

August 9, 2017

Laura Jester
Administrator
Bassett Creek Watershed Management Commission
16145 Hillcrest Lane
Eden Prairie, MN 55346

RE: 50% Design Plans –Bassett Creek Main Stem Erosion Repair Project

Dear Ms. Jester,

Please find attached the 50% design plans and the engineering letter presenting information about the feasibility study, the design features of the project, and the approval/permitting needs for the Bassett Creek Main Stem Erosion Repair Project.

This project is being constructed by the city per the cooperative agreement between the City of Minneapolis and the BCWMC and the plans and specifications are subject to approval by the Commission. I request that this project be included with the Commission packet for the August 17th Regular meeting. City staff and the project design engineer will be at that meeting to present the project and answer any questions.

If you have any questions or need any additional information please contact me at 612-673-5284 or Elizabeth.stout@minneapolismn.gov.

Thank you.



Elizabeth Stout, PE, CFM
Water Resources Regulatory Coordinator
City of Minneapolis – Public Works

August 8, 2017

Elizabeth Stout, PE, CFM
Water Resources Regulatory Coordinator
City of Minneapolis – Public Works
105 S 5th Avenue, Suite 200
Minneapolis, MN 55401

Re: 50% Design Plans – Bassett Creek Main Stem Stabilization

Dear Ms. Stout:

Attached please find the 50% design plans for the Bassett Creek Main Stem Stabilization Project. The Bassett Creek Watershed Management Commission (BCWMC) is funding the Bassett Creek Main Stem Stabilization Project (BCWMC CIP 2017CR-M) through a 2017-2018 ad valorem levy (via Hennepin County). Per the cooperative agreement between the City of Minneapolis and the BCWMC, the city is to construct the project, and the plans and specifications are subject to approval by the Commission. Also, per the BCWMC's CIP project flow chart, the 50% design plans for this project must be submitted to the BCWMC for review and approval. If the attached 50% plans meet the city's approval, we recommend submitting them, along with this letter, to the BCWMC for inclusion in the meeting packet for their August 17 meeting. Barr staff will present the 50% plans to the BCWMC at the meeting and answer any questions from the BCWMC.

The remainder of this letter presents information about the feasibility study, the design features of the project, and approval/permitting needs.

Feasibility Study Summary and Selected Project

Bank erosion along the main stem of Bassett Creek in Minneapolis between Glenwood Avenue and Irving Avenue was evaluated in 2005 for an erosion inventory performed by Minneapolis Park and Recreation Board (MPRB). Portions of the reach were stabilized in a previous BCWMC CIP project (2012CR-M).

The BCWMC completed the *Feasibility Report for the Bassett Creek Main Stem Erosion Repair Project* (May 2016) to evaluate options for stabilizing additional eroding banks at sites along the Bassett Creek Main Stem between Cedar Lake Road and the entrances to the Old and New Bassett Creek tunnels as well as at the Fruen Mill site between Glenwood Avenue North and the Soo Line Railroad Bridge crossing. The study evaluated multiple stabilization options for 15 sites along Bassett Creek, including bioengineering and hard armoring techniques. The analysis considered various advantages and disadvantages of each option and included a detailed assessment of probable lifecycle costs. Based on the results of the analysis, the recommended stabilization measures for each site are summarized in Table 1.

Table 1 Bassett Creek Feasibility Study and 50% Design Summary

Site	Reach and Station (50% Design Plans)	Existing Conditions Description	Recommended Alternative (Feasibility Study)	Design Modifications (50% Design Plans)
1	Reach 2 1+60 to 4+00	Eroding pedestrian trail	Design trail for sub-mergence at high flows	Trail surface stabilization method TBD
2	Reach 2 0+10 to 5+60	Bank armored with concrete and stone	Grade stream bank and vegetate	None
3	Reach 2 4+00 to 5+00	Bank erosion adjacent to riprap	Extend riprap to tie into historic wall	None
4	Reach 2 6+00 to 7+30	Undercut concrete swale and downstream banks	Install riprap toe protection	None
5	Reach 2 6+00 to 7+30	High eroding bank	Install VRSS and riprap toe protection	None
6	Reach 1 2+10 to 7+50	Steep undercut and eroding bank	Install VRSS and riprap toe protection	None
7	Reach 1 2+00 to 7+50	Stream bed with imported materials	Install boulder or log vanes to create step-pools	Boulder cross vanes selected
8	Reach 1 2+10 to 10+60	Paved top of stream bank	Remove debris and stabilize top of bank	Willow live stakes selected for stabilization
9	Reach 1 8+10 to 11+00	Undercut outer stream bank	Install willow stakes and live fascines	None
10	Reach 1 8+60	Culvert perched at low flows	Shorten culvert and add riprap	None
11	Reach 1 15+40	Culvert perched at low flows	Add riprap at existing culvert	None
12	Reach 1 13+70 to 15+80	Eroding stream bank toe	Install riprap toe protection and cross vane	None
13	Reach 1 16+80 to 21+40	Undercut outer stream bank	Install willow stakes and live fascines	None
14	Reach 1 22+70 to 27+70	Bare lower stream banks	Improve vegetation without grading	Willow live stakes selected for stabilization
15	Not applicable	Overflow channel with woody debris	Clear trees and remove woody debris	None

Design Features – 50% Plans

The primary design features for the Project are shown in the 50% plans and summarized in Table 1. These features include:

- Restoring the vegetative buffer and improving stream bank vegetation, using a custom native seed mix that focuses on resilient species that will be more resistant to invasive species and the

industrial/urban environment; the seed mix specified includes species that are typically available and substitutions are possible in the event of seed unavailability.

