CITY of DULUTH
Spirit Mountain Recreation Authority
Contract Documents

Contract D – Water Pumping Improvements; Pump Station Packages

Duluth, Minnesota

Bid No.: SM 4504D

Opening Date: November 20, 2014

Time: 2:00 pm

Place: RM 100, Duluth City Hall
411 West 1st St.
Duluth, MN 55802

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PROJECT DIRECTORY

Project Name: Contract D - Water Pumping Improvements; Pump Station Packages **Location:** Duluth, Minnesota

Owner

Name: Spirit Mountain Recreation Area
Address: 9500 Spirit Mountain Place
Duluth, MN 55810
Contact: Brandy Ream, Executive Dir.
Phone: 218-624-8501
E-mail: bream@spiritmt.com

Owner

Name: Spirit Mountain Recreation Area
Address: 9500 Spirit Mountain Place
Duluth, MN 55810
Contact: Jody Ream, General Manager
Phone:
E-mail: jream@spiritmt.com

Owner

Name: Spirit Mountain Recreation Area
Address: 9500 Spirit Mountain Place
Duluth, MN 55810
Contact: Ryan Abel, Trail Maintenance Mgr.
Phone:
E-mail: ryanabel@spiritmt.com

Project Manager

Name: Foster Jacobs Johnson
Address: 345 Canal Park Drive Suite 200
Duluth, MN 55802
Contact: Randy Anderson
Phone: 218.213.1825
E-mail: randya@fjj.com

Engineer

Name: SEH
Address: 416 South 6th Street, Suite 200
Brainerd, MN 56401-3540
Contact: Jeff Ledin
Phone: 218.855.1711
Fax: 888.908.8166
E-mail: jledin@sehinc.com

Other

Name:
Address:

Contact:
Phone:
Fax:
E-mail:

Snow Making Consultant

Name: Torrent Engineering & Equipment
Address: P.O. Box 270
10693 N. Orn Rd.
Milford, IN 46542
Contact: Mark Meadows
Phone: 574.658.3200
E-mail: mark@torrentee.com

Other

Name:
Address:

Contact:
Phone:
E-mail:

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CITY OF DULUTH
INVITATION TO BID (ENG)

PROJECT NAME/DESCRIPTION: City of Duluth, Spirit Mountain Recreation Area, Water System Improvements: Contract D - Water Pumping Improvements; Pump Station Packages
PROJECT NUMBER: SEH-FOSJJ 129137
BID NUMBER: SM 4504D

Sealed bids will be received by the City Purchasing Agent in and for the Corporation of the City of Duluth, Minnesota, at his office, Room 100 - City Hall, Duluth, Minnesota, 55802, (218) 730-5340 until 2:00pm local time on Thursday November 20, 2014 for the above named project. Immediately thereafter, bids will be taken to Room 106A - City Hall, where they will be publicly opened and read aloud.

NOTICE TO BIDDERS:

1. Unless a Certificate of Exemption is provided, any out-of-state bidder receiving a bid award will have 8% retained from invoice payments on any contracts over $50,000. **This form may be found at the following web address: http://taxes.state.mn.us/Forms_and_Instructions/sde.pdf.**

Scope of project: Water Pumping Improvements: Off-site manufactured complete packages for water pumping equipment skids (with electrical equipment and controls) for Main and River pump stations.

Questions pertaining to this project should be directed to the issuing office: SEH Duluth, 418 West Superior Street, Suite 200, Duluth, MN 55802-1512. Phone: 218.279.3000

A pre-Bid conference will be held at 10:00 a.m. on Thursday November 6, 2014 at Spirit Mountain Recreation Area, 9500 Spirit Mountain Place, Duluth, MN 55810. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference.

Plans and specifications are on file for inspection at the City Engineering office, Duluth Builders Exchange, F.W. Dodge Plan Room, Minneapolis Builders Exchange and St. Paul Builders Exchange.

Digital image copies of the Bidding Documents are available at http://www.sehinc.com for a fee of $30. These documents may be downloaded by selecting this project from the BIDDING DOCUMENTS link and by entering eBidDocTM Number 3568812 on the SEARCH PROJECTS page. For assistance and free membership registration, contact QuestCDN at 952.233.1632 or info@questcdn.com.

Paper copies of the Bidding Documents may be obtained from Docunet Corp. located at 2435 Xenium Lane North, Plymouth, MN 55441 (763.475.9600) for a fee of $70.

A certified check or bank draft, payable to the order of the City of Duluth, negotiable U.S. Government Bonds (at par value), or a satisfactory bid bond executed by the bidder and acceptable surety, in an amount equal to five per cent (5%) of the total bid, shall be submitted with each bid.

Attention is called to the fact that not less than the minimum salaries and prevailing wages as set forth in the contract documents must be paid on this project. The contractor must take affirmative action to ensure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin, and must meet the affirmative action goals. Contractors are encouraged to subcontract with Disadvantaged Business Enterprises when possible.

Contractor will comply with all applicable Equal Employment Opportunity laws and regulations.

The City of Duluth is an Equal Opportunity employer.

CITY OF DULUTH

Dennis Sears
Purchasing Agent

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Additional Forms

The following forms and regulations/rules/statutes and interpretations, which are incorporated by reference in this contract, are available on the World Wide Web at the sites listed below. The City of Duluth will use its best efforts to ensure that the most recent, applicable forms and regulations/rules/statutes and interpretations are included on the web sites provided; however, if you are the successful bidder, prior to signing the contract, you are responsible for comparing the versions of the forms and regulations/rules/statutes and interpretations attached to the contract which you are signing with the versions on the web to ensure conformity.

THE VERSIONS OF THE FORMS AND REGULATIONS/RULES/STATUTES and INTERPRETATION ATTACHED TO THE CONTRACT WILL BE CONTROLLING. HARD COPIES OF ALL FORMS ARE AVAILABLE AT THE ENGINEERING DIVISION, EXCEPT THE NON-COLLUSION AND AFFIRMATIVE ACTION POLICY STATEMENT, WHICH ARE AVAILABLE AT THE CITY OF DULUTH PURCHASING DEPARTMENT.

Item listing from web:

FORM	**WEB SITE**
Affidavit of Non-Collusion (required by awarded contractor only)	www.duluthmn.gov/engineering/construction_documents.cfm
Affirmative Action Policy Statement/Certificate - EEO	www.duluthmn.gov/engineering/construction_documents.cfm
(required by awarded contractor only)	
Bidder's Label for submitting project bids	www.duluthmn.gov/engineering/construction_documents.cfm
Certified Payroll Report form WH347 (front side only)	www.dol.gov/whd/forms/WH347.pdf
Contractor's Haul Route	www.duluthmn.gov/engineering/construction_documents.cfm
Debarment/Suspension Notice (most current version)	www.dot.state.mn.us/pre-letting/prov/order/suspension.pdf
HUD 4010	www.hud.gov/offices/adm/hudclips/forms/files/4010.pdf
IC-134 form	www.taxes.state.mn.us/Forms_and_Instructions/ic134.pdf
IC-134 on-line submittal (click: Submit Contractor Affidavit; r-side of screen)	www.mndor.state.mn.us/
MN Rules 5200.1105 & .1106	www.duluthmn.gov/engineering/construction_documents.cfm
MN Statutes 177.41 to 177.44	www.revisor.mn.gov/statutes/?id=177
Notice to Bidders Prompt Payment to Subs	www.duluthmn.gov/engineering/construction_documents.cfm
One-Call Instructions	www.duluthmn.gov/engineering/construction_documents.cfm
Purchasing Division General Specifications	www.duluthmn.gov/engineering/construction_documents.cfm
Request to Sublet TP-21834 (5-12-09)	www.duluthmn.gov/engineering/construction_documents.cfm
Statement of Compliance Form (12-10)	www.dot.state.mn.us/const/labor/forms.html
Statement of Compliance Form - 2nd page WH347	www.dol.gov/whd/wh347.pdf
Supplemental General Conditions Part II 4/15/11	www.duluthmn.gov/engineering/construction_documents.cfm

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MINNESOTA · REVENUE **ST3**

Certificate of Exemption

Purchaser: Complete this certificate and **give it to the seller**.
Seller: If this certificate is not fully completed, you must charge sales tax. Keep this certificate as part of your records.

This is a blanket certificate, unless one of the boxes below is checked, and remains in force as long as the purchaser continues making purchases, or until otherwise cancelled by the purchaser.

☐ Check if this certificate is for a single purchase and enter the related invoice/purchase order # _____.

☐ If you are a contractor and have a purchasing agent agreement with an exempt organization, check the box to make multiple purchases for a specific job. Enter the exempt entity name and specific project:

Exempt entity name _____ Project description _____

Type or print

Name of purchaser

Business address | City | State | Zip code

Purchaser's tax ID number | State of issue

If no tax ID number, enter one of the following: | FEIN | Driver's license number/State issued ID number: state of issue | number

Name of seller from whom you are purchasing, leasing or renting

Seller's address | City | State | Zip code

Type of business

Type of business. Circle the number that describes your business.

01 Accommodation and food services
02 Agricultural, forestry, fishing, hunting
03 Construction
04 Finance and insurance
05 Information, publishing and communications
06 Manufacturing
07 Mining
08 Real estate
09 Rental and leasing
10 Retail trade
11 Transportation and warehousing
12 Utilities
13 Wholesale trade
14 Business services
15 Professional services
16 Education and health-care services
17 Nonprofit organization
18 Government
19 Not a business (explain) _____
20 Other (explain) _____

Reason for exemption

Reason for exemption. Circle the letter that identifies the reason for the exemption.

A Federal government (department) _____
B Specific government exemption (from list on back) _____
C Tribal government (name) _____
D Foreign diplomat # _____
E Charitable organization # _____
F Educational organization # _____
G Religious organization # _____
H Resale
I Agricultural production
J Industrial production/manufacturing
K Direct pay authorization
L Multiple points of use (services, digital goods, or computer software delivered electronically)
M Direct mail
N Other (enter number from back page) _____
O Percentage exemption
☐ Advertising (enter percentage) _____%
☐ Utilities (enter percentage) _____%
☐ Electricity (enter percentage) _____%

Sign here

I declare that the information on this certificate is correct and complete to the best of my knowledge and belief. (PENALTY: If you try to evade paying sales tax by using an exemption certificate for items or services that will be used for purposes other than those being claimed, you may be fined $100 under Minnesota law for each transaction for which the certificate is used.)

Signature of authorized purchaser | Print name here | Title | Date

Forms and fact sheets are available on our website at www.revenue.state.mn.us

Exemption descriptions

See the Form ST3 instructions and exemption descriptions for more information about the following exemptions.

Purchasers are responsible for knowing if they qualify to claim exemption from tax and will be held liable for any use tax, interest and possible penalties due if the items purchased are not eligible for exemption.

A. Federal government
Fill in department.

B. Specific government exemption
- Ambulance services
- Biosolids processing equipment
- Bullet-resistant body armor
- Chore/homemaking services
- Correctional facility meals or drinks
- Emergency rescue vehicle repair and replacement parts
- Emergency vehicle accessory items
- Firefighter equipment
- Hospitals
- Libraries
- Metropolitan Council
- Nursing homes
- Petroleum products used by government
- Regionwide public safety radio communication system
- Solid waste disposal facility
- State or local government agency from another state
- Local governments
- Transit program vehicles
- Water used directly in providing fire protection

C. Tribal government
Fill in the name of the Tribe.

D. Foreign diplomat
Fill in the number issued to the foreign diplomat.

E. Charitable organization
Organizations that operate exclusively for charitable purposes.

F. Educational organization
Schools, school districts, scouts, youth groups, etc.

G. Religious organization
Churches and other religious organizations.

H. Resale
Items or services purchased for resale.

I. Agricultural production
Materials and supplies used or consumed in agricultural production of items intended to be sold ultimately at retail. Does not cover furniture, fixtures, machinery, tools (except qualifying detachable tools and special tooling) or accessories used to produce a product.

J. Industrial production
Materials and supplies used or consumed in industrial production of items intended to be sold ultimately at retail. Does not cover furniture, fixtures, machinery, tools (except qualifying detachable tools and special tooling) or accessories used to produce a product.

K. Direct pay
Direct pay authorization issued by the Department of Revenue. Cannot be used for meals, lodging and most services.

L. Multiple points of use
Beginning July 1, 2013. Services, digital goods, or electronically delivered computer software concurrently available for use in more than one taxing jurisdiction at the time of purchase.

M. Direct mail services

N. Other exemptions
1. Aggregate delivered by a third party hauler to be used in road construction
2. Airflight equipment
3. Ambulances
4. Aquaculture production equipment
5. Automatic fire-safety sprinkler systems
6. Coin-operated entertainment and amusement devices
7. Construction exemption for special projects under M.S. 297A.71
8. Exempt publications
9. Farm machinery
10. Handicapped accessible (building materials)
11. Handicapped accessible (vehicle costs)
12. Horse materials
13. Hospitals and outpatient surgical centers
14. Instructional materials for post-secondary school students
15. Instrumentalities of each and all the states
16. Job opportunity building zones (JOBZ)
17. Logging equipment
18. Materials used for business in a state where no sales tax applies
19. Materials used to provide taxable services
20. Medical supplies for a health-care facility
21. Motor carrier direct pay (MCDP) authorization
22. Nonprofit snowmobile clubs
23. Nursing homes and boarding care homes
24. Packing materials used to ship household goods outside Minnesota
25. Poultry feed
26. Prizes used for games at fairs or other events lasting fewer than six days
27. Purchasing agent agreement with exempt organization
28. Repair or replacement parts used in another state/country as part of a maintenance contract
29. Resource recovery facility authorization
30. Senior citizen group (exempt status authorization required)
31. Ship replacement parts and lubricants
32. Ski area items
33. Solar energy systems
34. Taconite production items
35. Telecommunications, cable television and direct satellite equipment **This exemption was not in effect from July 1, 2013 through March 31, 2014.**
36. Textbooks
37. Tribal government construction contract
38. TV commercials
39. Veteran organizations
40. Waste-management containers and compactors
41. Wind energy conversion systems and materials used to construct, install, repair or replace them.
42. Preexisting construction contracts and bids.
43. Lump-sum construction contracts — temporary exemption for new local tax on building materials

O. Percentage exemptions
- Advertising materials for use outside Minnesota or local taxing area.
- Utilities used in agricultural or industrial production.
- Electricity used in the operation of qualified data centers.

MINNESOTA · REVENUE

Certificate of Exemption

Form ST3 instructions and exemption descriptions

Forms and fact sheets are available on our website at **www.revenue.state.mn.us**.

Purchasers

Complete this certificate and give it to the seller. Do not send it to the Department of Revenue.

You must include your Minnesota tax identification number if you have one.

Warning to purchaser: Purchasers are responsible for knowing if they qualify to claim exemption from tax and will be held liable for any use tax, interest and possible penalties due if the items purchased are not eligible for exemption.

Sellers

Keep this certificate as part of your records. Accepting a fully completed exemption certificate relieves you from collecting the tax. If this certificate is not fully completed, you must charge sales tax. You may be required to provide this exemption certificate (or the data elements required on the form) to the state to verify this exemption.

Exemption descriptions

Use Form ST3, Certificate of Exemption, *to claim the following exemptions. Fact sheets are available for some of the items as noted. Contact our office for details about other exemptions not listed here.*

A. Federal government. The seller must obtain a purchase order, payment voucher, work order, a fully completed Form ST3 or similar documentation to show the purchase was from the federal government.

B. Specific government exemptions. Fill in the title from the list below. For more information, see *Fact Sheet 142, Sales to Governments,* and/or *Fact Sheet 135, Fire Fighting, Police and Emergency Equipment.* Also *Fact Sheet 139, Libraries, and Fact Sheet 176- Local Governments- Cities, Counties, and Townships*.

- Ambulance services
- Biosolids processing equipment
- Bullet-resistant body armor
- Chore/homemaking services
- Correctional facility meals or drinks
- Emergency rescue vehicle repair and replacement parts
- Emergency vehicle accessory items
- Firefighter equipment
- Hospitals
- Libraries
- Local Governments
- Metropolitan Council
- Nursing homes
- Petroleum products used by government
- Regionwide public safety radio communication system
- Solid waste disposal facility
- State or local government agency from another state
- Transit program vehicles
- Water used directly in providing fire protection

C. Tribal government. All sales to Indian tribal governments are exempt.

D. Foreign diplomat. Sales tax exemption cards are issued to some foreign diplomats and consular officials stationed in this country. Fill in the number issued to the foreign diplomat.

