GENERAL CONSTRUCTION NOTES:

1. ALL EXCAVATION WITHIN OR ADJACENT TO THE STREAM BED SHALL BE UNDERTAKEN IN DRY CONDITIONS. THE CONTRACTOR SHALL INSTALL SANDBAGS, COFFERDAMS, AND BYPASS PIPING AS NECESSARY TO SAFELY ROUTE THE STREAM FLOW AROUND THE EXCAVATION AREA UNTIL CONSTRUCTION IS COMPLETE. THIS WORK ITEM SHALL BE PAID FOR AS A PART OF THE LUMP SUM BID ITEM FOR CONTROL OF WATER.

2. DEBRIS AND DEADFALL REMOVAL SHALL NOT BE INTERPRETED TO MEAN GRUBBING, BUT MAY INCLUDE REMOVAL OF LIVE TIMBER BY CUTTING AND LEAVING STUMP INTACT. LIVE TIMBER CAN BE CUT AT BREAK OR NO CLOSER THAN 2- FEET TO THE GROUND. DEADFALL IS TO BE CONSIDERED ONLY FLOATABLE DEBRIS. DEADFALL OR CUT TIMBER IN GOOD CONDITION MAY BE UTILIZED ON SITE FOR TOE WOOD STABILIZATION AS APPROVED BY THE ENGINEER. DEADFALL IS TO EITHER BE RECYCLED ON SITE AS TOE WOOD OR IS TO BE REMOVED FROM PROJECT LIMITS.

3. COMMON EXCAVATION SHALL INCLUDE TOPSOIL STRIPPING AND STOCKPILING, AND SUBSOIL EXCAVATION AND STOCKPILING. IT IS ANTICIPATED THAT THE EXCAVATED SUBSOIL WILL BE SUITABLE FOR REUSE AS BACKFILL FOR V.R.S.S., TOE WOOD TOE PROTECTION, AND IN OTHER AREAS AS NECESSARY. IT IS ANTICIPATED THAT IMPORTING TOPSOIL OR GENERAL FILL WILL NOT BE NECESSARY. COMMON EXCAVATION SHALL BE INCIDENTAL TO CONSTRUCTION.

4. DEADFALL AND DEBRIS REMOVAL IS ASSUMED BETWEEN STATIONS 202+00 AND 204+50, AND BETWEEN STATIONS 212+50 AND 217+00 AND TO BE WITHIN 10-FEET OF THE BANKFULL WIDTH. AS NOTED WITHIN THE PLANS AND SPECIFICATIONS, DEADFALL AND DEBRIS TO BE REMOVED SHALL BE MARKED IN THE FIELD WITH SURVEYORS PAINT AND/OR FLAGGING BY CITY STAFF.

5. OTHER ITEMS WHERE A METHOD OF PAYMENT IS NOT NOTED SHALL BE INCIDENTAL TO CONSTRUCTION.

INVASIVE SPECIES CONTROL MEASURES:

PRIOR TO ENTERING THE PROJECT SITE, THE CONTRACTOR SHALL INSPECT ALL EQUIPMENT AND GEAR AND REMOVE AQUATIC PLANTS, ANIMALS, AND MUD FROM ALL ITEMS. EQUIPMENT AND GEAR SHALL BE DEFINED AS ALL BOATS, MOTORS, TRACKED VEHICLES, AND HEAVY EQUIPMENT, BARGES, HOSES, PUMPS, SHEET PILING, SILT CURTAINS OR TURBIDITY BARRIERS, WADERS, AND ALL OTHER EQUIPMENT WHICH MAY COME INTO CONTACT WITH SURFACE WATERS DURING CONSTRUCTION. THE CONTRACTOR SHALL SCRUB ALL EQUIPMENT AND GEAR WITH A STIFF-BRISTLED BRUSH WHEN FEASIBLE. THE CONTRACTOR SHALL MAINTAIN A MANIFEST DOCUMENTING THE ITEM, DATE, LOCATION AND DISINFECTION METHOD USED TO PERFORM DISINFECTATION.

