5. Dimensions and locations of blocking for hardware attachment.
 - 6. Clearances and undercuts.
 - 7. Requirements for veneer matching.
 - 8. Apply Program label to Shop Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
 - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
 - 2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 - 3. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: Program certificates.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
 - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
- C. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
 - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS AND FRAMES, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with "Architectural Woodwork Standards."
 - 1. Provide labels and certificates from AWI certification program indicating that doors and frames comply with requirements of grades specified.
- B. Interior Doors, Solid-Core Five-Ply Veneer-Faced:
 - 1. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.
 - 2. Performance Grade by Location:
 - 3. Basis of Design: Jen-Weld
 - a. ANSI/WDMA I.S. 1A Standard Duty: Closets, Bedrooms, Bathrooms, Laundry Room.
 - 4. Architectural Woodwork Standards Grade: Premium.
 - 5. Faces: Single-ply wood veneer not less than 1/50 inch (0.508 mm) thick.
 - a. Species: Select white birch.
 - b. Cut: Per manufacturer.
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Center-balance match.

- e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

2.2 HOLLOW-CORE FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors, Hollow-Core Veneer-Faced:

1. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.
2. Architectural Woodwork Standards Grade: .
3. Species: Select white birch.
4. Cut: Rotary cut.
5. Match between Veneer Leaves: Book match.
6. Assembly of Veneer Leaves on Door Faces: Center-balance match.
7. Pair and Set Match: Provide for doors hung in same opening.
8. Exposed Vertical and Top Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
9. Construction: Standard hollow core.
10. Blocking: Provide wood blocking with minimum dimensions as follows:
 - a. 5-by-18-inch (125-by-460-mm) lock blocks.
 - b. 5-inch (125-mm) top- and bottom-rail blocking.
 - c. 10-inch (250-mm) top- and bottom-rail blocking.
 - d. 2-1/2-inch (64-mm) midrail blocking.
- 11.

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.
- D. Exterior Doors: Factory treat exterior doors with water repellent after fabrication has been completed but before factory priming finishing.
1. Flash top of out swinging doors with manufacturer's standard metal flashing.

2.4 FACTORY PRIMING

- A. Doors for Opaque Finish: Factory prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099123 "Interior Painting."

2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all four edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Factory finish doors that are indicated on Drawings to receive transparent finish.
- D. Factory finish doors where indicated in schedules or on Drawings as factory finished.
- E. Transparent Finish:
1. Architectural Woodwork Standards Grade: .
 2. Architectural Woodwork Standards System-5, Varnish, Conversion.
 3. Architectural Woodwork Standards System-9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
 4. Architectural Woodwork Standards System-10, UV Curable, Water Based.
 5. Architectural Woodwork Standards System-11, Polyurethane, Catalyzed.
 6. ANSI/WDMA I.S. 1A TR-4 Conversion Varnish.
 7. ANSI/WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
 8. ANSI/WDMA I.S. 1A TR-8 UV Cured Acrylated Polyester/Urethane.
 9. Staining: None required.
 10. Sheen: .
- F. Opaque Finish:
1. Architectural Woodwork Standards Grade: .
 2. Architectural Woodwork Standards System-5, Varnish, Conversion.
 3. Architectural Woodwork Standards System-9, UV Curable, Acrylated Epoxy, Polyester, or Urethane.

4. Architectural Woodwork Standards System-10, UV Curable, Water Based.
5. Architectural Woodwork Standards System-11, Polyurethane, Catalyzed.
6. ANSI/WDMA I.S. 1A OP-4 Conversion Varnish.
7. ANSI/WDMA I.S. 1A OP-6 Catalyzed Polyurethane.
8. Color: Match Wall colors.
9. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- B. Install frames level, plumb, true, and straight.
 1. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3.2 mm in 2400 mm)**.
 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 3. Install fire-rated doors and frames in accordance with NFPA 80.
 4. Install smoke- and draft-control doors in accordance with NFPA 105.
- C. Job-Fitted Doors:
 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 2. Machine doors for hardware.
 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 4. Clearances:
 - a. Provide **1/8 inch (3.2 mm)** at heads, jambs, and between pairs of doors.
 - b. Provide **1/8 inch (3.2 mm)** from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide **1/4 inch (6.4 mm)** from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 5. Bevel non-fire-rated doors **1/8 inch in 2 inches (3-1/2 degrees)** at lock and hinge edges.

6. Bevel fire-rated doors **1/8 inch in 2 inches** (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of access door and frame and for each finish specified.
- C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

1.4 ACCESS DOORS AND FRAMES

- A. Interior Flush GFRG Access Doors with Concealed Flanges, sizes as shown on plan:
 1. Description: Face of concealed-hinge door flush with frame, with concealed flange for gypsum board installation.
 2. Optional Features: .
 3. Locations: Wall and ceiling.
 4. Door Size: As shown on Plan.
 5. Door Type Concealed-hinge, square corner.
 6. Door and Frame Material: Unpainted glass-fiber-reinforced gypsum, with frames reinforced for hardware and fastenings.
 7. Latch and Lock: Cam latch, screwdriver operated.

1.5 MATERIALS

- A. Frame Anchors: Same material as door face.
- B. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

1.6 FABRICATION

- A. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- C. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.

1.7 FINISHES

- A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of **1 mil (0.025 mm)** for topcoat.
 - a. Color: Match ceiling and wall colors..

PART 2 - EXECUTION

2.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes vinyl-framed windows.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.

- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC.
 - 2. Minimum Performance Grade: 25.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.35 Btu/sq. ft. x h x deg F (2.0 W/sq. m x K).
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.30.
- E. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone for basic protection.

2.2 VINYL WINDOWS

- A. Operating Types: As indicated on Drawings.
- B. Basis of Design: Jen-Weld V-4500 Builder Grade
- C. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 1. Finish: Integral color, Bronze exterior, White interior.
 - 2. Gypsum Board Returns: Provide at interior face of frame.
- D. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
 - 1. Kind: Fully tempered where indicated on Drawings.
- E. Insulating-Glass Units: ASTM E2190.
 - 1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.
 - 2. Low-E Coating: Per manufacturer.
- F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- G. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.
 - 1. Exposed Hardware Color and Finish: As indicated by manufacturer's designations.
- H. Projected Window Hardware:
 - 1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.

- a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
- 2. Hinges: Manufacturer's standard type for sash weight and size indicated.
- 3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches (735 mm) tall and two arms on taller sashes.
- I. Hung Window Hardware:
 - 1. Counterbalancing Mechanism: AAMA 902.
 - 2. Locks and Latches: Operated from the inside only.
 - 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis.
- J. Horizontal-Sliding Window Hardware:
 - 1. Sill Cap/Track: Designed to comply with performance requirements indicated and to drain to the exterior.
 - 2. Locks and Latches: Operated from the inside only.
 - 3. Roller Assemblies: Low-friction design.
- K. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- L. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.3 ACCESSORIES

- A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.
 - 1. Quantity and Type: Per building elevations.
 - 2. Material: Manufacturer's standard.
 - 3. Pattern: As indicated on Drawings.
 - 4. Profile: As selected by Architect from manufacturer's full range.
 - 5. Color: As selected by Architect from manufacturer's full range.

2.4 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Half, outside for single-hung Half, outside for sliding sashes.
- B. Aluminum Frames: Complying with SMA 1004 or SMA 1201.

1. Finish for Interior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.
 2. Finish for Exterior Screens: Matching color and finish of cladding.
- C. Glass-Fiber Mesh Fabric: 18-by-14 (1.1-by-1.4-mm) or 18-by-16 (1.0-by-1.1-mm) mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
1. Mesh Color: Manufacturer's standard.

2.5 FABRICATION

- A. Fabricate vinyl windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze vinyl windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, compatible with window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units. Provide manufacturer's standard finish to match window units.
- E. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant reinforcement.
- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

- D. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
- E. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085313

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silvered flat glass mirrors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

A. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.

1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

- 1. Warranty Period: one years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Allen + Roth - Lowes

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C1503; manufactured using copper-free, low-lead mirror coating process.
- B. Safety Glazing Products: For film-backed mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors.
- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 - 1. Aluminum J-Channel Bottom and Side Trim: J-channels formed with front leg and back leg not less than **3/8 and 7/8 inch (9.5 and 22 mm)** in height, respectively, and a thickness of not less than **0.04 inch (1.0 mm)**.

2. Aluminum J-Channel Top Trim: J-channels formed with front leg and back leg not less than **5/8 and 1 inch (16 and 25 mm)** in height, respectively, and a thickness of not less than **0.04 inch (1.0 mm)**.
 3. Finish: Clear bright anodized.
- B. Mirror Bottom Clips: H beveled Frameless wall mirror.
 - C. Mirror Top Clips: H beveled Frameless wall mirror.
 - D. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.5 FABRICATION

- A. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.
- B. Mirror Edge Treatment: Beveled polished edge of width shown.
 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
- C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- B. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks **1/8 inch (3 mm)** thick by **4 inches (100 mm)** long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than **1/4 inch (6.4 mm)** wide by **3/8 inch (9.5 mm)** long at bottom channel.
 - 2. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of **1/8 inch (3 mm)** between back of mirrors and mounting surface.
- C. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 088300

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 1. Thickness: 1/2 inch
 2. Long Edges: Tapered
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 1. Thickness: 5/8 inch
 2. Long Edges: Tapered
- C. Gypsum Ceiling Board: ASTM C1396/C1396M.
 1. Thickness: 1/2 inch
 2. Long Edges: Tapered.

- D. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 1/2 inch regular type
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.3 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.

1. Core: 1/2 inch (12.7 mm), regular type.
2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.

- B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joint sand damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use compound.

- a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Tile Backing Panels:
- 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.6 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

2.7 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
 - 1. Texture: Spatter knock-down.

PART 3 - EXECUTION

3.1 INSTALLATION OF PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide ~~1/4-~~ to 1/2-inch-wide spaces at these locations and trim edges with edge

trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

3.2 FINISHING OF GYPSUM BOARD

- A. Prefill open joints and damaged surface areas.
- B. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- C. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: On all walls and ceilings that have texture applied.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- D. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.3 APPLICATION OF TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

3.4 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.
2. Finish coatings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of topcoat product.

1.3 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin-Williams

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another, and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

- B. Colors: As indicated on the exterior elevations.

2.3 PRIMERS

- A. Exterior, Latex Wood Primer: White, waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on exterior wood subject to extractive bleeding.
- B. Water-Based Bonding Primer: Pigmented, water-based-emulsion primer formulated for exterior use and to promote adhesion of subsequent specified coatings.

2.4 FINISH COATINGS

- A. Exterior Latex Paint, Low Sheen: Water-based, pigmented coating; formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as portland cement plaster, concrete, and primed wood.
 - 1. Gloss and Sheen Level: Manufacturer's standard low-sheen finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.
- B. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.

3.3 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Wood-Based Panel Substrates:
 - 1. Latex over Latex Primer System As shown on exterior elevations:
 - a. Prime Coat: Exterior, latex wood primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, low sheen.
 - 2. Latex over Alkyd Primer System As shown on exterior elevations:
 - a. Prime Coat: Exterior, alkyd/oil wood primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, low sheen.
 - 3. Alkyd System As shown on exterior elevations:
 - a. Prime Coat: Exterior, alkyd/oil wood primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior alkyd enamel, semigloss.
- B. Cementitious Composition Board Substrates: Siding, Trim, Panels As shown on exterior elevations.
 - 1. Latex System:
 - a. Prime Coat: Matching topcoat.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, low sheen.

2. Latex over Alkyd Primer System:
 - a. Prime Coat: Exterior, alkali-resistant, water-based primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, low sheen.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Primers.
 - 2. Water-based finish coatings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of topcoat product.
- C. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin-Williams
- B. Benjamin Moore

2.2 PAINT PRODUCTS, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

- B. Colors: Sherwin-Williams SW 7005 Pure White.

2.3 PRIMERS

- A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.
- B. Alkali-Resistant, Water-Based Primer: Water-based primer formulated for use on alkaline surfaces, such as plaster, vertical concrete, and masonry.
- C. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.
- D. Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on interior wood subject to extractive bleeding.

2.4 WATER-BASED FINISH COATS

- A. Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 - 1. Gloss and Sheen Level: Manufacturer's standard eggshell finish.
- B. Interior, Latex, Satin: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 - 1. Gloss and Sheen Level: Manufacturer's standard low-sheen finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- B. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

- C. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

- A. Finish Carpentry: Wood trim Doors Windows and Wood board paneling.
 - 1. Latex over Latex Primer System:
 - a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.
- B. Spray-Textured Ceiling Substrates:
 - 1. Latex System: Spray applied:
 - a. Prime Coat: Matching topcoat.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.
- C. Gypsum Board Substrates:
 - 1. Latex over Latex Sealer System:
 - a. Prime Coat: Interior latex primer sealer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.

END OF SECTION 099123

SECTION 123619 - WOOD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood countertops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For wood countertops.

1. Apply Program label to Shop Drawings.

C. Samples: For each shop-applied transparent finish and for each color and wood species specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For the following:

1. Composite wood products.
2. Adhesives.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Shop Certification: AWI's Quality Certification Program accredited participant.

B. Installer Qualifications: Fabricator of products.

1.5 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install wood countertops until building is enclosed, wet-work is complete, and HVAC system is operating

and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

- B. Environmental Limitations with Humidity Control: Do not deliver or install wood countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOOD COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood countertops indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that countertops comply with requirements of grades specified.
- B. Grade: Economy.
- C. Butcher-Block Countertops: For transparent finish. Fabricated from narrow strips of lumber glued together and arranged for random mix of color and grain.
 - 1. Wood Species: Baltic Birch.
 - 2. Strip Thickness: 1-1/2 inches (38 mm) minimum.
 - 3.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood countertop and quality grade specified unless otherwise indicated.
 - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches (75 mm) wide.
 - 2. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 - 1. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
 - 2. Particleboard: ANSI A208.1, Grade M-2.
 - 3. Softwood Plywood: DOC PS 1.

2.3 ACCESSORIES

- A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Outside Diameter: 1-1/4 inches (32-mm).
 - 2. Color: Brown,

2.4 FABRICATION

- A. Fabricate wood countertops to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
 - 2. Edges of Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.

2.5 SHOP FINISHING

- A. General: Finish wood countertops at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. Finish Materials: Use finish materials that comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Shop Priming: Shop apply the prime coat including backpriming, if any, for items specified to be field finished. Refer to Section 099300 "Staining and Transparent Finishing" for material and application requirements.
- D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood countertops, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of wood countertops. Apply two coats to end-grain surfaces.
- E. Transparent Finish:
 - 1. Grade: Economy.

2. Finish: System - 6, synthetic penetrating oil.
3. Washcoat for Closed-Grain Woods: Apply washcoat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Staining: None required.
5. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
6. Filled Finish for Open-Grain Woods: After staining, apply washcoat sealer and allow to dry. Apply paste wood filler and wipe off excess. Tint filler to match stained wood.
7. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter in accordance with ASTM D523.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Grade: Install wood countertops to comply with same grade as item to be installed.
- B. Assemble wood countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 1. Secure field joints in countertops with concealed clamping devices located within **6 inches (150 mm)** of front and back edges and at intervals not exceeding **24 inches (600 mm)**. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut wood countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a **1/8-inch-in-96-inches (3-mm-in-2400-mm)** variation from a straight, level plane.
 2. Seal joints between countertop and backsplash, and joints where countertop and backsplash abut walls with sealant specified in Section 079200 "Joint Sealants."
- F. Shop Finishes: Touch up finishing after installation of wood countertops.
 1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- G. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches (1220 mm)** o.c. Remove protection at Substantial Completion.

END OF SECTION 123619

SECTION 220000 - PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

A. General:

1. The Bidding Requirements, Contract Requirements, and the General Requirements (Division 01) of these specifications shall govern all parts of the work.

B. Work Included:

1. Install work in accordance with these specifications and the accompanying plans. Furnish all labor, material, and equipment together with all incidental items not specifically shown or specified which are required by good practice to provide the complete plumbing systems as described.

C. Coordination and Site Visits:

1. This section of the work requires examination of and reference to all architectural, structural, utility, and electrical drawings for construction conditions that may affect the work. Inspect the building site and existing facilities for verification of existing conditions. Base all measurements from established benchmarks. Any discrepancy between actual measurements and those indicated, which prevents following good practices or the intent of the drawings and specifications, shall be reported to the Architect/Engineer, and work halted until instructions are received from the Architect/Engineer.

1.2 CODES, PERMITS, FEES

- A. Install all work in accordance with applicable codes and standards. Obtain all required permits; pay all required fees including utility connections or extensions, in connection with this portion of the construction. Obtain all required certificates of inspection for the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Materials:

1. All materials and equipment shall be of first quality, new, full size and weight, standard in every respect, and suitable for the space required. Use the same manufacturer for products of similar class or service, such as valves and pumps. Protect all materials against loss, theft, or damage before and after installation.
2. Furnish and install all necessary foundations, supports, pads, bases, and piers required for all materials and equipment furnished under this contract.
3. Provide all required firestopping at piping penetrations of fire rated walls, floors, ceilings, and roofs. Firestopping shall be Dow Corning Fire Stop Sealant 2000 or Fire Stop Foam 2001, or approved equal.
4. Provide a heat-expanding fire collar for all non-metallic piping up to 6" size at penetrations of fire rated walls, floors, and ceilings per ASTM E 814.

B. Workmanship:

1. All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each subtrade. Work shall be installed to the satisfaction of the Architect/Engineer with unsatisfactory work removed and reinstalled to his satisfaction at no extra cost to the Owner.
2. Provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces. No structural members shall be cut without the approval of the Architect/Engineer. Provide all sleeves and inserts required before the floors and walls are built.

3. Locate all equipment that must be serviced in fully accessible positions. Provide clearance for removal of replacement parts and components, and with necessary couplings or flanges to remove the component for maintenance.

2.2 SUBMITTALS AND SUBSTITUTIONS

A. Prebid Approval:

1. Manufacturer's trade names and catalog numbers stated herein are intended to indicate the quality of equipment or materials desired. All manufacturers not specifically listed require prior approval. Submit catalog data, including specifications, of the proposed equipment to the Architect/Engineer for his approval at least 10 calendar days prior to bid opening. Notice of such approvals will be published in an addendum. Approval of listed alternate equipment manufacturers is for bidding only. Final approval is to be based on requirements of the plans and specifications.

B. Submittals:

1. Within thirty days after award of this contract, provide an electronic copy of a complete list of all materials and equipment proposed for this project. List shall contain make, type, manufacturer's name, and trade designation of all materials and equipment. Submittal shall also include manufacturer's complete specification for each item, including ratings, and dimensions as required to check space requirements. The scheduled equipment is the basis of design for physical size, etc. Alternate manufacturers shall not exceed the weight or physical size. Any changes to the Architectural, Structural and Mechanical systems due to alternate manufactures shall be the responsibility of the Contractor and Supplier. Submittals for fixtures, trim, and other plumbing related items, requiring submittals, shall be submitted in a single complete package. Individual items will not be reviewed independently unless approved by the Engineer.
2. Approval of submittals shall not relieve the contractor from responsibility for deviations from the plans or specifications, unless he has, in writing, called the Architect's /Engineer's attention to deviations at the time of submission, and obtained his written approval. Approval of submittals does not relieve the contractor from responsibility for errors in shop drawings or literature.

C. Equipment Requiring Submittals:

1. Plumbing Fixtures & Trim
2. Valves
3. Cast Iron Soil Piping
4. Pipe Stands

PART 3 - EXECUTION

3.1 ACCESSIBILITY & SAFETY

A. Accessibility:

1. All equipment which must be serviced or operated shall be located in fully accessible position. Minor changes from the drawings may be made to allow for better accessibility. All changes shall be approved prior to actual installation.
2. Access panels shall be provided if required for accessibility. Access panels to be steel, flanged, hinged doors by Cendrex, model AHD, or equal. Size as required for installation. Subcontractor shall furnish the required panels to the General Contractor and the required location for all access panels, unless otherwise specified in the Architectural specifications. Panels shall be installed by the General Contractor.

B. Safety:

1. No water piping shall run immediately over or within a 3-foot plan view clearance of any electrical panel or motor starter. Where piping must be located within these zones, install piping inside a conduit to prevent

water access to electrical equipment.

3.2 COORDINATION

- A. Coordinate all work with the various trades involved to provide a complete and satisfactory installation. The exact details of piping and equipment are not shown. No additional compensation will be made for offsets or relocation required in coordination with other trades.
- B. Alterations required due to improper supervision by the subcontractor shall be made at no extra cost, to the satisfaction of the Architect/Engineer.

3.3 EXCAVATION & BACKFILL

- A. Excavate trenches required for underground piping to proper elevation and grade. Provide trenches with solid bottoms to allow support of piping along entire length with excavation at bells as required for jointing and inspection. Provide repairing of finished surfaces, and all required shoring, bracing, pumping, and protection for safety of persons and property. Observe all Local or State Safety Codes. Verify that elevations of existing utilities will allow for proper grading of piping connecting to existing utilities.
- B. Excavation and Backfill shall be in accordance with the requirements of Division 31, of these specifications.

3.4 IDENTIFICATION AND CODING

- A. General:
 - 1. The Contractor shall use ASME 13 standards for all piping identifications, color coding, and compliance.
- B. Painting:
 - 1. All painting of equipment, accessories, and piping shall be furnished and applied under the Architectural section of these specifications. All painting shall be completed before any identification markings are applied.
- C. Piping:
 - 1. Identify all piping as to the service of the pipe and the direction of flow. The letters shall be 3/4 inch high on piping two inches or smaller, and 1-1/4 inches high on piping up to six inches. Flow arrows shall be at least six inches long. The letters and flow arrows shall be made by precut stencils and oil base paint, one inch high and black, or factory fabricated plastic pipe markers. Piping shall be identified at 25 foot maximum intervals, on long continuous lines; adjacent to each item of equipment; on each riser and junction, and on both sides of all wall penetrations. Underground piping shall be identified with bright colored continuously printed plastic tape of not less than 6" wide by 4 mil thick, manufactured for direct burial service. Install directly above all buried pipe, 6 to 8 inches below finished grade.
- D. Valves:
 - 1. Regardless of size, all valves shall be tagged with a numbered brass tag, 1-1/2 inches by 3 inches minimum in size and 0.051 inch thick. A valve chart indicating valve tag number, location, service, and normal position shall be mounted in a suitable framed and glassed cover in the main mechanical room or as directed. Valve chart shall be duplicated in the Maintenance and Operations Manual.

3.5 TESTING

- A. Piping:
 - 1. All plumbing piping (drainage, water, gas) shall be tested in accordance with the requirements of local adopted plumbing code, latest edition. Other piping systems shall be tested hydrostatically to 1.5 times

- the operating pressure but not less than 100 psi, for a minimum period of two hours. If the test pressure falls more than 5 percent during the test period, the leak shall be located, repaired, and the test repeated.
2. Piping shall be tested before insulation has been installed. Delicate control mechanisms shall be removed during tests to prevent shock damage. The use of chemicals or compounds to stop leaks shall not be permitted.
 3. A test report shall be submitted for each piping system test. Test report forms are part of Specifications Section 220100, or are available from the Engineer.

B. Systems:

1. All plumbing systems shall be tested at the completion of the building to establish that the systems operate as specified and required.

3.6 CLEANING AND ADJUSTING

- A. Thoroughly clean all parts of the system at the completion of the work. Flush all water circulating systems with fresh water and then drain. Clean all strainers and refill system. Adjust all devices for proper operation and lubricate all equipment as required. Repaint any painted surface that has been damaged.
- B. All potable water systems shall be flushed and disinfected after tests are completed. Disinfection shall be in accordance with local municipal and State Plumbing Inspector's criteria. In lieu of such criteria, the following procedure shall be followed for disinfection:
1. Completely flush system. Add alkali or acid (hydrochloric) to bring water ph level to between 7.4 and 7.6.
 2. Inject chlorine (liquid, powder, tablet, or gas) throughout the system to obtain 50 to 80 mg/L residual.
 3. Bleed water from outlets to ensure distribution, and test for residual at a minimum of 15 percent of the outlets.
 4. Maintain disinfection in system for 24 hours.
 5. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
 6. Flush disinfectant from system until residual is equal to that of incoming water, or 1.0 mg/L.
 7. Take samples no sooner than 24 hours after flushing, from 10 percent of the outlets and the incoming water.

3.7 PROJECT CLOSEOUT

- A. Operations & Maintenance Manual:
The Contractor shall provide an operations and maintenance manual at least thirty days prior to completion of work. The manual shall be of the three-ring binder type, entitled "Operations and Maintenance Manual", with the job name and year of completion also included. O & M manuals shall be submitted in a single package. Individual items will not be accepted independently unless approved by the Engineer. The manual shall include, as a minimum:
1. Maintenance instructions for all equipment, including lubrication requirements.
 2. Fixture suppliers names, addresses, and telephone numbers.
 3. Fixture catalog cuts, ratings tables, model numbers, serial numbers, and accessories.
 4. Parts numbers for all replaceable parts.
 5. Valve tagging chart as hereinbefore specified.
 6. Guarantee letter as specified below.
 7. Any additional information required to enable the Owner to properly maintain the building plumbing system.
 8. After approval of the Operations and Maintenance Manual by the Architect/Engineer, the Contractor shall furnish two copies of the manual to the Owner.
- B. As-Built-Drawings:

1. Provide two sets of red-line mechanical drawings showing the work as it was actually installed. The drawings shall indicate all departures from the contract drawings and shall locate all underground utility lines with dimensions from established building lines. Make all notations neat and legible, with red indelible pencil. At the completion of the work, these as-built drawings shall be signed and dated by the Plumbing Contractor and returned to the Architect/Engineer.

C. Guarantee:

1. All work furnished under this section shall be guaranteed in writing to be free from defective work or materials for a period of one year after acceptance of the contract. All repairs or replacements because of defective materials or workmanship or noncompliance with code shall be provided without additional cost to the Owner. Contractor shall furnish a letter indicating above guarantee with space for date of acceptance and expiration of guarantee. Letter shall be included in O & M Manual.

END OF SECTION 220000

SECTION 220100 - PLUMBING

PART 1 - GENERAL

1.1 SCOPE

- A. This section covers the work necessary for the plumbing system, complete. The Plumbing General Requirements, Section 220000, are to be included as a part of this section of the specifications.

1.2 CODES

- A. The plumbing system shall be installed in accordance with the requirements of local adopted plumbing code, latest edition, International Fuel Gas Code, latest edition; and all local and State Codes.

1.3 FIXTURES & EQUIPMENT

A. General:

- 1. Plumbing fixtures and equipment shall be as listed on the drawings. In addition to those specifically listed, the following manufacturers are approved for bidding only. All other manufacturers require prior approval. Final approval for installation is based on submittal data furnished:
 - a. Tank Type Water Closets: American Standard, Kohler, Mansfield, Sloan, Toto, & Zurn.
 - b. Flush Valve Water Closets: American Standard, Briggs, Kohler, Mansfield, Sloan & Zurn.
 - c. Urinals: American Standard, Briggs, Gerber, Kohler, Mansfield, Sloan, Toto & Zurn.
 - d. Vitreous China Sinks: American Standard, Crane, Kohler, Mansfield, Sloan, Toto, & Zurn.
 - e. Stainless Steel Sinks: Elkay, Just.
 - f. Faucets: American Standard, AMTC, Aquaspec, CHG Encore Saniguard, Chicago Faucets, Delta, Elkay, Gerber, Geberit, Kohler, Moen, T&S Brass, Symmons, Speakman, Sloan & Zurn.
 - g. Sensor Faucets: Chicago Faucets, Elkay, Mac Faucets, Symmons, Speakman, Sloan, & T & S Brass.
 - h. Valves and Trim: Brasscraft, Dearborn Brass, ProFlo, Sloan & T&S Brass.
 - i. Flush Valves: American Standard Selectronic, AMTC, Delta, Kohler, Moen (sensor-operated only) Sloan, & Zurn.
 - j. Carriers and Drainage Products: Jay R. Smith, Josam, MIFAB, Neenah Foundry, NDS, Sun Drainage, Wade, Watts, & Zurn.
 - k. Toilet Seats: American Standard, Beneke, Church, Kohler, Plumb Tech & Zurn.
 - l. Mixing Valves: Acorn Controls, Lawler, Leonard, Powers, Stingray, Symmons, Watts, & Wilkins.
 - m. Fiberglass/ Acrylic Fixtures: Aquatic, Aquaglass, Best Bath, Fiat, Intersan, MAXX, Mustee Praxis-Comfort Designs, & Swan.
 - n. Drinking Fountains/ Electric Water Coolers: Elkay, Halsey Taylor, Haws, Murdock Stern Williams, & Sunroc.
 - o. Safety Fixtures & Safety Mixing Valves: Acorn, Bradley, Chicago Faucets, Encon, Guardian, Haws, Lawler, Speakman, Speakman, Stingray.
 - p. Security Fixtures: Acorn, Bradley, Willoughby.
 - q. Wash Fountains: Acorn, Bradley, Intersan, Sloan, & Willoughby.
 - r. Service Sinks: Acorn, Fiat, Mustee, Proflo, Stern Williams, & Zurn.
 - s. Water Heaters (Tank): American, A.O. Smith, Bock, Bradford-White, Heat Transfer-Phoenix, Lochinvar Shield, PVI, & Rheem.
 - t. Water Heaters (Instantaneous - Gas): A.O. Smith, Bradford-White, Lochinvar, Rheem, & Rinnai.
 - u. Water Heaters (Instantaneous - Electric): Bradford-White, EcMax, Chronomite, & Rheem.
 - v. System Valves: Apollo, Nebco & Red-White Valve Corp.
 - w. Backflow Preventers: Conbraco/Apollo, Watts, & Wilkins.

- x. Hose Bibbs: Josam, J.R. Smith, Prier, Woodford, & Zurn.
- y. Trench Drains: ABT, ACO, Dura Trench, J.R. Smith, NDS, Strongwell Polycast, Rapid, Wade, & Zurn.
- z. Utility Sinks: Fiat, Mustee, & Proflo.
- 2. Plumbing Fixture Standards:
All plumbing fixtures shall meet or exceed the following standards:
 - a. ANSI A112.6.1 - Supports for Off-the Floor Plumbing Fixtures for Public Use.
 - b. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
 - c. ANSI A112.19.1 - Enameled Cast Iron Plumbing Fixtures.
 - d. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.
 - e. ANSI A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
 - f. ANSI A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.
 - g. ANSI A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.
 - h. ANSI Z124.1 - Gel-Coated Glass-Fiber Reinforced Polyester Resin Bathtub Units.
 - i. ANSI Z124.2 - Gel-Coated Glass-Fiber Reinforced Polyester Resin Shower Receptor and Shower Stall Units.
 - j. ANSI Z358.1 - Emergency Eye Wash and Shower Equipment.
 - k. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers.
 - l. AWSI/ASSE 1001 – Atmospheric Vacuum Breaker
 - m. ANSI/ASSE 1012 - Backflow Preventers with Immediate Atmospheric Vent.
 - n. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.
 - o. ANSI/ASSE 1013 - Backflow Preventers, Reduced Pressure Principle.
 - p. ANSI/ASSE 1015 – Backflow Preventers, Double Check Principle
 - q. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
 - r. AWSI/ASSE 1020 – Pressure Vacuum Breaker
 - s. AWSI/ASSE – 1-52 – Hose Connection, Double Check
 - t. ANSI A112.21.1 - Floor Drains.
 - u. ANSI A112.21.2 - Roof Drains.
 - v. ANSI A112.26.1 - Water Hammer Arresters.
 - w. PDI WH-201 - Water Hammer Arresters.
 - x. ANSI/AWWA C606 – Grooved and Shouldered Joints
 - y. NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES & TRIM

- A. All plumbing fixtures shall be provided complete with all required trim for a complete and operational system. All piping penetrations through finished walls shall be provided with chrome escutcheons. All plumbing fixtures shall be caulked and sealed to surrounding surfaces. All sink traps shall be provided with a cleanout plug in the bottom of the trap. All interior exposed pipe, valves, and fixture trim shall be chrome plated, including kitchen compartment sinks. Braided stainless steel pipe risers are approved for concealed locations only, such as behind casework doors or lav shields. Each fixture shall be provided with stop valves and the stop valves shall be quarter-turn brass ball type. All fixtures and trim must be lead free. All floor drains and floor sinks shall be provided with trap primers (PPP, Zurn or Wade as needed for appropriate use. Provide ball valve type shut-off valve upstream of all trap primer valves).

2.2 PIPING AND FITTINGS

- A. General:
 - 1. Underground sanitary sewer and storm drain lines shall be installed at 1/4" per foot slope, unless otherwise indicated. If such slope is not possible due to existing inverts, approval shall be obtained from the Architect/Engineer and the authority having jurisdiction before any piping is installed at a lesser slope.

2. Connections between piping of dissimilar materials shall be made with dielectric waterway fittings or unions.
3. Provide standard manufactured water hammer arresters at all flush valves. Size and locate per manufacturers recommendations. Provide access panels for access to all water hammer arresters.

B. Domestic & Non-Potable Hot and Cold Water:

1. Contractor option #1: Piping inside building above slab or above grade in crawl space shall be ASTM B88, Type "L", hard drawn copper. Fittings shall be ANSI/ASME B16.22 cast brass, or ANSI/ASME B16.29 wrought copper. Joints shall be ANSI/ASTM B32 solder, Grade 95-5, lead free.
 - a. Cold Water Only Option- ANSI/ASME B16.18 cast bronze, or ANSI/ASME B16.22 wrought copper. Joints shall be copper-tube dimensioned grooved joint couplings, and Flush Seal style gasket. (Gasket shall be UL classified in accordance with ANSI/NSF-61 for potable water service.) Victaulic Style 606, Gruvlok style 6400, Grinnell Universal Tongue and Groove 672, Shurjoint C305, or equal.
2. Contractor option #2: PEX Piping: Potable hot and cold water distribution system, using cross-linked polyethylene tubing and ASTM F1960 cold expansion fittings.
3. References
 - a. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - b. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - c. ASTM E814 Standard Test for Fire Tests of Through-Penetrations Fire Stops.
 - d. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing.
 - e. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Hot and Cold Water Distribution Systems.
 - f. ASTM F1960 Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing.
4. Tubing:
 - a. Standard Grade hydrostatic design and pressure ratings from PPI.
 - b. Minimum Bend Radius (cold bending): No less than 6 times the outside diameter. Bends with a radius less than stated shall require the use of a bend support as supplied by the PEX tubing manufacturer.
 - c. Nominal Inside Diameter: Provide tubing with nominal inside diameter, in accordance with ASTM F876 as indicated.
 - 1) 3/8 inch (9.53 mm)
 - 2) 1/2 inch (12.7 mm)
 - 3) 3/4 inch (19.05 mm)
 - 4) 1 inch (25.4 mm)
 - 5) 1 1/4 inch (31.75 mm)
 - 6) 1 1/2 inch (38.1 mm)
 - d. Material: Cross-linked polyethylene (PEX) manufactured by PEX-A or Engel method.
5. Manifolds:
 - a. At contractors option - see plans for detailed manifold requirements.
6. Accessories:
 - a. Angle stops and straight stops that are compatible with PEX tubing shall be supplied by the PEX tubing manufacturer.
 - b. Bend supports designed for maintaining tight radius bends shall be supplied by the PEX tubing manufacturer.
 - c. Clips and/or PEX rails for supporting tubing runs shall be provided by the tubing manufacturer.
7. Installation:
 - a. Install in accordance with the tubing manufacturer's recommendations and as indicated in the installation handbook.
 - b. Do not install PEX tubing within 6 inches (152 mm) of gas appliance vents or within 12 inches (305 mm) of any recessed light fixtures.
 - c. Do not solder within 18 inches (457 mm) of PEX tubing in the same waterline. Make sweat connections prior to making PEX connections.

- d. Do not expose PEX tubing to direct sunlight for more than 30 days.
 - e. Ensure that no glues, solvents, sealants or chemicals come in contact with the tubing without prior permission from the tubing manufacturer.
 - f. PEX tubing passing through metal studs shall use grommets or sleeves at the penetration.
 - g. Protect PEX tubing with sleeves where abrasion may occur.
 - h. Use strike protectors where PEX tubing penetrates a stud or joist and has the potential for being struck with a screw or nail.
 - i. No PEX piping is allowed within 18 inches of a water heater.
 - j. Tubing manufacturer supplied bend supports shall be used where bends are less than six times the outside pipe diameter.
 - k. Tubing shall be supported to structural members with minimum horizontal supports not less than 32 inches between hangers, using support methods required by local plumbing codes and the installation handbook.
 - l. Pressurize PEX piping with air in accordance with applicable codes or in the absence of applicable codes to a pressure of 25 psi (173 kPa) above normal working pressure of the system.
 - m. Comply with safety precautions when pressure testing, including use of compressed air, where applicable. Water shall not be used to pressurize the system if ambient air temperature has the possibility of dropping below 32 degrees F (0 degrees C).
 - n. PEX piping shall be installed in concealed locations only.
8. Through Penetration Firestop:
- a. Ensure 1 and 2-hour rated through penetration assemblies have been tested in accordance with ASTM E814.
 - b. List of manufacturers that list PEX tubing with their firestop systems is available from the PEX tubing manufacturer.
9. Approved Manufacturers:
- a. Uponor Wirsbo
 - d. HeatLink
 - e. REHAU RaupeX
 - f. or approved equal
10. Warranty:
- a. Manufacture's Warranty covers the repair or replacement of any tubing or fittings proven defective.
 - b. Warranty may transfer to subsequent owners.
 - c. Warranty Period for PEX Tubing: 30 year, non pro-rated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factory-trained contractor.
 - d. Warranty Period for Manifolds and Fittings: 5-year, non pro-rated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factory trained contractor.
 - e. Warranty Period for Controls and Electrical Components: 2-year, non pro-rated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion when installed by a factor-trained contractor.
 - f. If a factory-trained contractor does not install the system, then the most recent limited warranty published by the PEX tubing manufacture takes precedence.
11. Piping underground within 5 feet of the building line, smaller than 4 inches, shall be ASTM B88, Type "K", hard drawn copper. Piping below floor slab, smaller than 4 inches, shall be type "K", soft annealed copper. Fittings shall be ANSI/ASME B16.29 wrought copper. Joints shall be ANSI/ASTM B32 solder, Grade 95-5, lead free. No joints shall be installed beneath concrete floor slabs, unless approved by the Engineer. Underground or underslab copper piping shall be provided with a polyethylene jacket, ANSI/AWWA C105, or shall be wrapped with double layer, half-lapped, 10 mil polyethylene tape.
- a. Underground (below slab) Piping Option- ½" to 4", High Density Polyethylene (HDPE) pressure pipe. ASTM D3350, ASTM D3035 & ASTM F714. AWWA C901 & AWWAC906, NSF. Fittings shall be HDPE, solvent weld. Piping shall be rated for not less than 150 psig.
 - b. Trap Primer Piping (below floor or concealed only) –
 - 1) ½" Wirsbo Aquapex Tubing or equal.
12. Piping underground beyond 5 feet from building line shall be Schedule 40 PVC, ASTM D1785 or D2241.

Fittings shall be PVC, ANSI/ASTM D2466. Joints shall be solvent weld, ASTM D2855, or gasketed, ASTM F477. Piping shall be rated for not less than 150 psig pressure.

C. Sanitary Sewer and Vent:

1. Sanitary Sewer and all vent piping and fittings shall be Schedule 40 PVC-DWV (cellular core), per ASTM F1488 and ASTM F891, solvent welded per solvent manufacturer's instructions, or ABS Schedule 40 piping and fittings per either ASTM D2661 or ASTM F628 with solvent cement conforming to ASTM D2235. All sewer risers (2 story or more) shall be service weight cast iron, no-hub or single-hub, ASTM A74. All piping penetrations through fire rated walls, floors, or ceilings, and all piping located above ceilings used as return air plenums shall also be cast iron or galvanized steel, ASTM A53. Underground PVC-DWV piping shall be installed per ASTM D-2321.
2. Piping and fittings beyond 5 feet from the building line shall be PVC, ASTM D3033 or D3034, SDR 35. Joints shall be ASTM F477 with elastomeric gaskets. Underground piping shall be installed per ASTM D-2321.
3. All 90 degree waste line elbows shall be formed per the latest issue of the adopted plumbing code, latest edition.
4. All exposed vent piping located in occupied areas or rooms, is to be cast iron with cast iron fittings.
5. All flush valve fixtures that are installed back to back shall have offset waste outlet fittings.
6. Cleanouts shall be provided at each horizontal drainage pipe, at its upper terminal, and each run of piping which is more than 100 feet and shall be provided for each 100 feet developed length, or fraction thereof of such piping. An additional cleanout shall be provided for each aggregate horizontal change of direction exceeding one hundred and thirty-five degrees, per applicable plumbing code. This shall be provided regardless of what is shown on the drawings.
7. All floor drains, floor sinks, and hub drains shall be installed with a trap primer.
 - a. Flush Valve Primer: Trap primer shall be Precision plumbing products model FVP-1VB with vacuum breaker.
 - b. Pressure Activated Primer: Trap primer shall be Precision Plumbing products Model CPO-500 with DU distribution unit if required.
 - c. Tail Piece Primer: Trap primer shall be Precision Plumbing Products Model LTP-1500 with ½" clear poly flexible priming make up water line and chrome plated escutcheons plates.
8. All vent's through roof (VTR'S) shall be extended at least 1 foot above the roof surface, or to the top of the closest adjacent parapet wall, whichever is greater.

D. Storm Drains:

1. Storm and overflow drain piping vertically through the living spaces shall be cast iron CISPI 301, ASTM A888 hubless with cast iron fittings. Joints shall be neoprene gaskets and stainless steel clamp-and-shield assemblies, and shall conform to CISPI 310, ASTM C 1277, FM 1680, & IGC-237. Heavy duty couplings shall conform to ASTM C 1540. Pipe and fittings shall be manufactured by AB&I, Charlotte, Tyler, or receive prior approval.
2. Storm and overflow drain piping below slab or in areas outside the living units shall be Schedule 40 PVC-DWV (cellular core), per ASTM F1488 and ASTM F891, solvent welded per manufacturer's instructions, or ABS Schedule 40 piping and fittings per either ASTM D2661 or ASTM F628 with solvent cement conforming to ASTM D2235. All piping located above ceilings used as return air plenums, and all piping penetrations through fire rated walls, floors, or ceilings shall be service weight cast iron, ASTM888 no-hub or single hub, ASTM A74. Underground piping shall be installed per ASTM D-2321.
3. Piping underground beyond 5 feet from the building line shall be PVC, ASTM D3033 or D3034, SDR 35, with PVC fittings. Joints shall be ASTM F477 with elastomeric gaskets. Underground piping shall be installed per ASTM D-2321.
4. Cleanouts shall be provided at each horizontal drainage pipe, at its upper terminal, and each run of piping 2" size which is more than 50 feet and shall be provided for each 50 feet developed length. 4" size or larger which is more than 100 feet developed length, or fraction thereof of such piping. Contractor shall coordinate with architect as to exact location of all storm water cleanouts as they exit the building, as

cleanouts may need to be positioned within certain block elevations. An additional cleanout shall be provided for each aggregate horizontal change of direction exceeding one hundred and thirty-five degrees, per applicable plumbing code. This shall be provided regardless of what is shown on the drawings. Final determination of cleanout spacing shall be per local jurisdiction and code requirements and shall be installed accordingly.

E. Natural Gas:

1. Piping shall be Schedule 40 black steel pipe, ASTM A53. Exposed fittings 2 inches and smaller shall be ANSI/ASME B16.3, screwed, black malleable iron.
2. Fittings larger than 2 inches and all underground fittings shall be Schedule 40 steel butt-welded type. Underground piping shall be provided with a polyethylene jacket, ANSI/AWWA C105, or shall be wrapped with double layer, half-lapped, 10 mil polyethylene tape.
 - a. Contractors Option for Underground Pipe:
 - 1) Gastite Type PE flexible corrugated gas piping. NFPA-54 & 56. ASTM D2513 Category 1. ASME D-B31.8-1995.
 - 2) Piping and fittings underground and outside the building line may be JM Eagle UAC 2000 MDPE, medium-density polyethylene yellow gas pipe or an approved equal. Piping shall be installed in accordance with JM Eagle Publication JME-12B, "Polyethylene Yellow Gas Distribution Installation Guide." JM Eagle's UAC 2000 system can be joined by butt heat fusion, socket fusion, or saddle fusion. Installing contractor shall be licensed for fusion pipe installation of polyethylene pipe. ASTM D2513.
3. All exterior piping exposed to the weather shall be coated with a rust inhibitor – Rustoleum #866 Pro-Guard Primer – yellow or gray color – or approved equal.

F. Condensate Drain Piping:

1. Exterior to building (connected to roof mounted equipment): Piping shall be Schedule 40 PVC. A union shall be installed directly at the roof top equipment for ease of replacement in the future.
2. Interior: Piping shall be Type L hard drawn copper, ASTM B88, with solder joints, grade 95TA, or may be Schedule 40 PVC. Copper piping shall not be used on 90% condensing type equipment. Provide a neoprene or rubber gasket at all copper piping support hangers to inhibit corrosion.
 - a. Inside Mechanical Rooms: Piping shall be Type L hard drawn copper, ASTM B88, with solder joints, grade 95TA, for durability reasons.

G. Hanger and Supports:

1. Pipe hangers shall be provided to adequately support all piping systems. Hangers shall be vertically adjustable to provide for proper pitch and drainage. Hangers shall allow for expansion and contraction of the piping system. Reference "General Regulations" of the latest edition of the adopted plumbing code, latest edition.
2. Hangers for pipe sizes 1/2 to 6 inches shall be adjustable clevis type, or unistrut saddles with all-thread hanger rod.
3. Hangers for hot pipe, sizes 6 inches and over shall be adjustable steel yoke, cast iron roll, double hanger type.
4. Vertical pipes shall be supported with steel riser clamps. Spacing interval requirements per "General Regulations" of the latest edition of the adopted plumbing code, latest edition.
5. All insulated piping shall be provided with minimum 18 gauge galvanized insulation shields, 12 inches long, and oversized hangers. Pipe sizes 2 inches and over shall also be provided with 12 inch long calcium silicate insulating blocks between the piping and the galvanized insulation shield.
 - a. Alternate: Insulated pipe support inserts may be provided at hanger, support, and guide locations on piping requiring insulation. The insert should consist of either Hydrous Calcium Silicate or Polyisocyanurate Foam insulation (Urethane) encircling the entire circumference of the pipe with a 360 deg. PVC (1.524 mm thick) or galvanized steel jacket and installed during the installation of the piping system. These insulated pipe support inserts shall be provided by the Mechanical

Contractor and installed by the same during pipe support installation.

6. Hanger rod sizing and spacing for pipe shall be as follows:

Pipe Size	Minimum Rod Diameter	Maximum Spacing
To 1-1/4 inches	3/8 inch	6.5 feet
To 2 inches	3/8 inch	10 feet
To 3 inches	1/2 inch	10 feet
To 6 inches	5/8 inch	10 feet
8 to 12 inches	7/8 inch	12 feet
PVC & ABS (all sizes)	3/8 inch	4 feet
Cast Iron No-Hub	5/8 inch	5 feet and at joints

7. Provide hangers within 12 inches of each horizontal elbow.
8. Provide hangers with minimum 1-1/2 inches vertical adjustment.

2.2 INSULATION

A. General:

1. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
2. Fire-Test-Response Characteristics: Insulation and related materials NFPA 255, UL Classified per UL 723 or meeting ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement containers, with appropriate markings of applicable testing and inspecting agency.
 - a. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - b. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

B. Piping:

1. All domestic, potable hot water lines and rain drains shall be insulated with preformed insulation.
 - a. Fiberglass insulation with a vapor barrier jacket. Insulation shall have a conductivity not exceeding 0.28 Btu-inch/hour-sq. ft.-degrees F. Laps and butt joints shall be sealed with pressure sensitive joint sealing tape of the same finish as the insulation jacket to provide a continuous vapor seal. Fittings and valves shall be insulated with PVC fitting covers and fiberglass insulation inserts, or with hydraulic setting insulating cement and four ounce canvass jacket with vapor barrier adhesive.
 - b. Alternate material for Cross-Linked Polyethylene Tubing (PEX): One piece preformed flexible elastomeric closed cell foam with built-in vapor barrier. Seal laps and butt joints with moisture resistant adhesive to provide a continuous vapor seal. Insulation shall have a conductivity rating not exceeding 0.27 Btu-inch/hour-sq. ft.-°F.

Insulation thicknesses shall be as follows:

<u>System</u>	<u>Pipe Sizes 1/2" and above</u>
Domestic Hot Water & Recirc. (pot. & non-pot.)	1"
Roof Drain Piping	1/2"
Overflow Drain Piping	1/2"
2. Roof and overflow drain sumps shall be insulated with 1/2" thick fiberglass with a vapor barrier, extending	

- 2" onto adjacent insulation.
- 3. Insulation shall be installed in strict accordance with manufacturer's instructions.
- 4. Insulation shall be continuous through penetrations.
- 5. All insulation shall be installed in a neat and workmanlike manner.

2.3 VALVES & STRAINERS

A. Ball Valves:

- 1. Valves 2-inches and smaller shall be lead free cast bronze body, chrome-plated brass ball, teflon seats, and lever handle, 600 psi CWP. Valves shall comply with MSS SP-110, NSF/ANSI 61, NSF/ANSI 372 Lead Free. Valves over 2-inches shall be cast steel body, chrome plated steel ball, teflon seats, and lever handle. Victaulic, Anvil Gruvlok, Grinnell, or Shurjoint ball valves are acceptable if grooved piping is used. Valves mounted higher than 7'-0" A.F.F. shall be provided with chain, wheel, and guides. Basis of design: Apollo #77CLF-A Series or equal.

B. Check Valves:

- 1. Valves 2-inches and smaller shall be bronze body Y-pattern, ASTM B-62, swing check, bronze disc, 200 psi WOG. Valves shall comply with MSS SP-80, NSF/ANSI 61-8 F&G, NSF/ANSI 372 Lead Free. Valves, over 2-inches shall be iron body, ASTM A-126, bronze trim, swing check, renewable disc and seat. Valves shall comply with MSS SP-71. Victaulic, Anvil Gruvlok, Grinnell, or Shurlock check valves are acceptable if grooved piping is used. Basis of design: Apollo # 161T-LF/161S-LF Lead Free Bronze, Apollo # 920F-LF Lead Free Cast Iron, or equal.
- 2. Swing check valves with outside lever and spring (not center guided) is to be used on sewage ejector or storm-water sump pumps. Basis of design: Apollo # 910FLW-LF Lead Free Cast Iron or equal.

C. Pressure Reducing Valves:

- 1. Valves 2-inches and smaller shall be bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, and single union end. Basis of design: Apollo # 36ELF Series Lead Free Bronze or equal.

D. Balance Valve:

- 1. Valve shall have a twin tube 316 S.S. design with blowout proof attachment to station body. Ports shall include 3/4" port for thermometer, 1/4" port for pressure gauge, air vent, and 1/2" drain port.
- 2. The instrument station shall be 120/150-flanged construction.
- 3. The butterfly valve shall be lug pattern with a rating of 200 WP, 250 deg. F. The valve shall have an infinite. Position operator with memory stop (6" and smaller), worm gear with memory stop (8" and larger).

E. Y-Pattern Strainers:

- 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
- 2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
- 3. Strainer Screen: 40-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
- 4. CWP Rating: 125 psig (862 kPa).

- F. Install strainers on inlet side of each control valve, pressure-reducing valve, solenoid valve, inline pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blow-off connection for strainers smaller than NPS (DN50).

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General:

1. Install all piping, fixtures, equipment, and accessories as shown, and in strict accordance with the plumbing laws, rules, and regulations of the State and/or City. All work shall be done in a neat and orderly fashion and left in a condition satisfactory to the Architect/Engineer.

B. Piping:

1. All piping shall be run parallel or perpendicular to established building lines. Install piping so as to allow for expansion. Waste and vent piping occurring above floor slab shall be installed true and plumb. Extend vents at least 1 foot above roof, or to the top of the closest adjacent parapet wall, whichever is greater, and provide watertight flashing sleeves. Excavation and backfill shall be in accordance with Section 220000 of these specifications.

C. Fixtures:

1. Install fixtures true and plumb with building walls. Caulk all plumbing fixtures at joints along walls, countertops, and other intersecting surfaces. Locate fixtures as shown and per manufacturer's instructions. Furnish all required trim for fixtures to provide a complete and workable installation.

3.2 TESTS

A. General:

1. All piping, fixtures, and equipment shall be inspected and approved before concealing or covering. All work shall be tested as required by Section 220000 of these specifications and shall be leak proof before inspection is requested. All tests shall be repeated if required by those making the inspection.
2. All potable water systems shall be flushed and disinfected in accordance with Section 220000 of these specifications. Following disinfection, system shall be flushed and water sampled to show compliance with requirements of public health authority having jurisdiction. If tested water does not meet requirements, disinfecting shall be repeated until water quality meets requirements.
3. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gasket shall be molded and produced by Victaulic Company, Gruvlok, or Grinnell Mechanical Products, or equal. Verify gasket grade is suitable for the intended service. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel the use of grooving tools, application of groove, and installation of grooved end products.
 - a. All grooved joint couplings, fittings, valves and specialties shall be the products of Victaulic Company, Gruvlok, Grinnell Mechanical Products, or equal.
4. Install the grooved piping in accordance with the latest recommendations as published by the manufacturer. Pipe shall be square cut, $\pm 0.30"$, properly deburred and cleaned. Mark pipe ends at the required location using a gauge supplied by the manufacturer to ensure full insertion into the coupling or fitting during assembly. Use a manufacturer's tool with the proper sized jaw for pressing.

B. Fixtures and Equipment:

1. Fill all plumbing fixtures with water and check for leaks or retarded flow. Repair as required. Adjust each piece of plumbing equipment as required to ensure proper functioning. Leave all fixtures and equipment in first class operating condition.
2. The Plumbing Contractor is responsible for all backflow devices to be inspected by a certified backflow technician before use of the building potable water system.

C. Smoke Test:

1. A smoke test shall be performed on the entire waste and vent system before building occupancy. After all fixtures are permanently connected and traps are filled with water, fill entire drainage systems with smoke under pressure of 1.3 pKa (1 inch of water) with a smoke machine. If leaks are detected, they shall be repaired and the smoke test shall be performed again until no leaks are found.
2. At contractors option a pressure test of the system can be performed.

MUSGROVE ENGINEERING
234 S. Whisperwood Way
Boise, Idaho 83709
E-mail: musgrove@musgrovepa.com
Phone: (208) 384-0765

PIPING SYSTEM TEST REPORT

STRUCTURE/BUILDING: _____ TEST NUMBER: _____

LOCATION: _____ CONTRACT NO. _____

DESCRIPTION OF SYSTEM/PIPING BEING TESTED: _____

Description of Test Performed	Test Pressure	Test Duration	Pass/Fail
Hydrostatic: _____	P.S.I.	_____	_____
Inert Gas: _____	P.S.I.	_____	_____
Compressed Air: _____	P.S.I.	_____	_____
Waste & Vent Smoke Test: _____	1" Water Column	_____	_____

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TEST'S FOR CONTRACTOR:

Name: _____ Title: _____

Signature: _____

I hereby certify that the above described system has been tested as indicated above and found to be entirely satisfactory as required in the contract specifications.

Signature of Inspector: _____ Date: _____

REMARKS: _____

END OF SECTION 220100

SECTION 230000 - HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

A. General:

1. The Bidding Requirements, Contract Requirements, and the General Requirements (Division 1) of these specifications shall govern all parts of the work.

B. Work Included:

1. Install work in accordance with these specifications and the accompanying plans. Furnish all labor, material, and equipment together with all incidental items not specifically shown or specified which are required by good practice to provide the complete mechanical systems as described.
2. The HVAC Contractor(s) and all Sub-tier Contractors shall provide installed equipment cut sheets and purchase orders required for utility rebates.

C. Coordination and Site Visits:

1. This section of the work requires examination of and reference to all architectural, structural, utility, and electrical drawings for construction conditions that may affect the work. Inspect the building site and existing facilities for verification of existing conditions. Base all measurements from established benchmarks. Any discrepancy between actual measurements and those indicated, which prevents following good practices or the intent of the drawings and specifications, shall be reported to the Architect/Engineer, and work halted until instructions are received from the Architect/Engineer.

1.2 CODES, PERMITS, FEES

- A. Install all work in accordance with applicable codes and standards. Obtain all required permits; pay all required fees including utility connections or extensions, in connection with this portion of the construction. Obtain all required certificates of inspection for the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Materials:

1. All materials and equipment shall be of first quality, new, full size and weight, standard in every respect, and suitable for the space required. Use the same manufacturer for products of similar class or service, such as valves, pumps, controls, and air handlers. Protect all materials against loss, theft, or damage before and after installation.
2. Furnish equipment that will operate under all conditions of load without any sound or vibration that is objectionable in the opinion of the Architect/Engineer. Vibration or noise considered objectionable will be corrected by the Subcontractor at his expense.
3. Furnish and install all necessary foundations, supports, pads, bases, and piers required for all materials and equipment furnished under this contract.
4. Provide all required firestopping at duct and piping penetrations of fire rated walls, floors, ceilings, and roofs. Firestopping shall be 3M Fire Barrier Sealant CP 25WB+ or 3M Fire Barrier Rated Foam

- FIP 1-Step, or approved equal.
5. Piping penetrations through walls, finished floors, and ceilings shall include one-piece stamped-steel escutcheons or one-piece floor plates.

B. Workmanship:

1. All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each subtrade. Work shall be installed to the satisfaction of the Architect/Engineer with unsatisfactory work removed and reinstalled to his satisfaction at no extra cost to the Owner.
2. Provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces. No structural members shall be cut without the approval of the Architect/Engineer. Provide sleeves at all piping penetrations of exterior walls and floors on grade. Provide all sleeves and inserts required before new floors and walls are built.
3. Locate all equipment that must be serviced in fully accessible positions. Provide clearance for removal of replacement parts and components, and with necessary couplings or flanges to remove the component for maintenance.

C. Protection of Equipment During Construction:

1. At the end of each shift, all duct openings and open ends shall be covered with a plastic poly sheeting film to protect against dust and construction contamination from entering the ductwork.

2.2 SUBMITTALS AND SUBSTITUTIONS

A. Prebid Approval:

1. Manufacturer's trade names and catalog numbers stated herein are intended to indicate the quality of equipment or materials desired. All manufacturers not specifically listed require prior approval. Submit catalog data, including specifications, of the proposed equipment to the Architect/Engineer for his approval at least 10 calendar days prior to bid opening. Notice of such approvals will be published in an addendum. Approval of listed alternate equipment manufacturers is for bidding only. Final approval is to be based on requirements of the plans and specifications.

B. Submittals:

1. Within thirty days after award of this contract, provide an electronic copy of a complete list of all materials and equipment proposed for this project. List shall contain make, type, manufacturer's name, and trade designation of all materials and equipment. Submittal shall also include manufacturer's complete specification for each item, including capacities, ratings, etc., and dimensions as required to check space requirements. The scheduled equipment is the basis of design for capacity, weights, physical size, etc. Alternate manufacturers shall not exceed the weight or physical size. Any changes to the Architectural, Structural, Mechanical, Electrical, and Control systems due to alternate manufactures shall be the responsibility of the Contractor and Supplier. Submittals for each major trade (i.e., dryside HVAC, wet-side HVAC, or Plumbing) shall be submitted in a single complete package. Individual items will not be reviewed independently unless approved by the Engineer.
2. Approval of submittals shall not relieve the contractor from responsibility for deviations from the plans or specifications, unless he has, in writing, called the Architect's /Engineer's attention to deviations at the time of submission, and obtained his written approval. Approval of submittals does not relieve the contractor from responsibility for errors in shop drawings or literature.

C. Equipment Requiring Submittals:

1. Fan coil
2. Condensing units

3. Electric wall heaters
4. Electric toe kick heaters
5. Grilles / Diffusers
6. Flex Duct
7. Exhaust Fans

PART 3 - EXECUTION

3.1 ACCESSIBILITY & SAFETY

A. Accessibility:

1. All equipment which must be serviced or operated shall be located in fully accessible position. Minor changes from the drawings may be made to allow for better accessibility. All changes shall be approved prior to actual installation.
2. Access panels shall be provided if required for accessibility. Access panels to be steel, flanged, hinged doors by Cendrex, or equal. Sized as required for installation. Subcontractor shall furnish the required panels to the General Contractor and the required location for all access panels, unless otherwise specified in the Architectural specifications. Panels shall be installed by the General Contractor.

B. Safety:

1. Subcontractor shall provide guards for all belt drives and rotating machinery.

3.2 COORDINATION

- A. Coordinate all work with the various trades involved to provide a complete and satisfactory installation. The exact details of ductwork and equipment are not shown. No additional compensation will be made for offsets or relocation required in coordination with other trades.
- B. Alterations required due to improper supervision by the subcontractor shall be made at no extra cost, to the satisfaction of the Architect/Engineer.

3.3 ELECTRICAL

- A. Electric motors required for equipment specified in this section shall be provided and installed by this Subcontractor. Motor starters, disconnects, relays, pilot lights, etc., are in general, to be furnished and installed by the Electrical Contractor. Starters, relays, controls, etc., which are factory assembled into packaged equipment shall be furnished by the Mechanical Contractor under this section of the specifications.
- B. All motors shall be provided with adequate starting and protective equipment as specified or required. Motor capacity shall be sufficient to operate driven device under all conditions of operation and load without overload. Minimum horsepower shall be as specified.

3.4 IDENTIFICATION AND CODING

A. Painting:

1. All painting of mechanical equipment, accessories and ductwork shall be furnished and applied under the Architectural section of these specifications. All painting shall be completed before any

identification markings are applied.

B. Equipment:

1. Identify all equipment with a black Formica label, with white reveal when engraved. Lettering to be 3/16 inch high minimum. In general, identify equipment as to area served in addition to title and code number of the equipment as taken from the plans.

C. Piping:

1. Identify all piping as to the service of the pipe and the direction of flow. The letters shall be 3/4 inch high on piping two inches or smaller, and 1-1/4 inches high on piping up to six inches. Flow arrows shall be at least six inches long. The letters and flow arrows shall be made by precut stencils and oil base paint, one inch high and black, or factory fabricated plastic pipe markers. Piping shall be identified at 25 foot maximum intervals, on long continuous lines; adjacent to each item of equipment; on each riser and junction, and on both sides of all wall penetrations. Underground piping shall be identified with bright colored continuously printed plastic tape of not less than 6" wide by 4 mil thick, manufactured for direct burial service. Install directly above all buried pipe, 6 to 8 inches below finished grade.

3.5 TESTING

A. Systems:

1. All systems, including heating, ventilating and air conditioning, shall be tested at the completion of the building to establish that the systems operate as specified and required. Testing shall be performed after air balancing is completed.
2. All controls shall be calibrated accurately and all equipment shall be adjusted for satisfactory operation. Excessive vibration or noise from any system shall be corrected.
3. The air conditioning system shall be tested for satisfactory operation when the outside air temperature reaches 60 degrees F. or warmer. All other systems shall be tested at building completion. All tests shall be performed in the presence of the Architect/Engineer or his representative.

3.6 BALANCING

A. Scope:

1. Prior to final acceptance by the Owners, all air systems shall be balanced to deliver the quantities as specified or directed. The air balance shall be performed by an independent agency specializing in balancing and is certified by the National Environmental Balancing Bureau.
2. Approved balance contractors are Evolve Engineering, NWESI, Building Systems Technologies, and Blue-Sky Commissioning. All other contractors must receive prior approval from the Engineer, in writing, before bidding the project.
3. The Mechanical Contractor shall provide assistance to the Balancing Contractor by identifying all installed mechanical systems and assisting access to all installed mechanical systems. All mechanical systems shall be completely operational and functional prior to the Balancing Contractor performing their specified work.

B. Air balancing:

1. Balancing of the air system shall consist of:
 - a. Adjust all air volumes to the quantities shown, with allowable variation of plus 10, minus 10 percent.

- b. Record all system, zone, diffuser, grille, and register C.F.M. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Balancing Engineer shall work with the Contractor to set minimum & maximum CFM quantities for zone dampers, or zone dampers/heaters.
- c. Test and record all system static pressures, inlet and discharge, on all packaged units, fans, and terminal units. Vary total system air quantities by adjustment of fan speeds. Provide drive changes as necessary. Vary branch air quantities by damper regulation.
- d. Test and record motor full load amps and nameplate amps.
- e. Test and record entering and leaving temperatures at all coils.
- f. Adjust all automatically operated dampers, in cooperation with the Control Contractor, to the required settings. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions within specified tolerances. Where modulating dampers or economizers are provided, take measurements at full return air, minimum outside air, and 100 percent outside air mode of operation.
- g. Adjust diffusers and grilles for proper deflection, throw, and coverage. Eliminate drafts and excessive noise where possible.
- h. Mark final positions of all balance dampers with a red felt pen.
- i. Air systems shall be balanced in accordance with standard procedures and recognized practices of the Associated Air Balance Council, and the Testing Adjusting, and Balancing Bureau.

C. Water Balancing:

- 1. Balancing of the water system shall consist of:
 - a. Adjust all heating and cooling water system flows to within 10 percent of the design quantities shown.
 - b. Record all system and terminal unit g.p.m.'s.
 - c. Test and record all pump, coil, boiler, heat transfer elements, and chiller entering and leaving water temperatures and pressures.
 - d. Test and record all pump full load amps and nameplate amps.
 - e. Mark all final positions of all balancing cocks, valves, and operators with a centerpunch.

D. Quality Assurance:

- 1. The Balancing Contractor shall demonstrate to the Engineer of record, flow verification for at least 10% of the balanced devices as selected by the Engineer. If more than 25% of the tested devices do not meet the designed or balance report, then the entire system balance must be rebalanced.

E. Balance Reports:

- 1. Submit four copies of the air system balance report to the Architect/Engineer for evaluation and approval. Reports shall be on TABB/SMACNA forms that indicate information addressing each of the testing methods, readings, and adjustments.

3.7 CLEANING AND ADJUSTING

- A. Thoroughly clean all air conditioning units, air handling units, and all associated parts of the system at the completion of the work. Install new, clean air filters in all systems. Adjust all devices for proper operation and lubricate all equipment as required. Repaint any painted surface that has been damaged.

3.8 PROJECT CLOSEOUT

- A. Operations & Maintenance Manual:
The Contractor shall provide an operations and maintenance manual at least thirty days prior to completion

of work. The manual shall be of the three-ring binder type, entitled "Operations and Maintenance Manual", with the job name and year of completion also included. O & M manuals shall be submitted in a single package. In addition, the contractor shall provide two consolidated electronic versions on two separate thumb drives. Individual items will not be accepted independently unless approved by the Engineer. The manual shall include, as a minimum:

1. Maintenance instructions for all equipment, including lubrication requirements.
2. Equipment suppliers' names, addresses, and telephone numbers.
3. Equipment catalog cuts, ratings tables, model numbers, serial numbers, and accessories.
4. Parts numbers for all replaceable parts.
5. Air and/or water systems balance report as hereinbefore specified.
6. Control diagram or drawing and operation sequence.
7. Valve tagging chart as hereinbefore specified.
8. Filter chart listing unit callout, size of filters, and quantity of filters.
9. Guarantee letter as specified below.
10. Any additional information required to enable the Owner to properly maintain the building mechanical system.
11. Mechanical Equipment Start-up forms, which are included in this specification, if they are required.
12. After approval of the Operations and Maintenance Manual by the Architect/Engineer, the Contractor shall furnish two copies of the manual to the Owner.

B. Mechanical System Training Period:

1. After the mechanical system is completely installed and operational, the mechanical contractor shall provide a minimum of 4 hours training and instruction time for the building Owner or his representative. During this period, the contractor shall instruct the Owner in the operation and maintenance of all parts of the mechanical system, using the O & M manual where applicable. The contractor shall provide a copy of the Project Owner Mechanical Systems Training Form (attached to this specification), with proper signatures, to the Engineer prior to substantial completion and ensure that a copy is inserted into the project O & M manuals.
2. **OPTION:** Video Taping – The mechanical contractor is to perform videotaping of the Owner training and instruction. Provide two (2) CD copies to Owner and one (1) copy to be inserted into the O & M Manuals.

C. As-Built-Drawings:

1. Provide two sets of red-line mechanical drawings showing the work as it was actually installed. The drawings shall indicate all departures from the contract drawings. Make all notations neat and legible, with red indelible pencil. At the completion of the work, these as-built drawings shall be signed and dated by the Mechanical Contractor, and returned to the Architect/Engineer.

D. Guarantee:

1. All work furnished under this section shall be guaranteed in writing to be free from defective work or materials for a period of one year after acceptance of the contract. All repairs or replacements because of defective materials or workmanship or noncompliance with code shall be provided without additional cost to the Owner. Contractor shall furnish a letter indicating above guarantee with space for date of acceptance and expiration of guarantee. Letter shall be included in O & M Manual.

END OF SECTION 230000

NAME OF PROJECT: _____

OWNER MECHANICAL SYSTEM TRAINING FORM

Upon completion of the equipment and systems installation and connections, the contractor shall assemble all required equipment factory representative and subcontractors together for system Owner training.

These people shall assist in Owner training their system(s) and remain at the site until the total system operations is acceptable and understood by the Owner's representative(s), maintenance and/or operation personnel, on operation and maintenance of their equipment. To prove acceptance of operation and instruction by the Owner's representative(s), the contractor shall provide a copy of this form, with proper signatures, to the Engineer prior to substantial completion, and ensure that a copy is inserted into the project Operation and Maintenance manuals.

"I, the Contractor, associated factory representative and subcontractors, have started each system and the total system(s); and have proven their normal operation to the Owner's representative(s) and maintenance/operation personnel and have instructed him/them _____, hours in the operation and maintenance thereof."

Owner's Representative

Contractor

Signature

Signature

Date

Date

SECTION 230100 - HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SCOPE

- A. This section covers the work necessary for the heating, ventilating, and air conditioning system, complete. The HVAC General Requirements, Section 230000, is to be included as a part of this section of the specifications.

1.2 CODES & STANDARDS

- A. The heating, ventilating, and air conditioning system shall be installed in accordance with the latest edition of the following codes and standards:
 - 1. International Mechanical Code (IMC)
 - 2. International Building Code (IBC)
 - 3. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
 - 4. National Fire Protection Association (NFPA)
 - 5. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)

PART 2 - PRODUCTS

2.1 AIR HANDLING UNITS AND APPURTENANCES

- A. See plans for air handler specifications and alternate manufacturers.

2.2 AIR DISTRIBUTION

- A. Ductwork:
 - 1. Low pressure ductwork shall be fabricated from galvanized sheet metal, unless otherwise indicated. Construction requirements shall be in accordance with SMACNA - HVAC Duct Construction Standards, metal and flexible, latest edition. All sheet metal ductwork shall be sealed with McGill United Sheet Duct Sealer or equal, in accordance with the International Energy Compliance Code, latest edition. Adjustable (twist) elbows are not allowed. Low pressure ductwork shall be constructed to the following SMACNA static pressure standards:
 - a. Supply air ductwork = 2" W.G.
 - b. Return, Exhaust, Outside Air Intake ductwork = 1" W.G.
 - 2. Low pressure ductwork which is exposed or located in mechanical rooms shall be fabricated from galvanized sheet metal. Construction requirements shall be in accordance with SMACNA HVAC Duct Construction Standards, metal and flexible, latest edition.
 - 3. Low or medium pressure, double wall acoustically insulated ductwork shall have a minimum 1" insulation, & perforated metal lining, & shall be McGill Acousti-k27, Metaltec, or equal.
 - 4. from minimum 16 gauge welded steel, and shall be constructed in strict accordance with the latest edition of the International Mechanical Code.
Type - 2 Kitchen Hood exhaust ductwork shall be fabricated from aluminum sheet metal, in accordance with SMACNA Standards
 - 5. Ductwork penetrating protective elements of fire-rated corridor walls, with no openings into corridor, shall be constructed of minimum 26 gauge galvanized steel.
 - b. All tests should be done according to manufacturer's instructions testing procedures.
Duct installation shall be per manufacturers recommendations.
To ensure an air and water tight system, AKDUCT AIRTITE Sealant caulk must be used as directed.
 - 6. Exterior exposed ductwork shall be fabricated from galvanized sheets. All joints and seams shall be standing-seam type with sealing mastic to provide watertight construction. All ductwork shall be

internally insulated as hereinafter specified. All exposed surfaces shall be primed and painted two coats of exterior enamel paint, color as selected by the Architect.

7. Flexible ducts shall be listed per UL-181 standard as Class 1 flexible, acoustical insulated air duct and complying with NFPA Standards 90A and 90B. Ducts shall be insulated with a minimum R-6 value, and shall have a maximum vapor transmission value of .05 perms. Ducts shall be factory made with and composed of: a PE liner duct permanently bonded to a coated spring steel wire helix. Duct shall be chlorine free and carry a ten-year warranty for the labor to replace the duct should there be a factory defect. Low permeability outer vapor barrier of fiberglass bidirectional reinforced metalized laminate shall complete the composite. Pressure rating shall be 6" w.g. and maximum length shall be 6 feet. Attach to duct take-off, diffuser, register, or grille only, with nylon or stainless steel duct clamp or tie. Flexmaster 1-M, or approved equal.

B. Duct Accessories:

1. Turning vanes shall be installed in all rectangular or square elbows. Vanes shall be installed in vane side rails. Vanes shall be single wall vanes, and be fabricated and installed per SMACNA standards.
2. Volume dampers shall be fabricated from galvanized steel in accordance with SMACNA standards. Dampers shall have a continuous galvanized steel shaft on ducts 13" diameter or larger, with damper regulators and end bearings. Dampers located above inaccessible ceilings (hard ceilings) shall be furnished with concealed ceiling damper regulators. Dampers shall be pressure rated equal to the design duct pressure rating. Dampers shall be provided at all diffuser and supply/exhaust grille takeoffs, regardless if indicated on the plans. Dampers are not required on the return air takeoffs unless specifically indicated.
3. Flexible connections shall be provided at all rotating fan equipment. Connectors shall be of fire, water, and weather resistant material.
4. Fire dampers shall be UL-labeled with frame, locking assembly, accordion style folded blades, and fusible link. Dampers shall be Style B with blades stored outside of the air stream. Provide duct inspection door at each fire damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel.
5. Combination smoke and fire dampers are to be fusible link type with factory sleeve and electric operator located exterior to duct 120 V. operator to be spring return, fail closed with 212 degrees F link and UL label. Provide duct inspection door at each damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel. Belimo operators/actuators only.
6. Smoke dampers are to be ultra-low leakage (less than 4CFM/ft²) type with factory sleeve and electric operator located exterior to duct 120 V. operator to be spring return, fail closed and UL label. Provide duct inspection door at each damper. Minimum size shall be 8" x 8". Inspection door shall be provided with a steel frame with gasketing around periphery, and a hinged panel. Dampers located in moisture laden air conditions shall have all metal parts made of stainless steel. Belimo operators/actuators only.