E. Charitable organizations. Must be operated exclusively for charitable purposes. You must apply for and receive exempt status authorization from the Department of Revenue. (Some nonprofit organizations do not qualify for sales tax exemption.) Effective December 2008, organizations that qualify for exempt status receive an authorization letter from the department rather than an exempt status number. Organizations that received an exempt status number prior to December 2008 may choose to continue using that number or they may use their Minnesota tax ID number.

F. Educational organizations. Schools and school districts operated exclusively for educational purposes must use Form ST3 on qualifying purchases. Nonprofit professional and trade schools, scouts, youth groups, and youth athletic and recreational programs, such as Little League, etc., operated exclusively for educational purposes must apply for exempt status authorization from the Department of Revenue and use Form ST3 on qualifying purchases. Effective December 2008, organizations that qualify for exempt status receive an authorization letter from the department rather than an exempt status number. Organizations that received an exempt status number prior to December 2008 may choose to continue using that number or they may use their Minnesota tax ID number.

G. Religious organizations. Churches and other religious organizations operated exclusively for religious purposes can use Form ST3 without exempt status authorization or may apply for exempt status authorization from the Department of Revenue. Effective December 2008, organizations that qualify for exempt status receive an authorization letter from the department rather than an exempt status number. Organizations that received an exempt status number prior to December 2008 may choose to continue using that number or they may use their Minnesota tax ID number.

H. Resale. Items or services must be purchased for resale in the normal course of business.

I. Agricultural production. Materials and supplies used or consumed in agricultural production of items intended to be sold ultimately at retail. Does not cover furniture, fixtures, machinery, tools (except qualifying detachable tools and special tooling) or accessories used to produce a product. *Fact Sheet 100, Agricultural Production.*

J. Industrial production. Materials and supplies used or consumed in industrial production of items intended to be sold ultimately at retail. Does not cover furniture, fixtures, machinery, tools (except qualifying detachable tools and special tooling) or accessories used to produce a product. *Fact Sheet 145, Industrial Production.*

K. Direct pay. Allows the buyer to pay sales tax on certain items directly to the state instead of to the seller. Applicants must be registered to collect sales tax in order to qualify and must apply for and receive direct pay authorization from the Department of Revenue. (*MN Rule 8130.3400)*

L. Multiple points of use. Taxable services, digital goods, or electronically delivered computer software that is concurrently available for use in more than one taxing jurisdiction at the time of purchase. Purchaser is responsible for apportioning and remitting the tax due to each taxing jurisdiction.

Continued

Certificate of Exemption
Form ST3 instructions and exemption descriptions *(continued)*

M. Direct mail. Allows the buyer to pay sales tax on direct mail directly to the state instead of to the seller. Direct mail is printed material that meets the three following criteria:

- it is delivered or distributed by U.S. Mail or other delivery service;
- it is sent to a mass audience or to addresses on a mailing list provided by the purchaser or at the direction of the purchaser; and
- the cost of the items is not billed directly to recipients.

N. Other exemptions

1. **Aggregate delivered by a third party hauler to be used in road construction.** Beginning July 1, 2008, charges for delivery of aggregate materials *by third party haulers* are exempt if the aggregate will be used in road construction.
2. **Airflight equipment.** The aircraft must be operated under Federal Aviation Regulations, parts 91 and 135.
3. **Ambulance services** — privately owned (leases of vehicles used as an ambulance or equipped and intended for emergency response). Must be used by an ambulance service licensed by the EMS Regulatory Board under section 144E.10. *Fact Sheet 135, Fire Fighting, Police, and Emergency Equipment.*
4. **Aquaculture production equipment.** Qualifying aquaculture production equipment, and repair or replacement parts used to maintain and repair it. *Fact Sheet 130, Aquaculture Production Equipment.*
5. **Automatic fire-safety sprinkler systems.** Fire-safety sprinkler systems and all component parts (including waterline expansions and additions) are exempt when installed in an existing residential dwelling, hotel, motel or lodging house that contains four or more dwelling units.
6. **Coin-operated entertainment and amusement devices** are exempt when purchased by retailers who (1) sell admission to places of amusement, or (2) make available amusement devices.
7. **Construction exemption for special projects under M.S. 297A.71.** Certain purchases for the construction of a specific project or facility are exempt under M.S. 297A.71, such as waste recovery facilities. This exemption does not apply to projects for which you must pay sales or use tax on qualifying purchases and then apply for a refund.
8. **Exempt publications.** Materials and supplies used or consumed in the production of newspapers and publications issued at average intervals of three months or less. Includes publications issued on CD-ROM, audio tape, etc.
9. **Farm machinery.** Qualifying farm machinery, and repair or replacement parts (except tires) used to maintain and repair it. *Fact Sheet 106, Farm Machinery.*
10. **Handicapped accessible (residential building materials).** Building materials and equipment purchased by nonprofit organizations if the materials are used in an existing residential structure to make it handicapped accessible, and the homeowner would have qualified for a refund of tax paid on the materials under M.S. 297A.71, subd. 11 or subd. 22. Nonprofit organizations include those entities organized and operated exclusively for charitable, religious, educational or civic purposes; and veteran groups exempt from federal taxation under IRC 501(c)(19).
11. **Handicapped accessible (vehicle costs).** Conversion costs to make vehicles handicapped accessible. Covers parts, accessories and labor.
12. **Horse materials.** Covers consumable items such as feed, medications, bandages and antiseptics purchased for horses. Does not cover machinery, tools, appliances, furniture and fixtures. *Fact Sheet 144, Veterinary Practice.*
13. **Hospitals and outpatient surgical centers.** Sales to a hospital and outpatient surgical center are exempt if the items purchased are used in providing hospital or outpatient surgical services. *(M.S. 297A.70, subd. 7)*
14. **Instructional materials** required for study courses by college or private career school students *(M.S. 297A.67, subd. 13a)*
15. **Instrumentalities of each and all the states** are exempt from sales tax during their annual meeting on the following items: prepared food, soft drinks, candy, and alcoholic beverages. Effective July 1, 2014 - December 31, 2014.
16. **Job opportunity building zones (JOBZ).** Applies to all goods and taxable services purchased by a qualified business and primarily used in the zone. Also includes purchases by a qualified business or a contractor of construction materials and supplies to construct improvements to real property if the property is used by a qualified business within the zone.
17. **Logging equipment.** Qualifying logging equipment, and repair or replacement parts (except tires) used to maintain and repair it. *Fact Sheet 108, Logging Equipment.*
18. **Materials used for business outside Minnesota** in a state where no sales tax applies to such items; or for use as part of a maintenance contract. This exemption applies only if the items would not be taxable if purchased in the other state (e.g., a state that does not have sales tax).
19. **Materials used to provide taxable services.** Materials must be used or consumed directly in providing services taxable under M.S. 297A.61, subd. 3.
20. **Medical supplies for a health-care facility.** Purchases by a licensed health care facility, outpatient surgical center or licensed health-care professional of medical supplies used directly on a patient or resident to provide medical treatment. The exemption does not apply to equipment, lab or radiological supplies, etc. *Fact Sheet 172, Health Care Facilities.*
21. **Motor carrier direct pay (MCDP).** Allows motor carriers to pay tax directly to the state when they lease mobile transportation equipment or buy certain parts and accessories. Applicants must be registered for sales tax in order to apply. You must apply for and receive MCDP authorization from the Department of Revenue. *Fact Sheet 107, Interstate Motor Carriers.*
22. **Nonprofit snowmobile clubs.** Certain machinery and equipment is exempt when used primarily to groom state (or grant-in-aid) trails. Prior certification from DNR must be received.
23. **Nursing homes and bonding care homes.** Beginning July 1, 2013, sales to nursing homes and boarding care homes are exempt. Nursing homes

Continued

must be licensed by the state. Boarding care homes must be certified as a nursing facility.

24. **Packing materials.** Packing materials used to pack and ship household goods to destinations outside of Minnesota.
25. **Poultry feed.** The poultry must be for human consumption.
26. **Prizes.** Items given to players as prizes in games of skill or chance at events such as community festivals, fairs and carnivals lasting fewer than six days.
27. **Purchasing agent.** Allows a business who has been appointed as a purchasing agent by an exempt organization to make purchases exempt from sales tax. All documentation pertaining to the purchasing agent agreement is kept by the purchasing agent to verify exemption.
28. **Repair or replacement parts used in another state or country** as part of a maintenance contract. This does not apply to equipment or tools used in a repair business.
29. **Resource recovery facilities.** Applies to equipment used for processing solid or hazardous waste (after collection and before disposal) at a resource recovery facility. You must apply for and receive approval from the Department of Revenue.
30. **Senior citizen groups.** Groups must limit membership to senior citizens age 55 or older, or under 55 but physically disabled. They *must* apply for and receive exempt status authorization from the Department of Revenue.
31. **Ship repair or replacement parts and lubricants.** Repair or replacement parts and lubricants for ships and vessels engaged principally in interstate or foreign commerce.
32. **Ski areas.** Items used or consumed primarily and directly for tramways at ski areas, or in snowmaking and snow-grooming operations at ski hills, ski slopes or ski trails. Includes machinery, equipment, water additives and electricity used in the production and maintenance of machine-made snow.
33. **Solar energy system** means a set of devices whose primary purpose is to collect solar energy and convert and store it for useful purposes including heating and cooling buildings or other energy using processes, or to produce generated power by means of any combination of collecting, transferring, or converting solar-generated energy.
34. **Taconite production items.** Mill liners, grinding rods and grinding balls used in taconite production if purchased by a company taxed under the in-lieu provisions of M.S. 298 if they are substantially consumed in the production of taconite. *Fact Sheet 147, Taconite and Iron Mining.*
35. **Telecommunications, cable television and direct satellite equipment** used directly by a service provider primarily to provide those services for sale at retail. *Fact Sheet 119, Telecommunications, Cable Television, Direct Satellite and Related Services.* **This exemption was not in effect from July 1, 2013 through March 31, 2014.**
36. **Textbooks** required for study to students who are regularly enrolled.
37. **Tribal government construction contract.** Materials purchased on or off the reservation by American Indian or non-American Indian contractors and subcontractors for use in construction projects on the reservation when the tribe or a tribally owned entity is a party to the contract, and the contract is being undertaken for the purpose of the tribe's welfare. It does not extend to the purchase or lease of equipment or tools for use on the project.
38. **TV commercials.** Covers TV commercials and tangible personal property primarily used or consumed in preproduction, production or post-production of a TV commercial. Includes rental equipment for preproduction and production activities only. (Equipment purchased for use in any of these activities is taxable.) *Fact Sheet 163, TV Commercials.*
39. **Veteran organizations.** Limited exemption applies to purchases by veteran organizations and their auxiliaries if they are organized in Minnesota and exempt from federal income tax under IRC Section 501(c)(19); and the items are for charitable, civic, educational or nonprofit use (e.g. flags, equipment for youth sports teams, materials to make poppies given for donations).
40. **Waste-management containers and compactors** purchased by a waste-management service provider to use in providing waste-management services that are subject to solid-waste management tax.
41. **Wind energy systems.** Wind energy conversion systems and materials used to construct, install, repair or replace them.
42. **Preexisting construction contracts and bids.** A contractor is allowed an exemption on certain services or items that become taxable effective July 1. The exemption is for the change in tax on those items or services if purchased during the transition period.

    For construction contracts, (1) the contractors must have documentation of a bona fide written lump-sum or fixed price construction contract in force before July 1; (2) the contract must not provide for allocation of future taxes; and (3) for each contract, the contractor must give the seller documentation of the contract on which an exemption is to be claimed. Deliveries must be made before January 1.

    For construction bids, (1) the building materials or services must be used pursuant to an obligation of a bid or bids, the bid or bids must be submitted and accepted prior to July 1; (2) the bid or bids must not be able to be withdrawn, modified or changed without forfeiting a bond; and (3) for each qualifying bid, the contractor must give the seller documentation of a bid on which an exemption is to be claimed. Deliveries must be made before January 1.
43. **Construction contracts.** When a new local tax is enacted, a contractor is allowed exemption from the new local tax on building materials during the transition period. Contractors must have documentation of a lump-sum contract in force before the new tax begins and deliveries must be made within the specific transition period.

Certificate of Exemption

Form ST3 instructions and exemption descriptions *(continued)*

0. Percentage exemptions

- **Advertising materials:** Percentage exemptions may be claimed for advertising materials for use outside of Minnesota or local taxing area. Purchaser must enter exempt percentage on Form ST3. *Fact Sheet 133, Advertising - Creative Promotional Services.*
- **Utilities:** Exemption applies to percent of utilities used in agricultural or industrial production. General space heating and lighting is not included in the exemption. Purchaser must enter exempt percentage on Form ST3. *Fact Sheets 100, Agricultural Production; and 129, Utilities Used in Production.*
- **Electricity:** Exemption applies to percent of electricity used to operate enterprise information technology equipment, or used in office and meeting spaces, and other support facilities in support of enterprise information technology equipment. Purchaser must enter exempt percentage on Form ST3. *Revenue Notice 12-11: Sales Tax – Exemptions – Qualified Data Centers.*

Forms and information

Website: www.revenue.state.mn.us.

Email: SalesUse.Tax@state.mn.us

Phone: 651-296-6181 or 1-800-657-3777 (TTY: Call 711 for Minnesota Relay)

OFFICIAL SEALED BID

REQUEST FOR BID
Issue Date:10/21/2014
Bid # SM4504D

RETURN BY OPENING TIME TO:
Purchasing Division
RM 100 City Hall
411 West 1st Street
Duluth, MN 55802

Buyer: Dennis Sears
Phone: 218-730-5003
Fax: 218-730-5922

Contract D – Water Pumping Improvements; Pump Station Packages

BID OPENING, AT 2:00 PM ON Thursday, November 20, 2014

Note: All bids must be written, signed, and transmitted in a sealed envelope, plainly marked with the bid number, subject matter, and opening date. The City of Duluth reserves the right to split award where there is substantial savings to the city, waive informalities and to reject any and all bids. Bidder should state in proposal if bid is based on acceptance of total order. Sales tax is not to be included in the unit price. Bidder to state freight charges if, proposal is F.O.B. shipping point, freight not allowed. Low bid will not be the only consideration for award of bid. All pages must be signed or initialed by authorized bidder's representative as indicated at the bottom of the page(s) of the request for bid.

Designated F.O.B. Point: Spirit Mountain Recreation Area Authority (SMRAA)
9500 Spirit Mountain Place
Duluth, MN 55810

Tax: Federal Excise Tax Exemption
Account No. 41-74-0056 K

Description

Two (2) prefabricated pump stations, factory built and delivered, for the snowmaking system at Spirit Mountain Ski Area, Duluth, MN

Lump Sum Price	$_____
Freight Charges	$_____
Total Bid Price	$_____

Delivery Date: On or before August 1, 2015

Bidder Information

Manufacturer _____

Address _____
_____
_____

By_____ _____
(Print) (Title)

_____ _____
(Signature) (Phone #)

SEH No. FOSJJ 129137

OFFICIAL SEALED BID

Bidder E-mail Address_____

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Work Included in Contract Documents
   2. Contract Information
   3. Work Under Other Contracts
   4. Contract Times

1.02 WORK INCLUDED IN CONTRACT DOCUMENTS

A. Description of the Project:
   1. Construction of water system improvements for the Spirit Mountain Recreational Area. This contract manual for Contract D is part of a larger project for which three additional separate contracts will be awarded. A general description of the four project contracts is included below.
      a. Contract A

      Reversible Water Supply and Runoff Collection Pipeline: Includes a runoff collection system, a grit chamber, transfer pipeline, yard piping at the Main pump station, low pressure supply pipe, a wet well and yard piping for the River pump station, an intake pipe (in St Louis River) and an intake structure.

      b. Contract B

      Water Supply Pump Stations. Main pump station and River pump station; including foundations, floors and complete building enclosures, plus mechanical and electrical equipment for these water pump stations.

      c. Contract C

      Hillside Water Improvements. Includes high pressure steel lines for increased distribution of water, upgrades to valve stations and electrical improvements

      d. Contract D

      Water Pumping Improvements: Off-site manufactured complete packages for water pumping equipment skids (with electrical equipment and controls) for Main and River pump stations.

