KRAUS-ANDERSON® CONSTRUCTION COMPANY

ADDENDUM NO. 1
June 15, 2011

Duluth International Airport
New Passenger Terminal
Voluntary Air Low Emissions (VALE)
Duluth, MN  55811

TO ALL CONTRACTORS:

The following are clarifications and/or changes to the Plans and Specifications, dated June 9, 2011, to be Bid on June 28, 2011, for the above named Project. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

1. A specific Bid Form Packet is required for the Prime Contractor’s bid submission on this project. Bidders must contact Chris Barta, Kraus-Anderson® Construction Company, at 218-722-3775 or chris.barta@krausanderson.com to obtain the required Bid Form Packet.

   A. Bid Form Packet documents (for reference only) can be found in Volume 1 of the Project Manual, following is a list of those documents included in the Bid Form Packet: City of Duluth cover page; Bid Form; City of Duluth Purchasing Division General Specifications; AIA Document A310 Bid Bond; Affidavit of Non-Collusion; EEO Affirmative Action Policy Statement & Compliance Certificate; Forms 1 & 2 for Demonstration of Good Faith Efforts, Good Faith Efforts Affidavit and Certificate of Good Faith Efforts. A City of Duluth Sealed Bid sticker is also part of the Packet.

   B. Faxed bids will not be accepted.

2. Section 00100 Instructions to Bidders

   A. Item 6. INQUIRIES REGARDING PROJECT - DISCREPANCIES OR AMBIGUITIES: Change all references to RS&H with Kraus-Anderson Construction Company.

3. Section 00305 Bid Form

   A. Incorporate new Bid Form - For Reference Only.
4. **Section 01014 Work Scope Index**

A. Under Work Scope 1.0V Geothermal System Spec #, delete P-162 Fence Complete and add P-102 Safety and Security Complete.

B. Add D-751 Manholes, Catch Basins, Inlets and Inspection Holes.

5. **Section 01014 Work Scope Descriptions**

A. **Work Scope 1.0V – Geothermal System**


2. Under 1.02 R. Add Two Test bores were completed at the project site. The drilling logs are included for your use in generating your bid. Also note test bore hole No. 2 has a steel casing remaining down to bedrock (approximately down to 40 feet). Addressing removal and final work associated with this is considered incidental to this work scope.

3. Add 1.02 AA. Directional drilling methods must be utilized for installations under existing Grinden drive (Access to the existing terminal) and under the East pedestrian enclosure (Blue enclosed walkway). At the Contractors option – open cut excavation OR directional drilling may be used across the disabled parking lot. If open cut is selected-continual access must be maintained to the East end of the existing terminal building. All restoration work including gravel, concrete and hot mix asphalt patching is incidental to this work.

4. Add 1.02 BB. Note Addendum No. 1 includes modifications to the geothermal routing between the field and building. The Civil & Architectural plan sheet layouts supercede the mechanical sheet layouts.

B. **Work Scope 3.0V – Mechanical**

1. Under 1.01 A. 1. Specific Specification Sections, add 15780 Hose Management System, only as applies to Alternates 1A, 1B, 1C, 1D, 2A, 2B, 2C and 2D.

2. Add 1.07 Alternates:

   Note: Electrical connections are to be by WS 4.0V. The Hose management system will be provided and installed by WS 3.0V.

   **Alternate No. 1A:** In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of four (4) Passenger Boarding Bridge locations.

   **Alternate No. 1B:** In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of three (3) Passenger Boarding Bridge locations.
Alternate No. 1C: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of two (2) Passenger Boarding Bridge locations.

Alternate No. 1D: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at one (1) Passenger Boarding Bridge location.

Alternate No. 2A: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of four (4) Passenger Boarding Bridge locations.

Alternate No. 2B: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of three (3) Passenger Boarding Bridge locations.

Alternate No. 2C: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of two (2) Passenger Boarding Bridge locations.

Alternate No. 2D: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at one (1) Passenger Boarding Bridge location.

C. Work Scope 4.0V - Electrical

1. Under 1.01 A. 1. Specific Specification Sections, add 15780 Hose Management System, only as applies to Alternates 1A, 1B, 1C, 1D, 2A, 2B, 2C and 2D.