C. Diffusers, Registers, Louvers, Grilles, Weathercaps:

1. See Drawings for requirement.

D. Duct Cleanliness:

1. Ductwork Delivery To Site
 - a. During ductwork being delivered from the premises of the manufacturer, care must be taken to prevent damage during transportation and off-loading.
2. Temporary Storage
 - a. Job site duct material storage areas should be clean, dry, and located away from high dust generating processes such as masonry or tile cutters, cutoff saws, drywall sanding, mortar and plaster mixers, roof pitch kettles, portable electric generators, and main walkways that will be constantly broom swept. The general contractor should designate a suitable area for temporary storage.

- b. To prevent ductwork material damage from standing water, storage locations should include pallets or blocking to keep fabricated metal ductwork above the floor surface. If there is a risk of water runoff from above or dusty areas cannot be avoided, coverage should be used to protect stored materials.
- 3. Installation
 - a. Before the installation of individual duct sections, they are to be inspected to ensure that they are free from all debris.
 - b. All ductwork risers must be covered to prevent the entry of debris into the duct.
 - c. Downward facing and horizontal ductwork openings will not be required to be covered.
 - d. Access covers shall be firmly fitted in position on completion of each section of the work. Open ends on completed ductwork and overnight work-in-progress shall be sealed.
 - e. The working area should be clean and dry and protected from the elements.
 - f. The internal surfaces of the uninsulated ductwork shall be wiped to remove excess dust immediately prior to installation.

2.3 INSULATION

A. General:

- 1. All insulation shall have composite fire and smoke hazard ratings, as tested by ASTM E-84, NFPA 255, and UL 723, not exceeding:

Flame Spread	25
Smoke Developed	50

B. Ductwork - External Insulation:

- 1. Insulation shall be fiberglass insulation with aluminum foil scrim kraft facing. All joints shall be taped with UL listed tape to provide a continuous vapor barrier. The following ducts shall be externally insulated:
 - a. Supply ducts in unconditioned spaces (unless internally insulated)
 - b. Return ducts in unconditioned spaces (unless internally insulated)
 - c. Combustion air ducts
 - d. Outside air intake ducts
 - e. Exposed ductwork located within conditioned spaces shall not be externally insulated
- 2. Insulation thickness & "R" values shall be as follows:
 - a. R-6 – ducts located in unconditioned spaces (such as above ceiling, but below roof insulation) and outside air intake ducts.
 - b. R-12 – ducts located outside of the building's insulation envelope (such as above the attic insulation).

C. Ductwork - Internal Insulation:

- 1. Insulation shall be flexible fiberglass duct liner. Liner shall be attached with 100% coverage of manufacturers recommended adhesive and welded or mechanically fastened galvanized steel pins. All exposed edges of liner shall be coated with adhesive. Duct dimensions shown are net air side face-to-face of duct liner. The following ducts shall be internally insulated:
 - a. Supply and Return ducts within 15'-0" of air handler
 - b. Supply and Return ducts in mechanical rooms
 - c. 15'-0" downstream of VAV terminal units.
 - d. 15'-0" downstream of fan coil units.
 - e. Exterior ducts (located outdoors)
 - f. Buried ductwork below concrete slab
 - g. Ducts as indicated on plans
- 2. Insulation thickness & "R" values shall be as follows:
 - a. R-6 – ducts located in unconditioned spaces (such as above ceiling, but below roof insulation, or buried ductwork) and outside air ducts located outside of the building envelope.

- b. R-12 – ducts located outside of the building's insulation envelope (such as above the roof).

E. Piping Insulation - Refrigerant Piping:

1. Insulation on refrigerant suction piping shall be one-piece preformed flexible formed tubing with built-in closed cell vapor barrier. Seal laps and butt joints with moisture resistant adhesive to provide a continuous vapor seal. Cover all insulated suction lines exposed on the exterior of the building with E-Flex Guard by Airex Manufacturing, Inc. At exterior wall penetration provide Titan outlet by Airex Manufacturing, Inc. or equal with an Insulation thickness as follows:

Refrigerant line set type	Nominal Pipe Diameter		
	1" and less	1" to < 1½"	1 ½" and above

Located with-in the conditioned spaces

Suction	½"	1"	1"
Liquid	not required		
Discharge (hi/low pressure)	1"	1"	1"

Located outside the conditioned spaces

Suction	½"	1"	1"
Liquid	not required		
Discharge (hi/low pressure)	1 ½"	1 ½"	2"

F. Piping Insulation - Exterior (Outdoor) Piping:

1. Piping located outdoors shall be insulated as specified above. In-addition piping shall be covered with a weather-proof aluminum alloy 3003 or 3105 jacket meeting ASTM standard B209, minimum 0.016" thick, installed per the manufacturers installation requirements. At a minimum the following installation shall occur. The jacketing overlap shall be a minimum of 2". Horizontal piping shall have the jacket seams located at the 3 o'clock or 9 o'clock position with the seam joint openings point downward to shed moisture. Vertical piping shall have the upper jacket seams overlap the lower seam to shed moisture. Valve handles and gauges shall be positioned on the bottom to help prevent water penetration. Banding shall be used to secure the jacketing; screws, rivets, and all other fasteners capable of penetrating the underlying vapor retarder shall be prohibited. Jacketing sealant shall be applied to all longitudinal and circumferential joints and the sealant shall be located between the aluminum jacket, not at the outer lip.

G. Equipment Insulation:

1. Equipment shall be insulated with 2" thick fiberglass, minimum 6 pounds/cubic foot density. Insulation shall be finished with hydraulic setting insulating cement (1/2" thick), 6-ounce canvas, and one layer of Arabol over entire surface. Equipment to be insulated includes the following:
- Hot water expansion tank
 - Air separator
 - Domestic hot water storage tank

2.4 VIBRATION ISOLATION

A. General:

1. All rotating equipment and appurtenances connected to rotating equipment shall be vibration isolated from the supporting structure. No metal-to-metal contact will be permitted between fixed and floating parts. All metal isolators exposed to weather shall be hot dipped galvanized after fabrication. Piping connected to rotating equipment shall be hung with spring hangers for first 50 pipe diameters.

B. Floor Mounted Spring Isolators:

1. Isolators shall be free standing, laterally stable, and include acoustical friction pads and leveling bolts.

Isolators shall have a minimum ratio of spring diameter to operating spring height of 1.0 and an additional travel to solid equal to 50% of rated deflection.

C. Floor Mounted Neoprene Pads:

1. Isolators shall be neoprene waffle or combination neoprene and cork sandwich. Pads shall be sized and selected as per manufacturers loading requirements.

D. Spring Hangers:

1. Vibration hanger shall contain a spring and double deflection neoprene element in series. Spring shall have a diameter not less than 0.8 of compressed operating spring height. Spring shall have a minimum additional spring travel of 50 percent between design height and solid height. Spring shall permit a 15-degree angular misalignment without rubbing on hanger box.

2.5 SEISMIC SUPPORTS

- A. All equipment, ductwork, and piping shall be seismically supported as required by the International Building Code, latest edition. Support details shall be as indicated on the Drawings.

2.6 CONTROL SYSTEM

A. General:

1. The Mechanical Contractor shall be responsible for a complete and operable control system, including equipment, installation, and accessories required to perform the required control functions. All control conduit and wiring shall be furnished by the Electrical Contractor. Thermostats, sub-base switches, remote control devices, etc., shall be supplied by the Mechanical Contractor and installed and connected by the Mechanical Contractor. The Mechanical Contractor shall furnish the Electrical Contractor with wiring diagrams for all mechanical equipment and controls.

B. Control Equipment and Accessories:

1. Control Dampers:

- a. All control dampers are to be furnished under this section, except those specified to be furnished with the air handling units. Damper blades shall be fabricated of 22-gauge galvanized sheet steel and frames shall be not less than 16-gauge galvanized steel. Blades shall be maximum 10 inches wide, 50 inches long, and shall be provided with neoprene gasketed edges and oilite bronze or nylon bearings. Dampers shall be ultra-low leakage, opposed blade type for proportional action and parallel blade type for two-position action. Leakage performance shall be a maximum of 3 cfm per sq. ft. @ a pressure differential of 1" w.g. Provide damper operators for all motorized dampers and louvers. Belimo or approved equal. Submittals shall include leakage and pressure drop data for all control dampers. All outside air dampers shall fail closed.

2. Control Valves:

- a. Control valves 2-1/2" and smaller shall be screwed, 3" and larger shall be grooved or flanged. Screwed valves shall be bronze or cast brass, grooved valves shall be ductile iron, and flanged valves shall be cast iron or cast steel. Three way valves shall have contoured plugs for linear flow characteristics and constant total flow throughout the stem travel. Straight-thru valves shall be single seated and have equal percentage characteristics for water service. Flat discs shall be used for on-off control only. All valves shall be stainless steel stems, replaceable seats, and self-adjusting Teflon or rubber packing. All heating control valves shall fail open. Belimo or approved equal.

3. Air Duct Smoke Detector:

- a. Smoke detector shall be products of combustion detector and shall be UL listed. The unit shall be designed for detection of combustion gases, fire, and smoke in air ducts in compliance with NFPA Pamphlet 90A. The sheet metal contractor shall provide a minimum 18"x18" hinged

access door, in inaccessible ceilings, for each detector that is furnished. The sheet metal contractor is also responsible for providing all necessary transitions in the ductwork for mounting of the duct detector.

4. Thermostats:
 - a. Thermostats shall be 7-day programmable type, with automatic changeover from heating to cooling, be provided with auxiliary contacts.
 - b. Thermostats shall be provided with lockable covers.
 - c. Thermostats installed on exterior walls shall be mounted on an insulating block, or on foam insulation filled J-box.
 - d. All thermostats shall have a mounting height of 46 inches, to the centerline of the device, unless otherwise noted on electrical drawings.
5. Equipment Control Schematics:
 - a. See Drawings for schematics and sequence of operations.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General:

1. Install all materials and equipment as shown and in strict accordance with the applicable codes for the State and/or city. Plans do not attempt to show exact details of all piping and ductwork, and no extra payment will be allowed for offsets required due to obstructions by other trades. All work shall be done in a neat and orderly fashion and left in a condition satisfactory to the Architect/Engineer.
2. All piping shall be run parallel or perpendicular to established building lines. Install piping so as to allow for expansion. Install all valves with stems horizontal or above. Install air vents at all high points. Provide all piping which passes through walls, floors, or ceilings with standard weight pipe sleeves.
3. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gasket shall be molded and produced by the grooved coupling manufacturer. Verify gasket grade is suitable for the intended service. The grooved coupling manufacturer's factory trained representative shall provide on-site training for the contractor's field personnel in the use of grooving tools, application of groove, and installation of groove end products.
4. Install the grooved piping and fittings in accordance with the latest recommendations as published by the manufacturer. Pipe shall be square cut, $\pm 0.030"$, properly deburred and cleaned. Mark pipe ends at the required location using a gauge supplied by the Manufacturer to ensure full insertion into the coupling or fitting during assembly. Use a manufacturer's tool with proper sized jaw for pressing.

B. Insulation:

1. All piping insulation shall be applied over clean, dry surfaces after system has been pressure tested and any leaks corrected. Finished appearance of all insulation shall be smooth and continuous. Provide coat of insulating cement where needed to obtain this result.
2. Flexible duct insulation shall be secured to duct surface with 4-inch wide bands of adhesive applied on maximum 18-inch centers. Additional galvanized tie-wire support shall be furnished as required and recommended by the insulation manufacturer.

C. Diffusers, Registers and Grilles:

1. All diffusers, grilles, and registers shall be installed tight on their respective mounting surfaces and shall be accurately centered on ceiling tile, recesses, windows, or doors.

D. Ductwork:

1. All sheet metal work shall be done by qualified, experienced mechanics in accordance with the requirements of ASHRAE and the latest edition of the applicable SMACNA Manual. All ductwork shall be installed in a neat and orderly manner, and shall be adequately supported to prevent vibration

or sagging. All sheet metal ductwork shall be sealed with United-Sheet Metal Duct Sealer or equal.

E. Air Conditioning Units:

1. Units shall be installed approximately where shown on the plans to provide access space for filter changing, motor, drive and bearing servicing, and fan shaft and coil removing. Pipe drain pan connection through a running trap to floor drain. Unit shall not be operated until filters are installed. Isolate sheet metal ducts from all fans with flexible connectors.

F. Condensing Units/ Heat Pumps:

1. Units located at grade shall be positioned such that they are beyond the roof drip line. Units shall be installed on a 6" concrete pad.
2. Units located on flat rooftops shall be provided with Miro Industries Model HD, or equal, heavy duty galvanized roof support with adjustable legs, sized 6 inches larger, in each direction, than equipment footprint.

END OF SECTION 230100

SECTION 260500 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Provisions of this Section shall apply to all Sections of Division 26, 27, and 28.

1.2 SCOPE OF WORK

- A. Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on the drawings and/or specified in all Sections of Division 26 and all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete installation, including all accessories required for testing the system. It is the intent of the drawings and specifications that all systems be complete and ready for operation.

1.3 CODE COMPLIANCE

- A. All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to, the following:
 - 1. Occupational Safety and Health Act Standards (OSHA)
 - 2. NFPA #70 – National Electric Code (NEC)
 - 3. ADA Standards – Americans with Disabilities Act
 - 4. ANSI/IEEE C-2 – National Electrical Safety Code
 - 5. NECA – Standard of Installation
 - 6. International Building Code
 - 7. International Fire Code
 - 8. International Energy Conservation Code
 - 9. NFPA #72 – Fire Code
 - 10. NFPA #101 – Life Safety Code
 - 11. All other applicable Federal, State and local laws and regulations.
- B. Work to be executed and inspected in accordance with local codes and ordinances. Permits, fees or charges for inspection or other services shall be paid for by the contractor. Local codes and ordinances are to be considered as minimum requirements and must be properly executed without expense to the owner; but do not relieve the contractor from work shown that exceeds minimum requirements.

1.4 CONDITIONS AT SITE

- A. Visit to site is recommended of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.
- B. Lines of other service that are damaged as a result of this work shall be promptly repaired at no expense to the owner to the complete satisfaction of the owner.

1.5 DRAWINGS AND SPECIFICATIONS

- A. All drawings and all specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.
- B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.
- C. Change to location, type, function, brand name, finish, etc., shall not be made without permission of engineer.
- D. Some equipment is specifically designated on the drawings. It is not the intent to sole source any item unless explicitly stated. Items have been specified based upon design requirements. All bidders are encouraged to submit products for approval. Prior approval must be obtained as required by these contract documents. Bids submitted with non-approved items will be considered invalid and bidders will be held to provide approved materials at no additional cost to the owner. Submittals received by the engineer after award of contract on non-approved equipment will not be reviewed nor will they be returned.
- E. Where conflicting direction is given within the specifications and drawings, the contractor shall include the most expensive option in the bid.

1.6 SAFETY AND INDEMNITY

- A. Safety: The contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.
- B. No act, service, drawing review or construction review by the owner is intended to include review of the adequacy of the contractor's safety measures in, on, or near the construction site.

1.7 CONSTRUCTION OBSERVATION BY THE ENGINEER

- A. Prior to covering: any major portion of the materials installed under this section, notify the engineer so that an observation can be made. Notification shall be made at least three (3) working days in advance of the date the items will be covered.

1.8 INSTRUCTION OF OWNER'S PERSONNEL

- A. The contractor shall conduct an on-site instructional tour of the entire project. The personnel designated by the owner shall be instructed in: operation of all electrical systems, trouble-shooting procedures, preventative maintenance procedures, uses of Operation and Maintenance manuals, maintenance and cleaning of lighting fixtures and operation of all special systems.
- B. Contractor will include in his bid 4 hours of instruction time to be held at the project location after substantial completion for instruction of owner's personnel. Coordinate time and number of owner personnel to be present and provide schedule to engineer.

1.9 PROJECT COMPLETION

- A. Upon completion of all work and operational checks on all systems, the contractor shall request that a final construction observation be performed.
- B. The engineer shall compile a punch list of items to be completed or corrected. The contractor shall notify the engineer upon completion of the items.

1.10 GUARANTEE

- A. All work under this section shall be guaranteed in writing to be free of defective work, materials, or parts for a period of one (1) year after final acceptance of the work under this contract or the period indicated under the Division 1 specifications whichever is longer.
- B. Repair, revision or replacement of any and all defects, failure or inoperativeness shall be done by the contractor at no cost to the owner.

PART 2 - PRODUCTS

2.1 MATERIAL APPROVAL

- A. The design, manufacturer and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE or ANSI standards.
- B. All materials must be new, unless noted otherwise, and UL listed. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency, which laboratory shall be acceptable to the owner and code enforcing agency.

2.2 SHOP DRAWINGS AND MATERIALS LIST

- A. Submit an electronic copy, unless noted otherwise under Division 1, of the Division 26, 27 and 28 shop drawings and material lists proposed for this project to the architect/engineer for review.

2.3 OPERATION AND MAINTENANCE MANUALS

- A. Submit an electronic copy, unless noted otherwise under Division 1, of the Operation and Maintenance Manuals for all Division 26, 27 and 28 equipment to the architect/engineer.

2.4 RECORD DRAWINGS

- A. Submit record drawings to owner.

2.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle materials in a manner to prevent damage.
- B. Protect equipment from weather and dampness.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

- A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.
- B. Provide experienced foreman with a minimum of three years experience working on this type of building placed in charge of this work at all times.

3.2 COORDINATION

- A. Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under trades that require electrical connections. Inform contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
- B. Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions subject to additional compensation, which are made without the authorization of the owner, shall be at contractor's risk and expense.

3.3 MANUFACTURER'S INSTRUCTIONS

- A. All installations are to be made in accordance with manufacturer's recommendations. A copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the engineer.
- B. Follow manufacturer's instructions where they cover points not specifically indicated on drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the engineer before starting work.

3.4 QUALITY ASSURANCE

- A. The contractor shall insure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.
- B. Provide quality assurance tests and operational check on all components of the electrical distribution system, all lighting fixtures, and special systems.

3.5 CUTTING AND PATCHING

- A. Perform all cutting and fittings required for work of this section in rough construction of the building.
- B. All patching of finished construction of building shall be performed under the sections of specifications covering these materials.
- C. No joists, beams, girders or columns shall be cut by any contractor without obtaining written permission from the architect/engineer.

END OF SECTION 260500

SECTION 260519 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

- A. Submit shop drawings and product data.

1.4 COORDINATION

- A. Coordinate layout and installation of cables with other installations.
- B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by the owner.

PART 2 - PRODUCTS

2.1 BUILDING WIRES AND CABLES

- A. Conductors: Stranded, copper, 600 volt insulation, type THHN/THWN, THHN/THWN-2, XHHN/XHHW.
- B. Conductors:
 - 1. Solid or stranded for No. 10 and smaller, stranded for No. 8 and larger, copper, 600 volt insulation, type THHN/THWN. Aluminum conductors not allowed unless noted otherwise.
 - 2. Insulation Types: THWN-2 for underground, THWN for wet locations, THHN for dry locations; XHHN/XHHW for GFI branch circuits and feeders fed from GFCI breakers.
- C. Color-code 120/240-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Black.
 - 2. Phase B: Red.
 - 3. Neutral: White.
 - 4. Ground: Green.
 - 5. Isolated ground: Green with yellow tracer.

- D. Wire connectors and splices: units of size, ampacity rating, material, type and class suitable for service indicated.
- E. Signal and communication circuits:
 - 1. Special cables as indicated on the drawings.
 - 2. Conductors for general use: stranded copper conductor, #16 AWG minimum, with THWN-2 insulation for underground, THWN for wet locations and THHN insulation for dry locations.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Use no wire smaller than #12 AWG for power and lighting circuits and no smaller than #18 AWG for control wiring.
- C. The contractor is responsible for upsizing conductor sizes to ensure the maximum voltage drop of any branch circuit does not exceed 3%. For reference, use No. 10 AWG conductor for 20 Amp, 120 volt branch circuits longer than 75 feet.
- D. Place an equal number of conductors for each phase of a circuit in the same raceway or conduit.
- E. Splice only in junction or outlet boxes.
- F. Neatly train or lace wiring inside boxes, equipment, and panelboards.
- G. Make conductor lengths for parallel circuits equal.
- H. Provide a separate neutral conductor for each ungrounded conductor. Ungrounded conductors may share a neutral when all of the following conditions are met:
 - 1. The ungrounded conductors are connected to a multi-pole breaker or breakers that are clipped together with a UL listed means that provide a common trip.
 - 2. The ungrounded conductors contained in the same conduit or raceway.
 - 3. The ungrounded conductors all originate from a separate and unique phase bus in the panel.

3.2 INSTALLATION

- A. Install wires and cables as indicated, according to manufacturer's written instructions, and the "National Electrical Installation Standards" by NECA.
- B. Remove existing wires from raceway before pulling in new wires and cables.
- C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means; including fish tape, cable, rope, and basket weave wire/cable grips that will not damage cables or raceway.

- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables above accessible ceilings; do not rest on ceiling tiles. Do not fasten cables to ceiling support wires. Use cable ties to support cables from structure.

3.3 CONNECTIONS

- A. Conductor Splices: Keep to minimum.
- B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
- C. Use splice and tap connectors compatible with conductor material.
- D. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.
- E. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.
- F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.
- G. Terminate spare conductors with electrical tape.

3.4 LABELING

- A. Provide Brady wire markers or equivalent on all conductors. All wire shall be labeled in each box and panel with the circuit number and panel identification.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage.
- B. Perform continuity testing on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION 260519

SECTION 260526 - GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SYSTEM DESCRIPTION

- A. Ground the electrical service system neutral at service entrance equipment to concrete encased electrode, metal underground water pipe, and effectively grounded metal frame of building.
- B. Ground each separately-derived system neutral to nearest effectively grounded metal structural frame of building or point of service entrance ground.
- C. Provide communications system grounding conductor to point of service entrance ground.
- D. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductors in raceways and cables, receptacle ground connectors, and plumbing systems.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Section 260519 - Conductors and Cables.
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or device enclosure.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow tracer. Where not available, green and yellow tape at each junction box or device enclosure.
- E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- F. Bare Copper Conductors: Medium hard drawn copper conductor, stranded, sized as shown on the drawings.

- G. Hardware: Bolts, nuts and washers shall be bronze; cadmium plated steel or other non-corrosive material, approved for the purpose.
- H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.2 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.
- D. Below grade compression fittings: Thomas & Betts, Series 52000, 53000, and 54000 or equivalent.
- E. Use connector and sealant approved for purpose on all below grade clamp or compression type connections.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, 5/8 inch diameter, minimum length 8 feet.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Use insulated spacer; space **1 inch** from wall and support from wall **6 inches** above finished floor, unless otherwise indicated.
- F. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least **24 inches** below grade.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NEC Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NEC are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.

- C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
- D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways bonded to outlet or equipment, sized per Section 250 of the NEC.
- G. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on grounding bar.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- H. Provide green insulated ground conductor to exterior post light standards.
- I. Provide grounding and bonding at pad-mounted transformer in accordance with Section 261200.

3.3 INSTALLATION

- A. Ground Rods: Where indicated, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are **2 inches** below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, unless otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding

conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

- E. UFER Ground (Concrete-Encased Grounding Electrode): Fabricate according to NEC 250, using a minimum of **20 feet** of bare copper conductor not smaller than No. 4 AWG. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 SYSTEM NEUTRAL GROUND

- A. Ground the neutral conductor of each transformer or generator to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

- B. For transformers 75 kVA or smaller with primary voltage 480 volt or less the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with NEC system ground conductor size.

3.6 EQUIPMENT GROUND

- A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a grounding conductor in each raceway system. Equipment grounding conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size grounding conductors per NEC 250 unless otherwise shown on the drawings.
- B. Install metal raceway couplings, fittings, and terminations secure and tight to ensure good grounding continuity. Provide grounding conductor sized per NEC through all raceway and conduit systems.
- C. Lighting fixtures shall be securely connected to equipment grounding conductors. Outdoor lighting standards shall have a factory installed ground lug for terminating the grounding conductor.
- D. Motors shall be connected to equipment ground conductors with a bolted solderless lug connection on the metal frame.

3.7 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION 260526

SECTION 260533 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RMC: Rigid metal conduit.
- F. RNC: Rigid Polyvinyl Chloride conduit.
- G. PVC: Rigid Polyvinyl Chloride conduit
- H. HDPE: High Density Polyethylene Conduit

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 COORDINATION

- A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.

- B. IMC: ANSI C80.6.
- C. PVC coated Steel Conduit and Fittings: NEMA RN 1; rigid steel conduit with external 40 mil PVC coating and internal two mil urethane coating.
- D. EMT and Fittings: ANSI C80.3. Fittings: Set-screw type.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. RNC: NEMA TC 2, Schedule 40 PVC. Fittings: NEMA TC 3; match to conduit and material.

2.3 METAL WIREWAYS

- A. Material: Sheet metal sized and shaped as indicated.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Finish: Manufacturer's standard enamel finish.

2.4 OUTLET AND DEVICE BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

2.5 FLOOR BOXES

- A. Floor Boxes: Cast metal, fully adjustable, rectangular, unless otherwise specified.

2.6 PULL AND JUNCTION BOXES

- A. Small Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.7 ENCLOSURES AND CABINETS

- A. Hinged-Cover Enclosures: NEMA 250, Type 1, 3R, or 4, with continuous hinge cover and flush latch, key operable.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

- B. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

- A. Outdoors: Use the following wiring methods:

1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground, Single Run: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.
4. Underground, Grouped: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.

- B. Indoors: Use the following wiring methods:

1. Exposed: EMT or "Wiremold" metallic raceways or equal.
2. Exposed in public areas: "Wiremold" metallic raceways or equal. Use of exposed raceways in public areas must be approved by the architect prior to installation for each location. Use of exposed EMT in areas visible to the public is not allowed unless specifically approved by the architect prior to installation. Replacement of unapproved installations of exposed raceways will be at the expense of the contractor if deemed necessary by the architect or engineer.
3. Concealed: EMT or MC-Cable. Note: MC-Cable is not approved for "homeruns"
4. Concealed in Dwelling Units: Type NM Cable and corresponding boxes.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.
6. Damp or Wet Locations: Rigid steel conduit.
7. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
 - a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.

3.3 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- B. Minimum Raceway Size: 1/2-inch trade size. 3/4-inch minimum for "homeruns".
- C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.

- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
- H. Use temporary closures to prevent foreign matter from entering raceways.
- I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- J. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- K. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.
- L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
- M. Raceways Embedded in Slabs: NOT Allowed
- N. follow the surface contours as much as practical.
 - 1. Run parallel or banked raceways together, on common supports where practical.
 - 2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- O. Join raceways with fittings designed and approved for the purpose and make joints tight.
 - 1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
 - 2. Use insulating bushings to protect conductors.
- P. Tighten set screws of threadless fittings with suitable tools.
- Q. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.
- R. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- S. Install pull wires in empty raceways. Utilize polyester line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.
- T. Telephone and Signal System Raceways: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

- U. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.
 - 2. Where conduit pass from the interior to the exterior of a building.
 - 3. Where otherwise required by NEC.
- V. Apply firestopping to cable and raceway penetrations of fire-rated floor, ceiling, and wall assemblies to achieve fire-resistance rating of the assembly. Boxes installed in fire-rated floor, ceiling, and wall assemblies shall result in no larger than a 16 square-inch penetration in the fire-rated wall surface and the quantity of penetrations shall not be greater than 100 square-inches for every 100 square feet of fire-rated wall area. Where boxes are located on both sides of a fire-rated wall, the boxes shall have a minimum of a 24" horizontal spacing, where a 24" horizontal spacing cannot be achieved, furnish and install listed fire-rated putty on the boxes as required by the IBC.
- W. Route conduit through roof openings for piping and ductwork where possible; otherwise, install roof penetrations in accordance with roofing system requirements. Coordinate with roofing installer.
- X. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.
- Y. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.
- Z. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
- AA. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.
- BB. Conduits shall not be routed on or above the roof without prior approval from the Engineer. Instead, the branch circuits shall be routed at the structure level below the roof to feed roof-top equipment. When approval is granted to route conduits on or above the roof, the conduits shall be strapped to COOPER industries DB series support blocks at intervals not exceeding NEC requirements. The conduits shall not be rested directly on the roof. It shall be permissible to penetrate the roof adjacent mechanical or electrical equipment to power that respective equipment.

3.4 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers, at least every 8 feet.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.
- K. Install metal channel racks for mounting cabinets, panelboards; disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit. Perform fastening according to the following unless other fastening methods are indicated:
 - 1. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 2. New Concrete: Concrete inserts with machine screws and bolts.
 - 3. Existing Concrete: Expansion bolts.
 - 4. Steel: Spring-tension clamps on steel.
 - 5. Light Steel: Sheet-metal screws.
 - 6. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.
- N. Do not drill structural steel members.
- O. All supports and attachments shall meet project seismic zone requirements.

3.5 BOX INSTALLATION

- A. Do not install boxes back-to-back in walls.
- B. Locate boxes in masonry walls to require cutting of masonry unit edge only. Coordinate masonry cutting to achieve neat openings for boxes.
- C. Provide knockout closures for unused openings.
- D. Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches of box.

- E. Use 4" boxes with multiple-gang mudring where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- F. Install boxes in walls without damaging wall insulation.
- G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- H. Position outlets to locate lighting fixtures as shown on reflected ceiling plans.
- I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.
- J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud walls, and adjustable steel channel fasteners for flush ceiling outlet boxes.
- K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- L. For boxes installed in metal construction, use rigid support metal bar hangers or metal bar fastened to two studs or with metal screws to metal studs.
- M. Set floor boxes level and adjust to finished floor surface.
- N. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- O. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
- P. Locate pull and junction boxes above accessible ceilings or in unfinished areas. Support pull and junction boxes independent of conduit.
- Q. Minimum box size to be 4" square by 2 1/8" deep.

3.6 LABELING

- A. Label coverplate of all pull and junction boxes by system served. Indicate panel circuits for power and lighting boxes.

3.7 CLEANING

- A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 260533

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:
 - 1. Lighting and appliance branch-circuit panelboards.
 - 2. Distribution panelboards.
- B. Related sections:
 - 1. Section 260501 - Field Test and Operational Check.
 - 2. Section 260526 - Grounding.

1.3 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. UL listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- D. Maintenance Data: For panelboards and components, include the following:
 - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the NEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with the NEC.

1.5 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Panelboards, Overcurrent Protective Devices and Accessories:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electric Co.; Electrical Distribution & Control Div.
 - c. Siemens
 - d. Square D Co.; Schneider Electric Brands
 - e. Or approved equal.

2.2 FABRICATION AND FEATURES

- A. Enclosures: Flush or surface mounted cabinets (as indicated on drawings). Construct cabinets with code gauge galvanized steel. Provide minimum 20" wide cabinets and extra wiring space where incoming feed-through or parallel lines are shown. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Doors: Provide door-in-door construction, made of cold-rolled steel. Inner door shall provide access to breaker handles and outer door shall provide access to wiring space as well. Inner door shall be completely flush with no visible bolts, screw-heads or hinges and with flush catch and lock. Outer door shall have concealed hinges, flush catch and lock to match inner door, located in line with inner door catch. (Tee bar handles are not acceptable).
- D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
- E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

- F. Bus: Hard-drawn copper, 98 percent conductivity. Attach circuit breakers to bus so that circuits 1, 3, and 5; 2, 4, and 6, or any three similarly numbered circuits form one three-phase, four-wire circuit.
- G. Main and Neutral Lugs: Compression or mechanical type suitable for use with conductor material.
- H. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- I. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- J. Isolated Equipment Ground Bus: Where indicated on drawings - Adequate for branch-circuit equipment ground conductors; insulated from box.
- K. Extra-Capacity Neutral Bus: Where indicated on drawings, neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads. Where indicated on plans, On 120/208Y Panels fed by K factor Type Transformer.
- L. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor. Where indicated on plans.
- M. Gutter Barrier: Arrange to isolate individual panel sections.
- N. Feed-through Lugs: Compression or mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device. For two-section panels.
- O. Panels located adjacent to each other shall have identically sized enclosures and trims.

2.3 PANELBOARD SHORT-CIRCUIT RATING

- A. UL label indicating series-connected rating with integral or remote upstream devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating. If not series rated: Fully rated to interrupt symmetrical short-circuit current available at terminals or the rating indicated on the plans, whichever is higher.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices:
 - 1. 120/240 volt branch circuit panelboards: Quick-make, quick-break, molded case plug-in type designed for 120/240 volt, single-phase three-wire service with minimum 10,000 amperes rms short circuit rating.
 - 2. Provide multi-pole units with common trip elements.
 - 3. Breaker shall have center-tripped position in addition to the ON and OFF positions.
 - 4. Provide lockouts for all circuits that should not be inadvertently tripped (as indicated on the drawings).

2.5 DISTRIBUTION PANELBOARDS

- A. Dead-front, dead-rear, Nema 1 or 3R enclosure as indicated, designed for use on a three-phase, four-wire, 120/240 volt system. See drawings for additional details.
- B. Construction: Code gauge galvanized steel fully flanged for strength and rigidity. Door and trim shall be cold-rolled steel, code gauge. Provide concealed butt hinges and 3-point catch and lock. Provide separately hinged or bolted vertical access doors over lug and wiring spaces.

- C. Bus Bars: Panel shall be fully bussed. Shall be used throughout and shall be hard-rolled, electrolytic copper of 98% conductivity designed for a maximum 1000 amperes per square inch. Bars shall be factory pre-drilled to accept future field installation of 2 or 3 pole circuit breakers in any combination. Brace all bus bars for required short circuit rating of the panel, but in no case less than 22,000 amperes rms, Refer to Short Circuit information above for additional requirements.
- D. Main Overcurrent Protective Devices: Circuit breaker unless otherwise noted.
- E. Provide handle locking devices for all circuit breakers.
- F. Provide engraved nameplates with minimum 1/4" high letters secured to panel front and for each circuit protective device in panel.

2.6 OVERCURRENT PROTECTIVE DEVICES

A. Feeder Circuit Breaker Assemblies 400 Amps or larger:

- 1. Feeder Circuit breakers 400 Amps or larger shall be digital solid state true RMS sensing Molded Case Circuit Breakers with temperature insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit breakers shall be of same design for over-current and ground fault trip coordination. The Circuit Breakers shall have the following minimum features:
 - a. UL listed for 80 percent load application unless otherwise indicated on plans.
 - b. Long time pickup (ampere setting) determined by interchangeable rating plug .
 - c. Adjustable instantaneous with short time tracking function.
 - d. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
 - e. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position
- 2. Where specifically indicated or required by NEC
 - a. Adjustable [L] Long time time-delay and ampere setting.
 - b. Adjustable [S] Short time-delay and pick-up.
 - c. Adjustable [I] Instantaneous trip.
 - d. Adjustable [G] Ground fault pick-up and delay where indicated or required by NEC.
 - e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
 - f. Short circuit, overload and ground fault trip indicators.
 - g. Trip device of circuit breakers shall be of same type for tripping coordination.

B. Feeder Circuit Breaker Assemblies 150 Amp and below:

- 1. Feeder Circuit breakers 150 Amp and below shall be thermal Magnetic Circuit breaker: Inverse time current element for low level overloads, and instantaneous magnetic trip element for short circuits, unless otherwise indicated or required to meet Section 2.4 C above. Minimum features below:
 - a. UL listed for 80 percent load application unless otherwise indicated on plans.
 - b. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
 - c. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position

2. Where specifically indicated or required by NEC

- a. Adjustable [L] Long time time-delay and ampere setting with Long time pickup (ampere setting) determined by interchangeable rating plug.
- b. Adjustable [S] Short time-delay and pick-up.
- c. Adjustable [I] Instantaneous trip.
- d. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
- e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
- f. Short circuit, overload and ground fault trip indicators.
- g. Trip device of circuit breakers shall be of same type for tripping coordination.

D. General Breaker Requirements:

1. Minimum interrupting capacity shall match the minimum required interrupt rating of the panel.
2. Standard frame sizes, trip ratings, and number of poles.
3. Lugs: Mechanical or compression style, suitable for number, size, trip ratings, and material of conductors.
4. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
5. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
6. Shunt Trip: 120-V trip coil energized from separate circuit.

PART 3 -EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Clearances: Minimum code required clearances around panelboards must be maintained.
- C. Mounting Heights: Top of trim 78 inches above finished floor, unless otherwise indicated.
- D. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- E. Mounting Hardware: Provide all necessary blocking, channels and other hardware for securing panelboards to wall, column or other parts of building structure.
- F. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- G. Install filler plates in unused spaces.
- H. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components.

- B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws. Label shall include panel designation, voltage and phase in minimum ¼" high letters.

3.3 CONNECTIONS

- A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.
- B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

- A. After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Balancing Loads: After Substantial Completion, measure load balancing and make circuit changes as follows:
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.5 ADJUSTING

- A. Set field-adjustable switches and circuit breaker trip ranges.
- B. Adjust all operating mechanisms for free mechanical movement.

3.6 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes receptacles, switches, and finish plates.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

- A. Submit shop drawings and product data.

1.5 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
- B. Wiring Devices:
 - 1. Bryant; Hubbell, Inc.
 - 2. GE Company; GE Wiring Devices.
 - 3. Hubbell Wiring Device – Kellems
 - 4. Leviton Manufacturing Co., Inc.
 - 5. Pass & Seymour/Legrand; Wiring Devices Div.
 - 6. Cooper Wiring Devices
 - 7. Or approved equal.
- C. Wiring Devices for Hazardous (Classified) Locations:
 - 1. Crouse-Hinds Electrical Co.; Distribution Equipment Div. or approved equal.

D. Multi-outlet Assemblies:

1. Wiremold.
2. Hubbell, Inc.; Wiring Devices Div.
3. Or approved equal.

2.2 RECEPTACLES

A. General Requirements for All Devices

1. Each device shall have an amperage rating not less than that of the branch circuit(s) overcurrent protection device. White color, unless noted otherwise.
 - a. Emergency devices backed up by an emergency generator and the associated cover plates shall be Red color.
2. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. All devices shall be Commercial Specification Grade (Construction specification grade is prohibited), unless noted otherwise.
 - a. All convenience receptacles shall be Heavy-Duty 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 5362 Series or similar.

B. Straight-Blade: All devices shall be Tamper Resistant where required by the National Electric Code and/or local amendments.

1. Tamper Resistant—Convenience Receptacles: 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362xxTR Series or similar.

C. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Provide one device for each location, daisy-chaining devices to achieve GFCI protection is not approved for this project.

1. Duplex GFCI Convenience Receptacles, 125 V, 20 A.
2. Straight Blade, non-feed through type.
3. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
4. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
5. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; GFRST20xx Series or similar.

D. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap, orange plastic face.

1. General Description: Straight Blade, 125 V, 20 A, Configuration 5-20R. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.
2. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
3. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
4. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362SA Series or similar.
5. Devices: Listed and labeled as isolated-ground receptacles.

6. Isolation Method: Integral to receptacle construction and not dependent on removable parts.
- E. TVSS Receptacles: Duplex type, NEMA WD 6, with integral TVSS in line to ground, line to neutral, and neutral to ground, blue plastic face.
1. General Description: Straight Blade, 125 V, 20 A, Configuration 5-20R. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.
 2. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
 3. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service".
 4. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL5362SA Series or similar.
- F. Mult-Outlet assemblies: Metal with White color finish, unless noted otherwise.
1. Two-piece surface (painted steel, brushed aluminum) raceway, with factory-wired multi-outlet harness.
 2. Components shall be products from single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
 3. Receptacles: 20 A, 125-V, NEMA WD 6 Configuration 5-20R receptacles complying with NEMA WD 1, UL 498, and FS W-C-596.
 4. Receptacle Spacing: 12 inches
 5. Wiring: No. 12 AWG solid, Type THHN copper, single circuit

2.3 SWITCHES

- A. Snap Switches: General-duty, quiet type, rated 20 amperes, 120/277 volts AC. Handle: white plastic, unless noted otherwise.
1. TOGGLE SWITCHES: Heavy-duty, quiet type, rated 20 amperes, 120/277 volts AC Comply with NEMA WD 1, UL 20, and FS W-S-896.
 - a. Single Pole: Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 1221 Series or similar.
 - b. Double Pole: Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 1222 Series or similar.
 - c. Three Way: Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 1223 Series or similar.
 - d. Four Way: Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; 1224 Series or similar.
 2. Pilot-Light Switches, Single pole, with neon-lighted handle, illuminated when switch is "on", 20 A, for 120 and 277 V. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL1221PL Series or similar.
 3. Illuminated Switches, Single pole, with neon-lighted handle, illuminated when switch is "off." 20 A, for 120 and 277 V. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL1221IL Series or similar.
 4. Key-Operated Switches, 120/277 V, 20 Amp, with factory-supplied key in lieu of switch handle. Subject to compliance with requirements, provide Hubbell Wiring Device-Kellems; HBL1221L Series or similar.
- B. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters
1. Control: Continuously adjustable slide. Single-pole or three-way switch to suit connections.

2. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch wire connecting leads.
3. Fluorescent Lamp Dimmers: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming to a maximum of 1 percent of full brightness.

2.4 WALL PLATES

- A. Single and combination types match corresponding wiring devices.
 1. Cover plate: Smooth white plastic, unless noted otherwise.
 2. Cover plate for surface mounted devices: Galvanized steel.
 3. Weatherproof cover plate: While in use, gasketed, cast metal, hinged device covers.
 4. Plate-Securing Screws: Metal with head color to match plate finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies plumb and secure.
- B. Install wall plates when painting is complete.
- C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.
- D. Do not share neutral conductor on load side of dimmers.
- E. Arrangement of Devices: Unless otherwise indicated, mount flush, vertically, with height as indicated or six inches above counters.
- F. Group adjacent switches under single, multigang wall plates.
- G. Protect devices and assemblies during painting.
- H. Install wall switches with off position down.
- I. Install cover plates on switch, receptacle, and blank outlets.

3.2 IDENTIFICATION

- A. Switches and receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on the outside of the face plate for receptacles and on the inside of the face plate for switches; utilize durable wire markers or tags within all outlet boxes. Labels shall be Brother ½" TZ tape, black ink on clear, extra-strength adhesive tape, with size 18 text or engineer approved equal. Use matching label printer.

3.3 CONNECTIONS

- A. Connect wiring device grounding terminal to outlet box with bonding jumper.
- B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.
- C. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

- A. Test wiring devices for proper polarity and ground continuity. Check each device to verify operation.
- B. Test GFCI operation according to manufacturer's written instructions.
- C. Replace damaged or defective components.

3.5 CLEANING

- A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 262726

SECTION 262815 - DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 WORK INCLUDED

- A. Provide and install motor disconnects.
- B. Provide and install circuit disconnects.

1.3 REFERENCES

- A. Underwriters' Laboratory, Inc. - Annual Product Directories.
- B. NEMA - Classification of Standard Types of Nonventilated Enclosures for Electric Controllers.

1.4 REGULATORY REQUIREMENTS

- A. Conform to National Electrical Code and to applicable inspection authority.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved equal.

2.2 COMPONENTS

- A. Motor and circuit disconnects shall have an Underwriters' Laboratory label.
- B. Single Phase 120 Volt Disconnect Switches: Single pole toggle switch with thermal overload motor protection where indicated. A Horse Power rated switch may be used where fractional horse power motors have internal overload protection.
- C. Single or Three Phase Motor Disconnect Switches: two or three pole heavy duty or fusible where other loads are on same circuit, 250 or 600 volt as required in NEMA Type 1, 3R, or 4 enclosures designed to reject all except Class 'R' fuses.

2.3 ACCEPTABLE MANUFACTURERS - FUSES

- A. Cooper Bussmann, Edison, Littelfuse, Ferraz Shawmut, or approved equal.

2.4 FUSES

- A. As indicated on the drawings. All shall be of the same manufacturer. Provide one spare set of fuses (minimum of three) for each current rating and type used. **See Section 262813.**

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install motor and circuit disconnect as indicated on Drawings and as required by Code. Where fuses are indicated, provide fuses correlated with full load current of motors provided.

END OF SECTION 262815

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces and recessed in canopies, emergency lighting units, and accessories.
- B. Related Sections include the following:
 - 1. Section 260923 Lighting Control Devices.

1.3 SUBMITTALS

- A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features and accessories.
- B. Maintenance data for lighting fixtures.
- C. Emergency lighting units including battery and charger.

1.4 QUALITY ASSURANCE

- A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in the NEC, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- B. Comply with the NEC.
- C. FM Compliance: Fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM.
- D. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, partition assemblies, and other construction.

1.6 WARRANTY

- A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Emergency Lighting Unit Batteries: Five years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining four years.
- B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: As indicated on the drawings.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

- A. Metal Parts: Free from burrs, sharp corners, and edges.
- B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit maintenance without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during maintenance and when secured in operating position.
- D. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.
 - 1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
 - 2. Lens Thickness: 0.125 inch minimum, unless greater thickness is indicated.

2.3 EXIT SIGNS

- A. General Requirements: Comply with UL 924 and the following:
 - 1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.
- B. Internally Lighted Signs: As follows:
 - 1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.
- C. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - 1. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Remote Test – Where indicated on the drawings: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
7. Integral Self-Test – Where indicated on the drawings: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.4 EMERGENCY LIGHTING UNITS

- A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
1. Emergency Connection: Operate fixture continuously at an output of 1100 lumens for 90 minutes. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
 2. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space. Provide integral to fixture or mounted adjacent to fixture.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 3. Battery: Sealed, maintenance-free, nickel-cadmium type.
 4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
 5. Battery: Sealed, maintenance-free, nickel-cadmium type.
 6. Charger: Fully automatic, solid-state type with sealed transfer relay.
 7. Night-Light Connection: Where night-light option is called out in the drawings, operate the fixture continuously.
- B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering the light fixture, remote mounted from the lighting fixture. Comply with UL 924.
1. Emergency Connection: Operate fixture continuously at an output of 1100 lumens for 90 minutes. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
 2. Battery: Sealed, maintenance-free, nickel-cadmium type.
 3. Charger: Fully automatic, solid-state, constant-current type.
 4. Housing: NEMA 250, Type 1 enclosure.
 5. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 6. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.5 FIXTURE SUPPORT COMPONENTS

- A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

- B. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.
- C. Rod Hangers: 3/16-inch- minimum diameter, cadmium-plated, threaded steel rod.
- D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- E. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.
- F. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)

2.9 FINISHES

- A. Fixtures: Manufacturer's standard, unless otherwise indicated.
 - 1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
 - 2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials.
- B. Furnish and install a protective barrier around fixtures that are not insulation-contact-rated (non-IC-rated) in locations where insulation is installed. The protective barrier shall be installed to yield a 4" air-gap from the fixture on all sides and top.
- C. Support for Fixtures in or on Grid-Type Suspended Ceilings: Attach supports to building structure.
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from fixture corners.
 - 2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- D. Suspended Fixture Support: As follows:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Suspend from cable installed according to fixture manufacturer's written instructions and details on Drawings.

3.2 CONNECTIONS

- A. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.3 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Tests: As follows:
 1. Verify normal operation of each fixture after installation.
 2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.
- C. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.
- D. Ballasts: Replace all noisy ballasts. Ballasts that can be heard shall be considered noisy. Repeat the procedure until a ballast is installed that is not noisy.

3.4 CLEANING AND ADJUSTING

- A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 265100

SECTION 271101 – TELECOM RACEWAY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes telecom raceway systems.

1.3 RELATED WORK

- A. Section 260533 – Raceways and Boxes.

1.4 SYSTEM DESCRIPTION

- A. Conduit, cable trays and boxes to form an empty raceway system.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Conduit: Refer to Section 260533.
- B. Outlet, pull or junction boxes: Refer to Section 260533.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide pullboxes in telecom conduit runs spaced less than 100 feet apart, and on the backboard side of runs with more than two right angle bends.
- B. Place telecom label on pull and junction boxes.
- C. Provide pullwire in each telecom conduit run.

END OF SECTION 271101

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing site utilities.
7. Temporary erosion and sedimentation control.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove.

1.3 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises as indicated by owner.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. Tree- and Plant-Protection Zones. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Erection of sheds or structures.
 4. Impoundment water.
 5. Excavation of other digging unless otherwise indicated.
 6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to plans.
- C. Protect existing site improvements to remain from damage during construction.
1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site according to plans.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to plans.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owners written permission.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Grind down stumps and remove roots larger than 3 inches (75 mm) in diameter, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
 - 2. Use only hand methods or air spade for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding Geotech recommendation. Compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Strip topsoil to depth in a manner to prevent intermingling with underlying subsoil or other waste materials.
- B. If topsoil is to be reused, stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks and pavements.
6. Subbase course and base course for asphalt paving.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner. Unauthorized excavation, as well as remedial work directed by Owner, will be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other fabricated stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct pre-excavation conference at Ponderosa Park, Kokanee Cove

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.
- B. Do not commence earth-moving operations until plant-protection measures specified on plans are in place.

PART 2 - PRODUCTS

2.1 FILL MATERIAL, GENERAL

- A. Approval Required: All fill material shall meet the requirements specified in the project documents and are subject to the approval of the Geotechnical Engineer.
- B. Notification: For approval of imported fill material, notify the Geotechnical Engineer at least 10 working days in advance of intention to import material, designate the proposed borrow area and provide the Engineer a sample from the borrow area for the purpose of making acceptance tests to prove the quality of the material.
- C. Where specified, backfill materials shall be compacted to achieve the required density and uniformity.

2.2 SUITABLE FILL MATERIAL

- A. Material suitable for STRUCTURAL BACKFILL shall be aggregate material which is free from frozen material, organic matter and other deleterious substance.

Imported material for BASE COURSE construction shall be $\frac{3}{4}$ inch minus material meeting the durability and materials requirements of base course materials. The material shall meet the gradation requirements of aggregate for base courses as defined by the ISPMC.

2.3 UNSUITABLE MATERIAL

- A. Material not meeting the requirements of SUITABLE FILL MATERIAL as defined above or material having excess moisture following reasonable effort for moisture conditioning.

2.4 OTHER MATERIAL

- A. All other materials not specifically described but required for a complete and proper installation shall be as selected by the Contractor subject to the approval of the Geotechnical Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Prior to all work of this Section, become thoroughly familiar with the site, the site conditions and all portion of the work falling within this Section.
- C. General: Excavate to the grades shown on the Drawings or as directed by the Engineer.
- D. Over Excavation: Backfill and compact all over excavated areas with suitable fill materials as directed by the Engineer.
- E. When excess excavated or unsuitable material exists the Contractor is to haul it off site.

- F. Concrete and Asphalt Excavation: Concrete and Asphalt excavation shall include the removal and off site disposal of concrete and asphalt.
- G. Excavated areas shall be kept free of standing water and debris to facilitate inspection and compaction.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 - 1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicate gradients, lines, depths, and elevations.
- B. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.6 SUBGRADE INSPECTION

- A. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Owner, without additional compensation.
- B. Unfavorable Weather: Do not place, spread or roll fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.
- C. Softened Subgrade: Where soil had been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and recompact as specified for effected area.

- D. Conditioning: Apply all reasonable effort required to adjust the moisture content of fill materials to obtain the required percent moisture content as determined by proctor testing methods, prior to placement in compacted layers. If the Contractor demonstrates he cannot obtain the required moisture content after applying reasonable effort the Engineer shall direct the Contractor to haul the unsuitable material off-site.

3.7 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring, bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Placement: After subgrade preparation has been completed approved fill materials shall be placed in uniform horizontal layers per Geotechnical Engineer.
- D. Moisture-conditioning: Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
- E. Compaction, General: Compact each soil layer to a minimum of 95% compaction. Repeat placement and compaction process until the desired grade is attained. The Contractor shall be responsible and pay for all quality control testing on this job.
- F. Compaction Requirements:

Standard Proctor

ITEM	(%)
Embankment Construction	95
Structural Embankment	95
Structural Backfill	95
Subgrade Preparation	90
Subbase Course	95
Base Course	95
Granular Cushion	95

As determined by ASTM D 698

- G. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- H. Warning Tape: Install warning tape directly above utilities at the depth specified by the governing jurisdiction.

3.9 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. General: Except as otherwise directed by the Engineer, perform all rough and finish grading required to attain the elevations, and drainage shown on the Drawings.
- C. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations.

3.10 FIELD QUALITY CONTROL

- A. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements or authorities having jurisdiction.
- B. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.11 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt patching.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 321313 "Concrete Paving" for concrete pavement and for separate concrete curbs, gutters, and driveway aprons.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:

1. Material Certificates: For each paving material
2. Material Test Reports: For each paving material, by a qualified testing agency.
3. Field quality-control reports

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
1. Prime Coat: Minimum surface temperature of 60 deg F.
 2. Tack Coat: Minimum surface temperature of 60 deg F.
 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
 4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

Table 1	
SUPERPAVE AGGREGATE DESING BANDS and VMA TOLERANCES	
SIEVE SIZE	NOMINAL MAXIMUM SIZE
	3/4 in.
	PERCENT PASSING
1 in.	100
3/4 in	*90-100
1/2 in.	90 Max
3/8 in.	*52-80
No. 8	*23-49
No. 200	*2.0-8.0
VMA, % Minimum	13.0
PRIMARY CONTROL SIEVE (PCS) CONTROL POINT FOR MIXTURE NOMINAL MAXIMUM AGG SIZE **	
Primary Control Sieve	No. 4
PCS Control Point (% passing)	47

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

2.2 CLASSIFICATIONS

- A. The Superpave HMA shall be composed of a combination of aggregate, mineral filler (if required), and performance graded (PG) asphalt binder material. The Contractor shall furnish a job mix formula (JMF) and a HMA pavement that complies with the following requirements. Any JMF dated more than 1-year from the date of submittal will either require updated specific gravities from the original crush, or a new JMF. Updated specific gravities shall not alter the JMF target values out of tolerance; otherwise a new JMF will be required.

2.3 AGGREGATES AND MIX DESIGN REQUIREMENTS

- A. Aggregate for all mixes, as a minimum shall be provided in two separate stockpiles. Aggregate shall be crushed stone or crushed gravel of such gradation that when combined with other required aggregate fractions and fillers, in proper proportion, the resultant mixture meets the gradation required under the composition of mixture for the specific class under contract.
- B. The fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting blend conforms to the grading requirements as defined in Table 1.
- C. Aggregates shall meet the requirements of ISPWC Section 803 – Plant Mix Aggregates with the exception of Table 1 through 4.
1. **Denotes the sieves that will be used for mix design control points and quality analysis sieves for Class SP1 & SP2 mixes.*
 2. ***The combined aggregate gradation shall be classified as coarse graded when it passes below the PCS control point as Defined in table 1. All other gradations shall be classified as fine graded. (This classification is based on the Contractors JMF and not individual gradation tests.)*

Table 2	
SUPERPAVE DESIGN REQUIREMENTS	
Minimum Use	
Quality Characteristics	SP4
Design ESALs (million)	3 < 10
LA Wear – AASHTO T-96, Max % loss	30
Fractured Face- 1 fracture/2 fracture, % Min	85/80
Uncompacted void Content of fine agg, % Min	45
Sand Equivalent, % Min	45
Flat & Elongated, % Max	10
Gyratory Compaction Gyrations for Ndes	90
Relative density, %Gmm@Ndes	96.0
Voids Filled With Asphalt, %VFA	65-75
Dust to Binder Ratio Range, DP	0.6-1.4
Absorption, % Max	2.0

Table 3	
SUPERPAVE PRODUCTION REQUIREMENTS	
Quality Characteristics	SP4
Asphalt Binder, % PBe	--
Gradation on Agg from Extraction	--
Air Voids, % Va	4.0 $\pm$ 1.0
Voids in Mineral Agg, VMA	Per Table 4
Density, %	92 - 96

Table 4			
SUPERPAVE AGGREGATE GRADATION & VMA TOLERANCES - PRODUCTION			
SIEVE SIZE	TOLERANCES FROM JMF		
	3/4 in.	1/2 in.	3/8 in.
1 in. – No. 4		$\pm$ 5%	
No. 8 – No. 30		$\pm$ 4%	
No. 50 – No. 100		$\pm$ 3%	
No. 200		$\pm$ 1.5%	
VMA, % min	13.0	14.0	15.0

2.4 ASPHALT

- A. Asphalt Binder shall meet the requirements of ISPWC Section 805 – Asphalt.
- Asphalt to be of the type and grade called for in the Contract Documents.
 - Asphalt will be accepted at the point of delivery.
 - Unless otherwise permitted, all asphalt for a specified project shall be furnished by one (1) supplier. If a change of supplier for asphalt is proposed, or if blending of plant mix asphalt from more than one supplier is proposed, mix design testing and verification are required as conditions of approval.

2.5 ANTI-STRIPPING ADDITIVE

- A. Anti-stripping additive shall meet the requirements of ISPWC Section 810 – Plant Mix Pavement, 2.4 Anti-Stripping Additive.
- B. All Superpave Plant Mixes shall use a minimum 0.5% approved liquid anti-stripping additive by weight of asphalt.

2.6 TEST METHODS

- A. Sieve Analysis of Fine and Coarse Aggregates – AASHTO T27.

- B. Materials Finer than No. 200 sieve in Mineral Aggregates by Washing – AASHTO T11.
- C. Preparing and Determining the Density of HMA Specimens by Means of the Superpave Gyratory Compactor. – AASHTO T312.
- D. Percentage of Fracture in Coarse Aggregate – AASHTO TP 61.
- E. Plastic Fines in Graded Aggregate and Soils by Use of the Sand Equivalent Test – AASHTO T 176.
- F. Flat and Elongated Particles in Coarse Aggregate – ASTM D4791
- G. Theoretical Maximum Specific Gravity and Density of HMA Paving Mixtures – AASHTO T 209.
- H. Bulk Specific Gravity of Compacted HMA using Saturated Surface-Dry Specimens – AASHTO T 166.
- I. Sampling Bituminous Paving Mixtures – AASHTO T 168.
- J. Sampling Bituminous Materials – AASHTO T40.
- K. In Place Density of HMA – WAQTC TM 8.
- L. Determining the Asphalt Binder Content of HMA by Ignition method – AASHTO T 308.
- M. Bulk Specific Gravity of compacted HMA mixtures using saturated surface- dry specimens – AASHTO T 166.
- N. Mechanical analysis of extracted aggregate – AASHTO T30.

PART 3 - EXECUTION

3.1 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

3.2 SURFACE PREPARATION

- A. Ensure that prepared subgrade is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.
- B. Herbicide Treatment: Apply herbicide in accordance with manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

3.3 HOT-MIX ASPHALT PLACEMENT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
- B. Workmanship shall meet the requirements of ISPWC Section 810, Part 3. Including, but not limited to, mixing plant, sampling devices, all equipment, recycled plant mix (RAP), paver, rollers, mix design approval and weather limitations and cutoff dates. Pavement shall be compacted to a range between 92%-96% of the theoretical maximum value from the JMF. Recycled plant mix (RAP) will be allowed up to 17% by weight of binder as outlined in the requirements of ISPWC Section 810, Part 2.5.
- C. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
- D. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
 3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.5 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:
 - 1. Paving asphalt shall be applied at a temperature of not less than 250°F, nor more than 375°F. The exact temperature will be determined by the on-site Inspector. The Subcontractor will give the district 24 hours notice before paving operations are to be started.
 - 2. Flatness: Maximum variation of 1/4 inch measured with 10-foot straight edge.
 - 3. Scheduled Compacted Thickness: Place to 1/2 inch compacted thickness.
 - 4. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected by the addition of asphalt concrete mixture of an appropriate class to low places or the removal of material from high places by methods satisfactory to the Project Architect-Engineer or by removal and replacement of the course of asphalt concrete. Corrections of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances.
 - 5. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Project Architect-Engineer.
 - 6. All costs involved in making the corrections of defects described above shall be borne by the Subcontractor and no compensation will be made for this work.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed during placement and compaction of asphalt and fabric installation. Compaction testing and verification of oil content and gradation of mix will be performed.
- B. Replace and compact hot-mix asphalt where core tests were taken.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.8 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for a minimum of at least three (3) hours. Asphalt concrete shall not be exposed to vehicular traffic until the temperature is less 150°F.
- B. Protection of Existing Street Surface: During the entire construction period, the Subcontractor shall take care to protect existing pavement or sealed surfaces. Backhoes and trenchers must have street pads as grousers, metal tipped pads will not be allowed. Surfaces scarred by cleanup or excavation equipment shall be repaired in a manner satisfactory to the Project Architect-Engineer. Any and all damage caused by the Subcontractor's operations to existing roads and/or streets including striping and raised pavement markers shall be repaired by the Subcontractor to at least the original condition to the satisfaction of and at no additional cost to the Owner.

3.9 WASTE HANDLING

- A. Remove surplus material and legally dispose of off Owner's property.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes concrete paving.
 - 1. Walks
- B. Related Requirements
 - 1. Comply with ISPWC Divisions 200, 700, 800 and all subsections of ISPWC that are appropriate.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of product, ingredient, or admixture requiring color selection.
- C. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
 - 1. Aggregates
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

PART 2 - PRODUCTS

- A. All materials used in this section shall comply with the requirements set forth in ISPWC Standards and from accepted sources for material production. Comply with ISPWC Divisions 200, 700, 800 and all subsections of list that are appropriate.

2.1 FORMS

- A. Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 CONCRETE MATERIALS

- A. All concrete shall be as described in Section 701 of the ISPWC.

PART 3 - EXECUTION

- A. Comply with ISPWC Divisions 200, 700, 800 and all subsections of listed that are appropriate. The Contractor shall comply to the size and dimensions shown on the plans or as directed by the Engineer in the construction of the facilities specified in this section.

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
 - 3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 2 Section "Earthwork".
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joint with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
- J. Screed pavement surfaces with a straightedge and strike off.

- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. Curbs: When automatic machine placement is used for curb placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove, and replace with formed concrete.
- M. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- N. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperatures have fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 def F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs
- O. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 def F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas..

3.5 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.6 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape

3.7 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: Plus 3/8inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.8 REPAIR AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321400 - UNIT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete pavers.
2. Stone pavers.

1.2 ACTION SUBMITTALS

- A. Product Data: For materials other than water and aggregates.
- B. Samples: For each type of unit paver indicated
 1. Joint materials involving color selection.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.

1.4 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Bituminous Setting Bed: Install bituminous setting bed only when ambient temperature is above 40 deg F (4 deg C) and when base is dry.
- C. Weather Limitations for Mortar and Grout:
 1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

- A. Concrete Pavers. As specified on plans.

2.2 STONE PAVERS

- A. Stone Pavers: As specified on plans.

2.3 ACCESSORIES

- A. Polymeric Joint Filler: HP Nextgel-High Performance Polymeric Sand or approved equal. Color per plan.

2.4 AGGREGATE SETTING-BED MATERIALS

- A. Aggregate for Base: As specified on plans.
- B. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C33/C33M for fine aggregate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- B. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
 - 1. For concrete pavers, a block splitter may be used.
- C. Joint Pattern: Random as indicated.
- D. Tolerances: Do not exceed tolerances listed 2010 ADA Standards for Accessible Design.
- E. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.2 AGGREGATE SETTING-BED APPLICATIONS

- A. Compact soil subgrade uniformly to at least 95 percent of ASTM D698 laboratory density.
- B. Place aggregate base, compact by tamping with plate vibrator, and screed to depth indicated.
- C. Place leveling course and screed to a thickness of 1, taking care that moisture content remains constant, and density is loose and uniform until pavers are set and compacted.
- D. Treat leveling course with herbicide to inhibit growth of grass and weeds.

- E. Set pavers with a minimum joint width of **1/16 inch** and a maximum of **1/4 inch** being careful not to disturb leveling base. Tolerances: Do not exceed tolerances listed 2010 ADA Standards for Accessible Design.
- F. Place pavers carefully by hand maintaining accurate alignment and uniform top surface. Tolerances: Do not exceed tolerances listed 2010 ADA Standards for Accessible Design.
- G. Protect newly laid pavers with plywood panels on which workers can stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of pavers.
- H. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints by sweeping polymeric sand over paved surface until joints are filled. Remove excess sand after joints are filled.
- I. Cleaning: Remove excess sand from exposed paver surfaces; wash and scrub clean.

END OF SECTION 321400

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove

1.3 ACTION SUBMITTALS

A. Product Data:

1. Pavement-marking paint, acrylic or approved equal. The Contractor shall furnish certified test report for the materials shipped to the project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Paint shall be stored in an area prepared to contain spills and prevent contamination of storm water.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design"

2.3 PAVEMENT-MARKING PAINT

- A. Pavement-Marking Paint, Acrylic: Acrylic, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952F, Type II.

1. Color:

- a. White 37875
- b. Blue 15180 (Pantone PM293C)

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Landscape Architect, Engineer, or Owner.
- B. Allow asphalt paving or concrete surfaces to age for a minimum of 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.

END OF SECTION 321723

SECTION 323223 - SEGMENTAL RETAINING WALLS

1.1 SUMMARY

A. Section Includes:

1. Segmental retaining walls.

1.2 PREINSTALLATION MEETINGS

- #### A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove.

1.3 ACTION SUBMITTALS

- #### A. Product Data: For each type of product.

B. Shop Drawings:

1. Show sizes, profiles, coursing, and locations of retaining wall units; including backfill and leveling base materials.
2. Show types, sizes, locations of soil reinforcing materials.

- #### C. Samples: Manufacturer's standard color sheets, showing full range of available colors and textures for segmental retaining wall units.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.5 PRECONSTRUCTION TESTING

PART 2 - PRODUCTS

2.1 SEGMENTAL RETAINING WALL UNITS

- #### A. Units: Sandstone walls by Table Rock Sandstone.

- #### B. Color: As indicated on plan.

- #### C. Shape and Texture: Provide units matching basic shape, dimensions, and face texture of basis-of-design product.

2.2 INSTALLATION MATERIALS

- A. Leveling Base: Comply with requirements in Section 312000 "Earth Moving" for base course.
- B. Drainage Fill: Comply with requirements in Section 312000 "Earth Moving" for drainage course.
- C. Comply with requirements in Section 312000 "Earth Moving" for satisfactory soils.

PART 3 - EXECUTION

3.1 INSTALLATION OF RETAINING WALLS

- A. General: Place units in accordance to manufacturer's instructions.
 - 1. Lay units in as shown on design drawings.
- B. Do not use units with chips, cracks, or other defects unless approved by project design professional.
- C. Leveling Base: Place and compact base material to thickness indicated on plans and with not less than 95 percent maximum dry unit weight in accordance with ASTM D698..
- D. First Course: Place first course of segmental retaining wall units for full length of wall. Place units in firm contact with each other, properly aligned and level.
- E. Subsequent Courses: Remove excess fill and debris from tops of units in course below. Place units in firm contact, properly aligned, and directly on course below.

3.2 FILL PLACEMENT

- A. General: Comply with requirements in Section 312000 "Earth Moving,"
- B. Fill voids between and within units with drainage fill. Place fill as each course of units is laid.
- C. Place, spread, and compact drainage fill and soil fill in uniform lifts for full width and length of embankment as wall is laid. Place and compact fills without disturbing alignment of units. Where both sides of wall are indicated to be filled, place fills on both sides at same time. Begin at wall, and place and spread fills toward embankment.
 - 1. Use only hand-operated compaction equipment within 48 inches (1200 mm) of wall or one-half of height above bottom of wall, whichever is greater.
 - 2. Compact reinforced-soil fill to not less than 95 percent maximum dry unit weight in accordance with ASTM D698.
 - a. In areas where only hand-operated compaction equipment is allowed, compact fills to not less than 90 percent maximum dry unit weight in accordance with ASTM D698.

3. Compact nonreinforced-soil fill to comply with Section 312000 "Earth Moving."
- D. Place drainage according to plans.
- E. Wrap subdrainage pipe with filter fabric and place in drainage fill as indicated.
- F. Place impervious fill over top edge of drainage fill layer.
- G. Slope grade at top of wall away from wall unless otherwise indicated. Slope grade at wall base away from wall. Provide uniform slopes that prevent ponding.

3.3 FIELD QUALITY CONTROL

- A. Comply with requirements in Section 312000 "Earth Moving" for field quality control.

END OF SECTION 323223

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil Preparation and amendment.
2. Seeding
4. Maintenance
5. Clean-up
6. Satisfactory Seed Area

B. Related Requirements:

1. Specification Section 311000 Site Clearing.
2. Specification Section 312000 Earthmoving.

1.2 DEFINITIONS

- A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- C. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, Brome Grass, Black Henbane, Buffalobur, Common Crupina, Dalmatian Toadflax, Diffuse Knapweed, Dyer's Woad, Eurasian Watermilfoil, Field Bindweed, Hoary Cress, joined Goatgrass, Leafy Spurge, Matgrass, Meadow Hawkweed, Meadow Knapweed, Milium, Musk Thistle, Orange Hawkweed, Perennial Pepperweed, Perennial Sowthistle, Poison Hemlock, Puncturevine, Purple Loosestrife, Russian Knapweed, Scotch Broom, Scotch Thistle, Silverleaf Nightshade, Skeletonleaf Bursage, Spotted Knapweed, Syrian Beancaper, Toothed Spurge, Yellow Starthistle, Yellow Toadflax
- D. Finish Grade: Elevation of finished surface of planting soil.
- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil. See Section 311000 Site Clearing and Section 312000 Earthmoving

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove.

1.4 INFORMATIONAL SUBMITTALS

- A. Certification of Seed.
 - 1. Product Data: For each type of product indicated.
 - 2. Certification of Seed: From seed vendor for each seed monostrand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 3. Submit certification for mix and location of source.
 - 4. Maintenance Data
 - a. Submit under provision of Division 1
 - b. Maintenance Data: Include maintenance instructions, cutting method and maximum height; types, application frequency, and recommended coverage of fertilizer; and herbicide.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Seed: Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- C. Regulatory Requirements:
 - 1. Comply with regulatory agencies for fertilizer and herbicide composition.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 1
- B. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- C. Seed: Deliver seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Each variety of seed shall be tested seed from the latest crop available and shall be delivered in standard sealed containers labeled in accordance with State and Federal laws. The label shall show the variety of seed, the percentage of germination, purity and weed content. All varieties

of seed shall have a minimum tested germination of 95% and contain a minimum of 95% pure seed by weight.

- D. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 PROJECT/SITE CONDITIONS

- A. Planting Season: Seeding shall be accomplished in the spring, after frost leaves and temperatures are consistent or in the fall after the first frost. See plans for approximate dates.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Division 1.

1.9 EXTENDED WARRANTY

- A. Provide one year warranty under provisions of Division 1. Warranty includes coverage for one continuous growing season; reseed if 90% vegetative coverage isn't achieved after initial seeding.

1.10 MAINTENANCE

- A. Seeded Areas:

1. Maintain seeded areas immediately after placement until 90% vegetative coverage is achieved.
2. Seeded areas will not be accepted as substantial completion until 90% vegetative coverage is achieved.

1.7 1.10 GUARANTEE AND REPLACEMENT

- A. Warranty Period: 12 months from date of Final Acceptance.
- B. Installer agrees to repair or replace all plant material and other materials installed under the Contract. All material installed under the Contract, shall be guaranteed until Final Acceptance against all poor, inadequate, or inferior materials and/or workmanship or improper maintenance, as determined by the Owner's Representative. All replacement materials and installations shall comply with the Plans and Specifications
 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, neglect by Owner, or acts of nature (disease, pest, etc.)
 - b. Structural failures including plantings falling or blowing over.
 2. Warranty Period: 12 months from date of Final Acceptance unless otherwise specified.
 3. Any materials found to be dead, missing, or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Owner's Representative shall be the sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the Contractor within five (5)

days of written notification by the Owner. All replacement materials and installations shall comply with the Plans and Specifications.

PART 2 - PRODUCTS

2.1 Materials

A. Seed:

1. Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances. Seed shall be weed free, fresh, re-cleaned, Grade A, new crop consisting of the percentages of mix as specified. Seed shall be labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act presently in effect.
2. Seed shall be provided from and mixed by a certified dealer. The seed mixture shall be labeled with manufacturer's guaranteed analysis, germination rate and purity rate.
3. Seed shall as specified on plan.

B. Water:

1. Shall be clean, fresh and free of substances or matter which could inhibit vigorous growth.

C. Weed Control:

1. Use Enide (Upjohn), Dymid (Elanco Products Co.), Treflan, Eptan, Surflan, Clarity (2nd) or approved equal.

D. Weed Abatement:

1. Round-up" (contact herbicide) by Monsanto or approved equal.

E. Soil Conditioner:

1. Simplot BA-Humus

F. Soil Amendment – Compost:

1. Compost shall be a well decomposed, stable, weedfree organic matter source. It shall be derived from agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings or source-separated or mixed solid waste. The product shall contain no substances toxic to plants, will possess no objectionable odors and shall not resemble the raw material from which it was derived.
2. Compost shall meet the following parameters:
 - a. pH: 5.0 - 8.5
 - b. Soluble salt concentration: max. 1
 - c. Moisture content: 30-60% (wet weight basis)

- d. Organic matter content: 30-65% (dry weight basis)
 - e. Particle size: 98% pass through $\frac{3}{4}$ " screen or smaller
 - f. Physical contaminants (inerts): less than 1%
- 3. Compost shall be measured by the cubic yard at the point of loading.
 - 4. Compost shall be Cascade Compost available through Cloverdale Nursery or approved equal.

G. Pesticides:

- 1. Pesticide shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

H. Fertilizers:

1. Planting Pit Fertilizer:

- a. Shall be Gro-Power Plus (bacteria included) with soil penetrant and shall consist of the following percents by weight:
 - 1) 5% nitrogen
 - 2) 3% phosphoric acid
 - 3) 1% potash
 - 4) 50% humus
 - 5) 15% humic acid

2. Planting Tablets:

- a. Shall be slow-release 21-gram tablets as manufactured by Agriform, containing the following percentages of nutrients by weight:
 - 1) 20% nitrogen
 - 2) 0% phosphoric acid
 - 3) 5% potash

3. Soil Sulfur:

- a. Shall be Agricultural grade sulfur containing minimum of 99% sulfur (expressed as elemental).

4. Soil Amendment NPK Fertilizer:

- a. Shall consist of the following percents by weight:
 - 1) 6% nitrogen
 - 2) 20% phosphoric acid
 - 3) 20% potash

I. Hydroseed:

1. Seed shall be hydroseeded or drill seeded at the contractor's option. Areas with a 4:1 or greater slope shall be hydroseeded.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that prepared topsoil is ready to receive the work of this Section.
- B. Beginning of installation means acceptance of existing site conditions.
- C. All planting areas shall be weed free at the time of seed installation.
- D. Soil Tests: Per Earthmoving specification section 312000.
 1. Prior to planting, amendments shall be added to correct for problems as noted by the soils report. Results of the soils tests determine the proper amendments.