1.03 CONTRACT INFORMATION

A. Type of Contract: Owner will award Multiple Prime Contracts.

B. Scope of Contract:
   1. Each contract is complete unto itself, including all labor and material required to complete each contract to the point of receiving the next section of Work to be installed.
   2. All Contracts will include:
      a. Contract Forms:
         1) Agreement
         2) Certificates
      b. Conditions of the Contract:
         1) General Conditions
         2) Supplementary Conditions
      c. Specifications:
         1) Division 1 - General Requirements
         2) Applicable Technical Sections
      d. Addenda
      e. Contract Modifications
   3. Separate contracts will be issued for:
      a. The other 3 Contract packages as listed above

1.04 WORK UNDER OTHER CONTRACTS

A. Other Work at Site:
   1. Owner reserves the right to let other separate contracts for Work of the Project, or to pursue other Work at the Site with its own personnel.
   2. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
   3. Coordinate the Work of this Contract with work performed under separate contracts.

B. Work Not Included:
   1. Work not included is either marked “NIC,” or “by others,” on Drawings or is noted in each section of Specifications.
   2. Provide all labor and materials required unless so specifically noted or marked.

1.05 CONTRACT TIMES

A. Time of the Essence:
   1. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

B. Contract Times:
   1. Contracting for this Work is expected to be completed in early January of 2015, however, the Notice to Proceed letter will be the official authorization to commence shop drawing and manufacturing operations.
   2. Substantial and Final Completion:
      a. Parts of the Work shall be substantially completed on or before the following Milestone(s):
         1) Milestone 1: Delivery of the Main Pump Station and appurtenances to the site July 1, 2015
         2) Milestone 2: Delivery of the River Pump Station and appurtenances to the site August 1, 2015.
      b. The Work will be substantially completed on or before October 31, 2015, and completed and ready for final payment on or before January 31, 2016.

C. Liquidated Damages
   1. Contractor and Owner recognize that time is of the essence and that Owner will suffer financial loss if the Work is not completed and milestones not achieved within the times specified, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
   2. Milestones:
      a. Contractor shall pay Owner $500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved.
      b. Contractor shall pay Owner $500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 2, until Milestone 2 is achieved.
   3. Substantial Completion: Contractor shall pay Owner $100 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified for Substantial Completion until the Work is substantially complete.
   4. Final Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $100 for each day that expires after such time until the Work is completed and ready for final payment.
   5. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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Specification Number: 782013-001 **SEPTEMBER 29, 2014**
Rev. Number: 0

SPECIFICATIONS FOR
PREFABRICATED PUMP STATIONS
SPIRIT MOUNTAIN SKI AREA, MN

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SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

1.0 GENERAL

1.1 This specification describes the requirements for the purchase of two prefabricated pump stations, factory built and delivered, for the snowmaking system at Spirit Mountain Ski Area, Duluth, MN. Installation is not included in this specification.

1.2 All equipment shall conform to applicable ANSI, ASTM, NEC, and UL standards.

1.3 Warranty shall be a minimum of 12 months from date of certified start-up, or 18 months from date of shipment, which ever occurs first. Vendor warrants that the equipment shall be new, free of defects in materials and workmanship, and shall be of type and quality described in this specification.

1.4 All equipment shall by supplied by a vendor with at least 5 years' experience and regularly engaged in production and/or supply of this type of equipment. The Vendor shall list at least (10) installations of prefabricated similar systems supplied in the last (5) years. "Build in place" installations are not acceptable examples.

1.5 Whenever possible, components utilized in the pump stations shall be interchangeable.

1.6 All contracts and purchases made by or under the supervision of the Owner for which competitive bids are required shall be awarded taking into consideration conformity with the specifications, terms of delivery and other conditions imposed in the call for bids. The Owner shall have the power to decide as to the best responsible bidder for all purchases. Any or all bids may be rejected.

1.7 Manufacturer names and types are used to establish standards for technical requirements and quality.

1.8 Three copies of the quotation and submittals shall be submitted to the owner.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

1.0 GENERAL CONTINUED

1.9 If awarded with an order, the vendor shall supply (3) copies of the as-built shop drawings, installation, instruction and maintenance manuals. Installation requirements and outline drawings shall be provided within (4) weeks of order receipt.

1.10 Successful bidder shall arrange delivery date with owner.

1.11 Quotation and Submittals;

- Formal quotation including price, complete description of type and quantity of items included in quote, freight to job site, shipment date after receipt of order, factory authorized start-up, and payment terms.
- Pump performance curve showing flow, pressure, efficiency and BHP characteristics.
- Outline dimensional drawings showing pump and motor dimensions, mounting details, suction/discharge size and rating, design point data, construction details.
- Complete bill of materials for all major components.
- Description of start-up services, start-up to be included in quotation. Also include a list of standard on site service rates and charges.
- Recommended spare parts list.
- List of similar installations within the last 5 years.
- List of available locations for on site service, factory service and repair parts.

1.12 Substitutions; specified manufacturers, materials, products and equipment have been used in preparing this specification and thus establish minimum qualities for performance. No substitutions will be considered unless written request has been submitted to the consultant for approval at least seven days prior to date set for receipt of bids. If the consultant approves any proposed substitution, such approval will be set forth in an addendum.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

2.0 CONDITIONS

2.1 Fluid pumped; Cold Water (35 to 55 F), SG = 1.0

2.2 Pump Station Designations; River Pump Station – Low Pressure Wet Well Type
Main Pump Station – High Pressure Booster Type

2.3 Installation elevation; River Pump Station - 615 feet ASL (above sea level)
Main Pump Station – 690 feet ASL (above sea level)

2.4 Environmental requirements; Pump stations are to be installed inside weather proof structures with an indoor temperature between 60 F minimum and 70 F maximum. All structures by others.

3.0 SCOPE OF SUPPLY

3.01 – River Pump Station

(3) Pump wet well with (2) pumps initially and (1) future pump

Low pressure, high volume withdraw pump station

200 HP, 480 V/3/60 motors

Complete mechanical and electrical

See section 3.1 below for details

3.02 – Main Pump Station

(6) Pump booster with (4) pumps initially and (2) future pumps

High pressure booster pump station

400 HP, 480 V/3/60 motors

Complete mechanical and electrical

See section 3.2 below for details

Also see the following sections for individual component specifications; 4.0 for pumps and motors, 5.0 for electrical and controls, 6.0 for pump station and accessories.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

3.0 SCOPE OF SUPPLY CONTINUED

3.1 River Pump Station scope of supply:

(1) Prefabricated variable speed control, wet well type pump station, installation by others. Three (3) pump station with (2) pumps at initial installation and provisions for (1) future similar pump. General arrangement drawing number 782013-M10, copy attached in the appendix. Also attached is B.O.M. and electrical drawing 782013-E10.

Pump rating;	Design point – 2,000 gpm each @ 230 ft. TDH Minimum efficiency at design - 80% Motor sizing - 200 HP Quantity – (2) each pump / motor
Pumps misc.;	Pump OAL (overall length) is 19'-0" as measured from bottom of base plate to bottom of basket strainer. TDH rating is at pump discharge flange; Minimum water level and internal losses must be accounted for by the manufacturer.

Pumps to be bottom suction wet well type, multistage vertical turbine, each with 460 V/3/60, 1800 RPM vertical hollow shaft electric motor. Accessories to include discharge valving, fittings, piping and instruments. Electrical to include; (1) service entry rated 1200 AMP 80% main circuit breaker disconnect with GFI, switchboard with individual pump circuit breakers, (2) 200 HP AC variable frequency drives, (1) PLC control and accessories, (1) 480-120/208 V house transformer and panel board. All equipment to be rated for continuous duty at the installation elevation.

Quotation Scope Summary;

- Pumps P1 – P2 including motors, packing assemblies, and strainers.
- Electrical, controls, control accessories and wiring.
- Accessories; Individual pump discharges and discharge manifold.
- (1) 2" by-pass throttling valve, mounted on manifold, discharge to wet well.
- (1) 3" pressure relief w/ isolation valve, mount on manifold, disc. to wet well.
- (1) 4" drain valve w/ electric actuator, shipped loose for installation by contractor.
- Prefabricated structural skid assembly
- All mechanical and electrical installed on pump skid (pumps/motors ship loose).
- Complete provisions for the addition of future pump # P3 and all required accessories without pump skid modification.
- Supply prefab pump station package, delivered to site, and provide start-up and training. There will be a separate contract to receive and set pump skid, pumps & motors, terminate motors, connect external piping and electrical.

Not Included;

- All installation
- Pump house including intake, wet well, slide gate, foundation, and structure
- Main 480V/3/60 power; transformer and incoming power to main service entry
- All mechanical piping and electrical external to pump skid including house heat, ventilation, lights and receptacles

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

3.0 SCOPE OF SUPPLY CONTINUED

3.2 Main Pump Station scope of supply:

(1) Prefabricated variable speed control, booster type pump station, installation by others. Six (6) pump station with (4) pumps at initial installation and provisions for (2) future similar pumps. General arrangement drawing number 782013-M20, copy attached in the appendix. Also attached is B.O.M. and electrical drawing 782013-E20.

Pump rating;	Design point – 1,000 gpm each @ 1,215 ft. TDH plus suction (estimated at 54 psig) Minimum efficiency at design - 79% Motor sizing - 400 HP Quantity – (4) each pump / motor
Pumps misc.;	Can style pumps with barrel and suction/discharge flanges. TDH rating is at pump discharge flange; internal losses must be accounted for by the manufacturer.

Pumps to be booster can type, multistage vertical turbine, each with 460 V/3/60, 3600 RPM vertical solid shaft electric motor and spacer coupling. Accessories to include suction and discharge valving, fittings, piping and instruments. Electrical to include; (2) service entries each rated 2000 AMP 80% main circuit breaker disconnect with GFI, switchboards with individual pump circuit breakers, Electrical services to be split P1-P3 and P4-P6. (2) 400 HP AC variable frequency drives, (2) 400 HP reduced voltage solid state starters, (1) PLC control and accessories, (1) 480-120/208 V house transformer and panel board Note, house transformer and panel board to be shipped loose for installation by contractor. All equipment to be rated for continuous duty at the installation elevation.

Quotation Scope Summary;

- Pumps P1, P2, P4 and P5 including motors, couplings, and seal assemblies.
- Electrical, controls, control accessories and wiring.
- Accessories; Individual pump suctions/discharges manifolds.
- (1) 2” by-pass throttling valve, mounted on manifold, discharge to drain.
- (1) 3” combo air vac/release valve, mounted on manifold.
- (1) 4” drain valve, shipped loose for installation by contractor.
- Prefabricated structural skid assembly
- All mechanical and electrical installed on pump skid (pumps/motors ship loose).
- Complete provisions for the addition of future pumps # P3 and #P6 and all required accessories without pump skid modification.
- Supply prefab pump station package, delivered to site, and provide start-up and training. There will be a separate contract to receive and set pump skid, pumps & motors, terminate motors, connect external piping and electrical.

Not Included;

- All installation
- Pump house including foundation, and structure
- Main 480V/3/60 power; transformer and incoming power to main service entry
- Pump house bridge crane.
- All mechanical piping and electrical external to pump skid house heat, ventilation, lights and receptacles. Note, house transformer and panel board to be shipped loose for installation by contractor.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

4.0 PUMPS

4.1 – RIVER WET WELL PUMPS

4.2 – MAIN BOOSTER PUMPS

4.1 RIVER WET WELL TYPE WATER PUMPS AND MOTORS

4.10 General; Vertical turbine wet well type water pump(s) designed to deliver cold water at the specified flow and pressure. All designs shall conform to the Hydraulic Institute general specifications for bottom suction wet well pump design, and to ANSI/AWWA specification E101. In addition, all pumps shall conform to this specification where applicable. Pumps to be Flowserve model APW vertical turbine design. The bowl assembly, column pipe, line shaft, head shaft, and discharge head assembly shall be of US manufacturer. Pumps to be product lubricated (water), opened line shaft construction.

4.11 Discharge head; ASTM A48 class 30 cast iron, free of holes and other defects and accurately machined. Head shall include a 90 degree elbow with ANSI 125# rated discharge flange integrally cast. Discharge flange shall be rated for maximum discharge pressure. Discharge head shall be capable of containing the maximum pressure developed by the pump. Head shaft shall be 416 stainless steel, turned and ground. Head shaft shall not exceed 10 feet in length. The pump manufacturer shall include a method of adjusting the pump impellers at the top of the head shaft / top of the motor, and provide a positive locking device. Top of head to be machined to accept a standard NEMA type P base, vertical hollow shaft driver. Discharge head to include the following NPT ports; discharge gauge port, head vent port, and seal drain. Paint outside of head with industrial enamel, gray, non-potable.

4.12 Seal assembly; high pressure packed box assembly, suitable for maximum pressure developed by the pump. Graphite fiber stacked packing material. Assembly bolted to the pump head with o-ring seal. A lower bronze throttling bushing is recommended. Flowserve.

4.0 PUMPS CONTINUED

4.13 Pump bowl assembly; pump bowls shall be ASTM A48 class 30 cast iron or better, free from casting defects. Porcelain or epoxy lined bowls to reduce internal friction. Impellers shall be ASTM A519 C903 bronze or better. ASTM B505 bronze C84400 bowl bearings. ASTM A582 416 SS bowl shaft. Buna-N bowl O-rings. All stainless steel bolting. All impellers to be dynamically balanced, and thrust balanced (if required to limit total pump thrust below applicable standard high thrust motor ratings). Impellers to be fastened to the shaft with steel split tapered sleeve bushings (lock collets). Impellers shall be adjustable vertically by external means at the driver coupling location.

4.14 Pump shaft; ASTM A582 line shaft shall, 416 stainless steel. Size of shaft shall be no less than determined by ANSI specifications, such that elongation due to hydraulic thrust will not exceed actual clearance of impellers in pump bowls. Product lubricated opened line shaft, Buna-N rubber bearings and threaded couplings. Shaft shall be furnished in interchangeable sections not to exceed 10 feet in length. Any line shaft couplings shall have a safety factor of at least 1.5 times the shaft safety factor. All bearings shall be easily replaceable, and spaced to provide adequate support for the shaft and prevent vibration.

4.15 Column and Strainer; column to be flange type construction, A-53 grade B pipe or better with sufficient wall thickness for the application. Column sections shall be furnished in interchangeable sections not to exceed 10 feet in length. Buna-N bowl O-rings. A galvanized clip-on type basket strainer shall be provided with sufficient net inlet area. Strainer openings not to exceed 75% of the minimum opening through bowl or impeller.

4.16 Markings; stamped nameplate to be fastened to discharge head listing manufacturer’s serial number, rating (flow and TDH), impeller model, number of stages, and any other standard nameplate data. Rotation direction arrow clearly marked on discharge head.

4.17 Coupling assembly; Hollow shaft driver – no coupling required.

4.0 PUMPS CONTINUED

4.18 Electric motor driver; All motor(s) to be vertical hollow shaft type, 1800 rpm, high thrust design, 460 V/3/60 rated, WP-1 enclosed, 1.15 service factor rated at installation altitude, standard efficiency, 40 C ambient, Class F or better insulation, Class F rise, NEMA starting code G or better. Motor shall be rated for continuous duty at installed elevation and designed to carry the maximum thrust load and will have a B10 bearing life of no less than 5 years. Conduit box per NEC minimum size requirements. Motor shall meet or exceed NEMA MG1-31, inverter duty rated and include insulated upper bearing and shaft grounding ring. NEMA premium efficiency. Capable of 10:1 speed range. Nameplate stamped with standard motor information and fastened to motor enclosure. Any special requirements by the pump manufacturer, which are not listed in this specification, are also to be included. Motors to be NIDEC (formerly US Motors) or General Electric.