2. Add 1.07 Alternates:

Note: Electrical connections are to be by WS 4.0V. The Hose management system will be provided and installed by WS 3.0V.

Alternate No. 1A: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of four (4) Passenger Boarding Bridge locations.

Alternate No. 1B: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of three (3) Passenger Boarding Bridge locations.
Alternate No. 1C: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of two (2) Passenger Boarding Bridge locations.

Alternate No. 1D: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at one (1) Passenger Boarding Bridge location.

Alternate No. 2A: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of four (4) Passenger Boarding Bridge locations.

Alternate No. 2B: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of three (3) Passenger Boarding Bridge locations.

Alternate No. 2C: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of two (2) Passenger Boarding Bridge locations.

Alternate No. 2D: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at one (1) Passenger Boarding Bridge location.


END OF KACC ADDENDUM NO. 1
BID TO: Duluth Airport Authority; By the City Purchasing Agent Room 100 City Hall Duluth, MN 55802

BID FROM: ____________________________________________
_____________________________________________________
_____________________________________________________

In accordance with the Invitation to Bid and the proposed Contract Documents prepared by Reynolds, Smith and Hill, relating to the construction of:

Duluth International Airport
New Passenger Terminal
Voluntary Air Low Emissions (VALE)
Duluth, Minnesota

the undersigned, having visited the site of proposed construction and having become thoroughly familiar with local conditions affecting the cost and performance of the Work and with all requirements of the Contract Documents and related Addenda, hereby proposes and agrees to provide all labor, materials, equipment, applicable permits and taxes required to construct and complete the Work in accordance with the Contract Documents and Addenda for the following amounts:

Base Bids:

Instructions for Submitting Base Bids:

• For bidders wishing to submit bids on more than one Work Scope, space has been provided to submit bids for Multiple Work Scopes on the same Bid Form.
• State Base Bid in both words and figures in spaces provided.
• Bidders submitting bids for more than one Work Scope are invited to submit a combined bid for work included under all Work Scopes for which Bidder is submitting a bid.
• All Work Scopes may have multiple Base Bids. Each bidder must bid on all Base Bids for the respective Work Scope to be considered a valid bid submission. Failure to do so may result in bid rejection.
1. Work Scope No. 1.0V - Geothermal System
   Base Bid 1A - Geothermal: ____________________________ $ ____________
   Total Bid Amount for Work Scope No. 1.0V - Geothermal System $ ____________

2. Work Scope No. 2.0V - General Construction
   Base Bid 2A - Geothermal: ____________________________ $ ____________
   Base Bid 2B – Solar Photovoltaic: _______________________ $ ____________
   Base Bid 2C – Solar Thermal: __________________________ $ ____________
   Total Bid Amount Work Scope No. 2.0V - General Construction $ ____________

3. Work Scope No. 3.0V - Mechanical
   Base Bid 3A - Geothermal: ____________________________
   Base Bid 3C – Solar Thermal: __________________________
   Base Bid 3D – Gate Electrification: _____________________ $ ____________
   Total Bid Amount Work Scope No. 3.0V – Mechanical $ ____________

4. Work Scope No. 4.0V - Electrical
   Base Bid 4A - Geothermal: ____________________________
   Base Bid 4B – Solar Photovoltaic: _______________________ $ ____________
   Base Bid 4C – Solar Thermal: __________________________
   Base Bid 4D – Gate Electrification: _____________________ $ ____________
   Total Bid Amount Work Scope No. 4.0V – Electrical $ ____________

**Combined Base Bid:**

Work Scope Numbers and Titles on which Combined Bid is based:

<table>
<thead>
<tr>
<th>Work Scope No.</th>
<th>Title:</th>
<th>____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Scope No.</td>
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<tr>
<td>Work Scope No.</td>
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<td>Work Scope No.</td>
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</tr>
<tr>
<td>Work Scope No.</td>
<td></td>
<td>____________________________</td>
</tr>
</tbody>
</table>

Combined Bid Amount: ________________ $ ____________
**Unit Prices and Cost Break Down:**

Refer to Section 01014 individual Work Scopes for complete description of Unit Prices.

