

STEAM LINE INSTALLATION - DULUTH STEAM

1ST ALLEY & 7TH AVE E.

Duluth, Minnesota

STRUCTURAL NOTES:

GENERAL

- Governing Specification is the 2006 Edition of the Minnesota Department of Transportation (MnDOT) Standard Specifications for Construction
- Designed in accordance with the AASHTO LRFD Bridge Design Specification, 4th Edition
- Design Loads:
 - HL-93 Design Vehicle
- Contractor shall ensure high standards of workmanship throughout, with strict adherence to the contract documents.
- Contractor to provide traffic control as required during construction
- KOA is responsible only for the design of the steam vault cover as shown in the contract documents. Design of all secondary structure or non-structural elements are by others.
- Notify the engineer immediately of any discrepancies between these notes, the contract drawings, the specification, or the governing code. The Engineer shall reply in writing. Any related work performed by the Contractor prior to receiving a reply from the Engineer is at the Contractor's sole risk. For purposes of bidding, the most stringent of the conflicting documents shall apply.
- Verify all existing conditions; verify all dimensions in the field; verify mechanical and electrical openings for size, location and number; notify the engineer of any discrepancies or conditions not included in or contrary to the contract documents prior to shop drawing submittal or construction.
- Coordinate the structural drawings with drawings from all other disciplines (including but not limited to Civil, Mechanical, and Electrical).
- The structure shown in these drawings is designed to be stable and to resist the loads specified above only in a fully completed form. Contractor shall ensure that the structure is adequately braced and shored during construction for all temporary loads until all elements are in place, and shall ensure that temporary loadings do not exceed the allowable capacity of any structural elements both before and after these elements are in place.
- Contractor is solely responsible for site safety, coordination, procedures, construction methodology, shoring, bracing, and sequencing.
- Contractor is solely responsible for the protection of existing buildings, utilities, streets, equipment, etc. during construction. Provide temporary bracing and protection as required.
- Do not scale drawings.
- Any holes or other alterations to the structure which are not specifically detailed on the contract drawings shall be submitted to the engineer for approval.
- These drawings, and all designs shown within these drawings, are copyrighted by Krech Ojard & Associates. Duplication is not permitted without written permission. The designs shown herein are intended for this project only and may not be used on any other project or for any other purpose.

SUBMITTALS

- Provide copies of all submittals to the Engineer, including one copy to be retained by KOA. Allow one week for review. Submittals will be reviewed for general conformance to the contract documents. Responsibility for adherence to the contract documents lies solely with the Contractor, including but not limited to dimensions, sizes, connections, and quantities.
- Contractor shall review, mark, and stamp all submittals before submittal to the Engineer. Unreviewed or unstamped submittals will be returned to the Contractor without review.
- Resubmittals shall have all revisions clearly identified with "drawing clouds" and revision dates. KOA shall not be responsible for review of any unmarked revisions.
- Shop drawings, to include typical and unique conditions and all connections, shall be submitted to the structural engineer of record for the following products prior to fabrication. Shop drawings shall clearly demonstrate the Contractor's understanding of the contract documents. Where indicated below, shop drawings shall be sealed by a Professional Engineer licensed in the State of Minnesota:
 - Concrete/Masonry Reinforcing Steel
 - Concrete/Grout Mix Designs (including copies of previous test reports)

SPECIAL INSPECTIONS AND TESTING

- A special inspection agency shall be retained to perform the following special inspection and testing regimen. Special inspection and testing should be performed in accordance with the MnDOT 2008 Materials Control Schedule.
- SOILS AND FOUNDATIONS: Conformance of site preparation, fill placement, and in-place density to 95% Standard Proctor Density.
- CONCRETE: Reinforcing steel placement and welding, cast-in-place and post-installed anchor installation, verification of design mix use, tests for strength, slump, and air content, and maintenance of proper curing techniques. (Exceptions: not required for isolated column footings and slabs-on-grade)
- Reference the electrical, and mechanical drawings and/or specifications for addition special inspection and testing requirements.

STRUCTURAL OBSERVATION

- Structural Observation will be performed as required. It shall be the Contractor's responsibility to keep the Engineer apprised of the general schedule of construction, such that observations may be made at appropriate stages before significant structural components (such as reinforcing bars, framing members, or wall holdowns) are obscured.