PLANTED SPECIES:

1. **Shrubs**
   - Pagoda Dogwood Cornus Alternifolia #2 Container 7
   - Red-Osier Dogwood Cornus Sericea #2 Container 12
   - Bush Honeysuckle Diervilla Lonicera #2 Container 14
   - Red-berried Elder Sambucus Pubens #2 Container 11
   - Snowberry Symphoricarpos Albus #1 Container 8

2. **Live Stakes**
   - Bebb's Willow Salix Bebbiana Live Stakes shall be 139
     - 4'-6' in Length & 1/2'-2' in Diameter 138
   - Balsam Willow Salix Pyrifolia 138
   - Red-Osier Dogwood Cornus Sericea 138
   - Black Willow Salix nigra 138

3. **Cover Crop**
   - Oats Avena Sativa - 100 lbs/ac
   - Winter Wheat Triticum Aestivum - 100 lbs/ac

**Table 3 - Summary of Work**

<table>
<thead>
<tr>
<th>Work Zone</th>
<th>Proposed Work</th>
<th>Disturbance Area (SY)</th>
<th>Work in Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Toe Wood &amp; V.R.S.S. Slope Repair</td>
<td>395</td>
<td>Yes</td>
</tr>
<tr>
<td>B</td>
<td>Rip Rap Bank Stabilization</td>
<td>222</td>
<td>No</td>
</tr>
</tbody>
</table>
TRANSITION TO EXISTING GRADE USE
EROSION CONTROL MAT CATEGORY 4N-2S
AND LIVE STAKES. LIVE STAKES SHALL BE
PLANTED AT 18" SPACING. EROSION
CONTROL MAT 3N-2S MAY BE
SUBSTITUTED IN AREAS WHERE THE SIDE
SLOPE IS 3H:1V OR LESS AND WITH NO
LIVE STAKES. TRANSITION AREA TO BE
PLACED WITH SEED MIXTURE 36-311
PER MNDOT 3876.

DEAD STOUT STAKES

LIVE STAKES TO BE
PLANTED ON TOP SIDE OF
EACH LAYER
STAKES PLACED 18" APART
OR LESS

2'-6" OUTER FIBER
MATTING LAYER

PER NOTE 4

DEAD STOUT
STAKE
CUT FROM
UNTREATED
2X4 LUMBER

LENGTH
12" MAX. LIFT
THICKNESS
2-3 FT
TOP OF ROCK RIP RAP TOE
PROTECTION, TOE-WOOD
TOE PROTECTION, OR V.R.S.S.
BENCH AT APPROXIMATE
BANKFULL ELEVATION OR AS
DIRECTED BY ENGINEER

FILLER LOG (TYP)
FILTER LOG (TYP)

SECTIONAL VIEW

EXISTING OR EXCAVATED
GROUND SURFACE

LIVE STAKES TO BE
SPACED APPROX 18" APART
TOP OF ROCK RIP RAP TOE
PROTECTION, TOE-WOOD
TOE PROTECTION, OR V.R.S.S.
BENCH AT APPROXIMATE
BANKFULL ELEVATION OR AS
DIRECTED BY ENGINEER

6" - 8" THICK TOPSOIL LAYER

6" - 8" THICK TOPSOIL LAYER

12" MAX THICKNESS

TOP OF FIBER MATTING IN PLACE WITH
WOODEN STAKES SPACED EVERY
THREE FEET AS SHOWN ON THE DRAWINGS.

EXISTING SOIL

MINIMUM OF 2 BUDS
EXPOSED ABOVE GROUND

TAMP SOIL AROUND LIVE STAKE

NOTE: LIVE STAKES
SHALL BE PER TABLE 2
ON SHEET G 2.

LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.) DETAIL

GENERAL NOTES ON V.R.S.S.

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.


3. LAY NATURAL FIBER MATTING ON BOTTOM OF THE BENCH, OVERLAPPING ADJACENT MATTING BY 1 FOOT. THE OUTER EXPOSED FIBER MATTING LAYER OF EACH SOIL LIFT SHALL BE GEOCORREXOXWE 90 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.

4. THE INNER LAYER OF FIBER MATTING FOR EACH SOIL LIFT SHALL BE BIONET C120BN OR AN ENGINEER APPROVED EQUIVALENT AND SHALL BE LAY BENEATH THE TOPSOIL LAYER. LAY THE INNER LAYER OF BIONET ON TOP OF NATURAL FIBER MATTING OF EACH SOIL LIFT. FABRIC SHOULD BE INSTALLED SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. STAKE THE SHOREWARD END OF THE FIBER MATTING IN PLACE WITH WOODEN STAKES SPACED EVERY THREE FEET AS SHOWN ON THE DRAWINGS.

5. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRANULAR MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 6 TO 8 INCHES ON THE FRONT OF THE SURFACE LAYER SHALL BE COMPRISED OF TOPSOIL MIX CONFORMING TO THE REQUIREMENTS OF MNDOT 3877.2A COMMON TOPSOIL BORROW AND SHALL BE WEED SEED FREE.

6. THE TOPSOIL LAYER SHALL BE SEEDED WITH SEED MIXTURE 34-361 PER MNDOT 3876 AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.

7. FOLD THE FIBER MATTING OVER THE FILL MATERIAL AND STAKE IN PLACE SO THE FABRIC IS TAUT AND SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. BACKFILL BEHIND THE BOTTOM SOIL LIFT WITH GRANULAR FILTER MATERIAL TO MEET THE EXISTING SLOPE AS SHOWN ON THE DRAWINGS.

8. SHRUBS SHALL BE SPACED APPROXIMATELY 36-INCHES ON CENTER AND SHALL BE SELECTED FROM TABLE 2 ON SHEET G2. SHRUB INSTALLATION LOCATION IS AS NOTED IN DETAIL A/G7.

9. V.R.S.S. SHALL BE MEASURED FOR PAYMENT BY SQUARE FOOT OF FACE (SFT) WHICH SHALL BE MEASURED IN ACCORDANCE TO SECTION 01 22 00.

10. INSTALLATION OF V.R.S.S. SHALL INCLUDE FILL MIXTURE, OUTER & INNER FABRIC TYPES SPECIFIED ABOVE, TOPSOIL AND SEED MIX SPECIFIED ABOVE. LIVE STAKES ARE TO BE PAID FOR SEPARATELY.

V.R.S.S. STABILIZATION
1. Prepare soil before installing blankets, including any necessary application of lime, fertilizer, and seed.

2. Begin at the top of the slope by anchoring the blanket in a 6" (15 cm) deep x 9" (23 cm) wide trench with approximately 12" (30 cm) of blanket extended beyond the top slope portion of the trend. Anchor the blanket with a row of staples/stakes approximately 12" (30 cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to compacted soil and fill backfilling to topsoil grade with a row of staggered stakes spaced approximately 12" (30 cm) apart across the width of the blanket.

3. Roll the blankets (A) down or (B) horizontally across the slope. Blankets will overlap with approximate side against the soil surface. All blankets must be secured fastening to soil surface by placing stainless-steel fasteners in approximate locations as shown in the staple pattern guide.

4. The edges of parallel blankets must be stapled with approximately 2" (5 cm) overlapping depending on blanket type.

5. Consecutive blankets spaced down the slope must be placed end over end (shingle style) with an approximate 3" (7.5 cm) overlap. Staple through overlapped area, approximately 12" (30 cm) apart across entire blanket width.

6. Erosion control blanket shall be category 3N-2S or 4N-2S with all natural netting & stitching per MNDOT 3885 - Table 3885-3.

NOTE:
1. Loose soil conditions, the use of staple or stake lengths greater than 6" (15 cm) may be necessary to properly secure the blankets.

2. For complete rip rap toe protection installation, root rip rap will be installed for the rip rap surface area above the stream base flow elevation. See detail D for rip rap toe protection.


4. Erosion control blanket shall be category 3N-2S or 4N-2S with all natural netting & stitching per MNDOT 3885 - Table 3885-3.

NOTE:
1. Loose soil conditions, the use of staple or stake lengths greater than 6" (15 cm) may be necessary to properly secure the blankets.

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NOTE:
1. Loose soil conditions, the use of staple or stake lengths greater than 6" (15 cm) may be necessary to properly secure the blankets.

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4. Erosion control blanket shall be category 3N-2S or 4N-2S with all natural netting & stitching per MNDOT 3885 - Table 3885-3.
1. SOLE CHANNEL & PLACE ANCHOR LOGS
- Excavate base of toe wood bench to specified width and elevation
- Excavation will be done in dry weather conditions.