- Installing a variety of stream stabilization measures, including riprap, live fascines, vegetated reinforced soil stabilization (VRSS), rock vanes, and riprap toe protection.
- Removing non-native channel bed material (brick and concrete block).

Hydraulic modeling of Bassett Creek for the project is ongoing, using the Bassett Creek model developed by the BCWMC, additional survey data collected by Barr, and hydraulic structure (bridge) information provided by the city. The model will be used to confirm stability of the project features and materials under various flow conditions and to verify that the project does not cause any increase in flood elevations as required by the BCWMC.

Design elements that are pending at the time of this 50% plan submittal include the following items, which will be finalized and added to the plans as necessary prior to the 90% submittal:

- Methods used to stabilize the foot path opposite the Fruen Mill site (Site 1 in Table 1), which will be determined in consultation with the city and MPRB and evaluated with the hydraulic model for the project.
- Sizing of rock materials used for riprap toe stabilization and boulder vanes, which will be evaluated with the hydraulic model for the project.
- Elevations and upstream/downstream stationing will be added to the plans for all proposed toe stabilization measures following evaluation with the hydraulic model.
- Protocols for addressing invasive species in water, soil, and woody material will be added to the plans.

Contaminated soils are known to be present within the project site and many of the adjacent properties. In conjunction with the feasibility study, the BCWMC completed a *Phase II Investigation Report* (April 2016). As noted in the 50% plans, all disturbed soils will be tested and managed in accordance with the Response Action Plan prepared for the project, and Barr staff will provide environmental oversight during project grading activities.

As stated in the feasibility study, the total reduction in pollutant loading as a result of the project is estimated as 48,300 pounds per year total suspended sediment and 27.8 pounds per year total phosphorus.

Approvals/Permit Requirements

In addition to BCWMC approval of the plans, other permits/approvals will be required for this project. Permit applications are being prepared for the following permit submittals:

- Minnesota Department of Natural Resources' (MDNR) public waters work permit
- USACE 404 permit, including a Section 106 review for historic and cultural resources
- Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater (CSW) General Permit and Stormwater Pollution Prevention Plan (SWPPP), which is included in draft form in the 50% plans

- City of Minneapolis Erosion and Sediment Control plan
- MPRB Construction Permit
- Burlington Northern Santa Fe (BNSF) Railroad access agreements (pending discussion with BNSF)

Recommendations

We recommend that the city request 1) BCWMC approval of the 50% drawings, and 2) BCWMC authorization for the city to proceed with final plans and contract documents, and permitting.

If you have any questions, please contact me at 952-832-2706 or jweiss@barr.com.

Sincerely,

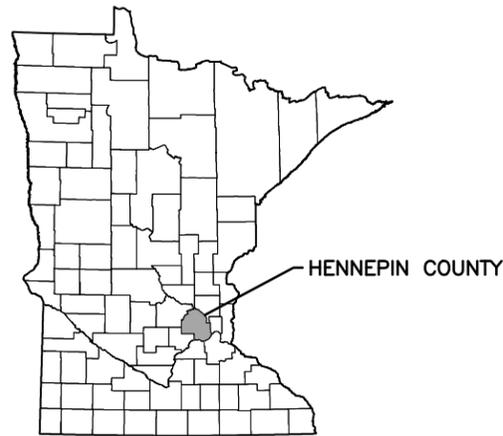
A handwritten signature in black ink, appearing to read "Jeff Weiss". The signature is fluid and cursive, with the first name "Jeff" being more prominent and the last name "Weiss" following in a similar style.

Jeff Weiss, P.E.
Senior Water Resources Engineer

BASSETT CREEK MAIN STEM STABILIZATION

CITY OF MINNEAPOLIS

MINNEAPOLIS, MN



MINNESOTA COUNTY MAP 



PROJECT LOCATION MAP 

INDEX OF SHEETS

- G-01 TITLE SHEET AND INDEX
- G-02 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)
- G-03 EROSION CONTROL AND RESTORATION PLAN
- C-01 SITE LAYOUT
- C-02 PLAN AND PROFILE - REACH 1 (STA. 0+00 TO 7+00)
- C-03 PLAN AND PROFILE - REACH 1 (STA. 7+00 TO 15+00)
- C-04 PLAN AND PROFILE - REACH 1 (STA. 15+00 TO 21+00)
- C-05 PLAN AND PROFILE - REACH 1 (STA. 21+00 TO 27+75)
- C-06 PLAN AND PROFILE - REACH 2
- D-01 STREAM RESTORATION DETAILS
- D-02 STREAM RESTORATION DETAILS
- D-03 STREAM RESTORATION DETAILS
- D-04 EROSION CONTROL DETAILS
- R-01 RESTORATION PLAN - REACH 1
- R-02 RESTORATION PLAN - REACH 1
- R-03 RESTORATION PLAN - REACH 2

GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING IN APRIL 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.