Motor Options (Required);

- Primary motor lead conduit box; oversized conduit box

- Space heaters; (1) 120 V/1/60, 100-200 watt rated, leads to conduit box.
- Winding thermostats; (3) NC thermostats (one per winding), leads to conduit box.

4.19 Pump/motor performance and design; pump BHP (break horsepower) at design shall not exceed 85% of the rated motor nameplate horsepower, exclusive of the service factor. Maximum horsepower at pump run out shall not be greater than the motor nameplate horsepower, exclusive of service factor. Pump curve characteristic of pressure versus flow shall be constant sloping, down and to the right (no peaks or dips in curve between shut off and run out), with a minimum 25% rise to shutoff head from design point head. NPSHR maximum = 20 feet. Maximum pressure at shut-off not to exceed 160 psig. Impeller selection shall reasonably limit the maximum number of stages required.

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4.0 PUMPS CONTINUED

4.2 MAIN BOOSTER CAN TYPE WATER PUMPS AND MOTORS

4.20 General; Vertical turbine can type water pump(s) designed to deliver cold water at the specified flow and pressure. All designs shall conform to the Hydraulic Institute general specifications for booster can pump design, and to ANSI/AWWA specification E101. In addition, all pumps shall conform to this specification where applicable. Pumps to be Flowserve model APW vertical turbine design. The bowl assembly, column pipe, line shaft, head shaft, and discharge head assembly shall be of US manufacturer. Pumps to be product lubricated (water), opened line shaft construction.

4.21 Discharge head; engineered fabricated carbon steel which meet or exceed ASTM A181 flanges, ASTM A-53 grade B (60,000 psi min. tensile strength) body pipe, and ASTM A-36 steel mounting plate. Raised face discharge flange, ANSI B16.5 rated for maximum discharge pressure. Discharge head shall be capable of containing the maximum pressure developed by the pump. Complete discharge head shall be hydrostatically tested to a minimum of 1.5 times pump shut off pressure. Discharge head shall be supplied with adequate integral motor stand height to accept seal arrangement and adjustable spacer coupling. Top of head to be machined to accept a standard NEMA type P base, vertical solid shaft driver, with (8) holes to allow motor installation in 45 degree position increments. Discharge head to include the following 0.5” NPT ports; discharge gauge port, head vent port, and seal drain. Paint outside of head with industrial enamel, gray, non-potable.

4.22 Seal assembly; mechanical type stainless steel assembly, suitable for maximum pressure developed by the pump. Seal to be a balanced cartridge type, bolted to pump head with O-ring seal. A lower bronze throttling bushing is recommended. Plan 13 seal flush piping assembly, carbon steel tubing, and SS fittings.
John Crane type 1-B.

4.0 PUMPS CONTINUED

4.23 Pump bowl assembly; pump bowls shall be ASTM A48 class 30 cast iron or better, free from casting defects. Porcelain or epoxy lined bowls to reduce internal friction. Impellers shall be ASTM A519 C903 bronze or better. ASTM B505 bronze C84400 bowl bearings. ASTM A582 416 SS bowl shaft. Buna-N bowl O-rings. All stainless steel bolting. All impellers to be dynamically balanced, and thrust balanced (if required to limit total pump thrust below applicable standard high thrust motor ratings). Impellers to be fastened to the shaft with steel split tapered sleeve bushings (lock collets). Impellers shall be adjustable vertically by external means at the driver coupling location.

4.24 Pump shaft; ASTM A582 line shaft shall, 416 stainless steel. Size of shaft shall be no less than determined by ANSI specifications, such that elongation due to hydraulic thrust will not exceed actual clearance of impellers in pump bowls. Product lubricated opened line shaft, Buna-N rubber bearings and threaded couplings. Shaft shall be furnished in interchangeable sections not to exceed 10 feet in length. Any line shaft couplings shall have a safety factor of at least 1.5 times the shaft safety factor. All bearings shall be easily replaceable, and spaced to provide adequate support for the shaft and prevent vibration.

4.25 Suction barrel (Can assembly); pump shall be supplied with a fabricated steel suction barrel assembly, constructed from similar materials as the discharge head. Can assembly shall be capable of containing maximum suction pressure supplied to the suction flange. Assembly shall be equipped with a steel base plate, machined and tapped to match the discharge head base flange. Base drilled to allow can assembly to be secured in place with anchor bolts. Can assembly shall be supplied with a proper O-ring or gasket and bolting seal between the barrel base plate and the pump discharge head base flange, Can length and diameter as required for bowl assemblies and NPSHR.

4.26 Markings; stamped nameplate to be fastened to discharge head listing manufacturer’s serial number, rating (flow and TDH), impeller model, number of stages, and any other standard nameplate data. Rotation direction arrow clearly marked on discharge head.

4.0 PUMPS CONTINUED

4.27 Coupling assembly; coupling to be flanged adjustable spacer type. Coupling shall connect pump input to motor output and allow for impeller adjustment. Coupling design to also allow for repair or replacement of mechanical seal without driver removal. All required keys and fasteners to be included. Supply couplings guards, which attach externally to pump head to protect personnel from rotating parts.

4.28 Electric motor driver; All motor(s) to be vertical solid shaft type, high thrust design, 460 V/3/60 rated, WP-1 enclosed, 1.15 service factor rated at installation altitude, standard efficiency, 40 C ambient, Class F or better insulation, Class F rise, NEMA starting code G or better. Motor shall be rated for continuous duty at installed elevation and designed to carry the maximum thrust load and will have a B10 bearing life of no less than 5 years. Conduit box per NEC minimum size requirements. Motor shall meet or exceed NEMA MG1-31, inverter duty rated and include insulated upper bearing and shaft grounding ring. NEMA premium efficiency. Capable of 10:1 speed range. Nameplate stamped with standard motor information and fastened to motor enclosure. Any special requirements by the pump manufacturer, which are not listed in this specification, are also to be included. Motors to be NIDEC (formerly US Motors) or General Electric.

Motor Options (Required);

- Primary motor lead conduit box; oversized conduit box

- Space heaters; (1) 120 V/1/60, 100-200 watt rated, leads to conduit box.
- Winding thermostats; (3) NC thermostats (one per winding), leads to conduit box.

4.29 Pump/motor performance and design; pump BHP (break horsepower) at design shall not exceed the rated motor nameplate horsepower, exclusive of the service factor. Maximum horsepower at pump run out shall not be greater than 1.05% higher of rated motor nameplate horsepower, exclusive of service factor. Pump curve characteristic of pressure versus flow shall be constant sloping, down and to the right (no peaks or dips in curve between shut off and run out), with a minimum 20% rise to shutoff head from design point head. NPSHR maximum = 30 feet. Maximum pressure at shut-off not to exceed 665 psig. Impeller selection shall reasonably limit the maximum number of stages required.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

5.0 ELECTRICAL EQUIPMENT

5.01 Scope - Provide complete electrical equipment package to start, stop, sequence and modulate pump speeds smoothly and efficiently, and reliably control the system to provide variable flow rates with constant discharge pressure based on operator set point and system demand. Control to accommodate (3) pumps total for River and (6) pumps total for Main, each installed in parallel configuration. River is all pumps VFD driven, Main is two pumps VFD driven and remaining pumps are soft starter driven. Both stations should allow for primary VFD pump selection. Sequence of operation; in automatic mode with all pumps enabled, primary VFD pump is to start and ramp up in speed and modulate to meet the pressure set point. If VFD pump reaches 100% speed and set point is not satisfied, control to sequence on a second pump at constant speed. VFD pump continues to run and modulate in conjunction with constant speed pump running to maintain set point. If VFD pump again reaches 100% speed and set point is still not satisfied, control to sequence on another constant speed pump, and so on. If pressure set point is exceeded, control to sequence pumps in reverse of described above. Primary VFD pump should to go to minimum speed before any constant speed pump is shut off. The control is to include a PID loop type algorithm, with internal timers to prevent excessive pump cycling. Control to also incorporate all safeties.

5.02 Variable speed control package shall include instrumentation (not limited to); discharge pressure transmitter, discharge temperature transmitter, discharge water flow meter, River sump level transmitter and sump low level shut down switch assembly, Main suction pressure transmitter and pump low suction pressure switches, seal temperature shut down switches (all VFD pumps), and a room temperature transmitter.

5.03 All logic control for the variable speed systems shall be handled by a PLC as an integral part of the control. A separate set point controller is NOT acceptable.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

5.1 SWITCHBOARDS - Square D type QED

5.11 Switchboards shall be supplied as follows unless otherwise noted:

- System Ampacity for main switchboard to be;
  - River – (1) 1200 amp 80% rated per NEC.
  - Main – (2) 2000 amp 80% rated per NEC.
- 480Y/277, 3 phase, 4 wire, 60Hz.
- NEMA 1 Indoor. Free Standing.
- Main circuit breaker disconnect with GFI protection.
- Short Circuit Capability:
  - River - 35,000 AIC, no series ratings allowed.
  - Main - 65,000 AIC, no series ratings allowed.
- Tin Plated Copper Bussing.
- Cable Connection - Bottom Feed.
- Front & Rear Access.
- U.L. Service Entrance Labeled.
- Switchboard overall Unit Nameplate.
- Square D type QED

5.12 Switchboard Branch Group Mounted Breakers shall be as follows unless otherwise noted:

- Quantity/Phase/Ampacity: Per the drawings
- Molded Case Thermal Magnetic type.
- Short Circuit Capability: River 35,000 AIC, Main 65,000 AIC.
- Adjustable Magnetic Trip for frame sizes greater than 100 Amp.
- Push-To-Trip button for all breakers.
- Nameplates for each breaker.
- Padlocking Capability for all breakers.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

5.0 ELECTRICAL EQUIPMENT CONTINUED

5.13 Switchboard Lightning/Surge Protection shall be as follows:

- Total Power Dissipation = 900 Joules
- Peak Current, Single Pulse = 40,000 Amps
- Maximum Clamping Voltage = 1,350 Volts

5.2 PANELBOARDS - Square D type NQOD.

5.21 Panelboards shall be supplied as follows unless otherwise noted:

- System Ampacity and Voltage; PB-1, 208/120 V/3ph4w/60, 100 A MCB
- 100 amp rated Main Circuit Breaker
- Quantity/Ampacity; Per the drawings
- NEMA 1 Indoor. Surface (Wall) Mount.
- Short Circuit Capability: 10,000 AIC
- Bottom Feed.
- Tin Plated Copper Bussing.
- Bolt-On type Branch Breakers.
- Panelboard overall Unit Nameplate and Directory Nameplate.
- Square D type NQOD

5.3 GENERAL PURPOSE TRANSFORMERS - Square D EE30T3H.

5.31 General Purpose, Low Voltage Transformers shall be as follows unless otherwise noted:

- 30 KVA transformer
- 480V/3/60 Delta Primary, 208/120 V/3/60 Secondary
- Ventilated, indoor type. 150 Degree C Rise.
- Core and Coil assemblies mounted on rubber isolation pads.
- Tested to meet or exceed IEEE, NEMA and ANSI standards.
- Square D type EE30T3H

5.4 ADJUSTABLE FREQUENCY DRIVES

ABB type ACS-550-PC.

5.41 Adjustable Frequency Drives shall be as follows unless otherwise noted:

- Capacity -
  - River; 200 HP, 480 V/3 ph, continuous loading capability.
  - Main; 400 HP, 480 V/3 ph, continuous loading capability.
- NEMA 1, IP21/UL type 1 indoor. Free Standing.
- Variable Torque pump and fan loads.
- Input Line Reactor.
- Input Fused Disconnect Switch, with 65,000 AIC min. rated input fusing.
- Door mounted Keypad Control Panel, minimum 4 lines, 20 characters.
- Local-Remote selector.
- Local speed control with Keypad.
- 480V input, +10%, -15%, imbalance +/- 3% phase-phase.
- Maximum motor cable length of 300 meters.
- 98% efficiency at nominal power level.
- -15 to 40 Deg.C (5-104 Deg.F) Operating Temperature.
- (3300 feet) installation altitude with NO derating.
- (2) Analog Inputs, (2) Analog Outputs.
- 250mA, 24vDC power supply for user Auxiliary Power.
- (6) Digital Inputs, (3) Relay Outputs, Form C.
- UL rated in accordance with NEC for solid state Motor Overload function, UL508C.
- Serial communications RS485, Modbus protocol.

5.42 Display and configuration shall be as follows unless otherwise noted:

- 4 Line Display of Reference, Motor Speed, Motor Current and Digital Inputs.
- Configuration of Motor Current Limit.
- Configuration of Auto-Restart and time delay between restarts.
- Configuration of Motor Stall trip.
- Configuration of Motor Overload trip.

5.5 ELECTRONIC REDUCED VOLTAGE STARTERS -

Benshaw type Redistart Micro MX2, model RB-2.

5.51 Solid State Starters shall be as follows unless otherwise noted:

- NEMA 1 Indoor. Free Standing.
- Capacity – Main 400 HP, 480 V/3ph, continuous loading capability.
- Pump application, standard duty 350% capability for 30 seconds.
- 65,000 AIC min. rated input fusing.
- SCR Solid State.
- Door mounted Keypad Control Panel, minimum 2 lines, 16 characters.
- Local-Off-Remote selector, Illuminated Start push button.
- 480V input, +10%, -10%.
- -10 to 40 Deg.C (14-104 Deg.F) Operating Temperature.
- (3300 feet) installation altitude with NO derating.
- Fused CPT sized sufficiently for complete operation of starter and cooling fans.
- (1) Analog input, (1) Analog output, (3) Digital Inputs, (3) Relay Outputs.
- Serial communications RS485, Modbus protocol.
- UL rated in accordance with NEC for solid state Motor Overload function.
- Motor current sensing by use of CTs and/or separate converter module.

5.52 Display and configuration shall be as follows unless otherwise noted:

- Display of Runtime Hours, Input Voltage and Motor Current for each phase.
- Configuration of “Pump Option” ramp starting and stopping curve.
- Configuration of Motor Current Limit.
- Configuration of Auto-Restart and time delay between restarts.
- Configuration of Motor Stall trip.
- Configuration of Motor Overload trip.
- Configuration of Overload Class.
- Configuration of Undervoltage trip level and time delay.
- Configuration of Overvoltage trip level and time delay.
- Configuration of Unbalance trip level and time delay.
- Configuration of Phase Reversal trip.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

5.6 PUMP PLC CONTROL PANEL

5.61 General Pump Control Panel requirements shall be as follows unless otherwise noted:

- UL 508A labeled.
- Complete wiring and layout drawings.
- Complete list of all panel components by manufacturer catalog number.
- NEMA 4 Hoffman type enclosure, wall mount.
- NEMA 4 door pilot devices and touch-screen operator interface.
- All wiring to be clearly tagged with printed wire markers.
- All PLC I/O external to panel to be through terminal blocks.
- All terminals blocks to be clearly tagged with printed terminal markers.
- Provide spare control fuses.

5.62 Internally Mounted Pump Control Panel hardware shall be as follows unless otherwise noted:

- Analog and Digital I/O as required.
- Ethernet communication network capability for connection to each pump station and to a remote interface system, see sections 5.65 and 5.70.
- Allen-Bradley MicroLogix processor with EEPROM backup.
- Internal light and 120V outlet for laptop usage.
- Current limiting control power Circuit Breakers for 120V distribution.
- Separate breakers for PLC, Field Inputs, Field Outputs, and Auxiliaries.
- 24vDC Power Supply for all field instruments.

5.63 Externally Mounted Pump Control Panel hardware shall be as follows unless otherwise noted:

- C-More model EA9-T12C 12” color Touch-Screen display with USB flash drive.
- Ethernet communication capability.
- PLC Manual-Off-Auto selector switch.
- Fault/Reset illuminated push button.
- VFD speed control for PLC Manual mode.
- On-Off illuminated pump selector switches for each motor.

5.6 PUMP PLC CONTROL PANEL CONTINUED

5.64 All Software Functions described below shall be available for user field configuration through operator interface touchscreen without use of a laptop or programming device. Provide fully programmed PLC and touch-screen interface as follows:

- Diagnostic capability to view all Digital and Analog input status values in processor.
- User setting of Discharge & Suction Pressure PID control.
- User setting of Upper Station Suction Pressure PID control.
- User configured DeadBand pressure values and pump sequence times for start and stop.
- User configured alarms and trip times for Low Suction Pressure, Low Discharge Pressure etc.
- User configured number of pumps installed. Allow up to 8 pumps total.
- User configured pump deadhead pressure value.
- User configured Pipe Fill alarm settings for Fill Mode monitoring.
- Other user configured parameters as normally needed for typical pump applications.