ANCHOR LOGS:
SPECIFICATION:
- 10'-12' DIA
- LIMBS REMOVED
- APPROX. 14' LENGTH

PLACEMENT:
- PLACE LOGS PARALLEL TO STREAM IN TOEWOOD TRENCH
- PLACE LOGS IN CROSSED PAIRS
(Cutting notches may be necessary to stabilize anchor logs)

2. PLACE TOEWOOD, BOULDERS, AND WOODY DEBRIS FILL

TOE WOOD:
SPECIFICATION:
- 12' MIN DIA
- APPROX. 12 LENGTH
- LIMBS REMOVED
- ROOT WADS LEFT INTACT
- ENDS SHARPENED

PLACEMENT:
- STACK TOE WOOD LOGS ON TOP OF FOOTER LOGS WITH ROOTS IN TRENCH
- PLACE TOEWOOD LOGS APPROX. 20 FEET ON CENTER
- ANGLE ROOTWADS 30 DEGREES UPSTREAM AS SHOWN
- DRIVE SHARPENED TRUNKS MN. 3" INTO BANK

BOULDERS:
SPECIFICATION:
- SHALL BE ANGULAR, FRACTURED OR BLOCKY
- SHALL WEIGH BETWEEN 800 AND 3,000 LBS

PLACEMENT:
- BOULDERS SHALL BE PLACED ALONG THE TRANSVERSE EDGE OF THE TOE WOOD EXCAVATION.
- APPROXIMATELY 4 TO 6 BOULDERS SHALL ALSO BE PLACED BETWEEN EACH TOE WOOD LOG.

WOODY DEBRIS:
SPECIFICATION:
- WOODY MATERIAL (COMPOSED OF SMALL LIMBS AND BRANCHES, APPROX. 4" MIN DIAMETER AND SMALLER)

PLACEMENT:
- FILL SPACES BETWEEN FOOTER LOGS AND TOEWOOD
- COMPACT DEBRIS WITH EXCAVATOR BUCKET

3. SOIL LIFT 1

SPECIFICATION:
- USE EXCESS MATERIAL FROM STREAMBED FOR SOIL FILL
- WRAP FILL IN MIN 7" WIDE GEOTEXTILE: GEOTEXTILE SHALL BE GEODONE/DEKOWE 800 WOVEN COCONUT FIBER MESH. BIO-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
- THE INNER LAYER OF FIBER MATTING SHALL BE BIODE C125BN OR AN ENGINEER APPROVED EQUIVALENT.

PLACEMENT:
- LAY FIRST HALF OF 600 WOVEN COCONUT FIBER MESH ON BENCH
- PLACE 6'-1" OF TOPSOIL ON TOP OF GEOTEXTILE AND ACROSS BENCH
- WRAP 2ND HALF OF GEOTEXTILE OVER PLACED SOIL SO THAT GEOTEXTILE IS EMBEDDED MIN 2" ABOVE AND BELOW SOIL LIFT
- SOIL LIFT 1 SHALL BE SEEDED WITH MNDOT SEED MIXTURE 34-361 PER MNDOT 3876.

4. PLACE LIVE CUTTINGS AND BUILD TO BANKFULL ELEVATION

PLACEMENT:
- STABILIZATION ABOVE SOIL LIFT 1 SHALL BE V.R.S.S. PER DETAIL B/G3
- OR AS OTHERWISE SHOWN ON THE PLANS.

GENERAL NOTES ON TOE WOOD STABILIZATION:
1. SOAK DORMANT CUTTINGS FOR A MINIMUM OF 24 HOURS IN FLOWING WATER BEFORE PLANTING. SOAKING FOR 5-7 DAYS IS CONSIDERED IDEAL. THE DORMANT CUTTINGS SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING. DORMANT CUTTINGS STORED IN COLD STORAGE WITH NO VISIBLE SIGN OF BUD BREAK MAY BE USED INTO LATE SPRING.


3. TOE WOOD STABILIZATION SHALL BE MEASURED LONGITUDINALLY ALONG THE EXCAVATION LIMIT WITHIN THE STREAMBED. THE WORK SHALL INCLUDE ALL ELEMENTS UP TO THE TOP OF SOIL LIFT 1. ALL OTHER V.R.S.S. LIFTS WILL BE COMPENSATED UNDER THE V.R.S.S. PAY ITEM. SHRUBS SHALL BE PAID AT THE CONTRACT UNIT PRICE FOR SHRUBS. SEED FOR SOIL LIFT 1 SHALL BE INCIDENTAL TO THE UNIT PRICE FOR TOEWOOD.
NOTES:
1. SCARIFY BOTTOM AND SIDES OF PLANTING PIT PRIOR TO PLANTING.
2. LOOSEN ROOT BALL BEFORE PLANTING.
3. BACKFILL WITH PLANTING SOIL AND TAMPER TO PREVENT SETTLEMENT.