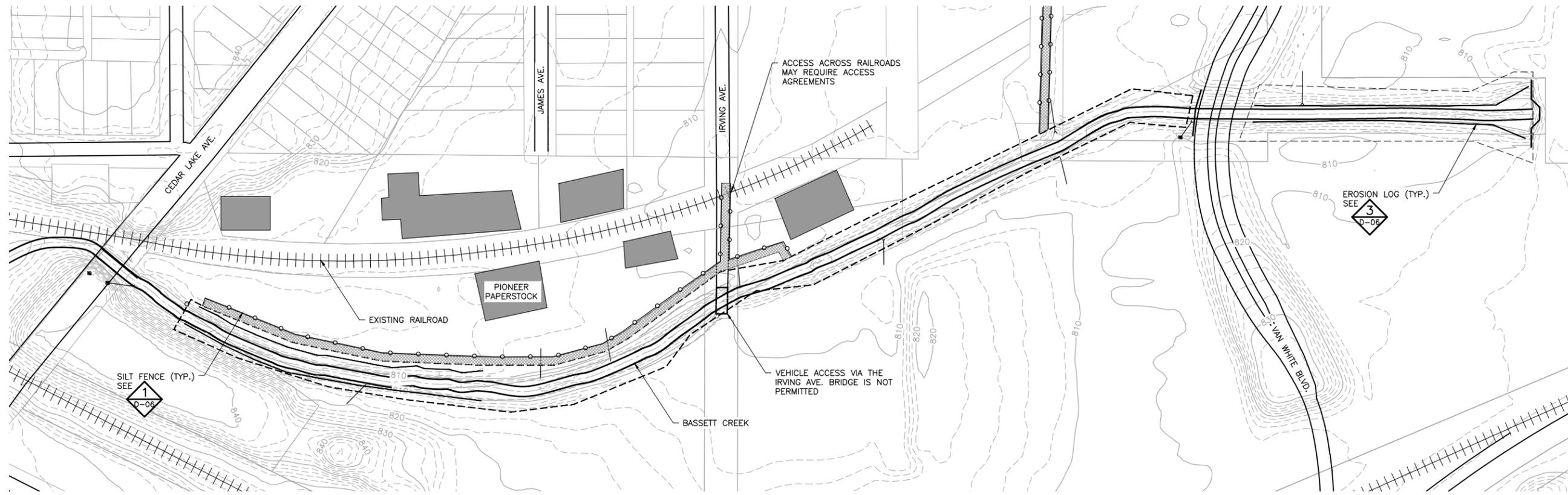


GOPHER STATE ONE CALL:
CALL BEFORE YOU DIG.
1-800-252-1166

*50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION*

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: <u>06/30/2017</u> LICENSE # <u>48031</u>				CLIENT: <u>06/30/17</u> BID: _____ CONSTRUCTION: _____				 BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com				Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN TITLE SHEET & INDEX		BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. _____	
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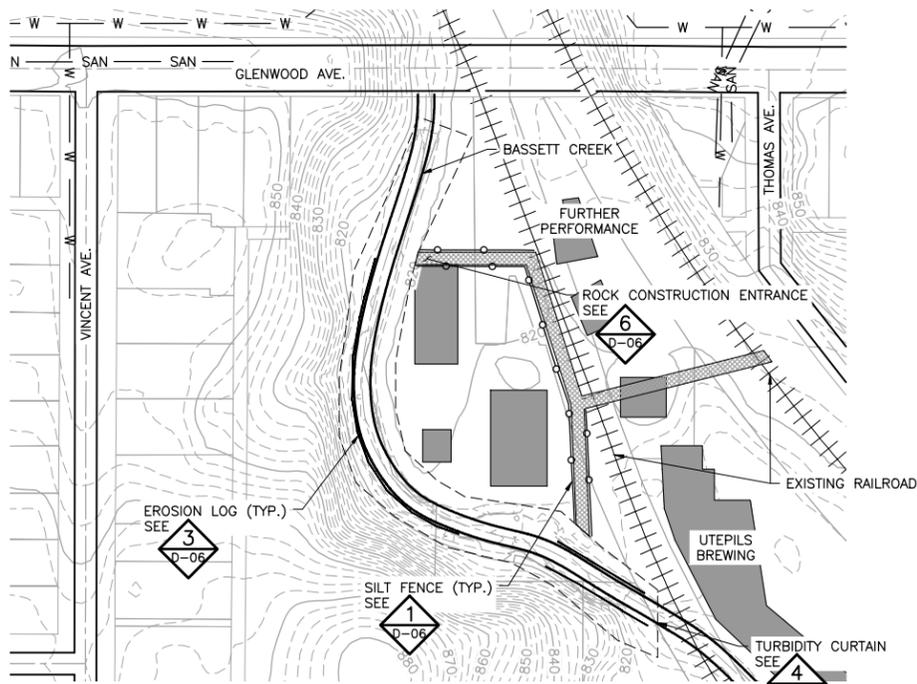
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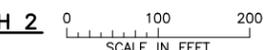
1 PLAN: EROSION CONTROL - REACH 1