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Unit Price No. 1 to Work Scope 1.0V</td>
<td>$</td>
<td>$ N/A</td>
</tr>
<tr>
<td>Unit Price No. 2 to Work Scope 1.0V</td>
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<tr>
<td>Cost Break Down No. 1 to Work Scope 1.0V</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Cost Break Down No. 3 to Work Scope 1.0V</td>
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<tr>
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<tr>
<td>Cost Break Down No. 8 to Work Scope 1.0V</td>
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</table>

**Alternates:**

Refer to Section 01230 for complete description of Alternates.

<table>
<thead>
<tr>
<th>ADD</th>
<th>DEDUCT</th>
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</thead>
<tbody>
<tr>
<td>Alternate No. 1A to Work Scope 3.0V</td>
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</tr>
<tr>
<td>Alternate No. 1B to Work Scope 3.0V</td>
<td>$</td>
</tr>
<tr>
<td>Alternate No. 1C to Work Scope 3.0V</td>
<td>$</td>
</tr>
<tr>
<td>Alternate No. 1D to Work Scope 3.0V</td>
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</tr>
<tr>
<td>Alternate No. 2C to Work Scope 3.0V</td>
<td>$</td>
</tr>
<tr>
<td>Alternate No. 2D to Work Scope 3.0V</td>
<td>$</td>
</tr>
</tbody>
</table>

DULUTH INTERNATIONAL AIRPORT  
NEW PASSENGER TERMINAL  
VOLUNTARY AIR LOW EMISSIONS (VALE)  
KACC ADDENDUM NO. 1  
SECTION 00305 - 3
Alternate No. 1A to Work Scope 4.0V $__________ $__________
Alternate No. 1B to Work Scope 4.0V $__________ $__________
Alternate No. 1C to Work Scope 4.0V $__________ $__________
Alternate No. 1D to Work Scope 4.0V $__________ $__________
Alternate No. 2A to Work Scope 4.0V $__________ $__________
Alternate No. 2B to Work Scope 4.0V $__________ $__________
Alternate No. 2C to Work Scope 4.0V $__________ $__________
Alternate No. 2D to Work Scope 4.0V $__________ $__________

Addenda: Receipt of the following Addenda to the Contract Documents and their costs being incorporated into the Bid is acknowledged (provide Addenda numbers below):

Addenda No. Dated Addenda No. Dated

Bid Acceptance: If written notice of the acceptance of this Bid is received by the undersigned within 90 days after date set for opening of this Bid or at any other time thereafter before Bid is withdrawn, the undersigned agrees to enter into and execute a Contract with the Owner in accordance with this Bid as accepted and in a form acceptable to Owner, and to furnish and deliver to the Construction Manager the Performance Bond, Payment Bond, and proof of insurance coverage, all within 10 days after notice of acceptance of this Bid.

Execution of Proposal: The entity(ies) signing this proposal is fully authorized to sign on behalf of the named firm and to fully bind the named firm to all of the conditions and provisions of the Contract. This proposal shall remain valid and not be withdrawn for 90 calendar days after bid due date.

Submitted this __________ day of ______________________, 20______.
Name of Firm: __________________________
Street Address: __________________________
City: __________________ State: ______ Zip: ___________
Phone Number: __________ Fax Number: ___________

Bidder is: (check one)

☐ Individual ☐ Partnership ☐ Corporation

DULUTH INTERNATIONAL AIRPORT
NEW PASSENGER TERMINAL
VOLUNTARY AIR LOW EMISSIONS (VALE)
KACC ADDENDUM NO. 1
If Bidder is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary. If a partnership, give names of all individual co-partners composing the firm. If an individual, give first and last name in full.

Name (typed or printed): ______________________________________
Signature: _________________________________________________
Title: ____________________________________________________

END OF DOCUMENT
Date: June 15, 2011

RE: City of Duluth Bid #11-4402
(VALE Program Bid Package)

Addendum No. 1

TO: Prospective Bidders

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated June 9, 2011. Acknowledge receipt of this Addendum in the space provided on the Eid Form. Failure to do so may subject the Bidder to disqualification.