5.65 Network interface capability via PLC control panel ethernet communication port. Ability to remotely view and control the pump station from either pump station or vice versa, or optional remote operator control panel, or secure browser interface. Owner to provide network connection at pump stations with fixed IP address. Also see section 5.70 below.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

5.7 REMOTE INTERFACE SYSTEM - OPTIONAL

5.70 Remote System Interface, provide as follows:

- Remote operator touch screen interface, field installed by owner in the shop valve station (old main pump house location).
- For communication with new River and Main pump stations PLC control panels via owner's computer network, Ethernet type connection, IP addressable.
- Provide C-More EA9-T12C color touch screen with complete wiring drawings.
- Ability to enable/disable individual pumps remotely.
- Ability to view River and Main pump stations remotely.

Note: Quote remote interface as option with price adder.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

6.0 PUMP STATION AND ACCESSORIES

6.1 PUMP STATION ACCESSORIES

6.10 Provide pump suction (main pump station only) and pump discharge accessories and manifold(s) as listed below;

River –

- Pump discharge check valves, class 150 rated wafer style, CS body and disc, 316 SS shaft and spring, Gulf (Tyco Valve Company).
- Pump discharge isolation valves, 285 psi rated wafer style, ductile iron body, AL-Bronze disc, 316 SS shaft and spring, Keystone or equal.
- Pump station drain valve, 4”-class 150 rated waffer style butterfly valve, CS body, 316 SS disc, with electric actuator, Bray series 40 valve with series 70 actuator.

Main -

- Pump suction isolation valves (Main pump station only), 285 psi rated wafer style, ductile iron body, AL-Bronze disc, 316 SS shaft and spring, Keystone or equal.
- Pump suction manifold combination air release / vacuum valve, 300 psi WP rated, Val-Matic model 103S, with 3” NPT inlet isolation ball valve, 300 psi rated.
- Pump discharge check valves, class 300 rated waffer style, CS body and disc, 316 SS shaft and spring, Gulf (Tyco Valve Company).
- Pump discharge isolation valves, class 300 rated waffer style butterfly valve, CS body, 316 SS disc, with gear operator, Bray series 42.
- Pump station drain valve, 4”-class 3000 rated flanged body gate valve, CS body, OS&Y, with hand wheel, Bonney Forge.

River and Main -

- Pump expansion coupling assemblies, 1000 psi rated, Victaulic or equal.
- Pump flanges, gaskets, bolts and piping.
- Pump piping supports.
- Pump discharge pressure gauge assemblies; instrument block valve, liquid filled pressure gauge, fittings and piping.
- Manual by-pass 2” minimum size, 1000 psi rated, for throttling by-pass to atmosphere, with piping, fittings and supports.
- Manifold drain valves, 1” minimum size, 600 psi rated, with piping, fittings and supports.
- Suction (Main only) and discharge manifold pressure gauge assembly; instrument block valve, liquid filled pressure gauge, fittings and piping.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

6.1 PUMP STATION ACCESSORIES CONTINUED

6.11 Provide the following control item and incorporate in the variable speed control system package (see section 5.02);

River –

- Discharge water flow meter, 4-20ma output, 10”-150# full bore flanged body magnetic type, Krohne Enviromag 2100C with IFC 100C.
- Discharge pressure transmitter, 4-20 ma output, Wika, with block valve, fittings and piping.
- Discharge water temperature transmitter, 4-20 ma output, Wika, with SS thermowell.
- All (VFD) Pumps - high seal temperature shut down switch, Kolbold, with fittings and piping.
- Wet well level transmitter, 4-20 ma output, submersible pressure type, Wika, with 50 ft. of submersible cable assembly.
- Wet well level switch assembly, for low water level pump shut down, N.O. contact, 120 V/1/60 rated, for 19’-0” pump length.

Main –

- Discharge water flow meter, 4-20ma output, 10”-300# full bore flanged body magnetic type, Krohne Enviromag 2100C with IFC 100C.
- Suction pressure transmitter, 4-20 ma output, Wika, with block valve, fittings and piping.
- Discharge pressure transmitter, 4-20 ma output, Wika, with block valve, fittings and piping.
- Discharge water temperature transmitter, 4-20 ma output, Wika, with SS thermowell.
- All VFD Pumps - high seal temperature shut down switch, Kolbold, with fittings and piping.

6.2-3 PUMP STATION ASSEMBLY

6.20 All electrical controls (PLC, VFD, and starters) to be 3rd party inspected and labeled compliant with UL508A and NFPA 79 (NEC 2011 or newer).

6.21 All wiring insulation in conduit, raceways, and internal to control panels to be 600V rated. Run Ethernet/Modbus Cat5 cable to separately from other cabling whenever possible. Any external control field wiring connected to the pump station to be 600V rated.

6.22 Provide ground lugs (4/0 cable size) for piping before flowmeter.

6.23 Provide a prefabricated pump skid arrangement, incorporating pumps and motors, pump suction and discharge accessories, suction and discharge manifolds, electrical and controls. This prefab arrangement is designed to reduce field installation time and costs.

6.24 Pump skid shall incorporate all pumps, suction and discharge accessories, instrumentation and safety interlocks, mechanically and electrically assembled and mounted on the skid. Pumps and motors to be shipped separately and installed on site by owner/owner's contractor, after the pump skid has been set in place and leveled. All electrical switch gear (service, disconnects, VFD, starters, control panel, secondary distribution) mounted and wired on the skid.

6.25 The pump station base shall be designed and fabricated to provide proper structural support for all attached equipment. The base shall supply sufficient rigidity to withstand the stresses of reasonable and competent transport to site, off loading, installation and operation. Main structural members shall be constructed from channel or I-beam steel. Provisions shall be made in the station base for off loading and handling the station at the site of installation. Base shall include 1/2" steel deck plate and 1/2" steel plate mounted under pump discharge heads. All deck plate and pump mounting plate shall be 100% seal welded on the outside of the skid to the main structural members, and also skip welded on the inside of the skid. Wet well access (if applicable) shall be covered by removable ¼" deck plate. Critical frequency of complete pump station shall be above all operating frequencies.

6.26 Piping; all piping shall be constructed from ASTM A-53, grade B or ASTM A105 (as applicable), schedule 40 pipe or heavier as required to maintain a 3 to 1 pressure safety factor (including 1/16" corrosion allowance).

6.27 Paint; structural steel, piping and supports shall be grit blasted per SSPC-10 to a near white metal condition. The cleaned surfaces shall thereafter be painted with an industrial grade 2 part epoxy paint to a thickness of no less than 3 mils. The deck surface shall also be non-skid painted.
All piping shall be color coded (low pressure light blue and high pressure dark blue). After piping, label piping with industrial adhesive process pipe markers and flow direction indication arrows.

6.28 Fasteners; all fasteners used in the assembly of the pump station shall be GR5 zinc plated steel or stainless steel to retard corrosion.

6.2-3 PUMP STATION ASSEMBLY CONTINUED

6.29 Suction valving (Main only) shall be ANSI rated for maximum supply pressure and mount directly on the pump suction. Discharge valving shall be ANSI rated for pump shut off pressure and include a check valve mounted directly on the pump discharge, a butterfly type discharge isolation valve with gear and hand wheel operator, flexible piping and coupling assembly (Victaulic or equal), and shall be properly supported.

6.31 Suction and Discharge header assemblies and all piping spools shall be fabricated from A-53 grade B steel pipe with a minimum pressure rating of 1.5 times maximum pump operating pressure. Headers are to be properly supported. ANSI rated flange connections to be provided for customer field piping mating connections to the pump skid.

6.32 All welding to be performed by qualified welders. Pipe welding per specification API 1104 and structural welding per AWS D1.1.

6.33 All instrumentation and safety interlock devices shall be pre wired on the skid to clearly marked customer field connections terminal blocks.

6.34 Structural steel; Specification ASTM A-36

6.35 Steel Pipe (3” nominal diameter and larger);
Specification ASTM A-53, Grade B (minimum)

6.36 Steel pipe (2 ½” nominal diameter and smaller);
Specification - ASTM A-105, Grade B (minimum)

6.37 Weld Fittings; Specification - ASTM 234, Std weight, Grade B carbon steel, Beveled ends for welding (30 deg. bevel), Ratings, dimensions, tolerances, markings and weld bevel per ANSI B16.9, Pressure and temperature ratings equal to seamless pipe of equal size, wall and material grade, all elbows to be long radius type unless otherwise specified.

6.38 Steel Flanges; Forged carbon steel, Class 150 & 300 rated per ASTM A105, grade 1, Dimensions and tolerances per ANSI B16.5, Raised face , Ratings; Class 300 - 720 psig max. non shock, Class 150 - 270 psig max. non shock Gaskets; flat ring type with corresponding flange pressure rating.

6.39 Threaded Fittings; Specification - ASTM A197, malleable iron or forged steel, Pressure/Temperature ratings and dimensional tolerances per ANSI B16.3 (to 3” size), threaded to NPT specifications, class 300 (XH) minimum, finish black unless otherwise specified.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

7.0 INSTALLATION AND WARRANTY

7.10 The owner/owner's contractor shall be responsible for providing all materials, equipment, and labor necessary to install all items associated with the pump station.

7.11 Installation of the pump station is the responsibility of the owner/owner's contractor (not the manufacturer/pump station supplier).

7.12 Start Up; when discharge piping, electrical connections, and electrical inspection have been completed, the pump station manufacturer shall be contacted for start up. A minimum of one week notice will be given to the manufacturer prior to scheduled start up date. During start up, the complete pumping system shall be given a running test of normal start and stop, and fully loaded operating conditions. During this test, each pump shall demonstrate its ability to operate without undue vibration, or overheating and shall demonstrate its general fitness for service. All defects shall be corrected and adjustments made at the expense of the pump station manufacturer. Testing shall be repeated until satisfactory results are obtained.

7.13 After the station start up has been completed, but before leaving the job site, a training session will be given. The training session will be given to the owner or owner's representative to familiarize them with the pumping system operation, maintenance and adjustments.

7.14 Warranty shall be a minimum of 12 months from date of certified start-up, or 18 months from date of shipment, which ever occurs first. Vendor warrants that the equipment shall be new, free of defects in materials and workmanship, and shall be of type and quality described in this specification.

SPECIFICATIONS FOR PREFABRICATED PUMP STATIONS SPIRIT MOUNTAIN SKI AREA, MN

APPENDIX

River -

- General Arrangement outline drawing, drawing number 782013-M12, Rev 0, dated 9-29-14.
- Electrical one-line & control diagram, drawing number 782013-E12, Rev 0, dated 9-29-14.
- 782013-R B.O.M (Bill of Materials) dated 09-29-2014, 3 pages.

Main -

- General Arrangement outline drawing, drawing number 782013-M22, Rev 0, dated 9-29-14.
- Electrical one-line & control diagram, drawing number 782013-E22, Rev 0, dated 9-29-14.
- 782013-M B.O.M (Bill of Materials) dated 09-29-2014, 3 pages.

END OF SPECIFICATION

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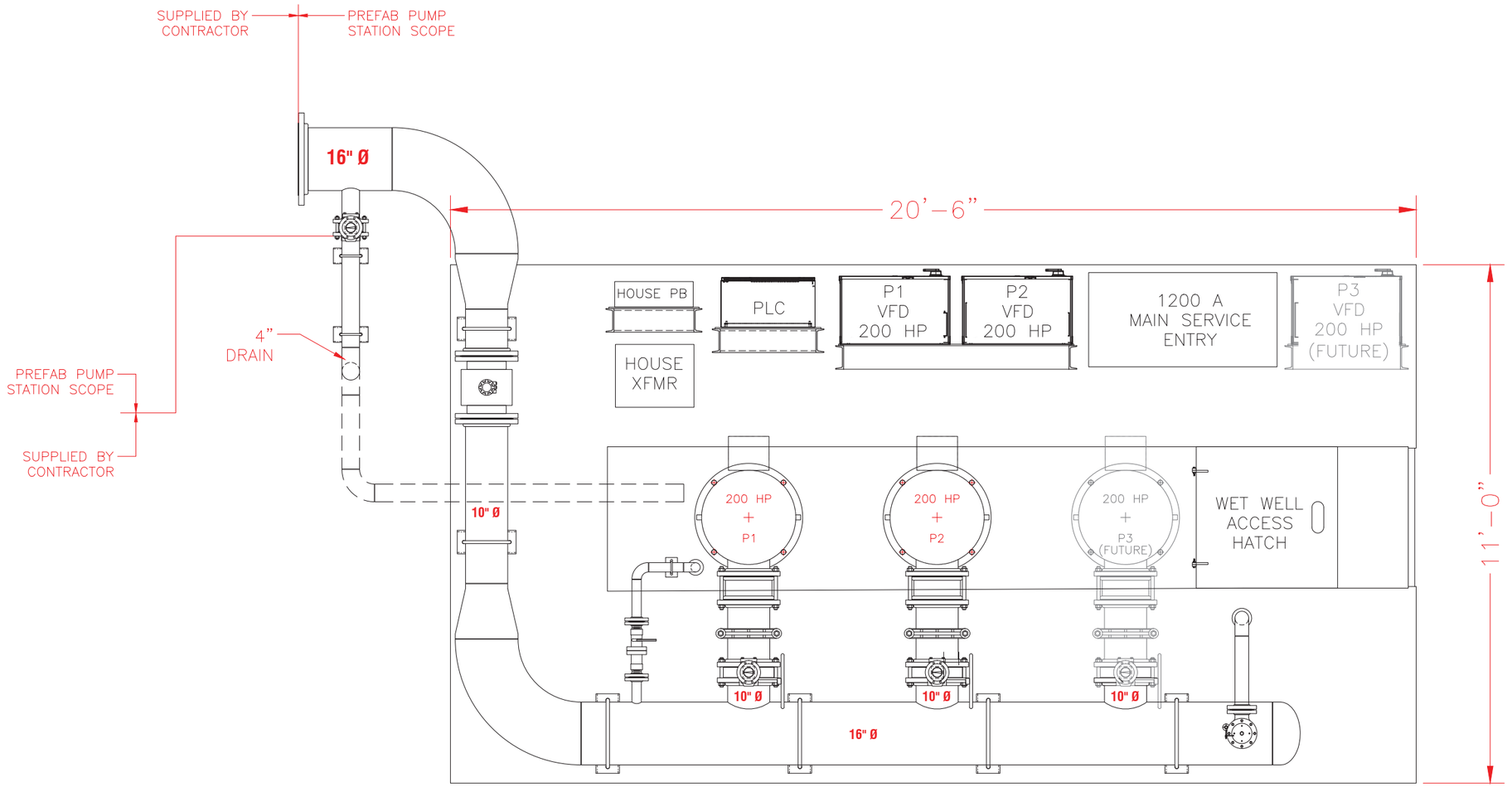


PLAN VIEW

SCALE: 3/4" = 1'-0"

REF: SPECIFICATION 782013-001

SPIRIT MOUNTAIN SKI AREA, MN
RIVER PREFABICATED PUMPSTATION

NO.	DATE	REVISION	BY
0	9-29-14	FOR QUOTE	JDM
1	10-08-14	UPDATED	JDM
2			
3			

TORRENT Engineering and Equipment
P.O. BOX 270 MILFORD, IN 46542 USA
Phone: (574)-658-3200 Fax: (574)-658-3229 www.torrentee.com

SPIRIT MOUNTAIN SKI AREA, MN
RIVER PREFABRICATED PUMPSTATION
PLAN VIEW

DRAWN BY: JDM	CHECKED : MRM
DATE: 10-08-2014	APPROVED : JDC
SCALE: AS NOTED	D - SIZE DRAWING
DRAWING NUMBER : 782013-M12	
REV : 1	SHEET : 1 OF 1