EROSION CONTROL LEGEND	
	CONSTRUCTION LIMITS
	SEDIMENT LOGS
	SILT FENCE
	CONSTRUCTION ACCESS ROUTE
	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR



1 PLAN: EROSION CONTROL - REACH 2



EROSION & SEDIMENT CONTROL NOTES:

- CONTRACTOR MUST CALL A CONSTRUCTION START 48 HOURS PRIOR TO ANY LAND DISTURBANCES 612-673-3867. FAILURE TO DO SO MAY RESULT IN FINES, THE REVOCATION OF PERMIT AND A STOP WORK ORDER BEING ISSUED.
- INSTALL PERIMETER EROSION CONTROL AT THE LOCATIONS SHOWN ON THE PLANS PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBANCE OR CONSTRUCTION ACTIVITIES.
- BEFORE BEGINNING CONSTRUCTION, INSTALL A TEMPORARY ROCK CONSTRUCTION ENTRANCE AT EACH POINT WHERE VEHICLES EXIT THE CONSTRUCTION SITE. USE 2 INCH OR GREATER DIAMETER ROCK IN A LAYER AT LEAST 6 INCHES THICK ACROSS THE ENTIRE WIDTH OF THE ENTRANCE. EXTEND THE ROCK ENTRANCE AT LEAST 50 FEET INTO THE CONSTRUCTION ZONE USING A GEO-TEXTILE FABRIC BENEATH THE AGGREGATE TO PREVENT MIGRATION OF SOIL INTO THE ROCK FROM BELOW.
- REMOVE ALL SOILS AND SEDIMENTS TRACKED OR OTHERWISE DEPOSITED ONTO PUBLIC AND PRIVATE PAVEMENT AREAS. REMOVAL SHALL BE ON A DAILY BASIS WHEN TRACKING OCCURS AND MAY BE ORDERED BY MINNEAPOLIS INSPECTORS AT ANY TIME IF CONDITIONS WARRANT. SWEEPING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION AND DONE IN A MANNER TO PREVENT DUST BEING BLOWN TO ADJACENT PROPERTIES.
- INSTALL INLET PROTECTION AT ALL PUBLIC AND PRIVATE CATCH BASIN INLETS, WHICH RECEIVE RUNOFF FROM THE DISTURBED AREAS. CONTRACTOR SHALL CLEAN, REMOVE SEDIMENT OR REPLACE STORM DRAIN INLET PROTECTION DEVICES ON A ROUTINE BASIS SUCH THAT THE DEVICES ARE FULLY FUNCTIONAL FOR THE NEXT RAIN EVENT. SEDIMENT DEPOSITED IN AND/OR PLUGGING DRAINAGE SYSTEMS IS THE RESPONSIBILITY OF THE CONTRACTOR. HAY BALES OR FILTER FABRIC WRAPPED GRATES ARE NOT ALLOWED FOR INLET PROTECTION.
- LOCATE SOIL OR DIRT STOCKPILES NO LESS THAN 25 FEET FROM ANY PUBLIC OR PRIVATE ROADWAY OR DRAINAGE CHANNEL. IF REMAINING FOR MORE THAN SEVEN DAYS, STABILIZE THE STOCKPILES BY MULCHING, VEGETATIVE COVER, TARPS, OR OTHER MEANS. CONTROL EROSION FROM ALL STOCKPILES BY PLACING SILT BARRIERS AROUND THE PILES. TEMPORARY STOCKPILES LOCATED ON PAVED SURFACES MUST BE NO LESS THAN TWO FEET FROM THE DRAINAGE/GUTTER LINE AND SHALL BE COVERED IF LEFT MORE THAN 24 HOURS.
- MAINTAIN ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES IN PLACE UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED. INSPECT TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES ON A DAILY BASIS AND REPLACE DETERIORATED, DAMAGED, OR ROTTED EROSION CONTROL DEVICES IMMEDIATELY.
- TEMPORARILY OR PERMANENTLY STABILIZE ALL CONSTRUCTION AREAS WHICH HAVE UNDERGONE FINAL GRADING, AND ALL AREAS IN WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY AGAINST EROSION DUE TO RAIN, WIND AND RUNNING WATER WITHIN 7-14 DAYS. USE SEED AND MULCH, EROSION CONTROL MATTING, AND/OR SODDING AND STAKING IN GREEN SPACE AREAS. REMOVE ALL TEMPORARY SYNTHETIC, STRUCTURAL, NON-BIODEGRADABLE EROSION AND SEDIMENT CONTROL DEVICES AFTER THE SITE HAS UNDERGONE FINAL STABILIZATION WITH PERMANENT VEGETATION ESTABLISHMENT. FINAL STABILIZATION FOR PURPOSES OF THIS REMOVAL IS 70% ESTABLISHED COVER OVER DENUDEED AREA.
- CHANGES TO APPROVED EROSION CONTROL PLAN MUST BE APPROVED BY THE EROSION CONTROL INSPECTOR PRIOR TO IMPLEMENTATION. CONTRACTOR TO PROVIDE INSTALLATION AND DETAILS FOR ALL PROPOSED ALTERNATE TYPE DEVICES.
- IF DEWATERING OR PUMPING OF WATER IS NECESSARY, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND/OR APPROVALS PRIOR TO DISCHARGE OF ANY WATER FROM THE SITE. IF THE DISCHARGE FROM THE DEWATERING OR PUMPING PROCESS IS TURBID OR CONTAINS SEDIMENT LADEN WATER, IT MUST BE TREATED THROUGH THE USE OF SEDIMENT TRAPS, VEGETATIVE FILTER STRIPS, OR OTHER SEDIMENT REDUCING MEASURES SUCH THAT THE DISCHARGE IS NOT VISIBLY DIFFERENT FROM THE RECEIVING WATER. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AT THE DISCHARGE POINT TO PREVENT SCOUR EROSION.

