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Addendum 2
Solicitation 24-99199
Lower Spirit Nordic Center Lighting & Snowmaking

This addendum serves to notify all bidders of the following changes to the solicitation documents:

- Specification # 852615-100 revision 4, pages 120-128 in the Bid Package is replaced with the attached Specification #852615-100 revision 5.
- Bid Sheets have been updated in BidExpress and are attached to this Addendum.

Questions: The following questions were asked and are answered below in *Italics*

1. How soon can work begin?
 - a. *Mechanical and Electrical work that would impact the existing Nordic trails cannot start until after April 1st 2024 due to an event. Construction on the Nordic Connector and the 800M trail extension can begin as soon as the notice-to-proceed has been issued. Any construction must not impact Alpine or Nordic operations and any work must be coordinated with Spirit Mountain prior to starting or mobilizing.*
2. What other events may impact construction?
 - a. *The Bike Duluth Festival is July 19th-21st 2024. Construction must pause during this period. Staging areas will need to be secured and organized to as minimal an area as possible and reasonable. This will need to be coordinated with Spirit Mountain the week before the event.*
3. How much snowmaking pipe is to be buried?
 - a. *Contractors will only be shallow burying pipe where the local landscape requires it due to a rise or berm or where the pipe needs to cross trails and other infrastructure.*
4. In the Electrical plan set please clarify how lump sums will be paid when the quantity is more than 1? Will lighting items be paid 41 times (as shown in the Base Bid Loop 1 Lighting) or 1 lump sum?
 - a. *Under the unit price column, we include NA. The only unit pricing the bid form has requested is metal and wood poles. All other items are single lump sum. Bid forms have been updated to show Expected Quantities for reference.*

Please acknowledge receipt of this Addendum by checking the acknowledgement box within the www.bidexpress.com solicitation.

Posted: **February 2, 2024**

**SPECIFICATIONS
FOR
SNOWMAKING PIPING INSTALLATION**

**GRAND AVENUE NORDIC CENTER
SPIRIT MOUNTAIN, MN**

SPECIFICATION # 852615-100

January 31, 2024

1.0 GENERAL

2.0 SCOPE

3.0 PROJECT INSTALLATION REQUIREMENTS

4.0 MATERIALS

PREPARED BY



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1.0 GENERAL

- 1.1 This specification describes the requirements for installation of piping and associated equipment for the snowmaking system at the Grand Avenue Nordic Center, Spirit Mountain, Duluth, MN.
- 1.2 Warranty shall be a minimum of 12 months from date of installation completion and customer acceptance.
- 1.3 Contractors with at least 5 years experience in the installation of this type of materials and equipment are preferred.
- 1.4 Manufacturer names and types are used to establish standards for technical requirements and quality. All products quoted must be of equal quality, performance and construction.
- 1.5 Alternate recommendations will be accepted at the time of quotation in an addition to the specified materials and equipment, provided the intent of the system (both present and future) is met.
- 1.6 Reference – Pipeline layout # 852615-M1 Rev 7.
- 1.7 See FJJ drawings and specifications for snow making machine trail electrical design and layout.

2.0 SCOPE

- 2.1 Provide materials and install piping for snowmaking system. Installation includes; piping, fittings, valves, and hydrants.
- 2.2 Installation bid to include all materials and labor, including any incidentals such as hydrant drain bed materials.
- 2.3 Quotations are to be submitted as total price for Phase 2 and Phase 3.

Quotations are to also include unit pricing, such as \$/linear foot or \$/each, in order to make adjustments for actual installed quantities.