Bid Form:

See Kraus-Anderson Addendum No. 1 attached.

Technical Specifications:

**Volume No. 2 Specification:** Add Division 01 – General Requirements Section 01230 – ALTERNATES; attached to this addendum.

**Volume No. 3 Specification:** Modify Division 15 – Mechanical Section 15747 – GROUND HEAT EXCHANGER – Modify Sub-paragraph A.1 of Article 1.3 – SUBMITTAL to read:

1. Submittal shall utilize drilling logs and thermal conductivity test information provided from (2) on site test bores. Any other parameters that the contractor uses in determining the GHEX shall be noted.
   a. Refer to Appendix I – Boring Logs for Test VHE Installations 1 & 2.
   b. Results of thermal conductivity testing shall be made available in a forthcoming addendum.

**Volume No. 3 Specification:** Modify Division 15 – Mechanical Section 15747 – GROUND HEAT EXCHANGER – Add: Appendix I – Boring Logs for Test VHE Installations 1 & 2; attached to this addendum.

**Volume No. 3 Specification:** Modify Division 15 – Mechanical Section 15780 – PRE-CONDITIONED AIR SYSTEMS – Modify Article 2.2: MANUFACTURERS; Paragraph A to include:


**Volume No. 3 Specification:** Modify Division 15 – Mechanical Section 15780 – PRE-CONDITIONED AIR SYSTEMS – Add Article 2.9: HOSE MANAGEMENT SYSTEM – ALTERNATE NO. 1, as follows:

2.9 HOSE MANAGEMENT SYSTEM – ALTERNATE NO. 1

   A. Provide motorized, electrically powered hose management device equipped with internal mechanisms that provide for storage of a continuous 135-foot length of pre-conditioned air hose. Hose to be
mechanically released from the enclosure such that airport ground crews can deploy only the amount of hose necessary to reach applicable aircraft parked at the gate with the remaining hose safely contained within the unit in a compressed, yet open condition to allow airflow through the hose management system and in to the aircraft. After pre-conditioned air services are no longer needed, the hose shall automatically retract back within the enclosure.

1. Function: The assembly is to be provided such that operation of the unit may be done by use of a remote control, with buttons located on the main electrical panel, or a stationary box located on the bridge. The position of the stationary box and the remote storage box are to be coordinated with the Owner prior to installation. Deployment speed of the hose shall be approximately 1.4 feet per second, allowing full deployment of the hose is approximately one minute. Provide Hose Movement Sensor and a Torque Limiter to detect faults in operation and prevent damage to the unit and hose. The unit is to contain both visual and audible alarms to notify ramp personnel of a fault.

2. Housing: Provide single piece welded frame comprised of 304 stainless steel square tubing. Enclosure to be aluminum with powder-coat finish matching passenger boarding bridge. Units shall be insulated and contain a heater to facilitate cold weather retraction and deployment and snow and ice removal. Heater shall be controlled by 2 thermostats; an adjustable thermostat and a non-adjustable shutoff.

3. Hose: Fabricate from 6.5 oz. synthetic fiber suitable for high endurance in outdoor applications, light-weight fabric made with high UV stability along with water and mildew resistance. Outside material shall include high abrasion and wear resistant properties. Insulate with radiant heat barrier that is mold, fungi and bacteria resistant.
   a. Provide PVC scuff stripping.
   b. The exit end of the hose is to be furnished with all of the parts and accessories required for attachment to the aircraft. Exit end cuffs are to be made of a PVC laminate over polyester scrim. Provide a 14” diameter hook system with Velcro cover, followed by a section of reducer hose to change diameter from 14” to 8”, followed by a loop system with Velcro, followed by a plain cuff. The connector to the plane shall also be provided. This connector shall be a swivel-type connector.
   c. Provide entrance cuff with hook and loop style with joining sections made with a split opening containing wings for ease of use and increased sealing connections. The Canvas hose is to be a continuous 135 feet long and 14 inches in diameter. It shall be spiral wound construction, double stitched for high strength. No seams are permitted.
that would allow airflow to escape and loss of temperature to the aircraft.

d. Hose Color: Manufacturer's standard high-visibility color.