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A	EPF	AKH	JDW	07/07/2017	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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.
 PRINTED NAME: JEFFREY D. WEISS
 SIGNATURE: _____
 DATE: 07/17/2017 LICENSE # 48031

CLIENT	DATE
BARR ENGINEERING CO.	07/07/17

BARR
 Project Office:
 BARR ENGINEERING CO.
 4300 MARKETPOINTE DRIVE
 Suite 200
 MINNEAPOLIS, MN 55435
 Corporate Headquarters:
 Minneapolis, Minnesota
 Ph: 1-800-632-2277

Scale	AS SHOWN
Date	07/07/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSET CREEK MAIN STEM STABILIZATION
 MINNEAPOLIS, MN
EROSION CONTROL PLAN

BARR PROJECT No.	23/27-1579.00
CLIENT PROJECT No.	-
DWG. No.	G-03
REV. No.	A

50% PLAN SET
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GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING IN 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.
3. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
4. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
6. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH.
7. CONTRACTOR TO MAINTAIN EXISTING STREAM BOTTOM WIDTH SO NOT TO DECREASE CREEK CROSS SECTIONAL AREA DURING RIPRAP INSTALLATION.
8. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE OWNER AND/OR ENGINEER AND STAKED IN THE FIELD.
9. TEST AND MANAGE DISTURBED SOILS ON SITE AS DESCRIBED IN THE RESPONSE ACTION PLAN.

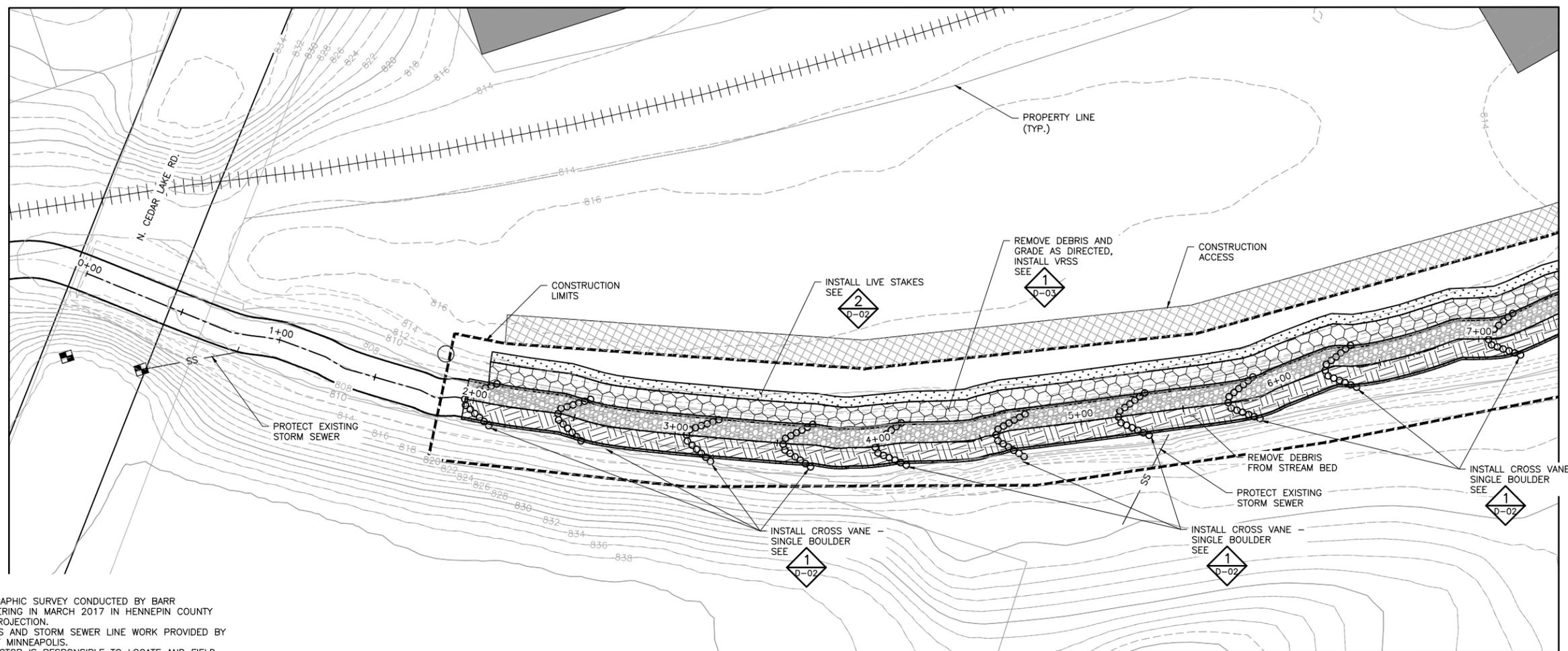
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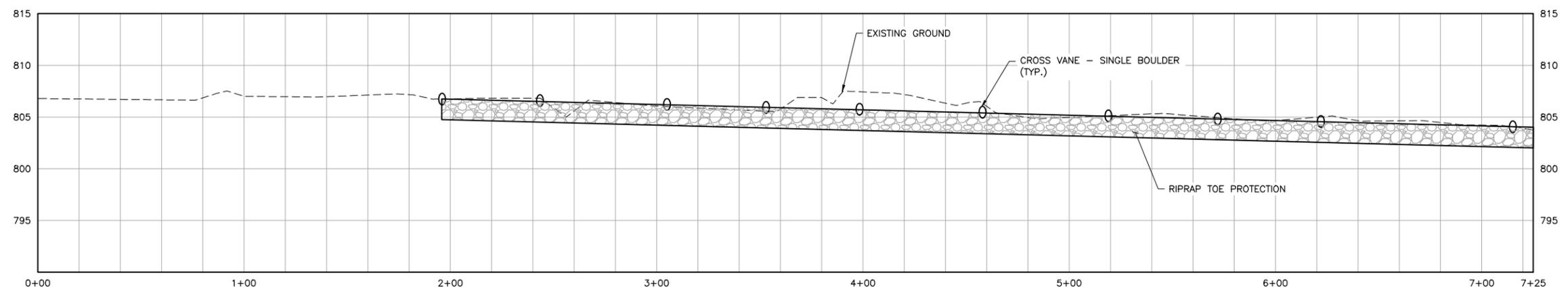
		I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 06/30/2017 LICENSE # 48031		CLIENT: 06/30/17 BID: _____ CONSTRUCTION: _____ RELEASED TO/FOR: _____ DATE RELEASED: _____		 BARR Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com		Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com		Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN SITE LAYOUT		BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. - DWG. No. C-01 REV. No. A	
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION												
A	EPF	PJH	JDW	06/30/2017	ISSUED FOR REVIEW												