REINFORCED CONCRETE

Materials:

Concrete @ 28 days (56 days OK for fly ash or slag concrete):

APPLICATION	f _c (psi)	w/c (max)	COARSE AGG. (max)	FLY ASH (max)	SILICA FUME (% substituted, by mass)	CRYSTALLINE WATERPROOFING
ROOF & WALLS	5000	0.42	3/4"	15%	5%	2-3%

- Cement: Type I or II per ASTM C150
- Fly Ash: Class C or Class F per ASTM C618
- Crystalline Waterproofing: Xypex's "C-500" or approved equal
- Corrosion Inhibitor: BASF Rheocrete CNI or approved equal @ 4.0 gallons per cubic yard dosage
- Fiber Reinforcement: Forea-Fero fibers @ 5 lbs per cubic yard dosage
- The use of water reducing agents and plasticizers may be required.
- Concrete exposed to weather shall have air entrainment as follows:

COARSE AGGREGATE	AIR CONTENT (+/-1.5%)
3/8"	7.5%
1/2"	7.0%
3/4" - 1"	6.0%
1 1/2"	5.5%

- Reinforcing Steel: Stainless steel A995, Gr 2205 or approved equal unless noted otherwise
- All reinforcing steel lap splices are to be Class B unless noted otherwise.
- Provide clear cover from outermost reinforcing to surface of concrete in accordance with following schedule:

EXPOSURE	ELEMENTS	BAR SIZE	CLEAR COVER
CAST AGAINST AND PERMANENTLY EXPOSED TO THE EARTH	ALL	ALL	3"
		#6 - #18	2"
FORMED, EXPOSED TO THE EARTH OR WEATHER	ALL	#6 OR SMALLER	1 1/2"
		#14, #18	1 1/2"
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	SLABS, WALLS, JOISTS	#11 OR SMALLER	3/4"
		BEAMS, COLUMNS (LONGITUDINAL, HOOPS, TIES, STIRRUPS, SPIRALS)	ALL

- Provide all accessories, chairs, spacer bars and supports necessary to secure steel in accordance with ACI Code of Standard Practice.
- Do not strip forms until concrete has reached adequate strength.
- Furnish and place all sleeves and openings as shown on the drawings or as specified.
- All reinforcing shall be shop fabricated, except #3 or #4 bars may be field bent. Bend bars only one time in any location, do not rebend.
- All hooked bars shall be a standard ACI shop fabricated hook unless noted otherwise.
- All concrete work shall conform to ACI 301 unless noted otherwise.
- Test cylinders shall be taken once per day or every 150 C.Y. of concrete placed, for each mix used, in accordance with MnDOT 2008 Materials Control Schedule.
- Observe all ACI recommendations for hot or cold weather concreting cure slabs using an approved curing compound or wet cure system per ACI recommendations, with special consideration for slag and fly ash concrete as appropriate.

CONCRETE/MASONRY ACCESSORIES:

- "Adhesive" or "Epoxy" anchors in solid base material shall be a stainless steel No. 5 bar set in Hilti HY 150 Max or approved equal. Hole preparation and rod installation shall be per manufacturer recommendation. Minimum embedment shall be 10 x rod diameter unless noted otherwise.
- Cast in place anchors shall be ASTM A316 Stainless Steel threaded rod with nut and washer at embedded end. Minimum embedment shall be 10 x rod diameter, but not less than shown on drawings, nor less than 7 inches. Anchors shall be affixed to form to prevent movement during casting, vibration, or set up and shall not be "Wet-Stubbed" into concrete. Embedment shall be measured from face of washer to surface of concrete.
- All concrete or grouted masonry must cure for a minimum of 7 days before any holes can be drilled; or any post installed anchors placed.
- All post-installed anchors shall be located to avoid drilling into reinforcement, unless specifically approved by the engineer. Reinforcement shall be placed with consideration for location of anchors.