4. Electronics: The unit shall be equipped with 400 Volts and a 10 Amp Fuse. The unit shall draw 7 amps maximum with heater and 3 amps maximum when heater is off. The Unit shall be equipped with electrical capability to interact with PCA unit and shall be able to be programmed to prevent bridge movement when air is connected to the plane. The unit shall be manufactured with an integral electrical disconnect switch.

5. Connection to Pre-Conditioned Air Unit: Provide 14" diameter, rigid, insulated duct connecting the Pre Conditioned Air Unit to the rear of the Motorized Hose Management assembly. Route duct to contain a minimum amount of elbows. Anchor duct to the jet bridge as required. Provide tight connections to equipment to allow for efficient air movement. Connection duct to be wrapped with insulation.


Volume No. 3 Specification: Modify Division 15 – Mechanical Section 15780 – PRE-CONDITIONED AIR SYSTEMS – Add Article 2.9: HOSE MANAGEMENT SYSTEM – ALTERNATE NO. 2, as follows:

2.10 HOSE MANAGEMENT SYSTEM – ALTERNATE NO. 2

A. Provide motorized, electrically powered hose reels mounted to underside of passenger boarding bridges for storage and motorized retraction of continuous 75-foot lengths of preconditioned air hose.

1. Function: Assembly is to be provided such that operation of the unit may be done by use of a remote control, with buttons located on the main electrical panel, or a stationary box located on the bridge. The position of the stationary box and the remote storage box are to be coordinated with the Owner prior to installation. The unit is to contain both visual and audible alarms to notify ramp personnel of a fault.


3. Provide swivel bases with pre-designated limit stops.


Drawings: Replace drawings listed below with sheets included with this Addendum No. 1

Civil Sheet C003 – Construction Safety Phasing Plan: Revised Pipe Routing.
Sheet AS102 - Overall Site Plan: Revised Pipe Routing
Sheet A104 – Overall Roof Plan: Added Roofing Protection Pads.
Sheet A114a – Enlarged Third Floor Plan Area A: Revised Targeting; Added Note and Details.
Sheet A214 – Enlarged Third Floor Reflected Ceiling Plan Area A: Revised Targeting; Added Note.
Sheet A524 – Roof Details: Added Note and Detail.
Sheet A715 – Exterior Systems Core Wall: Revised Targeting; Added Note and Details.
Sheet M-101 – Mechanical Equipment Schedules: Re-formatted; No change in content.

Other:
Incorporate Kraus-Anderson Construction Company’s Addendum No. 1, dated June 15, 2011, in its entirety.

END OF ADDENDUM NO. 1
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1.  The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

ALTERNATES SHALL INCLUDE:

A. Alternate No. 1A: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of four (4) Passenger Boarding Bridge locations.

Add the sum of: ____________________ Dollars ($______).

B. Alternate No. 1B: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of three (3) Passenger Boarding Bridge locations.

Add the sum of: ____________________ Dollars ($______).

C. Alternate No. 1C: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at each of two (2) Passenger Boarding Bridge locations.

Add the sum of: ____________________ Dollars ($______).

D. Alternate No. 1D: In lieu of Pre-Conditioned Air Hose Baskets and Hoses specified in Section 15780, Article 2.4, Paragraphs F & G, provide Hose Management System - Alternate No. 1 in accordance with the provisions of Section 15780, Article 2.9, at one (1) Passenger Boarding Bridge location.

Add the sum of: ____________________ Dollars ($______).

E. Alternate No. 2A: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of four (4) Passenger Boarding Bridge locations.

Add the sum of: ____________________ Dollars ($______).

F. Alternate No. 2B: In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of three (3) Passenger Boarding Bridge locations.
Add the sum of: _______________ Dollars ($_______).

G. **Alternate No. 2C:** In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at each of two (2) Passenger Boarding Bridge locations.

Add the sum of: _______________ Dollars ($_______).