2.0 SCOPE CONTINUED

2.4 Piping – Supply and install the following;

1. Piping;
 1. Approximately 6,350 ft. of 4” to 8” diameter uncoated (bare steel) above ground welded steel water distribution piping. Piping to be installed on the cross country 3.3 K trail network. Scope begins at the 10” stub out tie in point to the Spirit Mountain Ski Area snowmaking system, reference point 1 on the drawing.
Phase 2 / add Alt. 5 – 3,510 ft. piping
Phase 3 / add Alt. 6 – 2,840 ft. piping
 2. See drawing 852615-M1 for pipeline layout and pipe size table.
 3. See materials section 4.1 for additional details.
2. Tie-in piping at points as shown on the drawings.
 1. Ref. Pt. 1 - Spirit Mountain Ski Area snowmaking system
3. Piping system isolation valve stations VS2, and VS3 at drawing reference pts. 7, and 8. See drawing for details.
Phase 2 / add Alt. 5 – VS2 / Pt 7
Phase 3 / add Alt. 6 – VS3 / Pt 8
4. Piping system end of line drains at drawing reference pts. 10, 10A, 12, 8B and 8D. See drawing for details.
Phase 2 / add Alt. 5 – pts. 10, 10A, 12
Phase 3 / add Alt. 6 – pts. 8B, 8D
5. All piping is to be installed on top of the ground (above ground). Except piping between points 1-2 to be deep buried below frost (freeze proof). Install piping to limit low points to drain locations only.
6. All pipe welding to be performed by qualified welders and according to specification API 1104.
7. Contractor to verify pipeline trench route and all hydrant locations.
8. Supply and install standard weld type pipeline fittings as shown on the drawings. Utilize standard weld fittings for all pipeline transitions that would otherwise cause pipeline kinking without a fitting (15 degree maximum without fitting).

See materials section 4.2 for additional details.

2.0 SCOPE CONTINUED

- 2.5 Hydrants – Supply and install the following water hydrants;
- (28) Water hydrants – 2" x 3 ft. nominal length deep bury type
See materials section 4.3 for additional details.
Phase 2 / add Alt. 5 – (15)
Phase 3 / add Alt. 6 – (13)
- 2.6 Snow machine trail electrical;
- See FJJ drawings and specifications. One each 60A/3 pedestal installed adjacent to each water hydrant. 480V/3 wiring adjacent to piping.
- 2.7 Contractor is responsible for locating all underground utilities throughout the project area.

3.0 PROJECT INSTALLATION REQUIREMENTS

3.1 Pipeline Installation

All piping is steel line pipe per piping material specification.

- Unload pipe from trucks at delivery site. Visually inspect for defects and/or damage.
- Move pipe to designated storage area.
- Move pipe to installation area. Cover opened ends with weld cap before dragging to prevent any debris from entering the pipe. Visually inspect inside of pipe for debris (dirt, rocks, etc) and remove before joining sections. Contractor to insure all pipelines are free from debris.
- Join sections of pipe. Pipe may be joined in strings before moving into final placement. Allowable method of joining pipe is welding. Any other methods are not acceptable. Pipe to be supplied in 40 ft double random lengths with beveled ends for welding, unless other arrangements are approved. Any persons performing welding are to be certified pipeline welders.
- Set pipe strings in final pipeline alignment location. Pipeline is to rest on undisturbed or properly compacted earth, and no sharp rocks or other objects. Join strings during final installation.
- Pipeline tie-ins. All pipeline junctions are to be joined together with standard weld type fittings. Long radius elbows are to be used at sharp bends. Trim standard 45 and 90 degree elbows when required to obtain non standard angles. Junction tees and reducers may not be replaced by "stub-ins".
- Any deviation from the specification must be approved.

3.0 PROJECT INSTALLATION REQUIREMENTS CONTINUED

3.2 Hydrant Installation

Quantity of hydrants – see section 2.5 above.

Installation as follows –

- Cut hole in the water pipeline for threadolet or offset elbow clearance. Do not allow cut piece to drop into pipeline.
- For direct mount hydrants; plumb vertically and weld a 2” diameter FNPT outlet extra heavy steel half coupling or 3000# steel threadolet to the pipeline, one per water hydrant.
- Install 2” x close XH threaded steel pipe nipple into threadolet.
- Install swing joint and water hydrant.
- Use Rectorseal No. 5 pipe thread sealant or equal on all threaded joint connections.