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- - - EXISTING 2' CONTOUR
- - - CONSTRUCTION LIMITS
- SS CITY STORM SEWER
- SAN CITY SANITARY SEWER
- W WATERMAIN LINE
- [Grid Pattern] BANK GRADING
2H TO 1V TYP.
- [Riprap Pattern] RIPRAP STABILIZATION
- [Dotted Pattern] LIVE STAKES
- [Diagonal Lines] FASCINES
- [Hexagon Pattern] VRSS
- [Cross-hatch Pattern] DEBRIS REMOVAL
- [Boulder Pattern] ROCK CROSS VANE—SINGLE BOULDER



- NOTES**
1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
 2. PARCELS AND STORM SEWER LINE WORK PROVIDED BY CITY OF MINNEAPOLIS.
 3. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 4. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, AND SIGNS SHALL BE PROTECTED DURING CONSTRUCTION.
 5. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF WORK.
 6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.

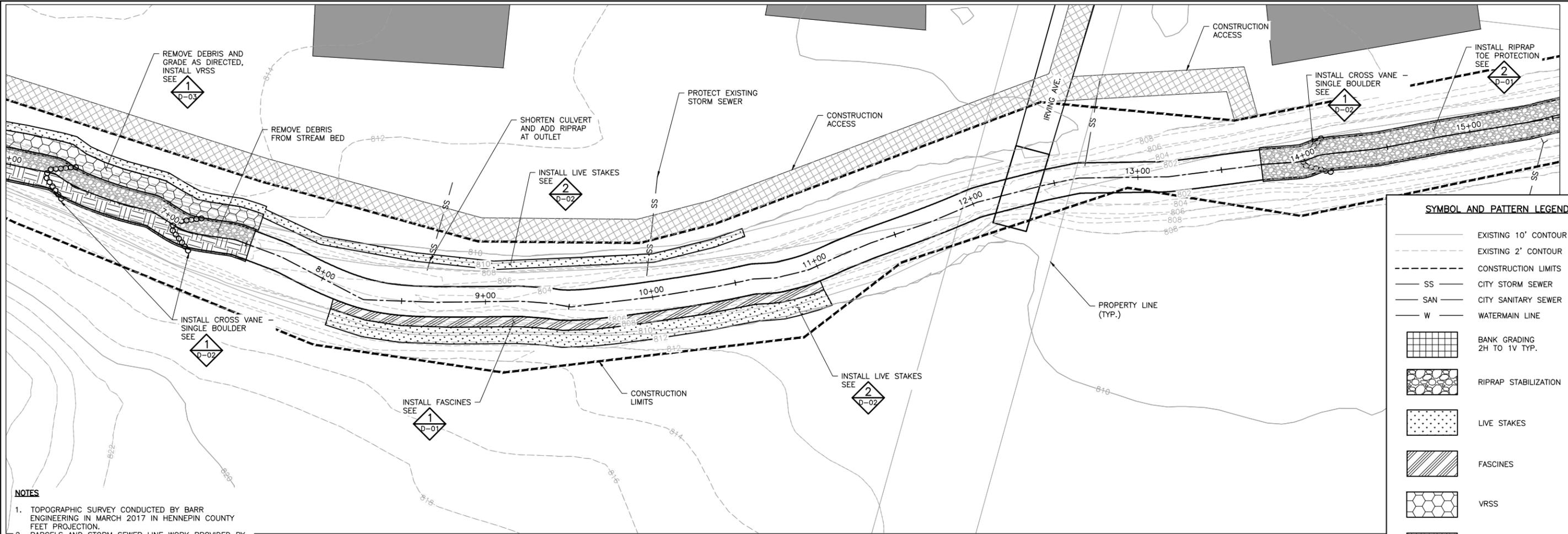


**50% PLAN SET
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		I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 06/30/2017 LICENSE # 48031		CLIENT: BARR ENGINEERING CO. BID: 4300 MARKETPOINTE DRIVE CONSTRUCTION: Suite 200 MINNEAPOLIS, MN 55435 RELEASED TO/FOR: A B C O 1 2 3 DATE RELEASED:		Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com		Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. - PLAN AND PROFILE REACH 1 (STA. 0+00 TO 7+00) DWG. No. C-02 REV. No. A	
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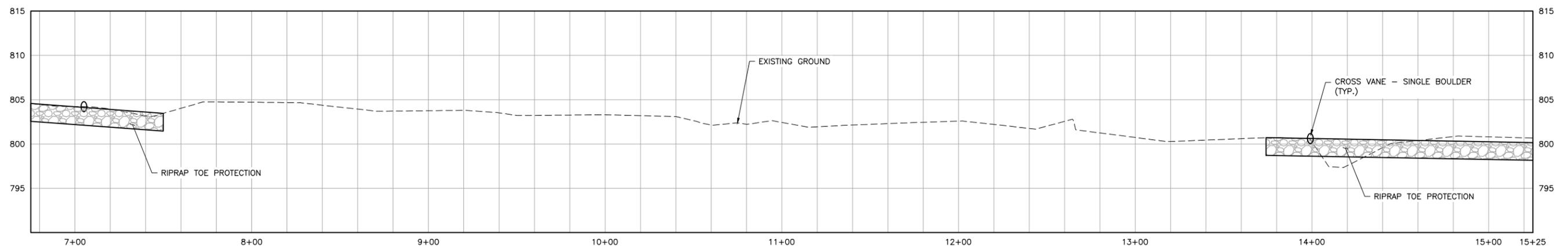


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 6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.

SYMBOL AND PATTERN LEGEND

	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	CONSTRUCTION LIMITS
	CITY STORM SEWER
	CITY SANITARY SEWER
	WATERMAIN LINE
	BANK GRADING 2H TO 1V TYP.
	RIPRAP STABILIZATION
	LIVE STAKES
	FASCINES
	VRSS
	DEBRIS REMOVAL
	ROCK CROSS VANE-SINGLE BOULDER