3.2 WEED ABATEMENT (ONLY REQUIRED FOR SEEDED TURF AREAS)

- A. All areas to be seeded shall have weed abatement operations performed on them prior to seeding and after placement of soil amendments.
- B. Contractor shall spray all exposed weeds with "Round-up" (contact herbicide) or approved equal.
- C. Do not water for at least three (3) days. Remove exposed weeds from the site.
- D. Apply second application of "Round-up" to all exposed weeds. Apply in strict conformance with manufacturer's specifications and instructions. Do not water for at least three (3) days. Remove weeds from the site. If no exposed, germinated weeds are present contact landscape architect to review the site for approval to begin seeding operations.
- E. If any evidence of weed germination exists after two (2) applications, Contractor shall be directed to perform a third application.
- F. At the time of seeding, all planting areas shall be weed free.

3.3 SEED AND TURF AREA PREPARATION

- A. General: Prepare planting area for soil placement and mix planting soil
 1. For seed, top elevation of seed shall be ½" below adjoining edging, paving, curbs, and sidewalks.
 2. Before planting, obtain Landscape Architect's, Engineers, or Owner's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- B. Soil Amendments:

1. After approximating finished grades have been established soil shall be conditioned and fertilized.

3.4 SEED AND TURF AREA EXECUTION

A. Seeding:

1. Sow seed with spreader or seeding machine.
2. Do not sow immediately following rain, or when the ground is too dry. The temperature shall be between 55 F and 95 F for a 24-hour period. The wind shall be less than 5 mph.
3. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
4. Do not use wet seed or seed that is moldy or otherwise damaged.
5. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer
6. Seed shall be sown as specified on plans.
7. Seed shall be hydroseeded or drill seeded at the contractor's option. Areas with a 4:1 or greater slope shall be hydroseeded.
 - a. Hydroseed: Mix specified seed, mulch and water, using equipment specified designed for hydroseed application. Apply slurry uniformly to all areas to be seeded. Apply water with a fine spray immediately after each area has been mulched. Saturate the top 4 inches of soil.
 - b. Drill Seed: Seed shall be spread by a mechanical cultipacker ("Brillon" equipment or equal) or approved similar equipment to drill, cover and firm the seed bed in one operation. Install with one-half (1/2) of the seed for each area being sown in a direction at right angles to the other half. Apply water with a fine spray immediately after each area has been seeded. Saturate the top 4 inches of soil.

3.5 SEED MAINTENANCE

A. Maintain and establish seed:

1. Protecting
 - a. Project seeded areas with warning signs during establishment and maintenance period.
 - b. Identify seeded areas with stakes and string around area periphery.
 - c. Replanting - Immediately reseed areas which show bare spots.

- B. Maintenance period to be a minimum of sixty (60) days after date of substantial completion. If seeded after September 15, continue maintenance to the following spring until 90% establishment.

- C. Continuously maintain the entire project area during the progress of work until final acceptance of the project by the Owner.

3.6 CLEANING

- A. After seeding operations have been completed, remove all trash, excess soil or rubbish from the property. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site. The contractor shall pick up all trash resulting from this work no less frequently than each Friday before leaving the site, once a week, and/or the last working day of each week. All trash shall be removed completely from the site. The Contractor shall leave the site area broom-clean and shall wash down all paved areas within the Contract area, leaving the premises in a clean condition acceptable to the Owner and Construction Manager.

3.7 SATISFACTORY SEED AND TURF AREA

- A. Turf Seed installations shall meet the following criteria as determined by Architect:
 - 1. Satisfactory Seed: At end of maintenance period, coverage must meet or exceed 90 percent over any 10 sq. ft. and bare spots not exceeding 12 by 12 inches.
- B. Use specified materials to reestablish seed that does not comply with requirements and continue maintenance until establishment is satisfactory.

END OF SECTION 329200

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plants.
 - 2. Tree-watering devices.
 - 3. Landscape edgings.

1.2 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- D. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Ponderosa State Park, Kokanee Cove.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples of each type of mulch.

1.5 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

1.7 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 1. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- B. Handle planting stock by root ball.
- C. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.9 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, neglect by Owner, or acts of nature (disease, pest, etc.).
 - b. Structural failures including plantings falling or blowing over..
 - 2. Warranty Periods: 12 months from date of Final Acceptance unless otherwise specified.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

2.2 FERTILIZERS

- A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1. Size: 5-gram
 - 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

- A. Organic Mulch: Permabark
 - 1. Size Range: Mini (approximately 3/4-inch minus)
 - 2. Color: Black and Tan

2.4 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

2.5 TREE-WATERING DEVICES

- A. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period; manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.
 - 1. 20 GALLON LEONARD ARBORRAIN HYDRATION SYSTEM OR APPROVED EQUAL PER PLANS.

2.6 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil
- B. Placing Planting Soil: Place manufactured planting soil over exposed subgrade.
- C. Before planting, obtain Landscape Architect's or Owner's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

2.7 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1. Excavate planting pits per landscape details.
 - 2. Excavate approximately three times as wide as ball diameter.
 - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball..
- B. Backfill Soil:
 - 1. Tree pits and planter beds - uniform backfill and soil mix as described below.
 - a. Seven parts native topsoil, by volume
 - b. Three parts compost, by volume
 - c. Seventeen lbs. Gro-Power Plus
 - d. Two lbs. soil sulfur

2.8 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set each plant plumb and in center of planting pit or trench with root flare 1 inch above finish grades.
 - 1. Backfill: See Backfill Soil.
 - 2. Balled and Burlapped Stock: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Container-Grown Stock: Carefully remove root ball from container without damaging root ball or plant.

4. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 5. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - a. Quantity: Per manufacturers recommendation.
 6. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

2.9 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

2.10 GROUND COVER AND PLANT PLANTING

- A. Spread soil amendment mixture (see Backfill Soil) per depths indicated on plans. Rototill soil amendments into planter bed (8) inches deep until a homogeneous mixture results. Rototill prior to installation of plan material.
- B. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings.
- C. Dig holes large enough to allow spreading of roots.
- D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

2.11 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch. Do not place mulch within 3 inches of trunks or stems.

2.12 INSTALLATION OF SLOW-RELEASE WATERING DEVICE

- A. Provide one device for each tree.

2.13 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
- D. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

2.14 MAINTENANCE SERVICE

- A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until final acceptance of project.

END OF SECTION 329300



January 6, 2023

KM Engineering
5725 North Discovery Way
Boise, Idaho 83713

Attention: Kevin McCarthy (kevin@kmengllp.com)

**RE: Geotechnical Evaluation
Kokanee Cove Renovations
Ponderosa State Park
McCall, Idaho
ALLWEST Project No. 522-443G**

Mr. McCarthy,

ALLWEST has completed the authorized geotechnical evaluation for the proposed Kokanee Cove Renovations to be located at Ponderosa State Park in McCall, Idaho. The purpose of this evaluation was to characterize the subsurface conditions at the site and prepare the attached report with the results of our field evaluation and laboratory testing, and our geotechnical recommendations to assist planning, design, and construction of the proposed development.

We appreciate the opportunity to provide services for this project. If you have any questions or need additional information, please contact us at (208) 895-7898.

Sincerely,

ALLWEST

Adrian Mascorro, P.E.
Area Manager



Kevin Dyekman, P.G.
Engineering Services Manager

**GEOTECHNICAL EVALUATION
KOKANEE COVE RENOVATIONS
PONDEROSA STATE PARK
MCCALL, IDAHO
ALLWEST PROJECT NO. 522-443G**

January 6, 2023

Prepared for:
KM ENGINEERING
5725 NORTH DISCOVERY WAY
BOISE, IDAHO 83713

Prepared by:
ALLWEST
255 NORTH LINDER ROAD, SUITE 100
MERIDIAN, IDAHO 83642



EXECUTIVE SUMMARY

The following summarizes select geotechnical information/recommendations from our evaluation:

- ◆ We anticipate approximately 6 to 12 inches of site stripping will be required for most of the site to remove surficial vegetation and roots (topsoil).
- ◆ In general, subsurface soils within the observed test pits consisted of silty sands, silty sands with gravel, and poorly-graded sands (with silt and/or gravel). Subrounded cobbles and boulders were also commonly observed throughout the soil profiles.
- ◆ At the time of exploration, we did not observe groundwater within the test pits to the maximum explored depth of 10 feet below existing ground.
- ◆ Excavation refusal due to dense cobbles and boulders was encountered in select test pits. Excavation of dense cobbles and boulders may require larger excavation equipment, hydraulic breakers, or other methods to achieve design subgrade depths.
- ◆ We recommend on-site stormwater disposal be achieved within silty sand with gravel or within poorly-graded sand with gravel soil layers. A design seepage rate of 2 in/hr is recommended for disposal into silty sand with gravel soils, and a design seepage rate of 8 in/hr is recommended for disposal into poorly-graded sand with gravel soils.
- ◆ Asphalt pavement sections for light vehicle traffic should consist of 2.5-inches of asphalt concrete, over 4-inches of crushed aggregate base, over 13-inches of aggregate subbase.
- ◆ Asphalt pavement sections for heavy-duty traffic should consist of 3-inches of asphalt concrete, over 6-inches of crushed aggregate base, over 12-inches of aggregate subbase.
- ◆ The proposed cabins should be supported by conventional spread footings bearing entirely on suitable native soils consisting of silty sands, silty sands with gravel, and/or poorly-graded sands (with silt and/or gravel). If a higher allowable bearing pressure is desired, spread footings may bear entirely on a minimum of 1 foot of granular structural fill placed over suitable native soil subgrades. Allowable bearing values are provided in section 6.9 *Foundation Recommendations*.
- ◆ We recommend placing a minimum of 12 inches of crushed base course below exterior slabs and flatwork. We recommend placing a minimum of 6 inches of crushed base course below interior slabs.

Our services were provided in accordance with our proposal No. 522-443P dated August 25, 2022. This summary should be used in conjunction with the entire report for design and construction purposes. It should be recognized that details were not included or fully developed in this section, and the report should be read in its entirety for a comprehensive understanding of the items contained herein.



**GEOTECHNICAL EVALUATION
KOKANEE COVE RENOVATIONS
PONDEROSA STATE PARK
MCCALL, IDAHO**

	Page
1.0 PROJECT DOCUMENTS	1
2.0 PROJECT DESCRIPTION.....	1
3.0 EVALUATION PROCEDURES	2
4.0 SITE CONDITIONS	2
4.1 Published Geologic and Soil Information	2
4.2 Subsurface Soil Conditions	3
4.3 Groundwater Conditions.....	3
5.0 LABORATORY TESTING.....	4
6.0 CONCLUSIONS AND RECOMMENDATIONS.....	4
6.1 Site Preparation.....	4
6.2 Excavations	7
6.3 Materials.....	7
6.4 Fill Placement and Compaction.....	8
6.5 Wet Weather Construction	8
6.6 Cold Weather Construction	9
6.7 Stormwater Disposal and Drainage.....	9
6.8 Asphalt Pavement	10
6.9 Foundation Recommendations	11
6.10 Concrete Slabs-on-Grade	12
6.11 Seismic Design Parameters	12
6.12 Grading and Drainage	13
6.13 Corrosion Potential.....	13
7.0 ADDITIONAL RECOMMENDED SERVICES	14
8.0 EVALUATION LIMITATIONS.....	14

Appendix A – Vicinity Map, Exploration Location Maps

Appendix B – Test Pit Logs, Unified Soil Classification System

Appendix C – Laboratory Test Results



GEOTECHNICAL | ENVIRONMENTAL
MATERIALS TESTING | SPECIAL INSPECTION

AN EMPLOYEE-OWNED COMPANY

**GEOTECHNICAL EVALUATION
KOKANEE COVE RENOVATIONS
PONDEROSA STATE PARK
MCCALL, IDAHO**

1.0 PROJECT DOCUMENTS

The following documents were provided to ALLWEST to help develop our understanding of the planned renovations and development:

- ◆ *Ponderosa State Park, Chapel Vicinity RV, Layout Option D*, prepared by KM Engineering, dated October 7, 2022
- ◆ *Memorandum for Ponderosa State Park – Kokanee Cove*, prepared by KM Engineering, dated July 28, 2022.
- ◆ *Memorandum for Ponderosa State Park Kokanee Cove – Project Scope*, prepared by KM Engineering, dated August 11, 2022.
- ◆ *Google Earth Placemark (KMZ file)*, sent by KM Engineering, received August 19, 2022.
- ◆ *Well Driller's Report for Well Tag No. D0057862 (Old Nazarene Church Camp)*, date completed May 25, 2011.
- ◆ *Untitled Aerial Image (depicting approximate location of existing sewer lines)*, received August 19, 2022.

2.0 PROJECT DESCRIPTION

Based on communication with you and review of the project documents, we understand that the proposed Kokanee Cove Renovations project (located approximately ¾ miles northeast of the Ponderosa State Park Visitors Center) will include renovating an existing chapel building, as well as constructing 4 new cabins (approximately 850 square-feet each) and 11 RV stalls with asphalt-paved access drives/parking areas, stormwater disposal facilities, and other infrastructure. Select existing structures and amenities will be demolished as part of the Kokanee Cove Renovations. In addition, separate areas for 2 potential seasonal cabins are proposed along Park Residence Road and Davis Avenue; these areas are located south of the main Kokanee Cove Renovations area. We anticipate that the Kokanee Cove cabins and the potential seasonal cabins, will be one- to two-story wood-framed structures supported on traditional shallow foundations with raised wood floors, and slab-on-grade construction for garages.



3.0 EVALUATION PROCEDURES

To complete this evaluation, we reviewed published geologic/soil information and advanced exploratory test pits on-site to evaluate the subsurface conditions. The general locations of the Kokanee Cove Renovations and potential seasonal cabins are shown on *Figure A-1: Vicinity Map* in Appendix A.

We observed the excavation of 7 test pits (TP-1 through TP-7) on October 6, 2022, utilizing a Yanmar Mini-Excavator with a 24-inch-wide toothed excavation bucket. Five test pits were placed throughout the Kokanee Cove Renovations area, and one test pit was placed adjacent to each of the potential seasonal cabin areas. Test pits were advanced to maximum depths of 6 to 10 feet below existing ground. Maximum depths varied due to excavation refusal on dense cobbles and/or boulders encountered during excavation. The approximate locations of the test pits within the Kokanee Cove Renovations and potential seasonal cabin areas are shown on *Figure A-2* and *Figure A-3*, respectively, in Appendix A.

The soils observed in the test pits were visually described and classified in general accordance with ASTM D 2488. We logged the subsurface profiles and obtained soil samples at select depths for further identification and laboratory testing. We also performed 2 field seepage tests within select test pits located in the Kokanee Cove Renovations area. Information obtained from the field evaluation, laboratory testing, and geotechnical analysis was utilized to develop the recommendations presented in this report. Information obtained from the field evaluation, laboratory testing, and geotechnical analyses was utilized to develop the recommendations presented in this report.

4.0 SITE CONDITIONS

At the time of exploration, the Kokanee Cove Renovations area consisted of an existing chapel and dorm buildings with dirt access roads and parking areas. The existing amenities were surrounded by trees and minor-to-moderate amounts of vegetation. The two potential seasonal cabin areas consisted of undeveloped land with trees and minor-to-moderate amounts of vegetation.

4.1 Published Geologic and Soil Information

The geologic conditions within the Kokanee Cove Renovations area are mapped as Younger Till Deposits of late-Pleistocene Glaciation (map symbol – Qgt_{1y}), and within the potential seasonal cabin areas are mapped as Younger Outwash of late-Pleistocene Glaciation (map symbol – Qgo_{1y}), on the *Surficial Geologic Map of Long Valley, Valley County, Idaho*, by R.M. Breckenridge and K.L. Othberg (2006). The Younger Till Deposits of late-Pleistocene Glaciation unit is described as surficial cobbly and bouldery sand underlain by gravelly coarse sand with a silty fine



sand matrix and pebble to boulder sized gravel. These deposits are 3 to 33 feet thick. The Younger Outwash of late-Pleistocene Glaciation unit is described as coarse sand with a silty fine sand matrix that is more than 10 feet thick.

The USDA Natural Resources Conservation Service (NRCS), which maps the upper 5 feet of the soil profile, has mapped soils in the Kokanee Cove Renovations area as McCall Complex and in the potential seasonal cabin areas as Kangas fine gravelly loamy coarse sand. These soils consist of very cobbly sandy loam, very cobbly coarse sand, fine gravelly coarse sand, and fine gravelly loamy coarse sand. Parent materials of these soils include till and outwash.

The soils encountered in test pits are generally consistent with published information.

4.2 Subsurface Soil Conditions

At the time of exploration, the development areas contained approximately 6 to 12 inches of surficial roots and vegetation at the ground surface. Tree roots were also observed within select test pits down to depths of 1.5 to 2 feet. Native subsurface soils within the observed test pits consisted of silty sands, silty sands with gravel, and poorly-graded sands (with silt and/or gravel). In general, these soils were observed to be brown to light brown, medium dense to dense, and dry to moist. Subrounded cobbles and boulders were also commonly observed throughout the soil profiles. Excavation refusal due to dense cobbles and boulders was encountered in select test pits.

Detailed descriptions of the soil observed within the test pits are presented on the individual test pit logs in Appendix B. The descriptive soil terms used on the test pit logs, and in this report, can be referenced by the *Unified Soil Classification System (USCS)*. A summary of the USCS is included in Appendix B. Subsurface conditions may vary between exploration locations; such changes in subsurface conditions may not be apparent until construction.

4.3 Groundwater Conditions

At the time of exploration, we did not observe groundwater within the test pits to the maximum explored depth of 10 feet below existing ground. Groundwater in the area is typically influenced by water levels of Payette Lake, precipitation, and snowmelt. Groundwater may also be influenced by local irrigation, on-site construction, and development to adjacent sites. Groundwater will fluctuate throughout the different seasons of the year and will likely peak during snowmelt and irrigation seasons (April to October).

We installed slotted PVC pipes within 2 test pits within the Kokanee Cove Renovations area for future groundwater monitoring. If requested, ALLWEST can perform monthly groundwater monitoring to help establish seasonal high groundwater elevations throughout the site.



5.0 LABORATORY TESTING

We performed or outsourced laboratory testing to supplement field classifications and assess some of the soil engineering properties and parameters. Laboratory testing included fines content (ASTM D1140), moisture content (ASTM D2216), liquid and plastic limits (ASTM D4318), California bearing ratio (CBR) (ASTM D1883), pH (AASHTO T289), resistivity (EPA 120.1), and sulfate/chloride content (EPA 300.0). The laboratory test results are included in Appendix C, and are also summarized on the individual test pit logs in Appendix B.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our field observations, testing, and evaluation, in our opinion the site is suitable for the planned development provided our recommendations are properly implemented. The following recommendations are presented to assist planning, design, and construction of the proposed renovations and development, relative to earthwork, utilities, stormwater disposal, asphalt pavement section design, and foundation construction.

The following recommendations are based on our understanding of the proposed development, the subsurface conditions observed, laboratory test results, and engineering analysis. If the proposed development changes or if unforeseen conditions are encountered, we must be given the opportunity to review the new information, and if necessary, update our recommendations.

6.1 Site Preparation

- ◆ Prior to conducting site grading, surficial soil containing vegetation, roots, and organics should be removed below proposed site grading fill areas, pavement areas, structural areas, and any other development areas. In general, we anticipate approximately 6 to 12 inches of site stripping will be required for most of the site to remove surficial vegetation and roots (topsoil).
- ◆ Where trees are encountered and will be removed as part of the development, large root systems should be completely over-excavated and replaced with suitable fill soils. Tree root depths will not fully be known until construction, but we anticipate approximately 2 to 3 feet of over-excavation will be required to remove large tree root systems.
- ◆ Where existing structures, outbuildings, and infrastructure will be demolished as part of this development, complete over-excavation is required down to suitable native soils. This includes any existing drain fields or previously placed undocumented fill. Depths and lateral limits of required over-excavation will not fully be known until construction. As such, the earthwork contractor should have contingencies in place to ensure these areas are completely over-excavated within proposed development areas.



- ◆ Loose test pit backfill will settle with time, so where any test pits are located below proposed pavement, structural, or any development areas, loose test pit backfill soil must be re-excavated its entire depth and replaced with suitably moisture-conditioned and compacted fill soils. Over-excavated soils can be reused as compacted fill soils, provided the soils are not overly saturated, and they can achieve the required compaction criteria as provided in section 6.4 *Fill Placement and Compaction*. Test pit locations may be identified in the field by white-flagged stakes (if still present from pre-marking) and/or white PVC pipes (where installed for future groundwater monitoring). The approximate locations of the test pits within the Kokanee Cove Renovations and potential seasonal cabin areas are shown on *Figure A-2* and *Figure A-3*, respectively, in Appendix A. We recommend test pit locations be accurately surveyed so that they may be located and remediated prior to earthwork construction and development.
- ◆ After site stripping, over-excavations, loose test pit remediation, and prior to site grading, utility/roadway construction, or any other type of development, exposed subgrades should be proof-rolled with a minimum 5-ton vibratory roller, with loaded dump trucks/front-end loaders, or with a vibratory hoe-pack, to confirm subgrade stability. This will also assist in identifying any soft subgrade areas. If native subgrades are observed to significantly deflect or pump, the subgrades should be over-excavated and replaced with properly compacted fill or stabilized as recommended in section 6.1.1 *Subgrade Stabilization*.
- ◆ Excavations for foundations, flatwork, and pavements should be accomplished using a smooth-blade bucket to limit subgrade disturbance.

6.1.1 Subgrade Stabilization

If native subgrades are observed to significantly deflect or pump during earthwork grading, the disturbed subgrades should be over-excavated and replaced with properly compacted fills or stabilized prior to fill placement.

Subgrades may be stabilized using geosynthetic (geogrid) or woven geotextile reinforcement in conjunction with imported granular structural fill. The required thicknesses of granular structural fill (used in conjunction with geogrid or woven geotextile reinforcement) will be dependent on the construction traffic loading (which is unknown at this time), the type of reinforcement (geogrid or woven geotextile), and subgrade conditions. Therefore, a certain degree of trial and error may be required during construction to verify recommended stabilization section thicknesses and reinforcement types.

Geogrid reinforcement should consist of Tensar TX-160 or equivalent. Woven geotextile reinforcement should consist of Contech C200 or equivalent. Alternatives to these reinforcement types should be approved by the geotechnical engineer prior to use on site. The following recommendations are provided for subgrade stabilization using reinforcement materials.



- ◆ Subgrade soils that are disturbed by construction equipment (caused rutting or pumping) should be over-excavated down to undisturbed native soils, utilizing a smooth-blade bucket to limit further disturbance.
- ◆ Reinforcement materials should be placed on a properly prepared non-disturbed subgrade with smooth surface.
- ◆ If geogrid reinforcement is used, a minimum weight 4-ounce, non-woven filter fabric should first be placed on the properly prepared subgrade. The geogrid reinforcement should then be placed directly on top of the filter fabric. The filter fabric and reinforcement materials should be unrolled in the primary direction of fill placement and should be over-lapped at least 3 feet, or in accordance with manufacturer's recommendations. Filter fabric is not required if a woven geotextile is used for reinforcement.
- ◆ The reinforcement materials should be pulled taut to remove slack.
- ◆ Construction equipment should not be operated directly on reinforcement materials. Structural fill should be placed from outside the excavation to create a pad to operate equipment on. We recommend a minimum of 12 to 18 inches of granular structural fill be placed over the reinforcement materials before operating construction equipment on the fill. Low pressure, track-mounted equipment should be used to place structural fill over the reinforcement materials.
- ◆ Granular structural fill placed directly over reinforcement materials should be properly moisture-conditioned prior to placement, and once placed, be statically rolled. This combination of reinforcement materials and granular structural fill is considered the "bridge" section over soft subgrades.
- ◆ After the first "bridge" section has been placed, the remaining structural fill materials above the "bridge" section should be compacted to structural fill criteria in section 6.4 *Fill Placement and Compaction*, utilizing vibratory compaction methods.
- ◆ Vibratory compaction should be discontinued if it reduces the subgrade stability. If compaction criterion is not met within the fill lift above the "bridge" section, the "bridge" section is not thick enough, and subgrade stabilization should be attempted again with a thicker "bridge" section.

The geotechnical engineer or a representative of the geotechnical engineer should be on-site during subgrade stabilization to verify our recommendations are followed, and to provide additional recommendations, as needed.



6.1.2 Utility Trenches

Support soils for underground utilities will likely consist of silty sands, silty sands with gravel, and poorly-graded sands (with silt and/or gravel and cobbles), as observed during our field exploration. These soils should provide adequate support for utilities, provided utility subgrades are compacted utilizing vibratory methods, such as with a large vibratory hoe-pack.

If utility pipe subgrades are soft, yielding, and/or saturated at the time of construction, subgrade over-excavation and replacement with competent structural fill may be required below utilities. If support soils yield and/or are saturated at the time of construction, we should be notified to observe these soils and provide additional recommendations, as necessary.

6.2 Excavations

We anticipate on-site soils can be excavated with typical excavation equipment. However, excavation refusal due to dense cobbles and boulders was encountered within select test pits. Excavation of dense cobbles and boulders may require larger excavation equipment, hydraulic breakers, or other methods to achieve design subgrade depths.

Slope stability of temporary excavations is a function of many factors, including the presence and abundance of groundwater, the type and density of various soil strata, the depth of cut, surcharge loadings adjacent to the excavation, and the length of time the excavation remains open. It is exceedingly difficult under the variable circumstances to pre-establish a safe and “maintenance-free” temporary cut slope angle. Therefore, it is the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered. Unsupported vertical slopes or cuts deeper than 4 feet are not recommended if worker access is necessary. The cuts should be adequately sloped, shored, or supported to prevent injury to personnel from local sloughing and spalling. The excavation should conform to applicable federal, state, and local regulations. Regarding trench wall support, the site soil is considered Type C soil according to Occupational Safety and Health Administration (OSHA) guidelines and therefore should not exceed a 1.5H:1V (horizontal to vertical) temporary slope.

6.3 Materials

Stripped soils containing vegetation or debris are only suitable for use in non-structural landscape areas. Existing on-site soils may be reused as site grading fill, provided they are stockpiled separately, they meet the criteria below, and they are moisture-conditioned and compacted as required in this report. Imported granular soils should be free of organics, debris, and other deleterious material and meet the following criteria. Import materials should be approved by ALLWEST prior to delivery to the site.



Fill Type	Criteria
Site Grading Fill	Maximum size $\leq$ 6 inches; Retained on $\frac{3}{4}$ -inch sieve $<$ 30%; Liquid limit $<$ 50%
Granular Structural Fill, Granular Subbase	Maximum size $\leq$ 6 inches; Retained on $\frac{3}{4}$ -inch sieve $<$ 30%; Passing No. 200 sieve $\leq$ 15%; Non-plastic Alternatively, meet ISPWC section 801 (6-inch max) or ISPWC section 802 (Type II)
Crushed Base Course	Maximum size $\leq$ 1 inch; Retained on $\frac{3}{4}$ -inch sieve $<$ 10%; Passing No. 200 sieve $<$ 10%; Non-plastic Alternatively, meet ISPWC section 802 (Type I)
Utility Trench Backfill	Maximum size $\leq$ 2 inches; Retained on $\frac{3}{4}$ -inch sieve $<$ 30%; Passing No. 200 sieve $\leq$ 10%; Non-plastic Alternatively, meet ISPWC section 305 (Type I)

6.4 Fill Placement and Compaction

Fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, 8- to 12-inch-thick loose-lifts are appropriate for rubber-tire and steel-drum compaction equipment. Lift thicknesses should be reduced to 4 inches for hand-operated compaction equipment. Fill should be moisture-conditioned to within 2 percentage points of the optimum moisture content prior to placement to facilitate compaction. Fill should be compacted to the following percentages of the maximum dry density based on ASTM D 1557 (modified Proctor).

Fill Area	Compaction (%)
Subgrade ¹	Proof-roll
Site Grading Fill / Granular Structural Fill	95
Granular Subbase / Crushed Base Course	95
Utility Trench Backfill	92

¹Subgrade stability must be verified and approved by a representative of the geotechnical engineer prior to any fill placement or construction.

6.5 Wet Weather Construction

We recommend earthwork for this site be scheduled for the drier seasons of the year. If construction is undertaken in wet periods of the year, it will be important to slope the ground surface to provide drainage away from construction. If construction occurs during or immediately after excessive precipitation, it may be necessary to over-excavate and replace saturated subgrade soil, which might otherwise be suitable.



The on-site soils are sensitive to disturbance when wet. If these soils become wet and unstable, we recommend construction traffic is minimized where these soils are exposed. Low ground-pressure (tracked) equipment should be used to minimize disturbance. Soft and disturbed subgrade areas should be excavated to undisturbed soil and backfilled with structural fill, compacted to requirements stated in this report.

In addition, it should be noted the on-site soils tend to have notable adhesion when wet and may be easily transported off-site by construction traffic.

6.6 Cold Weather Construction

The on-site soils are frost susceptible. If site grading and construction are anticipated during cold weather, we recommend good winter construction practices be observed. Snow and ice should be removed from excavated areas and fill areas, prior to additional earthwork or construction. Pavement and flatwork portions of the construction should not be placed on frozen ground, nor should the supporting soils be permitted to freeze during or after construction. Frozen soils should not be used as fill.

If native subgrades, or suitably moisture-conditioned and compacted fill lifts, will be left exposed to freezing temperatures overnight, those areas should be protected with a minimum of 12 inches of loose soil, or covered with heated construction blankets, so construction subgrades do not freeze. Any frozen soils should be removed prior to additional fill placement or construction of any kind.

Earthwork construction during cold inclement weather will require a higher level of attention and detail to achieve required construction and compaction criteria and may lead to additional earthwork requirements and extended construction schedules.

6.7 Stormwater Disposal and Drainage

During our field exploration we performed seepage testing in test pits TP-1 and TP-4 within silty sand with gravel and cobbles, and within poorly-graded sand with gravel and cobbles. We obtained field-measured seepage rates of 3 inches per hour (in/hr) within the silty sand with gravel and cobbles, and greater than 15 in/hr within the poorly-graded sand with gravel and cobbles.

We recommend the following seepage rates be utilized for on-site civil stormwater disposal design within silty sand with gravel and poorly-graded sand with gravel soil layers.

- ◆ Silty Sand with Gravel and Cobbles 2 in/hr
- ◆ Poorly-graded Sand with Gravel and Cobbles 8 in/hr



Stormwater disposal facilities should be constructed a minimum of 1 foot into the recommended receiving soil. Filter fabric should be properly utilized to separate native soils from stormwater disposal facility drain rock and filter sand materials to help prevent fine-soil migration into drainable/filtering media, as required by civil design.

The proper separation from the bottom of stormwater disposal facilities and seasonal high groundwater should be maintained. As such, the presence or absence of seasonal high groundwater should be confirmed via groundwater monitoring throughout seasonal snowmelt and irrigation seasons (April to October). We installed slotted PVC pipes within 2 test pits within the Kokanee Cove Renovations area for future groundwater monitoring. If requested, ALLWEST can perform monthly groundwater monitoring to help establish seasonal high groundwater elevations within the Kokanee Cove Renovations area.

We recommend the final grading plan for the project include adequate slopes and/or gradients that direct stormwater run-off away from structures, flatwork, and pavement areas to a stormwater management system. Water should not be allowed to pond or infiltrate adjacent to any development areas.

6.8 Asphalt Pavement

Prior to pavement section construction, exposed subgrade soils should be proof-rolled as recommended in section 6.1 *Site Preparation*. Access drives and parking areas for light vehicle traffic should be designed for a 20-year *Equivalent Single Axle Load* (ESAL) of 33,000, which is equivalent to *Traffic Index* (TI) value of 6 (similar to a local roadway). Where heavy-duty traffic is expected, access drives and parking areas should be designed with a 20-year ESAL of 370,000, which is equivalent to a TI of 8 (similar to a collector roadway). If actual traffic conditions are different than what is stated, we should be notified so that we may modify our pavement section design.

Based on existing site grades, it is anticipated that majority of pavement subgrade areas will consist of silty sand, silty sand with gravel, and/or poorly-graded sand (with silt and/or gravel). We performed CBR testing on a silty sand with gravel soil to evaluate pavement section design and obtained a CBR of 12.3, which is approximately equivalent to an R-value of 21. These values were utilized in our pavement section design.

The following flexible asphalt pavement sections were designed utilizing the AASHTO pavement methodology, our experience with local jurisdictions, and the anticipated frost depth in the area. Based on subgrade preparation requirements and design assumptions, we recommend the following pavement sections be utilized for construction of access drives and parking areas for light vehicle and heavy-duty traffic.



Pavement Application	Asphalt Concrete (inches)	Crushed Base Course (inches)	Granular Subbase (inches)
Light Vehicle Traffic	2.5	4	13
Heavy-Duty Traffic	3	6	12

Base course and subbase should conform to the material recommendations as noted in this report and should be placed over a properly prepared subgrade. Finished asphalt surfaces should slope no less than 2% to help reduce the potential for surface water to infiltrate into the underlying pavement sections and subgrade soils. If the overall site is relatively flat, then finished asphalt surfaces should be constructed with crowns that slope away at a minimum gradient of 2% toward stormwater collection areas.

Crack maintenance on pavements should be performed at least every 3 years, or when cracking is evident. Crack sealing will help reduce surface water from infiltrating into the supporting soils.

6.9 Foundation Recommendations

The proposed one- to two-story cabins may be supported on conventional spread footing, provided the recommendations included herein are properly implemented during design and construction.

- ◆ For frost protection, conventional spread footings should be embedded at least 30 inches below the lowest final adjacent grade.
- ◆ Spread footings should bear entirely on suitable native soils consisting of silty sands, silty sands with gravel, and poorly-graded sands (with silt and/or gravel).
- ◆ If a higher allowable bearing pressure is desired, spread footings may bear entirely on a minimum of 1 foot of granular structural fill placed over suitable native soil subgrades.
- ◆ If used, granular structural fill should extend a minimum of 6 inches beyond the edges of the spread footings and be compacted as recommended in section 6.4 *Fill Placement and Compaction*.
- ◆ ALLWEST should observe any foundation excavations, including column footings for porches and/or canopies, to confirm subgrade suitability and confirm that our recommendations are being properly implemented. Foundation subgrade soils should be probed, and any over-excavations should be approved, prior to placement of granular structural fill or concrete.
- ◆ If subgrades are constructed and approved as stated above, spread footings/foundations may be designed using the following allowable bearing pressures:



Bearing Condition	Allowable Bearing Pressure (psf)	Minimum Granular Structural Fill Thickness below Footing (feet)
Suitable Native Soils	2,000	-
Granular Structural Fill Over Suitable Native Soils	2,500	1

- ◆ The net allowable bearing pressure value may be increased by 1/3 to account for transient loads such as wind and seismic.
- ◆ If the previous recommendations are implemented, it is our opinion total settlement will be approximately less than 1 inch and differential settlement will be approximately less than ½ of an inch over a 30-foot span.
- ◆ A coefficient of friction of 0.40 may be used for sliding resistance between concrete and native soils. A coefficient of friction of 0.45 may be used for sliding resistance between concrete and granular structural fill.

6.10 Concrete Slabs-on-Grade

For exterior concrete slabs and flatwork, we recommend placing a minimum of 12 inches of crushed base course below any concrete. For interior slabs, we recommend placing a minimum of 6 inches of crushed base course below any concrete. Subgrades within these areas should be prepared as indicated in section 6.1 *Site Preparation* and be suitably proof-rolled utilizing vibratory compaction equipment. Base course should be compacted as recommended in section 6.4 *Fill Placement and Compaction*.

If moisture-sensitive floor coverings are planned, we recommend consideration be given to including a moisture vapor retarder beneath concrete slab-on-grade floors to retard moisture migration through the slabs. We recommend the moisture retarder be installed per American Concrete Institute (ACI) recommendations and specifications. To protect slabs from moisture migration which may impact flooring performance, it is important to include the moisture vapor retarder as well as directing surface and subsurface water away from the slabs. In addition, concrete should have adequate time to cure prior to placing impermeable flooring.

6.11 Seismic Design Parameters

We anticipate the most current edition of the International Building Code (IBC) will be used as the basis for design of the proposed structures. Based on our experience and review of well driller logs in the area, the subsurface soils up to 100 feet below ground can be characterized as Site Class D “stiff soil” for seismic design.



The following seismic parameters were calculated using OSHPD Seismic Design Maps using site-specific latitude and longitude coordinates. The calculated seismic design parameters within the Kokanee Cove Renovations area and the seasonal cabin areas were similar. As such, the following maximum earthquake spectral response accelerations may be used for design.

Latitude	Longitude	Spectral Accelerations		Site Coefficients	
		S _s	S ₁	F _a	F _v
44.934425°	-116.083039°	0.413	0.129	1.470	2.284

6.12 Grading and Drainage

Final grades should slope down and away from the completed building foundation at a minimum gradient of 5% within the first 5 feet. Final grades adjacent to foundations should be based on the grade of properly moisture-conditioned and compacted ground surfaces, not the grade of loose/dry soil, or the grades of landscape rock/gravel adjacent to the foundation. If the adjoining ground surfaces consist of impermeable hardscapes (i.e., asphalt or concrete), those surfaces may be sloped at a minimum gradient of 2% within the first 5 feet.

6.13 Corrosion Potential

Resistivity, pH, and chloride testing were performed on a near surface silty sand with gravel soil sample to evaluate the corrosion potential of the on-site soils to buried metal (cables, pipes, piles, etc.). Laboratory testing of the on-site soil resulted in a resistivity value of 16,670 Ohm-cm, pH value of 6.7, and chloride concentration of 17 parts per million (ppm).

A pH of 7 is considered neutral, values below 7 are considered acidic, and values above 7 are considered basic; pH ranges of 5 to 8.5 are generally considered unlikely to have a significant influence on corrosion of buried metals.

In general, soil resistivity values below 1,000 are considered extremely corrosive to metal, values between 1,000 and 3,000 are considered highly corrosive to metal, values between 3,000 and 10,000 are considered mildly corrosive to metal, and values above 10,000 are considered noncorrosive to metal (Roberge, 2006). Based on resistivity test results, the on-site soils are considered noncorrosive to buried metal.

Chloride can affect buried metals differently and the severity of the effect is dependent on the type of metal and the chloride concentration of the soil. Relevant protection/coating should be determined by the design engineer based on the type of metal to be buried and the anticipated chloride concentrations.

Sulfate testing was also performed to evaluate requirements for concrete exposed to water-soluble sulfates in soil. Based on sulfate test results, the on-site soils are designated to class "S0" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the on-site soils should be designed according to ACI 318-19, Table 19.3.2.1 using the "S0" sulfate classification.



7.0 ADDITIONAL RECOMMENDED SERVICES

To maintain continuity and efficiency, we recommend ALLWEST be retained to provide observations and testing throughout earthwork construction. As an independent testing company, ALLWEST can document the recommendations included in this report are properly implemented, provide quality control testing, and observe earthwork for conformance to project specifications. As a minimum, we recommend the following testing and observations be provided by ALLWEST:

- ◆ Observe site stripping, compaction of test pit backfill, and any other soil over-excavations and backfills.
- ◆ Observe subgrade proof-rolling and approve subgrades prior to fill construction, materials placement, or pavement section/utility construction.
- ◆ Observe removal of disturbed soil and subgrade stabilization, if required.
- ◆ Observe and approve foundation subgrades prior to placement of fill and/or concrete.
- ◆ Conduct compaction testing of fill soils for general site grading, utility backfills, pavement subsections.
- ◆ Observe placement of/test asphalt for compaction, oil content, and gradation.

If we are not retained to provide the recommended construction observation and testing services, we shall not be responsible for soil engineering-related construction errors or omissions.

8.0 EVALUATION LIMITATIONS

This report has been prepared to assist the planning, design, and construction for the Kokanee Cove Renovations project to be located in McCall, Idaho. Reliance by any other party is prohibited without the written authorization of ALLWEST. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices in the local area at the time this report was prepared. This acknowledgement is in lieu of all warranties, express or implied.

The following appendices complete this report:

Appendix A – Vicinity Map, Exploration Location Maps
Appendix B – Test Pit Logs, Unified Soil Classification System
Appendix C – Laboratory Test Result



Appendix A

A-1: Vicinity Map

A-2: Exploration Location Map (Kokanee Cove)

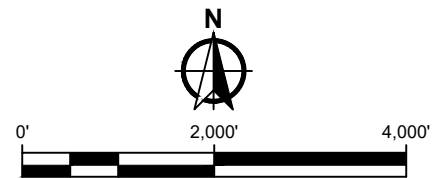
A-3: Exploration Location Map (Seasonal Cabins)



GEOTECHNICAL | ENVIRONMENTAL
MATERIALS TESTING | SPECIAL INSPECTION

AN EMPLOYEE-OWNED COMPANY

Base Map: Google Earth



255 N. LINDER ROAD, SUITE 100
MERIDIAN IDAHO, 83642
PHONE: (208) 895-7898 FAX: (208) 898-3959

FIGURE A-1: VICINITY MAP

GEOTECHNICAL EVALUATION

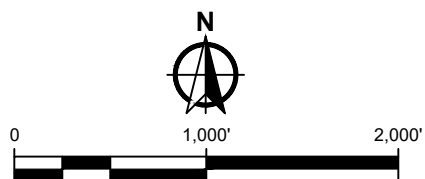
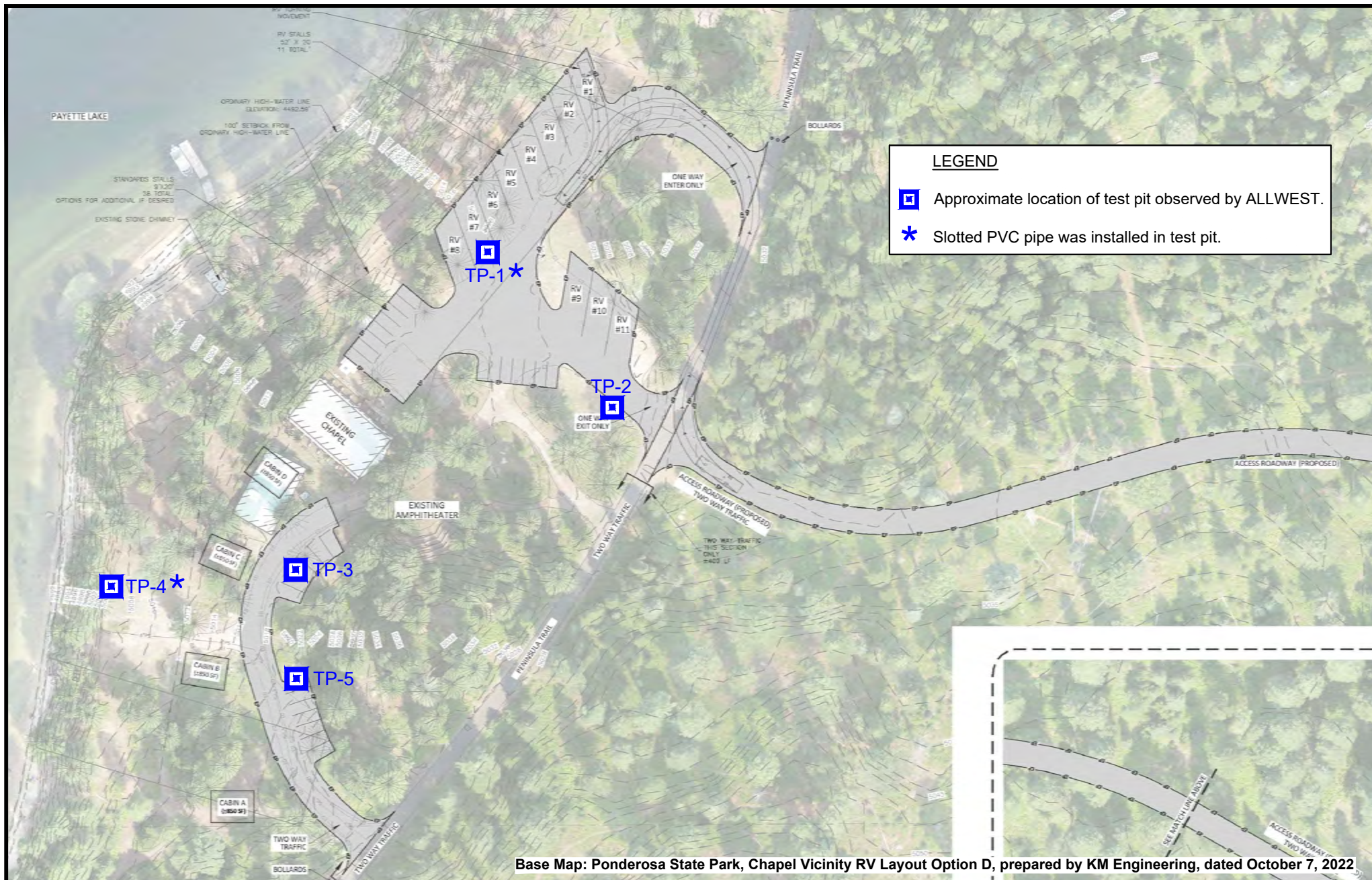
PONDEROSA STATE PARK - KOKANEE COVE RENOVATIONS

MCCALL, IDAHO

CLIENT: KM ENGINEERING

PROJECT NO.: 522-443G

DATE: JANUARY 2023



ALLWEST

255 N. LINDER ROAD, SUITE 100
 MERIDIAN IDAHO, 83642
 PHONE: (208) 895-7898 FAX: (208) 898-3959

FIGURE A-2: EXPLORATION LOCATION MAP

GEOTECHNICAL EVALUATION

PONDEROSA STATE PARK - KOKANEE COVE RENOVATIONS

MCCALL, IDAHO

CLIENT: KM ENGINEERING

PROJECT NO.: 522-443G

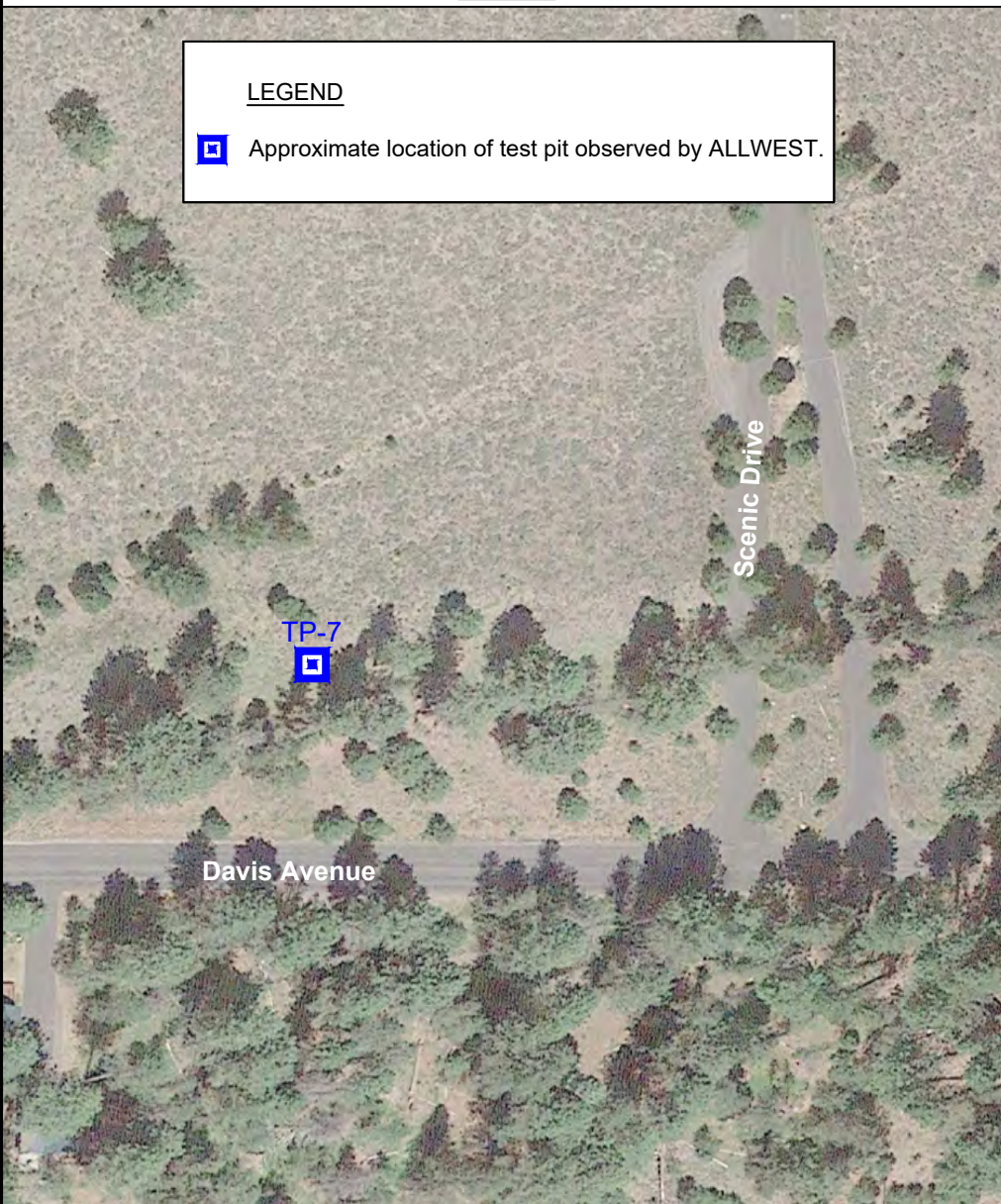
DATE: JANUARY 2023

AREA 1



Base Map: Google Earth

AREA 2



LEGEND

 Approximate location of test pit observed by ALLWEST.



0 1,000' 2,000'




255 N. LINDER ROAD, SUITE 100
MERIDIAN IDAHO, 83642
PHONE: (208) 895-7898 FAX: (208) 898-3959

FIGURE A-3: EXPLORATION LOCATION MAP

GEOTECHNICAL EVALUATION

PONDEROSA STATE PARK - KOKANEE COVE RENOVATIONS

MCCALL, IDAHO

CLIENT: KM ENGINEERING

PROJECT NO.: 522-443G

DATE: JANUARY 2023

Appendix B

Test Pit Logs

Unified Soil Classification System



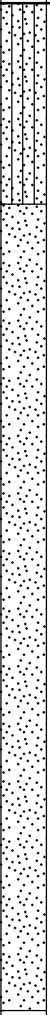
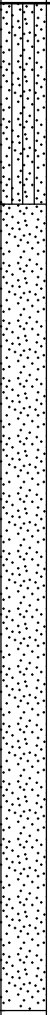
GEOTECHNICAL | ENVIRONMENTAL
MATERIALS TESTING | SPECIAL INSPECTION

AN EMPLOYEE-OWNED COMPANY

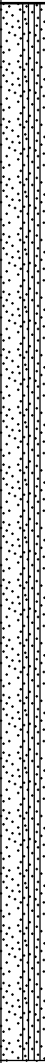
ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 1 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°56'7.1988" (44.935333°)		GRAPHIC LOG	SAMPLE	NOTES
		LONGITUDE (DEGREES): W -116°4'56.6832" (-116.082412°)				
		TOTAL DEPTH: 9'				
		DESCRIPTION				
0	SM	Silty SAND with Gravel and Cobbles (Native); brown, medium dense, moist ...subrounded cobbles up to 8 inches in maximum dimension			Bag 1' - 1.5'	Significant roots and vegetation observed to 6 inches. Tree roots observed to 2 feet. Passing No. 200 sieve = 20% Moisture content = 9% pH = 6.7 Resistivity = 16,670 Ohm-cm Sulfate = < 10 ppm Chloride = 17 ppm
1						
2						
3						
4	SP	Poorly-Graded SAND with Gravel; light brown, medium dense, moist			Bag 5' - 5.5'	Passing No. 200 sieve = 13% Moisture content = 5% Field seepage test performed at 7 feet. Field seepage rate = 3 in/hr.
5						
6	SM	Silty SAND with Gravel and Cobbles; brown, dense, moist ...subrounded gravel and cobbles up to 10 inches in maximum dimension			Bag 6.5' - 7'	
7						
8						
9						
10		Test pit terminated at 9 feet due to excavation refusal on dense cobbles. Slotted PVC pipe installed.				
11						
12						
13						
14						
15						
15	WATER LEVELS					
	☒ WHILE EXCAVATING					
	☒ AT COMPLETION					
	☒ AFTER EXCAVATING					

ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 2 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°56'5.9316" (44.934981°)		GRAPHIC LOG	SAMPLE	NOTES
		LONGITUDE (DEGREES): W -116°4'55.308" (-116.08203°)				
		TOTAL DEPTH: 6'				
		DESCRIPTION				
0	SM	Silty SAND with Gravel (Native); brown, medium dense, moist			Bulk 0.5' - 1.5'	Significant roots and vegetation observed to 6 inches. Passing No. 200 sieve = 47 % LL = NV, PL = NP, PI = NP CBR = 12.3
1		...subrounded cobbles and boulders up to 18 inches in maximum dimension observed from 1 to 6 feet				
2						
3						
4						
5						
6		Test pit terminated at 6 feet due to excavation refusal on dense cobbles and boulders.				
7						
8						
9						
10						
11						
12						
13						
14						
15	WATER LEVELS					
	☒ WHILE EXCAVATING					
	☒ AT COMPLETION					
	☒ AFTER EXCAVATING					Sheet 1 of 1

ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 3 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°56'4.6428" (44.934623°)		GRAPHIC LOG	SAMPLE	NOTES
		LONGITUDE (DEGREES): W -116°4'58.7856" (-116.082996°)				
		TOTAL DEPTH: 7'				
		DESCRIPTION				
0	SM	Silty SAND with Gravel and Cobbles (Native); brown, medium dense, dry to moist ...subrounded cobbles up to 8 inches in maximum dimension			Bag 5.5' - 6'	Significant roots and vegetation observed to 12 inches. Tree roots observed to 2 feet.
1						
2						
3						
4						
5	SP-SM	Poorly-Graded SAND with Silt, Gravel, and Cobbles; light brown with orange-brown staining, dense, moist ...subrounded cobbles up to 12 inches in maximum dimension ...moderate induration observed throughout soil layer				Passing No. 200 sieve = 11% Moisture content = 5%
6						
7		Test pit terminated at 7 feet due to excavation refusal on dense cobbles.				
8						
9						
10						
11						
12						
13						
14						
15	WATER LEVELS					
	☒ WHILE EXCAVATING					
	☒ AT COMPLETION					
	☒ AFTER EXCAVATING					

ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 4 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°56'4.4196" (44.934561°) LONGITUDE (DEGREES): W -116°5'0.654" (-116.083515°) TOTAL DEPTH: 10'		GRAPHIC LOG	SAMPLE	NOTES
		DESCRIPTION				
0	SM	Silty SAND (Native); brown, medium dense, dry to moist			Bag 4' - 4.5'	Significant roots and vegetation observed to 12 inches. Passing No. 200 sieve = 3% Moisture content = 4% Field seepage test performed at 4.5 feet. Field seepage rate = > 15 in/hr.
1						
2	SP	Poorly-Graded SAND with Gravel and Cobbles; light brown, medium dense, moist ...subrounded cobbles up to 10 inches in maximum dimension			Bag 7' - 7.5'	Passing No. 200 sieve = 4% Moisture content = 6%
3						
4						
5						
6						
7						
8						
9						
10		Test pit terminated at 10 feet. Slotted PVC pipe installed.				
11						
12						
13						
14						
15	WATER LEVELS					
	☐ WHILE EXCAVATING					
	☐ AT COMPLETION					
	☐ AFTER EXCAVATING					

ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 5 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°56'3.8256" (44.934396°)		GRAPHIC LOG	SAMPLE	NOTES
		LONGITUDE (DEGREES): W -116°4'58.5984" (-116.082944°)				
		TOTAL DEPTH: 6.5'				
		DESCRIPTION				
0	SM	Silty SAND (Native); brown, medium dense, dry to moist				Significant roots and vegetation observed to 6 inches.
1						
2						
3						
4		...subrounded cobbles up to 8 inches in maximum dimension observed from 3 to 5 feet				
5	SP-SM	Poorly-Graded SAND with Silt, Gravel, and Cobbles; light brown with orange-brown staining, medium dense to dense, moist				
6		...subrounded cobbles up to 12 inches in maximum dimension				
7		Test pit terminated at 6.5 feet due to excavation refusal on dense cobbles.				
8						
9						
10						
11						
12						
13						
14						
15	WATER LEVELS					
	☐ WHILE EXCAVATING ☐ AT COMPLETION ☐ AFTER EXCAVATING					

ALLWEST MERIDIAN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG			DATE STARTED: 10/6/2022 DATE FINISHED: 10/6/2022 OPERATOR: Jonathan Prior COMPANY: Dig Earth LOGGER: Kevin Dyekman WEATHER: Sunny		TP - 6 EXCAVATOR: Yanmar Mini-Ex EXCAVATION METHOD: 24-inch bucket	
PROJECT: 522-443G Ponderosa State Park - Kokanee Cove Renovations			NOTES: See Figures A-2 and A-3 in Appendix A for approximate test pit location.			
DEPTH (ft)	USCS	LATITUDE (DEGREES): N 44°55'50.0268" (44.930563°) LONGITUDE (DEGREES): W -116°4'48.81" (-116.080225°) TOTAL DEPTH: 10.5'		GRAPHIC LOG	SAMPLE	NOTES
		DESCRIPTION				
0	SP-SM	Poorly-Graded SAND with Silt (Native); brown, medium dense, moist			Bag 2' - 2.5'	Significant roots and vegetation observed to 6 inches. Tree roots observed to 1.5 feet.
1						
2						Passing No. 200 sieve = 9% Moisture content = 4%
3		...becomes light brown at 3 feet				
4						
5					Bag 4.5' - 5'	
6		...subrounded gravel and cobbles up to 6 inches in maximum dimension observed from 3 to 10.5 feet				
7						
8						
9						
10						
		Test pit terminated at 10.5 feet.				
11						
12						
13						
14						
15	WATER LEVELS					
	☐ WHILE EXCAVATING					
	☐ AT COMPLETION					
	☐ AFTER EXCAVATING					

Unified Soil Classification System

MAJOR DIVISIONS			SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	Well-Graded Gravel, Gravel-Sand Mixtures.
			GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES	GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS	SW	Well-Graded Sand, Gravelly Sand.
			SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES	SM	Silty Sand, Sand-Silt Mixtures.
			SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%		ML	Inorganic Silt, Silty or Clayey Fine Sand.
			CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
			OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic Silt, Elastic Silt, Micaceous Silt, Fine Sand or Silt.
			CH	Inorganic Clay of High Plasticity, Fat Clay.
			OH	Organic Clay of Medium to High Plasticity.
			Highly Organic Soils	



Appendix C

Laboratory Test Results



GEOTECHNICAL | ENVIRONMENTAL
MATERIALS TESTING | SPECIAL INSPECTION

AN EMPLOYEE-OWNED COMPANY

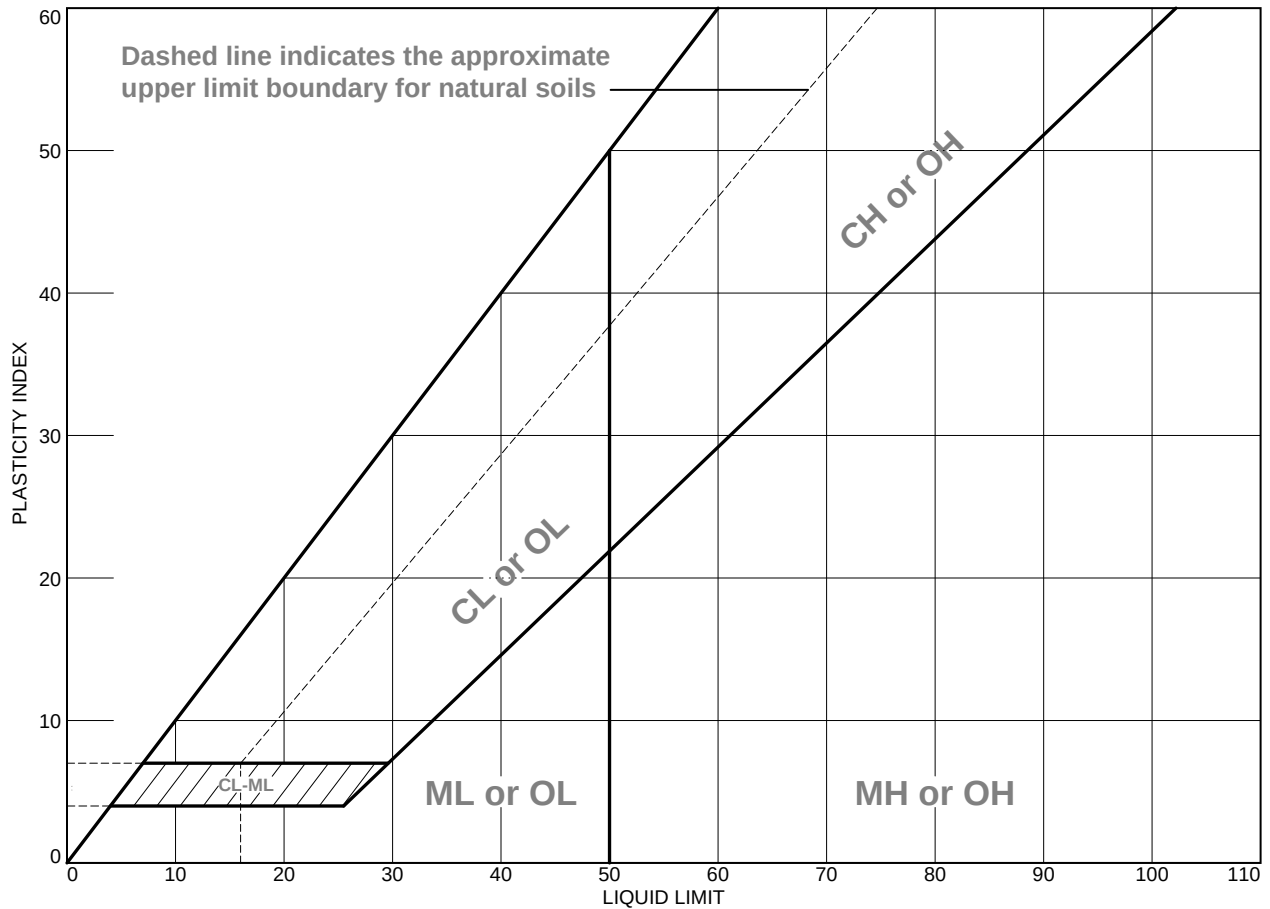
Table C-1: Summary of Laboratory Test Results

[illegible]

NV / NP = No Value / Non-Plastic

*Outsourced testing to Analytical Laboratories.

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
Silty Sand with gravel	NV	NP	NP	--	47%	SM

Project No. 522-443G Client: KM Engineering

Project: Ponderosa State Park - Kokanee Cove

Location: TP-2 Depth: 0.5-1.5'

Remarks:



Figure C-1

Tested By: C. Downes

Checked By: J. Varozza

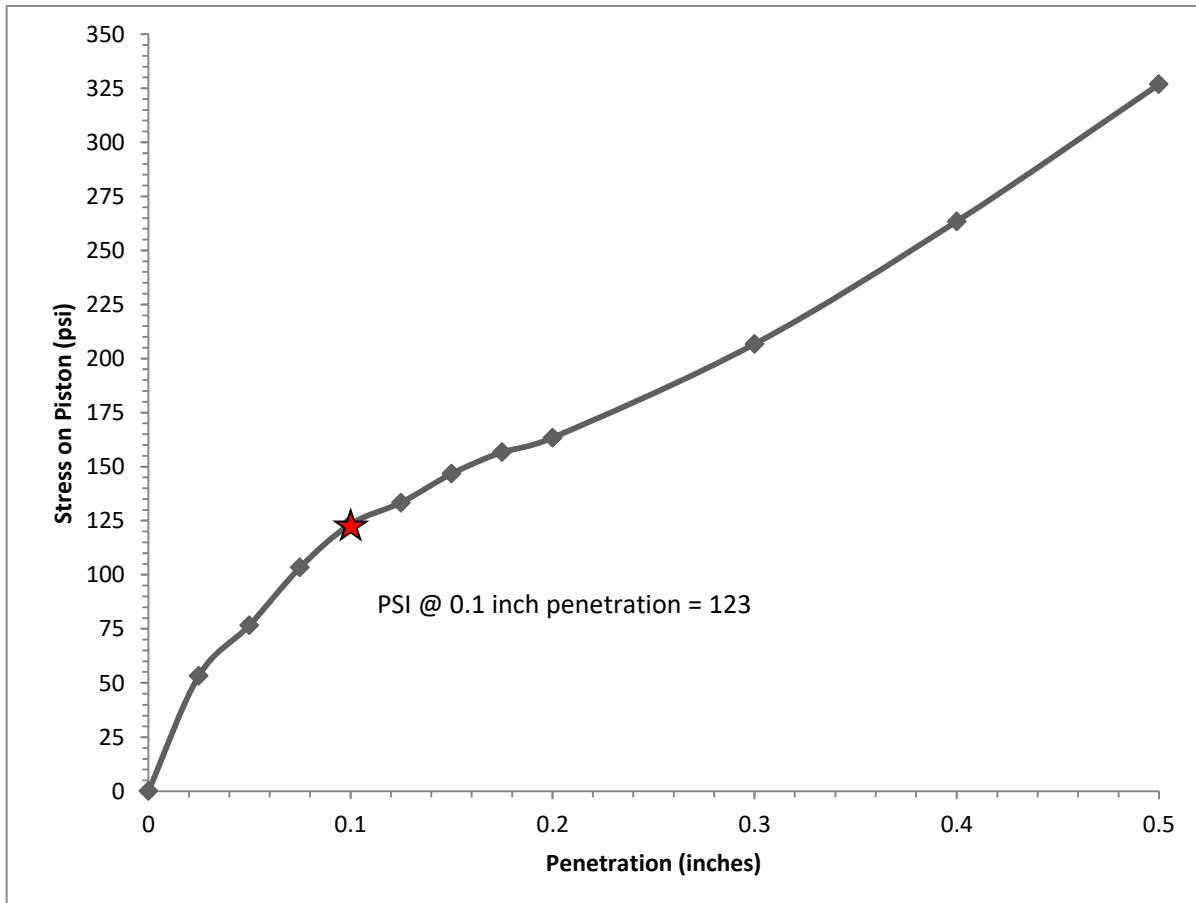
This test report shall not be reproduced except in full without the permission of ALLWEST Testing & Engineering, Inc.

California Bearing Ratio

ASTM D1883

Project: Ponderosa State Park - Kokanee Cove
Renovation
Client: KM Engineering
Date Tested: 11/7/22
Tested By: C. Downes

Project No.: 522-443G
Location: TP-2 @ 0.5 - 1.5 ft
Compaction Method: ASTM D1557
Classification: Silty Sand w/ Gravel (SM)



CBR @ 0.1 Inch Penetration:	12.3
Swell (%):	0.9
Dry Unit Weight Before Soak (pcf):	80.1
Water Content Before Soak (%):	23.3
Water Content After Soak, Top 1 Inch (%):	43.4
Surcharge (psf):	50
Immersion Period (hrs):	96

Maximum Dry Unit Weight (pcf):	88.6
Optimum Water Content (%):	21.8
Remold of Max. Dry Unit Wgt (%):	90

Reviewed By: _____ James Varozza

Figure: C-2



**PAYETTE LAKES RECREATIONAL WATER AND SEWER
DISTRICT**

VALLEY COUNTY, IDAHO

**STANDARD REVISIONS TO 2020 ISPWC
& SUPPLEMENTAL SPECIFICATIONS**

REVISED

MAY 2022



THIS PAGE INTENTIONALLY BLANK

**PAYETTE LAKES RECREATIONAL WATER & SEWER
DISTRICT**

VALLEY COUNTY, IDAHO

**STANDARD REVISIONS TO 2020 ISPWC
& SUPPLEMENTAL SPECIFICATIONS**

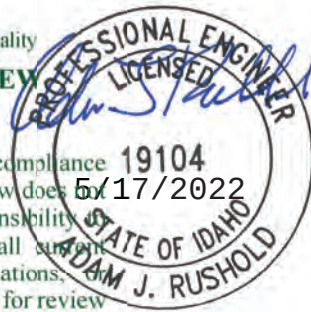
MAY 2022



State of Idaho • Department of Environmental Quality

PLANS & SPECIFICATIONS REVIEW

These plans and/or specifications have been reviewed for compliance with Department of Environmental Quality rules. This review does not relieve the owner, engineer, or the contractor of the responsibility to design or construct these facilities in compliance with all current applicable federal, state, and local laws, rules, regulations, and ordinances. Plans and/or specifications must be resubmitted for review if construction is not completed within one year from approval date.



Dan Smith

Reviewing DEQ Engineer:

May 23, 2022

Approval Date:

Prepared by:

Refer to approval conditions in letter to:

Jeff Bateman

JUB ENGINEERS, Inc.

Engineers • Surveyors • Planners

201 South Jackson Street

Moscow, ID 83843

Project No. 21-21-002

THIS PAGE INTENTIONALLY BLANK

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT

VALLEY COUNTY, IDAHO

STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 10 - GENERAL	2
10.1 DEFINITIONS	2
10.2 GENERAL	3
10.3 STANDARD NOTES AND DRAWINGS.....	6
DIVISION 100 – GENERAL CONDITONS	11
Article 6 – Bonds and Insurance	11
Article 7 – Contractor's Responsibilities.....	11
DIVISION 200 – EARTHWORK	12
Section 202 – Excavation and Embankment	12
Section 203 – Soil Materials	12
Section 204 – Structural Excavation and Compacting Backfill	12
Section 205 – Dewatering.....	12
Section 206 – Permanent Erosion Control.....	13
DIVISION 300 – TRENCHING	14
Section 301 – Trench Excavation	14
Section 304 – Trench Foundation Stabilization.....	14
Section 305 – Pipe Bedding	15
Section 306 – Trench Backfill	16
Section 307 – Street Cuts and Surface Repairs.....	16
DIVISION 500 – SEWER	20
Section 501 – Gravity Sewers	20
Section 502 – Manholes	21
Section 504 - Sewer Services.....	24
Section 505 - Pressure Sewers	26
SP-1 CONSTRUCTION COORDINATION AND SCHEDULING	28
SP-2 SEWAGE BYPASS CONTROL SYSTEMS	30
SP-3 PRIVATE INDIVIDUAL DWELLING LIFT STATIONS.....	32
SP-4 SEWAGE LIFT STATION.....	34
STANDARD DRAWINGS.....	48
APPENDIX A	49

THIS PAGE INTENTIONALLY BLANK

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

DIVISION 10 - GENERAL

10.1 DEFINITIONS

- A. Approved Construction Plans. The official drawings and supplemental drawings approved by the Payette Lakes Recreational Water and Sewer District (PLRWSD), or exact reproductions thereof, showing the location, character, dimensions and details of the work to be done.
- B. Contractor. An individual, partnership, firm or corporation executing a Contract and is primarily responsible for the acceptable performance of the construction, licensed in the State of Idaho as a public works contractor with a specialty license for installation of sewer lines and appurtenances.
- C. District. The Payette Lakes Recreational Water and Sewer District.
- D. District Board of Directors. The Board of Directors of the Payette Lakes Recreational Water and Sewer District.
- E. Drawings of Record. The official drawings and supplemental drawings, or exact reproductions thereof, showing the locations, dimensions, elevations and details of the work completed. The Design Engineer shall request manhole numbers from PLRWSD during design and shall include the assigned numbers on the final Record Drawings. Prior to acceptance and no later than (30) days following completion of construction four (4) sets of record drawings must be provided to Payette Lakes Recreational Water and Sewer District: one (1) reproducible; two (2) full size prints; and one electronic (AutoCAD version 2010 or newer, including datum, projection, and linear unit of distance information), a letter accepting the wastewater system by the District for ownership and maintenance shall be issued after the project successfully passes the final inspection.
- F. Design Engineer. Idaho licensed professional engineer of record for the project.
- G. Engineer. The District Engineer for the Payette Lakes Recreational Water and Sewer District or properly authorized Consulting Engineer, being a registered professional engineer, acting within the authority delegated to him by the PLRWSD.
- H. Payette Lakes Recreational Water and Sewer District Manager. An individual employed by and/or authorized by the District Board of Directors to act within the authority delegated by the District Board of Directors.
- I. Property Owner. A holder or proprietor of land. The property owner owns and is responsible for the maintenance, repair, and replacement (if necessary) of the sewer connection and service line from the point at which it connects into the sewer main line to the structure being served.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

- J. Specifications. The directors, provisions and requirements pertaining to the method and manner of performing the work, the kind and type of equipment, or the qualities of materials to be furnished. Said Specifications shall be the 2020 ISPWC as amended by PLRWSD Standard Specifications or any supplemental specifications approved by the PLRWSD.
- K. Standards and Test Methods. All specifications and test methods of any society, association or organization herein referred to shall be the latest standards and tentative standards as are in force on the date the construction plans are approved. A partial list of said standards is as follows:
- AASHTO - The American Association of State Highway (and Transportation) Officials
 - ASTM - The American Society for Testing Materials
 - ANSI - American National Standards Institute (formerly ASA – American Standards Association)
 - AWWA - American Water Works Association
 - ISPWC - Idaho Standard of Public Works Construction
 - PLRWSD - Payette Lakes Recreational Water & Sewer District

10.2 GENERAL

- A. Intent of Standard Revisions and Supplemental Specifications. The Payette Lakes Recreational Water and Sewer District (PLRWSD) has adopted the 2020 Idaho Standards for Public Works Construction (ISPWC) as its standard construction specifications with the modifications listed in the following PLRWSD Standard Revisions and Supplemental Sections. All construction shall comply with the approved construction plans, ISPWC, and the PLRWSD Standard Revisions and Supplemental Specifications to the ISPWC, all applicable State, Federal, County and local district regulations and specifications, and the conditions of approval placed by the PLRWSD Board of Directors. In the event of a conflict between the ISPWC and the PLRWSD Standard Revisions and Supplemental Specifications, the PLRWSD Standard Revisions and Supplemental Specifications shall govern, unless specifically identified in the design.

These Standard Revisions and Supplemental Specifications were prepared for and apply to general conditions only. The need may arise to alter them to meet specific design conditions. If this occurs, all alterations shall be approved by the PLRWSD. In the event an error or omission is discovered in these Standard Specifications, whether through an oversight or change in technology, the finder shall notify the PLRWSD in writing so that the proper steps may be taken to make the corrections. It

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

is further understood that the PLRWSD or its authorized agents are not responsible for said errors or omissions.