H. **Alternate No. 2D:** In lieu of Pre-Conditioned Air Hose Baskets specified in Section 15780, Article 2.4, Paragraph F, provide Hose Management System - Alternate No. 2 in accordance with the provisions of Section 15780, Article 2.10, at one (1) Passenger Boarding Bridge location.

Add the sum of: _______________ Dollars ($_______)

END OF SECTION 01230
APPENDIX I

Boring Logs
For
Test VHE Installations 1 & 2
<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>Silt</th>
<th>USCS</th>
<th>Graphic</th>
<th>Temperature (°F)</th>
<th>Description</th>
<th>Water Levels</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>0 - 1410</td>
<td>TS-</td>
<td>SM</td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Silty sand, very dark grayish brown 10YR 3/2, fine grained, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 1390</td>
<td>SM</td>
<td></td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Silty sand, strong brown 7.5YR 4/6, fine grained, with gravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - 1370</td>
<td>GP</td>
<td></td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Gravel, with silt, strong brown 7.5YR 4/6, fine grained - possible boulder at 18'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 1350</td>
<td>MdI</td>
<td></td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Gabbro, grayish black N 2/0, hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 - 1330</td>
<td>MdI</td>
<td></td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Gabbro, medium dark gray N 4/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 - 1310</td>
<td>MdI</td>
<td></td>
<td>Graphic</td>
<td>750 - 950</td>
<td>Gabbro, medium light gray N 6/0, to medium gray N 5/0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COORDINATES:** Latitude: 46° 50.341' N; Longitude: 92° 10.674' W  
**COORDINATE SYSTEM:** None - Estimated from Google Earth  
**SURFACE ELEVATION:** 1410 (ft-AMSL)  
**BENCHMARK:** None  
**TOTAL HOLE DEPTH:** 500 FT  
**ACTIVE VHE DEPTH:**

**BOREHOLE DIAMETER:** 0' - 40': 8-3/4"  
**40'-500': 6"  
**DRILLING TIME:** 6/9 START 14:24 END 18:55 @ 200'  
**6/10 START 06:26 END 13:43 @ 500'**

**LOG DATE:** 6/14/11
<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>Surf. Elev.</th>
<th>USCS</th>
<th>Graphic</th>
<th>Temperature (°F)</th>
<th>Description</th>
<th>Water Levels</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>1210</td>
<td>Mdi</td>
<td></td>
<td></td>
<td>GABBRO, medium light gray N 6/0, to medium gray N 5/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>1210</td>
<td>Mdi</td>
<td></td>
<td></td>
<td>GABBRO, dark grey N 3/0, to grayish black N 2/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>1190</td>
<td>Mdi</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0, soft seam at 205 FT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>1170</td>
<td>Mdi</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0, hard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Log of Boring: Test VHE 1**

**Date:** 6/9/11 - 6/10/11

**Company/Method:** Sam's Well Drilling / Mud Rotary 0 - 40 FT

**Halco Air Percussion Hammer 40 - 500 FT**

**Borehole Diameter:** 0' - 40'; 4.3/4"

**Drilling Time:** 6/9 Start 14:24 End 18:55 @ 200'

**6" Bore Hole**

**1.25" HDPE Pipe SDR 9**

**Portland-Cement/ Silica Sand (1:1)**

**Drilling Production Rate:**
- 0.95 ft/min
- 0.7 ft/min
- 0.8 ft/min
- 0.8 ft/min
- 0.74 ft/min
- 0.8 ft/min
- 0.77 ft/min

**Active VHE Depth:**

**Coordinates:**
- Latitude: 46° 50' 34.1" N
- Longitude: 92° 10' 67.4" W
- Coordinate System: None - Estimated from Google Earth
- Surface Elevation: 1410 (ft-AMSL)
- Benchmark: None
- Total Hole Depth: 500 FT

**Log Date:** 6/14/11
### LOG OF BORING: TEST VHE 1

**PROJECT NAME:** Duluth International Airport - New Passenger Terminal  
**PROJECT ADDRESS:** 4701 Airport Road  
**ST. LOUIS**  
**COUNTY:** GSB  
**REPORT PREPARED BY:** GT-11-02378  
**DATE:** 6/9/11 - 6/10/11  
**COMPANY/METHOD:** SAM'S WELL DRILLING / MUD ROTARY 0 - 40 FT  
**HALCO AIR PERCUSSION HAMMER 40 - 500 FT**