SHRUB PLANTING DETAIL

FILTER LOG BLANKET SYSTEM DETAIL

SILT FENCE BAFFLE DETAIL

ROCK WEEPER DETAIL

NOT TO SCALE
This page contains information regarding stormwater pollution prevention planning (SWPPP) for construction activities. It includes details on construction practices to minimize stormwater contamination, erosion control measures, and other environmental considerations.

**Summary of Priorious and Impervious Directions of Flow/Drainage Area Overview Sheet ST 1 THRU ST 3**

- **Vegetated Reinforced Soil Slopes (VRSS), Live Stakes, and Permanent Erosion Control via Seeding.** Various methods of slope stabilization will be used to ensure proper plant growth and soil stabilization.

**Location of SWPPP Requirements in Project Plan**

- **Description:** The SWPPP requirements include measures to control erosion, sediment, and stormwater runoff during construction.

**Erosion Control Notes**

- **Submit Erosion Control (EC) Schedule at or before the Pre-construction Conference.**
- **Submit EC Schedule Alterations/Adjustments Weekly Thereafter for Engineer's Approval.**

**Designated Function**

- **STABILIZED CONSTRUCTION ENTRANCE, OR REUSABLE MUD MAT SHALL BE USED TO REDUCE SEDIMENT TRACKING.**

**Corrective Actions that were Taken.**

- **MNDOT Standard Specifications for Construction (2016 Edition) shall apply.**
- **Submit Initial Erosion Control (EC) Schedule at or before the Pre-construction Conference.**
- **Submit EC Schedule Alterations/Adjustments Weekly Thereafter for Engineer's Approval.**

**Erosion Control blankets (ECB) [N. American Green S150 or Approved Equal] along with seed mixture, fertilizer, and soil staples per 2573.** The upgradient end of each blanket strip shall be buried at least 6 inches in a vertical check slot. Staples shall be placed at seams and throughout the blanket at a maximum 12. Cover debris and crushing stockpiles. Provide silt fencing around perimeter of stockpile areas. Replace topsoil and seed all areas disturbed by work.

**Construction Practices to Minimize Stormwater Contamination**

- **All areas that are rough graded must be kept in a smooth condition to allow sheet flow of stormwater wherever practical and always ready to receive sheet flow.**
- **Spill kits will be included with all fueling services and maintenance activities.**
- **Stabilized Construction Entrance, or Reusable Mud Mat shall be used to reduce sediment tracking.**

**Correct Procedure for Disposal.**

- **Material and Equipment Necessary for Spill Clean-up shall be readily available and be kept in an enclosed trailer or shed on site.**
- **Some of the best measures that can be taken to minimize stormwater contamination are:**

**Contact Information**

- **Project Engineer:**
  - **Name:** Joseph J. Jurewicz, P.E.
  - **Title:** Project Engineer
  - **Company:** MSA Professional Services, Inc.
  - **Address:** 332 W. Superior Street, Suite 480 Duluth, MN 55802
  - **Phone:** (218) 724-3215
  - **E-mail:** jjurewicz@msa-ps.com

- **Project Owner:**
  - **Name:** James Dexter
  - **Title:** Site Manager
  - **Company:** MPCA
  - **Address:** 1568 Highway 2 Duluth, MN 55802
  - **Phone:** (218) 834-1442
  - **E-mail:** tpfeffer@DuluthMN.gov

- **State Duty Officer:**
  - **Name:** Patricia Fowler
  - **Title:** State Duty Officer
  - **Company:** MPCA
  - **Address:** 1568 Highway 2 Duluth, MN 55802
  - **Phone:** (218) 720-5291 ext. 35402
  - **E-mail:** pfowler@state.mn.us
NOTE:
ALL WORK IS BEING CONDUCTED WITHIN CITY OF DULUTH OR STATE OF MINNESOTA OWNED PARCELS.
DATA OBTAINED FROM ST. LOUIS COUNTY.