1 PLAN: REACH 1 (STA. 7+00 TO 15+00)



2 PROFILE: REACH 1 (STA. 7+00 TO 15+00)

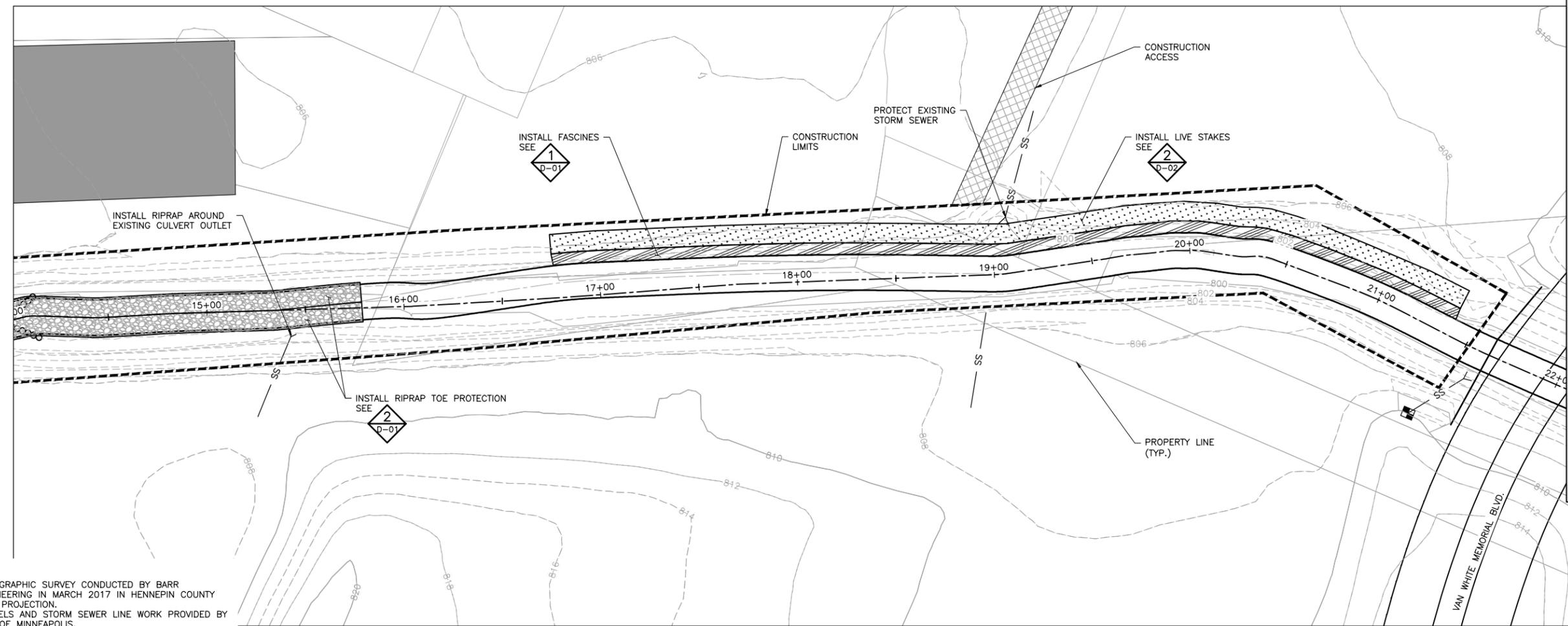


**50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION**

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 06/30/2017 LICENSE # 48031				CLIENT: 8/30/17 BID: _____ CONSTRUCTION: _____ RELEASED TO/FOR: A B C O 1 2 3 DATE RELEASED: _____				BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: (952) 832-2601 www.barr.com				Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com				Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW				CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA				BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN PLAN AND PROFILE REACH 1 (STA. 7+00 TO 15+00)				BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. _____ DWG. No. C-03 REV. No. A			
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION																										
A	EPF	PJH	JDW	06/30/2017	ISSUED FOR REVIEW																										

SYMBOL AND PATTERN LEGEND

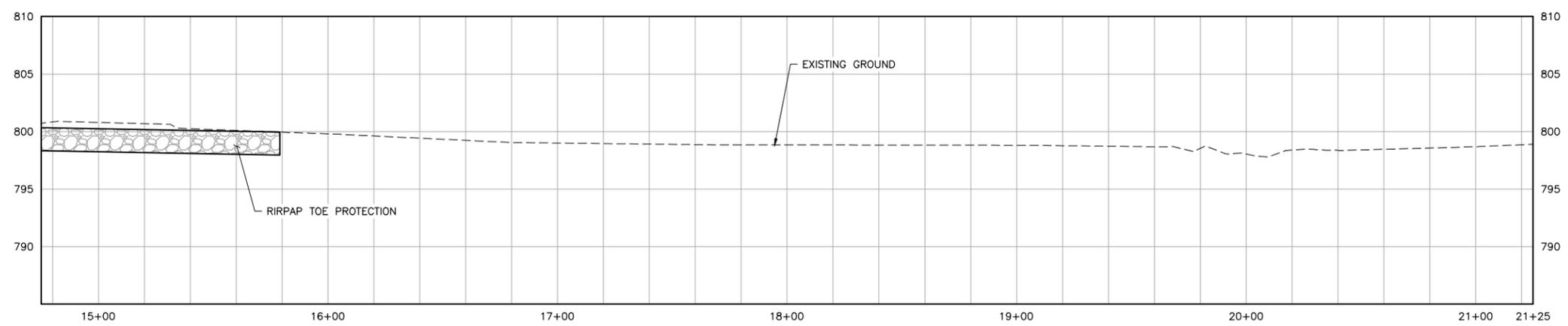
- EXISTING 10' CONTOUR
- - - EXISTING 2' CONTOUR
- - - CONSTRUCTION LIMITS
- SS CITY STORM SEWER
- SAN CITY SANITARY SEWER
- W WATERMAIN LINE
- [Grid Pattern] BANK GRADING
2H TO 1V TYP.
- [Riprap Pattern] RIPRAP STABILIZATION