3.3 System flush and pressure testing;

Piping system to be flushed with water to insure there is no debris in the pipelines.

Completed water piping system to be pressure tested to insure system is leak free. Pressure testing is to be performed after installation of piping and hydrants. Piping system to be pressurized with water from the snowmaking system. Contractor to supply any additional equipment required to perform the pressure testing. If the system is found not to maintain pressure and leakage is indicated, contractor is responsible for locating and repairing any leaks, and then re repeating the pressure testing until satisfactory results are obtained.

Completed snow gun electrical system to be tested to insure the system functional and passes any applicable inspections. See FJJ specifications for details.

4.0 MATERIALS

4.1 STEEL LINE PIPE

4.1.1 Steel Pipe (3" nominal diameter and larger);

- Use - Snowmaking distribution mountain piping system
- Service - Cold Water
- Specification - API 5L , Grade B (minimum)
- Thickness, sizes and quantity - As noted on the drawings.
- New black steel pipe, domestic
- ERW - Electric resistance welded
- Double random lengths (+/- 40')
- Beveled ends for welding unless otherwise specified.
- Markings - Paint stenciled; mfg, specification, grade, diameter, wt/ft or wall thickness.
- Inspection by customer at delivery.

4.1.2 Steel pipe (2 ½" nominal diameter and smaller);

- Use - Snowmaking distribution mountain piping system
- Service - Cold Water
- Specification - ASTM A-120, Grade B (minimum)
- Thickness, sizes and quantity - As noted on the drawings.
- New black steel pipe, domestic
- ERW - Electric resistance welded
- Double random lengths (+/- 40')
- Beveled ends for welding unless otherwise specified.
- Markings - Paint stenciled; mfg, specification, grade, diameter, wt/ft or wall thickness.
- Inspection by customer at delivery.

Substitutions on specification, grade, or thickness are not permitted without engineering approval.

4.1.3 Pipeline Coatings;

If specified, piping is to be externally coated with a multipurpose thermosetting two part epoxy coating, for buried or immersion service, slip-bore and directional drilling and also excavated trench applications, 3M Scotchkote 323 or equal.

Pipe is to be shot-blasted to SSPC-SP10 near white metal conditions and coated per NAPCA bulletin 12-78-04. Coating applied to an average minimum dry thickness of 12 – 15 mils.

4.0 MATERIALS CONTINUED

4.2 PIPELINE FITTINGS

4.2.1 Weld Fittings

- Specification - ASTM 234
- Standard weight schedule (unless otherwise specified) per ANSI B36.10
- Grade B carbon steel
- Beveled ends for welding (30 deg. bevel)
- 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.
- Markings - size, wall thickness designation, mfg., grade
- Domestic preferred

4.2.2 Steel Flanges

- Forged carbon steel
- Rating - As specified on drawings
- Manufacture Specification;
 - Class 150 & 300 rated per ASTM A181, grade I
 - Class 400 & 600 rated per ASTM A105, grade I
 - Class 900 rated per ASTM A105, grade II
- Pressure ratings, dimensions and tolerances per ANSI B16.5
- Raised face
- Slip on type (except where other type is specifically noted).
- Gaskets; flat ring type with corresponding flange pressure rating.

4.0 MATERIALS CONTINUED

4.2 PIPELINE FITTINGS CONTINUED

4.2.3 Threaded Fittings

- Specification – ASTM A105, Forged Steel
ASTM A197, malleable iron
- Pressure/Temperature ratings and dimensional tolerances per ANSI B16.3 (to 3" size)
- Threaded to NPT specifications
- Class 150 (Std.), Class 300 (XH), or FS as specified
- Unions - ANSI B16.39 specification
- Finish - Black unless otherwise specified
- Galvanizing - per ANSI A 153 (if specified).