- B. Protection of District Property. Adequate protection shall be provided for all construction projects that impact existing District facilities. All road projects shall include temporary steel plate covers of adequate thickness for traffic loads in order to protect existing manholes, frames, and covers. Any damages to existing District facilities shall be repaired and paid for by the Contractor.

In any situation where an open trench excavation crosses an existing District facility; the following is required:

1. Contractor shall fully support the existing sewer while the trench is open with no allowable settlement of the sewer.
2. Contractor shall conduct a pre- and post-construction CCTV to visually determine if construction has created sags or noticeable changes in grade.
3. Contractor shall install joint restraints on any exposed existing sewer joint within the open trench.

- C. Pre-design Meeting. The Design Engineer or project representative shall arrange a meeting with District's staff prior to the initiating project design.

- D. Progress of Construction. It is the intent of these Contract Documents to ensure the progress of the work shall proceed in a systematic manner for minimal inconvenience to the public and PLRWSD facilities during construction.

Backfilling of any trench shall be accomplished so no section of approved pipe is left open longer than twenty-four (24) hours except by permission of the PLRWSD. Complete backfill and cleanup shall be accomplished after each section of pipe is inspected and approved.

- E. Interfering Structure and Utilities. The Contractor shall exercise all possible caution to prevent damage to existing structures and utilities, whether aboveground or underground. The Contractor shall notify DigLine (811) per Idaho Code §55-2205 at least forty-eight (48) hours in advance of construction operations in which a utility's facilities may be involved. This shall include, but is not limited to, irrigation, water, sanitary sewer, storm sewer, telephone, electric, communications, oil and gas.

It shall be the responsibility of the Contractor to locate and expose all existing underground structures and utilities in advance of the trench excavation. Any structure or utility damaged shall be repaired or replaced in a condition equal to or better than the condition prior to the damage.

The Contractor shall remove and replace or protect such small miscellaneous structures as fences, catch basins, drainpipe, culverts, mailboxes, signposts, buildings, drainage ways or other improvements

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

and similar items. The Contractor shall replace these structures in a condition equal to or better than their original conditions.

All bituminous type pavements requiring surface repair shall be cut prior to any excavation with an approved pavement cutter. The width of pavement cut shall be at least equal to the required width of the trench at ground surface. Pavement removed during excavation shall not be used in the backfill.

If the Contractor encounters existing facilities which prevent the construction of any facility as shown on the Construction Plans, the Contractor shall notify the PLRWSD as to the extent and type of field modification necessary to avoid interfering with the structure or utility.

- F. Public Safety and Convenience. The Contractor shall comply with all rules and regulations of the City, County and State authorities regarding the closing of public streets or highways to the use of public traffic.

The Contractor shall, at all times, conduct work with the least amount of obstruction to traffic and normal commercial pursuits. Where necessary, all obstructions within traveled roadways shall be protected by appropriate signs, barricades and lights, or as ordered by the PLRWSD and the jurisdictional authority for the safety of the traveling public.

The Contractor shall be required to confine construction operations within the dedicated rights-of-way for public thoroughfares or within areas for which construction easements have been obtained unless special arrangements are made with the affected property owners in advance. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be restricted from access to their residence or place of business for a period exceeding eight (8) hours unless the Contractor has made special arrangements with the affected persons.

- G. Contractor's Responsibility for Utility Properties and Services. At locations where the Contractor's operations are adjacent to or cross properties of telegraph, telephone, communications, irrigation or canal, storm drainage, power, oil, gas, water, sewer and petroleum companies, or are adjacent to other property; the Contractor shall be solely and directly responsible to the owners and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions or claims of any character brought because of any injuries which may result from the work. The Contractor is responsible for adjusting manhole or valve lids to the proper grade and repairing any damage done to existing sewer facilities according to District specifications. After manhole grade adjustments, sewer lines shall be cleaned with a hydro-cleaner, or other Engineer approved cleaning equipment prior to television inspection and final acceptance of the sewer. Clean two (2) line segments (manhole to manhole) downstream of any manhole tie in or adjustment work.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

In the event of an interruption to domestic water, irrigation water, sewer, or other utility services as a result of accidental breakage, or of being exposed or unsupported; the Contractor shall promptly notify the proper authority. The Contractor shall cooperate with said authority to restore service as promptly as possible and shall bear all repair costs.

- H. Land Monuments. The Contractor shall preserve existing City, County, State and Federal land monuments wherever possible. When these monuments cannot be preserved, the Contractor shall notify affected entities and Design Engineer at least forty-eight (48) hours in advance of the proposed construction and retain an Idaho licensed professional surveyor to reference these monuments for later replacement.
- I. Construction within State Lands and Highway Rights-of-Way. It shall be the responsibility of the Contractor to procure all permits necessary for construction within State lands, the Idaho Department of Transportation, Valley County Highway rights-of-way or City of McCall streets. The Contractor shall comply with the specifications and requirements stipulated in the permit granted by the Idaho Department of Lands, the Idaho Department of Transportation, Division of Highways, Valley County, and the City of McCall to use said rights-of-way or lands for construction and maintenance purposes.
- J. Work Below Lake Water Line. The Contractor shall not operate equipment or work below the water line of Big Payette Lake without securing all necessary local, state, and Federal permits.
- K. Supplemental Specifications. The District recognizes that these Standard Specifications may not address all situations that might be encountered. However, this does not release the Design Engineer from properly designing the work or the Contractor from properly constructing the work. Any supplemental specifications the Design Engineer, District or District Engineer feels are necessary for the proper construction of any work shall be prepared and issued to the Contractor, prior to commencing construction.

10.3 STANDARD NOTES AND DRAWINGS.

Each set of project development plans shall contain the following minimum standard notes: "General" and "Sewer" as shown below. These notes shall appear before any other on the Construction Plans. Additional notes may be required by the PLRWSD.

- A. General Notes
 - 1. All work shall be done in accordance with the 2020 ISPWC Standard Specifications and Drawings, PLRWSD Standard Revisions to the ISPWC and Supplemental Specifications, and requirements of the other local, state and federal authorities having jurisdiction.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

2. All Contractors, subcontractors and/or utility contractors shall attend a pre-construction conference a minimum of five (5) working days prior to start of work.
3. The Contractor shall maintain all existing drainage facilities within the construction area until the drainage improvements are in place and functioning.
4. All Contractors working within the project boundaries are responsible for compliance with all applicable safety laws of any jurisdictional body. The Contractor shall be responsible for all barricades, safety devices and control of traffic within and around the construction area.
5. All material furnished on or for the project must meet the minimum requirements of the approving agencies or as set forth herein, whichever is more restrictive. Contractors must furnish proof that all materials installed on this project meet the specified requirements at the request of the approving agency and/or the Design Engineer.
6. The locations of existing underground utilities are shown in an approximate way only. The Contractor shall determine the exact location of all existing utilities before commencing work. The Contractor assumes all responsibility for any and all damages caused by his failure to exactly locate and preserve any and all underground utilities. The Contractor shall notify DIGLINE (811) at least 48 hours in advance of construction operations.
7. Work subject to approval by any political subdivision or agency must be approved prior to (A) backfilling trenches; (B) placing of aggregate base; (C) placing of concrete; (D) placing of asphalt paving. Work done without such approval does not relieve the Contractor from the responsibility of performing the work in an acceptable manner.
8. All Contractors working within the public road right-of-way are required to secure a right-of-way construction permit from the jurisdictional authority at least forty-eight (48) hours prior to any construction.
9. The Design Engineer shall submit record drawings to the PLRWSD before final approval is given to the project.
10. Only plan sets stamped "Approved for Construction" and signed by the PLRWSD or their authorized representative shall be used by the project contractor(s). Use of any plans on the job without the "Approved for Construction" stamp shall be grounds for the issuance of a stop work order.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

11. At all times, the Contractor shall keep onsite a copy of the approved construction Plans on which is recorded the actual locations of the constructed pipeline and any other utilities encountered. The Contractor shall provide these locations to the Design Engineer for use in the production of record drawings prior to final approval of the pipeline installation.
 - a. All sewer service connection locations shall be identified and documented on the record drawings by the distance and orientation from the nearest manhole center.
12. Each Contractor shall be responsible for acquiring any necessary Idaho Pollutant Discharge Elimination System (IPDES) permits, filing any NOIs, and preparing a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the current Environmental Protection Agency Construction General Permit (CGP). Said permit shall be presented to the Engineer at least 48 hours prior to the beginning of construction. The NOI must be filed a minimum of 14 days in advance of any construction operations onsite, per the waiting period requirements of the CGP.

B. Sewer Notes

1. All work shall be done in accordance with the latest edition of the PLRWSD Standard Specifications and Drawings and the 2020 ISPWC.
2. Approval and acceptance of all sewer construction will be by the PLRWSD and their decision shall be final. Such inspections shall not relieve the Contractor from the responsibility of performing the work in an acceptable manner in accordance with the approved construction plans and Standard Specifications and Drawings. No sewer permits will be issued to customers prior to sewer line acceptance.
3. Sewer lines shall be located in roads. Manholes shall be in the roadway centerline, or in the center of the driving lane. Alternatively, provide a 30-foot-wide utility easement for all sewer mains serving the development (on or offsite) outside of the public right-of-way. The sewer must be centered in the easement. A twelve-foot wide ISPWC Type 3 gravel access road is required for access to all sewer mains. The remainder of the easement can be restored with native grasses. No trees or permanent structures (other than sewer related infrastructure) will be allowed in the easement.
4. All gravity sewer pipe shall be bell and spigot, polyvinyl chloride (PVC), SDR 35, ASTM D-3034, unless otherwise approved by the District.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

5. Locate service lines to the points shown on the standard drawings.
6. The District reserves the right to complete spot observation. The Contractor will notify the District forty-eight (48) hours prior to start of construction, and again twenty-four (24) hours prior to pouring concrete collars.
7. Maintain groundwater levels one foot (1') or more below the pipe invert, per ISPWC, during pipe laying and pipe joining operations and while making sewer taps. Clean and restore to their original state any ditches and storm drain facilities that are silted due to the Contractor's dewatering efforts. Obtain all necessary permits for dewatering discharges. Bedding and pipe zone material shall be Type I aggregate pipe bedding material.
8. Install sewer service lines prior to street improvements.
9. Construct sanitary sewer manholes in accordance with Standard Specifications and Drawings.
10. The Contractor shall test all sewer lines in accordance with ISPWC and shall be observed by the District. The Contractor shall be prepared for the District inspection and shall remove all manhole covers prior to inspection. All construction inspections shall be completed before November 1 of the year when initial construction commenced unless otherwise approved by the District. The warranty period commences as dated upon the letter of final acceptance.
11. Place sewer service lines in a six (6) inch diameter water class pipe wherever the service line crosses a stormwater disposal facility (i.e., seepage beds, drainage swales).
12. All parallel or crossing installations of potable and non-potable pipelines must be in accordance with IDAPA 58.01.08.542.07.
13. When cover over a sewer pipe is less than three (3) feet from top of pipe to subgrade or top of pipe to natural ground, use "Class 200 water pressure pipe", ASTM D 2241, SDR 21, including service lines and fittings. Design engineer shall make more stringent requirements as needed.
14. All sewer lines shall be cleaned with a hydro-cleaner, or other Engineer approved cleaning equipment prior to television inspection and final acceptance of the sewer. Clean two (2) line segments (manhole to manhole) upstream and downstream of any tie in or adjustment work.
15. A television inspection shall be conducted by a qualified, properly equipped independent contractor upon completion of the sewer

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

lines and provide a videotape/DVD of the inspection prior to final acceptance of the sewer, as specified in these standards.

THIS PAGE INTENTIONALLY BLANK

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

DIVISION 100 – GENERAL CONDITIONS

ARTICLE 6 – BONDS AND INSURANCE

Amend the second sentence of Part 6.01.A to require that “...bonds remain in effect until two years after the date when final payment becomes due or until completion of the correction period...”

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

Add the following to Part 7.17.A: The Contractor warrants and guarantees that all work performed shall be free from defects due to faulty materials and/or workmanship for a period of two years from the date of final acceptance.

THIS PAGE INTENTIONALLY BLANK

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

DIVISION 200 – EARTHWORK

SECTION 202 – EXCAVATION AND EMBANKMENT

PART 1 GENERAL

Replace Part 1.3.E with the following:

- E. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

PART 3 WORKMANSHIP

Amend all instances of “T 99” with “T 180”.

Add the following to Part 3.8.A:

- 8. Embankment construction requirements must comply with any additional and more stringent requirements from the geotechnical engineer for allowable lift heights and compaction requirements.

SECTION 203 – SOIL MATERIALS

PART 1 GENERAL

Replace Part 1.3.B with the following:

- B. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

SECTION 204 – STRUCTURAL EXCAVATION AND COMPACTING BACKFILL

PART 1 GENERAL

Replace Part 1.3.E with the following:

- E. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

SECTION 205 – DEWATERING

PART 3 WORKMANSHIP

Amend Part 3.1.B to include the following additional requirements: Contractor shall secure all necessary permits for discharge to surface water, irrigation, and drainage facilities. The Contractor shall be responsible for securing any necessary permits based

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

on the dewatering system used. Contact the DEQ Boise Office to determine whether this project will require an IPDES permit.

1. The DEQ contact is:

IPDES Compliance Supervisor
Idaho Department of Environmental Quality
Boise Regional Office
1445 N. Orchard St.
Boise, ID 83706
208-373-0550
lance.holloway@deq.idaho.gov

SECTION 206 – PERMANENT EROSION CONTROL

PART 3 WORKMANSHIP

Replace Part 206.3.1.D.1. as follows:

1. Allowable seeding times shall be directed by the Design Engineer in accordance with the following schedule:
 - a. Spring Seeding: Any time when the soil is primarily dry and friable.
 - b. Fall Seeding: A minimum of six (6) weeks before first average annual fall freeze date when soil moisture is adequate.
 - c. Winter Seeding: After temperatures are cold enough to stop native plant growth, and seeds will not germinate until spring soil temperatures are adequate.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

DIVISION 300 – TRENCHING

SECTION 301 – TRENCH EXCAVATION

PART 1 GENERAL

Replace Part 1.3.A with the following:

- A. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

PART 3 WORKMANSHIP

Add the following to Part 3.1:

- E. Where trenching operations will disturb beach sand, the sand shall be removed full depth and across the full width of the work area. Stockpile sand separately to ensure no contamination with excavated soils. Place sand to precedent conditions as required in ISPWC Section 307.
- F. Where surficial boulders are encountered along the pipeline alignment, remove and set aside during construction. Place affected boulders to their original position, setting depth and elevation.

Replace Part 3.12.B.3. with the following:

- 3. Maximum Top Trench Width: 15 feet.

Add Part 3.20:

3.20 ROCK TRENCHING

- A. At locations where the trench bottom occurs in rock or cemented sands and gravels, the bottom of the trench shall be excavated as required to achieve the nominal clearances below the pipe invert as required in the bedding system specified in ISPWC Section 305 – Pipe Bedding. See Section 302 for further requirements for rock excavation.

SECTION 304 – TRENCH FOUNDATION STABILIZATION

PART 1 GENERAL

Replace Part 1.3.C with the following:

- C. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

PART 2 MATERIALS

Amend all instances of “T 99” with “T 180”.

Add the following section:

2.4 GEOTEXTILE

- A. Where recommended by the Design Engineer or Geotechnical Engineer, the trench foundation material shall be wrapped in geotextile fabric having the performance characteristics for the specific installation condition.

PART 3 WORKMANSHIP

Amend all instances of “T 99” with “T 180”.

Amend Part 3.2.B to replace all instances of “standard” with “modified”.

Amend Part 3.2 to include the following:

- C. Where specifically recommended by the Design Engineer, Type II trench foundation material bedding shall be wrapped in a non-woven geotextile fabric, or both a non-woven geotextile fabric and geogrid. The Design Engineer and/or Geotechnical engineer shall provide specific recommendations based on the varying subsurface conditions.
 - 1. If only non-woven geotextile fabric is used, it shall overlap a minimum of 12” on top of the foundation material. No other joints in the geotextile around the perimeter of the foundation material shall be permitted. Pipe bedding placement shall not disturb the overlap joint. Longitudinal joints in the geotextile along the pipe shall be installed with a minimum 12” overlap.
 - 2. If both geotextile fabric and geogrid are used together, geogrid shall be laid on top of non-woven geotextile fabric and both lined up the side of the trench wall. The distance the geogrid and fabric are to be lined up the trench side wall and the longitudinal joint overlap will be determined based on the geogrid material specifications and recommendations determined by the Design Engineer and Geotechnical engineer.

SECTION 305 – PIPE BEDDING

PART 1 GENERAL

Replace Part 1.3.C with the following:

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

- C. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

PART 2 MATERIALS

Amend all instances of “T 99” with “T 180”.

PART 3 WORKMANSHIP

Amend all instances of “T 99” with “T 180”.

Replace Part 3.2.A with the following

- A. Place Type 1 Bedding 8 inches below the bottom of the pipe and 8 inches above the top of pipe.

Part 3.11.A shall be amended to require **Class A-1 Bedding System for all sanitary gravity and pressure sewers and service lines.**

SECTION 306 – TRENCH BACKFILL

Amend Section 306 to remove all references to water settling and Type A-2 Compaction.

PART 1 GENERAL

Replace Part 1.3.C with the following:

- C. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

PART 3 WORKMANSHIP

Amend all instances of “T 99” with “T 180”.

Amend Part 3.3.B.1 to require **95% compaction of AASHTO T 180.**

Amend Part 3.3.B to include the following:

- 5. Contractor shall bear all costs associated with compaction testing and re-testing. A minimum of one (1) compaction test per 100 linear feet and a minimum three (3) tests per utility alignment, per instance, whichever results in the greater number of tests, per each fill lift.

SECTION 307 – STREET CUTS AND SURFACE REPAIRS

PART 1 GENERAL

Add the following to Part 1.1:

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

- B. All materials and workmanship for the repair of roadways shall be completed to the more stringent requirements of these Standard Revisions, Idaho Transportation Department Standard Specifications, and Valley County Road Department specifications, or the authority having jurisdiction.

Replace Part 1.3.A with the following:

- A. AASHTO T 180: Standard Method of Test for Moisture-Density Relations of Soil Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

Add the following to Part 1.3:

- E. ASTM C33: Standard Specification for Concrete Aggregate

PART 2 MATERIALS

Add Part 2.7

2.7 BEACH SAND

- A. Clean beach sand or import natural sand meeting requirement of Section 305.2.4, ASTM C-33, and free of dirt balls and other deleterious materials.

PART 3 WORKMANSHIP

Amend all instances of “T 99” with “T 180”.

Amend Part 3.1. to include the following:

- G. Asphalt pavement removal and patching must be to the centerline of the travel lane or to the street centerline or section line. If more than 50% of the roadway is disturbed, full width reconstruction is required.

Amend Part 3.5.A to include the following: Installation requirements for seeding and related work shall be in accordance with ISPWC Section 206 and amendments herein.

Amend Part 3.5 to including the following:

- C. Miscellaneous Surface Restoration (Sod and Seeding)
 - 1. Restore surface in accordance with ISPWC Section 306.3.4.D Topsoil and Finish Work except as amended herein.
 - 2. Remove and stockpile topsoil ahead of trench excavation and keep topsoil from being mixed with other soils and materials. Remove topsoil to limits of disturbance. If the

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

Contractor's operations are inadequate to remove and stockpile topsoil, import topsoil shall be utilized.

3. Place topsoil to a minimum depth of 12 inches or greater to match preexisting topsoil depths over backfilled trench and other disturbed areas. Topsoil shall meet requirements of Section 203 for Topsoil Type S1. Prepare surface for seeding in accordance with Section 306.3.4.D Topsoil and Finish Work.
4. Replant disturbed area with native grass mixture approved by the Department of Agriculture, local extension office, property owner, and Engineer. Utilize a Class A seeding per Table 1 of Section 206.3.1. Seeding rate shall not be less than a rate of 12–15 lbs/acre using drill-seeding method per Section 206. Planting depth shall be between $\frac{1}{4}$ " and $\frac{1}{2}$ ". Replanting shall reasonably match adjacent undisturbed area. Fertilize at a rate of twenty-five (25) pounds of nitrogen and twenty-five (25) pounds of phosphate per acre or as recommended by the local extension office of the Department of Agriculture.
5. Grass Sod Restoration:
 - a. Prepare surface for sodding as specified for seed bed preparation herein.
 - b. Sod species shall be at the selection of the landowner. Store sod in a shaded area and water as needed to maintain viability. Sod shall not be stored more than one (1) week prior to installation.
 - c. Rake soil surfaces immediately before installation. Under no circumstances place sod on frozen, muddy or unsuitable surface conditions. Place sod in accordance with NRCS guidelines. Lay sod strips in a staggered fashion and ensure rows are parallel to and tightly meshed with each other to prevent voids. Immediately irrigate to saturate the top 4" of soil and maintain until sod is rooted and fully established.
 - d. If freezing conditions are present which prevents the placement of sod, fine grade topsoil in disturbed area to allow for drainage. Install sod in acceptable weather conditions.

Add the following to Part 3:

3.14 SAND RESTORATION

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

A. Miscellaneous Surface Restoration (Sand)

1. Spread stockpiled sand evenly across the work area to the depth precedent to construction. Employ special care to assure the sand surface repair is free from dirt, mud, or clay clumps. The appearance of the affected area upon completion shall be comparable to that prior to excavation.

3.15 WARRANTY AND ESTABLISHMENT PERIOD

- A. The Contractor shall be responsible for replacing any vegetative surface repairs that do not become established within a one-year period after installation as determined by the Engineer.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

DIVISION 500 – SEWER

SECTION 501 – GRAVITY SEWERS

PART 2 MATERIALS

Amend Part 2.1.A. as follows:

- A. The Contractor shall install solid wall PVC pipe meeting the requirements of 2.2.A or 2.2.B in addition with the requirements specified herein. There shall be no substitutes to these materials.

Delete Parts 2.2.C through 2.2.I.

Replace Part 2.2.J as follows:

- C. Water Class PVC Sewer Pipe
 - 1. “Water class” gravity sewer pipe shall comply with Section 401.2.2.A. DR-18 for pipe 12 inches and smaller, and Section 401.2.2.B. DR-25 for pipe 15 inches and larger. Size to match the inside diameter of the adjoining PVC gravity sewer within 0.125” plus or minus. Water class PVC pipe shall be run from manhole to manhole. There shall be no substitutes to these materials.
 - 2. High Density Polyethylene Pipe (HDPE) conforming to Section 401.2.5 DR-13.5 with approval from the District.

PART 3 WORKMANSHIP

Amend Part 3.1.A to require sewer excavation, construction, and backfill to conform to the District standard drawings.

Amend Part 3.2.A to include the following additional requirements: No construction debris shall be allowed to enter the existing sewer collection system. Failure to comply will obligate the Contractor to clean downstream collection system components as required by the District.

Add the following to Part 3.2

- U. New sewer construction shall be tested by a qualified and properly equipped contractor and approved by the District prior to placement of asphalt or another surface repair.
- V. Gravity sewer mains shall have a minimum of 36” cover to prevent freezing or greater as required by the District to accommodate service connections.
- W. All main line extensions with potential for upstream development must be extended to the property line.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

- X. Gravity sewer mains shall be installed with a minimum slope in accordance with IDAPA 58.01.16.430.02.d and Table 1A below.

TABLE 1A

Nominal Sewer Size	Minimum Slope
8"	0.40%*
10"	0.28%
12"	0.22%
15"	0.15%
18"	0.12%
21" and Larger	0.10%

*Most upstream runs of 8" sewer shall be at 0.60% slope as practical

Amend Part 3.4.A to require that testing shall be observed by the District with a minimum advanced notification of 48 hours.

Amend Part 3.4.B to specify that infiltration shall be cause for rejection.

Amend Part 3.4.G to require mandrel testing at the District's discretion if visual or CCTV inspection reveals pipe damage or deflection.

Part 3.4.H shall be revised to require CCTV inspection on all gravity sewer and 6-inch sewer service pipe. All new utilities parallel to or crossing the sewer trench must be installed prior to CCTV inspection. The CCTV inspection and submittal of DVDs shall include a calibration DVD made to simulate a 3/8" grade deflection in the supplied pipe. Only one (1) sag measuring no greater than 3/8" in depth and no greater than six (6) feet in length shall be present between any pipe segment between manholes. Any additional sags of any detectable depth or length shall be grounds for rejection. Any pipe shown to be crushed, deflected, cracked, or otherwise damaged, or not constructed to the design lines and grades shall be rejected. The District will make the final determination of pipeline acceptance or rejection.

Add the following to Part 3.4.H.6:

- a. Sandbag or plug downstream manholes as required to prevent debris from being flushed downstream.
- b. Amend Part 3.4.H.7 to require water/dye mixture to be poured within 15 minutes prior to CCTV inspection.

SECTION 502 – MANHOLES

PART 2 MATERIALS

Part 2.2.A shall be revised to require that all manholes be Standard Manhole Type A per ISPMC SD-501 and as modified herein and as shown on the Drawings.

Replace Part 2.4 with the following:

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

- A. "Whirlygig" manhole riser system is required on all manholes in lieu of concrete grade rings and shall be installed per the manufacturer's recommendations up to the maximum height of 13 inches (18 inches total maximum height from top of cone to finished grade). The joint between the Whirlygig and top of manhole cone shall be sealed with Vulkem 116 high-performance polyurethane sealant.

Replace Part 2.5 with the following:

- A. The frames, covers, and dust pans shall be 24-inch diameter with a minimum clear opening of 22" conforming to the District standard drawings and be manufactured by Kits Foundry, PLRWSD STD., no substitutes.

Kits Foundry
779 East 1100 North
Shelley, ID 83274
(208) 357-7773
- B. Manhole covers shall have "PLRWSD Sewer" cast in the surface with 2" raised lettering and include (1) one-inch diameter pull hole.
- C. Dust pans are required in all manholes and shall be cast-iron in construction with integral machined flanges cast into frame. Dust pans shall have a raised drain hole, venting provisions, and lifting strap or stainless-steel chain per the District standard drawing. At the District's discretion, stainless steel or HDPE dust pans may be required.
- D. Watertight frames and covers where specified by the District shall have a minimum clear opening of 22" manufactured by Kits Foundry, PLRWSD STD., no substitutes. Lettering shall conform to the requirements specified in Part 2.5.A.

Add the following to Part 2.6:

- B. Stamped and/or stained concrete as required to match existing surfacing.
- C. Pavers as required to match existing surfacing.

Replace Parts 2.8.A and B with the following:

- A. Grout shall be Dayton 1107 Advantage, SpecChem SC Multi-Purpose Grout, or a District approved equal.

PART 3 WORKMANSHIP

Replace Part 3.3.A with the following:

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

- A. All pipe-to-manhole connections shall be flexible boot-type manhole connectors meeting the following minimum requirements:
1. For 8" to 15" diameter pipe, Kor-N-Seal Model S106 with EPDM rubber boot and stainless-steel wave band or approved equal.
 2. For 21" diameter and larger pipe, Kor-N-Seal Model S206 with EPDM rubber boot, double wedge and stainless-steel wave band or approved equal.
 3. Cored holes are required. No cast holes will be allowed.
 4. SikaFlex 1a, Vulkem 116, or approved equivalent shall be applied to the entire surface perimeter of the cored hole immediately prior to installation of the boot and an additional bead shall also be applied around the perimeter interface between the boot and the pipe after the band has been tightened.
 5. Grout meeting the requirements of Part 2.8.A shall be applied to both the interior and exterior side of the boot after installation.
 6. Leaking and/or weeping boot installations will not be accepted by the District.

Add the following sentence to Part 3.3.E: After completion of successful vacuum testing, the interior side of the boot connection shall be completely filled and packed with grout leaving no voids.

Part 3.7.B shall be amended to required "Con-Seal CS-102" mastic on all manhole joints. Joints shall be grouted smooth on the interior surfaces only and joints shall be completely filled and packed leaving no void. All joints shall be watertight.

Part 3.7.F shall be amended to require 12-inch-wide, Infi-Shield Gator Wrap on all exterior joints.

Part 3.7 shall be amended to include the following:

- G. All new manholes shall be installed with a minimum depth of six feet (6') between the manhole rim and sewer invert. Off-road installations with the cone section exposed to meet this requirement may be allowed with District approval. If the manhole is located within a road, and the depth requirement cannot be met, the District will review lower depth designs on a case-by-case basis, but in no case will less than three feet (3') of cover be allowed over any sewer.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS

Part 3.12.A. shall be revised to require vacuum leakage testing by a qualified, properly equipped contractor of all new and existing manholes that are to be modified. Testing shall be observed by the District with a minimum advanced notification of 48 hours.

SECTION 504 - SEWER SERVICES

PART 1 GENERAL

Add the following to Part 1.2.

- C. SP-3 – Private Individual Dwelling Lift Stations

PART 2 MATERIALS

Part 2.1.A shall require sewer services to comply with material requirements specified in 2.2.A, 2.2.E, 2.2.F and 2.4. Sewer service line markers as specified in Part 2.3 shall be required. Pressure sewer services from individual dwelling lift stations shall be in accordance with SP-3.

Delete Part 2.2.E and replace with the following:

1. Tees or Wyes: Consistent with main and service lines.
 - a. Tees are not to be used on water class pipe.
Connect services to water class pipe with Service Saddle Connections in 2.2.F.
2. “Inserta Tee” allowed for service connections to existing trunk sewers 24-inch and greater.
3. All clamps, straps, nuts, bolts, washers for fitting to be solid stainless steel.

Replace Part 2.2.F with the following:

- F. Service Saddle Connections
1. Saddles: Romac “CB” or approved substitution for all connections to existing mains 8-inch through 21-inch and for new mains 18-inch and larger.
 2. All clamps, straps, nuts, bolts, washers for fitting to be solid stainless steel.

Add Part 2.5 as follows:

2.5 GREASE INTERCEPTORS

- A. A grease interceptor shall be required for all commercial kitchens. See the attached standard drawing.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

PART 3 WORKMANSHIP

Amend Part 3.2.A to require Type “A”, Type “B”, or Type “D” service connection for all service connection to private property as shown on the attached Standard Drawings. Extend service line a minimum five (5) feet into property line and at a maximum cover depth of five feet (5') unless noted otherwise or approved by the District. A minimum cover depth of three feet (3') may be allowed with prior approval of the District.

Amend Part 3.2.B to require maximum bend angles in accordance with the attached Standard Drawings.

Add the following to Part 3.2

- E. No services longer than 200 feet are allowed without prior approval.
- F. Separation between service connections shall be a minimum of four feet (4').
- G. Property owner is responsible for the maintenance, repair, and replacement (if necessary) of the sewer connection and service line from the point at which it connects into the sewer main line to the structure being served.

Replace 3.3.A. with the following:

- A. Connection to New Mains
 - 1. Solid Wall PVC (8-inch through 15-inch): PVC Tee
 - a. Tees are not to be used on water class pipe. Connect services to water class pipe with Service Saddle Connections in 2.2.F.
 - 2. Solid Wall PVC (18-inch and greater): Service Saddle per Section 2.2.F.
 - 3. Ductile Iron (all sizes): Ductile Iron Tee

Replace 3.3.B. with the following:

- A. Connection to Existing Mains
 - 1. All main materials (8-inch through 21-inch): Service saddle per 2.2.F
 - 2. All main materials (24-inch and greater): Tee fitting 2.2.E.

Delete Part 3.4 in its entirety. Service connections to manholes are not allowed.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

Amend Part 3.6.A to require sewer service markers to conform to the District standard drawing.

Add Part 3.6.G as follows:

- G. In locations where sewer services underly concrete sidewalks, stamp the concrete with "PLRWSD SEWER SERVICE" above the sewer service location.

Part 3.8 shall be amended to require leakage testing of service lines in conjunction with the mainline. Contractor shall coordinate and pay for any additional permits and testing required by the State Plumbing Bureau.

Add Part 3.10 as follows:

3.10 SERVICE LINE REPAIR

- A. Any service line that is damaged shall be repaired or replaced according to the District Standard Specifications and Drawings to the satisfaction of the District. The use of a Romac 501 or Ford FC2W (of appropriate size) rigid coupler is required. Fernco couplers are not allowed.

SECTION 505 - PRESSURE SEWERS

PART 2 MATERIALS

Amend Part 2.1.A to specify pressure sewer materials shall conform to Parts 2.2 and 2.3 as modified herein.

Amend Part 2.2.A.1 to require a minimum DR-18 or lower DR as required to meet the anticipated design conditions as recommend by the Design Engineer.

Amend Part 2.3.A.3 to require a minimum DR-21 or lower DR as required to meet the anticipated design conditions as recommended by the Design Engineer.

Revise Part 2.7.A. to require No. 10 AWG copper locating wire with insulation and epoxy splice kits.

PART 3 WORKMANSHIP

Amend Part 3.2.C requiring a minimum cover of 72 inches over the top of pipe or greater as specifically required by the Design Engineer.

Add the following to Part 3.2:

- F. Discharge will not be allowed into existing manholes. The force main shall discharge into a new manhole installed upstream of the gravity sewer. The discharge manhole shall be constructed in accordance with Section 502. Sewage shall flow from the discharge manhole to the gravity sewer by an appropriately sized gravity sewer pipe. The discharge manhole shall be smoothly

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

coated, prior to discharge of any sewage into the manhole, with Sauereisen SewerGard, Spray Roq, or prior approved equal.

Replace Part 3.3 with the following:

- A. Flush pressure sewer in accordance with Section 401. Provide all necessary fittings, flushing and air relief valves, and test water to complete flushing and testing.
- B. Testing of PVC pressure sewer shall be in accordance with Section 401 with a two-hour duration test. Disinfection is not required.

Amend Part 3.4.B to provide enough slack wire to reach an earth ground.

Add the following to Part 3.4:

- E. Any portion of the force main that is located outside of traveled roadways shall be marked with flexible fiberglass marking stakes with "Caution - Buried Sewer Line Below", or approved equivalent, in 1-1/2-inch minimum black letters. Markers shall be placed at angle points to depict angle and every 200' along force main.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

SP-1 CONSTRUCTION COORDINATION AND SCHEDULING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This item shall consist of required coordination of construction activities with residents, businesses, services, and local agencies.

PART 2 MATERIALS

2.1 NOT USED

PART 3 WORKMANSHIP

3.1 PROJECT STATUS MEETINGS

- A. The Contractor shall conduct bi-weekly construction progress meetings with the District if requested by the District. Contractor shall prepare a revised schedule, meeting agenda and minutes.
- B. The Contractor shall maintain up to date record drawings of the construction including: variances from the design sewer grade and alignment, limits of backfill types, location and depth of underground utilities, and any other sub-surface features or conditions including the limits and depths. These drawings shall be updated daily during construction and shall be reviewed by the Design Engineer.

3.2 SERVICES COORDINATION

- A. The Contractor shall coordinate construction activities to minimize disruption of services. The Contractor shall attend and participate in a services coordination meeting at the start of construction and as required during construction to resolve service issues.
- B. The Contractor shall be responsible for providing uninterrupted solid waste service to all properties during construction. If the Contractor's operation prevents access to properties for solid waste pick-up, the Contractor shall move individual household solid waste containers, bags, and other items accepted by the solid waste hauler to an accessible location. The containers shall be returned to the households after pick-up. The Contractor shall prevent damage or loss of containers and shall replace containers damaged or lost.
- C. The Contractor shall meet with the School District, school bus service providers, and local seniors transit service to minimize disruption of these services and plan alternative routes.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

- D. The Contractor shall coordinate with the U.S. Postal service and provide access for mail delivery to all properties during construction.
- E. Emergency services (Police, Fire, & Paramedic) access shall be provided, per International Fire Code 503.4, at all times during construction. The Contractor shall coordinate with these agencies on a weekly basis and communicate the status of the project, access, and special concerns.

3.3 RESIDENT COORDINATION

- A. The Contractor shall notify adjacent residents, and other contractors mobilized in the project vicinity two (2) weeks prior to start of work.
- B. Notification of planned service disruptions (water main shutdowns, sewer service interruptions, etc.) shall be made to residents 48 hours in advance and include the extent and type of service disruption, Contractor's contact name and phone number, and date and time of disruption.
- C. Safe access shall be maintained at all time to all properties abutting the project.

END OF SECTION

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

SP-2 SEWAGE BYPASS CONTROL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sewage bypass control systems.

1.2 SUBMITTALS

- A. At the pre-construction meeting, submit to the District a sewage bypass control plan. If the work impacts a City of McCall facility (streets, water, etc.) submit a copy of the bypass plan to the appropriate city officials. Plan shall include descriptions and details of the bypass pumping system, and when the system will be required in the work sequence. Include a contingency plan in case of primary system failure.
- B. No work on the existing sewer system shall occur without an approved sewage bypass control plan.

1.3 DEMONSTRATION

- A. The Contractor shall demonstrate bypass systems to the District prior to implementation.

PART 2 MATERIALS

2.1 NOT USED

PART 3 WORKMANSHIP

3.1 PREPARATION

- A. During the work sequence, construction operations must be compatible with the functional operation of the District sewage collection system. During the work sequence, coordinate with the District to allow operations to proceed as required.
- B. Contractor shall provide temporary power sources for sewage bypass equipment that requires a power source.
- C. Prepare contingency plans for equipment or power failure and unexpected flow conditions.
- D. Prepare all necessary diversions and modifications to existing system as approved by the District.
- E. Verify new downstream sewers and bypass piping have passed leakage testing and are approved for receiving wastewater flows.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

- F. Furnish, install and operate necessary temporary pumping equipment and/or diversion mechanisms to continuously divert peak hourly sewage flows without surcharging existing sewer collection systems.
- G. Provide all necessary temporary electrical service to machinery and provisions for backup power generation. Provide personnel to operate and maintain system function throughout the project period.
- H. Install discharge piping in a manner to provide safe and reliable service, without disrupting public access. Report spillage immediately to the Engineer, the District, and IDEQ (208) 373-0550, isolate area from the public, and start remediation.

3.2 TERMINATION

- A. Remove equipment, temporary piping, and appurtenances upon termination of sewage bypass control activities. If existing sewer lines have been surcharged, the Contractor may be required to clean said lines at sole discretion of the District. Plug all temporary pipe penetrations into manholes with gasketed plugs or caps to ensure watertight abandonment. Reform manhole invert channels to pre-existing flow lines. Remove all temporary fittings and valving from pressure sewers.

END OF SECTION

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

SP-3 PRIVATE INDIVIDUAL DWELLING LIFT STATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section covers small individual pressure sewer services to the gravity sewer and individual on-lot pumping systems. The homeowner installing an on-lot pumping system prior to the availability a gravity sewer is assuming full responsibility for operation and maintenance of the system. Routine maintenance of even the best equipment in accordance with the manufacturer's recommendation is essential if the system is to operate reliably. These standards present performance criteria for an on-lot system. Selection of the mechanical and electrical equipment to be used remains the prerogative of the homeowner. The equipment used should be carefully selected, and local maintenance and warranty service should be available.
- B. Neither the District nor the District Engineer assumes responsibility or liability for the operation, maintenance or performance of an on-lot pump system.

1.2 REGULATORY

- A. All work outside of the public rights-of-way shall be in compliance with the latest requirement of the Uniform Plumbing Code, State Plumbing Bureau, National Electric Code and these specifications. In case of conflicting requirements, the more stringent shall prevail.
- B. In general, individual residence pump stations, grinder pump stations, and septic tank effluent pump stations fall under the jurisdiction of the Idaho Division of Building Safety, Plumbing Bureau if the pump station or vault is inside an individual residence or other structure. Those that are not inside an individual residence or other structure, fall under the jurisdiction of IDEQ. Refer to IDAPA 58.01.16.441, and the Memorandum of Understanding between the two agencies, for further requirements.

PART 2 MATERIALS

2.1 PACKAGE PUMP SYSTEM

- A. System: The package system shall include vault, pump, motor control panel specifically designed for sewage service.
- B. Grinder Pump: Minimum discharge shall be 15 gpm against the total dynamic head when calculated using Hazen-Williams C-value of 120. Pump shall be mounted to be removable without entering sump basin. Pump shall be minimum 2 Hp.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

- C. Sump Basin: Minimum 36" diameter storing at least 50 gallons between high level alarm and invert of inlet sewer. Sump basins shall be designed to withstand flotation and lateral earth and hydrostatic pressures. Fiberglass, concrete, or HDPE are acceptable. Gas-tight openings shall be incorporated for the discharge and vent piping and for the access hatch.
- D. Connection to Gravity Trunk: Krausz Industries, USA, Model EZ Tap Repair Clamp, Ford Meter Box service saddle or approved equivalent.
- E. Sewer Service Line: PE SDR-7 per ISPWC Section 505. Pipe size shall be at least as large as the discharge diameter of the grinder pump.
- F. Control and Alarms: System shall comply with the National Electrical Code (NEC) and State Plumbing Bureau requirements. System shall alternatively start and stop the pump at preset water surface elevations and activate the high-level alarms. Alarms shall be visual and audible inside the dwelling.

PART 3 WORKMANSHIP

3.1 INSTALLATION

- A. Pump, pump basin and controls shall be installed in strict conformance with the NEC and State Plumbing Bureau requirements. The homeowner is responsible for obtaining all required permits, inspections, and approvals.

3.2 INSPECTION

- A. Prior to backfilling an independent qualified company shall inspect the entire installation and witness pressure testing of the sewer line. Each pressure sewer line shall be tested to 30 psi for 30 minutes without leakage or pressure drop. A copy of the test results must be included in the District's records.

END OF SECTION

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

SP-4 SEWAGE LIFT STATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section covers general requirements for smaller lift stations. All proposed lift stations may be subject to additional requirements not included in this section, such as unique site characteristics, depth, pumping into gravity sewer served by another existing lift station or with a wide range of initial and ultimate in-flows may be required to meet additional requirements not contained in this specification.
- B. Lift stations that will become a part of the District collection system must be approved by the Idaho Department of Environmental Quality prior to construction. DEQ may have additional requirements not contained in this specification. The Engineer of any proposed lift station should consult with DEQ and obtain their Wastewater Pump Station Checklist prior to design. All engineering shall be performed by an Idaho licensed Professional Engineer.
- C. Any requirement or specification not covered by this section shall conform to Division 500, Section 505, PRESSURE SEWERS, of ISPWC.

1.2 SUBMITTALS

- A. In addition to subdivision collection system approval, preliminary equipment submittals must be submitted to and approved by the District prior to subdivision development plan review approval for any proposed sewage lift station. The submittal shall include, at a minimum, the following:
 - 1. Drawings depicting plan, elevation and section views of proposed lift station, electrical and control diagrams.
 - 2. Design criteria and calculations including:
 - a. Initial and ultimate service area flows (in coordination with the District)
 - b. Wet well volume sizing. Basis: 6 pump starts per hour maximum per pump, 30 minutes emergency storage above highwater alarm, and below incoming gravity sewer invert, at peak sewage inflow.
 - c. Pump and pressure main sizing including system curves for initial pump installation and ultimate size pumps. Minimum pressure main size is four (4) inch diameter. Minimum velocity at design pump rate is 2.5 feet per second.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

- d. Uplift or buoyancy potential of wet well. Minimum factor of safety is 2.0.
- 3. Catalog cut sheets of proposed pumps and related appurtenances.
- 4. Three sets of operation and maintenance manuals on the pumps, valves, electrical control panels and accessories shall be delivered to the District at the time of start-up.

1.3 REQUIREMENTS

- A. Facility must be accessible by all equipment necessary to operate and maintain the facility under normal or emergency conditions on a year - round basis by a permanently maintained easement. An all-weather gravel access road shall be constructed from the street to the lift station. The entire lift station area shall consist of a minimum 6" of 3/4" minus road mix. Landscaping shall not be installed without review and approval of the District. Positive site drainage shall be provided from the lift station and valve vault. Roadway vertical alignment shall be designed not to exceed 3% grade.
- B. At a minimum, the facility shall be a duplex pump configuration.
- C. All manufacturer's recommended spare parts shall be provided and delivered to the District.
- D. The District requires one (1) additional spare pump ready for installation to be supplied.
- E. A ¾-inch water service including a "Frost Free" yard hydrant shall be installed to the lift station for clean-up purposes, at a location to be determined during plan review and approval. A reduced pressure back flow assembly shall be installed as approved by the water authority having jurisdiction and in compliance with the IDEQ rules.
- F. For larger lift stations, lift stations in remote or sensitive areas, or in locations as determined by the District, dedicated permanent on-site Godwin Dri-Prime Backup System equipment shall be provided.

PART 2 MATERIALS

2.1 PIPE, VALVES AND FITTINGS

- A. Pipe shall be either stainless steel Pipe 304, Schedule 10, or ductile iron pipe (DIP) Class 250 conforming to ISPWC Section 505 shall be used inside the confines of the wet well and shall be connected with stainless steel bolt pack. Pipe installed from outside the wet well to and through the adjacent valve manhole shall be ductile iron conforming to ISPWC 505. All pipe shall be flange connected with rubber gaskets meeting AWWA

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

C111 Specifications. Pipe installed from the valve manhole to the point of discharge to a gravity sewer shall be polyvinyl chloride (PVC) water class pipe bell and spigot joints with elastomeric-gaskets conforming to ISPWC Section 505.

- B. Fittings. Fittings shall conform to ISPWC Section 505.
- C. Plug Valves. Eccentric plug valves, Val-matic, DeZurik, or equivalent manufacturer with rated working pressure of 150 psi. Fusion bonded epoxy interior coating is required.
- D. Check Valves. Check valves shall be equipped with an external adjustable high-tensile strength steel outside lever arm and weight. The check valves shall have cast iron body with stainless steel disc plate arm and replaceable seat ring, EPT seals and resilient seat, all suitable for sewer service, or approved equal. The disc of the check valves shall be easily removable without the need of any special training or tools. All the check valves shall be installed between flanges drilled to 125-pound ANSI Standard. Fusion bonded epoxy interior coating is required.
- E. Thrust Blocks. Per ISPWC Section 401.
- F. Locating Wire. Per ISPWC Section 505.
- G. Air and Vacuum Relief Valves. Air and vacuum relief valves may be required depending on project specific design. Combination air/vacuum valves shall be manufactured by A.R.I, model D-26 NS, or approved equal. All valves shall be installed with non-slam attachments. Connection shall be made with a flanged tee and a blind flange with threaded direct tap and shall include a stainless-steel ball valve. 2" valves shall be constructed of reinforced nylon. 3" and larger valves shall be constructed of ductile iron with fusion bonded epoxy interior coating.
- H. Air Valve Vaults. All air valves shall be installed in 6'x6' precast vaults with steps, and depth as required for minimum pipeline cover, 18" minimum clearance between the top of the air valve and the lid, and sufficient maintenance access. Vaults shall vent to outside, and vault floors shall be sloped to a 2" drain line with a water-tight floor penetration. All vaults shall be traffic rated.
- I. Identification Tape. Identification tape shall be two inches wide with the marking "Caution – Buried Sewer Line Below", or equivalent, in 1-1/2-inch minimum black letters.

2.2 WET WELL

- A. The wet well shall consist of pre-cast concrete 72-inch diameter manhole barrel sections, or larger as appropriate for the number of pumps and piping arrangement, with steps and a manhole base. The valve vault shall be a minimum 6'x6' precast structure with steps. All interior fasteners,

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

anchors and miscellaneous hardware shall be stainless steel. The entire wet well shall be lined prior to exposure of any sewage, with a smooth coating of Sauereisen SewerGard, T-Lock PVC liner, Spray Roq or prior approved equal. Valve vault shall contain plug-type isolation valves, check valves and manual bypass capabilities. A 2" drain line with a watertight, gas-tight check valve, with a minimum slope of 2% is required between valve vault and wet well. Lids shall be HS-25 load rating and be a minimum 12-inch thickness. All covered wet wells shall have provisions for air displacement.

2.3 SYSTEM PUMPS AND ACCESSORIES

- A. General. These specifications and requirements apply to those lift stations proposed to serve a smaller service area. Lift stations proposed to serve larger service areas will be evaluated on a case-by-case basis. The requirements of larger lift stations may be significantly different from the specifications contained in this section.
- B. Pumps.
 - 1. Each station shall be equipped with a minimum of two submersible, close-coupled wastewater pumps. Each pump shall be equipped with an appropriately sized submersible electric motor, capable to operate on a 230-volt, single phase, 60 hertz voltage supply.
 - 2. At a minimum, the lift station shall be a duplex pump station capable of pumping 110% of the projected peak hourly flow generated by its service area with any one pump out of service. The pump shall be capable of handling raw domestic wastewater with fibrous materials like wet wipes and shall be capable of passing a three-inch solid unless the pump is a grinder. The impeller blades shall be self-cleaning upon each rotation as they pass across a sharp relief groove in the insert ring and shall keep the impeller blades clear of debris. The pump inlet shall have a guide pin which moves fibers from the center of the impeller to the leading edges of the impeller. The clearance between the insert ring and the impeller leading edges shall be adjustable. The pump shall also be equipped with a cutter ring to grind the solids if three-inch sphere passage is not otherwise feasible. The pump shall be capable to operate without any limitation between 50% and 125% of the best efficiency point (B.E.P) of the performance curve. The impeller shall be wear resistant against sand and grit which is expected to enter the pump station with the sewage and made of high chromium cast iron with at least 24% chrome. Impellers that have surface hardening (by thermal, coating, etc.) will not be allowed. The impeller shall be mounted on the motor shaft. Couplings shall not be accepted.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

3. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. It shall be permanently submersible according standard IEC 60034 and protection class IP 68. The motor shall be capable of no less than 15 evenly spaced starts per hour and be able to operate throughout the entire pump performance curve from shut-off through run-out even when the motor is not submerged. The stator windings shall be insulated with moisture resistant Class H insulation rated for 356°F.
4. The pump shall be equipped with a guiding claw to lift and lower the pump on parallel guide bars and connect it to wet well mounted discharge connection. There shall be no need for personnel to enter the wet well when removing or reinstalling the pumps.
5. The junction chamber containing the terminal board shall be hermetically sealed from the motor by an elastomeric compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.
6. The motor shall be protected by three (3) thermal switches embedded in the stator set to open at 260°F and one leakage sensor (floating type) located in the stator chamber. The sensor and the switches shall be connected to the control panel which shall stop the motor and send an alarm when the sensors are activated.
7. The pump shall be explosion proof according FM CLASS 1, DIVISION 1, "C" and "D".
8. The cable entry shall consist of dual cylindrical elastomer sleeves, flanked by washers, all having a close tolerance fit against the cable and the cable entry. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.
9. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated and have a nominal L10 lifetime of 50,000 hours. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two-row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable.
10. The shaft shall be sealed by a tandem mechanical shaft seal system, each having an independent spring system. The seals shall require neither maintenance nor adjustment and shall be

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

capable of operating in either clockwise or counterclockwise rotation without damage or loss of seal function.

11. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal, shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. Seal lubricant shall be non-hazardous.
 12. The Materials of construction shall be as follows:
 - a. Pump housing: ASTM A-48, Class 35B
 - b. Impeller and Insert ring: A 532 ALLOY III A (25% Chrome)
 - c. Stator housing: ASTM A-48, Class 35B
 - d. Shaft: ASTM A479 S43100-T.
 - e. Shaft Seal Pump Side: Corrosion resistant Tungsten carbide WCCR
 - f. Shaft seal Motor side: Carbon (Csb) Aluminum oxide (AL₂O₃)
 13. All castings must be blasted before coating. All wet surfaces are to be coated with two-pack oxirane ester Durasolid 50. The total layer thickness should be at least 120 microns. Zinc dust primer shall not be used.
 14. The motor shall be equipped with a minimum of 30 feet of cable, or longer as appropriate for the installation and suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.
- C. Manufacturer. The pump system shall be Flygt pumps manufactured by Xylem, Inc., explosion-proof, with N-impeller, or approved equivalent. Pump systems, including control panels, by other manufacturers may be considered if they substantially conform to the requirements listed in this specification. The manufacturer shall provide data on alternate equipment manufacturer's experience. Only Manufacturers with 20 or more years of experience, a manufacturer certified service center located within 110 miles of McCall, ID, and who have furnished at least five (5) similar lift stations shall be considered. Review and approval must occur prior to

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

development plan approval. No substitutions will be considered after District review and approval of the construction plans.

D. Pump System Components

1. The pump system shall consist of the following components:
 - a. Two pumps (minimum).
 - b. For each pump the contractor shall supply and install a discharge connection made of cast iron ASTM A-48, Class 35B.
 - c. The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two parallel non-sparking guide bars extending from the top of the station to the wet well mounted discharge connection. The material of the guide bars shall be stainless steel AISI 316.
 - d. Guide bars shall be fastened at the top of the station with a guide bar holder made of stainless steel AISI 316.
 - e. For each pump the contractor shall supply and install a cable holder made with four (4) hooks of stainless steel AISI 316.
 - f. The sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be accepted. The entire weight of the pump/motor unit shall be properly borne by the pump discharge elbow. No portion of the pump/motor unit shall bear on the sump floor directly or on a sump floor mounted stand.
 - g. Each pump shall be equipped with a cutter ring.
 - h. Each pump shall be fitted with a sufficient length of stainless-steel lifting chain or lifting cable. The working load of the lifting system shall be 50% greater than the pump unit weight.
 - i. Control panel.
 - j. Emergency Provisions: Dependent on the specific project conditions, the District will require, at their discretion, a power receptacle for a portable generator, access provisions for the District's portable backup pump, a

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPMC

separate backup system, or standby power with
automatic transfer switchgear (diesel or propane).

2. Pumps should be designed to operate on 230-volt, single phase, 60 Hz, unless otherwise required and approved by the District. Pumps shall contain a stainless steel identifying attached tag showing manufacturer's name, model number and rating/capacity. The pumps shall be provided with a five (5) year warranty against defects in materials and or workmanship. The warranty shall cover the entire pump, not individual components. Upon warranty occurrence, the manufacturer's authorized service center shall remove the pump, repair, reinstall and provide start up on the repaired pump. A detailed failure analysis shall be submitted to the District for their records summarizing corrective action taken.
3. Supports and Anchors. All pipe and other supports and anchors, lifting chains, excepting the supports integral with the pump and base plate-elbow, shall be stainless steel.
4. Sleeves. Where piping penetrates the wall or ceiling of the wet well or valve vault, the space between the pipe and adjacent surface shall be closed off with a watertight flexible connector. The connector shall be Kor-N-Seal or approved equal. Refer to Section 502.3.3.A for requirements.

2.4 ACCESS DOORS

- A. Aluminum Wet Well and Valve Vault Access Door and Frame. The frame and door shall be aluminum with mill finish. The frame and door shall support a HS25 live load where subject to traffic loading conditions, or a minimum of 300 pounds per square-foot (psf) live load at other locations as approved by the District. The frame shall include accessories for attachment of the stainless-steel pump removal guide rails. The aluminum cover shall include a minimum of four (4) hinges per door, be equipped with a flush drop handle with a frame drain to the wet well or vault floor drain, and staples for padlocks.

2.5 CONTROL PANEL

- A. NFPA 70E arc flash hazard assessment shall be required for all new lift station control panels.
- B. Enclosure must be NEMA 4 rated or above, service entrance rated, lockable by a single rotary handle, fan heated, and situated a minimum of 30" above ground level. Self-standing on concrete base, or on a panel constructed per "Lift Station Panel" drawing included herein.
- C. One main disconnect required, separate pump breakers, hand/off/auto switches, magnetic starters, transfer switch, overloads, manual resets, green run lights and hour meters for each pump. A Crouse-Hinds

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

generator receptacle part # AR2041-S22, which mates to District's emergency generators and associated breakers and wiring is required. On smaller stations other arrangements can be made, all subject to District approval.

- D. To keep redundancy in the District system, a Milltronics Hydorranger Controller with XPS 15 ultrasonic transducer, with submergence shield, is required as the primary control system. A secondary timed controller will be used for redundant control. All brackets for mounting of transducers and redundant float strain relief must be as per "transducer/redundant float bracket" spec drawing, which is included in this manual. The primary controller must be powered through uninterruptible power supply for protection. The District currently uses APC Model SC420, equivalents accepted on District approval. Schematic required.
- E. Multi-phase systems require a phase monitor in control panel.
- F. No alarm light or audible devices are required.
- G. Provision must be made for a phone line to control panel for alarm system. Required alarms include power failure, sump and wetwell high water levels, unauthorized entry or other causes of pump station malfunction.

2.6 STANDBY POWER GENERATOR

- A. Products to be reviewed on a case-by-case basis by the District.

PART 3 WORKMANSHIP

3.1 GENERAL

- A. Install wet well per ISPWC Section 502 and piping per applicable sections in the ISPWC.
- B. Pumps. Pumps shall be installed in strict accordance with the manufacturer's instructions and recommendations. The piping adjacent to the pumps shall be supported such that no weight is carried on the pump casings. The pump shall operate at the specified system fluid temperature without vapor binding and cavitation, is non-overloading in operation and operates within twenty-five (25) percent of the midpoint of the published maximum efficiency curve. The Contractor shall align and verify alignment of the pump and piping prior to start up.
- C. Supports, Anchors and Sleeves. All work shall be done in a workmanlike manner and in accordance with the approved construction plans.

3.2 ELECTRICAL

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

- A. Standards. All electrical work shall be executed in strict accordance with the following:
 - 1. National Electrical Code.
 - 2. State of Idaho and local rules and regulations.
- B. If there is any conflict between these drawings and specifications and the applicable codes, rules and regulations, the codes, rules and regulations apply.
- C. Permits and Inspections. The Contractor shall obtain and pay for all required permits and inspections in connection with this work.
- D. Tests. The Contractor shall completely test the electrical system to assure that circuits are wired as called for on the drawings and shall test the system for grounds and short circuits.
- E. UL Listings. All equipment and material supplied shall be UL 508/913 listed or appropriate listing acceptable to the jurisdictional authority.
- F. Storage and Protection of Materials. Provide storage for materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare. Protect completed work, work underway and materials against loss or damage. Close circuit openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt or damage caused by water, chemicals or mechanical accident.
- G. Field Measurements. Verify all measurements at the site and become fully acquainted with the existing conditions before beginning work.
- H. Coordination. The Contractor shall coordinate the work under this section with the work being done under other sections. The Contractor shall promptly notify the District and the Design Engineer of any conflicts within the Plans and Specifications. All changes required in the work of the Contractor as a result of the Contractors failure to notify the Engineer shall be made by the Contractor at his own expense.
- I. Shop Drawings. The Design Engineer shall be responsible for review of shop drawings and equipment submittals. Two complete sets of the shop drawings and other submittals shall be submitted to the District prior to installation of the lift station and equipment.
- J. Electrical cables to pumps shall be run in 1-1/2-inch minimum diameter conduit. A separate 1-1/2-inch schedule 80 PVC conduit shall be run for each of the ultrasonic transducer cables and redundant control cable. A tagged nylon pull wire shall be provided in all empty conduits with at least eighteen (18) inches coiled free at each end. Seal-offs shall be Crouse-Hinds reusable type.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPMC

- K. Conductors shall be continuous from outlet to outlet.
- L. Conduit outlet bodies shall be aluminum and have a minimum five (5) inch opening.
- M. Convenience receptacles shall be duplex, ground fault interrupting type, 20 ampere, 125 volt rated.
- N. Conduit seal offs shall be Crouse-Hinds Catalog # EYRS5.
- O. Conduit junction boxes shall be Crouse-Hinds Catalog # GUAC59.

3.3 SYSTEM START-UP

- A. General. The Contractor shall:
 - 1. Coordinate a schedule for start-up of various equipment and systems.
 - 2. Notify the design engineer and the District five (5) days prior to start-up of each item.
 - 3. Clean wet well of all construction debris and grit prior to starting pumps to prevent damage.
 - 4. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
 - 5. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
 - 6. Verify wiring and support components for equipment are complete and tested.
 - 7. Execute start-up under supervision of responsible manufacturer's representative and Contractor's personnel in accordance with manufacturer's instructions.
 - 8. Submit a written report that all equipment and control system operations, including alarms have been properly installed and are functioning correctly.
 - 9. The District's Lift Station Start-Up Check List shall be completed and submitted at the time of start-up. See Appendix A.
- B. Demonstration and Instruction
 - 1. Demonstrate operation and maintenance of the system to District personnel prior to final acceptance. The Contractor shall provide

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

the equipment manufacturer's representative for a minimum of one (1) day of training District operations staff personnel. The Contractor shall coordinate and schedule a demonstration of the system with the District.

2. Sufficient water must be secured by the Contractor to demonstrate lift station operation at start-up for a minimum of five (5) cycles.
3. True pump flow rate shall be measured at start-up (flow metered).
4. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with District personnel in detail to explain all aspects of operation and maintenance.
5. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
6. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.4 STATION COMPLETION REQUIREMENTS

The Contractor shall complete the following for station approval and acceptance:

- A. Final Cleaning
 1. Execute final cleaning prior to final inspection.
 2. Clean site; sweep paved areas, rake clean landscaped surfaces.
 3. Remove waste, surplus materials and construction debris from the site.
- B. Adjustments. Adjust equipment to ensure smooth and unhindered operation.
- C. Project Record Documents
 1. Maintain onsite, one (1) set of the following record documents:
 - a. Construction drawings.
 - b. Specifications.
 - c. Reviewed shop drawings, product data, and samples.
 2. Record Documents and Shop Drawings. Legibly mark each item to record actual construction including:

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPMC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPMC

- a. Measured depths of foundations in relation to finish floor datum.
 - b. Measured horizontal and vertical locations of underground utilities and appurtenances referred to permanent surface improvements.
 - c. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - d. Field changes of dimension and detail.
 - e. Details not on original, approved construction drawings.
 - f. Submit documents to the Design Engineer and the District with written request for final approval and acceptance.
 - g. Product substitutions of alternates utilized.
- D. Operation and Maintenance Data
- 1. Three (3) Operation and Maintenance Manuals, bound in 8-1/2 x 11-inch pages, D-size three-ring binders with durable plastic covers, are ultimately required prior to final acceptance.
 - 2. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project.
 - 3. Internally subdivide the binder contents with permanent page dividers, logically organized as described below with tab titling clearly printed under reinforced laminated plastic tabs.
 - 4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, type on thirty (30) pound white paper in the following general organizational layout:
 - a. Part 1: Directory listing names, addresses, and telephone numbers of Design Engineer, Contractor, subcontractors, and major equipment suppliers.
 - b. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, address and telephone numbers of subcontractors and suppliers. Identify the following:
 - 1. Significant design criteria.
 - 2. List of equipment.

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS
OWNERS SPECIAL PROVISIONS TO THE ISPWC

3. Parts list for each component.
 4. Operating instructions.
 5. Maintenance instructions for equipment and systems.
 6. Electrical to include: switchgear, manufacturer's recommended maintenance and operation instructions, parts list with name, address and phone number of local source of replacement parts.
- c. Part 3: Project documents and certificates, including the following:
1. Shop drawings and product data.
 2. Certificates.
 3. Photocopies of warranties.
5. Submit one (1) copy of completed volumes in final form fifteen (15) days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.
6. Submit final four revised volumes prior to final acceptance.
- E. Warranties
1. Provide duplicate notarized copies.
 2. Submit prior to request for final approval and acceptance.
 3. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
 4. Start-up and demonstration in accordance with Section 3.3 must be completed prior to issuance of Substantial Completion.
- F. Spare Parts and Maintenance Materials
1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections. Deliver spare parts, extra materials and other required products to the District yard; obtain receipt prior to final approval and acceptance.

END OF SECTION

PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

STANDARD DRAWINGS

SD-1: TYPICAL SEWAGE LIFT STATION STANDARD DETAILS

SD-2: LIFT STATION PANEL AND ROOF DETAILS

SD-3: TRANSDUCER BRACKET DETAIL

SD-4: STANDARD SEWER SERVICE LINES DETAIL

SD-5: STANDARD SERVICE MARKER DETAIL

SD-6: SHALLOW MANHOLE FRAME DETAIL

SD-7: STANDARD MANHOLE FRAME, DUSTPAN AND COVER DETAIL

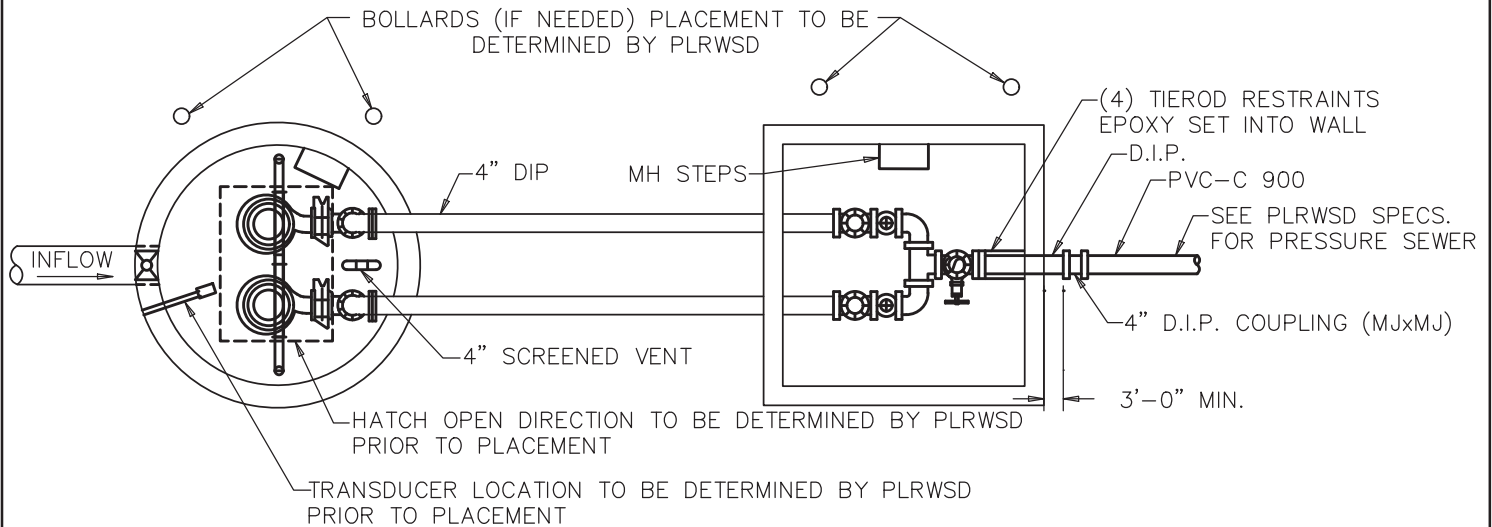
SD-8: WATERTIGHT MANHOLE FRAME AND COVER DETAIL

SD-9: STANDARD MANHOLE DETAIL

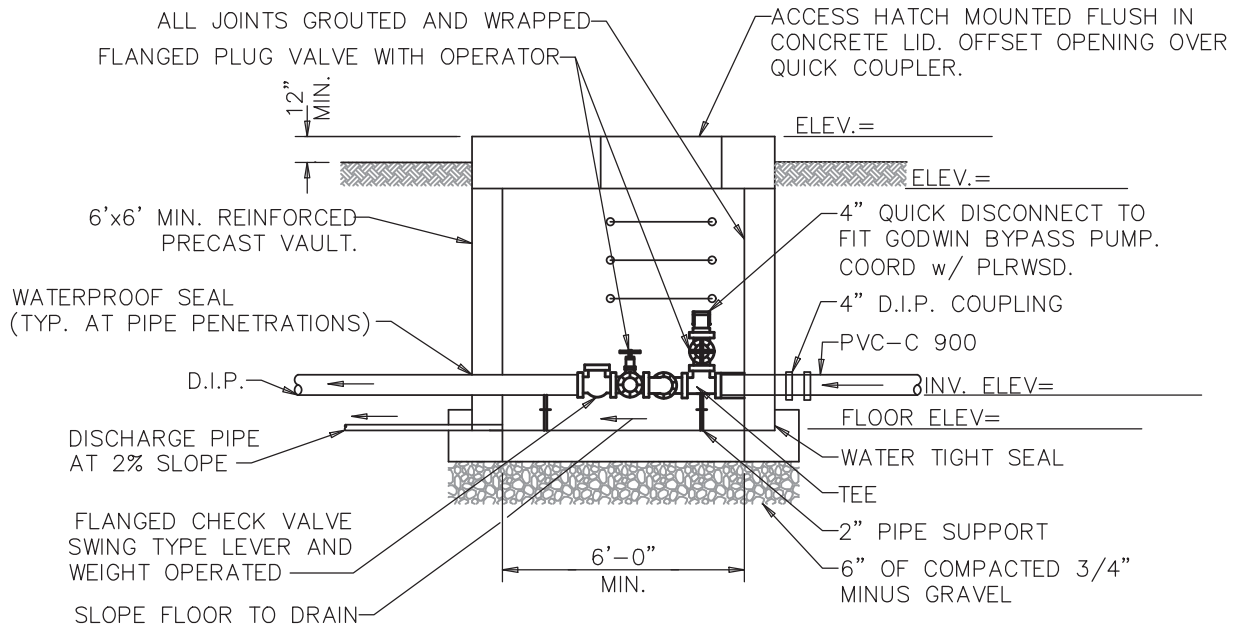
SD-10: STANDARD TRENCH DETAIL

GREASE INTERCEPTOR

THIS PAGE INTENTIONALLY BLANK



WET WELL & VALVE VAULT – PLAN



WET WELL EXTERIOR PIPING & VALVE VAULT – SECTION

SEE DETAIL 1 FOR WET WELL ELEVATION

NOTES

1. POSITIVE SITE DRAINAGE SHALL BE PROVIDED FROM WET WELL AND VALVE VAULT.
2. INSTALL NON-POTABLE IDENTIFICATION TAPE 12 INCHES (MIN.) BELOW SUBGRADE OVER ALL PRESSURE SEWER PIPE AND LOCATE WIRE PER ISPWC. MARKERS PER PLWS SPEC.

REUSE OF DRAWINGS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: 11475-729LS
PROJ. #: 21-19-002
PLOT DATE: 2/27/2020
LAST UPDATED: 2/27/2020
DRAWN BY: JAH
DESIGN BY: C.O.M.
CHECKED BY: PHK

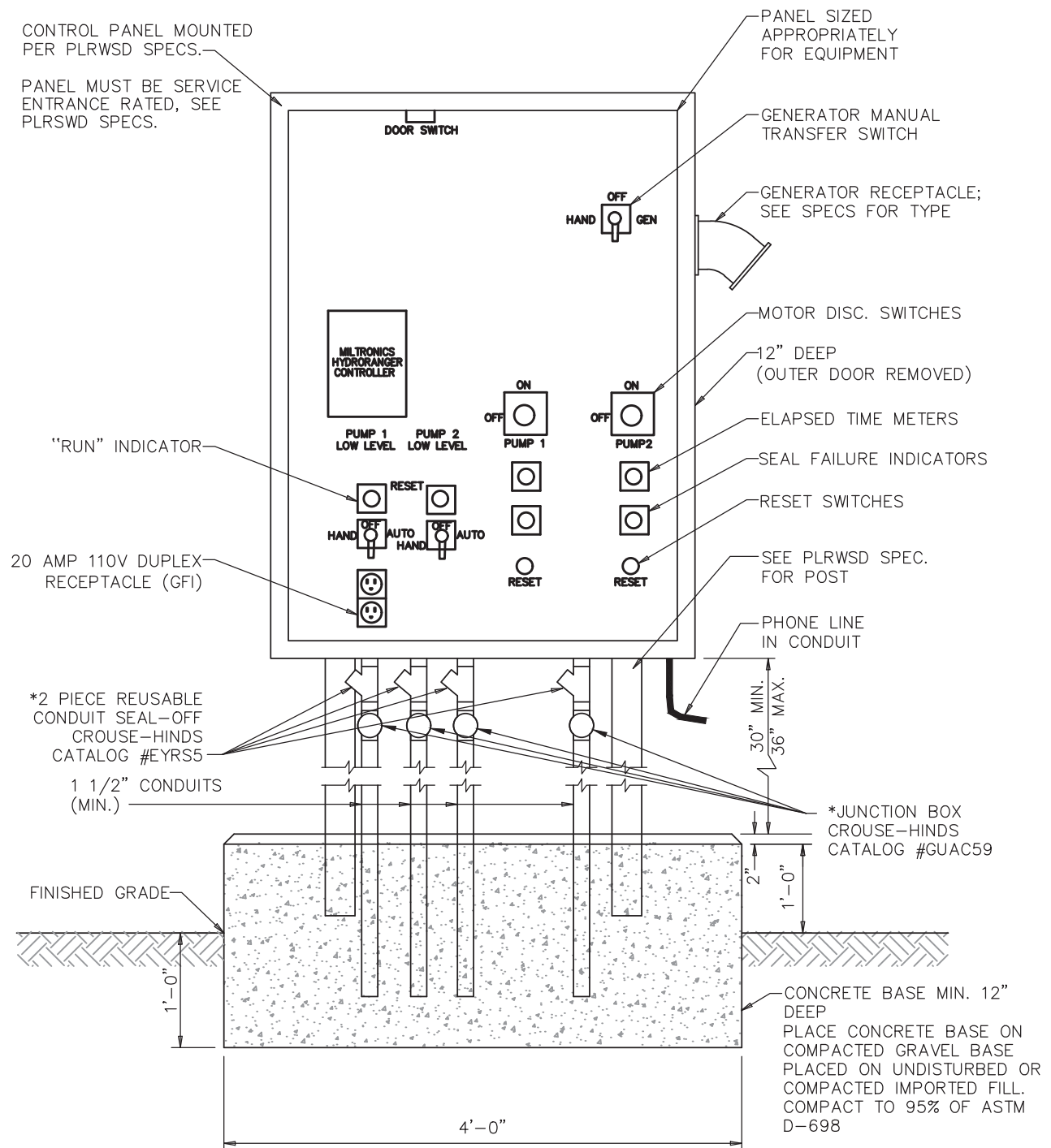
SD-1

**STANDARD DETAIL FOR
PLRWS, VALLEY COUNTY, ID**

**TYPICAL SEWAGE LIFT STATION DETAIL:
GENERAL ARRANGEMENT PLAN**

SHEET
2
OF
3

NO. REVISION DESCRIPTION BY APR. DATE



*NOTE
THE CONFIGURATION OF THE CONTROL
PANEL IS GENERAL AND IS INTENDED ONLY
TO SHOW THE MINIMUM REQUIREMENTS.
SEE PLRWSO SPECIFICATIONS FOR CONTROL
PANEL REQUIREMENTS.