LOAD SUMMARY

LOAD	DESCRIPTION	HP	AMPS	SWBD CB (AMPS)
RP1	RIVER PUMP #1 - VFD	200	230	350
RP2	RIVER PUMP #2 - VFD	200	230	350
RP3	FUTURE RIVER PUMP #3 - VFD	200	230	350
TVSS	SURGE SUPPRESSOR		0	30
T1	30 KVA TRANSFORMER		36	50
HTR1	10 KW HEATER 1		13	20
HTR2	10 KW HEATER 2		13	20
CU1	CUSTOMER USE / SPARE		40	50
CU2	CUSTOMER USE / SPARE		40	50

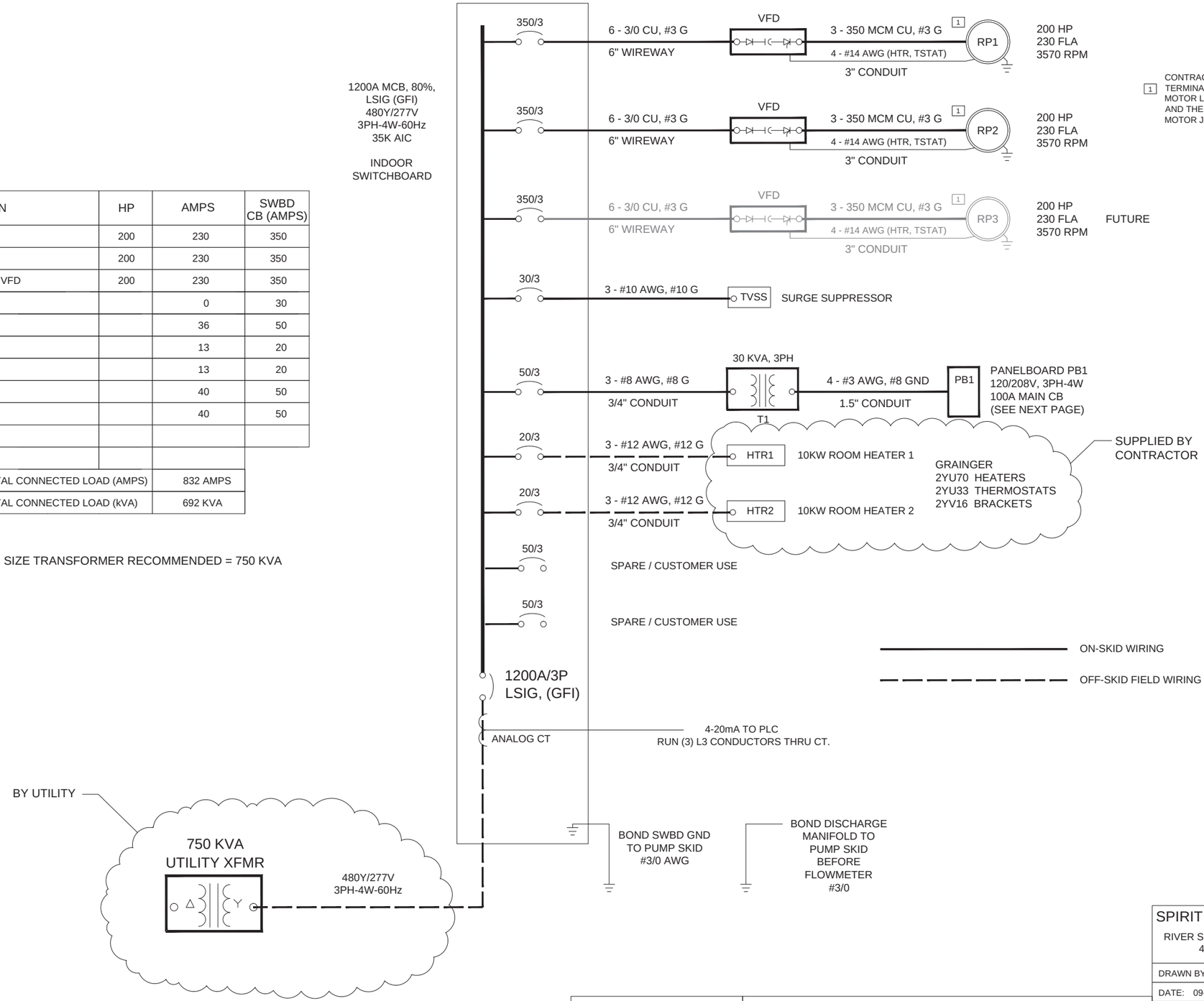
TOTAL CONNECTED LOAD (AMPS)	832 AMPS
TOTAL CONNECTED LOAD (kVA)	692 KVA

MINIMUM SIZE TRANSFORMER RECOMMENDED = 750 KVA

MAIN SWITCHBOARD

1200A MCB, 80%,
LSIG (GFI)
480Y/277V
3PH-4W-60Hz
35K AIC

INDOOR
SWITCHBOARD



1 CONTRACTOR TO FIELD TERMINATE FACTORY SUPPLIED MOTOR LEAD, SPACE HEATER AND THERMOSTAT WIRING AT MOTOR J-BOXES.

NO.	DATE	REVISION	BY
0	09-29-2014	INITIAL DRAWING RELEASE	CAD

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SPIRIT MOUNTAIN SKI AREA

RIVER SNOW MAKING PUMP STATION
480V POWER ONE-LINE

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E12	
REV : 0	SHEET : 1 OF 3

PANELBOARD PB1
208Y/120V-3PH4W-60Hz

	20/3	1	2	20/1	2 - #12, #12 G INTERIOR LIGHTS
SPARE		3	4	20/1	2 - #12, #12 G INTERIOR LIGHTS
		5	6	20/1	2 - #12, #12 G EXTERIOR LIGHTS
SPARE	30/1	7	8	20/1	2 - #12, #12 G RECEPTACLES
SPARE	20/1	9	10	20/1	2 - #12, #12 G RECEPTACLES
SPARE	20/1	11	12	20/1	SPARE
SPARE	20/1	13	14	20/1	SPARE
SPARE	20/1	15	16	20/1	SPARE
SPARE	20/1	17	18	20/1HID	SPARE
SPARE	20/1	19	20	20/1HID	SPARE
SKID PB1 GFCI RECEPTACLE 2 - #12, #12 G	20/1	21	22	20/1	SPARE
PLC PANEL 2 - #12, #12 G	20/1	23	24	20/1	SPARE
P1 MOTOR SPACE HEATER 2 - #14, #14 G	10/1	25	26	20/1	SPARE
P2 MOTOR SPACE HEATER 2 - #14, #14 G	10/1	27	28	20/1	SPARE
P3 MOTOR SPACE HEATER 2 - #14, #14 G	10/1	29	30	20/1HID	2 - #12, #12 G

MCB 100/3

N Gnd

SUPPLIED BY CONTRACTOR

SUPPLIED BY CONTRACTOR

TSTAT

SET @ 75F

L INLET LOUVER

F FAN 0.75 HP, 11 AMP

GRAINGER
7CF08 36" FAN, 0.75 HP, 120V
3C310 36" EXHAUST SHUTTER
3C131 36" INLET DAMPER, 120V
4LZ94 THERMOSTAT

FROM 50/3 BREAKER:
3 - #8 AWG, #8 GND
3/4" CONDUIT

30 KVA

480V

G

H1 H2 H3

3 3 3

SQD EE30T3H

X0 X1 X2 X3

208Y/120V

G N X1 X2 X3

4 - #3 AWG, #8 GND
1.5" CONDUIT

X1 X2 X3 N G

NO.	DATE	REVISION	BY
0	09-29-2014	INITIAL DRAWING RELEASE	CAD

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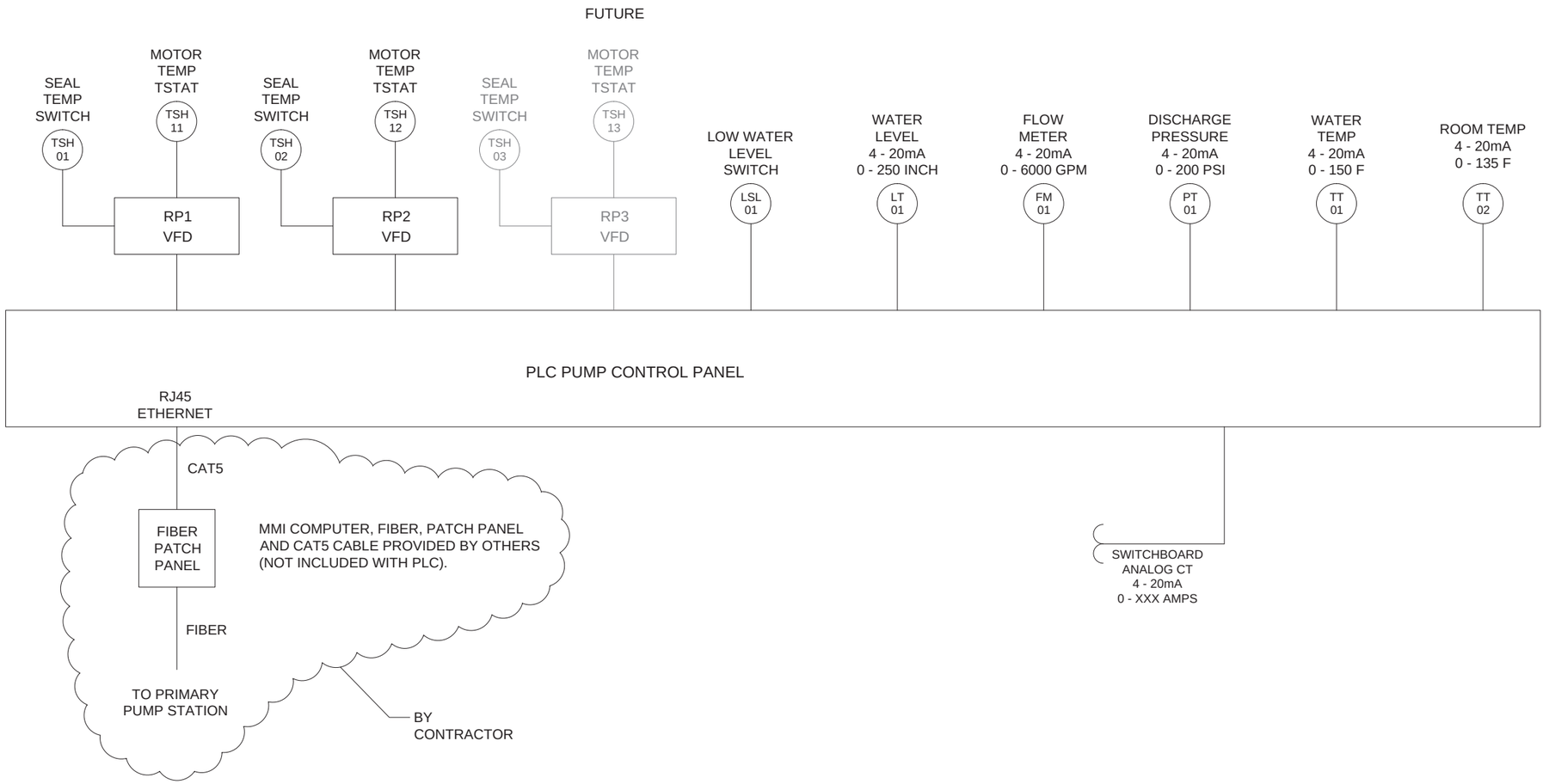
SPIRIT MOUNTAIN SKI AREA
RIVER SNOW MAKING PUMP STATION
120/208V POWER ONE-LINE

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E12	
REV : 0	SHEET : 2 OF 3



NO.	DATE	REVISION	BY
0	09-29-2014	INITIAL DRAWING RELEASE	CAD

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SPIRIT MOUNTAIN SKI AREA

RIVER SNOW MAKING PUMP STATION
CONTROL BLOCK DIAGRAM

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E12	
REV : 0	SHEET : 3 OF 3

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	P-01 to P-02	**Vertical Wet Well Pump:** Rated 2,000 gpm @ 230' TDH (100psi) total discharge pressure.		Flowserve (IDP). Model 15EMM-3 stage. 10" 125# discharge. 19'-0" overall pump length including strainer. 10" threaded column pipe. Plan 13 steel seal flush piping. 416 SS bowl & column shaft. Class 30 cast iron bowl & bronze impellers. Packed box shaft seal.	2
	M-01 to M-02	**Vertical Hollow Shaft Motor:** 200 HP, 1800 RPM, 460/3/60, WP-1, 1.15SF, Inverter duty rated.		US 445TP, NRR 16-1/2 BD, 2-5/16 Bore Diameter, Code G Includes 120VAC space heaters and N/C thermostats..	2
	E1	**Main Service Entry & Power Distribution Panel:** Main circuit breaker w/ GFI bottom feed. NEMA 1 enclosure. Includes feeder breakers for pumps and building utiltilties, utility transformer and utility distribution panel.		Square D. 1200 amp 80% bus rating. 35K AIC. 480 Volt. 3PH/4W. 60 hertz. Lockable breaker handles. Service entrance rated. Bottom incoming feed. Copper Bus. Feed breakers for pumps and accessories.	1
	E2	**Pump Station Control PowerTransformer:** 460-220Y/120V, 3phase, 4wire, Nema 1.		Square D 30kVA.	1
	E3	**Pump Station Control Power Panelboard:** Breaker panel for lighting and building utilities.208Y/120V, 3phase, 4wire, Nema 1,		Square D NQMB. 10K AIC. 100 MCB, 22 Circuit, Includes branch circuit breakers as needed,	1
	E4	**PLC Control Panel:** Control hardware and operator Interface. Microprocessor based with 12" C-More TouchScreen operator interface. Ethernet network compatible.		A-B Micro 1400 Nema 12, Memory Mod, Ethernet, Analog & Discrete I/O, 24DC Power Supply, Ethernet C-More 12' TouchScreen, H-O-A, Fault Light, Reset, Individual Pump Switches. NEMA 12 enclosure with inside maint. light. Phenolic ID tags. (36"H x 24"W x 12"D)	1
	E4.1	**TorrentLogic Software :** PLC logic software for modulating pump speed to control pressure and cycling of constant speed pumps. Installed in PLC panel and Touchscreen, the software allows the operator to access settings and status screens. Software also includes optional Inputs and Outputs for weather, water levels, streamflows, cooling towers, compressors and is capable of control based on pressure, flow, level or temp. Multiple site networking allows for control and viewing of other remote PLC locations via comm cable, fiber network or radio modem.		Software operation features include: Pressure setpoint and actual display. Flow rate and flow total display w/ reset. Pump Run status display. Alarm status and time/date log display. Pump run time log display. Pump run time rotation. Automatic line-fill mode. Automatic start/stop. Automatic restart after power failure. Low water supply alarm and shutdown. Low discharge pressure alarm and shutdown. High discharge pressure alarm and shutdown. High pump temp alarm and shutdown. User configurable I/O and calibration screens.	
	E5	**200 HP Variable Frequency Drive:** 460V, 50-60Hz, 245Amp, Nema 1, Circuit Breaker Disconnect Switch, Input Line Reactor, keypad display with "Local-Remote" function.		ABB. Model Number: ACS550-PC-246A-4 R6 frame (47.7"H x 28.1"W x 19"D)	2
	E6	**SLAP with Box, Fuseholder and Fuses:** Surge and Lightning Protector		High Voltage Power Systems CS9168C1 , 3 phase, 4-wire surge arrestor, Hoffman A404CH, CH WMZT3D20 circuit Breaker	1
	E7	**200HP Power Cabling:** 460/3/60. Motor Control to Motor. Includes rigid & flex conduit, cable and motor termination kit.		Torrent	2
	E8	**24VDC Instrument Cabling:** 24VDC. Instruments to control panel termination. Includes rigid & flex conduit, j-box and cord grip.		16ga. Type MTW conductors, color coded, 600V.	3
	E9	**4-20ma Instrument Cabling:** 4-20ma Instruments to control panel termination. Includes rigid & flex conduit, j-box and cord grip.		Carol. C1202.18.01. 18/2 Black. Shielded .	4
	FSL-01	**Float Switch:** Measures water level. Normally closed, open on fall, close on rise.		PK2NOW50 Orange Level Switch N.O, Open on fall, close on rise. 50' cable.	1