4.3 HYDRANTS

4.3.1 Water Hydrants

- Type - Freeze proof, self-draining
- Service - Cold water throttling
- Rating - 800 psig minimum non shock working pressure rated
- Capacity - 200 gpm minimum at full opened condition and 250 psi inlet pressure.
- Inlet - 2" female NPT
- Outlet – 2" diameter NPT, orientation 90 deg. from inlet. With 2" male camlock type quick connect fitting attached, brass or hard coat aluminum. PT coupling or equal.
- Stand pipe - 2" diameter, schedule 40 API 5L grade B (or better) steel pipe, galvanized.
- Length - 2 feet (stand pipe length), 3 ft. overall nominal length.
- General - Self draining water hydrant with automatic drain valve(s) installed. All castings to be free from defects. Packings to be adjustable and replaceable at outlet housing. Design to prevent operating shaft creep during throttling operation. Each hydrant to be tested before shipment for leakage. Hydrant plug and operating rod assembly to be removable from top of hydrant for service without excavation.
- Water hydrants to be HTM model E20M090T-0.

4.0 MATERIALS CONTINUED

4.3 HYDRANTS CONTINUED

4.3.1 Hydrant installation fittings

- Weld fittings – Forged steel thread-o-let (3000# rated) or half coupling.
- Threaded fittings – Per specification 4.2.3 above.

APPENDIX

- Piping layout and details, # 852615-M1.

End of Specification

852615-100 Spirit Mtn CC Piping Spec 2-27-18.doc

CITY OF DULUTH

Duluth Project No: L30159

Grand Avenue Nordic Center Ski Trails - 0.8 KM Loop and 2.0 KM Connector

2/2/2024

BASE BID #1 - Loop 1 Lighting					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	BASE BID 1 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	LIGHTING ASSEMBIES	41	EACH	41	NA
3	LIGHTING CONTROL INSTALLATION	41	LUMP SUM	1	NA
4	METAL POLE INSTALLATION	10	EACH	10	
5	WOOD POLE INSTALLATION	31	EACH	31	
6	LIGHTING ASSEMBLY POWER CONNECTIONS	41	LUMP SUM	1	NA

Alternate 1 - Loop 2 Underground power					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 1 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	UNDERGROUND LIGHTING POWER	22	LUMP SUM	1	NA
3	UNDERGROUND SNOWMAKING PED. POWER	12	LUMP SUM	1	NA

Alternate 2 - Loop 3 Underground power					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 2 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	UNDERGROUND LIGHTING POWER	17	LUMP SUM	1	NA
3	UNDERGROUND SNOWMAKING PED. POWER	6	LUMP SUM	1	NA
4	ELECTRIC SERVICE PACKAGE AND VH-3 FEEDER	10	LUMP SUM	1	NA

Alternate 3 - Loop 2 Aboveground Snowmaking power					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 3 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	ABOVEGROUND SNOWMAKING PEDISTAL	12	EACH	12	

Alternate 4 - Loop 3 Aboveground Snowmaking power					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 4 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	ABOVEGROUND SNOWMAKING PEDISTAL	6	EACH	6	
3	VALVE HOUSE #3 ELECTRICAL PACKAGE	1	LUMP SUM	1	NA
4	ELECTRIC SERVICE GEAR PACKAGE	1	LUMP SUM	1	NA

Alternate 5 - Loop 2 Aboveground Lighting Systems					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 5 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	LIGHTING ASSEMBIES	22	LUMP SUM	1	NA
3	LIGHTING CONTROL INSTALLATION	22	LUMP SUM	1	NA
4	METAL POLE INSTALLATION	5	EACH	5	
5	WOOD POLE INSTALLATION	17	EACH	17	
6	LIGHTING ASSEMBLY POWER CONNECTIONS	22	LUMP SUM	1	NA