TRINITY ROAD

MILLER CREEK

WORK ZONE A
STA. 216+25 TO STA. 217+00
APPROXIMATE DISTURBANCE AREA: 392 SQ YRDS
STA. 217+00: N: 4834758.3266
E: 3339792.0906

WORK ZONE B
STA. 203+30 TO STA. 203+90
APPROXIMATE DISTURBANCE AREA: 222 SQ YRDS
STA. 203+90: N: 4834217.6641
E: 3338807.1157

NOTE:
ALL WORK IS BEING CONDUCTED WITHIN CITY OF DULUTH OR STATE OF MINNESOTA OWNED PARCELS.
DATA OBTAINED FROM ST. LOUIS COUNTY.

12-FT WIDE ACCESS ROAD
COORDINATE LOCATION WITH CITY OF DULUTH CONSTRUCTION REPRESENTATIVE. RESTORE AT CONSTRUCTION COMPLETION.

DISTURBANCE AREA: 3386 SQ. YRDS

-rock construction entrance

MAINTENANCE AND RESTORATION OF HAUL ROADS, ACCESS ROADS/PATHS AND PARKING AREAS SHALL INCLUDE AGGREGATE, TOPSOIL, SEED MIXTURE 36-311 FOR WOODED AREAS AND SEED MIXTURE 25-131 FOR ROADSIDE AREAS AND EROSION CONTROL MAT 3N-2S. ANY NECESSARY FILTER LOGS SHALL BE INCIDENTAL TO PROJECT MOBILIZATION.
GENERAL NOTES:
1. AT THE PROJECT LIMITS, TOE WOOD AND VRSS SHALL BE SMOOTHLY TAPERED AND KEYED INTO THE EXISTING BANK A MINIMUM OF 6- FEET. THE CONTRACTOR SHALL USE RECLAIMED BOULDERS TO BULKHEAD THE TOE WOOD AT EACH END.
2. ALL EXCAVATION WITHIN OR ADJACENT TO THE STREAM BED SHALL BE UNDERTAKEN IN DRY CONDITIONS. THE CONTRACTOR SHALL INSTALL SANDBAGS, COFFERDAMS AND BYPASS PIPING AS NECESSARY TO SAFELY ROUTE THE STREAM FLOW AROUND THE EXCAVATION AREA UNTIL CONSTRUCTION IS COMPLETE.
3. CONTRACTOR TO REMOVE DEAD FALL AND WOODY DEBRIS WITHIN 10 FEET OF TOP OF BANK BETWEEN STATION 202+00 TO STATION 217+75. SEE SHEET ST 1 FOR LIMITS.
4. CONTRACTOR TO MAINTAIN APPROXIMATE BANK FULL WIDTH AS DEFINED BY THE TOP OF BANK OR AS DETERMINED BY THE DNR.

WARNING
LOCATION OF UNDERGROUND UTILITIES TO BE CONFIRMED BY CONTRACTOR.
Gopher State One Call.

EDC
KNN
EJT

Existing Sanitary Manhole, Do Not Disturb

Match Existing Grades (Typ.)
Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Install SLT Fence Baffle, See Detail C/D.
Approx. Existing Top of Bank (Typ.)
Approx. Existing Location of Rock Weeper, Orientation to be Determined Prior to Construction Based on Contractors Bypass Plan. See Detail C/D.

APPROXIMATE LOW FLOW CHANNEL
APPROX. EXISTING TOE OF SLOPE (TYP.)

STA. 217+00 Off RT. To STA. 216+25 Off RT
Minor Excavation (Approx. 7' Depth) Within Stream Bed. Use Spoils for VRSS Slope Repair or Haul Off Site. Work As Directed by the Engineer.

Approximate Existing Top of Bank (Typ.)
Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Preserve & Protect Existing Sanitary Sewer

Install SLT Fence Baffle, See Detail C/D.
Approx. Existing Top of Bank (Typ.)
Approx. Existing Location of Rock Weeper, Orientation to be Determined Prior to Construction Based on Contractors Bypass Plan. See Detail C/D.

APPROXIMATE LOW FLOW CHANNEL
APPROX. EXISTING TOE OF SLOPE (TYP.)

STA. 217+00 Off # LT. To STA. 216+25 Off # LT
Toe Wood Stabilization and VRSS Slope Repair, See Typical Sections B/G3 and A/G5

Approximate Existing Top of Bank (Typ.)
Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Preserve & Protect Existing Sanitary Sewer

Install SLT Fence Baffle, See Detail C/D.
Approx. Existing Top of Bank (Typ.)
Approx. Existing Location of Rock Weeper, Orientation to be Determined Prior to Construction Based on Contractors Bypass Plan. See Detail C/D.