[illegible]

CAD FILE: 11475-730LS
PROJ. #: 21-19-002
PLOT DATE: 2/27/2020
LAST UPDATED: 7/3/2012
DRAWN BY: JAH
DESIGN BY: C.O.M.
CHECKED BY: PHK

SD-1

STANDARD DETAIL FOR PLRWSD, VALLEY COUNTY, ID

TYPICAL SEWAGE LIFT STATION DETAIL
TYPICAL CONTROL PANEL

SHEET
3
OF
3

MONO SLOPE
ROOF, SEE
NEXT SHEET

2"x10" MIN FIR

THRU BOLTED

$\frac{3}{16}$ "x3"
FLAT BAR OR
ANGLE

HSS 4"x4"x $\frac{1}{4}$ "
FILLED w/
CONCRETE

30" MIN,
36" MAX
ABOVE FINISH GRADE

36" MIN BURY DEPTH

10" MIN SONOTUBE OR
GREATER AS REQ'D PER
DESIGN CRITERIA

NOTES:

1. PANEL SHALL BE SIZED TO ACCOMMODATE ALL NECESSARY ELECTRICAL EQUIPMENT.
2. ELECTRICAL PANELS SHALL BE THROUGH-BOLTED ONTO PANEL.
3. PANEL SHALL BE STAINED WITH SUPER DECK "VALLEY".
4. SEE NEXT SHEET FOR MINIMUM DESIGN CRITERIA.

REUSE OF DRAWINGS

THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: LIFT STATION PANEL AND ROOF

PROJ. #: 21-19-002

PLOT DATE: 2/27/2020

LAST UPDATED: 2/27/2020

DRAWN BY: ARB

DESIGN BY: JPE

CHECKED BY: RSM

SD-2

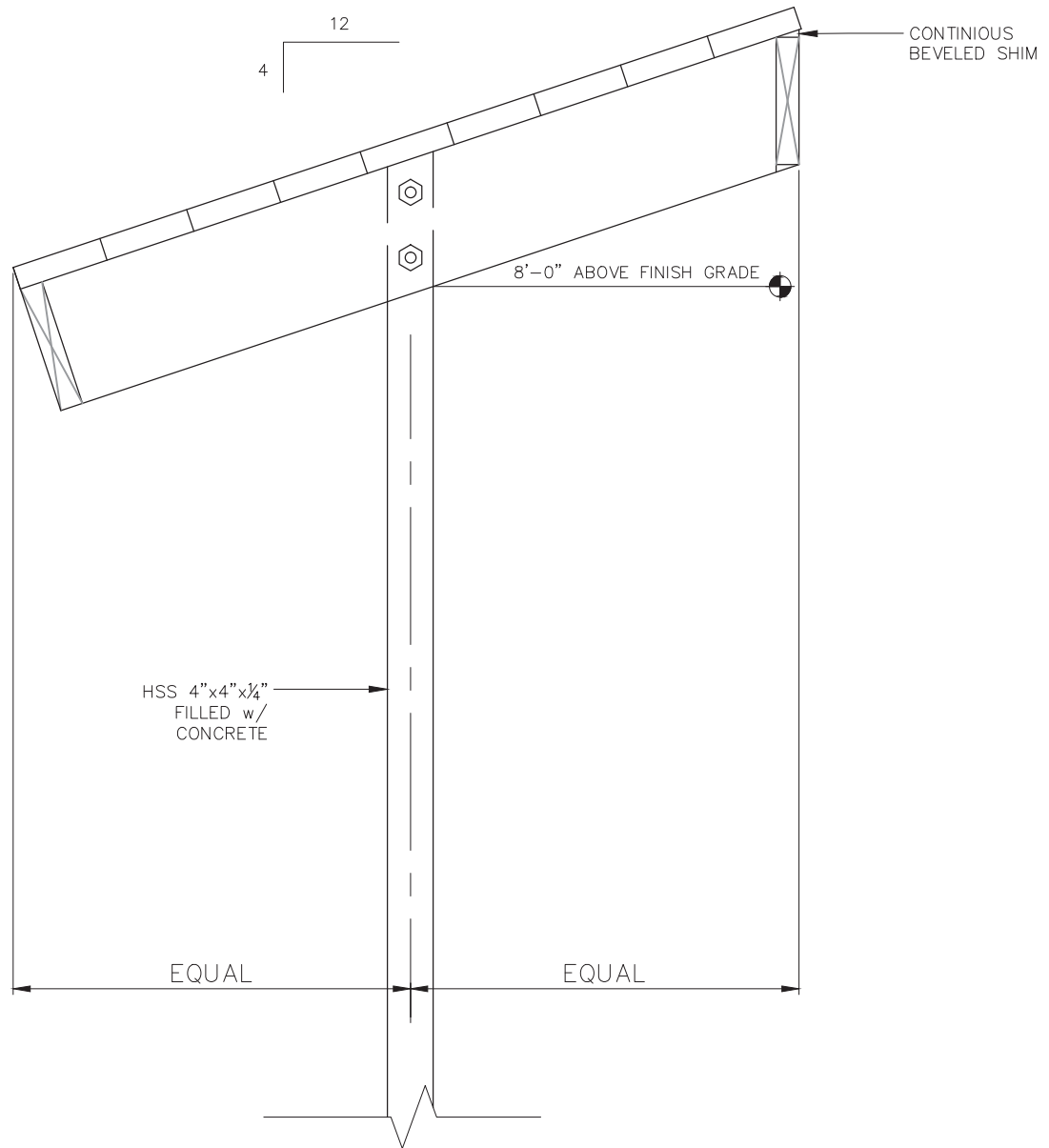
STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID

LIFT STATION PANEL & ROOF

SHEET
1

OF
2

Date Created: 2/26/2020 \\MSCHFILES\PUBLIC\PROJECTS\JUB\21-19-002 - PLRWSD-2019 ENGINEERING SERVICES\21-19-002 - DOC\2020 STANDARDS UPDATE\CAD\LIFT STATION PANEL AND ROOF



NOTES:

- PANEL ROOFS SHALL BE DESIGNED AS GENERALLY SHOWN AND SHALL BE IN ACCORDANCE WITH THE FOLLOWING MINIMUM DESIGN CRITERIA:
 - SEISMIC ZONE: $S_s=30\%$, $S_1=10\%$
 - WIND LEVEL 115mph EXPOSURE C (OR TO SPECIFIC SITE EXPOSURE)
 - SNOW LOAD 150psf
- ALL PROPOSED PANEL ROOFS SHALL BE SUBMITTED TO THE DISTRICT WITH DESIGN DRAWINGS AND CALCULATIONS SEALED BY A LICENSED IDAHO PROFESSIONAL ENGINEER.
- AS AN ALTERNATIVE CONTRACTOR'S MAY UTILIZE A PRE-ENGINEERED MONO-SLOPE ROOF DESIGN AVAILABLE FROM THE DISTRICT UPON REQUEST.

REUSE OF DRAWINGS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: LIFT STATION PANEL AND ROOF

PROJ. #: 21-19-002

PLOT DATE: 2/27/2020

LAST UPDATED: 2/27/2020

DRAWN BY: ARB

DESIGN BY: JPE

CHECKED BY: RSM

SD-2

**STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID**

LIFT STATION PANEL & ROOF

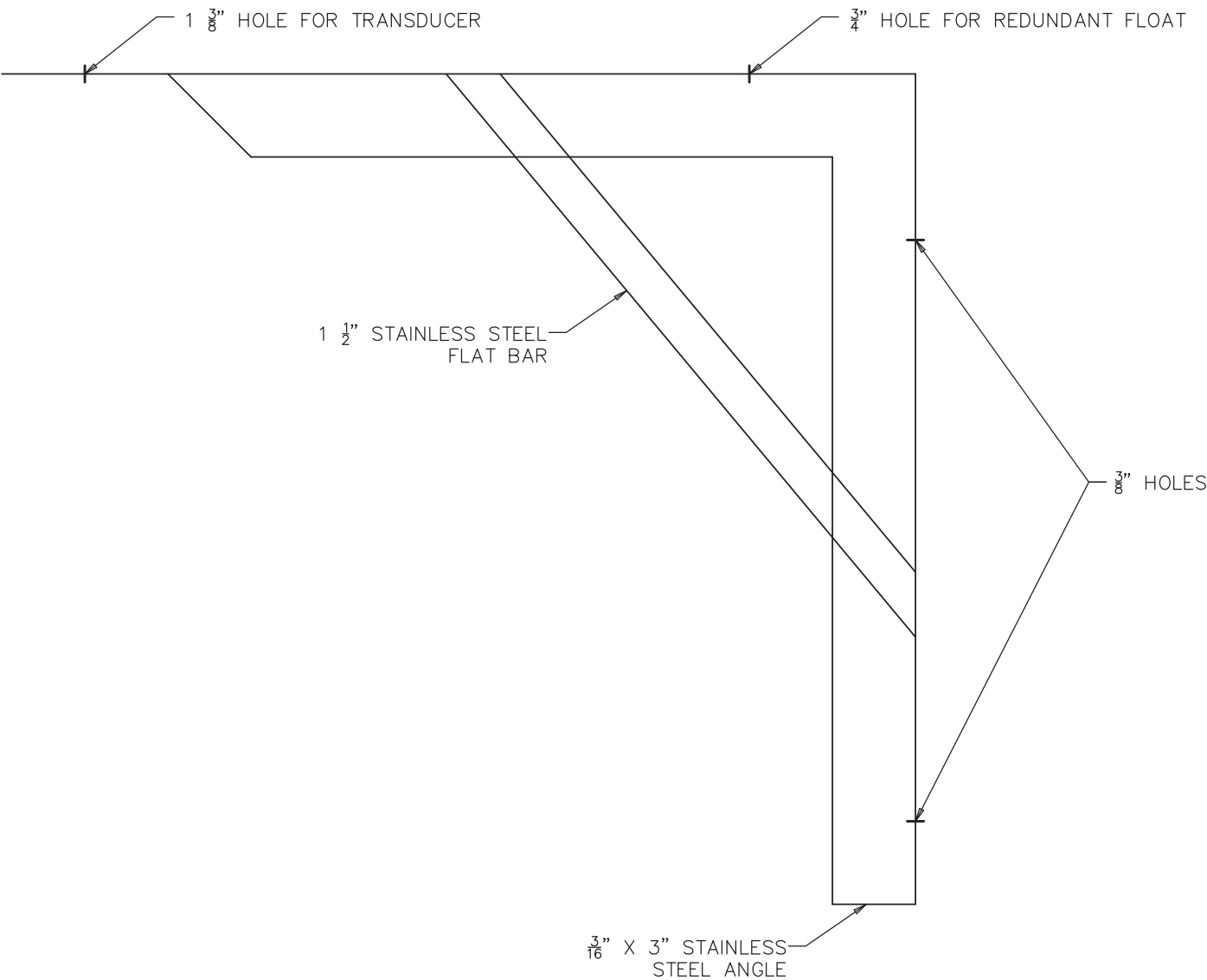
SHEET
2

OF
2

NO. REVISION DESCRIPTION BY APR. DATE

Date Created: 2/26/2020 J:\MSCHFILES\PUBLIC\PROJECTS\JUB\21-19-002 - PLRWSD-2019 ENGINEERING SERVICES\21-19-002 - DOC\2020 STANDARDS UPDATE\CAD\LIFT STATION PANEL AND ROOF

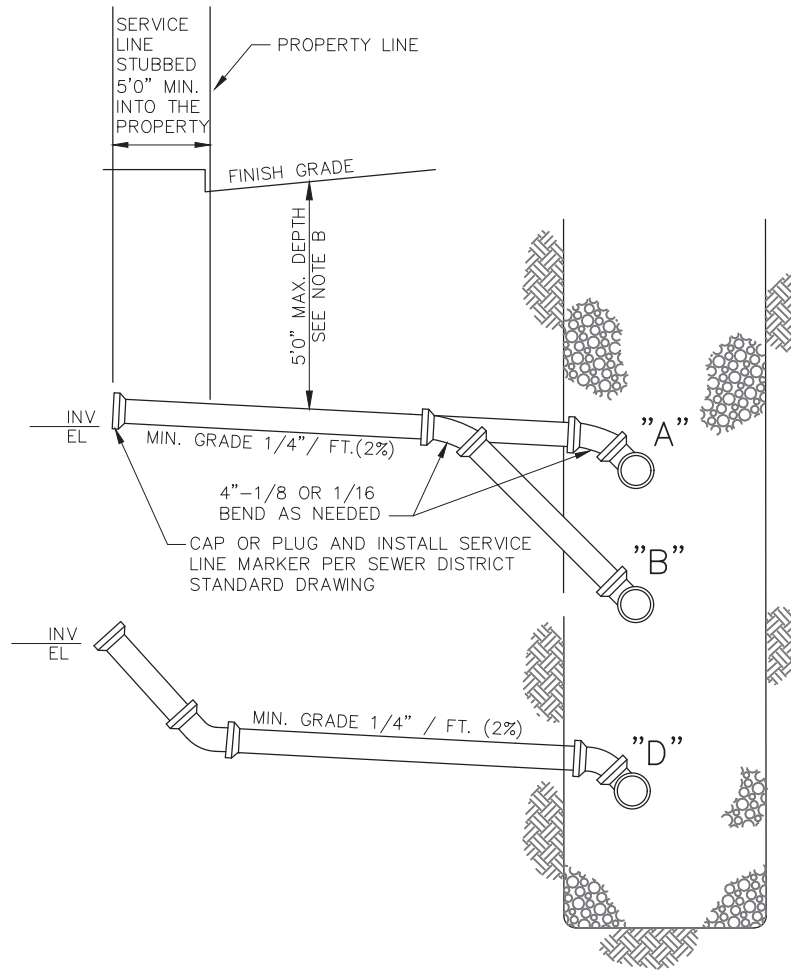
\\msc\files\public\projects\j\j0119-002 - PLRWS-D-2019 ENGINEERING SERVICES\J\J0119-002 - DOC\2020 STANDARDS UPDATE\CAD\TRANSDUCER-FLOAT BRACKET



NOTE

1. CONTACT PLRWS-D FOR BRACKET MEASUREMENTS.
SIZE DEPENDENT ON THE WET WELL.

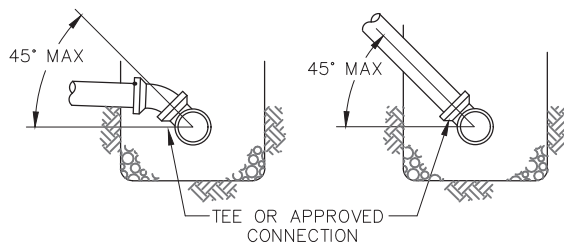
REUSE OF DRAWINGS THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.				CAD FILE: TRANSDUCER-FLOAT_BRACKET		SD-3	STANDARD DETAIL FOR PLRWS-D, VALLEY COUNTY, ID		SHEET
				PROJ. #: 21-19-002					1
				PLOT DATE: 2/27/2020					
				LAST UPDATED: 5/14/2008					
				DRAWN BY: JAH					
				DESIGN BY: C.O.M.					
				CHECKED BY: PHK					
NO.	REVISION DESCRIPTION			BY	APR.	DATE	TRANSDUCER / REDUNDANT FLOAT BRACKET		OF
									1



- NOTES:
- (A) ALL SERVICE LINES TO BE 4" INSIDE DIAMETER UNLESS OTHERWISE NOTED.
 - (B) A MINIMUM OF 3'-0" COVER DEPTH MAY BE ALLOWABLE WITH PRIOR APPROVAL FROM THE PLRWSD .

ELEVATIONS

N.T.S.



TYPE "A" & "D" TYPE "B"

CONNECTION DETAILS

N.T.S.

Data Created: 2/27/2020, WMSFILES\PUBLIC\PROJECTS\JUB\21-19-002 - PLRWSD-2019 ENGINEERING SERVICES\21-19-002 - DOC\2020 STANDARDS UPDATE\CAD\STD-SWR-SER-LINE

REUSE OF DRAWINGS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: STD-SWR-SER-LINE
PROJ. #: 21-19-002
PLOT DATE: 2/27/2020
LAST UPDATED: 2/27/2020
DRAWN BY: BAK
DESIGN BY: BAK
CHECKED BY: PHK

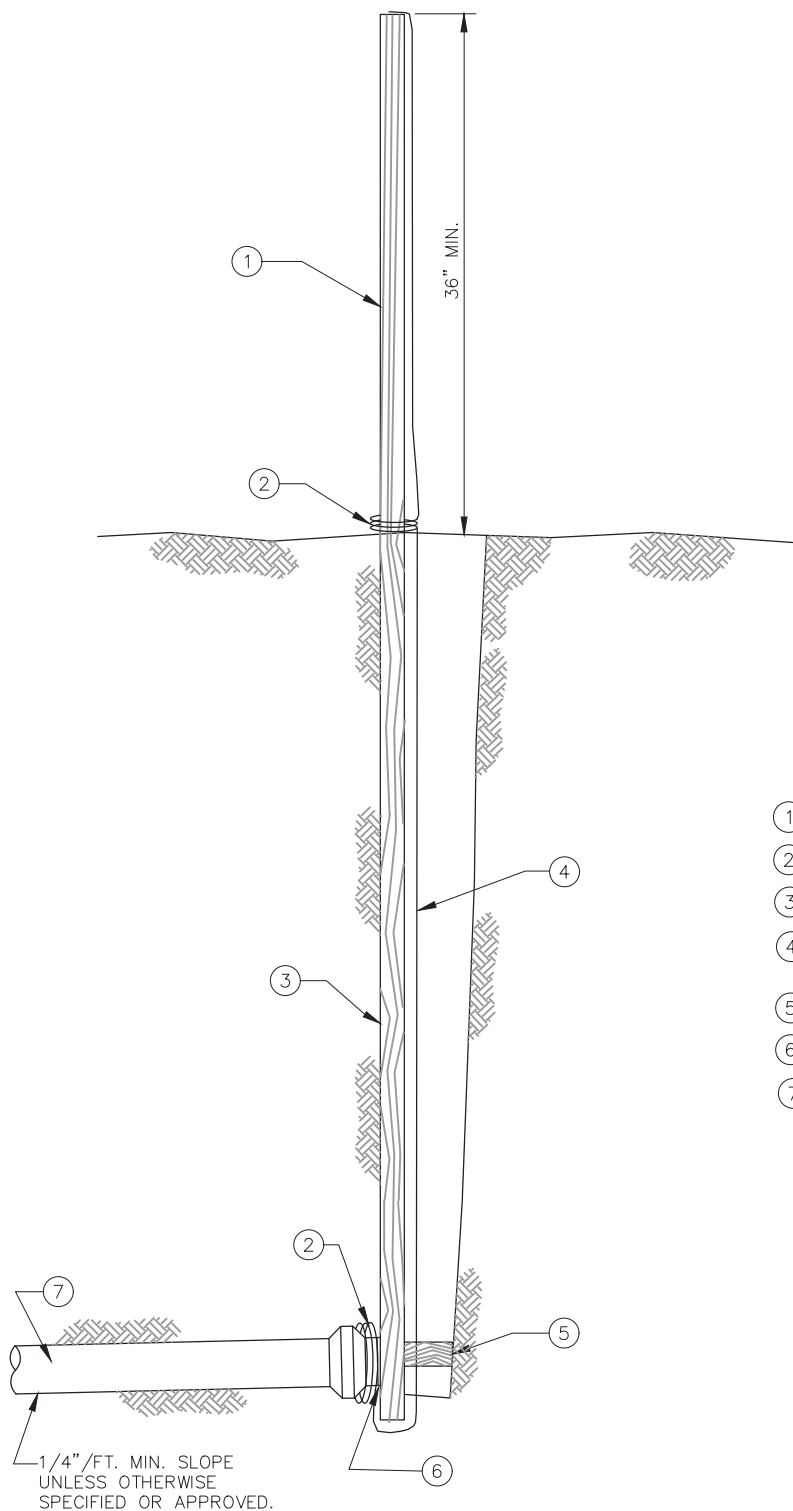
SD-4

**STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID**

**STANDARD SEWER
SERVICE LINES**

SHEET
1
OF
1

NO.	REVISION DESCRIPTION	BY	APPR	DATE



LEGEND

- ① PAINT GREEN.
- ② THREE 6" DIAMETER COILS.
- ③ 4"x4" PRESSURE TREATED POST.
- ④ NO. 9 AWG. GALVANIZED FINDER WIRE (FASTEN TO BOTTOM OF SERVICE CONNECTION).
- ⑤ 2" X 4" BLOCKING.
- ⑥ PLUG OR CAP.
- ⑦ 4" OR 6" SEWER SERVICE PIPE.

PROFILE
N.T.S.

SD-5

STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID
STANDARD SERVICE MARKER

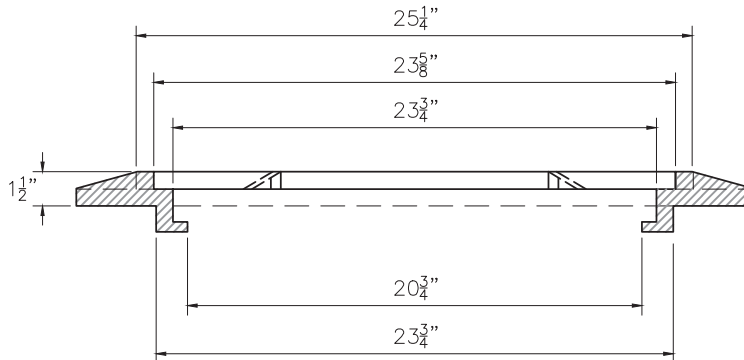
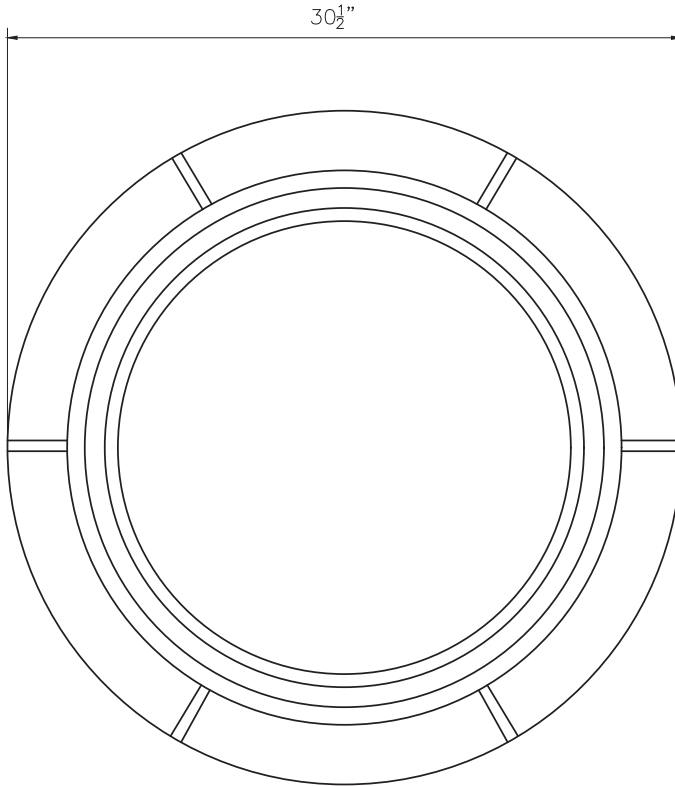
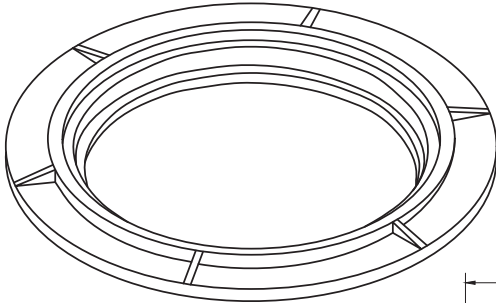
SHEET
1
OF
1

REUSE OF DRAWINGS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: 11475-731LS
PROJ. #: 21-19-002
PLOT DATE: 2/27/2020
LAST UPDATED: 2/27/2020
DRAWN BY: BAK
DESIGN BY: BAK
CHECKED BY: PHK

NO.	REVISION DESCRIPTION	BY	APR	DATE

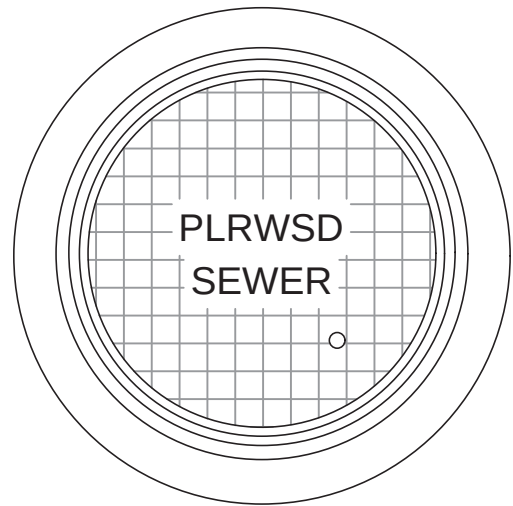
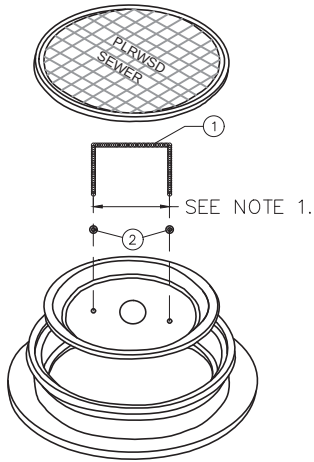
PLRWSD Standard
Kits Foundry
Shelley, Id



Date Created: 2/26/2020, JMS\FILES\PUBLIC\PROJECTS\SUB\21-19-002 - PLRWSD-2019 ENGINEERING SERVICES\21-19-002 - DOC\2020 STANDARDS UPDATE\CAD\MANHOLE SHALLOW FRAME

REUSE OF DRAWINGS THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc. <table><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td></tr></table>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

PLRWSD Standard
Kits Foundry
Shelley, Id

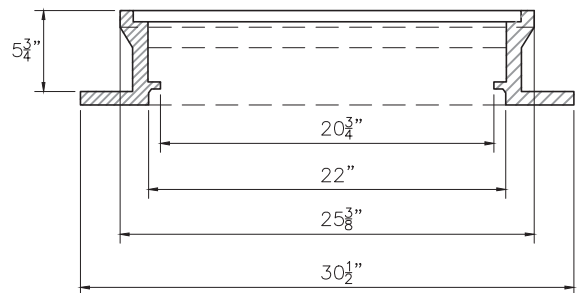
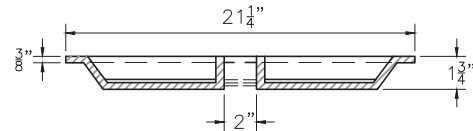
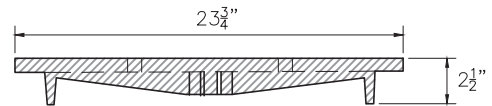


DUST PAN LIFT HANDLE: KEY NOTES

- ① $\frac{5}{16}$ " CHAIN
- ② $\frac{5}{16}$ " (INSIDE) S.S. FLAT FENDER WASHER

INSTALLATION NOTES

1. FIELD MEASURE DISTANCE PRIOR TO FABRICATION.
ADJUST LENGTH OF ① AS NECESSARY.
2. WELD ① TO ② .
3. INSERT ② THROUGH DUST PAN HOLES.
4. WELD ③ TO ② SO HANDLE SLIDES FREELY
THROUGH DUST PAN HOLES.



DRAWN: 4/26/2022, JUB.COM/CENTRAL/CLIENTS/ID/PLRWSD/PROJECTS/21-22-002_2022ENGINEERING/CS/DESIGN/CAD/PLRWSD STANDARD MANHOLE DETAIL/SD MANHOLE STANDARD FRAME-DUST PAN-COVER

REUSE OF DRAWINGS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN,
AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF
J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART,
FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN
AUTHORIZATION OF J-U-B ENGINEERS, Inc.

CAD FILE: MANHOLE STANDARD FRAME-DUST PAN-COVER
PROJ. #: 10-12-040
PLOT DATE: 4/27/2022
LAST UPDATED: 4/26/2022
DRAWN BY: BAK
DESIGN BY: BAK
CHECKED BY: PHK

SD-7

STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID

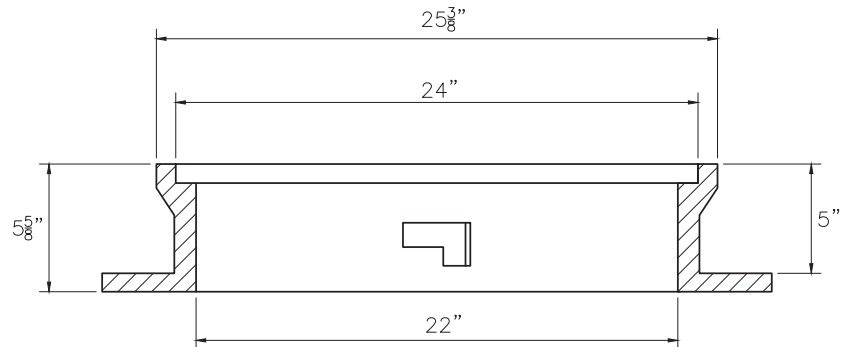
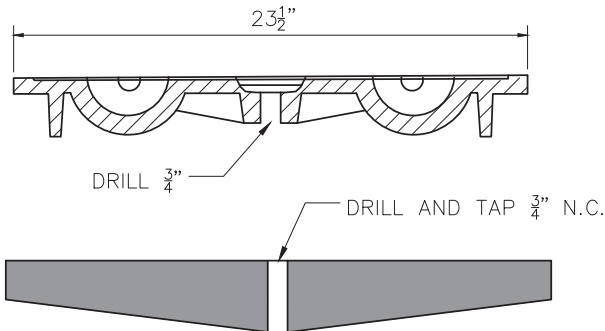
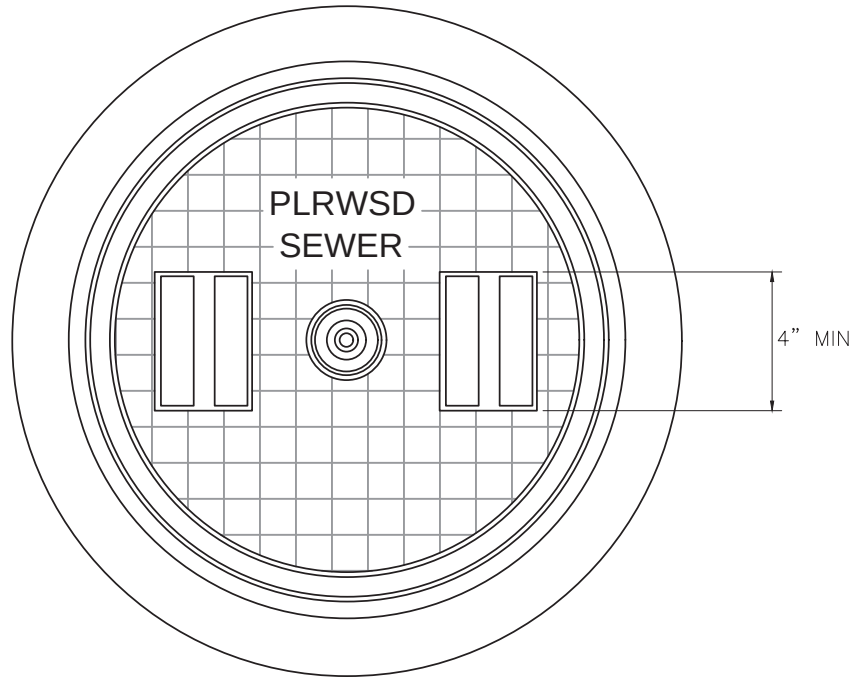
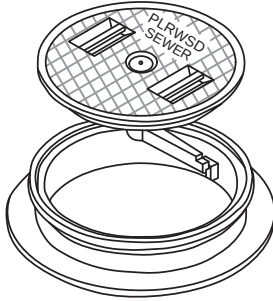
Manhole Standard Frame-Dust Pan-Cover

SHEET
1

OF
1

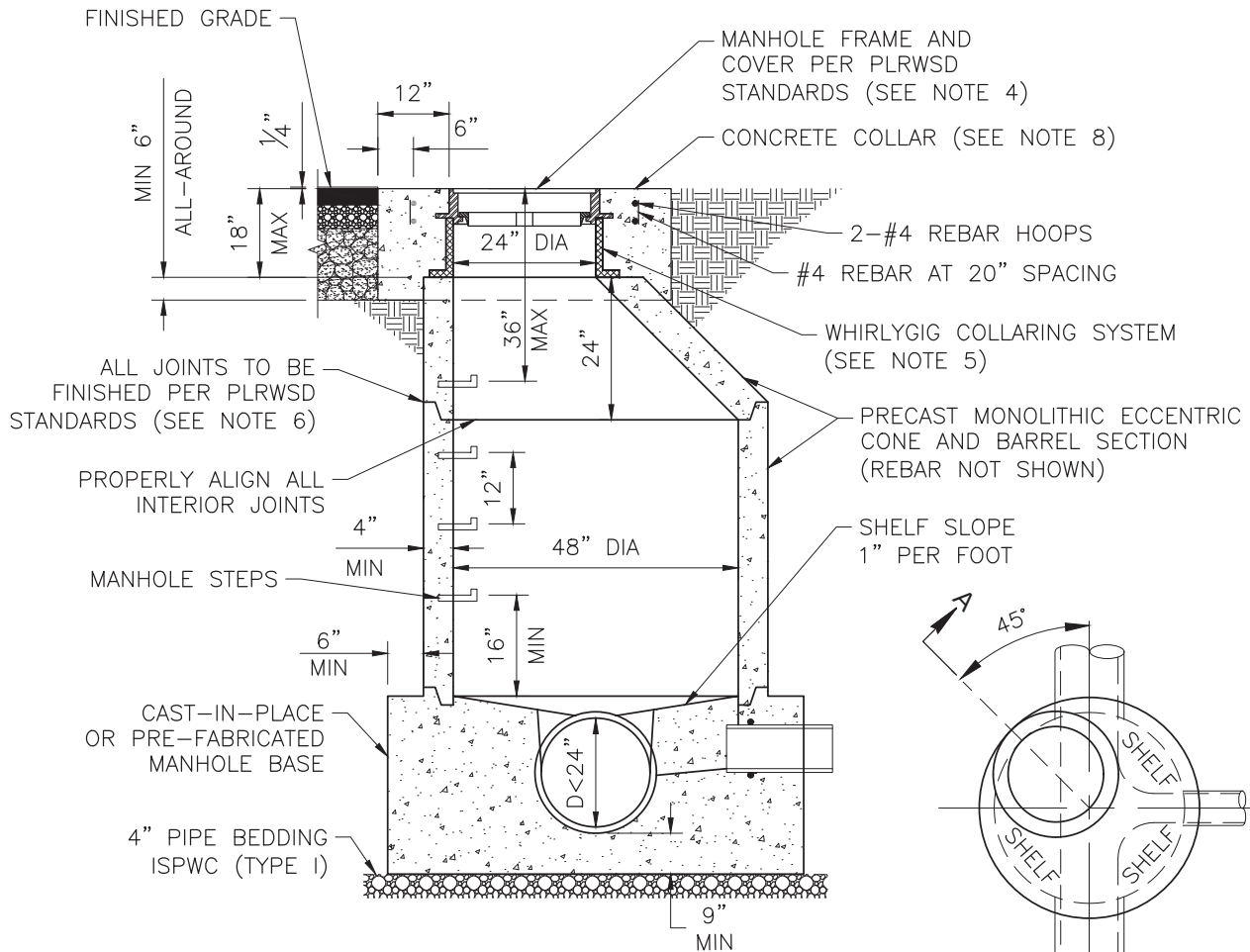
NO. REVISION DESCRIPTION BY APR. DATE

PLRWSD Standard
Kits Foundry
Shelley, Id

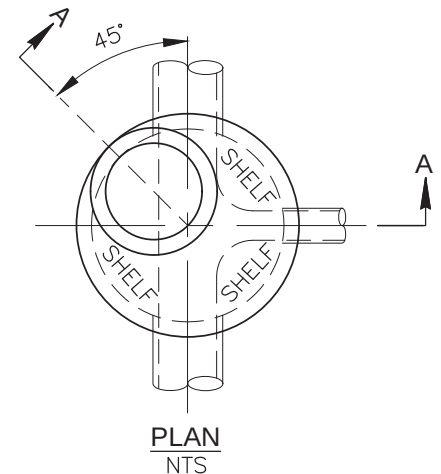


Date Created: 2/26/2020, WMSCHFILES\PUBLIC\PROJECTS\JUB\21-19-002 - PLRWSD-2019 ENGINEERING SERVICES\21-19-002 - DOC\2020 STANDARDS UPDATE\CAD\MANHOLE WATER TIGHT FRAME

REUSE OF DRAWINGS THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF J-U-B ENGINEERS, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF J-U-B ENGINEERS, Inc.				CAD FILE: MANHOLE WATER TIGHT FRAME PROJ. #: 21-19-002 PLOT DATE: 2/27/2020 LAST UPDATED: 2/27/2020 DRAWN BY: BAK DESIGN BY: BAK CHECKED BY: PHK		SD-8		STANDARD DETAIL FOR PLRWSD, VALLEY COUNTY, ID		SHEET 1
NO. REVISION DESCRIPTION BY APR. DATE				WATER TIGHT FRAME AND COVER		OF 1				



SECTION A-A
NTS



PLAN
NTS

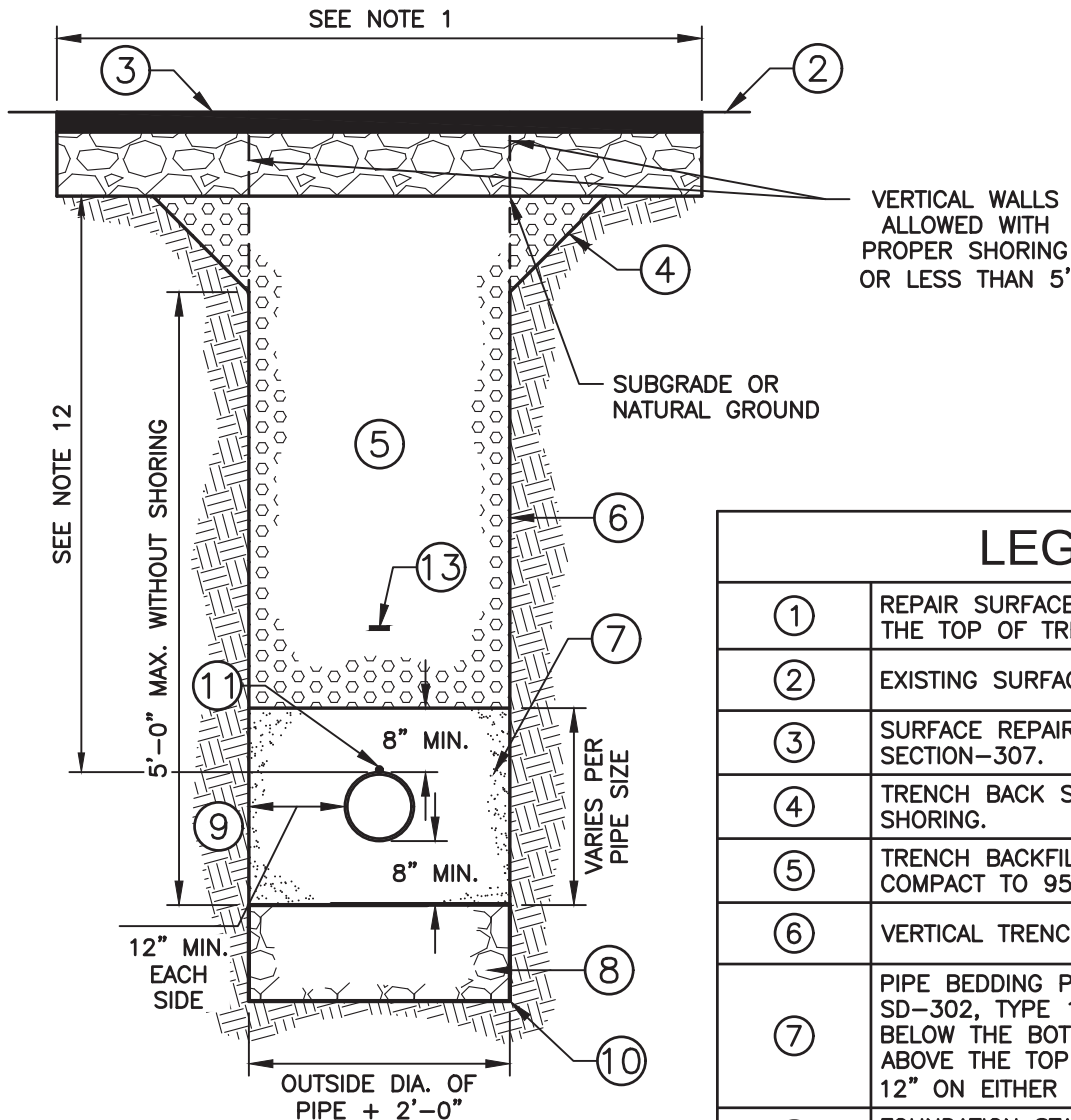
NOTES:

1. OPTIONAL PRE-FABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL.
2. PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
3. WHERE PVC PIPE IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO ENSURE A WATERTIGHT SEAL.
4. ALL MANHOLES TO HAVE CAST-IRON DUST PANS CONSTRUCTED WITH INTEGRAL MACHINED FLANGES CAST INTO THE FRAME. DUST PANS TO HAVE A RAISED DRAIN HOLE AND WIRE LIFTING STRAP. MANHOLE COVER TO BE STAMPED "PLRWSD SEWER". FRAMES, COVERS, AND DUSTPANS TO BE MANUFACTURED BY KITS FOUNDRY & MACHINE, INC (208-357-7773)
5. "WHIRLYGIG" COLLARING SYSTEM REQUIRED ON ALL MANHOLES IN PLACE OF CONCRETE GRADE RINGS. JOINT BETWEEN WHIRLYGIG COLLARING SYSTEM (BOTTOM OF PLASTIC FLANGE) AND TOP OF MANHOLE CONE SHALL BE SEALED WITH "VULKEM 116" HIGH-PERFORMANCE POLYURETHANE SEALANT.
6. ALL MANHOLE JOINTS TO INCLUDE CON-SEAL "CS-102 BUTYL RUBBER SEALANT," "VULKEM 116" HIGH-PERFORMANCE POLYURETHANE SEALANT, AND BE GROUTED (INSIDE & OUT) USING DAYTON 1107 ADVANTAGE, SPECHEM SC MULTIPURPOSE GROUT, OR EQUAL APPROVED BY PLRWSD. EXTERIOR MANHOLE JOINTS TO BE COVERED WITH NINE (9") INCH WIDE INFI-SHIELD GATOR WRAP AFTER GROUTING.
7. PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADS.
8. IF MANHOLE IS INSTALLED IN STAMPED CONCRETE, STAINED CONCRETE, OR PAVERS, COLLAR TO BE AS REQUIRED TO MATCH EXISTING SURFACING.

SD-9

STANDARD DETAIL FOR
PLRWSD, VALLEY COUNTY, ID
STANDARD MANHOLE

SHEET
1
OF 1



LEGEND

①	REPAIR SURFACE TO A MINIMUM 2' OUTSIDE THE TOP OF TRENCH.
②	EXISTING SURFACE.
③	SURFACE REPAIR TO MATCH EXISTING PER SECTION-307.
④	TRENCH BACK SLOPE PER OSHA OR SUITABLE SHORING.
⑤	TRENCH BACKFILL PER SECTION-308. COMPACT TO 95% OF AASHTO T180.
⑥	VERTICAL TRENCH WALLS SHORING PER OSHA.
⑦	PIPE BEDDING PER SECTION-305. SEE SD-302, TYPE 1 BEDDING FROM 8 INCHES BELOW THE BOTTOM OF PIPE TO 8 INCHES ABOVE THE TOP OF PIPE WITH A MINIMUM OF 12" ON EITHER SIDE OF PIPE.
⑧	FOUNDATION STABILIZATION MAY VARY PER SOIL TYPE AND STABILITY PER SECTION-304.
⑨	UNDISTURBED SOIL, TYP.
⑩	IF REQUIRED WRAP THE FOUNDATION STABILIZATION AGGREGATE WITH NON-WOVEN GEOTEXTILE FABRIC PER THE DESIGN ENGINEER, GEOTECHNICAL ENGINEER, AND SECTION-304 REQUIREMENTS.
⑪	INSTALL NO. 10 AWG COPPER LOCATING WIRE WITH INSULATION AND EPOXY SPLICE KITS PER SECTION-505 FOR ALL PRESSURE SEWER PIPE.
⑫	MINIMUM 3' OF COVER OVER GRAVITY PIPE. MINIMUM 6' OF COVER OVER PRESSURE SEWER PIPE.
⑬	INSTALL 2" WIDE IDENTIFICATION TAPE MARKED "CAUTION BURIED SEWER LINE BELOW" IN MINIMUM 1-1/2" BLACK LETTERS 18" ABOVE THE TOP OF ALL BURIED PRESSURE SEWER PIPE.

NOTES

- (A) TRENCH EXCAVATION PER SECTION-301
- (B) BACKFILL AND COMPACTION PER SECTION-306
- (C) SURFACE REPAIR AND BASE PER SECTION-307. SEE SD-303.
- (D) ADDITIONAL GEOTEXTILE AND GEOGRID SPECIFICATIONS PER SECTION-304.

Plot Date: 3/1/2022 1:35 PM Plotted By: Adam Rushold
 Date Created: 2/29/2022 J:\UB.COM\CENTRAL CLIENTS\ID\PLRWS\DESIGN\CAD\PLRWS\STANDARD\TRENCH DETAIL SD-10.TRENCH.DWG

REUSE OF DRAWINGS			
J-U-B SHALL RETAIN ALL COMMON LAW, STATUTORY, COPYRIGHT AND OTHER RESERVED RIGHTS OF THESE DRAWINGS, AND THE SAME SHALL NOT BE REUSED WITHOUT J-U-B'S PRIOR WRITTEN CONSENT. ANY REUSE WITHOUT WRITTEN CONSENT BY J-U-B WILL BE AT CLIENT'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO J-U-B.			
NO	REVISION DESCRIPTION	BY	DATE

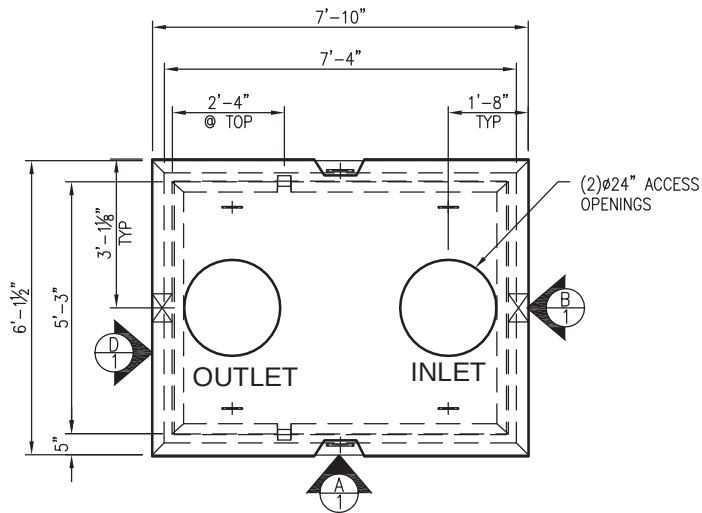
FILE: SD10_TRENCH
JUB PROJ. #: 21-21-002
DRAWN BY: DMK
DESIGN BY:
CHECKED BY:
LAST UPDATED: 3/1/2022



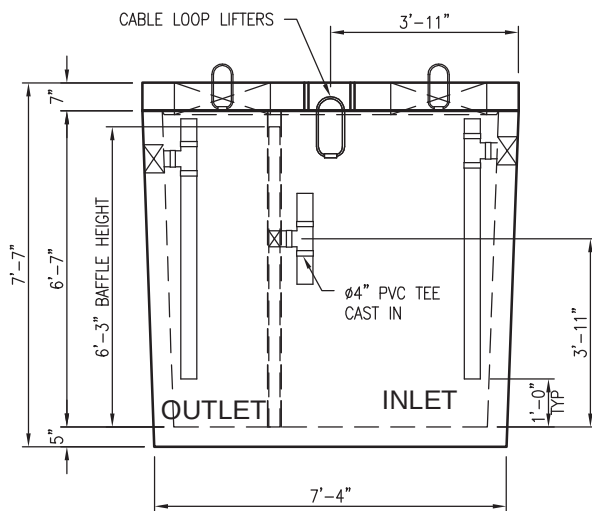
STANDARD DETAIL
 PLRWS, VALLEY COUNTY, ID
 STANDARD TRENCH

SHEET

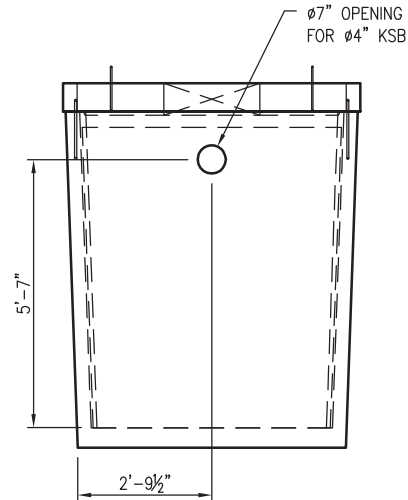
SD-10



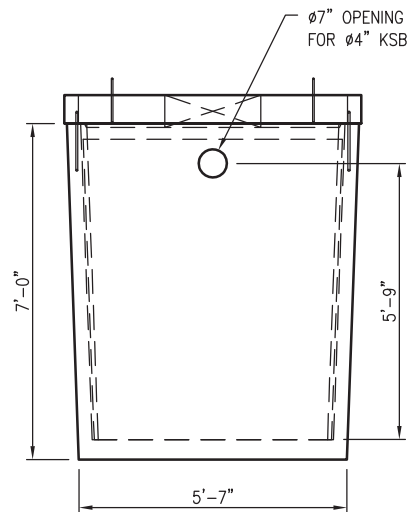
PLAN VIEW
SCALE: 1/4" = 1'-0"



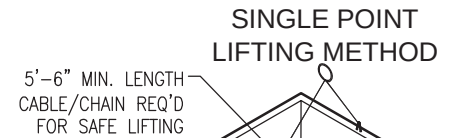
VIEW A
SCALE: 1/4" = 1'-0"



VIEW D-OUTLET
SCALE: 1/4" = 1'-0"



VIEW B-INLET
SCALE: 1/4" = 1'-0"



SHIPPED LOOSE ITEMS

QTY	DESCRIPTION
2 EA	Ø4" PVC TEE
12 FT	Ø4" PVC PIPE

PRODUCT WEIGHTS

PRODUCT	HANDLING WEIGHT
1500 GALLON TANK BASE	13,911 LBS
1500 GALLON TANK LID	3,938 LBS

DESIGN NOTES:

- MIN. DESIGN CRITERIA PER ACI - 318 CODE & AS NOTED.
- DESIGN LOADINGS:
 - AASHTO HS-25-44, W/IMPACT
 - SOIL WEIGHT = 120 PCF.
 - DEPTH OF OVERBURDEN 0.0' MIN 3.0' MAX.
 - ASSUMED WATER TABLE: 5.0' BELOW FINISHED GRADE
 - EQUIV. FLUID PRESSURE = 40 PCF.
 - LATERAL LIVE LOAD SURCHARGE PER CODE.
- CONCRETE 28 DAY COMPRESSIVE STRENGTH: 6000 PSI (MIN)
- STEEL REINFORCEMENT: REBAR, ASTM A-615 GRADE 60
- CEMENT: ASTM C-150 SPECIFICATIONS



Oldcastle Precast®

16419 TEN LANE Nampa, IDAHO 83857
PHONE: (208) 465-0176, FAX: (208) 465-7129

THIS DOCUMENT IS THE PROPERTY OF OLDCASTLE PRECAST, INC. IT IS CONFIDENTIAL. IT IS SUBMITTED FOR REFERENCE PURPOSES ONLY, AND SHALL NOT BE USED IN ANY WAY INJURIOUS TO THE INTERESTS OF, OR WITHOUT THE WRITTEN PERMISSION OF OLDCASTLE PRECAST, INC. COPYRIGHT © 2015 OLDCASTLE PRECAST, INC. ALL RIGHTS RESERVED.

1500 GAL. GREASE INTERCEPTOR

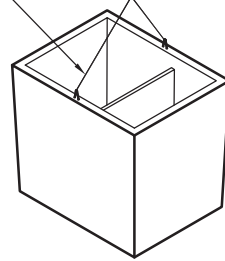
SUBMITTAL LAYOUT

CUSTOMER

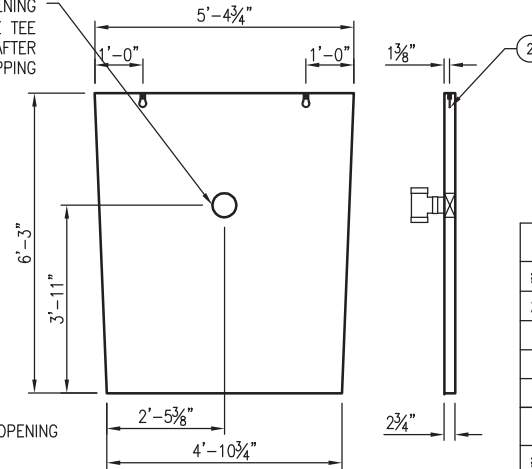
DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
11/11/14	OCP-240	CLP	MPB		
DRAWING NUMBER				REVISION	SHEET
240-X1500GL-001				0 REV DATE: 6/10/2015	1 OF 2
#	DATE	REVISIONS			BY
C	11/11/2014	MODIFIED BAFFLE WALL			CLP
D	6/10/2015	ADJUSTED SHIP LOOSE/CAST IN ITEM			CLP

SINGLE POINT LIFTING METHOD

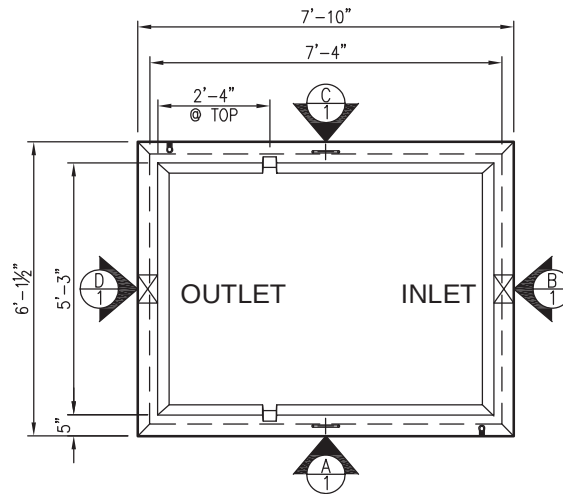
5'-6" MIN. LENGTH
CABLE/CHAIN REQ'D
FOR SAFE LIFTING



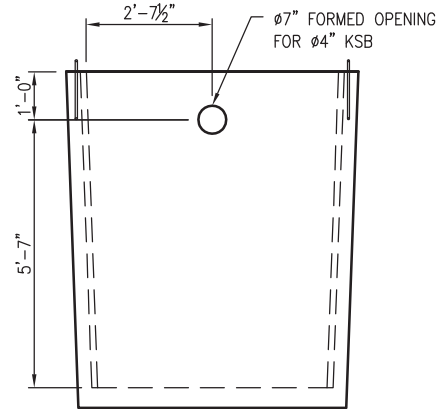
Ø6" OPENING
FOR Ø4" PIPE TEE
GROUT IN AFTER
STRIPPING



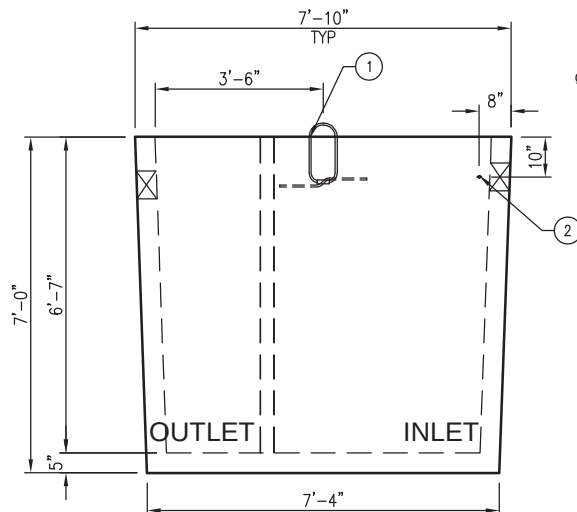
BAFFLE DETAILS
SCALE: 1/4" = 1'-0"



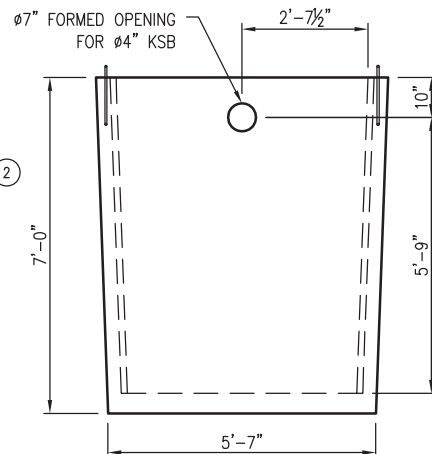
PLAN VIEW
SCALE: 1/4" = 1'-0"



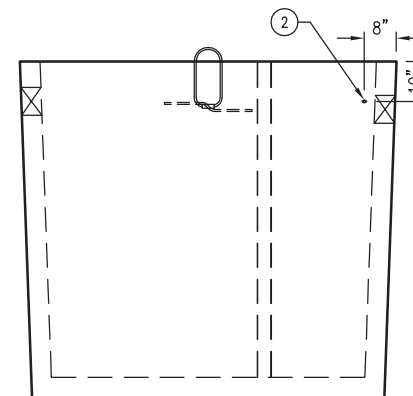
VIEW D-OUTLET
SCALE: 1/4" = 1'-0"



VIEW A
SCALE: 1/4" = 1'-0"



VIEW B-INLET
SCALE: 1/4" = 1'-0"



VIEW C
SCALE: 1/4" = 1'-0"

BILL OF MATERIALS-BAFFLE

#	QTY	DESCRIPTION	AX#
2	2 EA	MB FX-5 1/2" FERRULE LOOP INSERT	8520100
	1 EA	4" PVC PIPE TEE	
	0.27 CYD	NAMPA MIX DESIGN #5 SCC 6K	8900500
	27.86 LBS	#3 REBAR	8010203

BILL OF MATERIALS-BASE

#	QTY	DESCRIPTION	AX#
1	2 EA	MB CABLE LIFT LOOP-LT. GREEN 2T	8500310
2	2 EA	MB FX-5 1/2" FERRULE LOOP INSERT	8520100
	2 EA	4" KSB-S106-TWS	8504300
	3.16 CYD	NAMPA MIX DESIGN #5 SCC 6K	8900500
	342.11 LBS	#4 REBAR	8010204

PRODUCT WEIGHTS

PRODUCT	WEIGHT
1500 GALLON TANK BASE	12,808 LBS
1500 GALLON BAFFLE WALL	1,103 LBS

SHOP NOTES:

1. USE STD REBAR
2. CONCRETE STRENGTH: 8000 PSI
3. 1500 PSI MINIMUM STRIPPING STRENGTH REQUIRED



APPROVED FOR
"FABRICATION"

DATE: 6/10/2015

INITIALS: CLP



Oldcastle Precast®

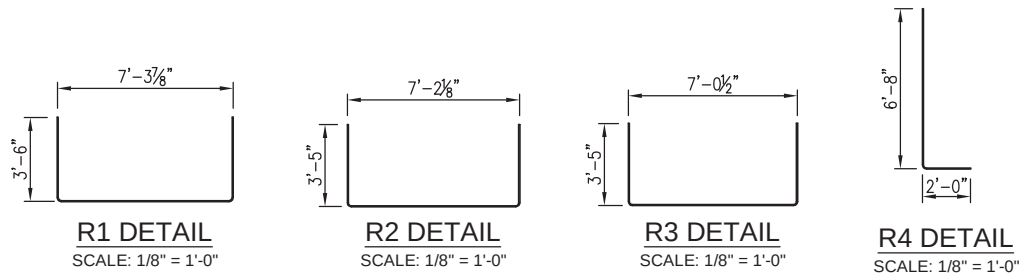
16419 TEN LANE NAMPA, IDAHO 83687
PHONE: (208) 465-0176, FAX: (208) 465-7129

THIS DOCUMENT IS THE PROPERTY OF OLDCASTLE PRECAST, INC. IT IS CONFIDENTIAL. IT IS SUBMITTED FOR REFERENCE PURPOSES ONLY, AND SHALL NOT BE USED IN ANY WAY INJURIOUS TO THE INTERESTS OF, OR WITHOUT THE WRITTEN PERMISSION OF OLDCASTLE PRECAST, INC. COPYRIGHT © 2015 OLDCASTLE PRECAST, INC. ALL RIGHTS RESERVED.

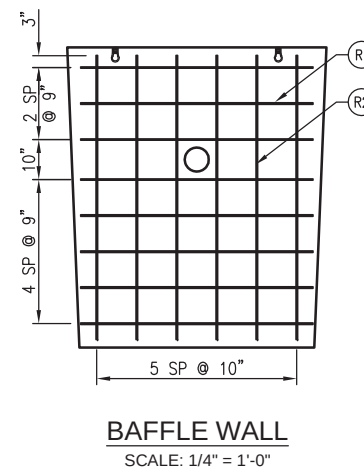
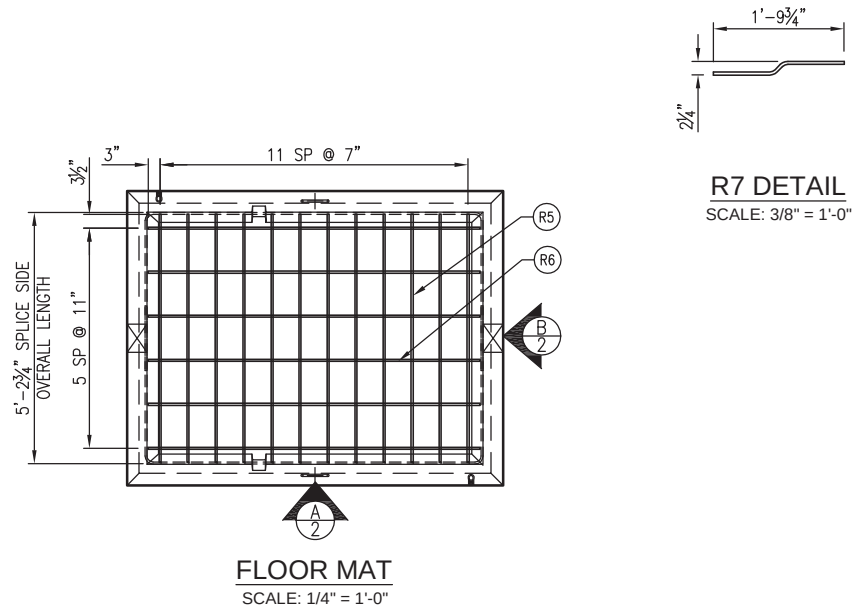
1500 GAL. GREASE INTERCEPTOR PRODUCTION DRAWING

CUSTOMER

DATE 11/11/14	SALES OCP-240	DRAWN CLP	ENGINEER MPB	CHECKED	SALES ORDER
DRAWING NUMBER 240-X1500GL-001				REVISION D REV DATE 6/10/2015	SHEET 1 OF 2
#	DATE	REVISIONS			BY
C	11/11/2014	MODIFIED BAFFLE WALL			CLP
D	6/10/2015	ADJUSTED SHIP LOOSE/CAST IN ITEM			CLP



REINFORCEMENT CUT LIST-BAFFLE				
#	QTY	MATERIAL	LENGTH	SHAPE
R1	8	#3 BAR	4'-10"	STR
R2	6	#3 BAR	5'-11"	STR



REINFORCEMENT CUT LIST				
#	QTY	MATERIAL	LENGTH	SHAPE
R1	4	#4 BAR	14'-1"	U BAR
R2	4	#4 BAR	13'-9 1/4"	U BAR
R3	4	#4 BAR	13'-7 1/2"	U BAR
R4	28	#4 BAR	8'-6 1/2"	L BAR
R5	12	#4 BAR	5'-2"	STR
R6	6	#4 BAR	6'-11"	STR
R7	2	#4 BAR	1'-10"	BENT

STEEL WEIGHT		
PRODUCT	MATERIAL	WEIGHT
BAFFLE WALL	#3/GRD60	27.86 LBS
VAULT BASE	#4/GRD60	342.11 LBS



APPROVED FOR
"FABRICATION"

DATE: 6/10/2015 INITIALS: CLP



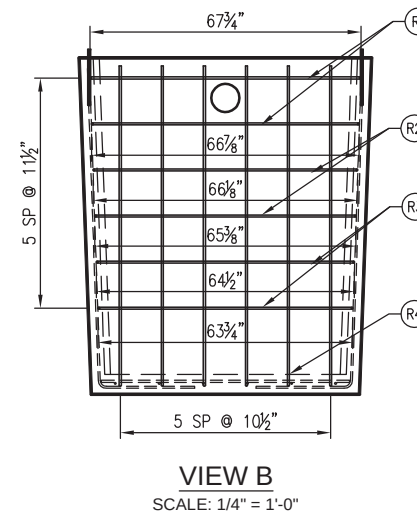
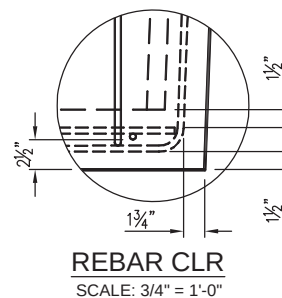
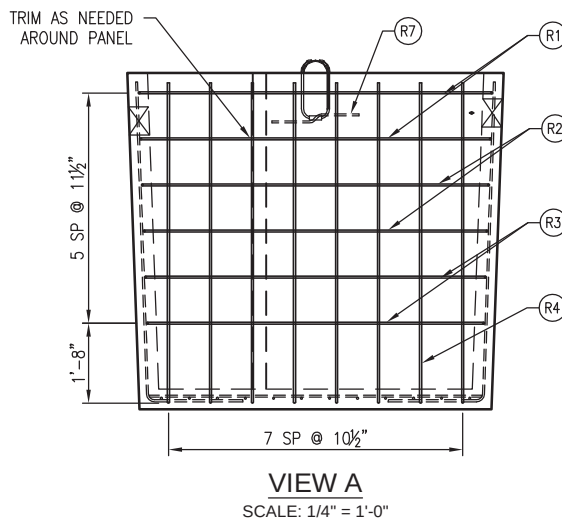
Oldcastle Precast®

18419 TEN LANE NAMP, IDAHO 83887
PHONE: (208) 465-0176, FAX: (208) 465-7128

THIS DOCUMENT IS THE PROPERTY OF OLDCASTLE PRECAST, INC. IT IS CONFIDENTIAL. IT IS SUBMITTED FOR REFERENCE PURPOSES ONLY, AND SHALL NOT BE USED IN ANY WAY INJURIOUS TO THE INTERESTS OF, OR WITHOUT THE WRITTEN PERMISSION OF OLDCASTLE PRECAST, INC. COPYRIGHT © 2015 OLDCASTLE PRECAST, INC. ALL RIGHTS RESERVED.

1500 GAL. GREASE INTERCEPTOR REINFORCING DRAWING

CUSTOMER					
DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
11/11/14	OCP-240	CLP	MPB		
DRAWING NUMBER				REVISION	SHEET
240-X1500GL-001				REV DATE 6/10/2015	2 OF 2
#	DATE	REVISIONS			BY
C	11/11/2014	MODIFIED BAFFLE WALL			CLP
D	6/10/2015	ADJUSTED SHIP LOOSE/CAST IN ITEM			CLP



PAYETTE LAKES RECREATIONAL WATER AND SEWER DISTRICT
VALLEY COUNTY, IDAHO
STANDARD REVISIONS TO THE 2020 ISPWC AND SUPPLEMENTAL SPECIFICATIONS

APPENDIX A

LIFT STATION START-UP CHECKLIST

PLRWSD - LIFT STATION START UP CHECK LIST

Date _____

Lift Station # _____

Complete
Incomplete

General:

☐	☐	Pre Design Meeting	Date of Meeting _____
☐	☐	Submittals received and approved	
☐	☐	Pre Construction Meeting	Date of Meeting _____
☐	☐	Truck and equipment access year round	
☐	☐	Phone line installed and operating properly	
☐	☐	Entire lift station area clean and 6" minimum of 3\4" road mix or paved surfacing	
☐	☐	Positive site drainage from wet well and valve vault, Minimum of 1 foot of wet well and vault above finish grade	
☐	☐	Bollards in place; if required	
☐	☐	Support panel properly constructed	
☐	☐	Electrical panels properly mounted	
☐	☐	O&M manuals with complete list of materials used-received	

Electrical:

☐	☐	Panel with a single rotary handle
☐	☐	Proper conduit seal offs with proper (removable) sealant
☐	☐	Correct UPS
☐	☐	Phone line routed through UPS
☐	☐	20 amp convenience receptacle
☐	☐	Correct generator receptacle; proper rotation
☐	☐	Correct pump controller, wired to District specifications and properly programmed
☐	☐	Redundant controller installed, wired to District specifications and properly operating, including alarm

Pumps:

☐	☐	Pump technical specifications verified and documents provided, including impeller diameter, horse power, etc.		
☐	☐	Installed TDH and flow (gpm) verified in field, and documents provided		
☐	☐	Pump curve provided, with supplied pump indicated on curve		
☐	☐	Start-Up Measurements:	Pump #1 _____ gpm	Pump #2 _____ gpm
			Pump #1 _____ Amps	Pump #2 _____ Amps
☐	☐	Spare pump delivered		

	Complete	Incomplete
Wet Well:	☐	☐ Wet well lined and clean
	☐	☐ Fillets installed or floor properly sloped
	☐	☐ All hardware stainless steel
	☐	☐ Proper access hatch; flush drop handle, staples for pad locks, drain to wet well
	☐	☐ Proper transducer/redundant float bracket; properly installed
	☐	☐ Redundant float with weight properly installed and restrained
	☐	☐ XPS 15 transducer with submergence shield
	☐	☐ 2" check valve installed on drain line from valve vault
	☐	☐ Pumps with lifting loops
	☐	☐ Extra pump cables secured on stainless steel hooks
Valve Vault:	☐	☐ Correct hatch on valve vault; flush drop handle, staples for pad lock and drain line to vault floor drain
	☐	☐ 2" minimum drain line with minimum 2% grade to wet well
	☐	☐ Valve vault sloped towards drain, (verified with water poured into vault and water drains to wet well)
	☐	☐ Steps installed
	☐	☐ Proper valves with operators in the correct configuration
	☐	☐ 4" minimum bypass quick disconnect male (ball) with cap
	☐	☐ Pressure line finder wire in place and tested, any splices to wire per ISPWC SD-514
	☐	☐ Fiberglass pressure sewer markers in place (if required)



STRUCTURAL CALCULATIONS
for
KOKANEE COVE DEVELOPMENT AND RENOVATION

at
1920 DAVIS AVENUE
MCCALL, ID 83638
for
KM ENGINEERING



BY: **SAMUEL CHRISTENSEN, S.E.**
Structural Engineer

ID FIRM LICENSE NUMBER: C2269

PROJECT #: **U5516.001.231**

DATE: **April 10, 2024**

DESIGNED BY SDC; CHECKED BY KSA

Note:

The calculations presented in this package are intended for a single use at the location indicated above, for the client listed above. These calculations shall not be reproduced, reused, "card filed", sold to a third party, or altered in any way without the written authorization of Vector Structural Engineering, LLC and KM Engineering.

Copyright © 2024 Vector Structural Engineering, LLC
These calculations contain proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.



PROJECT: Kokanee Cove Development and Renovation

PROJECT NO.: U5516.001.231

SUBJECT: CRITERIA

Design Criteria:

General:

Code: Structural design is based upon the International Building Code, 2018 Edition
Risk Category: II

Wind Criteria: ASCE7-16

Analysis Procedure: ASCE 7-16, Chapter 28 - Envelope Procedure - Part 2
Basic Wind Speed - Ultimate (mph): 103 (3-sec gust)
Wind Exposure: B

Seismic Criteria:

Analysis Procedure: ASCE 7-16, Equivalent Lateral Force Procedure
Site Class: D(default)
Seismic Importance Factor, I_E : 1.0
Mapped Spectral Response Accelerations:
 $S_S = 0.420$ $S_1 = 0.136$
 $S_{DS} = 0.410$ $S_{D1} = 0.211$
Seismic Design Category: D
Cabins Seismic Force Resisting System: Wood Shearwalls
Seismic Response Coefficient, C_s : 0.063
Seismic Base Shear, V (k): 5.241
Restroom Seismic Force Resisting System: Special Reinforced Masonry Shear Walls
Seismic Response Coefficient, C_s : 0.082
Seismic Base Shear, V (k): 5.1

Flat Roof Snow Load, p_f (psf): 120
Sloped Roof Snow Load, p_s (psf): 120

Live Loads:

Roof Live Load (psf): 20
Floor Live Load (psf): 40

General Notes:

- The contractor shall verify dimensions, conditions and elevations before starting work. The engineer shall be notified immediately if any discrepancies are found.
- The typical notes and details shall apply in all cases unless specifically detailed elsewhere. Where no detail is shown, the construction shall be as shown for other similar work and as required by the building code.
- These calculations are limited to the structural members shown in these calculations only. The connection of the members shown in these calculations to any existing structure shall be by others.
- The contractor shall be responsible for compliance with local construction safety orders. Approval of shop drawings by the architect or structural engineer shall not be construed as accepting this responsibility.
- All structural framing members shall be adequately shored and braced during erection and until full lateral and vertical support is provided by adjoining members.

Wood Construction:

- All dimensional lumber shall be Douglas Fir Larch #2 or equal
- All wood timbers shall be Douglas Fir Larch #1 5X & Larger Or Equal
- Wood construction code checks are per the National Design Specification for Wood Construction (NDS) and Standard for Design of Timber Frame Structures (TFEC 1)

Structural Steel:

- All structural steel code checks based on the AISC 360-10 and AISC 341-10.
- All steel pipe shall be per ASTM A53 Gr B.
- All steel rectangular tubes (HSS) shall be per ASTM A500 GR. B (46 KSI), U.N.O.
- All steel wide flange shapes shall be per ASTM A992 (50 KSI), U.N.O.
- All other structural steel shapes & plates shall be per ASTM A36, U.N.O.
- All bolts for steel-to-steel connections shall be per ASTM A325N, U.N.O.
- All bolted connections shall be tightened to "snug tight" condition as defined by AISC, U.N.O.
- All welding shall be performed by certified welders in accordance with American Welding Society (AWS) D1.1, latest applicable edition.