Alternate 6 - Loop 3 Aboveground Lighting Systems					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ADD ALT. # 6 QUANTITY	UNIT PRICE
1	MOBILIZATION	1	LUMP SUM	1	NA
2	LIGHTING ASSEMBIES	17	LUMP SUM	1	NA
3	LIGHTING CONTROL INSTALLATION	17	LUMP SUM	1	NA
4	METAL POLE INSTALLATION	4	EACH	4	
5	WOOD POLE INSTALLATION	13	EACH	13	
6	LIGHTING ASSEMBLY POWER CONNECTIONS	17	LUMP SUM	1	NA

t Mountain, MN

**NORDIC SNOWMAKING PIPING - END OF LINE DRAINS - REF PT 8C, 8D
Base Bid 2
QUANTITIES LISTED ARE FOR EACH END OF LINE LOCATION**

ITEM	DESCRIPTION	MANUFACTURER/ MODEL/ENGINEERING DATA	Estimated Quantity	QTY	
1.00	Reducer, Weld, Eccentric: 4x2	Standard wall, bevel end, A234	1	1	each
2.00	Pipe: 2"	2" (2-3/8" OD) CS SEAMLESS PIPE, Black, beveled ASTM A-120 GRADE A, 0.218" (SCH80) wall As Required +/- 4'-0"	4'	1	Lump Sum
3.00	Gate Valve: 2"-300# Gate valve	0907-1001 2" 300# Bonney gate valve 3-11-RF, CS body .OS&Y Gate Valve FE T:8 P:GRF HW	1	1	each
4.00	300# Flange Stud Set 2" Flange	2474-0223 B7, Zinc Plated Stud with 2 Nuts 5/8"x4-1/4"	8	8	each
5.00	Spiral Wound Gasket	2511-0133 2" 300# Steel / Chlorite / Graphite	2	2	each
6.00	Flange: 2" 300# RFSO.	2" 300# slip-on flange, raised face standard bore A105	2	2	each
7.00	Reducer, Weld, Eccentric: 10x8	Standard wall, bevel end, A234	1	1	each
8.00	Elbow - 90 Deg: 10" Long radius weld	10" 90 Standard wall, bevel end, long radius A234 weld	1	1	each
9.00	Elbow - 45 Deg: 10" weld	10" 45 Standard wall, bevel end, A234 weld	2	2	each
10.00	Tee: 10" weld	10" Tee Standard wall, bevel end, A234	1	1	each
11.00	Elbow - 45 Deg: 10" weld	10" 45 Standard wall, bevel end, A234 weld	1	1	each
12.00	Elbow - 45 Deg: 10" weld	10" 45 Standard wall, bevel end, A234 weld	2	2	each
13.00	Elbow - 90 Deg: 10" Long radius weld	10" 90 Standard wall, bevel end, long radius A234 weld	1	1	each
14.00	Elbow - 90 Deg: 6" Long radius weld	6" 90 Standard wall, bevel end, long radius A234 weld	1	1	each
15.00	Elbow - 45 Deg: 6" weld	6" 45 Standard wall, bevel end, A234 weld	3	3	each
16.00	Elbow - 45 Deg: 6" weld	6" 45 Standard wall, bevel end, A234 weld	2	2	each
17.00	Reducer, Weld, Eccentric: 6x4	Standard wall, bevel end, A234	1	1	each
18.00	Elbow - 45 Deg: 4" weld	4" 45 Standard wall, bevel end, A234 weld	2	2	each
19.00	Elbow - 45 Deg: 4" weld	4" 45 Standard wall, bevel end, A234 weld	2	2	each
20.00	Elbow - 90 Deg: 4" Long radius weld	4" 90 Standard wall, bevel end, long radius A234 weld	1	1	each
21.00	Hydrants	Hydrants	12	12	each
22.00	10-3/4" X 0.365" Pipe	10-3/4" X 0.365" Pipe	1380'	1,380	Feet
23.00	6-5/8" X 0.280" Pipe	6-5/8" X 0.280" Pipe	1110'	1110	Feet
24.00	4-1/2" x 0.237 " Pipe	4-1/2" x 0.237 " Pipe	630'	630	Feet