Exterior Waterproofing System:

- The following approved waterproofing systems (60 mil minimum thickness) shall be installed on the exterior surfaces that are exposed for construction or repair (walls and roof slab):
 - Polyken No. 660 system (Polyken Industries)
 - Bituthene 4000 (Grace Construction Products)
 - Jiffy Seal 140/60 (Protecto Wrap)
 - Polyguard 650 (Polyguard Products)
 - Or approved equal

WARNING
 BEFORE DIGGING CALL
 1-800-252-1166
 REQUIRED BY LAW



STATE OF MINNESOTA

PROJECT LOCATION
 ST. LOUIS COUNTY
 CITY OF DULUTH

SHEET INDEX		
SHEET #	DESCRIPTION	REVISION
S1	STRUCTURAL TITLE SHEET	
S2	STRUCTURAL PLAN AND DETAILS	

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

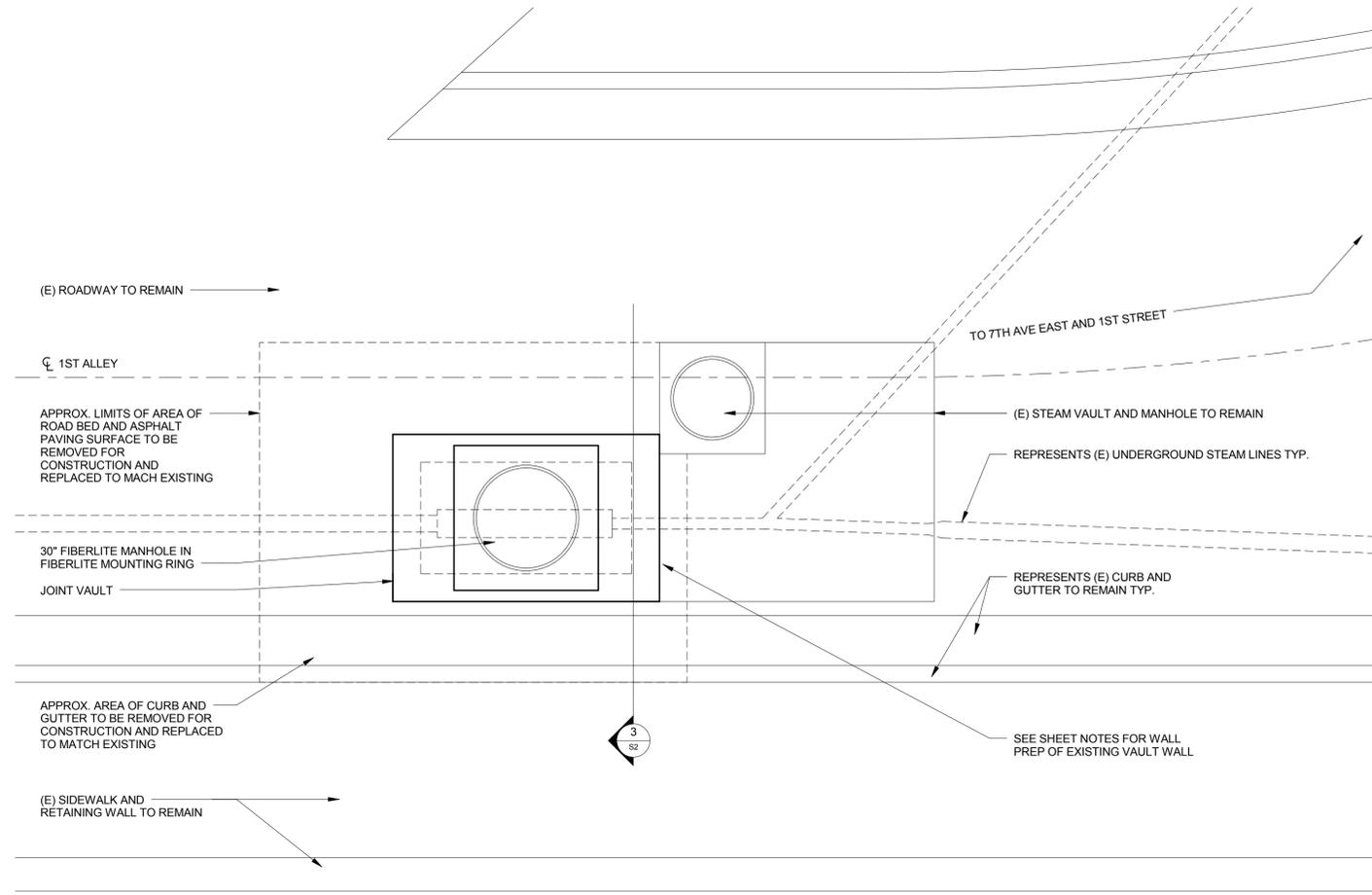
NAME: LEE C. M. WINNERS
 SIGNATURE: [Signature]
 DATE: 9/11/13
 LIC. No. 56862