APPROXIMATE LOW FLOW CHANNEL
APPROX. EXISTING TOE OF SLOPE (TYP.)

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Toe Wood Stabilization and VRSS Slope Repair, See Typical Sections B/G3 and A/G5

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Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Preserve & Protect Existing Sanitary Sewer

Install SLT Fence Baffle, See Detail C/D.
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Approximate Existing Top of Bank (Typ.)
Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Preserve & Protect Existing Sanitary Sewer

Install SLT Fence Baffle, See Detail C/D.
Approx. Existing Top of Bank (Typ.)
Approx. Existing Location of Rock Weeper, Orientation to be Determined Prior to Construction Based on Contractors Bypass Plan. See Detail C/D.

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Toe Wood Stabilization and VRSS Slope Repair, See Typical Sections B/G3 and A/G5

Approximate Existing Top of Bank (Typ.)
Approx. Existing Centerline of Stream (Typ.)
Disturbance Limits (Typ.)

Preserve & Protect Existing Sanitary Sewer

Install SLT Fence Baffle, See Detail C/D.
GENERAL NOTES:

1. AT THE PROJECT LIMITS, RIP RAP TOE PROTECTION SHALL BE SMOOTHLY TAPERED AND KEYED INTO THE EXISTING BANK A MINIMUM OF 6-FOOT.

2. ALL EXCAVATION WITHIN OR ADJACENT TO THE STREAM BED SHALL BE UNDERTAKEN IN DRY CONDITIONS. THE CONTRACTOR SHALL INSTALL SANDBAGS, COFFERDAMS AND BYPASS PIPING AS NECESSARY TO SAFELY ROUTE THE STREAM FLOW AROUND THE EXCAVATION AREA UNTIL CONSTRUCTION IS COMPLETE.

3. CONTRACTOR TO REMOVE DEAD FALL AND WOODY DEBRIS WITHIN 10 FEET OF TOP OF BANK BETWEEN STATION 203+00 TO STATION 217+75. SEE SHEET ST 1 FOR LIMITS.

4. CONTRACTOR TO MAINTAIN APPROXIMATE BANK FULL WIDTH AS DEFINED BY THE TOP OF BANK OR AS DETERMINED BY THE DNR.

WARNING

LOCATION OF UNDERGROUND UTILITIES TO BE VERIFIED BY CONTRACTOR

Gopher State One Call

1-800-252-1166

REQUIRED BY LAW
NOTE: CROSS SECTIONS ARE LOOKING DOWNSTREAM.

EXISTING EL. 1044.25
DESIGN EL. (FLOWLINE) 1042.25
EXISTING EL. 1045.53

INSTALL V.R.S.S. AT 1:5:1 TO ELEV. 1051.70.
INSTALL EROSION CONTROL BLANKET 4N-2S ABOVE V.R.S.S. TO DISTURBANCE LIMITS OR TO TOP OF BANK AS DIRECTED BY ENGINEER.

TOE WOOD EXCAVATION LIMIT
TOE OF BANK SLOPE

TOE WOOD EXCAVATION LIMIT

Existing EL. 1040.25
design EL. (flowline) 1042.25

WLSSD SEWER
BANKFULL WIDTH 25'

CITY OF DULUTH PROJECT NO. 1356
BANK STABILIZATION
MILLER CREEK

PLOT DATE: 05/05/16

sheet: 02/12/16
ISSUE FOR BID

JOSEPH J. JUREWICZ

BY:
License No.
I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Date: 05/20/2015

SCALE:

DRAWN BY:
CHECKED BY:
PROJECT NO.:
PROJECT DATE:
AS SHOWN

Work Zone A
NOTE:

1. CROSS SECTIONS ARE LOOKING DOWNSTREAM.
2. PRE-CONSTRUCTION DIMENSIONS:
   A. LOW FLOW WIDTH = 10'
   B. BANKFULL WIDTH = 25'

INSTALL V.R.S.S. AT 1.5:1 TO ELEV. 1050.80.
INSTALL EROSION CONTROL BLANKET 4N-2S ABOVE V.R.S.S. TO DISTURBANCE LIMITS OR TOP OF BANK AS DIRECTED BY ENGINEER.