NORDIC SNOWMAKING PIPING - VALVE STATION #3 (VS3) - REF PT 8
Alternate 7
QUANTITIES LISTED ARE FOR EACH VALVE STATION

ITEM	DESCRIPTION	MANUFACTURER/ MODEL/ENGINEERING DATA	Estimated Quantity	QTY	Unit
1	Pipe: 10"	10"-BLK CS ERW PIPE (10-3/4" OD) ASTM A-53 / API 5L GRADE B, 0.365" wall (MIN) As Required +/- 5'-0"	5'	1	Lump Sum
2	Tee: 10"	10" Tee Standard wall, bevel end, A234	1	1	Each
3	Reducer, Weld, Concentric: 10x8	Standard wall, bevel end, A234	1	1	Each
4	Reducer, Weld, Concentric: 10x6	Standard wall, bevel end, A234	1	1	Each
5	Pipe: 8"	8"-BLK CS ERW PIPE (8-5/8" OD) ASTM A-53 / API 5L GRADE B, 0.322" wall (MIN) As Required +/- 5'-0"	5'	1	Lump Sum
6	Pipe: 6"	6"-BLK CS ERW PIPE (6-5/8" OD) ASTM A-53 / API 5L GRADE B, 0.280" wall (MIN) As Required +/- 5'-0"	5'	1	Lump Sum
7	Isolation Valve: 10"-300# wafer butterfly valve with gear operator.	Bray Series 42-466 10" 300# CS body, 316ss disc, 17-4 shaft, RTFE seat, TFE packing, Glass backed TFE bearing, Gear Operator	1	1	Each
8	Stud And Nut Set 1"x10"	2474-0877 B7, Zinc Plated Stud with 2 Nuts 1"x10"	16	16	Each
9	Spiral Wound Gasket	2511-0156 10" 300# Steel / Chlorite / Graphite	2	2	Each
10	Flange: 10" 300# RFSO.	1700-3186 slip on flange, raised face standard bore A105 10" 300#	2	2	Each
11	Isolation Valve: 8"-300# wafer butterfly valve with gear operator.	Bray Series 42-466 8" 300# CS body, 316ss disc, 17-4 shaft, RTFE seat, TFE packing, Glass backed TFE bearing, Gear Operator	1	1	Each
12	Stud And Nut Set 7/8"x9"	2474-0677 B7, Zinc Plated Stud with 2 Nuts 7/8"x9"	12	12	Each
13	Spiral Wound Gasket	2511-0153 8"300# Steel / Chlorite / Graphite	2	2	Each
14	Flange: 8" 300# RFSO.	1700-3178 slip on flange, raised face standard bore A105 8" 300#	2	2	Each
15	Isolation Valve: 6"-300# wafer butterfly valve with gear operator.	Bray Series 42-466 6" 300# CS body, 316ss disc, 17-4 shaft, RTFE seat, TFE packing, Glass backed TFE bearing, Gear Operator	1	1	Each
16	Stud And Nut Set 3/4"x7-1/2"	2474-0469 B7, Zinc Plated Stud with 2 Nuts 3/4"x7-1/2"	12	12	Each
17	Spiral Wound Gasket	2511-0149 6" 300# Steel / Chlorite / Graphite	2	2	Each
18	Flange: 6" 300# RFWN.	1702-3195 6" 300# weldneck flange, raised face standard bore A105	2	2	Each
19	Pipe: 2"	2" (2-3/8" OD) CS SEAMLESS PIPE, Black, beveled ASTM A-120 GRADE A, 0.218" (SCH80) wall As Required +/- 30'-0"	30'	1	Lump Sum
20	Elbow: 2" Long radius	2" 90 Standard wall, bevel end, long radius A234 weld	3	3	Each
21	Gate Valve: 2"-300# Gate valve .	2" 300# Bonney gate valve 3-11-RF, CS body ,OS&Y Gate Valve FE T:8 P:GRF HW	2	2	Each
22	300# Flange Stud Set 2" Flange	B7, Zinc Plated Stud with 2 Nuts 5/8"x4-1/4"	16	16	Each
23	Spiral Wound Gasket	2" 300# Steel / Chlorite / Graphite	4	4	Each
24	Flange: 2" 300# RFSO.	2" 300# slip-on flange, raised face standard bore A105	4	4	Each
25	Thread-O-Let: 2"	36-6x2, A105 TOL	3	3	Each
26	Nipple: 2" x 3"	2" X 3" NPT,XH , Forged Steel, SA106 Black	3	3	Each
27	Ball Valve: 2"	Apollo 70 108-01 600 WOG bronze 2 piece threaded 2"	3	3	Each
28	Pipe Stand 10"	10" saddle pipe support with U-bolt and bolt to floor, fabricated and painted.	1	1	Each
29	Pipe Stand 8"	8" saddle pipe support with U-bolt and bolt to floor, fabricated and painted.	1	1	Each
30	Pipe Stand 6"	6" saddle pipe support with U-bolt and bolt to floor, fabricated and painted.	1	1	Each
31	Pipe Stand 2"	2" saddle pipe support with U-bolt and bolt to floor, fabricated and painted.	3	3	Each
32	Vale Station Structure	Manufacturer built per plan sheet	1	1	Each