Revision Schedule	
#	Date
	9/11/13

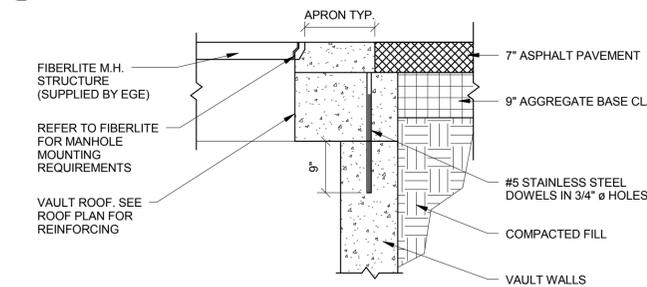
STEAM LINE INSTALLATION -
 DULUTH STEAM
 1ST ALLEY & 7TH AVE. E.
 DULUTH, MN
 STRUCTURAL TITLE SHEET

JOB No: 131164
 DATE: 9/11/13
 DRAWN BY: -
 CHECKED BY: LCMW

SHEET:
S1



1 WEST WASHINGTON AND 1ST ALLEY PLAN VIEW
3/8" = 1'-0"



4 MANHOLE APRON AND ROAD WAY REPAIR DETAIL
3/4" = 1'-0"

DEMOLITION QUANTITIES		
ITEM	UNIT	EST. QTY.
SAWCUT AND REMOVE ROADWAY SURFACE OVER NEW VAULT	SQ. FT.	104
SAWCUT AND REMOVE CURB AND GUTTER OVER NEW VAULT	SQ. FT.	26
EXCAVATE FOR NEW VAULT	LS	1

CONSTRUCTION QUANTITIES		
ITEM	UNIT	EST. QTY.
MOBILIZATION	LS	1
SUPPLY AND INSTALL STAINLESS STEEL DOWELS FOR ROOF CONNECTION	EA	12
SUPPLY AND INSTALL VAULT ROOF INCLUDING STAINLESS STEEL REINFORCING*	C.Y.	1.3
INSTALL MANHOLE RINGS COVERS AND APRONS	EA	1
FORM AND CAST FLOOR*	C.Y.	1.9
REBUILD ROADWAY TO MATCH EXISTING	SQ. FT.	84
FORM AND CAST WALLS (FINAL HEIGHT TO BE DETERMINED IN FIELD)*	C.Y.	4.6
FORM WALLS AND FLOOR AROUND EXISTING THRUST BLOCK	LS	1
PROVIDE AND INSTALL PIPE SLEEVES FOR STEAM PIPE	EA	2
PROVIDE AND PLACE / COMPACT GRANULAR FILL	C.Y.	11
CLEAN AND SANDBLAST (E) VAULT WALL	LS	1

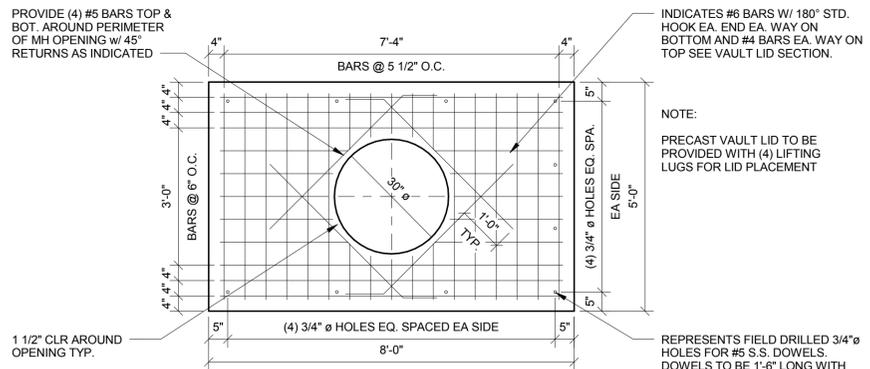
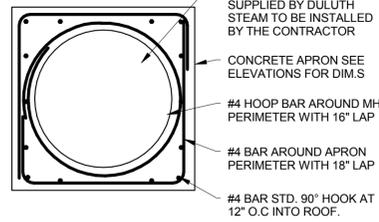
* USE APPROVED ARROWHEAD CONCRETE MIX FOR HIGH TEMPERATURE APPLICATIONS