PROJECT: Kokanee Cove Development and Renovation

PROJECT NO.: U5516.001.231

SUBJECT: CRITERIA

Foundation / Concrete:

- All concrete mixing, placement, forming, and reinforcing installation shall be performed in accordance with the requirements of "Building Code Requirements for Reinforced Concrete", ACI 318, latest applicable edition.
- Foundation concrete shall have a minimum compressive strength of 2500 psi at 28 days.
- Cement for all concrete shall be Type I or II with a minimum of 6% entrained air. Maximum aggregate size shall be 3/4".
- Reinforcing steel shall be per ASTM A615 Gr. 60, U.N.O.
- Foundation design is based upon the project soils report prepared by:
ALLWEST
Report No.: 522-443G
January 6, 2023

Concrete Masonry Units:

- Masonry units shall be grade N-II units, 2000 psi, conforming to the latest ASTM designation C-90 & in (Design F'M = 2000 psi.)
- Portland cement shall conform to ASTM designation C-150 & be as specified for concrete.
- Mortar mix shall conform to the requirements of I.B.C. table 2103.7, type S, & project specifications. Mortar shall attain a compressive
- Grout shall conform to the requirements of section 2103 of IBC for coarse grout. Use sufficient water for grout to flow into all joints of
- Provide a minimum of 1/2" grout between main reinforcing & masonry units.
- Low lift construction, maximum grout pour height is 4 feet.
- Cells shall be in vertical alignment. Dowels in footings shall be set to align with cores containing reinforcing steel.
- Refer to architectural drawings for surface & height of units, laying pattern & joint type.
- Special inspection is required for all CMU walls per I.B.C. section 1704.



Copyright © 2018 Vector Structural Engineering, LLC

This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: Kokanee Cove Development and Renovation

JOB NO.: U5516.001.231

SUBJECT: GRAVITY LOADS

		Increase due to pitch	Original loading
ROOF			
ROOF PITCH/12		8	
ASPHALT SHINGLES		4.81	1.20 4.00
3/4" PLYWOOD		2.70	1.20 2.25
FRAMING		3.00	
INSULATION		2.00	
1/2" GYPSUM CLG.		2.20	
M, E & MISC		2.29	
FUTURE SOLAR		3.00	
	DL	20.00	
	LL	20.00	
	SNOW	120.00	
SNOW INCLUDED IN LATERAL		24.0	
2ND FLOOR (WHERE OCCURS)			
FLOOR COVERING		1.00	
3/4" T&G PLYWOOD		2.30	
MFG TRUSSES / FRAMING		2.00	
INSULATION		1.00	
1/2" GYPSUM CEILING		2.20	
PARTITION		2.00	
M, E & MISC.		1.50	
OTHER		0.00	
	DL	12.00	
	LL	40.00	
EXTERIOR WALLS			
STUCCO/SIDING		3.50	
2x6 FRAMING W/3 PLATES		1.30	
INSULATION		1.00	
1/2" GYPSUM		2.20	
1/2" PLYWOOD		1.50	
OTHER		0.50	
	DL	10.00	
OVERFILL			
ASPHALT SHINGLES		4.00	
1/2" PLYWOOD		1.50	
RAFTERS & MISC		3.50	
OTHER		0.00	
	DL	9.00	
	LL	20.00	

TYPICAL ROOF OVERBUILD MAX SPAN TABLE

Grade	Size	Spacing (ft)	L _{max} (ft)
DFL#2	2X4	2	3.30
DFL#2	2X6	2	4.80
DFL#2	2X8	2	6.10
DFL#2	2X10	2	7.50

C _r	C _D	C _{F,V}	M _{allow} (ft-lb)	V _{allow} (lb)	Ctrl'g factor
1.15	1.00	1.50	385	382	Moment
1.15	1.00	1.30	824	601	Moment
1.15	1.00	1.20	1322	792	Moment
1.15	1.00	1.10	1973	1011	Moment

Footings Schedule

Concrete Density	145 pcf
Compressive Strength	4000 psi
Reinforcing Strength	60000 psi
Cover	4 in
LRFD to ASD factor (1.0)	1.4

Column Width	8 in
Wall Width	6 in
Compression Strain	0.003
Bearing Pressure	1500 psf
Frost Depth	30 in
Soil Weight	110 pcf
Interior Slab Thickness	4 in

Spot Footings

Mark	Length ft	Width ft	Thickness in	Bearing Pr psf	Bearing Lo kip	Frost Weig kip	Interior Wt kip	T&S As LW in^2	As CW in^2	M As LW in^2	As CW in^2	Bar Size	# LW	#CW
F3.0	3	3	12	1500	13.5	2.79	2.07	0.7776	0.7776	0.7776	0.7776	#4	4	4
F3.5	3.5	3.5	12	1500	18.375	3.7975	2.8175	0.9072	0.9072	0.9072	0.9072	#4	5	5
F4.0	4	4	12	1500	24	4.96	3.68	1.0368	1.0368	1.0368	1.0368	#4	6	6
F4.5	4.5	4.5	12	1500	30.375	6.2775	4.6575	1.1664	1.1664	1.1664	1.1664	#4	6	6
F5.0	5	5	14	1500	37.5	7.895833	6.354167	1.512	1.512	1.512	1.512	#5	5	5
F5.5	5.5	5.5	14	1500	45.375	9.553958	7.688542	1.6632	1.6632	1.6632	1.6632	#5	6	6
F6.0	6	6	16	1500	54	11.58	10.02	2.0736	2.0736	2.0736	2.0736	#5	7	7
F7.0	7	7	18	1500	73.5	16.0475	14.8225	2.7216	2.7216	2.7216	2.7216	#5	9	9
F8.0	8	8	20	1500	96	21.333333	20.90667	3.456	3.456	3.456	3.456	#5	12	12
F9.0	9	9	22	1500	121.5	27.4725	28.4175	4.2768	4.2768	4.2768	4.2768	#6	10	10
F10.0	10	10	24	1500	150	34.5	37.5	5.184	5.184	5.184	5.184	#6	12	12
F11.0	11	11	26	1500	181.5	42.450833	48.29917	6.1776	6.1776	6.1776	6.1776	#6	15	15
F12.0	12	12	28	1500	216	51.36	60.96	7.2576	7.2576	7.2576	7.2576	#6	17	17
F9.0x4.0	9	4	16	1500	54	11.58	10.02	1.3824	3.1104	1.910107	3.1104	#5	7	11
F12.0x5.0	12	5	20	1500	90	20	19.6	2.16	5.184	3.307654	5.184	#5	11	17

Continuous Footings

Mark	Width ft	Thickness in	Bearing Pr psf	Bearing Lo plf	Frost Weig plf	Interior Wt plf	T&S As LW in^2	As CW in^2	M As CW in^2	Bar Size	# LW	Spacing in
CF1.0	1	12	1500	1500	310	230	0.2592	0.2592	0.2592	#4	2	10
CF1.33	1.33	12	1500	1995	412	306	0.344736	0.2592	0.2592	#4	2	10
CF1.5	1.5	12	1500	2250	465	345	0.3888	0.2592	0.2592	#4	2	10
CF1.67	1.67	12	1500	2505	518	384	0.432864	0.2592	0.2592	#4	3	10
CF2.0	2	12	1500	3000	620	460	0.5184	0.2592	0.2592	#4	3	10
CF2.5	2.5	12	1500	3750	775	575	0.648	0.2592	0.2592	#4	4	10
CF3.0	3	12	1500	4500	930	690	0.7776	0.2592	0.2592	#4	4	10
CF3.5	3.5	12	1500	5250	1085	805	0.9072	0.2592	0.2592	#4	5	10
CF4.0	4	12	1500	6000	1240	920	1.0368	0.2592	0.2592	#4	6	10
CF4.5	4.5	12	1500	6750	1395	1035	1.1664	0.2592	0.2592	#4	6	10
CF5.0	5	12	1500	7500	1550	1150	1.296	0.2592	0.2592	#4	7	10
CF6.0	6	12	1500	9000	1860	1380	1.5552	0.2592	0.312862	#4	8	8
CF7.0	7	12	1500	10500	2170	1610	1.8144	0.2592	0.436973	#4	10	6
CF8.0	8	12	1500	12000	2480	1840	2.0736	0.2592	0.581768	#4	11	5
CF9.0	9	12	1500	13500	2790	2070	2.3328	0.2592	0.747249	#4	12	4
CF10.0	10	13	1500	15000	3129	2421	2.808	0.2808	0.828953	#4	15	3
CF15.0	15	18	1500	22500	4913	4538	5.832	0.3888	1.238266	#4	30	2



PROJECT: Kokanee Cove Development

JOB NO.: U5516.001.231

SUBJECT: STUDS & OTHER MEMBERS

DESIGN LOADS (psf)

	Dead	Live	Snow		
Roof	20	20	120	Design Wind Speed	103
Floor	12	40		Wind Exposure	B
Exterior Wall	10				
Interior Wall	8				

LOADING PARAMETERS

Label:	Typical Ext.	Gable Jamb	Gable Jamb 2	Gable Jamb 3	Ext HDR 3ft	Ext HDR 8ft	Int HDR 6ft
Wind/Wall Tributary (ft)	1.33	5.00	3.50	3.00	2.33	4.67	7.00
Bending Axis	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Roof Tributary (ft)	15	4	4	4	15	15	0
Floor Tributary (ft)					6	6	9
Additional Dead Load (lbs)							
Additional Floor Live Load (lbs)							
Additional Roof Live Load (lbs)							
Additional Snow Load (lbs)							
Location for Wind Loading	C&C Zone 5	C&C Zone 4	C&C Zone 4	C&C Zone 5	C&C Zone 4	C&C Zone 4	Interior
Mean Roof Height (ft)	20	20	20	20	20	20	20
Axial Loads (lbs):							
Dead	459	825	534	420	972	1947	1008
Floor Live	0	0	0	0	559	1121	2520
Roof Live	399	400	280	240	699	1401	0
Snow	2394	2400	1680	1440	4194	8406	0
Bending Load (plf):							
Wind	31.8	93.4	65.4	71.6	46.2	92.7	35.0

MEMBER PROPERTIES

Strong-Axis Unbraced Length, l_1 (ft)	9	17	14.5	12	9	9	9
Weak-Axis Unbraced Length, l_2 (ft)	1	1	1	1	1	1	1
Compression Edge Unbraced Length, l_u (ft)	1	1	1	1	1	1	1
Grade	DFLSTUD	ROLLAM LVL (1	DFLSTUD	DFLSTUD	DFLSTUD	DFLSTUD	DFLSTUD
Size	2x6	1-3/4x5-1/2	2x6	2x6	2x6	2x6	2x4
Quantity of Members	1	4	2	2	1	2	2

SPECIAL CONDITIONS

Moisture Category	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Temperature Category	≤100°	≤100°	≤100°	≤100°	≤100°	≤100°	≤100°
Incising?	No	No	No	No	No	No	No
Repetitive Member Category	Rep. (Special)	Rep. (Special)	Rep. (Special)	Rep. (Special)	Rep. (Special)	Rep. (Special)	Rep. (Special)
Finish Type	Plaster/Stucco	Plaster/Stucco	Plaster/Stucco	Plaster/Stucco	Plaster/Stucco	Plaster/Stucco	Plaster/Stucco

SECTION PROPERTIES

Width, b (in)	1.5	1.75	1.5	1.5	1.5	1.5	1.5
Depth, d (in)	5.5	5.5	5.5	5.5	5.5	5.5	3.5
Moment of Inertia, I (in ⁴)	20.796875	24.26302083	20.796875	20.796875	20.796875	20.796875	5.359375
Section Modulus, S (in ³)	7.5625	8.822916667	7.5625	7.5625	7.5625	7.5625	3.0625

DESIGN VALUES

F_{bx} (psi)	675	2600	675	675	675	675	675
F_{by} (psi)	675	3455	675	675	675	675	675
F_c (psi)	825	2510	825	825	825	825	825
E_{xx} (psi)	1400000	1900000	1400000	1400000	1400000	1400000	1400000
E_{yy} (psi)	1400000	1900000	1400000	1400000	1400000	1400000	1400000
E_{minxx} (psi)	510000	966000	510000	510000	510000	510000	510000
E_{minyy} (psi)	510000	966000	510000	510000	510000	510000	510000

RESULTS

D+L	9%	4%	9%	5%	29%	29%	88%
D+Lr	14%	6%	13%	8%	28%	28%	24%
D+S	50%	15%	36%	23%	90%	90%	25%
D+0.75L+0.75Lr	13%	5%	12%	7%	32%	32%	70%
D+0.75L+0.75S	39%	12%	29%	18%	79%	79%	71%
D+0.6W	23%	16%	62%	45%	37%	37%	36%
D+0.75L+0.42W+0.75Lr	17%	11%	46%	32%	35%	36%	90%
D+0.75L+0.42W+0.75S	33%	13%	61%	38%	89%	89%	90%
Deflection Limit (L/)	360	360	360	360	360	360	360
Deflection (L/)	2156	510	501	806	1481	1478	471
Column Slenderness, l_e/d	19.6	37.1	31.6	26.2	19.6	19.6	30.9
Beam Slenderness, R_B	7.8	6.7	7.8	7.8	7.8	7.8	6.2
Unity Check	50%	74%	72%	52%	90%	90%	90%



Copyright © 2024 Vector Structural Engineering, LLC
This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: KOKANEE COVE DEVELOPMENT AND RENOVATION NO.: U5516.001.231

COMPONENTS & CLADDING WIND CALCULATIONS

Note: Calculations per ASCE7-16

SITE-SPECIFIC WIND PARAMETERS:

Basic Wind Speed [mph]: 103
Exposure Category: B
Elevation (AMSL): 5021 ft

Notes:

ADDITIONAL INPUT & CALCULATIONS:

Height of roof, h [ft]: 15
Building Length, L [ft]: 40.33
Building Width, B [ft]: 28.67
Roof Type: Gable
Roof Slope [deg]: 33.7
Enclosure Classification: Enclosed Buildings

Eave for slopes <10°, mean height otherwise
Not including overhangs
Not including overhangs

Roof Slope [deg]: 33.7
8 / 12 Slope
h/B: 0.52
Used for Hipped roofs and 60ft<h<90ft, disregard for other cases
Applicable Tables: Gable Roofs 27° ≤ θ ≤ 45° (Set this cell correctly)

α: 7
Table 26.11-1
z_g [ft]: 1200
Table 26.11-1
K_z: 0.701
Table 26.10-1
K₁:
Figure 26.8-1
K₂:
Figure 26.8-1
K₃:
Figure 26.8-1
K_{at}: 1
Equation 26.8-1
K_d: 0.85
Table 26.6-1
K_e: 0.83
Table 26.9-1

Velocity Pressure, q_h [psf]: 13.49
Equation 26.10-1

GC_{pi}: 0.18
Table 26.13-1 (largest abs. value)

$$p = q_h [(GC_p) - (GC_{pi})]$$

Figure 30.3-1

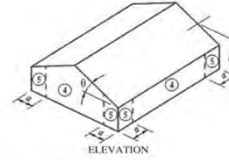
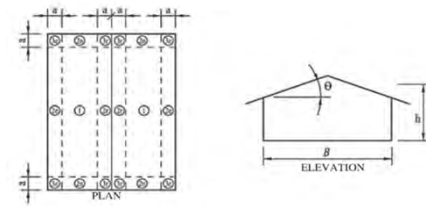


Figure 30.3-2D



OUTPUT:

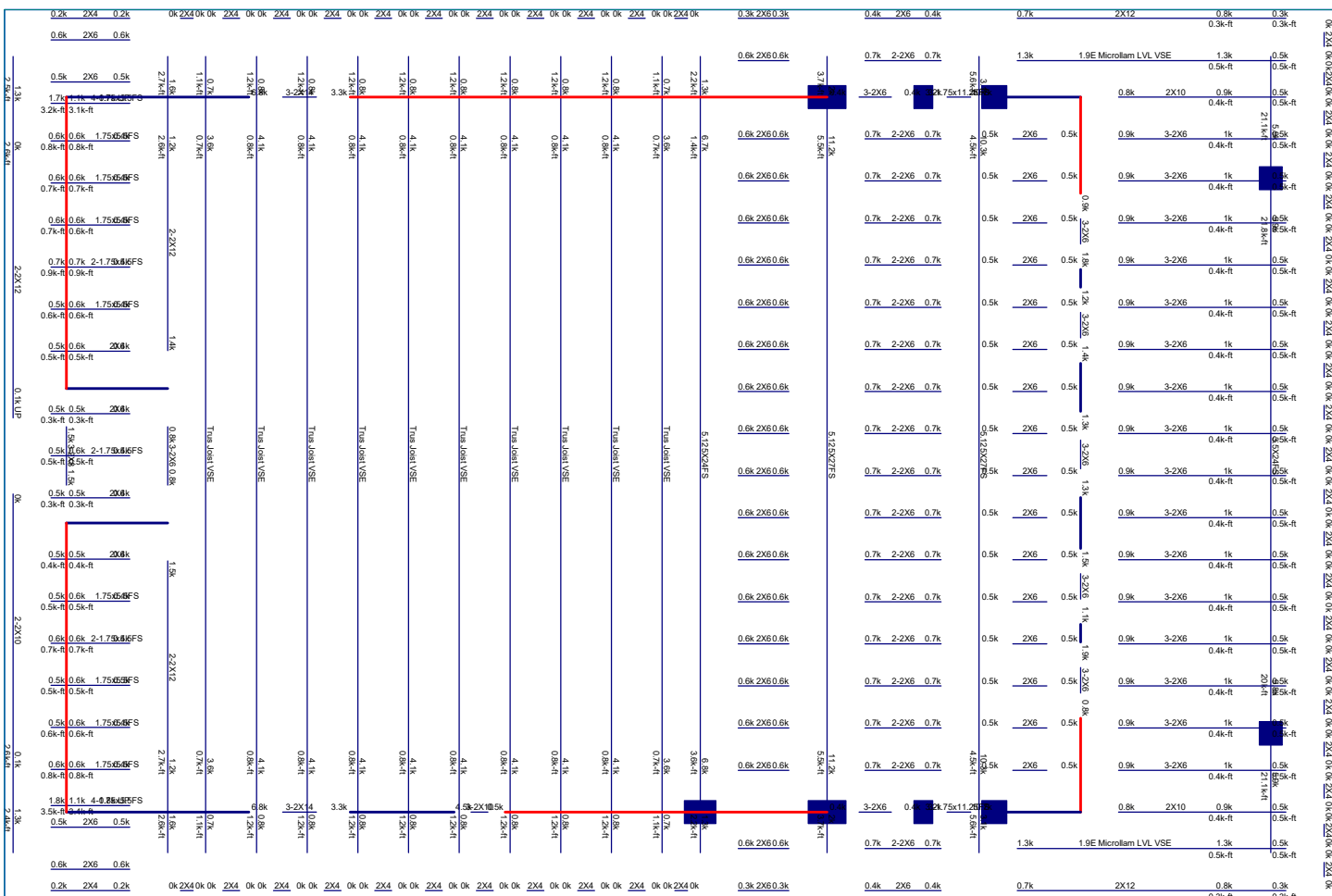
Element Wind Loads										Pressures (1.0W)															
Member	Span ft	Trib Width ft	Conn?	C&C Loc z ft	K _z	q _z psf	A _{eff} sf	a ft	Walls			Roof													
									All + psf	4 psf	5 psf	All + psf	1 psf	2e psf	2r psf	2n psf	3r psf	3e psf	1OH psf	2eOH psf	2rOH psf	2nOH psf	3rOH psf	3eOH psf	
Roof Zones	1	10	No	Roof			10	3	-	-	-	14.6	26.7	26.7	26.7	29.4	29.4	36.1	37.5	37.5	37.5	40.2	40.2	46.8	
Roof Zones	1	20	No	Roof			20	3	-	-	-	12.9	22.6	22.6	22.6	26.3	26.3	31.9	33.4	33.4	33.4	37.1	37.1	42.7	
Roof Zones	1	50	No	Roof			50	3	-	-	-	10.8	17.3	17.3	17.3	22.2	22.2	26.5	28.1	28.1	28.1	32.9	32.9	37.3	
Roof Zones	1	100	No	Roof			100	3	-	-	-	9.17	13.2	13.2	13.2	19	19	22.4	24	24	24	29.8	29.8	33.2	
Roof Zones	1	500	No	Roof			500	3	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
Wall Zones	1	10	No	Walls	15	0.701	13.49	10	3	15.9	17.3	21.3	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	20	No	Walls	15	0.701	13.49	20	3	15.2	16.5	19.9	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	50	No	Walls	15	0.701	13.49	50	3	14.2	15.6	18	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	100	No	Walls	15	0.701	13.49	100	3	13.5	14.9	16.5	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	200	No	Walls	15	0.701	13.49	200	3	12.8	14.2	15.1	-	-	-	-	-	-	-	-	-	-	-	-	
Roof Trusses	32	2	No	Roof			341.3	3	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
Outlookers	6	1.33	No	Roof			12	3	-	-	-	14.1	25.6	25.6	25.6	28.6	28.6	35	36.4	36.4	36.4	39.4	39.4	45.8	
Wall Stud	12	1.33	No	Walls	15	0.701	13.49	48	3	14.3	15.6	18.1	-	-	-	-	-	-	-	-	-	-	-	-	

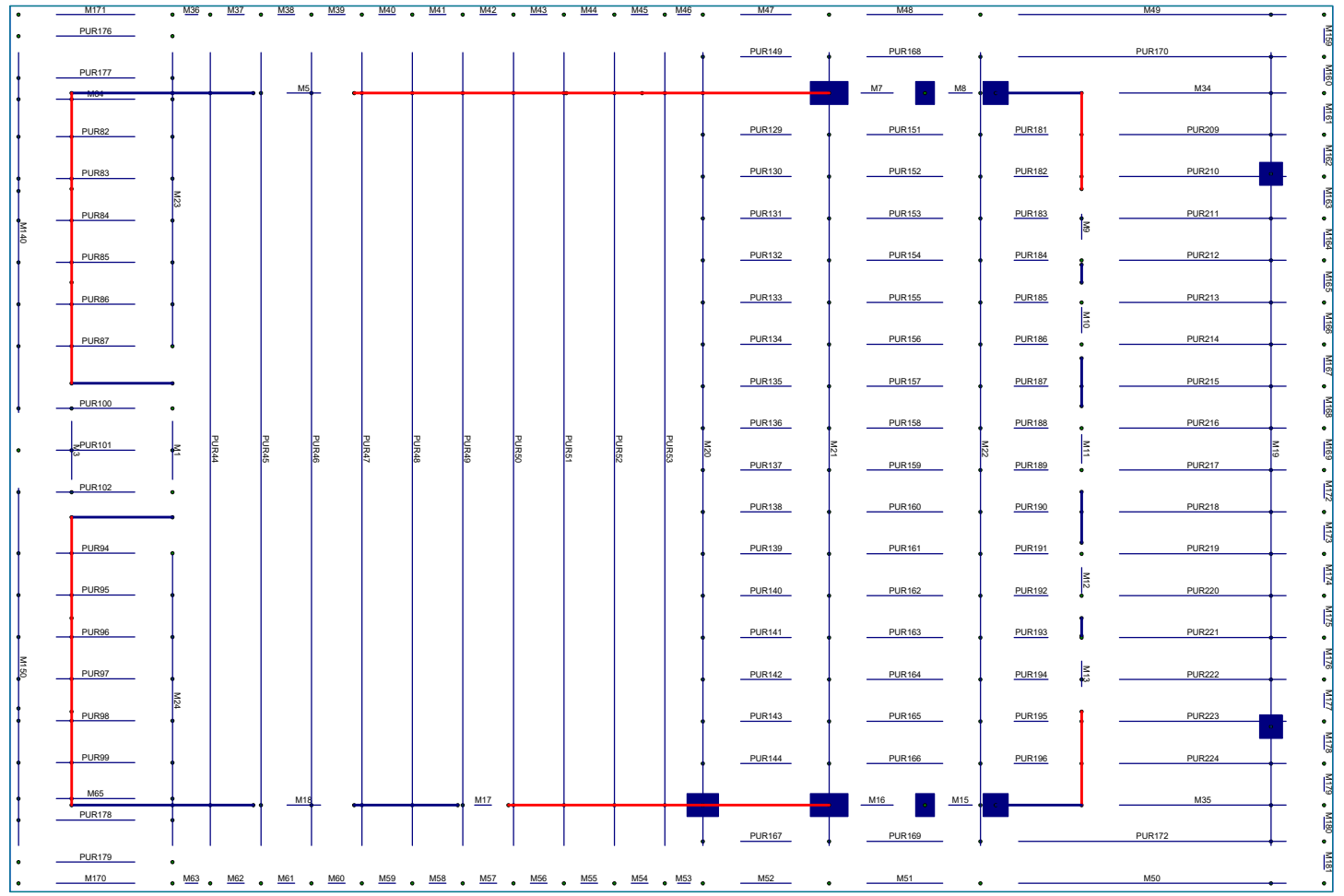


Roof

SK - 1

Feb 26, 2024 at 11:26 PM





Loads: DL: Precomp - PrecastComposite Deck Load
Reinforced for LC 1, Service Dead

Vector SE

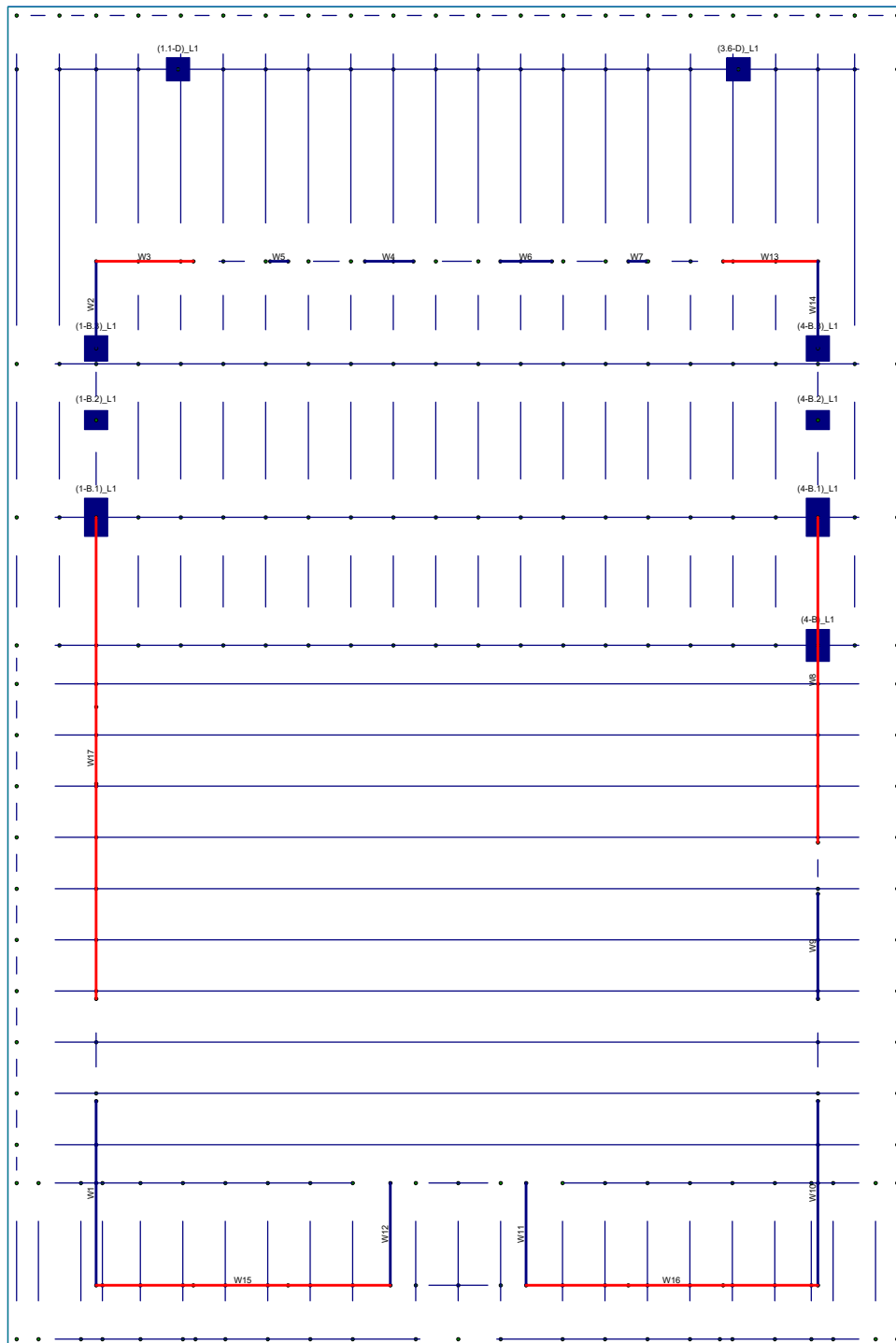
sam.christensen

Roof

SK - 2

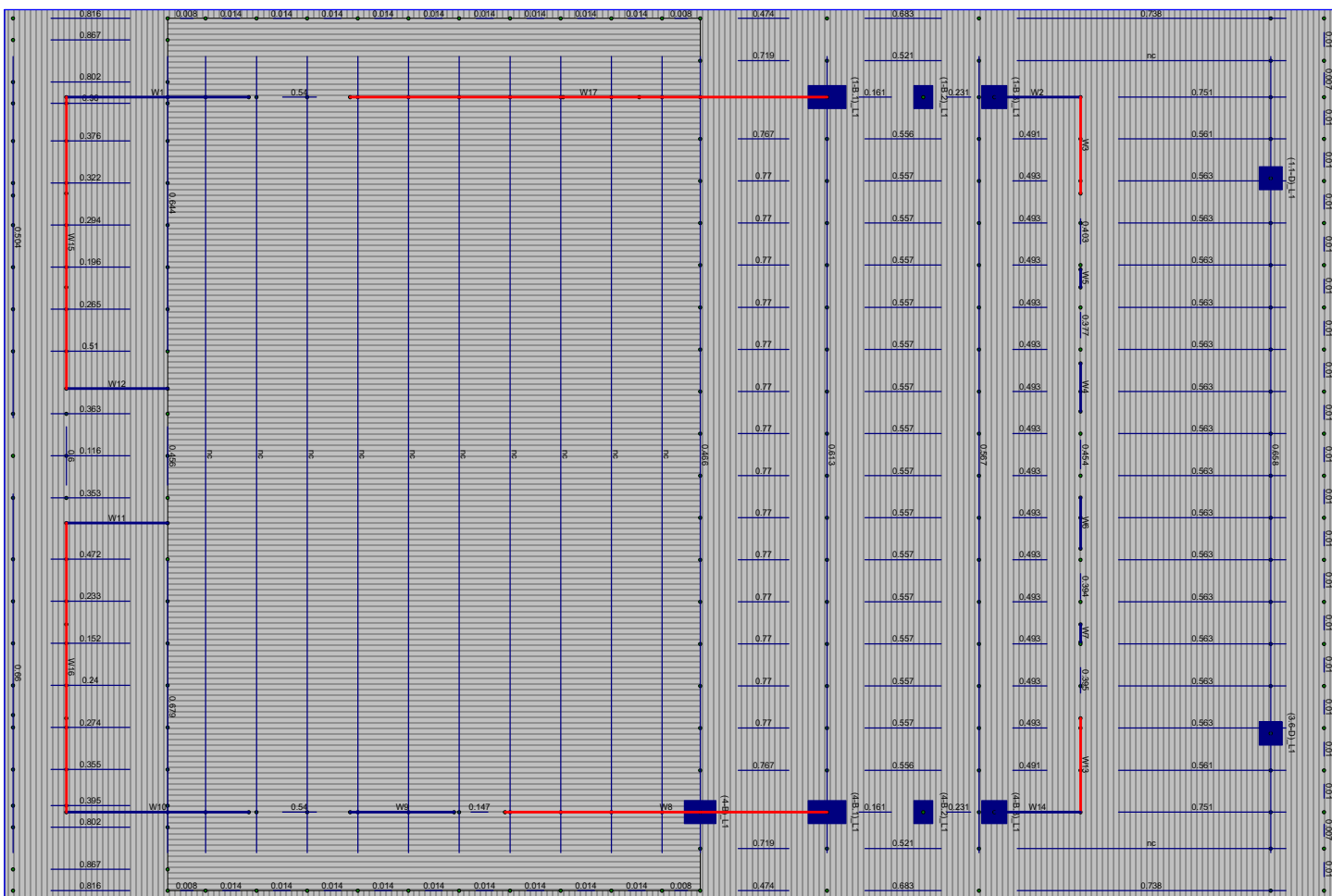
Feb 26, 2024 at 11:28 PM

Kokanee Cabins 20240215.rft



Loads: DL PreComp - PreComposite Dead Load
Results for LC 1, Service Dead

Vector SE	Roof	SK - 3
sam.christensen		Feb 26, 2024 at 11:28 PM
		Kokanee Cabins 20240215.rfl



Member Bending Check
Loads: Envelope Results

Vector SE

sam.christensen

Roof

SK - 4

Feb 26, 2024 at 11:30 PM

Kokanee Cabins 20240215.rfl

Wood Material Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm (/...	Dens[lb/f...
1	DF	Solid Sa...	Visually ...	Douglas Fir-Larch	No.2			1	0.3	0.3	35.001
2	LVL	SCL	TrusJoist	1.9E_DF/LP/WH Microllam ...	na			1	0.3	0.3	35
3	Gl B	Glulam	Table 5A	24F-V4 DF/DF	na			1	0.3	0.3	35

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[lb/ft^3]
1	gen_Conc3NW	3155	1372	0.15	0.6	145
2	gen_Conc4NW	3644	1584	0.15	0.6	145
3	gen_Conc3LW	2085	906	0.15	0.6	109.999
4	gen_Conc4LW	2408	1047	0.15	0.6	109.999
5	gen_Alum	10100	4077	0.3	1.29	173
6	gen_Steel	29000	11154	0.3	0.65	490
7	gen_Plywood	1800	38	0	0.3	35
8	RIGID	1e+6		0.3	0	0
9	gen_Ortho	29000	11154	0.3	0.65	490
10	COLUMN RIGID	1e+6	3.846e+5	0.3	0	0

Design Size/U.C. Parameters

	Label	Max Depth[in]	Min Depth[in]	Max Width[in]	Min Width[in]	Max Bending Chk	Max Shear Chk
1	WCol	5.5	5.5	9	3	0.85	0.85
2	SCol	5	5			0.85	0.85
3	HDR			5.5	4.5	0.95	0.95
4	FJoist	9.5				0.95	0.95
5	Beam					0.95	0.95
6	Truss					1	1
7	Purlins	5.5				1	1
8	Footings					1	1

Design Deflection Parameters

	Label	DL Defl[j...DL Ratio	LL Defl[jin] LL Ratio	DL+LL ...	DL+LL ...	Category	Defl[jin]	Ratio	Category	Defl[jin]	Ratio	
1	WCol		240		360		240	None		360	None	360
2	SCol		240		360		240	None		360	None	360
3	HDR		240		360		240	None		360	None	360
4	FJoist		240		360		240	None		360	None	360
5	Beam		240		360		240	None		360	None	360
6	Truss		240		360		240	None		360	None	360
7	Purlins		240		360		240	None			None	
8	Footings		240		360		360	None		360	None	360

Wood Diaphragm Parameters

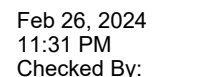
	Label	Database	Panel Grade	Min. Panel T...	Max. Panel T...	Min. Nail Spa...	Max. Nail Sp...	Nail Spacing ...
1	Typical	AWC 2015 OSB	Structural-I	0.375	0.75	2-in	6-in	1

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud Sp...	Max Stud Sp...	Green Lumb...	Header Size	Header Matl
1	Typical	2-2X6	2X6	2X6	16	16		3-2X6	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min. Pan...	Max. Pan...	Double Si...	Max. Nail...	Min. Nail ...	HD Chords	HD Chor...	Hold Down	Chord Strap
1	Typical	AWC 2015 O...	0.375	0.375	No	6-in.	2-in.	2-2X6	Same as ..	HDU DF...	CS DF-SP

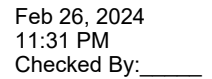


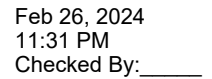
	Label	Additive	PreDL[psf]	PostDL[psf]	LL[psf]	LL Type	VL[psf]	Dyn Load[psf]
1	Floor	Yes		15	40	LL-Reduce		20
2	Roof			20	20	RLL-Non		12
3	Snow	Yes			120	SI		24

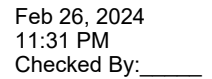
	Stack Label	Project ...	Z [ft]	X [ft]	Lift No.	Length...	Bot El. ...	Top El....	Shape	Material	Function	Design R...	Flexural L...	Shear La...
1	(1.1-D)	1.1-D	3.2	47.5	1	10	0	10	Glulam_...	GLB	Gravity	WCol	N/A	N/A
2	(3.6-D)	3.6-D	25.1	47.5	1	10	0	10	Glulam_...	GLB	Gravity	WCol	N/A	N/A
3	(1-B.2)	1-B.2	0	33.8	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
4	(4-B.2)	4-B.2	28.2	33.8	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
5	(1-B.1)	1-B.1	0	30	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
6	(4-B.1)	4-B.1	28.2	30	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
7	(4-B)	-	28.2	25	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
8	(1-B.3)	1-B.3	0	36.6	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A
9	(4-B.3)	4-B.3	28.2	36.6	1	10	0	10	VSE Multi...	DF	Gravity	WCol	N/A	N/A

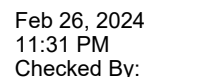
	Label	Top Floor	Bottom Floor	Start ...	End ...	Material T...	Material S...	Thickn...	Function	Design R...	Distanc...	Parape...	Parent
1	W1	Roof	Base	N181	N182	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
2	W2	Roof	Base	N197	N2	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
3	W3	Roof	Base	N2	N204	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None
4	W4	Roof	Base	N205	N210	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
5	W5	Roof	Base	N211	N212	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
6	W6	Roof	Base	N213	N214	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
7	W7	Roof	Base	N215	N216	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
8	W8	Roof	Base	N218	N247	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None
9	W9	Roof	Base	N248	N249	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
10	W10	Roof	Base	N250	N251	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
11	W11	Roof	Base	N254	N255	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
12	W12	Roof	Base	N256	N257	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
13	W13	Roof	Base	N22	N38	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None
14	W14	Roof	Base	N38	N217	Wood	DF	5.5 (stu...	Gravity	Typical	Default...	NA	None
15	W15	Roof	Base	N257	N181	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None
16	W16	Roof	Base	N251	N254	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None
17	W17	Roof	Base	N185	N196	Wood	DF	5.5 (stu...	Lateral	Typical	Default...	NA	None

	Label	Start Point	End Point	Shape	Material	Design Rul...	Function	Orientation	Start Rel...	End Rel...	Outtrigger?
1	M1	N255	N256	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
2	M3	N254	N257	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
3	M5	N182	N185	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
4	M7	N196	N261	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
5	M8	N261	N197	1.9E Microllam L...	LVL	HDR	Gravity	Strong Axis	Pinned	Pinned	
6	M9	N204	N211	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
7	M10	N212	N205	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
8	M11	N210	N213	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
9	M12	N214	N215	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
10	M13	N216	N22	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
11	M15	N217	N262	1.9E Microllam L...	LVL	HDR	Gravity	Strong Axis	Pinned	Pinned	
12	M16	N262	N218	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
13	M17	N247	N248	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
14	M18	N249	N250	VSE Multi-Ply Be...	DF	HDR	Gravity	Strong Axis	Pinned	Pinned	
15	M19	N47	N48	Glulam_Western	GLB	Truss	Gravity	Strong Axis	Fixed	Fixed	
16	M20	N54	N53	Glulam_Western	GLB	Truss	Gravity	Strong Axis	Fixed	Fixed	
17	M21	N49	N52	Glulam_Western	GLB	Truss	Gravity	Strong Axis	Fixed	Fixed	





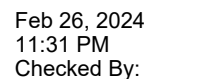
Page 16 of 74



	Label	Elevation[ft]	Floor Type	Area Load Default	Inactive	Splice Dis...	Splice Ty...	No Wind/...	Parapet Hei...
1	Roof	10	Floor Beam	Roof		10	Shear		0

	Label	Deck Default	Deck Angle Default (deg)	Parent
1	Roof	Wood	0	None

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
1	M1	3-2X6	No	DF	0.456	2.65	5	0.272	2.65	LL	0.227	0	5
2	M3	3-2X8	No	DF	0.6	2.65	5	0.231	2.65	LL	0.339	5.3	5
3	M5	3-2X14	No	DF	0.54	2.292	5	0.073	2.167	LL	0.821	0	5
4	M7	3-2X6	No	DF	0.161	1.9	5	0.069	1.9	LL	0.126	3.8	5
5	M8	3-1.75x11.25...	No	LVL	0.231	2.188	5	0.061	1.663	LL	0.831	2.8	5
6	M9	3-2X6	No	DF	0.403	1.188	5	0.124	1.406	LL	0.516	3	5
7	M10	3-2X6	No	DF	0.377	0.813	5	0.138	1.5	LL	0.419	3	5
8	M11	3-2X6	No	DF	0.454	1.7	5	0.198	1.7	LL	0.388	3.4	5
9	M12	3-2X6	No	DF	0.394	2.094	5	0.136	1.563	LL	0.444	0	5
10	M13	3-2X6	No	DF	0.395	1.719	5	0.117	1.625	LL	0.542	0	5
11	M15	3-1.75x11.25...	No	LVL	0.231	0.613	5	0.061	1.138	LL	0.831	0	5
12	M16	3-2X6	No	DF	0.161	1.9	5	0.069	1.9	LL	0.126	3.8	5
13	M17	3-2X10	No	DF	0.147	1.792	5	0.036	0	LL	0.782	2	5
14	M18	3-2X14	No	DF	0.54	1.708	5	0.073	1.833	LL	0.821	4	5
15	M19	3.5X24FS	No	GLB	0.658	6.45	5	0.848	34.4	LL	0.58	6.45	5
16	M20	5.125X24FS	No	GLB	0.466	16.483	5	0.868	0	LL	0.274	31.175	5
17	M21	5.125X27FS	No	GLB	0.613	16.483	5	0.997	0	LL	0.397	31.175	5
18	M22	5.125X27FS	No	GLB	0.567	16.483	5	0.956	34.4	LL	0.365	31.175	5
19	M23	2-2X12	No	DF	0.644	4.867	5	0.597	14.6	LL	0.366	11.102	5
20	M24	2-2X12	No	DF	0.679	4.682	5	0.614	14.5	LL	0.381	11.026	5
21	M34	2X10	No	DF	0.751	3.7	5	0.538	9.6	LL	0.679	7.5	5
22	M35	2X10	No	DF	0.751	3.7	5	0.538	9.6	LL	0.679	7.5	5
23	M36	2X4	No	DF	0.008	0.75	1	0.036	0	LL	0.012	1.5	1
24	M37	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
25	M38	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
26	M39	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
27	M40	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
28	M41	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
29	M42	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
30	M43	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
31	M44	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
32	M45	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
33	M46	2X4	No	DF	0.008	0.75	1	0.036	0	LL	0.012	1.5	1
34	M47	2X6	No	DF	0.474	2.5	5	0.253	2.5	LL	0.282	5	5
35	M48	2X6	No	DF	0.683	3	5	0.436	3	LL	0.338	6	5
36	M49	2X12	No	DF	0.738	5.667	5	0.577	13.6	LL	0.332	11.475	5
37	M50	2X12	No	DF	0.738	7.933	5	0.577	0	LL	0.332	2.125	5
38	M51	2X6	No	DF	0.683	3	5	0.436	3	LL	0.338	6	5
39	M52	2X6	No	DF	0.474	2.5	5	0.253	2.5	LL	0.282	5	5
40	M53	2X4	No	DF	0.008	0.75	1	0.036	0	LL	0.012	1.5	1
41	M54	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
42	M55	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
43	M56	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
44	M57	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
45	M58	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
46	M59	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
47	M60	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1
48	M61	2X4	No	DF	0.014	1	1	0.036	0	LL	0.016	2	1

Page 18 of 74

Beam Code Summary for Wood : Roof (Continued)

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
106	PUR183	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
107	PUR184	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
108	PUR185	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
109	PUR186	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
110	PUR187	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
111	PUR188	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
112	PUR189	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
113	PUR190	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
114	PUR191	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
115	PUR192	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
116	PUR193	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
117	PUR194	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
118	PUR195	2X6	No	DF	0.493	2	5	0.259	2	LL	0.421	4	5
119	PUR196	2X6	No	DF	0.491	2	5	0.258	2	LL	0.419	4	5
120	PUR209	3-2X6	No	DF	0.561	3.7	5	0.909	9.6	LL	0.411	7.5	5
121	PUR210	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
122	PUR211	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
123	PUR212	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
124	PUR213	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
125	PUR214	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
126	PUR215	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
127	PUR216	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
128	PUR217	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
129	PUR218	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
130	PUR219	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
131	PUR220	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
132	PUR221	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
133	PUR222	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
134	PUR223	3-2X6	No	DF	0.563	3.7	5	0.912	9.6	LL	0.412	7.5	5
135	PUR224	3-2X6	No	DF	0.561	3.7	5	0.909	9.6	LL	0.411	7.5	5
136	PUR149	2X6	No	DF	0.719	2.5	5	0.472	2.5	LL	0.491	5	5
137	PUR167	2X6	No	DF	0.719	2.5	5	0.472	2.5	LL	0.491	5	5
138	PUR169	2-2X6	No	DF	0.521	3	5	0.407	3	LL	0.297	6	5
139	PUR168	2-2X6	No	DF	0.521	3	5	0.407	3	LL	0.297	6	5
140	PUR170	Not Designed	No	LVL	No Calc			0	0	N/A	No Calc		
141	PUR172	Not Designed	No	LVL	No Calc			0	0	N/A	No Calc		
142	PUR176	2X6	No	DF	0.867	3.05	5	0.692	3.05	LL	0.485	6.1	5
143	PUR177	2X6	No	DF	0.802	3.05	5	0.641	3.05	LL	0.465	0	5
144	PUR178	2X6	No	DF	0.802	3.05	5	0.641	3.05	LL	0.465	0	5
145	PUR179	2X6	No	DF	0.867	3.05	5	0.692	3.05	LL	0.485	6.1	5
146	M159	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
147	M160	2X4	No	DF	0.007	0.72	1	0.036	0	LL	0.011	1.44	1
148	M161	2X4	No	DF	0.01	0.825	1	0.036	0	LL	0.013	1.65	1
149	M162	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
150	M163	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
151	M164	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
152	M165	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
153	M166	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
154	M167	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
155	M168	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
156	M169	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
157	M172	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
158	M173	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
159	M174	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
160	M175	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
161	M176	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
162	M177	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1

Beam Code Summary for Wood : Roof (Continued)

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
163	M178	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1
164	M179	2X4	No	DF	0.01	0.825	1	0.036	0	LL	0.013	1.65	1
165	M180	2X4	No	DF	0.007	0.72	1	0.036	0	LL	0.011	1.44	1
166	M181	2X4	No	DF	0.01	0.83	1	0.036	0	LL	0.013	1.66	1

Wood Column Code Checks

	Stack	Lift	Shape	Code C...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	Eqn
1	(1.1-D)	1	5.5x5.5FS	0.575	10	5	0.017	10	z	5	1.232	1.265	2.76	1.667	0.265	3.9-3
2	(3.6-D)	1	5.5x5.5FS	0.575	10	5	0.017	10	z	5	1.232	1.265	2.76	1.667	0.265	3.9-3
3	(1-B.2)	1	3-2X6	0.405	10	5	0	10	z	7	0.365	0.86	1.341	1.345	0.207	3.6.3
4	(4-B.2)	1	3-2X6	0.405	10	5	0	10	z	7	0.365	0.86	1.341	1.345	0.207	3.6.3
5	(1-B.1)	1	6-2X6	0.832	10	5	0.039	10	y	5	0.844	0.86	1.344	1.345	0.207	3.9-3
6	(4-B.1)	1	6-2X6	0.832	10	5	0.039	10	y	5	0.844	0.86	1.344	1.345	0.207	3.9-3
7	(4-B)	1	5-2X6	0.639	10	5	0.034	10	y	5	0.74	0.86	1.344	1.345	0.207	3.9-3
8	(1-B.3)	1	4-2X6	0.57	10	5	0	10	z	7	0.574	0.86	1.343	1.345	0.207	3.6.3
9	(4-B.3)	1	4-2X6	0.57	10	5	0	10	z	7	0.574	0.86	1.343	1.345	0.207	3.6.3

Wall Forces, Dead and Other : Roof

	Wall	St Loc[ft]	End Loc[ft]	Length[ft]	Max Bas...	Max Base...	DL[k]	Pre DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
1	W1	0.0	0.7.2	7.2	14.496	5	2.755	0.783	0	0	0	0
2	W2	0.36.6	0.40	3.4	0.925	5	0.294	0.189	0	0	0	0
3	W3	0.40	3.8.40	3.8	4.459	5	0.923	0.345	0	0	0	0
4	W4	10.5.40	12.4.40	1.9	4.181	5	0.834	0.285	0	0	0	0
5	W5	6.8.40	7.5.40	0.7	3.072	5	0.623	0.222	0	0	0	0
6	W6	15.8.40	17.8.40	2	4.271	5	0.851	0.291	0	0	0	0
7	W7	20.8.40	21.5.40	0.7	3.072	5	0.623	0.222	0	0	0	0
8	W8	28.2.30	28.2.17.3	12.7	21.366	5	4.03	1.088	0	0	0	0
9	W9	28.2.15.3	28.2.11.2	4.1	17.91	5	3.255	0.766	0	0	0	0
10	W10	28.2.7.2	28.2.0	7.2	14.477	5	2.758	0.79	0	0	0	0
11	W11	16.8.0	16.8.4	4	3.062	5	0.658	0.288	0	0	0	0
12	W12	11.5.4	11.5.0	4	3.017	5	0.646	0.282	0	0	0	0
13	W13	24.5.40	28.2.40	3.7	4.369	5	0.906	0.34	0	0	0	0
14	W14	28.2.40	28.2.36.6	3.4	0.925	5	0.294	0.189	0	0	0	0
15	W15	11.5.0	0.0	11.5	12.055	5	2.763	1.007	0	0	0	0
16	W16	28.2.0	16.8.0	11.4	11.811	5	2.692	0.967	0	0	0	0
17	W17	0.11.2	0.30	18.8	47.179	5	8.998	2.512	0	0	0	0

Wind Generation Input

Wind Code: **ASCE 7-16**
Wind Speed, V(mph): **103**

Exposure Category: **B**
Base Elevation(ft): **0**

Topographic Factor K1: **0**
Topographic Factor K2: **0**
Topographic Factor K3: **0**
Directionality Factor Kd: **0.85**
Parapet Height(ft): **0**

Wind Generation Detail Results

Exposure Constant Alpha: **7**
Exposure Constant zg: **1200**
Gust Effect Factor, G: **0.85**

Kzt: **1**
h (ft): **10**
Kh: **0.575**
Windward Cp: **0.8**
qh (psf): **13.268**
GCpn (windward): **+1.5**
GCpn (leeward): **-1.0**

Wind Generation Floor Geometry Results

Floor Level	Height (ft)	Kz	Width (X) (ft)	Length (Z) (ft)	Leeward Cp(X)	Leeward Cp(Z)
Roof	10	0.575	52.367	35.067	0.401	0.5

Wind Generation Floor Force Results

Floor Level	qz (psf)	Windward Pres. (psf)	Leeward Pres. X (psf)	Leeward Pres. Z (psf)	Force X (k)	Force Z (k)
Roof	13.268	9.022	4.526	5.639	2.375	3.839

Seismic Generation Input

Seismic Code:	ASCE 7-16	T_X (sec):	Not Entered	R_X:	6.5
Ct_X:	0.02	T_Z (sec):	Not Entered	R_Z:	6.5
Ct_Z:	0.02	Ct Exp. Z:	0.75		
Ct Exp. X:	0.75	TL (sec):	6		
Risk Cat	I or II	SDS (g):	0.41	S1 (g):	0.136
SD1 (g):	0.211	Parapet Ht (ft):	0		
Base Elev (ft):	0				

Seismic Generation Detail Results

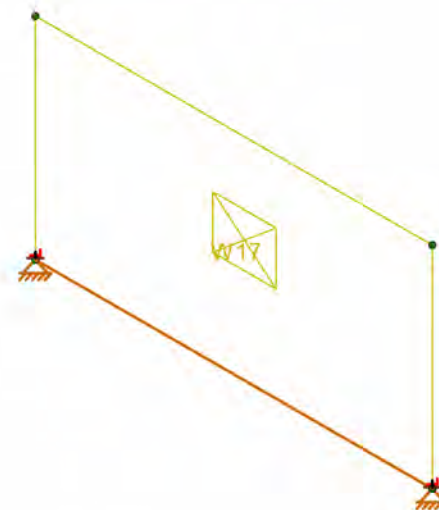
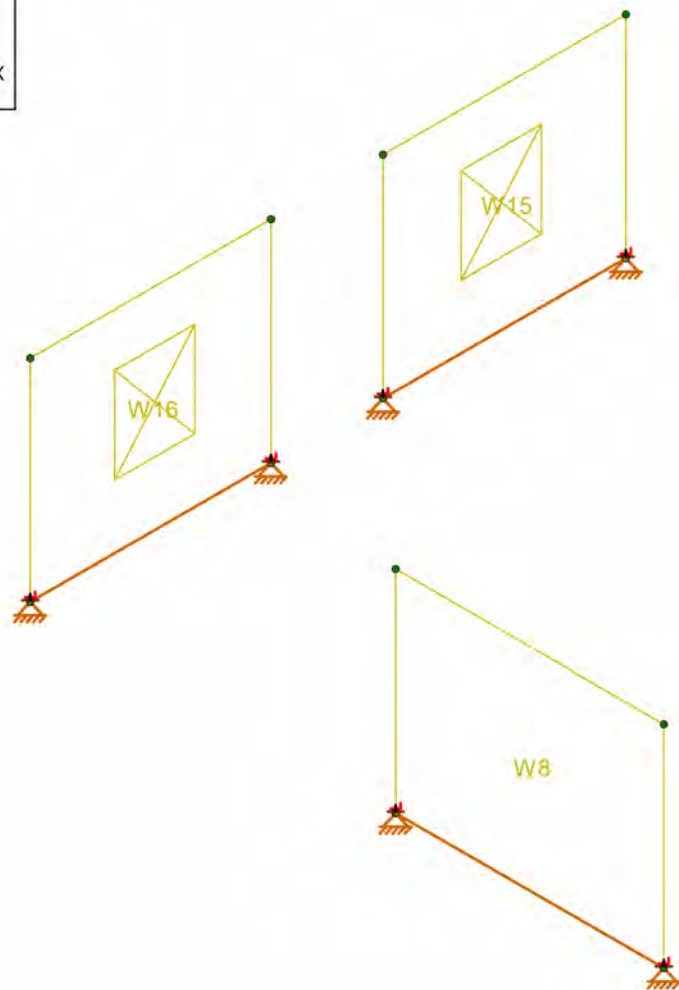
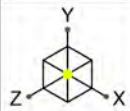
T_X Used (sec):	0.112	T_X Method A:	0.112	T_X Upper Limit:	0.169
T_Z Used (sec):	0.112	T_Z Method A:	0.112	T_Z Upper Limit:	0.169
Importance Fac.:	1	Design Cat.:	D		
V_X (k):	5.251	Gov. Eqn.	ASCE Eqn 12.8-2	Cs_X:	0.063
V_Z (k):	5.251	Gov. Eqn.	ASCE Eqn 12.8-2	Cs_Z:	0.063

Seismic Generation Force Results

Floor Level	Height (ft)	Weight (k)	Force X (k)	Force Z (k)	CG X (ft)	CG Z (ft)
Roof	10	80.91	5.251	5.251	24.17	14.114
Base		2.342				
Totals		83.252	5.251	5.251		

Seismic Generation Diaphragm Results

Floor Level	Width (X) (ft)	Length (Z) (ft)	X Plus (ft)	X Minus (ft)	Z Plus (ft)	Z Minus (ft)
Roof	52.367	35.067	2.618	2.618	1.753	1.753



Vector SE
sam.christensen

SK-1

Feb 26, 2024 at 11:36 PM

Kokanee Cabins 20240215.rfl



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in ²)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Global

Hot Rolled Steel	AISC 15th (360-16): ASD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): ASD
Cold Formed Steel	AISI S100-16: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18 / SDPWS-15 ASD
Temperature	< 100F
Concrete	ACI 318-19
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-15: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	Yes
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	ASCE 7-16
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes
S ₁ (g)	0.136
SD ₁ (g)	0.211
SD _s (g)	0.41
T ₁ (sec)	6
T ₂ (sec)	
T ₃ (sec)	
C ₂	0.02
C ₃	0.02
C _{Exp. Z}	0.75
C _{Exp. X}	0.75
R ₂	6.5
R ₃	6.5
Q ₂	2.5
Q ₃	2.5
C ₂ Z	4
C ₃ X	4



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Model Settings (Continued)

ρ Z	1
ρ X	1
Diaphragm Mass Self Weight Options	
Use Gravity Self Wt in Diaphragm Mass	Yes
Use Deck Self Wt in Diaphragm Mass	Yes
Use Lateral Self Wt in Diaphragm Mass	Yes



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Node Boundary Conditions

No Data to Print...

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e ⁻⁶ F ⁻¹]	Density [lb/ft ³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.2			1	0.3	0.3	35.001
2	LVL	SCL	TrusJoist	1.9E DF/LP/WH Microllam LVL	na			1	0.3	0.3	35
3	GLB	Glulam	NDS Table 5A	24F-V4_DF/DF	na			1	0.3	0.3	35

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	WOOD1A	2X6	Beam	None	DF	WCol	8.25	1.547	20.797	5.125

Member Primary Data

No Data to Print...

Member Advanced Data

No Data to Print...

Wood Design Parameters

No Data to Print...

Wall Panel Data

	Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
1	W3	F1 N2	F1 N204	N81A	N95	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@4 16
2	W8	F1 N218	F1 N247	N83	N82	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@6 16
3	W13	F1 N22	F1 N38	N89A	N93	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@4 16
4	W15	F1 N257	F1 N181	N73	N76	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@6 16
5	W16	F1 N251	F1 N254	N87B	N84	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@6 16
6	W17	F1 N185	F1 N196	N80A	N77	Wood	DF	5.5 (stud)	Typical	S1 3/8 8d@4 16

Wall Panel Advanced Data

	Label	Seismic Rule	Design Method	SSAF	In-Plane Icr Factor	Out-Plane Icr Factor	Cm In-Plane	Cm Out-Plane	Stud Bracing	Sheathing Connect Dist [in]
1	W3	N/A	Segmented	1	N/A	N/A	N/A	N/A	N/A	N/A
2	W8	N/A	Segmented	1	N/A	N/A	N/A	N/A	N/A	N/A
3	W13	N/A	Segmented	1	N/A	N/A	N/A	N/A	N/A	N/A
4	W15	N/A	Force Transfer	1	N/A	N/A	N/A	N/A	N/A	N/A
5	W16	N/A	Force Transfer	1	N/A	N/A	N/A	N/A	N/A	N/A
6	W17	N/A	Force Transfer	1	N/A	N/A	N/A	N/A	N/A	N/A

Floor Diaphragms

	Elevation [ft]	Mass [k]	Mass MOI [k-ft ²]	Center Of Mass [ft]	Plus X Eccentricity [ft]	Minus X Eccentricity [ft]	Plus Z Eccentricity [ft]	Minus Z Eccentricity [ft]	Inactive Diaphragm	Type	Design Rule	SGAF	Material	Thickness [in]	No Wind/Drift	
1	10	80.91	27602.896	24.17, 14.114	%5	%5	%5	%5		D1	Semi-Rigid	N/A	N/A	gen Plywood	0.75	

Design Size and Code Check Parameters

	Label	Max Depth [in]	Min Depth [in]	Max Width [in]	Min Width [in]	Max Axial/Bending Chk	Max Shear Chk
1	WCol	5.5	5.5	9	3	0.85	0.85
2	SCol	5	5			0.85	0.85
3	HDR			5.5	4.5	0.95	0.95
4	FJoist	9.5				0.95	0.95
5	Beam					0.95	0.95
6	Truss					1	1
7	Purlins	5.5				1	1
8	Footings					1	1

Member Area Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed	Surface(Plate/Wall)
1	Dead Load	DL	-1	42	2	
2	Live Load	LL				
3	Live Load Special (public assemb	LLS				
4	Roof Live Load	RLL		42	2	
5	Snow Load	SL		42	2	
6	Snow Load Nonshedding	SLN				
7	Rain Load	RL				
8	Wind Load X	WLX				



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Point	Distributed	Surface(Plate/Wall)
9	Partial X Wind Load 1	WLXP1				
10	Partial X Wind Load 2	WLXP2				
11	Wind Load Z	WLZ				
12	Partial Z Wind Load 1	WLZP1				
13	Partial Z Wind Load 2	WLZP2				
14	Earthquake Load X	ELX		9	199	3
15	Earthquake Load X Plus Z Eccentr	ELX+Z		9	218	6
16	Earthquake Load X Minus Z Eccentr	ELX-Z		9	218	6
17	Earthquake Load Z	ELZ		9	199	3
18	Earthquake Load Z Plus X Eccentr	ELZ+X		9	203	6
19	Earthquake Load Z Minus X Eccentr	ELZ-X		9	203	6
20	Other Load 1	OL1				
21	Other Load 2	OL2				
22	Other Load 3	OL3				
23	Other Load 4	OL4				
24	Wind Load Roof +X	WLX+R				
25	Wind Load Roof -X	WLX-R				
26	Wind Load Roof +Z	WLZ+R				
27	Wind Load Roof -Z	WLZ-R				
28	Semi-Rigid Wind Load +X	WL+X			6	
29	Semi-Rigid Wind Load -X	WL-X			6	
30	Semi-Rigid Wind Load +Z	WL+Z			30	
31	Semi-Rigid Wind Load -Z	WL-Z			30	
32	Semi-Rigid Wind Load +XP1	WL+XP1			6	
33	Semi-Rigid Wind Load +XP2	WL+XP2			6	
34	Semi-Rigid Wind Load -XP1	WL-XP1			6	
35	Semi-Rigid Wind Load -XP2	WL-XP2			6	
36	Semi-Rigid Wind Load +ZP1	WL+ZP1			30	
37	Semi-Rigid Wind Load +ZP2	WL+ZP2			30	
38	Semi-Rigid Wind Load -ZP1	WL-ZP1			30	
39	Semi-Rigid Wind Load -ZP2	WL-ZP2			30	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1												
2	Deflection 2	Yes	Y	LL	1												
3	Deflection 3	Yes	Y	DL	1	LL	1										
4	IBC 16-8	Yes	Y	DL	1												
5	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1								
6	IBC 16-10 (b)	Yes	Y	DL	1	SL	1	SLN	1								
7	IBC 16-11 (b)	Yes	Y	DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75				
8	IBC 16-12 (a) (a)	Yes	Y	DL	1	WLX	0.6	WL+X	0.6								
9	IBC 16-12 (a) (b)	Yes	Y	DL	1	WLXP1	0.6	WL+XP1	0.6								
10	IBC 16-12 (a) (c)	Yes	Y	DL	1	WLXP2	0.6	WL+XP2	0.6								
11	IBC 16-12 (a) (d)	Yes	Y	DL	1	WLZ	0.6	WL+Z	0.6								
12	IBC 16-12 (a) (e)	Yes	Y	DL	1	WLZP1	0.6	WL+ZP1	0.6								
13	IBC 16-12 (a) (f)	Yes	Y	DL	1	WLZP2	0.6	WL+ZP2	0.6								
14	IBC 16-12 (a) (g)	Yes	Y	DL	1	WLX	-0.6	WL-X	0.6								
15	IBC 16-12 (a) (h)	Yes	Y	DL	1	WLXP1	-0.6	WL-XP1	0.6								
16	IBC 16-12 (a) (i)	Yes	Y	DL	1	WLXP2	-0.6	WL-XP2	0.6								
17	IBC 16-12 (a) (j)	Yes	Y	DL	1	WLZ	-0.6	WL-Z	0.6								
18	IBC 16-12 (a) (k)	Yes	Y	DL	1	WLZP1	-0.6	WL-ZP1	0.6								
19	IBC 16-12 (a) (l)	Yes	Y	DL	1	WLZP2	-0.6	WL-ZP2	0.6								
20	IBC 16-13 (a) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75	WL+X	0.45				
21	IBC 16-13 (a) (b)	Yes	Y	DL	1	WLXP1	0.45	LL	0.75	LLS	0.75	WL+XP1	0.45				
22	IBC 16-13 (a) (c)	Yes	Y	DL	1	WLXP2	0.45	LL	0.75	LLS	0.75	WL+XP2	0.45				
23	IBC 16-13 (a) (d)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75	WL+Z	0.45				
24	IBC 16-13 (a) (e)	Yes	Y	DL	1	WLZP1	0.45	LL	0.75	LLS	0.75	WL+ZP1	0.45				
25	IBC 16-13 (a) (f)	Yes	Y	DL	1	WLZP2	0.45	LL	0.75	LLS	0.75	WL+ZP2	0.45				
26	IBC 16-13 (a) (g)	Yes	Y	DL	1	WLX	-0.45	LL	0.75	LLS	0.75	WL-X	0.45				
27	IBC 16-13 (a) (h)	Yes	Y	DL	1	WLXP1	-0.45	LL	0.75	LLS	0.75	WL-XP1	0.45				
28	IBC 16-13 (a) (i)	Yes	Y	DL	1	WLXP2	-0.45	LL	0.75	LLS	0.75	WL-XP2	0.45				
29	IBC 16-13 (a) (j)	Yes	Y	DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	WL-Z	0.45				
30	IBC 16-13 (a) (k)	Yes	Y	DL	1	WLZP1	-0.45	LL	0.75	LLS	0.75	WL-ZP1	0.45				
31	IBC 16-13 (a) (l)	Yes	Y	DL	1	WLZP2	-0.45	LL	0.75	LLS	0.75	WL-ZP2	0.45				
32	IBC 16-13 (b) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+X	0.45
33	IBC 16-13 (b) (b)	Yes	Y	DL	1	WLXP1	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+XP1	0.45
34	IBC 16-13 (b) (c)	Yes	Y	DL	1	WLXP2	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+XP2	0.45
35	IBC 16-13 (b) (d)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+Z	0.45
36	IBC 16-13 (b) (e)	Yes	Y	DL	1	WLZP1	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+ZP1	0.45
37	IBC 16-13 (b) (f)	Yes	Y	DL	1	WLZP2	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL+ZP2	0.45
38	IBC 16-13 (b) (g)	Yes	Y	DL	1	WLX	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-X	0.45
39	IBC 16-13 (b) (h)	Yes	Y	DL	1	WLXP1	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-XP1	0.45
40	IBC 16-13 (b) (i)	Yes	Y	DL	1	WLXP2	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-XP2	0.45
41	IBC 16-13 (b) (j)	Yes	Y	DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-Z	0.45
42	IBC 16-13 (b) (k)	Yes	Y	DL	1	WLZP1	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-ZP1	0.45
43	IBC 16-13 (b) (l)	Yes	Y	DL	1	WLZP2	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75	WL-ZP2	0.45



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
44	IBC 16-15 (a)	Yes	Y	DL	0.6	WLX	0.6	WL+X	0.6								
45	IBC 16-15 (b)	Yes	Y	DL	0.6	WLXP1	0.6	WL+XP1	0.6								
46	IBC 16-15 (c)	Yes	Y	DL	0.6	WLXP2	0.6	WL+XP2	0.6								
47	IBC 16-15 (d)	Yes	Y	DL	0.6	WLZ	0.6	WL+Z	0.6								
48	IBC 16-15 (e)	Yes	Y	DL	0.6	WLZP1	0.6	WL+ZP1	0.6								
49	IBC 16-15 (f)	Yes	Y	DL	0.6	WLZP2	0.6	WL+ZP2	0.6								
50	IBC 16-15 (g)	Yes	Y	DL	0.6	WLX	-0.6	WL-X	0.6								
51	IBC 16-15 (h)	Yes	Y	DL	0.6	WLXP1	-0.6	WL-XP1	0.6								
52	IBC 16-15 (i)	Yes	Y	DL	0.6	WLXP2	-0.6	WL-XP2	0.6								
53	IBC 16-15 (j)	Yes	Y	DL	0.6	WLZ	-0.6	WL-Z	0.6								
54	IBC 16-15 (k)	Yes	Y	DL	0.6	WLZP1	-0.6	WL-ZP1	0.6								
55	IBC 16-15 (l)	Yes	Y	DL	0.6	WLZP2	-0.6	WL-ZP2	0.6								
56	IBC 16-12 (b) (a)	Yes	Y	DL	1	Sds*DL	0.14	ELX	0.7								
57	IBC 16-12 (b) (b)	Yes	Y	DL	1	Sds*DL	0.14	ELX+Z	0.7								
58	IBC 16-12 (b) (c)	Yes	Y	DL	1	Sds*DL	0.14	ELX-Z	0.7								
59	IBC 16-12 (b) (d)	Yes	Y	DL	1	Sds*DL	0.14	ELZ	0.7								
60	IBC 16-12 (b) (e)	Yes	Y	DL	1	Sds*DL	0.14	ELZ+X	0.7								
61	IBC 16-12 (b) (f)	Yes	Y	DL	1	Sds*DL	0.14	ELZ-X	0.7								
62	IBC 16-12 (b) (g)	Yes	Y	DL	1	Sds*DL	0.14	ELX	-0.7								
63	IBC 16-12 (b) (h)	Yes	Y	DL	1	Sds*DL	0.14	ELX+Z	-0.7								
64	IBC 16-12 (b) (i)	Yes	Y	DL	1	Sds*DL	0.14	ELX-Z	-0.7								
65	IBC 16-12 (b) (j)	Yes	Y	DL	1	Sds*DL	0.14	ELZ	-0.7								
66	IBC 16-12 (b) (k)	Yes	Y	DL	1	Sds*DL	0.14	ELZ+X	-0.7								
67	IBC 16-12 (b) (l)	Yes	Y	DL	1	Sds*DL	0.14	ELZ-X	-0.7								
68	IBC 16-14 (a)	Yes	Y	DL	1	Sds*DL	0.105	ELX	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
69	IBC 16-14 (b)	Yes	Y	DL	1	Sds*DL	0.105	ELX+Z	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
70	IBC 16-14 (c)	Yes	Y	DL	1	Sds*DL	0.105	ELX-Z	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
71	IBC 16-14 (d)	Yes	Y	DL	1	Sds*DL	0.105	ELZ	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
72	IBC 16-14 (e)	Yes	Y	DL	1	Sds*DL	0.105	ELZ+X	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
73	IBC 16-14 (f)	Yes	Y	DL	1	Sds*DL	0.105	ELZ-X	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
74	IBC 16-14 (g)	Yes	Y	DL	1	Sds*DL	0.105	ELX	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
75	IBC 16-14 (h)	Yes	Y	DL	1	Sds*DL	0.105	ELX+Z	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
76	IBC 16-14 (i)	Yes	Y	DL	1	Sds*DL	0.105	ELX-Z	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
77	IBC 16-14 (j)	Yes	Y	DL	1	Sds*DL	0.105	ELZ	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
78	IBC 16-14 (k)	Yes	Y	DL	1	Sds*DL	0.105	ELZ+X	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
79	IBC 16-14 (l)	Yes	Y	DL	1	Sds*DL	0.105	ELZ-X	-0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
80	IBC 16-16 (a)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX	0.7								
81	IBC 16-16 (b)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX+Z	0.7								
82	IBC 16-16 (c)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX-Z	0.7								
83	IBC 16-16 (d)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ	0.7								
84	IBC 16-16 (e)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ+X	0.7								
85	IBC 16-16 (f)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ-X	0.7								
86	IBC 16-16 (g)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX	-0.7								
87	IBC 16-16 (h)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX+Z	-0.7								
88	IBC 16-16 (i)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX-Z	-0.7								
89	IBC 16-16 (j)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ	-0.7								
90	IBC 16-16 (k)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ+X	-0.7								
91	IBC 16-16 (l)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ-X	-0.7								

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	W3	max	0.002	76	4.463	6	0.931	66	8.977	90	0.007	90	0	91
1		min	-0.001	82	0	2	-0.891	84	-9.099	60	-0.007	60	0	1
2	W8	max	1.739	87	21.388	6	0.003	90	0	91	0.019	60	11.589	81
3		min	-1.742	57	0	2	-0.003	60	0	1	-0.018	90	-62.221	75
4	W13	max	0.002	75	4.374	6	0.843	90	8.609	66	0.007	66	0	91
5		min	-0.002	81	0	2	-0.884	60	-8.508	84	-0.007	84	0	1
6	W15	max	0.004	76	12.082	6	1.08	91	12.625	79	0.02	78	0	91
7		min	-0.001	82	0	2	-1.122	61	-10.168	85	-0.011	84	0	1
8	W16	max	0.003	75	11.833	6	1.106	67	9.924	91	0.011	90	0	91
9		min	-0.001	81	0	2	-1.062	85	-13.282	73	-0.013	72	0	1
10	W17	max	2.183	64	47.205	6	0.003	90	0	91	0.031	84	13.495	82
11		min	-2.183	82	0	2	-0.004	60	0	1	-0.035	66	-97.832	6
12	Totals:	max	3.671	86	101.345	6	3.672	67						
13		min	-3.671	56	0	2	-3.672	85						

Envelope Member End Reactions

No Data to Print...

Envelope AWC NDS-18 / SDPWS-15 ASD Member Wood Code Checks

No Data to Print...