<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SUCE ELEV.</th>
<th>USCS</th>
<th>GRAPHIC</th>
<th>TEMPERATURE (°F)</th>
<th>DESCRIPTION</th>
<th>WATER LEVELS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>1070</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0, hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>1050</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, medium dark gray N 4/0, to dark gray N 3/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>1030</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>1010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>970</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>460</td>
<td>950</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>930</td>
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<tr>
<td>500</td>
<td>910</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**END OF BORING AT 500 FEET BELOW GRADE**

**COORDINATES:** LATITUDE: 46° 50.341'N; LONGITUDE: 92° 10.674'W  
**COORDINATE SYSTEM:** NONE - ESTIMATED FROM GOOGLE EARTH  
**SURFACE ELEVATION:** 1410 (FT-AMSL)  
**BENCHMARK:** NONE  
**TOTAL HOLE DEPTH:** 500 FT  
**ACTIVE VHE DEPTH:**

**BOREHOLE DIAMETER:** 0'- 40' - 8 3/4''  
40'- 500' - 6''

**DRILLING TIME:** 6/9 START 14:24 END 18:55 @ 200'  
6/10 START 06:26 END 13:43 @ 500'  
**LOG DATE:** 6/14/11
### Preliminary Log of Boring: Test VHE 2

**Project Name:** Duluth International Airport - New Passenger Terminal  
**Project Address:** 4701 Airport Road  
**City:** Duluth  
**State:** MN  
**ZIP Code:** 55811  
**County:** St. Louis  
**Report Prepared By:** GS&G  
**Report No.:** GT-11-02378  
**Company/Method:** Sam's Well Drilling / Mud Rotary 0 - 48 FT, Mincon MC61 Air Percussion Hammer 48 - 500 FT

<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>USCS</th>
<th>Graphic</th>
<th>Temperature (°F)</th>
<th>Description</th>
<th>Water Levels</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SM</td>
<td></td>
<td></td>
<td>Silty sand, dark brown 10YR 3/3, fine grained, with medium gravel, angular to subrounded, dry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>SM</td>
<td></td>
<td></td>
<td>Silty sand, dark brown 10YR 3/3, very fine grained, with trace gravel, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>GP</td>
<td></td>
<td></td>
<td>Silty sand, dark brown 10YR 3/4, very fine grained, with trace gravel, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>GP</td>
<td></td>
<td></td>
<td>Gravel, red/grey, fine to medium grained, trace wood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>GP</td>
<td></td>
<td></td>
<td>Gravel, grey, fine to medium grained, rocky</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>Gravel, brown/grey 10YR 3/3, fine to medium grained, subrounded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td>Gabbro, dark grey N 3/0, thin chips of granite, hard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Cave-in at 15**:  
  - 6/9 start of day  
  - Water level measured at 16 FT below grade

- **Duluth Complex (1:1)**:  
  - 48' - 100' No Water Production

- **Drilling Production Rate:**  
  - 1.3 FT/Min
  - 1.25 FT/Min
  - 1.5 FT/Min  
  - Little Water: 100' - 120' = 1 GPM

- **Water:** 1 GPM

- **Drilling Production Rate:**  
  - 2.0 FT/Min  
  - 1.5 GPM, No Evidence of Fractures