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	PG-01	**Pump Discharge Pressure Gauge / Isolation Valve Assembly:** 0-200 psi range, 1/2" NPT, Includes 1/2" pipe fittings		Wika. Gauge Type 213.53, SS case. Glycerine filled. With Iso Valve Type 910.11. CS body. And 1/2" pipe fittings.	2
	PG-02 PT-01	**Pressure Gauge / Pressure Transmitter / Isolation Valve Assembly:** PG 0-200 psi range, 1/2" NPT, PT 0-200 psi range, 1/4" NPT Includes 1/2" pipe fittings		Wika. Gauge Type 213.53, SS case. Glycerine filled. With (2) wire 4-20ma output Transmitter. With Iso Valve Type 910.11. CS body. And 1/2" pipe fittings.	1
	TT-01	**Temperature Transmitter Assembly: 6" Stem** Measures process water temp. 4-20ma signal to logic control. Includes quick connection cable, receptacle, and thermowell		Wika. Temp Transmitter with 6" stem. AB Quick connection cable and recept. Alltemp Thermowell	1
	TI-01	**Thermometer:** Bi-Metal thermometer		Wika. Model 32 32040D002G4 Dual Scale F/C -40/120F & -40/50C. 3.25" face. 4" stem length.	1
	TI-01.1	**Thermowell:** Allows thermometer / switch / transmitter maintenance without draining process line.		Wika. Type TH2R. Part#50-TH2R-025-CC. 1/2" process connection,304SS, for 4" x 1/4" stem.	1
	TSH-01	**Temperature Switch:** Monitors discharge water temp on pump. Includes quick connection cable, 1/2", and 3/4" pipe fittings.		Kobold. Model TWR-5202. Stainless construction. Range (113F). N/C contact. 220VAC rated. 6' STO Cable and 1/2" and 3/4" pipe fittings.	2
	FM-01	**10" 150# Flow Meter:** Measures discharge water flow in GPM. Full bore, flanged body, magnetic type. 250 - 6100 GPM. With Signal Converter		Krohne EnvioMag 2000 Part # VB154FA0130321 IFC 100 flow converter. Includes flange mounting kit.	1
	CV-01 CV-02	**Pump Check Valve:** 10"-150# wafer Check valve **.**		Gulf 10MB15-2021-SR. Wafer style, Double disc, CS body and disc, 316SS shaft and spring, Buna-N seat	2
		Stud And Nut Set 7/8"x11"		2474-0709 B7, Zinc Plated Stud with 2 Nuts 7/8"x11"	24
		Spiral Wound Gasket		2511-0093 10" 150# Steel / Chlorite / Graphite	4
	PC-01 PC-02	**Flexible Pipe Coupling:** 10"		2310-6736 10" Victaulic Style 77, Max Pressure: 800 psi	2
		Victaulic GRV x P.E.: 10"x 12"		Victaulic groove X P.E. 10" Dia. X 12" long. Sched 40 carbon steel.	4
	BV-01 BV-02	**Isolation Valve:** 10"-250psi wafer butterfly valve with gear actuator.		10" Keystone 789-803-100-221-002. Ductile iron body, SS shaft, Aluminum-bronze disc, EDPM seat, Gear operator, 250Psi	2
		Stud And Nut Set 7/8"x8"		2474-0661 B7, Zinc Plated Stud with 2 Nuts 7/8"x8"	24
	BPV-01	**By-Pass Valve:** 2" Choke type. Allows draining and manual relief of up-stream pressure back to wet well.		Baker SPD. Model 948205811. Includes 300# flange mounting kit with studs and gaskets.	1
	PRV-01	**Pressure Relief / Backpressure valve.** 3" - angle style PRESSURE SETTING 130 psi		108G002-030111 MODEL 108-2 ANSI 150 flange conn, 1330 Model Brnz pilot Includes: Y-strainer, isolation ball valves, flow control adjustment.	1
		Spiral Wound Gasket		2511-0077 3" 150# Steel / Chlorite / Graphite	1
		Stud And Nut Set 5/8"x4"		B7, Zinc Plated Stud with 2 Nuts 5/8"x4"	4
	BV-03	**Isolation Valve:** 3"-250psi wafer butterfly valve with lever actuator**.**		3" Keystone 789-803-030-221-001. Cast iron body, Aluminum-bronze disc, EDPM seat, Lever operator, 250Psi	1
		Stud And Nut Set 5/8"x6"		B7, Zinc Plated Stud with 2 Nuts 5/8"x6"	4
	DV-01	**Isolation Valve:** 4"-150# wafer butterfly valve with electric actuator.		Bray series 40-466 4" 150# CS body, 316ss disc, 17-4 shaft, RTFE seat, TFE packing, Glass backed TFE bearing, Series 70 120 VAC electric actuator, on-off, NEMA 4, manual override, position indicator, aux. limit switches.	1
		Stud And Nut Set 5/8"x6-1/2"		2474-0269 B7, Zinc Plated Stud with 2 Nuts 5/8"x6-1/2"	8
		Spiral Wound Gasket		2511-0080 4" 150# Steel / Chlorite / Graphite	2

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	SA	**Base Structural Skid Assembly:** (3) pump wet well service. 11'-0" W x 20'-6" L Structural steel base assembly, pipe supports, electrical panel racks, access hatch. 2-part paint system treatment		Torrent	1
	DM	**Discharge Manifold Assembly:** (3) pump - class 150# 16" dia manifold x 10" dia pump connections. Includes pump discharge spool assemblies. 3"-150# PRV and 2" By-Pass valves connections. 4"-150# drain connection.		Torrent - Includes manifold pipe, end cap, pump connection flanges, thread-o-lets, spool flanges, victaulic #77 coupling and groove x plain nipples.	1
	TT-02	**Room Temperature Transmitter:** Measures room temp. 4-20ma signal to logic control.		Omega EWS-TX 0-135degF 4-20ma output for room temperature	1
	END				

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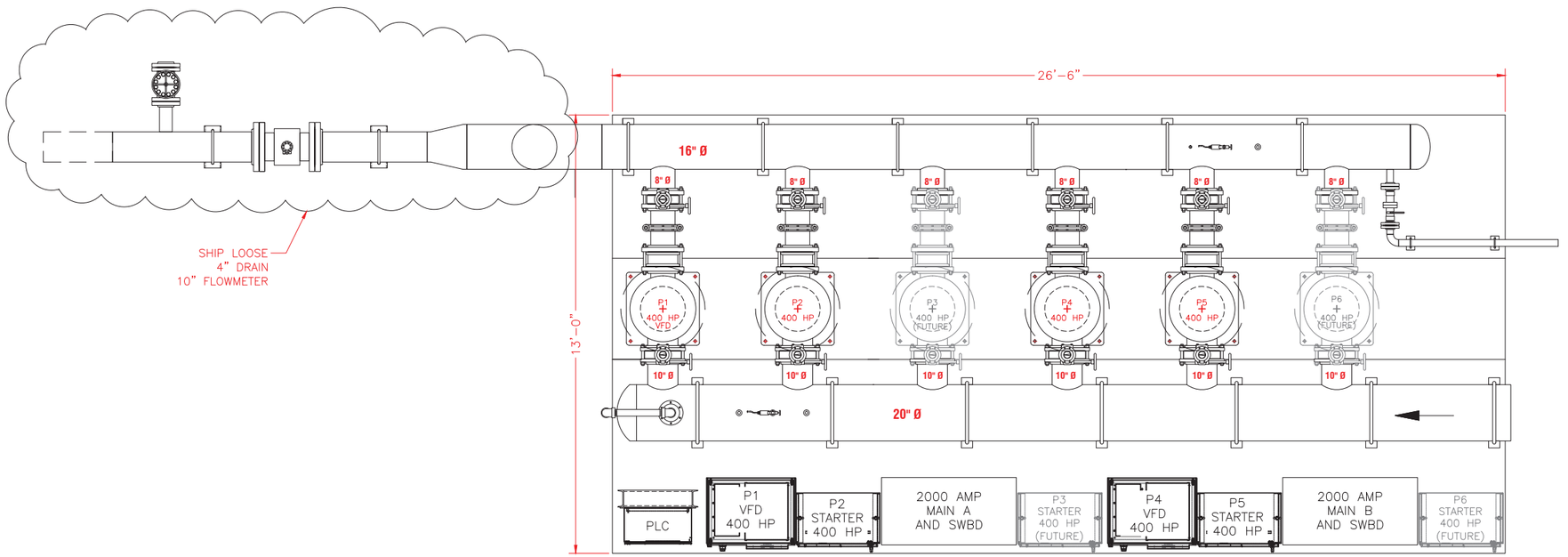

PLAN VIEW

SCALE: ½" = 1'-0"

REF: SPECIFICATION 782013-001

NO.	DATE	REVISION	BY
0	09-29-14	FOR QUOTE	JDM

SPIRIT MOUNTAIN SKI AREA, MN
SNOWMAKING MAIN PREFABRICATED PUMPSTATION

TORRENT Engineering and Equipment
P.O. BOX 270 MILFORD, IN 46542 USA
Phone: (574)-658-3200 Fax: (574)-658-3229 www.torrentee.com

SPIRIT MOUNTAIN SKI AREA, MN
SNOWMAKING MAIN PREFAB PUMPSTATION
PLAN VIEW

DRAWN BY: JDM	CHECKED : MRM
DATE: 09-29-2014	APPROVED :
SCALE: AS NOTED	D - SIZE DRAWING
DRAWING NUMBER : 782013-M22	
REV : 0	SHEET : 1 OF 1

PRIMARY- MAIN A

[1] CONTRACTOR TO FIELD TERMINATE FACTORY SUPPLIED MOTOR LEAD, SPACE HEATER AND THERMOSTAT WIRING AT MOTOR J-BOXES.

2000A MCB, 80%, LSIG (GFI) 480Y/277V 3PH-4W-60Hz 65K AIC

INDOOR SWITCHBOARD

600/3 — VFD — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P1 — 400 HP 440 FLA 3550 RPM

600/3 — SOFT-START — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P2 — 400 HP 440 FLA 3550 RPM

600/3 — SOFT-START — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P3 — FUTURE 400 HP 440 FLA 3550 RPM

30/3 — 3 - #10 AWG 3/4" CONDUIT — TVSS — SURGE SUPRESSOR

50/3 — 3 - #8 AWG, #8 G 3/4" CONDUIT — TRANSFER SW — 3 - #8 AWG, #8 G 3/4" CONDUIT

20/3 — 3 - #12 AWG + #12 GND 3/4" CONDUIT — HTR1, 10KW

50/3 — SPARE

30 KVA, 3PH — T1 — 4 - #3 AWG, #8 GND 1.5" CONDUIT — PB1 — PANELBOARD PB1 120/208V, 3PH-4W 100A MAIN CB (SEE NEXT PAGE)

SUPPLIED BY CONTRACTOR

SUPPLIED WITH PREFAB INSTALLED BY CONTRACTOR

2000A/3P 80% LSIG, (GFI) 120V SHUNT-TRIP

ANALOG CT — 4-20mA TO PLC RUN (3) L3 CONDUCTORS THRU CT.

BOND SWBD GND TO PUMP SKID 350 MCM

T1A TRANSFORMER 1500 KVA PRIMARY 480Y/277V 3PH-4W-60Hz

BY UTILITY

PRIMARY- MAIN B

[1] CONTRACTOR TO FIELD TERMINATE FACTORY SUPPLIED MOTOR LEAD, SPACE HEATER AND THERMOSTAT WIRING AT MOTOR J-BOXES.

2000A MCB, 80%, LSIG (GFI) 480Y/277V 3PH-4W-60Hz 65K AIC

INDOOR SWITCHBOARD

600/3 — VFD — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P4 — 400 HP 440 FLA 3550 RPM

600/3 — SOFT-START — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P5 — 400 HP 440 FLA 3550 RPM

600/3 — SOFT-START — 2 x (3 - 350 MCM, #1 GND) 4 - #14 (HTR, TSTAT) — 2 x 3" CONDUITS — P6 — FUTURE 400 HP 440 FLA 3550 RPM

30/3 — 3 - #10 AWG 3/4" CONDUIT — TVSS — SURGE SUPRESSOR

50/3

20/3 — 3 - #12 AWG + #12 GND 3/4" CONDUIT — HTR2, 10KW

50/3 — SPARE

SUPPLIED BY CONTRACTOR

2000A/3P 80% LSIG, (GFI) 120V SHUNT-TRIP

ANALOG CT — 4-20mA TO PLC RUN (3) L3 CONDUCTORS THRU CT.

BOND SWBD GND TO PUMP SKID 350 MCM

T1B TRANSFORMER 1500 KVA PRIMARY 480Y/277V 3PH-4W-60Hz

BY UTILITY

ON-SKID WIRING

OFF-SKID FIELD WIRING

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SPIRIT MOUNTAIN SKI AREA

PRIMARY SNOW MAKING PUMPHOUSE
480V POWER ONE-LINE

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E22	
REV : 0	SHEET : 1 OF 4

LOAD SUMMARY

LOAD	DESCRIPTION	HP	MAIN A AMPS	MAIN B AMPS	SWBD CB (AMPS)
P1	PRIMARY PUMP #1 - VFD	400	440		600/3
P2	PRIMARY PUMP #2 - SOFT STARTER	400	440		600/3
P3	FUTURE PRIMARY PUMP #3 - SOFT STARTER	400	440		600/3
P4	PRIMARY PUMP #4 - VFD	400		440	600/3
P5	PRIMARY PUMP #5 - SOFT STARTER	400		440	600/3
P6	FUTURE PRIMARY PUMP #6 - SOFT STARTER	400		440	600/3
TVSS	SURGE SUPPRESSOR		0	0	30
T1	30 KVA TRANSFORMER		36	36	50
HTR1	10 KW HEATER 1		13		20
HTR2	10 KW HEATER 2			13	20
CU1	CUSTOMER USE / SPARE		40		50
CU2	CUSTOMER USE / SPARE			40	50

TOTAL CONNECTED LOAD (AMPS)	1409 AMPS	1409 AMPS
TOTAL CONNECTED LOAD (kVA)	1171 KVA	1171 KVA

MINIMUM SIZE TRANSFORMER RECOMMENDED = 2 x 1500 KVA (TRANSFORMERS A AND B)

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SPIRIT MOUNTAIN SKI AREA

PRIMARY SNOW MAKING PUMPHOUSE
480V POWER ONE-LINE

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E22	
REV : 0	SHEET : 2 OF 4

PANELBOARD PB1
208Y/120V-3PH4W-60Hz

	20/3	1	2	20/1	2 - #12, #12 G — INTERIOR LIGHTS
SPARE		3	4	20/1	2 - #12, #12 G — INTERIOR LIGHTS
		5	6	20/1	2 - #12, #12 G — EXTERIOR LIGHTS
SPARE	30/1	7	8	20/1	2 - #12, #12 G — RECEPTACLES
SPARE	20/1	9	10	20/1	2 - #12, #12 G — RECEPTACLES
SPARE	20/1	11	12	20/1	SPARE
SPARE	20/1	13	14	20/1	SPARE
SPARE	20/1	15	16	20/1	SPARE
SPARE	20/1	17	18	20/1HID	SPARE
SPARE	20/1	19	20	20/1HID	SPARE
SKID PB1 GFCI RECEPTACLE	20/1	21	22	20/1	SPARE
PLC PANEL	20/1	23	24	20/1	SPARE
P1 MOTOR SPACE HEATER	10/1	25	26	20/1	SPARE
P2 MOTOR SPACE HEATER	10/1	27	28	20/1	SPARE
P3 MOTOR SPACE HEATER	10/1	29	30	20/1HID	SPARE

BY CONTRACTOR — 2 - #12, #12 G — INTERIOR LIGHTS / INTERIOR LIGHTS / EXTERIOR LIGHTS / RECEPTACLES / RECEPTACLES — BY CONTRACTOR

BY CONTRACTOR — 2 - #14, #14 G — SKID PB1 GFCI RECEPTACLE / PLC PANEL / P1 MOTOR SPACE HEATER / P2 MOTOR SPACE HEATER / P3 MOTOR SPACE HEATER