Company : Vector SE
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:39:06 PM
Checked By : _____

Envelope Wall Panel Forces

	Wall Label	Elevation [ft]		Axial [k]	LC	x Shear [k]	LC	z Shear [k]	LC	x-x Moment [k-ft]	LC	z-z Moment [k-ft]	LC
0	W3	0	max	4.463	6	0.931	66	0.001	82	0	76	9.099	60
1		0	min	0	2	-0.891	84	-0.002	76	0	82	-8.976	90
2	W8	0	max	21.388	6	1.742	57	0.003	60	0	90	62.22	75
3		0	min	0	2	-1.739	87	-0.003	90	0	60	-11.588	81
4	W13	0	max	4.374	6	0.843	90	0.002	81	0	75	8.508	84
5		0	min	0	2	-0.884	60	-0.002	75	0	81	-8.609	66
6	W15	0	max	12.082	6	1.122	61	0.004	76	0	82	12.624	79
7		0	min	0	2	-1.08	91	-0.001	82	0	76	-10.167	85
8	W16	0	max	11.833	6	1.062	85	0.003	75	0	81	9.923	91
9		0	min	0	2	-1.106	67	-0.001	81	0	75	-13.281	73
10	W17	0	max	47.205	6	2.183	64	0.003	90	0	60	13.494	82
11		0	min	0	2	-2.183	82	-0.004	60	0	90	-97.832	6

AWC NDS-18 / SDPWS-15 ASD Wall Panel Wood Code Checks (Axial)

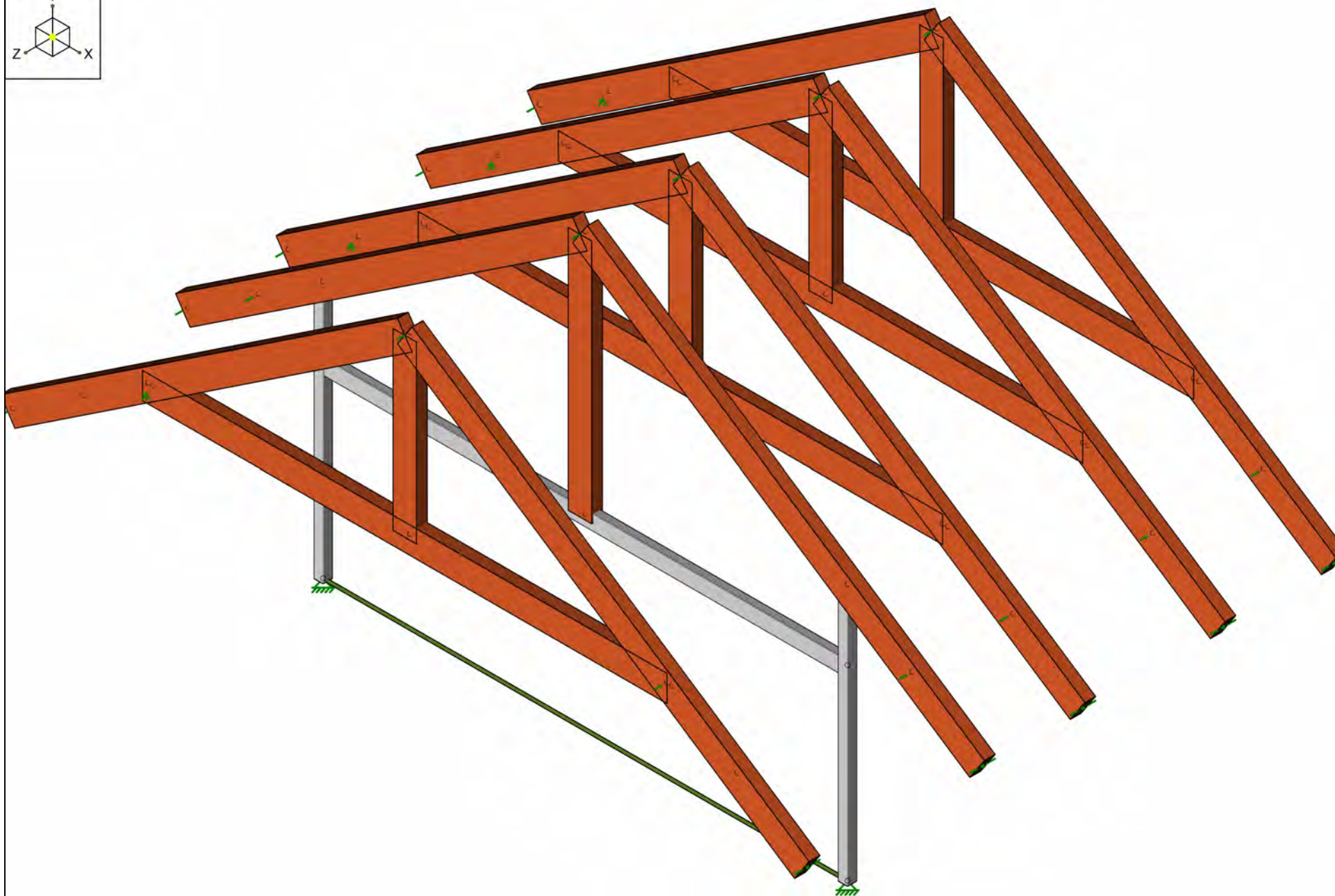
	Wall Panel	Region	Stud Size	Stud Spacing[in]	Axial Check	Gov LC	Chord Size	Chord Axial Check	Gov LC
0	W3	R1	2X6	16	0.151	6	2-2X6	0.175	72
1	W8	R1	2X6	16	0.264	6	2-2X6	0.46	6
2	W13	R1	2X6	16	0.148	6	2-2X6	0.17	78
3	W15	N/A	2X6	16	0.228	6	2-2X6	0.114	6
4	W16	N/A	2X6	16	0.229	6	2-2X6	0.118	6
5	W17	N/A	2X6	16	0.59	6	2-2X6	0.566	6

AWC NDS-18 / SDPWS-15 ASD Wall Panel Wood Code Checks (In-Plane)

	Wall Panel	Shear Panel Label	Region	Shear Check	Shear Force[lb/ft]	Gov LC	Hold-Down Label	Chord Strap Label	Tension Check	Tie-Down Force[k]	Gov LC
0	W3	S1 3/8 8d@4	R1	0.895	244.916	66	HU2-SDS2.5 DF-SP	NC	0.693	2.132	84
1	W8	S1 3/8 8d@6	R1	0.596	137.153	57	HU2-SDS2.5 DF-SP	NC	0.234	0.721	87
2	W13	S1 3/8 8d@4	R1	0.897	238.859	60	HU2-SDS2.5 DF-SP	NC	0.673	2.07	90
3	W15	S1 3/8 8d@6	N/A	0.713	164.065	67	HU2-SDS2.5 DF-SP	NC	0.083	0.255	91
4	W16	S1 3/8 8d@6	N/A	0.65	149.547	61	HU2-SDS2.5 DF-SP	NC	0.089	0.275	85
5	W17	S1 3/8 8d@4	N/A	0.914	329.078	76	Not Req'd	NC	NC	NC	NC

AWC NDS-18 / SDPWS-15 ASD Wall Panel Wood Code Checks (Header)

	Wall Panel	Header Label	Design Rule	Size	Bend UC	Shear UC	Gov LC
0	W15	H1	Typical	3-2X6	0.468	0.773	6 (shear)
1	W16	H1	Typical	3-2X6	0.34	0.672	6 (shear)
2	W17	H1	Typical	3-2X6	0.468	0.891	6 (shear)



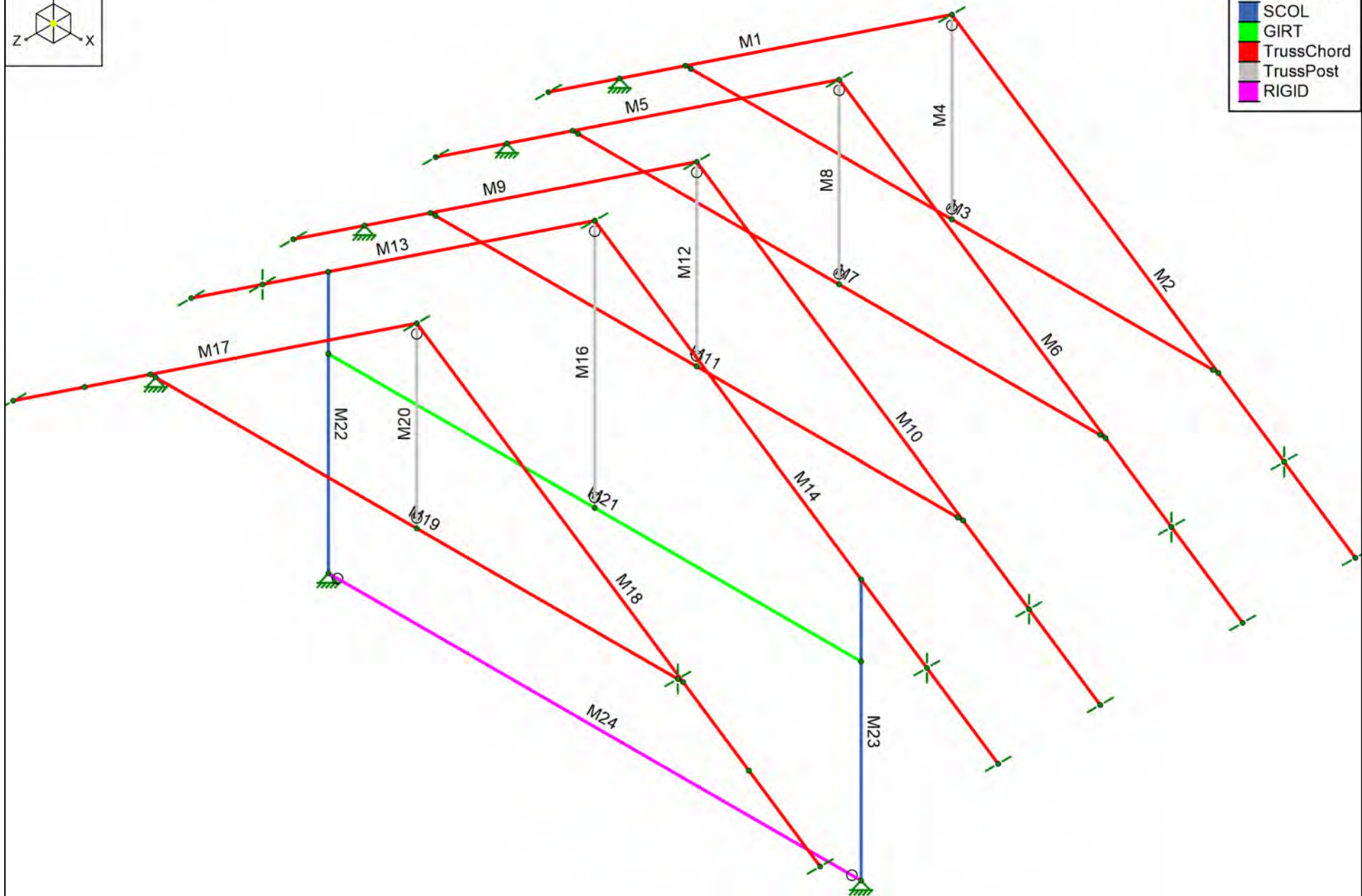
<Licensed Company>
sam.christensen

SK-1

Feb 26, 2024 at 10:46 PM
Cabin Timber Truss 03.r3d



Section Sets	
█	SCOL
█	GIRT
█	TrussChord
█	TrussPost
█	RIGID

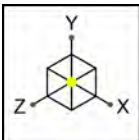


<Licensed Company>
sam.christensen

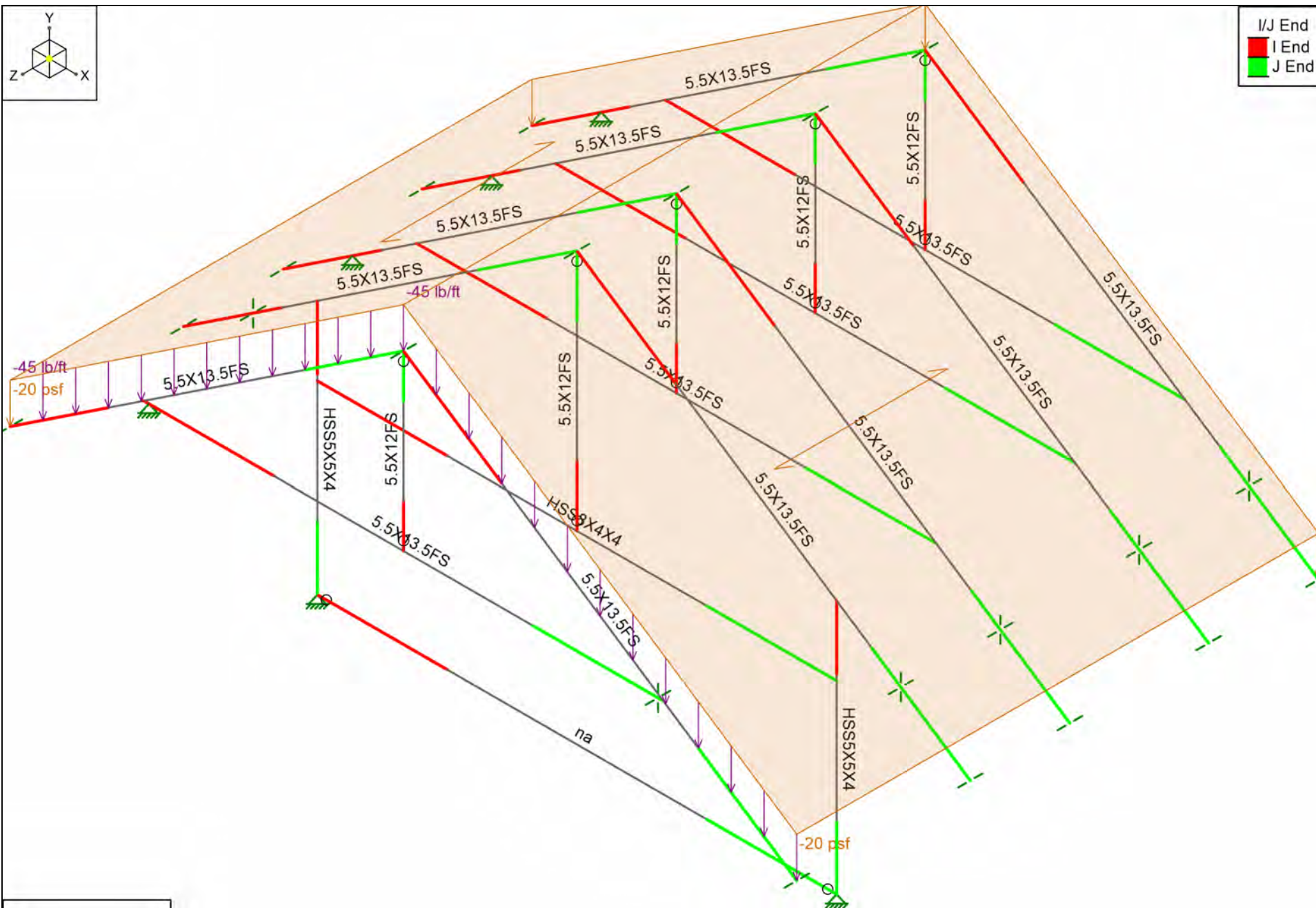
SK-2

Feb 26, 2024 at 10:47 PM

Cabin Timber Truss 03.r3d

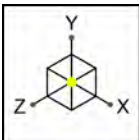


I/J End
■ I End
■ J End

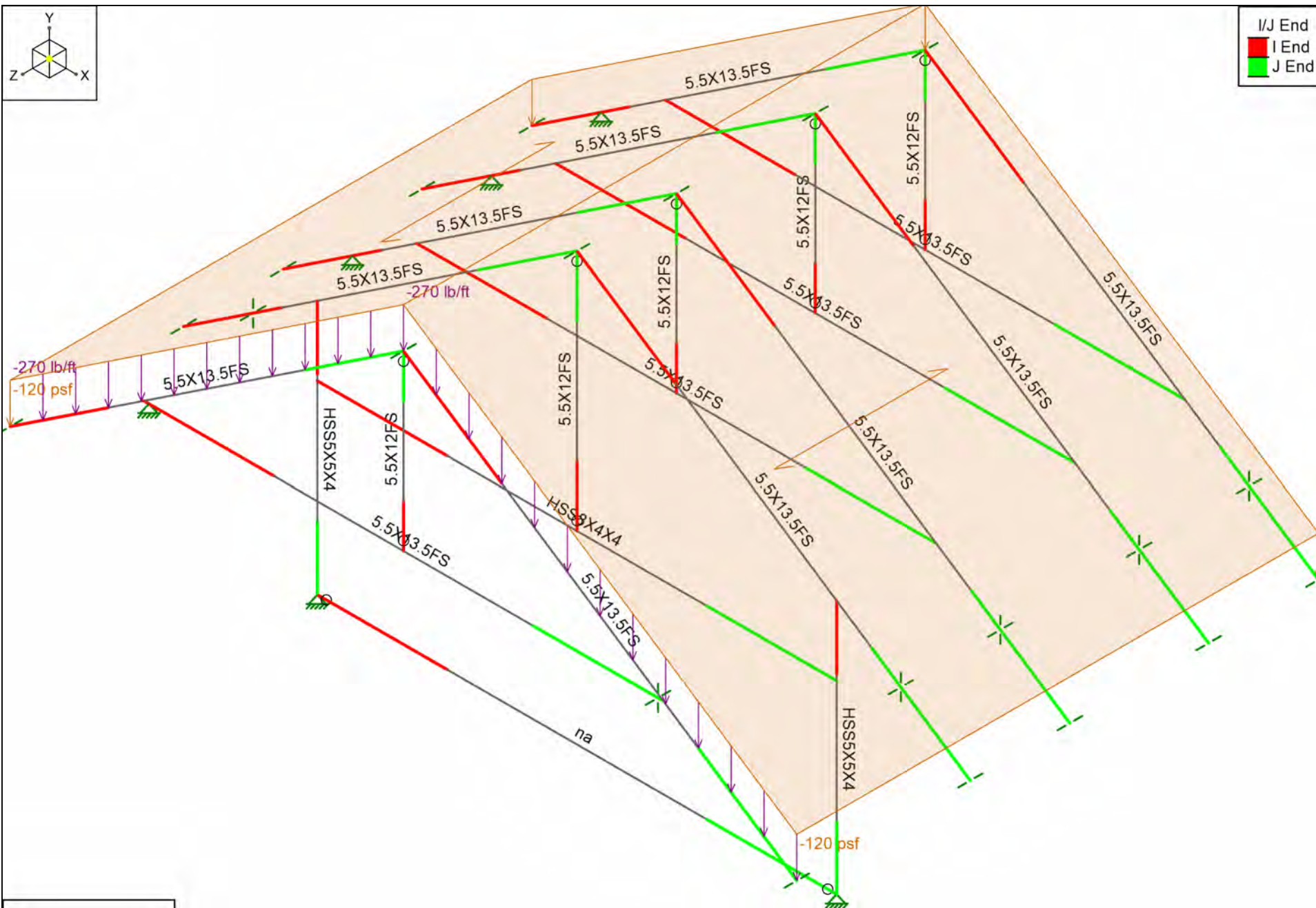


Loads: BLC 1, Dead

	<Licensed Company>	SK-3
	sam.christensen	Feb 26, 2024 at 10:49 PM
		Cabin Timber Truss 03.r3d



I/J End
■ I End
■ J End

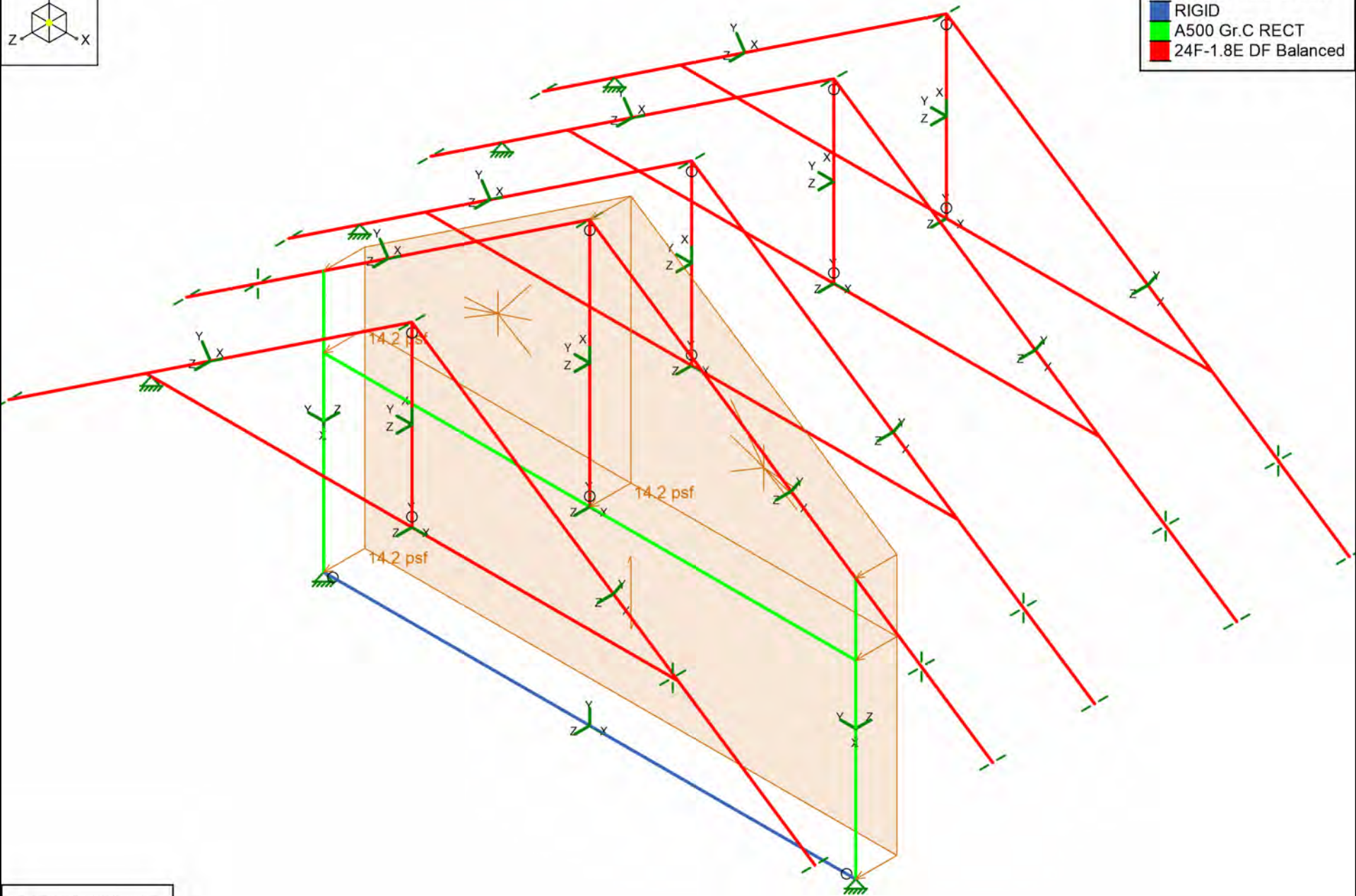


Loads: BLC 2, Snow

	<Licensed Company>		SK-4
	sam.christensen		Feb 26, 2024 at 10:49 PM
			Cabin Timber Truss 03.r3d

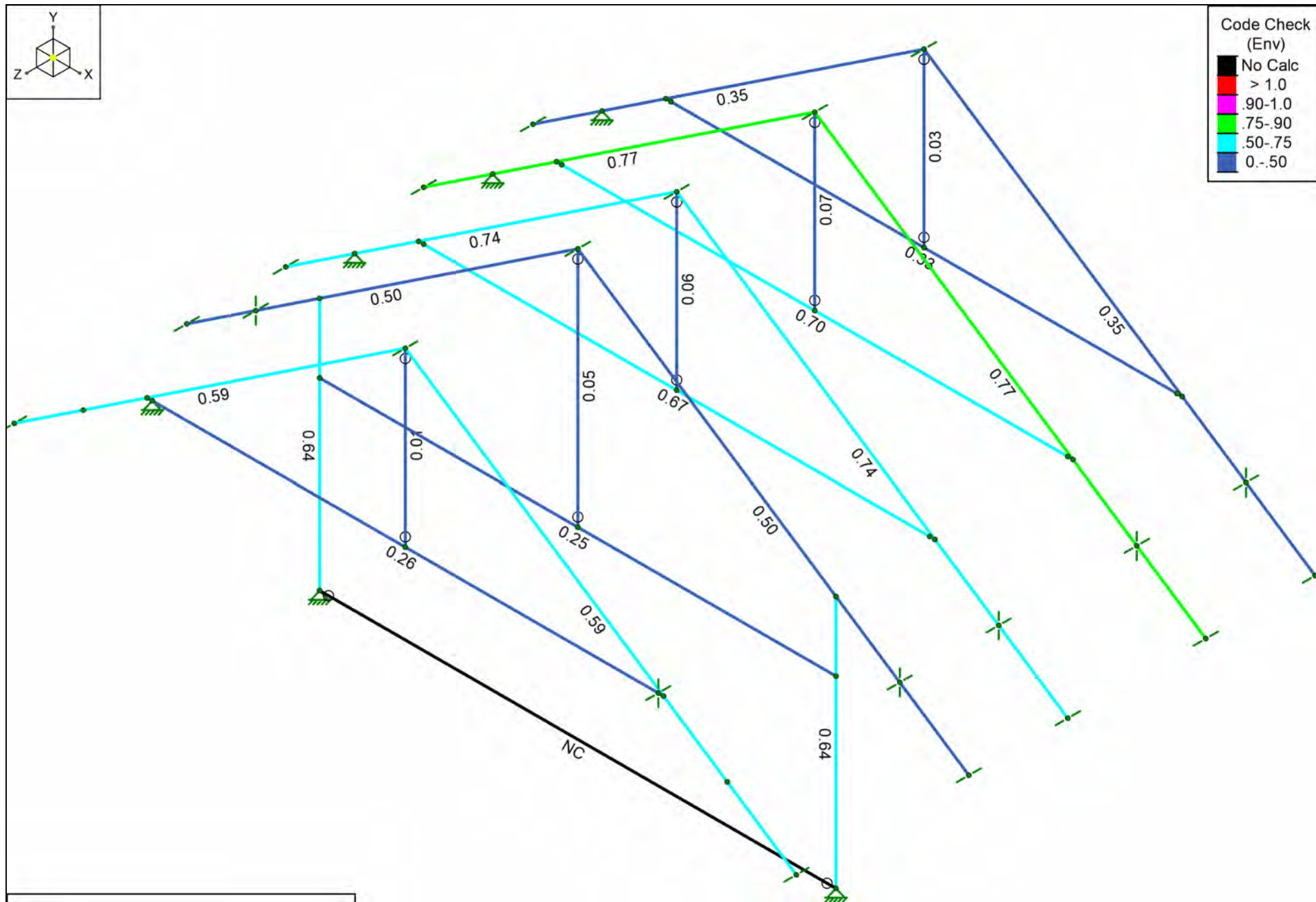


Member Material Sets	
■	RIGID
■	A500 Gr.C RECT
■	24F-1.8E DF Balanced



Loads: BLC 3, Wind

	<Licensed Company>	SK-5
	sam.christensen	Feb 26, 2024 at 10:51 PM
		Cabin Timber Truss 03.r3d



Member Code Checks Displayed (Enveloped)



<Licensed Company>

sam.christensen

SK-5

Feb 26, 2024 at 10:45 PM

Cabin Timber Truss 03.r3d



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in ²)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Global

Hot Rolled Steel	AISC 15th (360-16): ASD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 15th (360-16): ASD
Cold Formed Steel	AISI S100-20: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18 / SDPWS-21 ASD
Temperature	< 100F
Concrete	ACI 318-19
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-20: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	ASCE 7-16
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes
S ₁ (g)	1
SD ₁ (g)	1
SD _s (g)	1
T ₁ (sec)	5
T ₂ (sec)	
T ₃ (sec)	
C ₂	0.02
C ₃	0.02
C _{Exp. Z}	0.75
C _{Exp. X}	0.75
R ₂	3
R ₃	3
Q ₂	1
Q ₃	1
C ₂ Z	4
C ₃ X	4



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Model Settings (Continued)

ρZ	1
ρX	1



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N61	Reaction	Reaction	Reaction
2	N60	Reaction	Reaction	Reaction
3	N40		Reaction	Reaction
4	N42		Reaction	Reaction
5	N13		Reaction	Reaction
6	N9	Reaction	Reaction	Reaction
7	N22		Reaction	Reaction
8	N32		Reaction	Reaction
9	N15	Reaction	Reaction	Reaction
10	N30	Reaction	Reaction	Reaction
11	N1			Reaction
12	N7			Reaction
13	N11			Reaction
14	N12			Reaction
15	N14			Reaction
16	N21			Reaction
17	N28			Reaction
18	N29			Reaction
19	N31			Reaction
20	N38			Reaction
21	N39			Reaction
22	N41			Reaction
23	N48			Reaction
24	N49			Reaction
25	N51			Reaction
26	N54	Reaction	Reaction	Reaction
27	N56		Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁶ F ⁻¹]	Density [lb/ft ³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	490	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	490	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	490	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	490	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	490	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	490	65	1.1	80	1.1

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e ⁶ F ⁻¹]	Density [lb/ft ³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.1			1	0.3	0.3	35.001
2	SP	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	35.001
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.1			1	0.3	0.3	35.001
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.1			1	0.3	0.3	35.001
5	24F-1.8E DF Balanced	Glulam	NDS Table 5A	24F-V4 DF/DF	na			1	0.3	0.3	35.001
6	24F-1.8E DF Unbalanced	Glulam	NDS Table 5A	24F-1.8E DF UNBAL	na			1	0.3	0.3	35.001
7	24F-1.8E SP Balanced	Glulam	NDS Table 5A	24F-1.8E SP BAL	na			1	0.3	0.3	35.001
8	24F-1.8E SP Unbalanced	Glulam	NDS Table 5A	24F-1.8E SP UNBAL	na			1	0.3	0.3	35.001
9	1.3E-1600F VERSALAM	SCL	Boise Cascade	1.3E-1600F VERSALAM	na			1	0.3	0.3	35.001
10	1.35E LSL SolidStart	SCL	Louisiana Pacific	1.35E LSL SolidStart	na			1	0.3	0.3	35.001
11	1.4E RIGIDLAM LVL	SCL	Roseburg Forest Products 2023	1.4E RIGIDLAM LVL	na			1	0.3	0.3	35.001
12	2.0E DF Parallam PSL	SCL	TrusJoist	2.0E DF Parallam PSL	na			1	0.3	0.3	35.001
13	LVL PRL 1.5E 2250F	Custom	N/A	LVL PRL 1.5E 2250F	na			1	0.3	0.3	35.001
14	LVL Microlam 1.9E 2600F	Custom	N/A	LVL Microlam 1.9E 2600F	na			1	0.3	0.3	35.001
15	PSL Parallam 2.0E 2900F	Custom	N/A	PSL Parallam 2.0E 2900F	na			1	0.3	0.3	35.001
16	LSL TimberStrand 1.55E 2325F	Custom	N/A	LSL TimberStrand 1.55E 2325F	na			1	0.3	0.3	35.001

General Materials Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁶ F ⁻¹]	Density [lb/ft ³]	Plate Methodology
1	gen Conc3NW	3155	1372	0.15	0.6	145	Isotropic
2	gen Conc4NW	3644	1584	0.15	0.6	145	Isotropic
3	gen Conc3LW	2085	906	0.15	0.6	109.999	Isotropic
4	gen Conc4LW	2408	1047	0.15	0.6	109.999	Isotropic
5	gen Alum	10100	4077	0.3	1.29	173	Isotropic
6	gen Steel	29000	11154	0.3	0.65	490	Isotropic
7	gen Plywood	1800	38	0	0.3	35	Isotropic
8	RIGID	1e+6		0.3	0	0	Isotropic
9	gen Ortho				0.65	490	Orthotropic



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	SCOL	HSS5X5X4	Column	Tube	A500 Gr.C RECT	Typical	4.3	16	16	25.8
2	GIRT	HSS8X4X4	Beam	Tube	A500 Gr.C RECT	Typical	5.24	14.4	42.5	35.3

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	TrussChord	5.5X13.5FS	Beam	Glulam Western	24F-1.8E DF Balanced	Typical	74.25	187.172	1127.672	556.966
2	TrussPost	5.5X12FS	Column	Glulam Western	24F-1.8E DF Balanced	Typical	66	166.375	792	474.044
3	Post	6X6	Beam	Rectangular Double	DF	Typical	30.25	76.255	76.255	128.871

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N11	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
2	M2	N11	N7	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
3	M3	N16	N20	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
4	M4	N18	N11	TrussPost	Column	Glulam Western	24F-1.8E DF Balanced	Typical
5	M5	N12	N21	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
6	M6	N21	N14	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
7	M7	N23	N27	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
8	M8	N25	N21	TrussPost	Column	Glulam Western	24F-1.8E DF Balanced	Typical
9	M9	N28	N31	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
10	M10	N31	N29	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
11	M11	N33	N37	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
12	M12	N35	N31	TrussPost	Column	Glulam Western	24F-1.8E DF Balanced	Typical
13	M13	N38	N41	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
14	M14	N41	N39	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
15	M16	N45	N41	TrussPost	Column	Glulam Western	24F-1.8E DF Balanced	Typical
16	M17	N48	N51	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
17	M18	N51	N49	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
18	M19	N53	N57	TrussChord	Beam	Glulam Western	24F-1.8E DF Balanced	Typical
19	M20	N55	N51	TrussPost	Column	Glulam Western	24F-1.8E DF Balanced	Typical
20	M21	N58	N59	GIRT	Beam	Tube	A500 Gr.C RECT	Typical
21	M22	N43	N60	SCOL	Column	Tube	A500 Gr.C RECT	Typical
22	M23	N47	N61	SCOL	Column	Tube	A500 Gr.C RECT	Typical
23	M24	N60	N61	RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M1			Yes	Default	None
2	M2			Yes	Default	None
3	M3			Yes	Default	None
4	M4	BenPIN	BenPIN	Yes	** NA **	None
5	M5			Yes	Default	None
6	M6			Yes	Default	None
7	M7			Yes	Default	None
8	M8	BenPIN	BenPIN	Yes	** NA **	None
9	M9			Yes	Default	None
10	M10			Yes	Default	None
11	M11			Yes	Default	None
12	M12	BenPIN	BenPIN	Yes	** NA **	None
13	M13			Yes	Default	None
14	M14			Yes	Default	None
15	M16	BenPIN	BenPIN	Yes	** NA **	None
16	M17			Yes	Default	None
17	M18			Yes	Default	None
18	M19			Yes	Default	None
19	M20	BenPIN	BenPIN	Yes	** NA **	None
20	M21			Yes	Default	None
21	M22			Yes	** NA **	None
22	M23			Yes	** NA **	None
23	M24	BenPIN	BenPIN	Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M21	GIRT	22.447	Lbyy	N/A	N/A	Lateral
2	M22	SCOL	11	Lbvy	N/A	N/A	Lateral
3	M23	SCOL	11	Lbyy	N/A	N/A	Lateral



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le-bend top [ft]	Cr	y sway	z sway
1	M1	TrussChord	20.43	2	Lbyy			
2	M2	TrussChord	20.43	2	Lbyy			
3	M3	TrussChord	22.447		Lbyy			
4	M4	TrussPost	7.48		Lbyy			
5	M5	TrussChord	20.43	2	Lbyy			
6	M6	TrussChord	20.43	2	Lbyy			
7	M7	TrussChord	22.447		Lbyy			
8	M8	TrussPost	7.48		Lbyy			
9	M9	TrussChord	20.43	2	Lbyy			
10	M10	TrussChord	20.43	2	Lbyy			
11	M11	TrussChord	22.447		Lbyy			
12	M12	TrussPost	7.48		Lbyy			
13	M13	TrussChord	20.43	2	Lbyy			
14	M14	TrussChord	20.43	2	Lbyy			
15	M16	TrussPost	10.48		Lbyy			
16	M17	TrussChord	20.43	2	Lbyy			
17	M18	TrussChord	20.43	2	Lbyy			
18	M19	TrussChord	22.447		Lbyy			
19	M20	TrussPost	7.48		Lbyy			

Plate Primary Data

No Data to Print...	

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
1	Dead	DL	-1	2	2
2	Snow	SL		2	2
3	Wind	WL			3
4	BLC 1 Transient Area Loads	None		10	
5	BLC 2 Transient Area Loads	None		10	
6	BLC 3 Transient Area Loads	None		33	

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/ft]	End Magnitude [lb/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M17	Y	-45	-45	0	%100
2	M18	Y	-45	-45	0	%100

Member Distributed Loads (BLC 2 : Snow)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/ft]	End Magnitude [lb/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M17	Y	-270	-270	0	%100
2	M18	Y	-270	-270	0	%100

Member Distributed Loads (BLC 4 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/ft]	End Magnitude [lb/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M2	Y	-47.5	-47.5	3.886e-15	20.43
2	M6	Y	-107.5	-107.5	2.998e-15	20.43
3	M10	Y	-103	-103	6.55e-15	20.43
4	M14	Y	-118	-118	3.886e-15	20.43
5	M18	Y	-75	-75	4.774e-15	20.43
6	M1	Y	-47.5	-47.5	2.998e-15	20.43
7	M5	Y	-107.5	-107.5	2.998e-15	20.43
8	M9	Y	-103	-103	2.998e-15	20.43
9	M13	Y	-118	-118	2.109e-15	20.43
10	M17	Y	-75	-75	2.109e-15	20.43

Member Distributed Loads (BLC 5 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/ft]	End Magnitude [lb/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M2	Y	-285	-285	3.886e-15	20.43
2	M6	Y	-645	-645	2.998e-15	20.43
3	M10	Y	-618	-618	6.55e-15	20.43
4	M14	Y	-708	-708	3.886e-15	20.43
5	M18	Y	-450	-450	4.774e-15	20.43
6	M1	Y	-285	-285	2.998e-15	20.43
7	M5	Y	-645	-645	2.998e-15	20.43
8	M9	Y	-618	-618	2.998e-15	20.43
9	M13	Y	-708	-708	2.109e-15	20.43
10	M17	Y	-450	-450	2.109e-15	20.43



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Member Distributed Loads (BLC 6 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/ft]	End Magnitude [lb/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M21	Z	56.8	56.8	2.554e-15	22.447
2	M24	Z	56.8	56.8	4.108e-15	22.447
3	M13	Z	0.686	21.111	6.129	8.172
4	M13	Z	21.111	40.857	8.172	10.215
5	M13	Z	40.857	46.449	10.215	12.258
6	M13	Z	46.449	42.939	12.258	14.301
7	M13	Z	42.939	29.83	14.301	16.344
8	M13	Z	29.83	12.982	16.344	18.387
9	M13	Z	12.982	0.686	18.387	20.43
10	M16	Z	13.37	60.892	0	2.096
11	M16	Z	60.892	86.894	2.096	4.192
12	M16	Z	86.894	77.055	4.192	6.288
13	M16	Z	77.055	42.388	6.288	8.384
14	M16	Z	42.388	3.96	8.384	10.48
15	M21	Z	2.001	24.798	0	2.245
16	M21	Z	24.798	41.397	2.245	4.489
17	M21	Z	41.397	47.932	4.489	6.734
18	M21	Z	47.932	34.193	6.734	8.979
19	M21	Z	34.193	2.001	8.979	11.223
20	M22	Z	10.878	24.798	0	3.3
21	M14	Z	0.689	12.883	0	2.043
22	M14	Z	12.883	26.941	2.043	4.086
23	M14	Z	26.941	40.824	4.086	6.129
24	M14	Z	40.824	47.391	6.129	8.172
25	M14	Z	47.391	41.642	8.172	10.215
26	M14	Z	41.642	21.654	10.215	12.258
27	M14	Z	21.654	0.689	12.258	14.301
28	M21	Z	1.937	30.817	11.223	13.468
29	M21	Z	30.817	46.567	13.468	15.713
30	M21	Z	46.567	41.636	15.713	17.957
31	M21	Z	41.636	23.399	17.957	20.202
32	M21	Z	23.399	1.937	20.202	22.447
33	M23	Z	5.153	30.817	0	3.3

Member Area Loads (BLC 1 : Dead)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N49	N7	N11	N51	Y	A-B	-20
2	N48	N1	N11	N51	Y	A-B	-20

Member Area Loads (BLC 2 : Snow)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N49	N7	N11	N51	Y	A-B	-120
2	N48	N1	N11	N51	Y	A-B	-120

Member Area Loads (BLC 3 : Wind)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N60	N58	N59	N61	Z	A-B	14.2
2	N58	N43	N41	N45	Z	Two Way	14.2
3	N45	N41	N47	N59	Z	Two Way	14.2

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1										
2	Deflection 2	Yes	Y	LL	1										
3	Deflection 3	Yes	Y	DL	1	LL	1								
4	IBC 16-8	Yes	Y	DL	1										
5	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1						
6	IBC 16-10 (b)	Yes	Y	DL	1	SL	1	SLN	1						
7	IBC 16-11 (b)	Yes	Y	DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75		
8	IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6								
9	IBC 16-12 (a) (b)	Yes	Y	DL	1	WL	-0.6								
10	IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	LL	0.75	LLS	0.75				
11	IBC 16-13 (a) (b)	Yes	Y	DL	1	WL	-0.45	LL	0.75	LLS	0.75				
12	IBC 16-13 (b) (a)	Yes	Y	DL	1	WL	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
13	IBC 16-13 (b) (b)	Yes	Y	DL	1	WL	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
14	IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6								
15	IBC 16-15 (b)	Yes	Y	DL	0.6	WL	-0.6								



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Envelope Node Reactions

Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N61	max	0.12	6	12.669	6	0.641	15	0	15	0	15	15
1		min	0	2	0	2	-0.641	14	0	1	0	1	1
2	N60	max	0	2	12.669	6	0.641	15	0	15	0	15	15
3		min	-0.12	6	0	2	-0.641	14	0	1	0	1	1
4	N40	max	0	15	5.047	6	1.069	9	0	15	0	15	15
5		min	0	1	0	2	-1.069	8	0	1	0	1	1
6	N42	max	0	15	5.047	6	1.064	9	0	15	0	15	15
7		min	0	1	0	2	-1.064	8	0	1	0	1	1
8	N13	max	0	15	7.424	6	0	15	0	15	0	15	15
9		min	0	1	0	2	0	1	0	1	0	1	1
10	N9	max	0	2	7.424	6	0	15	0	15	0	15	15
11		min	0	6	0	2	0	1	0	1	0	1	1
12	N22	max	0	15	16.005	6	0	15	0	15	0	15	15
13		min	0	1	0	2	0	1	0	1	0	1	1
14	N32	max	0	15	15.361	6	0	15	0	15	0	15	15
15		min	0	1	0	2	0	1	0	1	0	1	1
16	N15	max	0	2	16.005	6	0	15	0	15	0	15	15
17		min	0	6	0	2	0	1	0	1	0	1	1
18	N30	max	0	2	15.361	6	0	15	0	15	0	15	15
19		min	0	6	0	2	0	1	0	1	0	1	1
20	N1	max	0	15	0	15	0	15	0	15	0	15	15
21		min	0	1	0	1	0	1	0	1	0	1	1
22	N7	max	0	15	0	15	0	15	0	15	0	15	15
23		min	0	1	0	1	0	1	0	1	0	1	1
24	N11	max	0	15	0	15	0	15	0	15	0	15	15
25		min	0	1	0	1	0	1	0	1	0	1	1
26	N12	max	0	15	0	15	0	15	0	15	0	15	15
27		min	0	1	0	1	0	1	0	1	0	1	1
28	N14	max	0	15	0	15	0	15	0	15	0	15	15
29		min	0	1	0	1	0	1	0	1	0	1	1
30	N21	max	0	15	0	15	0	15	0	15	0	15	15
31		min	0	1	0	1	0	1	0	1	0	1	1
32	N28	max	0	15	0	15	0	15	0	15	0	15	15
33		min	0	1	0	1	0	1	0	1	0	1	1
34	N29	max	0	15	0	15	0	15	0	15	0	15	15
35		min	0	1	0	1	0	1	0	1	0	1	1
36	N31	max	0	15	0	15	0	15	0	15	0	15	15
37		min	0	1	0	1	0	1	0	1	0	1	1
38	N38	max	0	15	0	15	0.559	14	0	15	0	15	15
39		min	0	1	0	1	-0.559	15	0	1	0	1	1
40	N39	max	0	15	0	15	0.556	14	0	15	0	15	15
41		min	0	1	0	1	-0.556	15	0	1	0	1	1
42	N41	max	0	15	0	15	0.526	15	0	15	0	15	15
43		min	0	1	0	1	-0.526	14	0	1	0	1	1
44	N48	max	0	15	0	15	0	15	0	15	0	15	15
45		min	0	1	0	1	0	1	0	1	0	1	1
46	N49	max	0	15	0	15	0	15	0	15	0	15	15
47		min	0	1	0	1	0	1	0	1	0	1	1
48	N51	max	0	15	0	15	0	15	0	15	0	15	15
49		min	0	1	0	1	0	1	0	1	0	1	1
50	N54	max	0	2	17.792	6	0	15	0	15	0	15	15
51		min	0	6	0	2	0	1	0	1	0	1	1
52	N56	max	0	15	17.792	6	0	15	0	15	0	15	15
53		min	0	1	0	2	0	1	0	1	0	1	1
54	Totals:	max	0	2	148.595	6	2.819	15					
55		min	0	6	0	2	-2.819	14					

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
0	M21	HSS8X4X4	0.248	11.223	13	0.024	0	z	15	29.832	156.886	18.85	33.184	2.118	H1-1b
1	M22	HSS5X5X4	0.637	0	6	0.192	2.979	y	13	91.417	128.743	18.987	18.987	2.765	H1-1b
2	M23	HSS5X5X4	0.637	0	6	0.192	2.979	y	13	91.417	128.743	18.987	18.987	2.765	H1-1b

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
0	M1	5.5X13.5FS	0.352	6.81	6	0.341	3.618	y	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3
1	M2	5.5X13.5FS	0.352	13.62	6	0.341	16.812	y	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3
2	M3	5.5X13.5FS	0.325	22.447	6	0.087	11.223	y	6	0.285	1.265	2.691	1.667	0.305	10.964	0.977	0.15	3.9-1
3	M4	5.5X12FS	0.033	7.48	6	0	7.48	z	15	1.628	1.265	2.119	1.667	0.368	5.967	0.996	0.858	3.9-1
4	M5	5.5X13.5FS	0.77	6.81	6	0.734	3.618	y	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3
5	M6	5.5X13.5FS	0.77	13.62	6	0.734	16.812	y	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3
6	M7	5.5X13.5FS	0.703	22.447	6	0.179	11.223	y	6	0.285	1.265	2.691	1.667	0.305	10.964	0.977	0.15	3.9-1
7	M8	5.5X12FS	0.066	7.48	6	0	7.48	z	15	1.628	1.265	2.119	1.667	0.368	5.967	0.996	0.858	3.9-1
8	M9	5.5X13.5FS	0.738	6.81	6	0.705	3.618	v	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
10:52:49 PM
Checked By : _____

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
9	M10	5.5X13.5FS	0.738	13.62	6	0.705	16.812	y	6	1.581	1.265	2.716	1.667	0.305	3.273	0.999	0.833	3.9-3
10	M11	5.5X13.5FS	0.674	22.447	6	0.172	11.223	y	6	0.285	1.265	2.691	1.667	0.305	10.964	0.977	0.15	3.9-1
11	M12	5.5X12FS	0.063	7.48	6	0	7.48	z	15	1.628	1.265	2.119	1.667	0.368	5.967	0.996	0.858	3.9-1
12	M13	5.5X13.5FS	0.499	7.023	6	0.35	7.023	y	6	1.581	1.265	2.094	1.667	0.305	10.46	0.986	0.833	3.9-3
13	M14	5.5X13.5FS	0.499	13.407	6	0.35	13.407	y	6	1.581	1.265	2.094	1.667	0.305	10.46	0.986	0.833	3.9-3
14	M16	5.5X12FS	0.048	5.022	9	0.012	0	z	9	1.224	1.76	2.935	2.32	0.368	7.063	0.992	0.464	3.9-3
15	M17	5.5X13.5FS	0.592	6.81	6	0.35	7.023	y	6	1.581	1.265	2.094	1.667	0.305	10.46	0.986	0.833	3.9-1
16	M18	5.5X13.5FS	0.592	13.62	6	0.35	13.407	y	6	1.581	1.265	2.094	1.667	0.305	10.46	0.986	0.833	3.9-1
17	M19	5.5X13.5FS	0.264	22.213	6	1.116	22.447	y	6	0.285	1.265	2.074	1.667	0.305	10.964	0.984	0.15	3.9-1
18	M20	5.5X12FS	0.014	0	6	0	7.48	z	15	1.628	1.265	2.119	1.667	0.368	5.967	0.996	0.858	3.6-3

Envelope Plate Forces (per ft)

No Data to Print...



Copyright © 2024 Vector Structural Engineering, LLC
This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: KOKANEE COVE DEVELOPMENT AND RENOVATION NO.: U5516.001.231

COMPONENTS & CLADDING WIND CALCULATIONS

Note: Calculations per ASCE7-16

SITE-SPECIFIC WIND PARAMETERS:

Basic Wind Speed [mph]: 103
Exposure Category: B
Elevation (AMSL): 5021 ft

Notes:

ADDITIONAL INPUT & CALCULATIONS:

Height of roof, h [ft]: 18 Eave for slopes <10°, mean height otherwise
Building Length, L [ft]: 72 Not including overhangs
Building Width, B [ft]: 38 Not including overhangs
Roof Type: Gable
Roof Slope [deg]: 45.0 12 / 12 Slope
Enclosure Classification: Enclosed Buildings
h/B: 0.47 Used for Hipped roofs and 60ft<h<90ft, disregard for other cases
Applicable Tables: Gable Roofs 27° ≤ θ ≤ 45° (Set this cell correctly)
α: 7 Table 26.11-1
z_g [ft]: 1200 Table 26.11-1
K_z: 0.701 Table 26.10-1
K₁: Figure 26.8-1 (leave blank for negligible topographic effects)
K₂: Figure 26.8-1 (leave blank for negligible topographic effects)
K₃: Figure 26.8-1 (leave blank for negligible topographic effects)
K_{zt}: 1 Equation 26.8-1
K_d: 0.85 Table 26.6-1
K_e: 0.83 Table 26.9-1
Velocity Pressure, q_h [psf]: 13.49 Equation 26.10-1
GC_{pi}: 0.18 Table 26.13-1 (largest abs. value)

$$p = q_h [(GC_p) - (GC_{pi})]$$

Figure 30.3-1

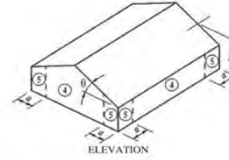
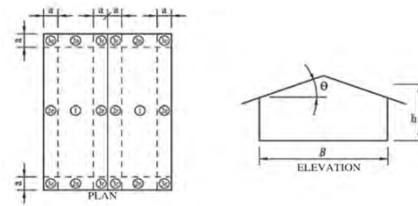
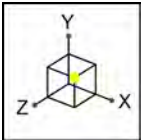


Figure 30.3-2D



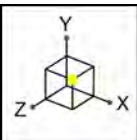
OUTPUT:

Element Wind Loads					Pressures (1.0W)																				
					Walls									Roof											
					Member	Span	Trib Width	Conn?	C&C Loc z	K _z	q _z	A _{eff}	a	All +	4	5	All +	1	2e	2r	2n	3r	3e	1OH	2eOH
	ft	ft		ft		psf	sf	ft	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf	psf
Roof Zones	1	10	No	Roof			10	3.8	-	-	-	14.6	26.7	26.7	26.7	29.4	29.4	36.1	37.5	37.5	37.5	40.2	40.2	46.8	
Roof Zones	1	20	No	Roof			20	3.8	-	-	-	12.9	22.6	22.6	22.6	26.3	26.3	31.9	33.4	33.4	33.4	37.1	37.1	42.7	
Roof Zones	1	50	No	Roof			50	3.8	-	-	-	10.8	17.3	17.3	17.3	22.2	22.2	26.5	28.1	28.1	28.1	32.9	32.9	37.3	
Roof Zones	1	100	No	Roof			100	3.8	-	-	-	9.17	13.2	13.2	13.2	19	19	22.4	24	24	24	29.8	29.8	33.2	
Roof Zones	1	500	No	Roof			500	3.8	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
Wall Zones	1	10	No	Walls	18	0.701	13.49	10	3.8	15.9	17.3	21.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall Zones	1	20	No	Walls	18	0.701	13.49	20	3.8	15.2	16.5	19.9	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall Zones	1	50	No	Walls	18	0.701	13.49	50	3.8	14.2	15.6	18	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall Zones	1	100	No	Walls	18	0.701	13.49	100	3.8	13.5	14.9	16.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Wall Zones	1	200	No	Walls	18	0.701	13.49	200	3.8	12.8	14.2	15.1	-	-	-	-	-	-	-	-	-	-	-	-	-
A-Frames	47.5	9	No	Roof			752.1	3.8	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
Endwall Mullions	21.5	6.5	No	Walls	18	0.701	13.49	154.1	3.8	13.1	14.4	15.7	-	-	-	-	-	-	-	-	-	-	-	-	-
Endwall Mullions 2	17	4.5	No	Walls	18	0.701	13.49	96.33	3.8	13.6	14.9	16.6	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Joists	9	0.5	No	Roof			27	3.8	-	-	-	12.2	20.9	20.9	20.9	24.9	24.9	30.2	31.7	31.7	31.7	35.7	35.7	41	
Canopy Beams	7	5	No	Roof			35	3.8	-	-	-	11.6	19.4	19.4	19.4	23.8	23.8	28.6	30.2	30.2	30.2	34.5	34.5	39.4	

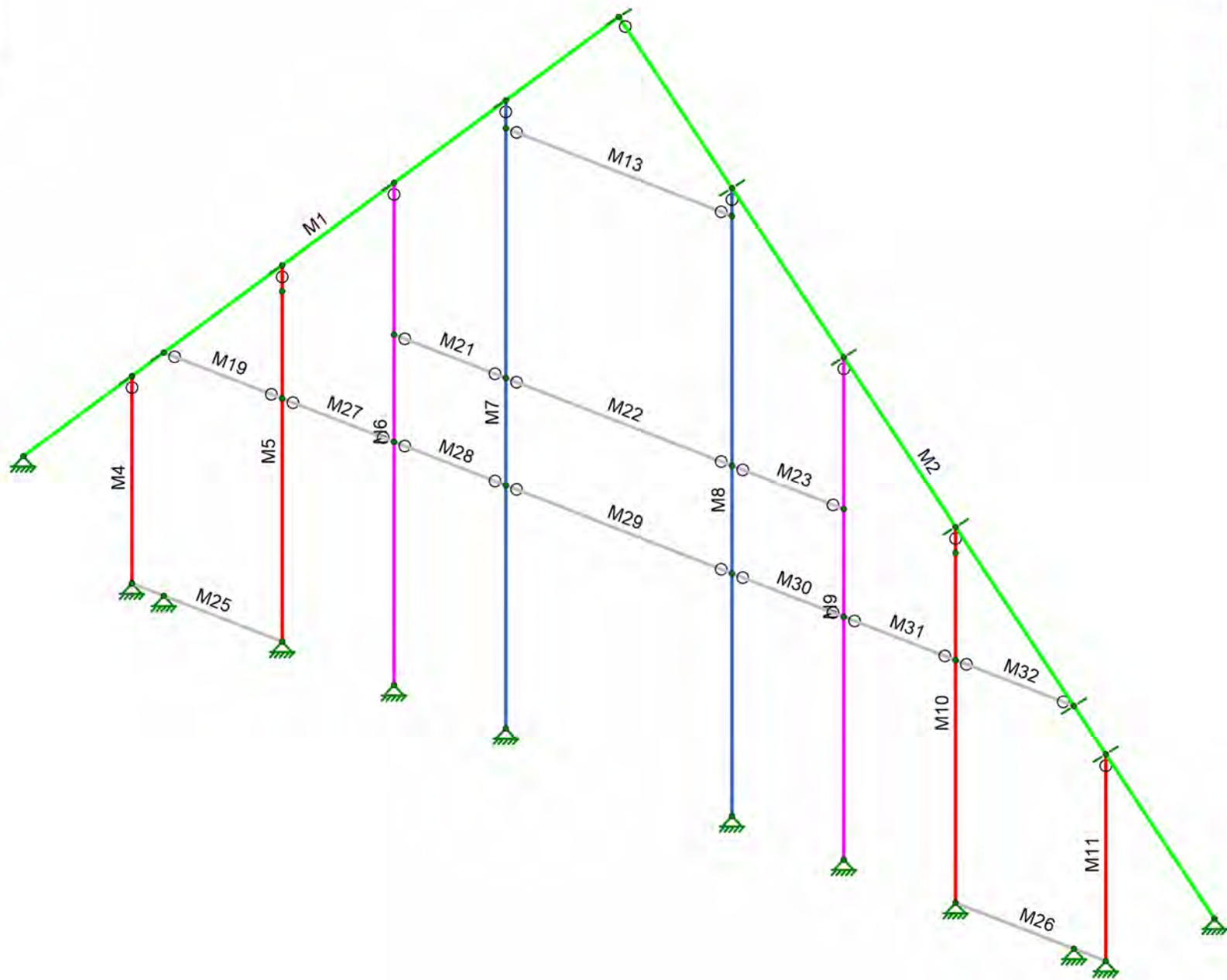


Member Code Checks Displayed (Enveloped)

	<Licensed Company>	SK-1
	sam.christensen	Feb 26, 2024 at 10:59 PM
		ChapelOpt2Wood.r3d

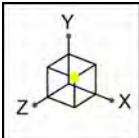


Section Sets	
na	Blue line
Frame	Green line
Mullion	Red line
HMullion	Grey line
Mullion2	Pink line

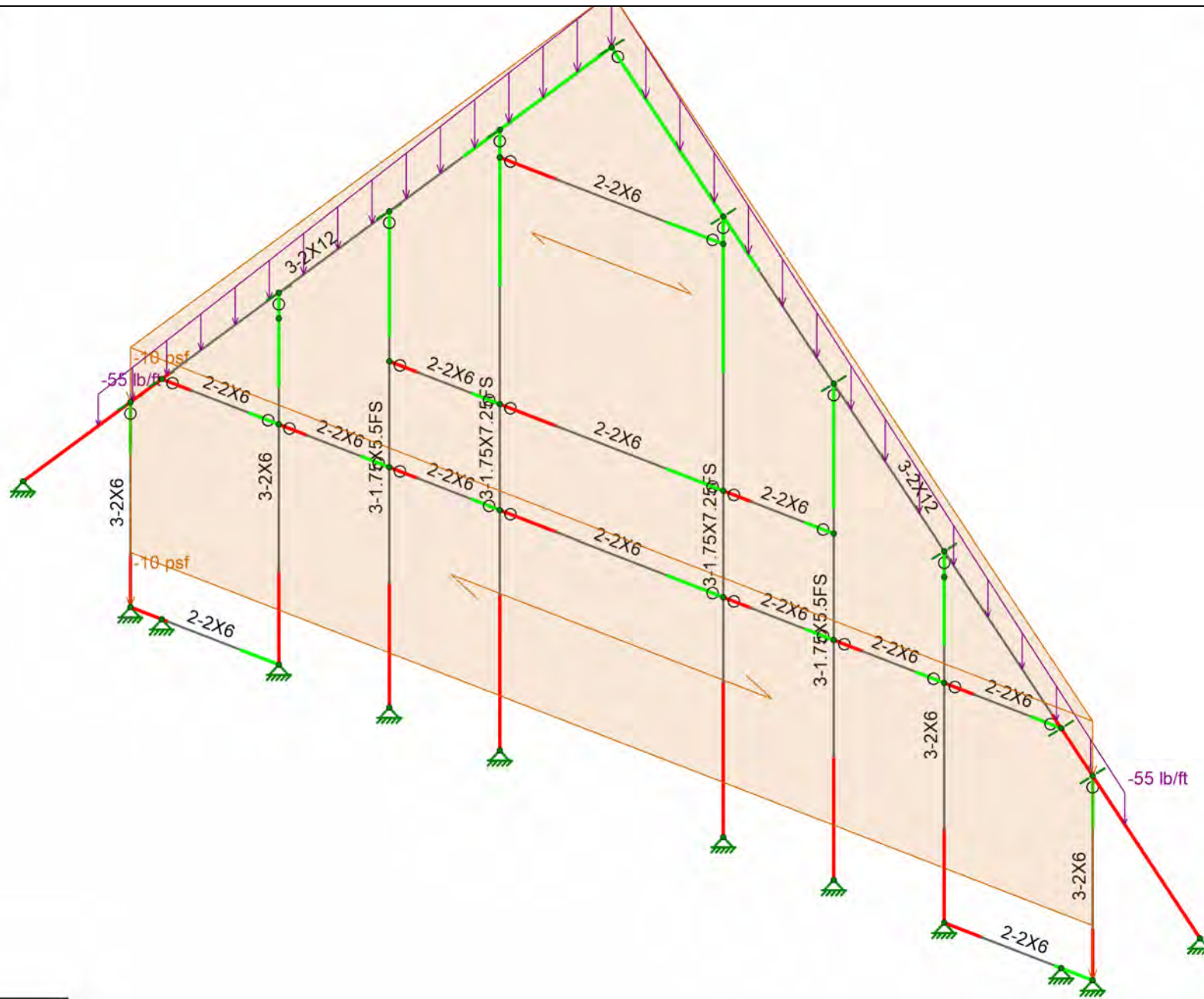


<Licensed Company>
sam.christensen

SK-2
Feb 26, 2024 at 11:01 PM
ChapelOpt2Wood.r3d

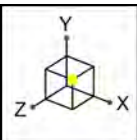


I/J End
■ I End
■ J End

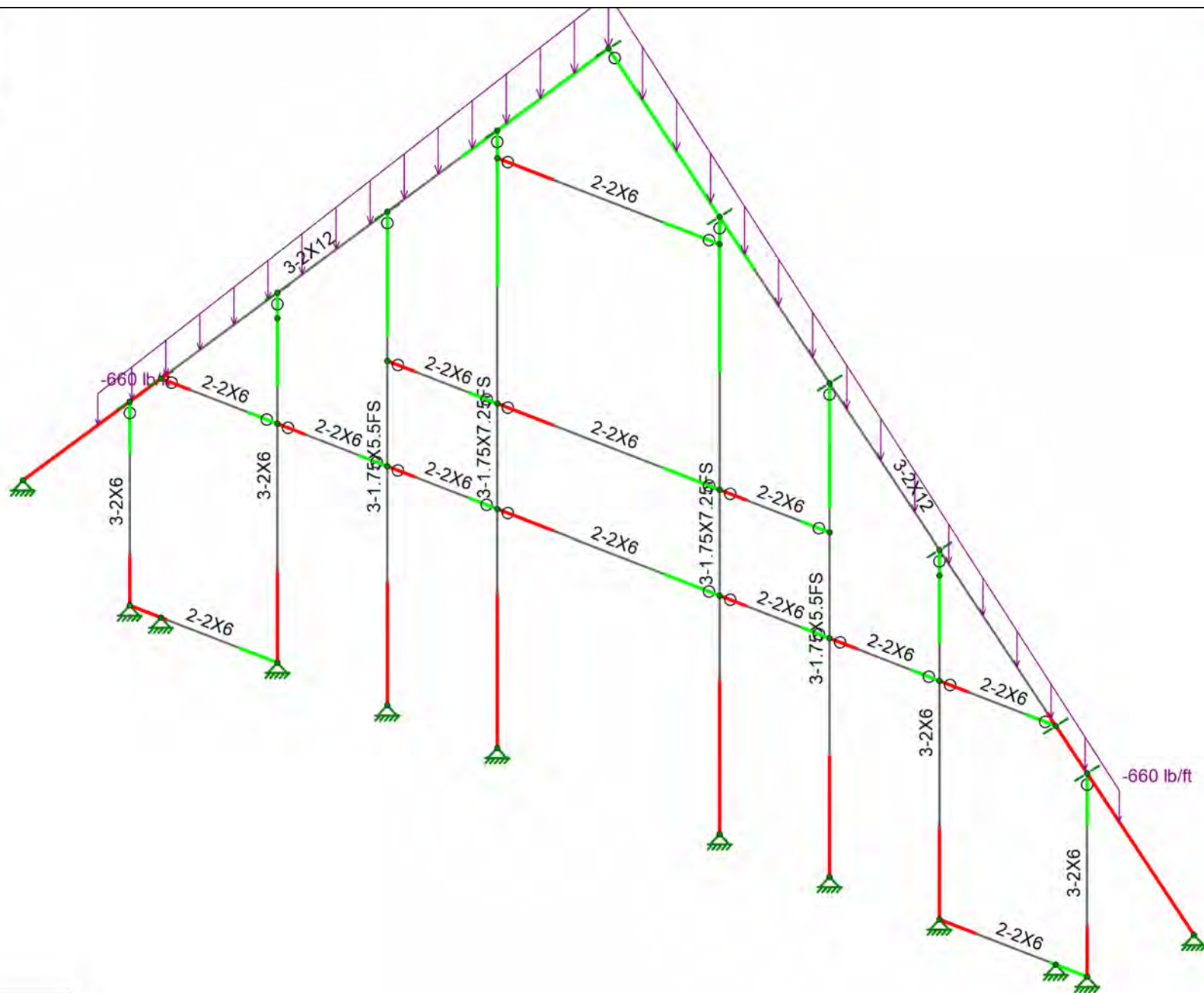


Loads: BLC 1, Dead

	<Licensed Company>		SK-3
	sam.christensen		Feb 26, 2024 at 11:03 PM
			ChapelOpt2Wood.r3d



I/J End
I End
J End



Loads: BLC 2, Snow

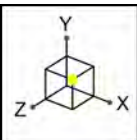


<Licensed Company>
sam.christensen

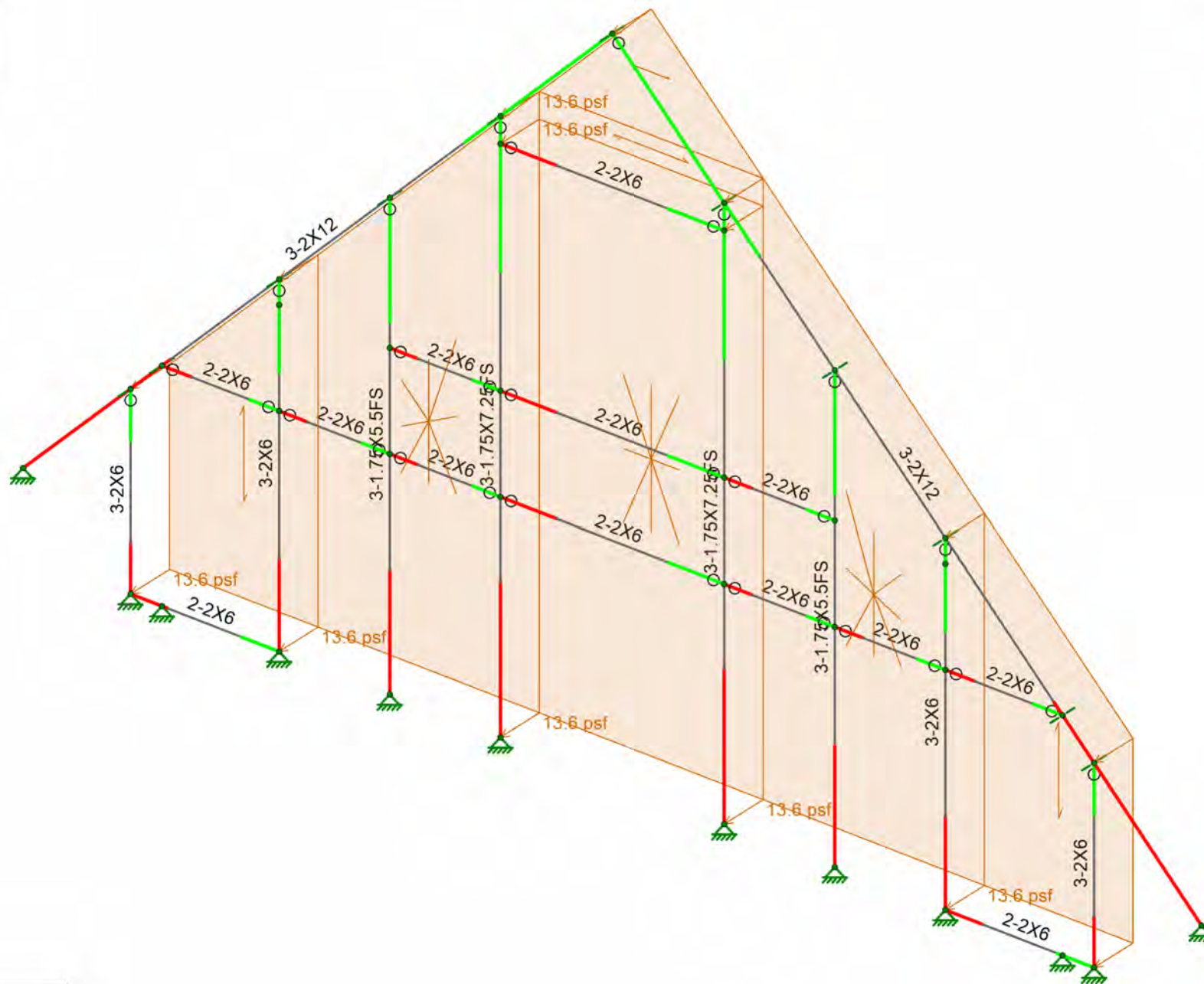
SK-4

Feb 26, 2024 at 11:06 PM

ChapelOpt2Wood.r3d



I/J End
■ I End
■ J End

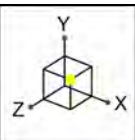


Loads: BLC 3, Wind

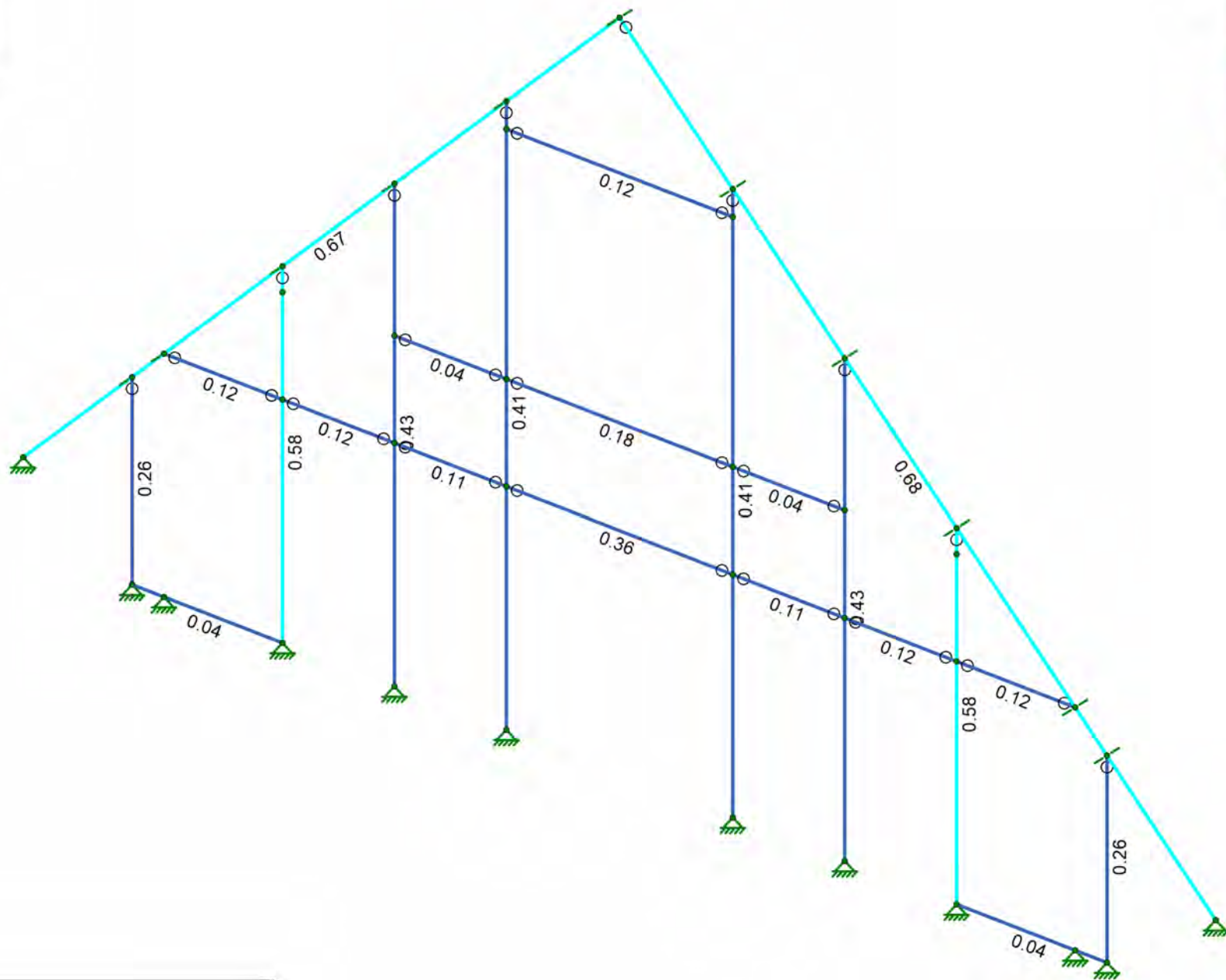


<Licensed Company>
 sam.christensen

SK-5
 Feb 26, 2024 at 11:07 PM
 ChapelOpt2Wood.r3d



Code Check (Env)	
No Calc	
> 1.0	
.90-1.0	
.75-.90	
.50-.75	
0-.50	



Member Code Checks Displayed (Enveloped)

	<Licensed Company>	SK-6
	sam.christensen	Feb 26, 2024 at 10:57 PM
		ChapelOpt2Wood.r3d



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in ²)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Global

Hot Rolled Steel	AISC 15th (360-16): ASD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 15th (360-16): ASD
Cold Formed Steel	AISI S100-20: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18 / SDPWS-21 ASD
Temperature	< 100F
Concrete	ACI 318-19
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-20: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	ASCE 7-16
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes
S ₁ (g)	1
SD ₁ (g)	1
SD _s (g)	1
T ₁ (sec)	5
T ₂ (sec)	
T ₃ (sec)	
C ₂	0.02
C ₃	0.02
C _{Exp. Z}	0.75
C _{Exp. X}	0.75
R ₂	3
R ₃	3
Q ₂	1
Q ₃	1
C ₂ Z	4
C ₃ X	4



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Model Settings (Continued)

ρZ	1
ρX	1



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N29			Reaction
2	N24			Reaction
3	N21			Reaction
4	N26			Reaction
5	N28			Reaction
6	N25			Reaction
7	N5	Reaction	Reaction	Reaction
8	N2	Reaction	Reaction	Reaction
9	N13	Reaction	Reaction	Reaction
10	N3	Reaction	Reaction	Reaction
11	N7	Reaction	Reaction	Reaction
12	N4	Reaction	Reaction	Reaction
13	N14	Reaction	Reaction	Reaction
14	N15	Reaction	Reaction	Reaction
15	N17	Reaction	Reaction	Reaction
16	N18	Reaction	Reaction	Reaction
17	N11			Reaction
18	N19			Reaction
19	N27			Reaction
20	N22			Reaction
21	N8			Reaction
22	N40	Reaction	Reaction	Reaction
23	N41	Reaction	Reaction	Reaction