**Coordinates:** Latitude: 46° 50.351'N; Longitude: 92° 10.594’W  
**Coordinate System:** None - Estimated from Google Earth  
**Surface Elevation:** 1392 (ft AMSL)  
**Benchmark:** None  
**Total Hole Depth:** 500 FT  
**Active VHE Depth:** 498.5 FT  
**Borehole Diameter:** 48' - 500' 6"  
**Drilling Time:** 6/7 start 09:52 end 18:17 @ 33°  
**Log Date:** 6/14/11
<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>SURE ELEV.</th>
<th>USCS</th>
<th>GRAPHIC</th>
<th>TEMPERATURE (°F)</th>
<th>DESCRIPTION</th>
<th>WATER LEVELS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>1212</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, dark gray N 3/0, thin chips of granite, hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>1192</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, dusty green SG 3/2 pieces in primarily olive black SY 2/1 matrix, dusky green pieces 40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>1172</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, light olive gray SY 6/1, moderate brown SYR 4/4, medium dark gray N 4/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>1152</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, medium dark gray N 4/0, hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>260</td>
<td>1132</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0, with minor inclusions of dark greenish gray, SGY 4/1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>280</td>
<td>1112</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, medium light gray N 6/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>1092</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, porphyritic (dark spots) with minor inclusions in light colored micaceous base, softer formation 295'-300'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>1072</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>1052</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>6/7 END OF DAY: WATER LEVEL MEASURED AT 261 FT BELOW GRADE WITH 330' OPEN HOLE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COORDINATES: LATITUDE: 46° 50.351’N; LONGITUDE: 92° 10.594’W
COORDINATE SYSTEM: NONE - ESTIMATED FROM GOOGLE EARTH
SURFACE ELEVATION: 1392 (FT-AMSL)
BENCHMARK: NONE
TOTAL HOLE DEPTH: 500 FT
ACTIVE VHE DEPTH: 498.5 FT
BOREHOLE DIAMETER: 0’-48” 8-3/4”
48”-500” 6”
DRILLING TIME: 6/7 START 09:52 END 18:17 @ 330’
6/8 START 07:57 END 11:38 @ 500’
LOG DATE: 4/14/11
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<th>DEPTH IN FEET</th>
<th>SUPE ELEV</th>
<th>USCS</th>
<th>GRAPHIC</th>
<th>TEMPERATURE °F</th>
<th>DESCRIPTION</th>
<th>WATER LEVELS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>1052</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>1032</td>
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</tr>
<tr>
<td>380</td>
<td>1012</td>
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</tr>
<tr>
<td>400</td>
<td>992</td>
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<td></td>
</tr>
<tr>
<td>420</td>
<td>972</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, medium dark gray N 4/0, to dark gray N 3/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>952</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>460</td>
<td>932</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>480</td>
<td>912</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, medium dark gray N 4/0, to dark gray N 3/0, with pale reddish brown 10R 5/4 (40%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>892</td>
<td>Mdl</td>
<td></td>
<td></td>
<td>GABBRO, grayish black N 2/0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

END OF BORING AT 500 FEET BELOW GRADE

COORDINATES: LATITUDE: 46° 50.351’N; LONGITUDE: 92° 10.594’W
COORDINATE SYSTEM: NONE - ESTIMATED FROM GOOGLE EARTH
SURFACE ELEVATION: 1392 (FT-AMSL)
BENCHMARK: NONE
TOTAL HOLE DEPTH: 500 FT
ACTIVE VHE DEPTH: 498.5 FT
### Pumps Schedule

<table>
<thead>
<tr>
<th>Pumps</th>
<th>Location</th>
<th>Horsepower</th>
<th>RPM</th>
<th>Voltage/Phase/Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>115/1/60</td>
<td>115</td>
<td>1/20</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>208/3/60</td>
<td>115</td>
<td>1/4</td>
</tr>
</tbody>
</table>

### Expansion Tank Schedule

<table>
<thead>
<tr>
<th>Expansion Tank</th>
<th>Size</th>
<th>Type</th>
<th>Material</th>
<th>Capacity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 1</td>
<td>500</td>
<td>Steel</td>
<td>Mild</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Tank 2</td>
<td>600</td>
<td>Steel</td>
<td>Stainless</td>
<td>600</td>
<td></td>
</tr>
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</table>

### Water to Water Non-Reversible Heat Pump Chiller Schedule

<table>
<thead>
<tr>
<th>Chiller</th>
<th>Size</th>
<th>Type</th>
<th>Ratem</th>
<th>Efficiency</th>
<th>Operating Temp</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiller 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table of Contents

- **Tag Area Served: Location Output**
- **Pumps Schedule**
- **Expansion Tank Schedule**
- **Water to Water Non-Reversible Heat Pump Chiller Schedule**
- **Table of Contents**