MCB 100/3

N Gnd

BY CONTRACTOR — 2 - #12, #12 G — TSTAT (SET @ 75F) — L INLET LOUVER — F FAN 0.75 HP, 11 AMP — BY CONTRACTOR

GRAINGER
7CF08 36" FAN, 0.75 HP, 120V
3C310 36" EXHAUST SHUTTER
3C131 36" INLET DAMPER, 120V
4LZ94 THERMOSTAT

FROM 50/3 TRANSFER SWITCH:
3 - #8 AWG, #8 GND
3/4" CONDUIT

G — 30 KVA — 480V — H1 H2 H3 — 3 3 3 — SQD EE30T3H — X0 X1 X2 X3 — 208Y/120V

G N X1 X2 X3

BY CONTRACTOR — 4 - #3 AWG, #8 GND — 1.5" CONDUIT — X1 X2 X3 N G

NO.	DATE	REVISION	BY
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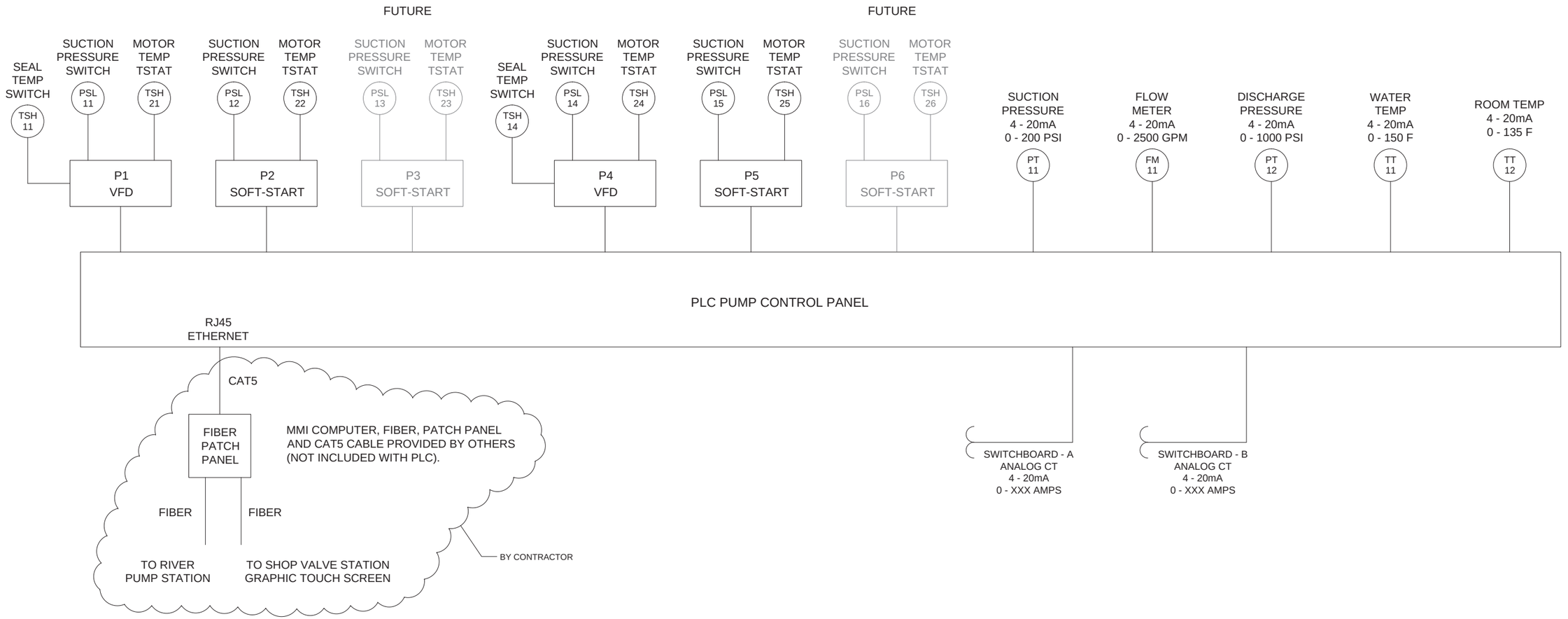
SPIRIT MOUNTAIN SKI AREA

PRIMARY SNOW MAKING PUMPHOUSE
120/208V POWER ONE-LINE

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E22	
REV : 0	SHEET : 3 OF 4



NO.	DATE	REVISION	BY
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SPIRIT MOUNTAIN SKI AREA

PRIMARY SNOW MAKING PUMPHOUSE CONTROL BLOCK DIAGRAM

DRAWN BY: RTR	CHECKED : RTR
DATE: 09-29-2014	APPROVED : MRM
SCALE: NONE	
DRAWING NUMBER : 782013-E22	
REV : 0	SHEET : 4 OF 4

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	P-01 to P-04	**Vertical Turbine Can Pump:** Rated 1000 gpm @ 1215' TDH + 125' suction = 1,340' (580psi) discharge.		Flowserve (IDP) Model 10EMM 7 stage 10" 150# X 8" 300# discharge. 16" diameter x 88" long suction can. Plan 13 steel seal flush piping. 416 SS bowl & column shaft. Class 40 cast iron bowl & bronze impellers. Mechanical seal and spacer adjustable flanged coupling.	4
	M-01 to M-04	**400HP Vertical Solid Shaft Motor:** 3550 RPM, 380/3/60. 1.15 service factor. Continuous duty. 40C Ambient. WP-1 enclosure. Class F insulation. Starting Code G.		GE Motors. Model NOCAT449V. Includes space heaters and N/C thermostat	4
	E1A and E1B	**Main Service Entry & Power Distribution Panel:** Main circuit breaker w/ GFI bottom feed. NEMA 1 enclosure. Includes feeder breakers for pumps and building utiltilties, utility transformer and utility distribution panel.		Square D. 1600amp 80% bus rating. 65K AIC. 480 Volt. 3PH/4W. 60 hertz. Lockable breaker handles. Service entrance rated. Bottom left incoming feed. Copper Bus. Feed breakers for pumps and accessories.	2
	E2	**Building Utility Transformer:** 460-220Y/120V, 3phase, 4wire, Nema 1. **SHIPPED LOOSE - INSTALLED BY CONTRACTOR**		Square D 45T8H 30kVA. (27"H x 20"W x 16"D)	1
	E3	**Building Utility Panelboard:** Breaker panel for lighting and building utilities.208Y/120V, 3phase, 4wire, Nema 1. **SHIPPED LOOSE - INSTALLED BY CONTRACTOR**		Square D NQOD. 10K AIC. 100/3 Q2main breaker, 30 Circuit, Includes branch circuit breakers as needed, (44"H x 20"W x 6"D)	1
	E4	**PLC Control Panel:** Control hardware and operator Interface. Microprocessor based with 12" C-More TouchScreen operator interface. Ethernet network compatible.		A-B Micro 1400 Nema 12, Memory Mod, Ethernet, Analog & Discrete I/O, 24DC Power Supply, Ethernet C-More 12' TouchScreen, H-O-A, Fault Light, Reset, Individual Pump Switches. NEMA 12 enclosure with inside maint. light. Phenolic ID tags. (36"H x 24"W x 12"D)	1
	E4.1	**TorrentLogic Software :** PLC logic software for modulating pump speed to control pressure and cycling of constant speed pumps. Installed in PLC panel and Touchscreen, the software allows the operator to access settings and status screens. Software also includes optional Inputs and Outputs for weather, water levels, streamflows, cooling towers, compressors and is capable of control based on pressure, flow, level or temp. Multiple site networking allows for control and viewing of other remote PLC locations via comm cable, fiber network or radio modem.		Software operation features include: Pressure setpoint and actual display. Flow rate and flow total display w/ reset. Pump Run status display. Alarm status and time/date log display. Pump run time log display. Pump run time rotation. Automatic line-fill mode. Automatic start/stop. Automatic restart after power failure. Low water supply alarm and shutdown. Low discharge pressure alarm and shutdown. High discharge pressure alarm and shutdown. High pump temp alarm and shutdown. User configurable I/O and calibration screens.	
	E5	**400 HP Variable Frequency Drive:** 480V, 50-60Hz, 602Amp, Nema 1, Disconnect Switch, Input Line Reactor, keypad display with "Local-Remote" function.		ABB. Model Number: ACS550-U2-602A-4 R8 frame (83.86"H x 31.5"W x 23.03"D)	2
	E5.1	**SLAP with Box, Fuseholder and Fuses:** Surge and Lightning Protector		High Voltage Power Systems CS9168C1 , 3 phase, 4-wire surge arrestor, Hoffman A404CH, CH WMZT3D20 circuit Breaker	2
	E6	**400 HP Motor Soft Starter:** Mail lug connection, 480/3/60, CPT, UTV Contact, UL Label, HOA Switch, Pilot Light, Nema 1 Enclosure. Full by-pass contactor.		Benshaw. Model Number: RB2-1-S-590A-18C 590 amp. Includes CPT, Start/Stop pushbuttons w/ run light, Local-Off-Remote selector switch, 30sec time delay relay with fault light. (3) control circuit relay's for remote options. Door mount operator interface.	2
	E7	**400HP Power Cabling:** 380/3/60. Motor Control to Motor. Includes rigid & flex conduit, cable and motor termination kit.			4

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	E8	**120VAC Instrument Cabling:** 120VAC. Instruments to control panel termination. Includes rigid & flex conduit, cable and quick connector at instrument end.		Carol. 86663.15.05. 18/3 STO Yellow. 60c 600V	12
	E9	**4-20ma Instrument Cabling:** 4-20ma Instruments to control panel termination. Includes rigid & flex conduit, cable and quick connector at instrument end.		Carol. C1202.18.01. 18/2 Black. Shielded .	8
	PG-01 PT-01	**Pressure Gauge / Pressure Transmitter / Isolation Valve Assembly - Suction:** PG 0-100 psi range, 1/2" NPT, PT 0-100 psi range, 1/4" NPT Includes 1/2" pipe fittings		Wika. Gauge Type 213.53, SS case. Glycerine filled. With (2) wire 4-20ma output Transmitter. With Iso Valve Type 910.11. CS body. And 1/2" pipe fittings.	1
	PSL-01	**Pressure Switch / Isolation Valve Assembly:** Protects pump from low water supply pressure. Includes Isolation Valve and 1/2" pipe fittings.		Kobold. Model KPH-8022. Aluminum. Buna-n construction. 3-30 psi range. 1/4" FNPT connection. N/O contact. 220VAC rated. With Iso Valve Type 910.11. CS body, 6' STO Cable, and 1/2" pipe fittings.	4
	TSH-01	**Temperature Switch:** Monitors discharge water temp on pump. Includes quick connection cable, 1/2", and 3/4" pipe fittings.		Kobold. Model TWR-5202. Stainless construction. Range (113F). N/C contact. 220VAC rated. 6' STO Cable and 1/2" and 3/4" pipe fittings.	1
	PG-02	**Pump Discharge Pressure Gauge / Isolation Valve Assembly:** 0-1000 psi range, 1/2" NPT, Includes 1/2" pipe fittings		Wika. Gauge Type 213.53, SS case. Glycerine filled. With Iso Valve Type 910.11. CS body. And 1/2" pipe fittings.	4
	PG-03 PT-02	**Pressure Gauge / Pressure Transmitter / Isolation Valve Assembly - Discharge:** PG 0-1000 psi range, 1/2" NPT, PT 0-1000 psi range, 1/4" NPT Includes 1/2" pipe fittings		Wika. Gauge Type 213.53, SS case. Glycerine filled. With (2) wire 4-20ma output Transmitter. With Iso Valve Type 910.11. CS body. And 1/2" pipe fittings.	1
	TT-01	**Temperature Transmitter Assembly: 6" Stem** Measures process water temp. 4-20ma signal to logic control. Includes quick connection cable, receptacle, and thermowell		Wika. Temp Transmitter with 6" stem. AB Quick connection cable and recept. Alltemp Thermowell	1
	TI-01	**Thermometer:** Bi-Metal thermometer		Wika. Model 32 32040D002G4 Dual Scale F/C -40/120F & -40/50C. 3.25" face. 4" stem length.	1
		Thermowell: Allows thermometer / switch / transmitter maintenance without draining process line.		Wika. Type TH2R. Part#50-TH2R-025-CC. 1/2" process connection,304SS, for 4" x 1/4" stem.	1
	FM-01	**10" 300# Flow Meter:** Measures discharge water flow in GPM. Full bore, flanged body, magnetic type. 250 - 6100 GPM **SHIPPED LOOSE - INSTALLED BY CONTRACTOR**		Krohne EnvioMag 2000 Part # VB154FB0130321 Hastelloy C4 electrodes and grounding rings. Hard rubber liner.	1
		24VDC Flow meter signal converter (Tube Mount) Flow meter electronics package. Includes flow converter with (1) 4-20mA output and (1) pulse output. SHIPPED LOOSE - INSTALLED ON FLOWMETER		IFC 100 flow converter, 24VDC mounted on flow tube. Includes PACTWARE Software. Part # VN314410460010100003	1
	BV-01	**Isolation Valve:** 10"-285psi wafer butterfly valve with gear actuator.		Keystone 784-803-100-221-002 10" Wafer style Butterfly Valve gear-operated	4
		Stud And Nut Set 7/8"x7-1/2"		B7, Zinc Plated Stud with 2 Nuts 7/8"x7-1/2"	48
	CV-01	**Pump Check Valve:** 8"-300# wafer Check valve **.**		Duo-Check# 08-G30-SMF. Wafer style, Double disc, CS body and disc, 316SS shaft and spring, Buna-N seat	4
		Stud And Nut Set 7/8"x11-1/2"		B7, Zinc Plated Stud with 2 Nuts 7/8"x11-1/2"	48
		Spiral Wound Gasket		8"300# Steel / Chlorite / Graphite	8
	BV-02	**Isolation Valve:** 8"-300# wafer butterfly valve with gear operator.		Flowseal # 08-3WA-121-RTG-3 CS body, 316ss disc, 17-4 shaft, RTFE seat, TFE packing, Glass backed TFE bearing, Gear Operator	4
		Stud And Nut Set 7/8"x9"		B7, Zinc Plated Stud with 2 Nuts 7/8"x9"	48
		Spiral Wound Gasket		8"300# Steel / Chlorite / Graphite	8

ITEM #	TAG	DESCRIPTION		MANUFACTURER/ MODEL/ENGINEERING DATA	QTY
	CH-01	**By-Pass Valve:** 2" Choke type. Allows draining and manual relief of up-stream pressure back to suction manifold or atmosphere.		Baker SPD. Model 948205811. Includes 300# flange mounting kit with studs and gaskets.	1
	ARV-01	**Vacuum Breaker / Air Release Valve:** Combination vacuum breaker / air release valve.		Val-Matic model 103S 300 psi rated 3"X 3" NPT	1
	DV-01	**Gate Valve:** 4"-300# Gate valve . **SHIPPED LOOSE - INSTALLED BY CONTRACTOR**		4" 300# Bonney gate valve 3-11-RF, CS body ,OS&Y Gate Valve FE T:8 P:GRF HW	1
		300# Flange Stud Set 4" Flange		B7, Zinc Plated Stud with 2 Nuts 3/4"x5"	8
		Spiral Wound Gasket		4" 300# Steel / Chlorite / Graphite	2
	SA	**Base Structural Skid Assembly:** (6) pump booster can service. 13'-0" W x 26-6" L Structural steel base assembly, pipe supports, electrical panel racks, 2-part paint system treatment. Includes space for strainer assembly.		Torrent	1
	SM	**Suction Manifold Assembly:** (6) pump - class 150# 20" dia manifold x 10" dia pump connections		Torrent - Includes manifold pipe, end cap, pump connection flanges, and thread-o-lets	1
	DM	**Discharge Manifold Assembly:** (6) pump - class 300# 16" dia manifold x 10" dia pump connections. Includes pump discharge spool assemblies.		Torrent - Includes manifold pipe, end cap, pump connection flanges, thread-o-lets, spool flanges, victaulic #77 coupling and groove x plain nipples.	1
	TT-02	**Room Temperature Transmitter:** Measures room temp. 4-20ma signal to logic control.		Omega EWS-TX 0-135degF 4-20ma output for room temperature	1
	END				

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