NOTE: BIDDERS SHALL INCLUDE UNIT PRICES FOR THE BID ITEMS ABOVE. CONTRACTOR WILL BE PAID AT THE UNIT BID PRICE ONLY FOR THOSE QUANTITIES ABOVE THE ESTIMATED QUANTITIES SHOWN

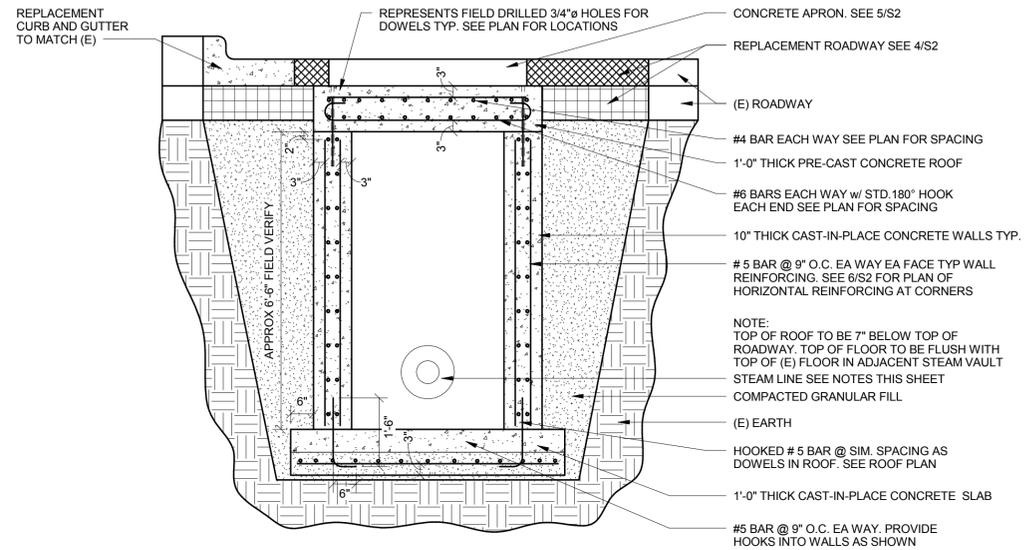
NOTES:

- SEE S1 FOR GENERAL NOTES AND SPECIFICATIONS
- DO NOT SCALE DRAWINGS. SCALE IS FOR DESIGN REFERENCE ONLY
- CONTRACTOR IS RESPONSIBLE SHORING AND BRACING
- NOTIFY ENGINEER OF DISCREPANCIES OR DAMAGE PRIOR TO PROCEEDING WITH WORK
- SUBSTITUTIONS FOR FASTENERS OR MATERIALS SHALL BE DONE IN WRITING
- THE WORK COVERED BY THESE PLANS INCLUDES THE EXCAVATION AND PREPARATION FOR AND CONSTRUCTION OF A VAULT AROUND A NEW STEAM PIPE JOINT.
- SEE MECHANICAL DRAWING M1 BY FJJ FOR STEAM PIPE AND PIPE COMPONENTS WORK DESCRIPTION
- PROVIDE PIPE SLEEVES AROUND STEAM PIPE
- FORM EAST WALL AND FLOOR AROUND EXISTING CONCRETE THRUST BLOCK LOCATED JUST OUTSIDE OF EXISTING STEAM VAULT. EXACT SIZE AND LOCATION UNKNOWN. NOTIFY ENGINEER OF POURING PLAN ONCE EXPOSED.
- POUR EAST WALL OF JOINT VAULT AGAINST WEST WALL OF EXISTING STEAM VAULT. PREP. SURFACE OF EXISTING VAULT WALL BY REMOVING DIRT AND LOOSE MATERIAL AND SANDBLASTING. WET EXISTING WALL TO A "SATURATED-SURFACE DRY" CONDITION PRIOR TO POURING NEW WALL