t Mountain, MN

**NORDIC SNOWMAKING PIPING - END OF LINE DRAINS - REF PT 10, 10A
Alternate 8
QUANTITIES LISTED ARE FOR EACH END OF LINE LOCATION**

ITEM	DESCRIPTION	MANUFACTURER/ MODEL/ENGINEERING DATA	Estimated Quantity	QTY	
1	Reducer, Weld, Eccentric: 4x2	Standard wall, bevel end, A234	1	1	Each
2	Pipe: 2"	2" (2-3/8" OD) CS SEAMLESS PIPE, Black, beveled ASTM A-120 GRADE A, 0.218" (SCH80) wall As Required +/- 4'-0"	4'	1	Lump Sum
3	Gate Valve: 2"-300# Gate valve .	0907-1001 2" 300# Bonney gate valve 3-11-RF, CS body .OS&Y Gate Valve FE T:8 P:GRF HW	1	1	Each
4	300# Flange Stud Set 2" Flange	2474-0223 B7, Zinc Plated Stud with 2 Nuts 5/8"x4-1/4"	8	8	Each
5	Spiral Wound Gasket	2511-0133 2" 300# Steel / Chlorite / Graphite	2	2	Each
6	Flange: 2" 300# RFSO.	2" 300# slip-on flange, raised face standard bore A105	2	2	Each
7	Elbow - 45 Deg: 8" weld	8" 45 Standard wall, bevel end, A234 weld	3	3	Each
8	Reducer, Weld, Eccentric: 8x6	Standard wall, bevel end, A234	2	2	Each
9	Elbow - 45 Deg: 6" weld	6" 45 Standard wall, bevel end, A234 weld	2	2	Each
10	Reducer, Weld, Eccentric: 8x6	Standard wall, bevel end, A234	1	1	Each
11	Elbow - 45 Deg: 6" weld	6" 45 Standard wall, bevel end, A234 weld	2	2	Each
12	Hydrants	Hydrants	18	18	Each
13	8-5/8" x 0.322" Pipe	8-5/8" x 0.322" Pipe	620'	620	Feet
14	6-5/8" X 0.280" Pipe	6-5/8" X 0.280" Pipe	720'	720	Feet