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e ⁶ F ⁻¹]	Density [k/ft ³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.1			1	0.3	0.3	0.035
2	GLB Balanced	Glulam	NDS Table 5A	24F-V8 DF/DF	na			1	0.3	0.3	0.035
3	GLB Unbalanced	Glulam	NDS Table 5A	24F-V4 DF/DF	na			1	0.3	0.3	0.035
4	LVL	SCL	TrusJoist	2.0E DF/LP/WH Microllam LVL	na			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	Frame	3-2X12	Beam	Rectangular Double	DF	Typical	50.625	85.43	533.936	255.789
2	Mullion	3-2X6	Column	Rectangular	DF	Typical	24.75	41.766	62.391	84.165
3	Girt	8.75X13.5FS	Beam	Glulam Western	GLB Balanced	Typical	118.125	753.662	1794.023	1801.771
4	HMullion	2-2X6	Beam	Rectangular Double	DF	Typical	16.5	12.375	41.594	32.615
5	Mullion2	3-1.75X5.5FS	Beam	None	LVL	Typical	28.875	66.322	72.789	116.791

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N7	N11		Frame	Beam	Rectangular Double	DF	Typical
2	M2	N17	N11		Frame	Beam	Rectangular Double	DF	Typical
3	M4	N2	N22	90	Mullion	Column	Rectangular	DF	Typical
4	M5	N3	N25	90	Mullion	Column	Rectangular	DF	Typical
5	M6	N4	N26	90	Mullion2	Beam	None	LVL	Typical
6	M7	N5	N21	90	3-1.75X7.25FS	Column	None	LVL	Typical
7	M8	N13	N24	90	3-1.75X7.25FS	Column	None	LVL	Typical
8	M9	N18	N29	90	Mullion2	Beam	None	LVL	Typical
9	M10	N15	N28	90	Mullion	Column	Rectangular	DF	Typical
10	M11	N14	N27	90	Mullion	Column	Rectangular	DF	Typical
11	M13	N10	N16	90	HMullion	Beam	Rectangular Double	DF	Typical
12	M21	N36	N37	90	HMullion	Beam	Rectangular Double	DF	Typical
13	M22	N37	N38	90	HMullion	Beam	Rectangular Double	DF	Typical
14	M23	N38	N39	90	HMullion	Beam	Rectangular Double	DF	Typical
15	M25	N2	N3	90	HMullion	Beam	Rectangular Double	DF	Typical
16	M26	N15	N14	90	HMullion	Beam	Rectangular Double	DF	Typical
17	M19	N8	N42	90	HMullion	Beam	Rectangular Double	DF	Typical
18	M27	N42	N43	90	HMullion	Beam	Rectangular Double	DF	Typical
19	M28	N43	N44	90	HMullion	Beam	Rectangular Double	DF	Typical
20	M29	N44	N45	90	HMullion	Beam	Rectangular Double	DF	Typical
21	M30	N45	N46	90	HMullion	Beam	Rectangular Double	DF	Typical
22	M31	N46	N47	90	HMullion	Beam	Rectangular Double	DF	Typical
23	M32	N47	N19	90	HMullion	Beam	Rectangular Double	DF	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M1			Yes	Default	None
2	M2		BenPIN	Yes	Default	None
3	M4		BenPIN	Yes	** NA **	None
4	M5		BenPIN	Yes	** NA **	None



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Member Advanced Data (Continued)

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
5	M6		BenPIN	Yes	Default	None
6	M7		BenPIN	Yes	** NA **	None
7	M8		BenPIN	Yes	** NA **	None
8	M9		BenPIN	Yes	Default	None
9	M10		BenPIN	Yes	** NA **	None
10	M11		BenPIN	Yes	** NA **	None
11	M13	BenPIN	BenPIN	Yes	Default	None
12	M21	BenPIN	BenPIN	Yes	Default	None
13	M22	BenPIN	BenPIN	Yes	Default	None
14	M23	BenPIN	BenPIN	Yes	Default	None
15	M25			Yes	Default	None
16	M26			Yes	Default	None
17	M19	BenPIN	BenPIN	Yes	Default	None
18	M27	BenPIN	BenPIN	Yes	Default	None
19	M28	BenPIN	BenPIN	Yes	Default	None
20	M29	BenPIN	BenPIN	Yes	Default	None
21	M30	BenPIN	BenPIN	Yes	Default	None
22	M31	BenPIN	BenPIN	Yes	Default	None
23	M32	BenPIN	BenPIN	Yes	Default	None

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le-bend top [ft]	le-bend bot [ft]	Cr	y sway	z sway
1	M1	Frame	33.271	2	Lbyy				
2	M2	Frame	33.271	2	Lbyy				
3	M4	Mullion	7.332		Lbyy				
4	M5	Mullion	13.321	Segment	Lbyy				
5	M6	Mullion2	17.78	Segment	Lbyy				
6	M7	3-1.75X7.25FS	22.24	Segment	Lbyy				
7	M8	3-1.75X7.25FS	22.24	Segment	Lbyy	Lbyy			
8	M9	Mullion2	17.78	Segment	Lbyy				
9	M10	Mullion	13.321	Segment	Lbyy				
10	M11	Mullion	7.332		Lbyy				
11	M13	HMullion	8.85		Lbyy				
12	M21	HMullion	4.375		Lbyy				
13	M22	HMullion	8.85		Lbyy				
14	M23	HMullion	4.375		Lbyy				
15	M25	HMullion	5.875		Lbyy				
16	M26	HMullion	5.875		Lbyy				
17	M19	HMullion	4.631		Lbyy				
18	M27	HMullion	4.375		Lbyy				
19	M28	HMullion	4.375		Lbyy				
20	M29	HMullion	8.85		Lbyy				
21	M30	HMullion	4.375		Lbyy				
22	M31	HMullion	4.375		Lbyy				
23	M32	HMullion	4.631		Lbyy				

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Member Area Loads (BLC 1 : Dead)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N2	N14	N27	N22	Y	A-B	-10
2	N22	N27	N11		Y	A-B	-10

Member Area Loads (BLC 3 : Wind)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N2	N22	N25	N3	Z	A-B	13.6
2	N15	N28	N27	N14	Z	A-B	13.6
3	N3	N25	N21	N5	Z	Two Way	13.6
4	N13	N24	N28	N15	Z	Two Way	13.6
5	N5	N10	N16	N13	Z	Two Way	13.6
6	N10	N16	N24	N21	Z	A-B	13.6
7	N21	N24	N11		Z	A-B	13.6

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
1	Dead	DL	-1	2	2
2	Snow	SL		2	
3	Wind	WL			7
4	BLC 1 Transient Area Loads	None		70	



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
5	BLC 3 Transient Area Loads	None		167	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1										
2	Deflection 3	Yes	Y	DL	1	WL	0.42								
3	IBC 16-8	Yes	Y	DL	1										
4		Yes	Y	DL	1	LL	1	LLS	1						
5	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1						
6	IBC 16-10 (b)	Yes	Y	DL	1	SL	1	SLN	1						
7	IBC 16-11 (b)	Yes	Y	DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75		
8	IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6								
9	IBC 16-12 (a) (b)	Yes	Y	DL	1	WL	-0.6								
10	IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	LL	0.75	LLS	0.75				
11	IBC 16-13 (a) (b)	Yes	Y	DL	1	WL	-0.45	LL	0.75	LLS	0.75				
12	IBC 16-13 (b) (a)	Yes	Y	DL	1	WL	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
13	IBC 16-13 (b) (b)	Yes	Y	DL	1	WL	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
14	IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6								
15	IBC 16-15 (b)	Yes	Y	DL	0.6	WL	-0.6								

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N29	max	0	15	0	15	331.294	9	0	15	0	15	0	15
1		min	0	1	0	1	-331.294	8	0	1	0	1	0	1
2	N24	max	0	15	0	15	635.005	9	0	15	0	15	0	15
3		min	0	1	0	1	-635.005	8	0	1	0	1	0	1
4	N21	max	0	15	0	15	638.947	9	0	15	0	15	0	15
5		min	0	1	0	1	-638.947	8	0	1	0	1	0	1
6	N26	max	0	15	0	15	331.112	9	0	15	0	15	0	15
7		min	0	1	0	1	-331.112	8	0	1	0	1	0	1
8	N28	max	0	15	0	15	260.23	9	0	15	0	15	0	15
9		min	0	1	0	1	-260.23	8	0	1	0	1	0	1
10	N25	max	0	15	0	15	260.102	9	0	15	0	15	0	15
11		min	0	1	0	1	-260.102	8	0	1	0	1	0	1
12	N5	max	0.038	11	9697.379	6	604.006	15	0	15	0	15	0	15
13		min	-2.027	6	1429.036	14	-604.006	14	0	1	0	1	0	1
14	N2	max	-0.097	15	4125.334	6	68.139	8	0	15	0	15	0	15
15		min	-0.207	6	400.959	14	-68.139	9	0	1	0	1	0	1
16	N13	max	2.02	6	9688.008	6	604.045	15	0	15	0	15	0	15
17		min	-0.05	2	1415.014	14	-604.045	14	0	1	0	1	0	1
18	N3	max	-0.467	15	7190.186	6	220.598	15	0	15	0	15	0	15
19		min	-1.551	6	797.183	14	-220.598	14	0	1	0	1	0	1
20	N7	max	4614.602	6	4481.196	6	1.079	9	0	15	0	15	0	15
21		min	326.398	14	335.363	14	-1.079	8	0	1	0	1	0	1
22	N4	max	-0.421	15	7050.94	6	299.832	15	0	15	0	15	0	15
23		min	-4.789	6	893.426	14	-299.832	14	0	1	0	1	0	1
24	N14	max	0.206	6	4120.672	6	64.332	8	0	15	0	15	0	15
25		min	0.096	14	398.139	14	-64.332	9	0	1	0	1	0	1
26	N15	max	1.535	6	7192.274	6	219.293	15	0	15	0	15	0	15
27		min	0.457	14	797.997	14	-219.293	14	0	1	0	1	0	1
28	N17	max	-326.375	15	4481.664	6	0.888	15	0	15	0	15	0	15
29		min	-4614.573	6	335.647	14	-0.888	14	0	1	0	1	0	1
30	N18	max	4.783	6	7049.557	6	299.795	15	0	15	0	15	0	15
31		min	0.417	14	897.516	14	-299.795	14	0	1	0	1	0	1
32	N11	max	0	15	0	15	39.798	15	0	15	0	15	0	15
33		min	0	1	0	1	-39.798	14	0	1	0	1	0	1
34	N19	max	0	15	0	15	126.201	15	0	15	0	15	0	15
35		min	0	1	0	1	-126.201	14	0	1	0	1	0	1
36	N27	max	0	15	0	15	33.342	9	0	15	0	15	0	15
37		min	0	1	0	1	-33.342	8	0	1	0	1	0	1
38	N22	max	0	15	0	15	33.538	9	0	15	0	15	0	15
39		min	0	1	0	1	-33.538	8	0	1	0	1	0	1
40	N8	max	0	15	0	15	125.963	15	0	15	0	15	0	15
41		min	0	1	0	1	-125.963	14	0	1	0	1	0	1
42	N40	max	0	15	18.174	11	186.206	9	0	15	0	15	0	15
43		min	0	6	10.904	14	-186.206	8	0	1	0	1	0	1
44	N41	max	0	6	18.187	11	183.47	9	0	15	0	15	0	15
45		min	0	14	10.912	14	-183.47	8	0	1	0	1	0	1
46	Totals:	max	0	6	65107.77	6	5297.991	15						
47		min	0	14	7722.095	14	-5297.991	14						



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Envelope Member End Reactions

Member	Member End		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC	
0	M1	I	max	6430.504	6	3.109	11	1.079	9	0	15	0	15	0	15
1			min	467.975	14	-155.308	6	-1.079	8	0	1	0	1	0	1
2		J	max	2143.779	6	-131.202	15	15.165	14	0	9	0.01	9	0	15
3			min	126.384	14	-2193.95	6	-15.165	15	0	8	-0.01	8	0	1
4	M2	I	max	6430.818	6	3.469	11	0.888	14	0	15	0	15	0	15
5			min	468.162	14	-154.96	6	-0.888	15	0	1	0	1	0	1
6		J	max	2152.414	6	-128.876	15	24.632	15	0.01	8	0	15	0	15
7			min	128.755	14	-2185.48	6	-24.632	14	-0.01	9	0	1	0	1
8	M4	I	max	4127.823	6	10.345	8	-0.098	15	0.018	8	0.002	6	0.076	8
9			min	403.178	14	-10.345	9	-0.25	6	-0.018	9	0.001	14	-0.076	9
10		J	max	3868.335	6	10.345	8	-0.098	15	0.018	8	0	15	0	15
11			min	247.486	14	-10.345	9	-0.25	6	-0.018	9	0	1	0	1
12	M5	I	max	7179.408	6	156.995	9	-0.47	15	0.013	8	0.011	6	0.076	9
13			min	791.73	14	-156.995	8	-2.073	6	-0.013	9	0.003	14	-0.076	8
14		J	max	6479.406	6	199.766	8	1.46	6	0.013	8	0	15	0	15
15			min	371.753	14	-199.766	9	0.147	14	-0.013	9	0	1	0	1
16	M6	I	max	7050.94	6	305.901	9	-0.424	15	0	15	0	15	0	15
17			min	893.426	14	-305.901	8	-5.13	6	0	1	0	1	0	1
18		J	max	6184.896	6	284.437	8	-1.279	15	0	15	0	15	0	15
19			min	373.715	14	-284.437	9	-10.516	6	0	1	0	1	0	1
20	M7	I	max	9697.379	6	620.072	9	0.031	11	0	15	0	15	0	15
21			min	1429.036	14	-620.072	8	-2.263	6	0	1	0	1	0	1
22		J	max	7993.987	6	556.68	8	-43.486	15	0	15	0	15	0	15
23			min	407.008	14	-556.68	9	-141.786	6	0	1	0	1	0	1
24	M8	I	max	9688.008	6	619.968	9	2.254	6	0	15	0	15	0	15
25			min	1415.014	14	-619.968	8	-0.044	2	0	1	0	1	0	1
26		J	max	8008.68	6	556.637	8	141.8	6	0	15	0	15	0	15
27			min	407.425	14	-556.637	9	43.482	14	0	1	0	1	0	1
28	M9	I	max	7049.557	6	305.906	9	5.122	6	0	15	0	15	0	15
29			min	897.516	14	-305.906	8	0.42	14	0	1	0	1	0	1
30		J	max	6173.544	6	284.453	8	10.521	6	0	15	0	15	0	15
31			min	371.825	14	-284.453	9	1.296	14	0	1	0	1	0	1
32	M10	I	max	7181.508	6	156.74	9	2.056	6	0.009	9	-0.003	15	0.076	9
33			min	792.551	14	-156.74	8	0.46	14	-0.009	8	-0.011	6	-0.076	8
34		J	max	6479.037	6	200.029	8	-0.134	15	0.009	9	0	15	0	15
35			min	371.093	14	-200.029	9	-1.436	6	-0.009	8	0	1	0	1
36	M11	I	max	4123.162	6	10.328	8	0.249	6	0.012	9	-0.001	15	0.076	8
37			min	400.359	14	-10.328	9	0.097	14	-0.012	8	-0.002	6	-0.076	9
38		J	max	3863.674	6	10.328	8	0.249	6	0.012	9	0	15	0	15
39			min	244.666	14	-10.328	9	0.097	14	-0.012	8	0	1	0	1
40	M13	I	max	158.112	6	59.917	15	-10.648	15	0	9	0	15	0	15
41			min	49.82	14	-59.917	8	-17.747	1	0	8	0	1	0	1
42		J	max	158.112	6	59.917	14	17.747	13	0	9	0	15	0	15
43			min	49.82	14	-59.917	9	10.648	14	0	8	0	1	0	1
44	M21	I	max	35.988	6	50.345	15	-5.264	15	0.083	9	0	15	0	15
45			min	4.04	14	-50.345	8	-8.773	1	-0.083	8	0	1	0	1
46		J	max	35.988	6	50.873	14	8.773	13	0.083	9	0	15	0	15
47			min	4.04	14	-50.873	9	5.264	14	-0.083	8	0	1	0	1
48	M22	I	max	13.815	6	119.946	15	-10.648	15	0	9	0	15	0	15
49			min	-9.87	2	-119.946	8	-17.747	1	0	8	0	1	0	1
50		J	max	13.815	6	119.946	14	17.747	13	0	9	0	15	0	15
51			min	-9.87	2	-119.946	9	10.648	14	0	8	0	1	0	1
52	M23	I	max	35.983	6	50.86	15	-5.264	15	0.083	8	0	15	0	15
53			min	4.072	14	-50.86	8	-8.773	1	-0.083	9	0	1	0	1
54		J	max	35.983	6	50.333	14	8.773	13	0.083	8	0	15	0	15
55			min	4.072	14	-50.333	9	5.264	14	-0.083	9	0	1	0	1
56	M25	I	max	0	15	57.794	8	3.7	11	0.076	9	-0.001	15	0.018	8
57			min	0	1	-57.794	9	2.22	14	-0.076	8	-0.002	6	-0.018	9
58		J	max	0	15	65.158	8	10.778	6	0.076	9	0.011	6	0.013	9
59			min	0	1	-65.158	9	5.453	14	-0.076	8	0.003	14	-0.013	8
60	M26	I	max	0	15	64.1	9	-5.446	15	0.076	8	0.011	6	0.009	9
61			min	0	1	-64.1	8	-10.766	6	-0.076	9	0.003	14	-0.009	8
62		J	max	0	15	54.004	9	-2.221	15	0.076	8	-0.001	15	0.012	8
63			min	0	1	-54.004	8	-3.701	2	-0.076	9	-0.002	6	-0.012	9
64	M19	I	max	1399.595	6	101.195	15	-5.572	15	0.032	8	0	15	0	15
65			min	99.574	14	-101.195	8	-9.287	1	-0.032	9	0	1	0	1
66		J	max	1399.595	6	122.139	14	9.287	13	0.032	8	0	15	0	15
67			min	99.574	14	-122.139	9	5.572	14	-0.032	9	0	1	0	1
68	M27	I	max	1396.335	6	48.075	15	-5.264	15	0.06	9	0	15	0	15
69			min	98.957	14	-48.075	14	-8.773	1	-0.06	8	0	1	0	1
70		J	max	1396.335	6	55.648	8	8.773	13	0.06	9	0	15	0	15
71			min	98.957	14	-55.648	9	5.264	14	-0.06	8	0	1	0	1
72	M28	I	max	1365.767	6	54.219	15	-5.264	15	0.105	9	0	15	0	15
73			min	95.77	14	-54.219	8	-8.773	1	-0.105	8	0	1	0	1
74		J	max	1365.767	6	54.219	14	8.773	13	0.105	9	0	15	0	15
75			min	95.77	14	-54.219	9	5.264	14	-0.105	8	0	1	0	1
76	M29	I	max	1366.759	6	157.07	15	-10.648	15	0	8	0	15	0	15



Company : <Licensed Company>
Designer : sam.christensen
Job Number :
Model Name :

2/26/2024
11:08:41 PM
Checked By : _____

Envelope Member End Reactions (Continued)

Member	Member End		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC	
77		min	99.364	14	-157.07	8	-17.747	1	0	9	0	1	0	1	
78	J	max	1366.759	6	157.07	14	17.747	13	0	8	0	15	0	15	
79		min	99.364	14	-157.07	9	10.648	14	0	9	0	1	0	1	
80	M30	I	max	1365.761	6	54.219	15	-5.264	15	0.105	8	0	15	0	15
81		min	95.733	14	-54.219	8	-8.773	1	-0.105	9	0	1	0	1	
82	J	max	1365.761	6	54.219	14	8.773	13	0.105	8	0	15	0	15	
83		min	95.733	14	-54.219	9	5.264	14	-0.105	9	0	1	0	1	
84	M31	I	max	1396.313	6	55.656	9	-5.264	15	0.059	8	0	15	0	15
85		min	98.932	14	-55.656	8	-8.773	6	-0.059	9	0	1	0	1	
86	J	max	1396.313	6	48.083	14	8.773	11	0.059	8	0	15	0	15	
87		min	98.932	14	-48.083	9	5.264	14	-0.059	9	0	1	0	1	
88	M32	I	max	1399.539	6	122.147	15	-5.572	15	0.035	9	0	15	0	15
89		min	99.526	14	-122.147	8	-9.287	1	-0.035	8	0	1	0	1	
90	J	max	1399.539	6	101.17	14	9.287	13	0.035	9	0	15	0	15	
91		min	99.526	14	-101.17	9	5.572	14	-0.035	8	0	1	0	1	

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
0	M1	3-2X12	0.675	27.033	6	0.44	27.033	y	6	0.383	0.776	1.122	1.15	0.207	14.893	0.976	0.222	3.9-3
1	M2	3-2X12	0.681	27.033	6	0.44	27.033	y	6	0.383	0.776	1.122	1.15	0.207	14.893	0.976	0.222	3.9-3
2	M4	3-2X6	0.261	0	6	0.036	7.332	y	2	0.638	1.009	1.491	1.719	0.18	4.888	0.997	0.336	3.6-3
3	M5	3-2X6	0.577	0	6	0.073	13.321	y	2	0.503	1.009	1.488	1.719	0.18	6.589	0.995	0.265	3.6-3
4	M6	3-1.75X5.5FS	0.433	0	6	0.039	0	y	2	0.564	1.909	3.144	3.163	0.285	6.525	0.994	0.186	3.6-3
5	M7	3-1.75X7.25FS	0.408	0	6	0.06	0	y	2	0.625	1.909	3.13	3.163	0.285	8.378	0.99	0.206	3.6-3
6	M8	3-1.75X7.25FS	0.407	0	6	0.06	0	y	2	0.625	1.909	3.151	3.163	0.285	5.21	0.996	0.206	3.6-3
7	M9	3-1.75X5.5FS	0.433	0	6	0.039	0	y	2	0.564	1.909	3.144	3.163	0.285	6.525	0.994	0.186	3.6-3
8	M10	3-2X6	0.577	0	6	0.065	13.321	y	2	0.503	1.009	1.488	1.719	0.18	6.589	0.995	0.265	3.6-3
9	M11	3-2X6	0.261	0	6	0.025	7.332	y	2	0.638	1.009	1.491	1.719	0.18	4.888	0.997	0.336	3.6-3
10	M13	2-2X6	0.12	4.425	2	0.021	8.85	y	2	0.23	0.878	1.292	1.495	0.18	8.056	0.994	0.14	3.9-3
11	M21	2-2X6	0.037	2.188	2	0.341	4.375	y	2	0.688	0.878	1.296	1.495	0.18	5.664	0.997	0.417	3.9-3
12	M22	2-2X6	0.183	4.425	2	0.042	8.85	y	2	0.23	0.878	1.292	1.495	0.18	8.056	0.994	0.14	3.9-3
13	M23	2-2X6	0.037	2.188	2	0.341	0	y	2	0.688	0.878	1.296	1.495	0.18	5.664	0.997	0.417	3.9-3
14	M25	2-2X6	0.037	1.224	2	0.331	1.285	y	2	0.47	0.878	1.295	1.495	0.18	6.564	0.996	0.285	3.9-3
15	M26	2-2X6	0.038	4.651	2	0.331	4.59	y	2	0.47	0.878	1.295	1.495	0.18	6.564	0.996	0.285	3.9-3
16	M19	2-2X6	0.124	4.631	6	0.168	4.631	y	2	0.685	1.009	1.49	1.719	0.18	5.828	0.996	0.361	3.6-3
17	M27	2-2X6	0.115	4.375	6	0.253	4.375	y	2	0.734	1.009	1.49	1.719	0.18	5.664	0.997	0.387	3.6-3
18	M28	2-2X6	0.113	4.375	6	0.431	4.375	y	2	0.734	1.009	1.49	1.719	0.18	5.664	0.997	0.387	3.6-3
19	M29	2-2X6	0.356	8.85	6	0.056	8.85	y	2	0.232	1.009	1.484	1.719	0.18	8.056	0.993	0.123	3.6-3
20	M30	2-2X6	0.113	4.375	6	0.431	4.375	y	2	0.734	1.009	1.49	1.719	0.18	5.664	0.997	0.387	3.6-3
21	M31	2-2X6	0.115	4.375	6	0.253	0	y	2	0.734	1.009	1.49	1.719	0.18	5.664	0.997	0.387	3.6-3
22	M32	2-2X6	0.124	4.631	6	0.182	0	y	2	0.685	1.009	1.49	1.719	0.18	5.828	0.996	0.361	3.6-3



PROJECT: Kokanee Cove Development and Renovation

PROJECT NO.: U5516.001.231

SUBJECT: CRITERIA

Design Criteria:

General:

Code: Structural design is based upon the International Building Code, 2018 Edition w/ Utah Amendments (20
Risk Category: II

Wind Criteria: ASCE7-16

Analysis Procedure: ASCE 7-16, Chapter 28 - Envelope Procedure - Part 2
Basic Wind Speed - Ultimate (mph): 103 (3-sec gust)
Wind Exposure: B

Seismic Criteria:

Analysis Procedure: ASCE 7-16, Equivalent Lateral Force Procedure
Site Class: D(efault)
Seismic Importance Factor, I_E : 1.0
Mapped Spectral Response Accelerations:
 $S_S = 0.420$ $S_1 = 0.136$
 $S_{DS} = 0.410$ $S_{D1} = 0.211$
Seismic Design Category: D
Seismic Force Resisting System: Ordinary Reinforced Masonry Shearwall
Seismic Response Coefficient, C_s : 0.063
Seismic Base Shear, V (k): 5.2

Snow Load:

Ground Snow Load, p_g (psf): 150
Snow Importance Factor, I_s : 1
Flat Roof Snow Load, p_f (psf): 120
Sloped Roof Snow Load, p_s (psf): 120

Live Loads:

Roof Live Load (psf): 20
Floor Live Load (psf): 40

General Notes:

- The contractor shall verify dimensions, conditions and elevations before starting work. The engineer shall be notified immediately if any discrepancies are found.
- The typical notes and details shall apply in all cases unless specifically detailed elsewhere. Where no detail is shown, the construction shall be as shown for other similar work and as required by the building code.
- These calculations are limited to the structural members shown in these calculations only. The connection of the members shown in these calculations to any existing structure shall be by others.
- The contractor shall be responsible for compliance with local construction safety orders. Approval of shop drawings by the architect or structural engineer shall not be construed as accepting this responsibility.
- All structural framing members shall be adequately shored and braced during erection and until full lateral and vertical support is provided by adjoining members.

Wood Construction:

- All dimensional lumber shall be Douglas Fir Larch #2 or equal
- All wood timbers shall be Douglas Fir Larch #1 5X & Larger Or Equal
- Wood construction code checks are per the National Design Specification for Wood Construction (NDS) and Standard for Design of Timber Frame Structures (TFEC 1)

Foundation / Concrete:

- All concrete mixing, placement, forming, and reinforcing installation shall be performed in accordance with the requirements of "Building Code Requirements for Reinforced Concrete", ACI 318, latest applicable edition.
- Foundation concrete shall have a minimum compressive strength of 2500 psi at 28 days.
- Cement for all concrete shall be Type I or II with a minimum of 6% entrained air. Maximum aggregate size shall be 3/4".
- Reinforcing steel shall be per ASTM A615 Gr. 60, U.N.O.
- Foundation design is based upon presumptive soil capacities. Vector Structural Engineering, LLC strongly recommends independent soils testing be performed by a licensed geotechnical engineer to verify soil capacities, slope stability, and any other related soil parameters.



Copyright © 2024 Vector Structural Engineering, LLC
This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: Kokanee Cove Development and Renovation

PROJECT NO.: U5516.001.231

SUBJECT: CRITERIA

Concrete Masonry Units:

- Masonry units shall be grade N-II units, 2000 psi, conforming to the latest ASTM designation C-90 & in (Design F'M = 2000 psi.)
- Portland cement shall conform to ASTM designation C-150 & be as specified for concrete.
- Mortar mix shall conform to the requirements of I.B.C. table 2103.7, type S, & project specifications. Mortar shall attain a compressive
- Grout shall conform to the requirements of section 2103 of IBC for coarse grout. Use sufficient water for grout to flow into all joints of
- Provide a minimum of 1/2" grout between main reinforcing & masonry units.
- Low lift construction, maximum grout pour height is 4 feet.
- Cells shall be in vertical alignment. Dowels in footings shall be set to align with cores containing reinforcing steel.
- Refer to architectural drawings for surface & height of units, laying pattern & joint type.
- Special inspection is required for all CMU walls per I.B.C. section 1704.



Copyright © 2023 Vector Structural Engineering, LLC

This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: Kokanee Cove Development and Renovation

JOB NO.: U5516.001.231

SUBJECT: GRAVITY LOADS

		Increase due to Pitch	Original loading
ROOF			
Roof Pitch/12	8		
Wood Shingles	3.61	1.20	3.00
19/32" Plywood	2.52	1.20	2.10
Trusses @ 24" o.c.	3.61	1.20	3.00
Insulation (12"-24" blown or batt)	2.00		
1/2" Gypsum Ceiling	2.20		
Mechanical, Electrical & Misc (Light)	2.30		
Future Solar	3.00		
Other	0.77		
DL	20.00		
LL	20.00		
SL	120.00		
Snow Included in Lateral	24.0		
FLOOR			
Carpet & Pad	2.00		
1.5" Gypcrete	13.00		
1-1/8" T&G Plywood	3.60		
I-Joists @ 16" o.c.	2.50		
Insulation (Light)	1.00		
1/2" Gypsum Ceiling	2.20		
Partition	2.00		
Mechanical, Electrical & Misc (Light)	2.30		
Other	Enter Value		
DL	28.60		
LL	40.00		
EXTERIOR WALLS			
6" CMU grouted @ 24" OC	40.00		
Insulation	1.00		
1/2" Gypsum	2.20		
EIFS 3"	1.90		
Other	Enter Value		
DL	45.10		



Copyright © 2024 Vector Structural Engineering, LLC
This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: KOKANEE COVE DEVELOPMENT AND RENOVATION NO.: U5516.001.231

COMPONENTS & CLADDING WIND CALCULATIONS

Note: Calculations per ASCE7-16

SITE-SPECIFIC WIND PARAMETERS:

Basic Wind Speed [mph]: 103
Exposure Category: B
Elevation (AMSL): 5021 ft

Notes:

ADDITIONAL INPUT & CALCULATIONS:

Height of roof, h [ft]: 15 Eave for slopes <10°, mean height otherwise
Building Length, L [ft]: 32.75 Not including overhangs
Building Width, B [ft]: 25 Not including overhangs
Roof Type: Gable
Roof Slope [deg]: 33.7 8 / 12 Slope
Enclosure Classification: Enclosed Buildings
h/B: 0.60 Used for Hipped roofs and 60ft<h<90ft, disregard for other cases
Applicable Tables: Gable Roofs 27° ≤ θ ≤ 45° (Set this cell correctly)
α: 7 Table 26.11-1
z_g [ft]: 1200 Table 26.11-1
K_z: 0.701 Table 26.10-1
K₁: Figure 26.8-1 (leave blank for negligible topographic effects)
K₂: Figure 26.8-1 (leave blank for negligible topographic effects)
K₃: Figure 26.8-1 (leave blank for negligible topographic effects)
K_{zt}: 1 Equation 26.8-1
K_d: 0.85 Table 26.6-1
K_e: 0.83 Table 26.9-1
Velocity Pressure, q_h [psf]: 13.49 Equation 26.10-1
GC_{pi}: 0.18 Table 26.13-1 (largest abs. value)

$$p = q_h [(GC_p) - (GC_{pi})]$$

Figure 30.3-1

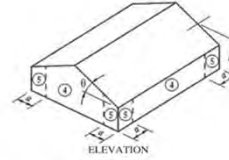
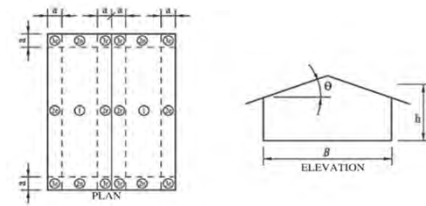


Figure 30.3-2D



OUTPUT:

Element Wind Loads										Pressures (1.0W)															
Member	Span ft	Trib Width ft	Conn?	C&C Loc z ft	K _z	q _z psf	A _{eff} sf	a ft	Walls			Roof													
									All +	4	5	All +	1	2e	2r	2n	3r	3e	1OH	2eOH	2rOH	2nOH	3rOH	3eOH	
Roof Zones	1	10	No	Roof			10	3	-	-	-	14.6	26.7	26.7	26.7	29.4	29.4	36.1	37.5	37.5	37.5	40.2	40.2	46.8	
Roof Zones	1	20	No	Roof			20	3	-	-	-	12.9	22.6	22.6	22.6	26.3	26.3	31.9	33.4	33.4	33.4	37.1	37.1	42.7	
Roof Zones	1	50	No	Roof			50	3	-	-	-	10.8	17.3	17.3	17.3	22.2	22.2	26.5	28.1	28.1	28.1	32.9	32.9	37.3	
Roof Zones	1	100	No	Roof			100	3	-	-	-	9.17	13.2	13.2	13.2	19	19	22.4	24	24	24	29.8	29.8	33.2	
Roof Zones	1	500	No	Roof			500	3	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
Wall Zones	1	10	No	Walls	15	0.701	13.49	10	3	15.9	17.3	21.3	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	20	No	Walls	15	0.701	13.49	20	3	15.2	16.5	19.9	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	50	No	Walls	15	0.701	13.49	50	3	14.2	15.6	18	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	100	No	Walls	15	0.701	13.49	100	3	13.5	14.9	16.5	-	-	-	-	-	-	-	-	-	-	-	-	
Wall Zones	1	200	No	Walls	15	0.701	13.49	200	3	12.8	14.2	15.1	-	-	-	-	-	-	-	-	-	-	-	-	
Roof Trusses	30	2	No	Roof			300	3	-	-	-	9.17	13.2	13.2	13.2	15.9	15.9	15.9	24	24	24	26.7	26.7	26.7	
CMU Walls	12	2.666667	No	Walls	15	0.701	13.49	48	3	14.3	15.6	18.1	-	-	-	-	-	-	-	-	-	-	-	-	

PROJECT: Kokanee Cove Development JOB NO.: U5516.001.231

SUBJECT: LATERAL LOADS

DESIGN OF ENCLOSED SIMPLE DIAPHRAGM LOW-RISE BUILDINGS FOR LATERAL LOADS

Seismic Parameters (ASCE 7-16 Chapters 11, 12, & 22)

Site Class:	D	S. 11.4.2	N =	1	S. 12.8.2.1
R =	5	T. 12.2-1	C _t =	0.02	T. 12.8-2
S _s =	0.42	F. 22-1	h _n (ft) =	14	S. 12.8.2.1
S ₁ =	0.136	F. 22-2	x =	0.75	T. 12.8-2
F _a =	1.464	T. 11.4-1	T _a =	0.14	E. 12.8-7
F _v =	2.328	T. 11.4-2	T ₀ =	0.10	S. 11.4.5
S _{MS} =	0.61	E. 11.4-1	T _S =	0.51	S. 11.4.5
S _{M1} =	0.32	E. 11.4-2	C _U =	1.49	T. 12.8-1
S _{DS} =	0.410	E. 11.4-3	T _L =	6	F. 22-12
S _{D1} =	0.211	E. 11.4-4	S _a =	0.410	S. 11.4.5

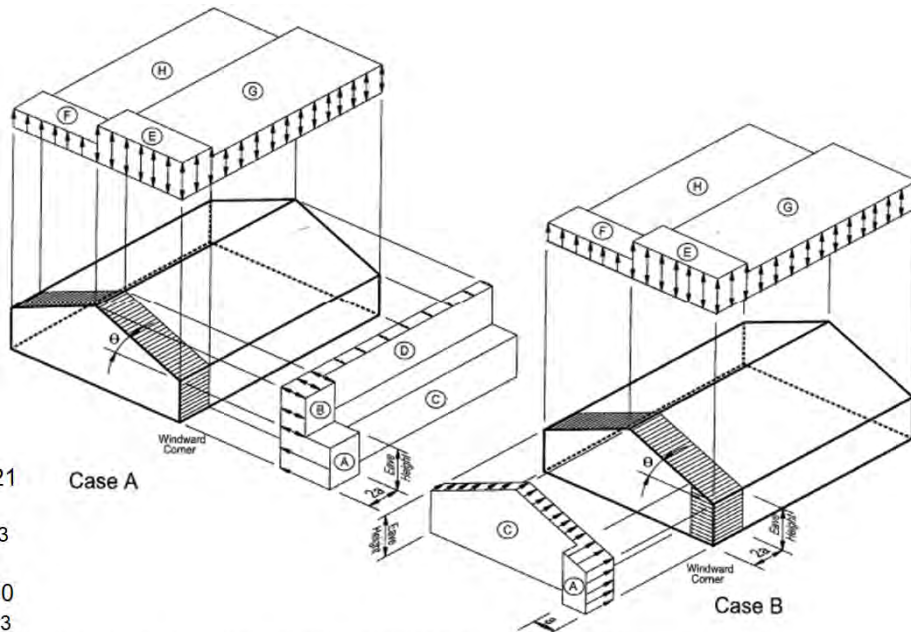
Determination of SDC:

Per Table 11.6-1:	C
Per Table 11.6-2:	D
SDC:	D
I _E =	1.00
C _{SMAX} =	0.292
C _S =	0.082
C _{SMIN} =	0.018
C _{SCONTROL} =	0.082
C _{SCONTROL} * .7 =	0.057

Seismic Analysis Req'd? Yes
Perform Seismic Analysis? Yes

Wind Parameters (ASCE 7-16 Chapter 26)

Wind areas labeled C and D are used for calculating line loads on the following sheet.



Elevation (ft): 5021
Risk Category: II
Basic Wind Speed (mph): 103
Exposure Category: B
K_{zt}: 1.00
K_e: 0.83

MAIN WIND FORCE RESISTING SYSTEM - METHOD 2 FIGURE 28.6-1
SIMPLIFIED DESIGN WIND PRESSURE, P_{s30} (psf) (Exposure B at h=30 feet)

BASIC WIND SPEED (mph)	ROOF ANGLE (degrees)	LOAD CASE	Note: Wind load determined from pressures below will be multiplied by 0.6 (ASD load factor on wind loads)									
			ZONES									
			HORIZONTAL PRESSURES				VERTICAL PRESSURES				OVERHANGS	
			A	B	C	D	E	F	G	H	E _{OH}	G _{OH}
103	0 to 5°	1	16.9	-8.7	11.2	-5.1	-20.3	-11.5	-14.1	-9.0	-28.3	-22.2
	10°	1	18.9	-7.9	12.6	-4.6	-20.3	-12.3	-14.1	-9.5	-28.3	-22.2
	15°	1	21.1	-7.0	14.1	-4.0	-20.3	-13.2	-14.1	-10.1	-28.3	-22.2
	20°	1	23.3	-6.2	15.6	-3.4	-20.3	-14.1	-14.1	-10.7	-28.3	-22.2
	25°	1	21.1	3.4	15.3	3.5	-9.4	-12.8	-6.8	-10.3	-17.5	-14.8
		2					-3.5	-6.9	-1.0	-4.4		
	30° to 45°	1	18.9	12.9	15.0	10.3	1.5	-11.5	0.4	-9.8	-6.6	-7.6
		2	18.9	12.9	15.0	10.3	7.3	-5.7	6.3	-4.1	-6.6	-7.6



Copyright © 2018 Vector Structural Engineering, LLC
This Excel workbook contains proprietary information belonging to Vector Structural Engineering, LLC, and may be neither wholly nor partially copied or reproduced without the prior written permission of Vector Structural Engineering, LLC.

PROJECT: Kokanee Cove Development and R JOB NO.: U5516.001.231

SUBJECT: LINE LOADS

Level Descriptions

Label	Height (ft)	W _{control} (lb)	V _{norm} (lb)	V _{redist} (lb)	Redist Fact
Roof	14	62070	5089	5089	1.00
		0	0	0	1.00
		0	0	0	1.00
		0	0	0	1.00

$$k = 1$$

$$\Sigma w_i h_i^k = 868984$$

Roof DL	20	psf
Seismic Snow	24	psf
Floor DL	29	psf
Wall DL	45	psf
Period, T	0.14	sec

Total Weight (lb)	62070
Total Base Shear (lb)	5089

Estimated Total Weight in Longitudinal Direction 62070
Estimated Total Weight in Transverse Direction 62070
Percent difference in estimated weights 0.0%

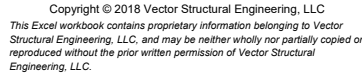
Seismic Line Loads

Label	Width	Level	Direction	Number of times to include	Roof Trib (ft)	Floor Trib (ft)	Wall Trib Height (ft)	Ext Wall Length (ft)	Other Weight (lb/ft)	Total Weight (lb/ft)	Total Force (lb/ft)	Cvx - Redist Factor	Revised Force (lb/ft)	Force Redist to 1
ω1	32.75	Roof	LONG	1	25		5	115.5		1895	155	1.00	155	NO
ω2	25	Roof	TRANS	1	32.75		5	115.5		2483	204	1.00	204	NO
ω3				1				0		0	0	1.00	0	NO
ω4				1				0		0	0	1.00	0	NO
ω5				1				0		0	0	1.00	0	NO
ω6				1				0		0	0	1.00	0	NO
ω7				1				0		0	0	1.00	0	NO
ω8				1				0		0	0	1.00	0	NO
ω9				1				0		0	0	1.00	0	NO
ω10				1				0		0	0	1.00	0	NO
ω11				1				0		0	0	1.00	0	NO
ω12				1				0		0	0	1.00	0	NO
ω13				1				0		0	0	1.00	0	NO
ω14				1				0		0	0	1.00	0	NO
ω15				1				0		0	0	1.00	0	NO
ω16				1				0		0	0	1.00	0	NO
ω17				1				0		0	0	1.00	0	NO
ω18				1				0		0	0	1.00	0	NO
ω19				1				0		0	0	1.00	0	NO
ω20				1				0		0	0	1.00	0	NO

Wind Line Loads

Surface type 'C' is flat wall and 'D' is sloped roof, 'CP1' and 'CP2' represent parapets on only one side and both sides of the structure, respectively

Label	Roof Pitch /12	Mean Roof Height (ft)	Surface Type 1	Equiv Height Exposed (ft)	Surface Type 2	Equiv Height Exposed (ft)	Roof Angle (°)	Applied Interior Press 1 (psf)	Applied Interior Press 2 (psf)	Applied End Zone Press 1 (psf)	Applied End Zone Press 2 (psf)	Height & Exp Coeff, λ	Total Int Unif Load (plf)	Total End Zone Unif Load (plf)
ω1	8	15	C	4.5	D	8.333	33.7	14.98	10.28	18.94	12.92	1.00	153.05	192.92
ω2	8	15	C	8.667			33.7	14.98	0.00	18.94	0.00	1.00	138.67	164.17
ω3							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω4							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω5							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω6							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω7							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω8							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω9							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω10							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω11							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω12							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω13							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω14							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω15							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω16							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω17							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω18							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω19							0.0	0.00	0.00	0.00	0.00		0.00	0.00
ω20							0.0	0.00	0.00	0.00	0.00		0.00	0.00



SUBJECT: SHEAR WALLS

(includes seismic snow where occurs)

[illegible]



PROJECT: Kokanee Cove Development and Renovation

JOB NO.: U5516.001.231

SUBJECT: Diaphragm Checks

Diaphragm Calculations

Location: Roof	Line Load: w1	ASD Loads (plf)	
Diaphragm Type: Roof		Seismic: 109	Wind: 92
Max Span (ft): 32.75	Depth (ft): 25	ASD Chord Demands (lbs)	
	Max Moment 14582 lb-ft	Seismic: 583	Wind: 492
Reentrant Corner or Discontinuity Chord Demands			
Location (ft):	Depth @ corner (ft):	Max Moment 0 lb-ft	ASD Demands (lbs)
		Seismic: -	Wind: -
		Diaphragm Capacity (plf)	Required Strap Development(ft)
		Seismic: -	Wind: -
		Seismic: -	Wind: -

Masonry Beam Demand

Location:					
Wall V	6	8	10	Floor D	0 psf
8	55	75	93	Floor LL	0 psf
16	40	60	69	Roof DL	20 psf
24	34	55	61	Roof SL	120 psf
32	32	52	57	Veneer	10 psf
40	30	50	55		
48	29	49	53		

Beam Loads			Self-Weight										Trib		TL																			
Beam	View	Sheet	Type	Width	Grout Sp	Depth	Span	Span Ty	Beam	Wall H	Wall	Floor	Roof	Veneer	DL	LL	SL	E or W	1.4D	1.2D+1	1.2D+1	Max	Mu	φMn	M unity	Vu	φVnm	φVn	Vnm U	V Unity	Deep	B	Check	
				in	in	in	ft	Cont. or	plf	ft	plf	ft	ft	plf	plf	plf	plf	plf	plf	plf	plf	plf	kip-ft	kip-ft	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip
L1	Roof	MB-6-1		6	24	16	2	Simple	73.33	0.667	22.67		15		396	0	1800		554.4	1375	3355	3355	1.68	11.81	0.14	3.36	4.30	4.30	0.78	0.78	2.32	OK	Dee	
L2	Roof	MB-6-2		6	24	24	9	Simple	110	7	238		5		448	0	600		627.2	837.6	1498	1498	15.16	22.97	0.66	6.74	7.92	13.70	0.85	0.49	3.48	OK		
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK
				0	8	0		Simple	0	0	0				0	0	0		0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	OK

Masonry Beam Schedule Capacities LRFD

General Properties

F'm	2000 psi	ε.m	0.0025	φm	0.9 moment
Fr	163 psi	ε.y	0.0021	φv	0.8 shear
Em	1800000 psi	α	1.5	φb	0.6 bearing
Fy	60 ksi	n	16.1		
Es	29000 ksi	γ.g	1.0		

Mark	Width in	Height in	#	Size in^2	As in^2	Local #	Size in^2	Av in^2	Spacing in	Bending						Shear					
										d in	a in	φmMn kip-ft	φmMcrc kip-ft	Check	φMn kip-ft	Ieff in^4	φVnm kip	φVns kip	φVn kip	φVnma:Avmin kip in^2	Check
MB-6-0	5.625	8	1 #4	0.2	6.5	1 #3	0.11	8	1.5	1.33	0.75	0.73 NG	↑ A	0.56	240	0.68	0.50	1.17	1.21	0.03 s>d/2	
MB-6-1	5.625	16	1 #5	0.31	6.5	1 #3	0.11	8	9.5	2.07	11.81	2.93 OK		11.81	306	4.30	3.14	7.44	7.65	0.03 s>d/2	
MB-6-2	5.625	24	1 #5	0.31	6.5	1 #3	0.11	8	17.5	2.07	22.97	6.60 OK		22.97	1483	7.92	5.78	13.70	14.09	0.03 OK	
MB-6-3	5.625	32	1 #5	0.31	6.5	1 #3	0.11	8	25.5	2.07	34.13	11.74 OK		34.13	4229	11.55	8.42	19.96	20.53	0.03 OK	
MB-6-4	5.625	40	1 #6	0.44	6.5	1 #3	0.11	16	33.5	2.93	63.43	18.34 OK		63.43	9215	15.17	5.53	20.70	26.97	0.06 OK	
MB-6-5	5.625	48	1 #6	0.44	6.5	1 #3	0.11	16	41.5	2.93	79.27	26.41 OK		79.27	16985	18.79	6.85	25.64	33.41	0.06 OK	
MB-6-6	5.625	56	1 #6	0.44	6.5	1 #3	0.11	16	49.5	2.93	95.11	35.94 OK		95.11	28590	22.41	8.17	30.58	39.85	0.06 OK	
MB-6-7	5.625	64	1 #6	0.44	6.5	1 #3	0.11	16	57.5	2.93	110.95	46.94 OK		110.95	45212	26.04	9.49	35.52	46.29	0.06 OK	
MB-8-0	7.625	8	1 #4	0.2	6.5	1 #3	0.11	8	1.5	0.98	0.91	0.99 NG	↑ A	0.68	325	0.92	0.50	1.42	1.64	0.04 s>d/2	
MB-8-1	7.625	16	2 #5	0.62	6.5	1 #3	0.11	8	9.5	3.05	22.25	3.98 OK		22.25	482	5.83	3.14	8.97	10.37	0.04 s>d/2	
MB-8-2	7.625	24	2 #5	0.62	6.5	1 #3	0.11	8	17.5	3.05	44.57	8.95 OK		44.57	2202	10.74	5.78	16.52	19.10	0.04 OK	
MB-8-3	7.625	32	2 #5	0.62	6.5	1 #3	0.11	8	25.5	3.05	66.89	15.91 OK		66.89	5938	15.65	8.42	24.07	27.83	0.04 OK	
MB-8-4	7.625	40	2 #5	0.62	6.5	1 #4	0.2	16	33.5	3.05	89.21	24.86 OK		89.21	12546	20.56	10.05	30.61	36.56	0.09 OK	
MB-8-5	7.625	48	2 #5	0.62	6.5	1 #4	0.2	16	41.5	3.05	111.53	35.79 OK		111.53	23025	25.47	12.45	37.92	45.28	0.09 OK	
MB-8-6	7.625	56	2 #5	0.62	6.5	1 #4	0.2	16	49.5	3.05	133.85	48.72 OK		133.85	38584	30.38	14.85	45.23	54.01	0.09 OK	
MB-8-7	7.625	64	2 #6	0.88	6.5	1 #4	0.2	16	57.5	4.33	219.13	63.64 OK		219.13	59967	35.29	17.25	52.54	62.74	0.09 OK	
MB-8-8	7.625	72	2 #6	0.88	6.5	1 #4	0.2	16	65.5	4.33	250.81	80.54 OK		250.81	87223	40.20	19.65	59.85	71.47	0.09 OK	
MB-8-9	7.625	80	2 #7	1.2	6.5	1 #4	0.2	16	73.5	5.90	380.97	99.43 OK		380.97	125285	45.11	22.05	67.16	80.20	0.09 OK	
MB-8-10	7.625	88	2 #7	1.2	6.5	1 #4	0.2	16	81.5	5.90	424.17	120.31 OK		424.17	167778	50.02	24.45	74.47	88.93	0.09 OK	
MB-8-11	7.625	96	2 #7	1.2	6.5	1 #4	0.2	16	89.5	5.90	467.37	143.18 OK		467.37	219473	54.94	26.85	81.79	97.66	0.09 OK	
MB-10-0	9.625	8	1 #5	0.31	6.5	1 #4	0.2	8	1.5	1.21	1.25	1.26 NG	↑ A	0.94	411	1.16	0.90	2.06	2.07	0.05 s>d/2	
MB-10-1	9.625	16	2 #5	0.62	6.5	1 #4	0.2	8	9.5	2.42	23.14	5.02 OK		23.14	549	7.36	5.70	13.06	13.09	0.05 s>d/2	
MB-10-2	9.625	24	2 #5	0.62	6.5	1 #4	0.2	8	17.5	2.42	45.46	11.30 OK		45.46	2598	13.56	10.50	24.06	24.10	0.05 OK	
MB-10-3	9.625	32	2 #5	0.62	6.5	1 #4	0.2	8	25.5	2.42	67.78	20.08 OK		67.78	7226	19.76	15.30	35.06	35.12	0.05 OK	
MB-10-4	9.625	40	2 #5	0.62	6.5	1 #4	0.2	16	33.5	2.42	90.10	31.38 OK		90.10	15721	25.96	10.05	36.01	46.14	0.11 OK	
MB-10-5	9.625	48	2 #5	0.62	6.5	1 #4	0.2	16	41.5	2.42	112.42	45.18 OK		112.42	29737	32.15	12.45	44.60	57.16	0.11 OK	
MB-10-6	9.625	56	2 #5	0.62	6.5	1 #4	0.2	16	49.5	2.42	134.74	61.50 OK		134.74	51461	38.35	14.85	53.20	68.18	0.11 OK	
MB-10-7	9.625	64	2 #6	0.88	6.5	1 #4	0.2	16	57.5	3.43	220.91	80.33 OK		220.91	75359	44.55	17.25	61.80	79.20	0.11 OK	
MB-10-8	9.625	72	2 #6	0.88	6.5	1 #4	0.2	16	65.5	3.43	252.59	101.66 OK		252.59	111808	50.75	19.65	70.40	90.22	0.11 OK	
MB-10-9	9.625	80	2 #6	0.88	6.5	1 #4	0.2	16	73.5	3.43	284.27	125.51 OK		284.27	160214	56.95	22.05	79.00	101.24	0.11 OK	
MB-10-10	9.625	88	2 #6	0.88	6.5	1 #4	0.2	16	81.5	3.43	315.95	151.87 OK		315.95	223494	63.15	24.45	87.60	112.26	0.11 OK	
MB-10-11	9.625	96	2 #7	1.2	6.5	1 #4	0.2	16	89.5	4.68	470.68	180.73 OK		470.68	277696	69.34	26.85	96.19	123.28	0.11 OK	
MB-12-0	11.625	8	1 #5	0.31	6.5	1 #4	0.2	8	1.5	1.00	1.40	1.52 NG	↑ A	1.05	496	1.40	0.90	2.30	2.50	0.07 s>d/2	
MB-12-1	11.625	16	2 #5	0.62	6.5	1 #4	0.2	8	9.5	2.00	23.72	6.06 OK		23.72	628	8.89	5.70	14.59	15.80	0.07 s>d/2	
MB-12-2	11.625	24	2 #5	0.62	6.5	1 #4	0.2	8	17.5	2.00	46.04	13.64 OK		46.04	3059	16.38	10.50	26.88	29.11	0.07 OK	
MB-12-3	11.625	32	2 #5	0.62	6.5	1 #4	0.2	8	25.5	2.00	68.36	24.25 OK		68.36	8773	23.86	15.30	39.16	42.42	0.07 OK	
MB-12-4	11.625	40	2 #6	0.88	6.5	2 #4	0.4	16	33.5	2.84	127.04	37.90 OK		127.04	18991	31.35	20.10	51.45	55.73	0.13 OK	
MB-12-5	11.625	48	2 #6	0.88	6.5	2 #4	0.4	16	41.5	2.84	158.72	54.57 OK		158.72	35137	38.84	24.90	63.74	69.04	0.13 OK	
MB-12-6	11.625	56	2 #7	1.2	6.5	2 #4	0.4	16	49.5	3.87	256.85	74.28 OK		256.85	59024	46.32	29.70	76.02	82.35	0.13 OK	
MB-12-7	11.625	64	2 #7	1.2	6.5	2 #4	0.4	16	57.5	3.87	300.05	97.02 OK		300.05	90741	53.81	34.50	88.31	95.66	0.13 OK	
MB-12-8	11.625	72	2 #8	1.58	6.5	2 #4	0.4	16	65.5	5.10	447.59	122.79 OK		447.59	134982	61.29	39.30	100.59	108.97	0.13 OK	
MB-12-9	11.625	80	2 #8	1.58	6.5	2 #4	0.4	16	73.5	5.10	504.47	151.59 OK		504.47	187432	68.78	44.10	112.88	122.28	0.13 OK	
MB-12-10	11.625	88	2 #8	1.58	6.5	2 #4	0.4	16	81.5	5.10	561.35	183.42 OK		561.35	252882	76.27	48.90	125.17	135.59	0.13 OK	
MB-12-11	11.625	96	2 #8	1.58	6.5	2 #4	0.4	16	89.5	5.10	618.23	218.29 OK		618.23	333377	83.75	53.70	137.45	148.90	0.13 OK	

Wall Design

Project: Kokanee Cove Development and Renovation

Location: Restroom

Code: IBC 2018, TMS 402/602-16 (LRFD), Section 9.3.5.4.3

Project Parameters		Reinforcing		Out of Plane		
f'm	1.5 ksi	Fy	60 ksi	Sds	0.41 g	
Em	1350 ksi	Es	29000 ksi	I	1	
em	0.0025			pW	18.1 psf	Unfactored Wind Pressure
fr (Grouted)	0.163 ksi			Veneer	5.0 psf	Additional Wall Weight
fr (UngROUTED)	0.084 ksi					

Wall Schedule

Mark	Masonry	Solid Grou	Vert Size	Spacing [in]	Layers	Vert Reinf	fr	Notes
MW-6A	6" CMU	Yes	#4	32	1	#4 @ 32" O.C.	0.163	
MW-8A	8" CMU	Yes	#5	32	1	#5 @ 32" O.C.	0.163	
MW-8B	8" CMU	Yes	#5	24	1	#5 @ 24" O.C.	0.163	
MW-8C	8" CMU	Yes	#5	16	1	#5 @ 16" O.C.	0.163	
MW-10A	10" CMU	Yes	#5	32	1	#5 @ 32" O.C.	0.163	
MW-10B	10" CMU	Yes	#5	24	1	#5 @ 24" O.C.	0.163	
MW-10C	10" CMU	Yes	#5	16	1	#5 @ 16" O.C.	0.163	
MW-12A	12" CMU	Yes	#6	32	1	#6 @ 32" O.C.	0.163	
MW-12B	12" CMU	Yes	#5	24	1	#5 @ 24" O.C.	0.163	
MW-12C	12" CMU	Yes	#5	16	1	#5 @ 16" O.C.	0.163	
MW-12D	12" CMU	Yes	#5	24	2	#5 @ 24" O.C. E.F.	0.163	
MW-12E	12" CMU	Yes	#6	24	2	#6 @ 24" O.C. E.F.	0.163	
MW-12F	12" CMU	Yes	#6	16	2	#6 @ 16" O.C. E.F.	0.163	

Wall Design

Project: Kokanee Cove Development and Renovation

Location: Restroom Walls

Code: IBC 2018, TMS 402/602-16 (LRFD), Section 9.3.5.4.3

Masonry			Reinforcing		Out of Plane		
Masonry	MW-6A	6" CMU	Fy	60 ksi	Sds	0.41 g	
f'm	1.5 ksi		Size	#4	I	1	
Height	12 ft		Layers	1	pW	18.1 psf	Unfactored Wind Pressure
t	5.625 in		Spacing	32	Wp	52.0 psf	Wall Self Weight
Width	12 in		d	2.8 in	Veneer	5 psf	Additional Wall Weight
Solid Grout	Yes		A.eff	0.075 in2	Fp	9.3	Unfactored Seismic Pressure
fr	0.1630 ksi		Es	29000 ksi	Wind Trib	1 ft	
Em	1350 ksi		n	21.5			
em	0.0025		es	0.0021			

Section Properties

				Checks	
tf	1 in	Mcr	0.86 k-ft	As.max	0.24 in ²
tw	1 in	h/t	25.6	As.min	0.17
Net Area	67.5 in ²	r	1.624 in		
In	178.0 in ⁴	h/r	88.7		
Icr	10.1 in ⁴	Scr	63.3		

Un-factored loads at mid-height of wall

Eccentric		Concentric		Lateral (OOP)	
D	0.3 kip or klf	D	kip or klf	W	0.018 klf
L	kip or klf	L	kip or klf	E	0.009 klf
S	1.8 kip or klf	S	kip or klf	f1	0.5
W	kip or klf	W	kip or klf	f2	0.2
E	kip or klf	E	kip or klf		
ecc	2 in	D (Wall)	0.312 kip or klf		

Factored Demands

Axial	ϕP_n	Pe (Icr)	Bearing						
	23.3	6.5	48.6						
Vertical Only				Pu [kip]	ψMu [k-ft]	ϕP_n	ϕMn	Δu	Unity
1.4D				0.86	0.04	23.3	1.1	0.00	0.04
1.2D + 1.6L + 0.5S				1.63	0.11	23.3	1.2	0.01	0.09
1.2D + 1.6S + (f1L or 0.5W)				3.61	0.28	23.3	1.6	0.03	0.18
Lateral				Pu [kip]	ψMu [k-ft]	ϕP_n	ϕMn	Δu	Unity
1.2D + 1.6S + 0.5W				3.61	0.45	23.3	1.6	0.05	0.28
1.2D + 1.0W + f1L + 0.5S				1.63	0.44	23.3	1.2	0.05	0.36
(1.2+0.2Sds)D + 1.0E + f1L + f2S				1.14	0.23	23.3	1.1	0.03	0.21
(0.9-0.2Sds)D - 1.0E				0.50	0.19	23.3	1.0	0.02	0.19
0.9D + 1.0W				0.55	0.35	23.3	1.0	0.04	0.35
Service for Deflection				P	ψM	$\psi \Delta$	$\Delta a=0.007h$	h/ Δ	Unity
D + 0.6W				0.61	0.22	0.02	1.01	6022	0.02
D + 0.7E				0.65	0.15	0.02	1.01	9203	0.02
D + 0.75L + 0.75S + 0.45W				1.96	0.29	0.03	1.01	4618	0.03
D + 0.75L + 0.75S + 0.525E				1.99	0.23	0.02	1.01	5780	0.02
0.6D + 0.6W				0.37	0.21	0.02	1.01	6322	0.02
0.6D - 0.7E				0.33	0.13	0.01	1.01	10133	0.01

Design Result

Use 6" CMU block with #4 bars at 32 inches O.C., vert.
0.36 unity OK

Unfactored Vertical Loads at Base of Wall

D	0.92
L	0.00
S	1.80
W	0.00
E	0.00

Column/Pilaster/Jamb Design

Project: Kokanee Cove Development and Renovation

Location: Restroom

Code: IBC 2018, TMS 402/602-16 (LRFD), Section 9.3.5.4.3

Masonry		Reinforcing		Out of Plane	
f'm	1.5 ksi	Fy	60 ksi	Sds	0.41 g
fr	0.163 ksi	Es	29000 ksi	I	1
Em	1350 ksi			p Wind	18.1 psf
em	0.0025			p Veneer	5.0 psf

Unfactored Wind Pressure
Additional Veneer Weight

Schedule

Mark	Masonry	Width [in]	Reinf Size	Cells	Layers	Vert Reinf	Notes
MC-6x8	6" CMU	8	#4	1	1	(1) #4	
MC-6x16	6" CMU	16	#4	2	1	(2) #4	
MC-6x24	6" CMU	24	#4	3	1	(3) #4	
MC-6x32	6" CMU	32	#4	4	1	(4) #4	
MC-8x8	8" CMU	8	#5	1	1	(1) #5	
MC-8x16	8" CMU	16	#5	2	2	(4) #5	
MC-8x24	8" CMU	24	#5	3	2	(6) #5	
MC-8x32	8" CMU	32	#5	4	2	(8) #5	
MC-8x40	8" CMU	40	#5	5	2	(10) #5	
MC-8x48	8" CMU	48	#5	6	2	(12) #5	
MC-10x16	10" CMU	16	#5	2	2	(4) #5	
MC-10x24	10" CMU	24	#5	3	2	(6) #5	
MC-10x32	10" CMU	32	#5	4	2	(8) #5	
MC-10x40	10" CMU	40	#5	5	2	(10) #5	
MC-10x48	10" CMU	48	#5	6	2	(12) #5	
MC-12x16	12" CMU	16	#6	2	2	(4) #6	
MC-12x24	12" CMU	24	#6	3	2	(6) #6	
MC-12x32	12" CMU	32	#6	4	2	(8) #6	
MC-12x40	12" CMU	40	#6	5	2	(10) #6	
MC-12x48	12" CMU	48	#6	6	2	(12) #6	
MC-16x16	16" CMU	16	#5	2	2	(4) #5	
MC-16x24	16" CMU	24	#6	3	2	(6) #6	
MC-16x32	16" CMU	32	#6	4	2	(8) #6	
MC-16x40	16" CMU	40	#6	5	2	(10) #6	
MC-16x48	16" CMU	48	#6	6	2	(12) #6	
MC-24x16	24" CMU	16	#6	2	2	(4) #6	
MC-24x24	24" CMU	24	#6	3	2	(6) #6	
MC-24x32	24" CMU	32	#6	4	2	(8) #6	
MC-24x40	24" CMU	40	#6	5	2	(10) #6	
MC-24x48	24" CMU	48	#6	6	2	(12) #6	
						(0)	
						(0)	
						(0)	

Pilaster Design

Project: Kokanee Cove Development and Renovation

Location: Jamb for openings up to 3ft wide

Code: IBC 2018, TMS 402/602-16 (LRFD), Section 9.3.5.4.3

Masonry			Reinforcing		Out of Plane		
v	MC-6x8	6" CMU	Fy	60 ksi	Sds	0.41 g	
f'm	1.5 ksi		Size	#4	I	1	
Height	12 ft		Layers	1	p Wind	18.1 psf	Unfactored Wind Pressure
t	5.625 in		Cells	1	p Mem	52.0 psf	Member Self Weight
Width [b]	8 in		d	2.8 in	p Veneer	5.0 psf	Additional Veneer weight
Solid Grout	Yes		A.eff	0.200 in2	Fp	9.3 psf	Unfactored Seismic Pressure
fr	0.163 ksi		Es	29000 ksi	Wind Trib	4.000 ft	
Em	1350 ksi		n	21.5	p Wall	75 psf	Adjacent Wall Weight
em	0.0025		es	0.0021	Wall Trib	2 ft	Adjacent Wall Trib

Section Properties

				Checks	
tf	1 in	Mcr	0.57 k-ft	As.max	0.16 in ²
tw	1 in	h/t	25.6	As.min	0.11
Gross Area	45 in ²	r	1.624 in		
Net Area	45.0 in ²	h/r	88.7		
In	118.7 in ⁴				
Icr	17.1 in ⁴	Scr	42.2		

Un-factored loads at mid-height of wall

Eccentric		Concentric		Lateral (OOP)	
D	1.2 kip	D	0.416 kip	W	0.072 klf
L	kip	L	kip	E	0.032 klf
S	7.2 kip	S	kip		
W	kip	W	kip	f1	0.5
E		E		f2	0.2
ecc	2 in	D (Weight)	0.208 kip		

Factored Demands

Axial	ϕP_n	Pe (Icr)	Bearing						
	15.5	11.0	32.4						
Vertical Only				Pu [kip]	ψMu [k-ft]	ϕP_n	ϕMn	Δu	Unity
1.4D				2.55	0.15	15.5	2.3	0.02	0.16
1.2D + 1.6L + 0.5S				5.79	0.47	15.5	2.5	0.07	0.37
1.2D + 1.6S + (f1L or 0.5W)				13.71	1.42	15.5	2.8	0.17	0.88
Lateral				Pu [kip]	ψMu [k-ft]	ϕP_n	ϕMn	Δu	Unity
1.2D + 1.6S + 0.5W				13.71	2.19	15.5	2.8	0.28	0.88
1.2D + 1.0W + f1L + 0.5S				5.79	2.33	15.5	2.5	0.55	0.91
(1.2+0.2Sds)D + 1.0E + f1L + f2S				3.78	0.89	15.5	2.4	0.13	0.37
(0.9-0.2Sds)D - 1.0E				1.49	0.68	15.5	2.1	0.11	0.32
0.9D + 1.0W				1.64	1.60	12.9	2.2	0.78	0.74
Service for Deflection				P	ψM	Δ	Δa	h/ Δ	Unity
D + 0.6W				1.82	1.02	0.40	1.01	356	0.40
D + 0.7E				1.93	0.53	0.09	1.01	1670	0.09
D + 0.75L + 0.75S + 0.45W				7.22	1.30	0.26	1.01	558	0.26
D + 0.75L + 0.75S + 0.525E				7.30	0.99	0.16	1.01	901	0.16
0.6D + 0.6W				1.09	0.93	0.38	1.01	380	0.38
0.6D - 0.7E				0.99	0.47	0.08	1.01	1887	0.08

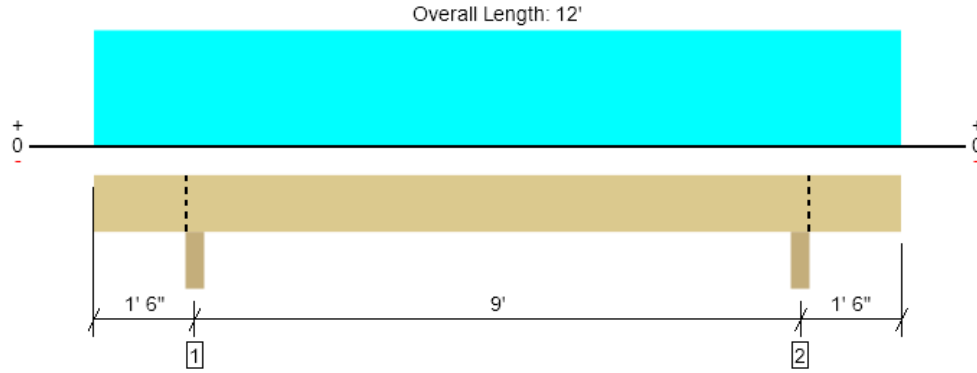
Design Result

Use 6" CMU block with #4 bars at 8 inches O.C., vert.
0.91 unity OK

Unfactored Vertical Loads at Base of Column/Pilaster/Jamb

D	2.03
L	0.00
S	7.20
W	0.00
E	0.00

Level, Canopy Rafters
2 piece(s) 2 x 6 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1090 @ 1' 6"	8438 (4.50")	Passed (13%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	704 @ 2' 1 3/4"	2277	Passed (31%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	1710 @ 6'	1950	Passed (88%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.331 @ 6'	0.450	Passed (L/326)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.370 @ 6'	0.600	Passed (L/292)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Member Length : 12'
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Beam - DF	4.50"	4.50"	1.50"	120	162	970	1090	Blocking
2 - Beam - DF	4.50"	4.50"	1.50"	120	162	970	1090	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 2" o/c	
Bottom Edge (Lu)	12' o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 12'	16"	15.0	20.0	120.0	Default Load

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.woyehaeuser.com/woodproducts/document-library.

The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

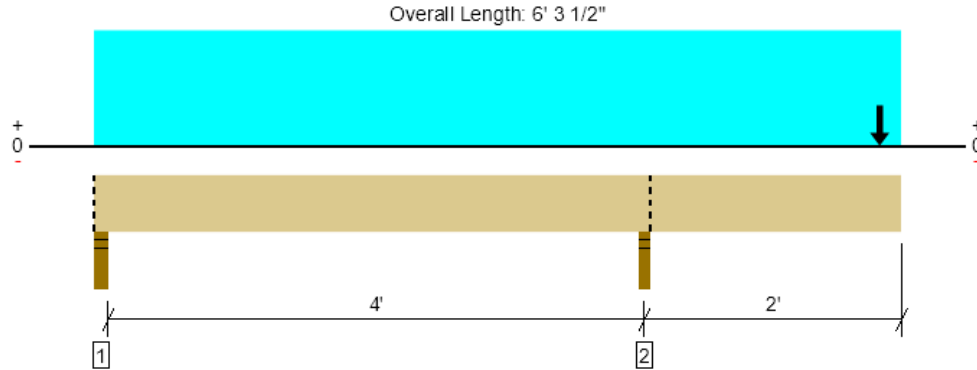
ForteWEB Software Operator	Job Notes
Sam Christensen Vector SE (208) 421-9321 sam.christensen@vectorse.com	



2/28/2024 12:57:18 AM UTC
ForteWEB v3.7, Engine: V8.4.0.40, Data: V8.1.5.0
File Name: Kokanee Cabins

Level, Outlooker Beam

2 piece(s) 1 3/4" x 5 1/2" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2794 @ 4' 3 1/2"	6563 (3.00")	Passed (43%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1613 @ 4' 10 1/2"	4206	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2846 @ 4' 3 1/2"	4889	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.186 @ 6' 3 1/2"	0.200	Passed (2L/258)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.208 @ 6' 3 1/2"	0.267	Passed (2L/230)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (0.2") and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 455 lbs uplift at support located at 2". Strapping or other restraint may be required.

Member Length : 6' 3 1/2"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - DF	3.50"	3.50"	1.50"	-22	9/-72	51/-433	29/-455	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	333	410	2461	2794	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 4" o/c	
Bottom Edge (Lu)	6' 4" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3 1/2"	N/A	5.6	--	--	
1 - Uniform (PSF)	0 to 6' 3 1/2" (Front)	1' 4"	15.0	20.0	120.0	Default Load
2 - Point (lb)	6' 1 1/2" (Top)	N/A	150	200	1200	

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

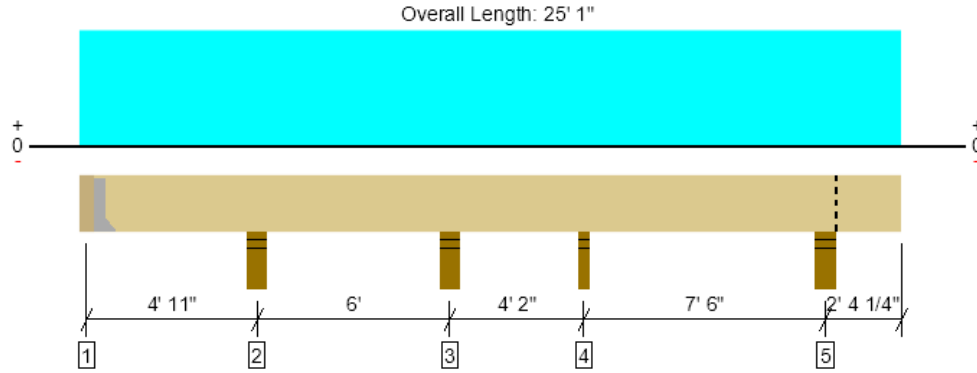
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sam Christensen Vector SE (208) 421-9321 sam.christensen@vectorse.com	



2/15/2024 9:12:21 PM UTC
ForteWEB v3.7, Engine: V8.4.0.40, Data: V8.1.5.0
File Name: Kokanee Cabins

Level, Purlins
1 piece(s) 2 x 6 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1298 @ 15' 2 3/4"	2813 (3.00")	Passed (46%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	645 @ 15' 9 3/4"	1139	Passed (57%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-842 @ 15' 2 3/4"	975	Passed (86%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.180 @ 19' 2"	0.375	Passed (L/501)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.197 @ 19' 1 7/8"	0.500	Passed (L/456)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Member Length : 24' 9 1/2"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Hanger on 5 1/2" DF beam	3.50"	Hanger ¹	1.50"	40	59	355	395	See note ¹
2 - Stud wall - DF	5.00"	5.00"	1.50"	127	173	1035	1162	None
3 - Stud wall - DF	5.00"	5.00"	1.50"	85	141	844	929	None
4 - Stud wall - DF	3.00"	3.00"	1.50"	132	194	1167	1298	None
5 - Stud wall - DF	5.00"	5.00"	1.50"	119	159	956	1074	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 1" o/c	
Bottom Edge (Lu)	7' 4" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 25' 1"	16"	15.0	20.0	120.0	Default Load

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.eyerhaeuser.com/woodproducts/document-library.

The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sam Christensen Vector SE (208) 421-9321 sam.christensen@vectorse.com	



2/15/2024 9:07:31 PM UTC
ForteWEB v3.7, Engine: V8.4.0.40, Data: V8.1.5.0

File Name: Kokanee Cabins