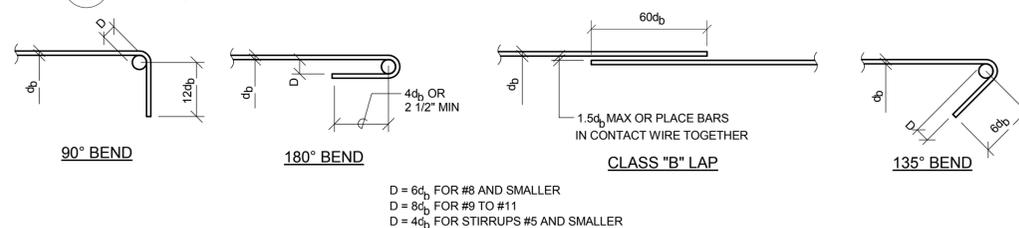
5 TYPICAL MANHOLE APRON REINFORCING PLAN
1/2" = 1'-0"



2 VAULT ROOF PLAN
1/2" = 1'-0"



3 TYP. VAULT SECTION LOOKING WEST
1/2" = 1'-0"

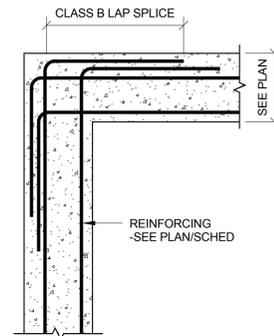


7 TYPICAL CONCRETE REINFORCING DETAILS
3/4" = 1'-0"

MINIMUM SPLICE AND EMBEDMENT LENGTHS					
CONCRETE STRENGTH = 4000 PSI BAR STRENGTH = 60,000 PSI					
Type	Lap Splice		Embedment		
	Vertical Bar or Bottom Bar	Horizontal Bar	Vertical Bar or Bottom Bar	Horizontal Bar	Standard Hook
3	19	24	15	19	6
4	25	32	19	25	7
5	31	40	24	31	9
6	37	48	29	37	10
7	54	70	42	54	12
8	62	80	48	62	14
9	70	91	54	70	15

- TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL-WEIGHT CONCRETE. THEY ARE TYPICAL MINIMUM VALUES TO BE USED UNLESS NOTED OTHERWISE WITHIN THE PLANS. LENGTHS ARE IN INCHES.
- BOTTOM HORIZONTAL BARS MUST BE CAST WITHIN THE BOTTOM 12" OF THE CONCRETE POUR
- LENGTHS ARE FOR CENTER TO CENTER BAR SPACING GREATER THAN OR EQUAL TO 2 BAR DIAMETERS AND CLEAR COVER GREATER THAN OR EQUAL TO ONE BAR DIAMETER. INCREASE THE TABULATED VALUES BY 50% FOR ALL OTHER CASES.
- ALL LAP SPLICES ARE ASSUMED TO BE CLASS B TYPE. TABULATED VALUES MAY BE REDUCED BY 25% FOR ALL CLASS A SPLICES AS APPROVED AS A REQUEST ON SHOP DRAWINGS
- FOR EPOXY COATED BARS, INCREASE THE TABULATED VALUES BY 20%.
- LENGTHS SHOWN ARE FOR SIDE CONCRETE COVER GREATER THAN OR EQUAL TO 2 1/2" AND END CONCRETE COVER GREATER THAN OR EQUAL TO 2"

6 TYPICAL CONCRETE CORNER REINFORCING DETAIL (PLAN)
3/4" = 1'-0"



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NAME: LEE C. M. WINTERS
SIGNATURE: [Signature]
DATE: 09/11/13
LIC. NO. 56862

Revision Schedule	Description	By
#	ISSUED FOR CONSTRUCTION	
Date	9/11/13	

STEAM LINE INSTALLATION -
DULUTH STEAM
1ST ALLEY & 7TH AVE. E.
DULUTH, MN

STRUCTURAL PLAN AND DETAILS

JOB No: 131164
DATE: 9/11/13
DRAWN BY:
CHECKED BY: LCMW

SHEET:
S2