INSTALL V.R.S.S. AT 1.5:1 TO ELEV. 1051.60.
INSTALL EROSION CONTROL BLANKET 4N-2S ABOVE V.R.S.S. TO DISTURBANCE LIMITS OR TO TOP OF BANK AS DIRECTED BY ENGINEER.

CITY OF DULUTH PROJECT NO. 1356

WEB ADDRESS: www.msa-ps.com

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NOTE: CROSS SECTIONS ARE LOOKING DOWNSTREAM.

EXISTING EL. 1041.65

EXISTING EL. 1042.41

DESIGN EL. 1041.00

TRANSITION AREA - INSTALL V.R.S.S. TO ELEV. 1050.20. INSTALL EROSION CONTROL BLANKET 4N-2S ABOVE V.R.S.S. TO DISTURBANCE LIMITS OR TO TOP OF BANK AS DIRECTED BY ENGINEER.

TOE WOOD EXCAVATION LIMIT

WLSSD SEWER

18-MO ELEV. = 1044.91

BANKFULL WIDTH 25'

18-LY ELEV. = 1049.20

100-YR ELEV. = 1049.20

TRANSLATION AREA
NOTE: CROSS SECTIONS ARE LOOKING DOWNSTREAM.

TOE OF RIP RAP SHALL BE 3-FT BELOW STREAM BED SURFACE OR SHALL TERMINATE AT BEDROCK SURFACE PER RIP RAP TOE PROTECTION DETAIL E/G4.

EXISTING EL. 1018.00
1018.43
1021.08
1021.12
1021.49
1021.60
1022.10

EXCAVATION LIMIT SHOWN ON THE PLANS

TOE OF RIP RAP SHALL BE 3-FT BELOW STREAM BED SURFACE OR SHALL TERMINATE AT BEDROCK SURFACE PER RIP RAP TOE PROTECTION DETAIL E/G4.

EXISTING EL. 1019.26
1019.28
1021.57
1022.00
1022.08
1022.10

EXCAVATION LIMIT SHOWN ON THE PLANS

TOE OF RIP RAP SHALL BE 3-FT BELOW STREAM BED SURFACE OR SHALL TERMINATE AT BEDROCK SURFACE PER RIP RAP TOE PROTECTION DETAIL E/G4.

EXISTING EL. 1016.96
1017.61
1019.26
1019.28
1020.12
1020.18
1021.08

EXPOSED BEDROCK LEDGE

INSTALL RIP RAP AT 2:1 TO ELEV 1021.1. INSTALL TOPSOIL, SEEDING, EROSION CONTROL BLANKET AND LIVE PLANTINGS. EROSION CONTROL BLANKET 4N-2S ABOVE RIP RAP TO DISTURBANCE LIMITS.

EXISTING EL. 1016.96
1017.61
1019.26
1019.28
1020.12
1020.18
1021.08

EXPOSED BEDROCK LEDGE

100-YR ELEV. = 1021.08
1018.43
1021.08
1021.12
1021.49
1021.60
1022.10

EXCAVATION LIMIT SHOWN ON THE PLANS

TOE OF RIP RAP SHALL BE 3-FT BELOW STREAM BED SURFACE OR SHALL TERMINATE AT BEDROCK SURFACE PER RIP RAP TOE PROTECTION DETAIL E/G4.

EXISTING EL. 1018.68
1019.26
1019.28
1021.08
1021.12
1021.49
1021.60
1022.10

EXPOSED BEDROCK LEDGE

INSTALL RIP RAP AT 2:1 TO ELEV 1022.1. INSTALL TOPSOIL, SEEDING, EROSION CONTROL BLANKET AND LIVE PLANTINGS. EROSION CONTROL BLANKET 4N-2S ABOVE RIP RAP DISTURBANCE LIMITS.

EXISTING EL. 1018.68
1019.26
1019.28
1021.08
1021.12
1021.49
1021.60
1022.10

EXPOSED BEDROCK LEDGE

TOE OF RIP RAP SHALL BE 3-FT BELOW STREAM BED SURFACE OR SHALL TERMINATE AT BEDROCK SURFACE PER RIP RAP TOE PROTECTION DETAIL E/G4.
NOTE:
CROSS SECTIONS ARE LOOKING DOWNSTREAM.

EXISTING EL. 1013.97

100-YR ELEV. = 1018.65
18-MO ELEV. = 1015.22

TRANSITION AREA