- [Dotted Pattern] LIVE STAKES
- [Diagonal Lines] FASCINES
- [Hexagon Pattern] VRSS
- [Block Pattern] DEBRIS REMOVAL
- [Boulder Pattern] ROCK CROSS VANE—SINGLE BOULDER



NOTES

1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. PARCELS AND STORM SEWER LINE WORK PROVIDED BY CITY OF MINNEAPOLIS.
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6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.

1 PLAN: REACH 1 (STA. 15+00 TO 21+00) 0 30 60 SCALE IN FEET



2 PROFILE: REACH 1 (STA. 15+00 TO 21+00) 0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET

**50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION**

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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.

PRINTED NAME: JEFFREY D. WEISS
 SIGNATURE: _____
 DATE: 06/30/2017 LICENSE # 48031

CLIENT	06/30/17					
BID						
CONSTRUCTION						
RELEASED TO/FOR	A	B	C	0	1	2
DATE RELEASED						

BARR
 Project Office:
 BARR ENGINEERING CO.
 4300 MARKETPOINTE DRIVE
 Suite 200
 MINNEAPOLIS, MN 55435
 Corporate Headquarters:
 Minneapolis, Minnesota
 Ph: 1-800-632-2277
 Ph: 1-800-632-2277
 Fax: (952) 832-2601
 www.barr.com

Scale	AS SHOWN
Date	06/30/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

**CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA**

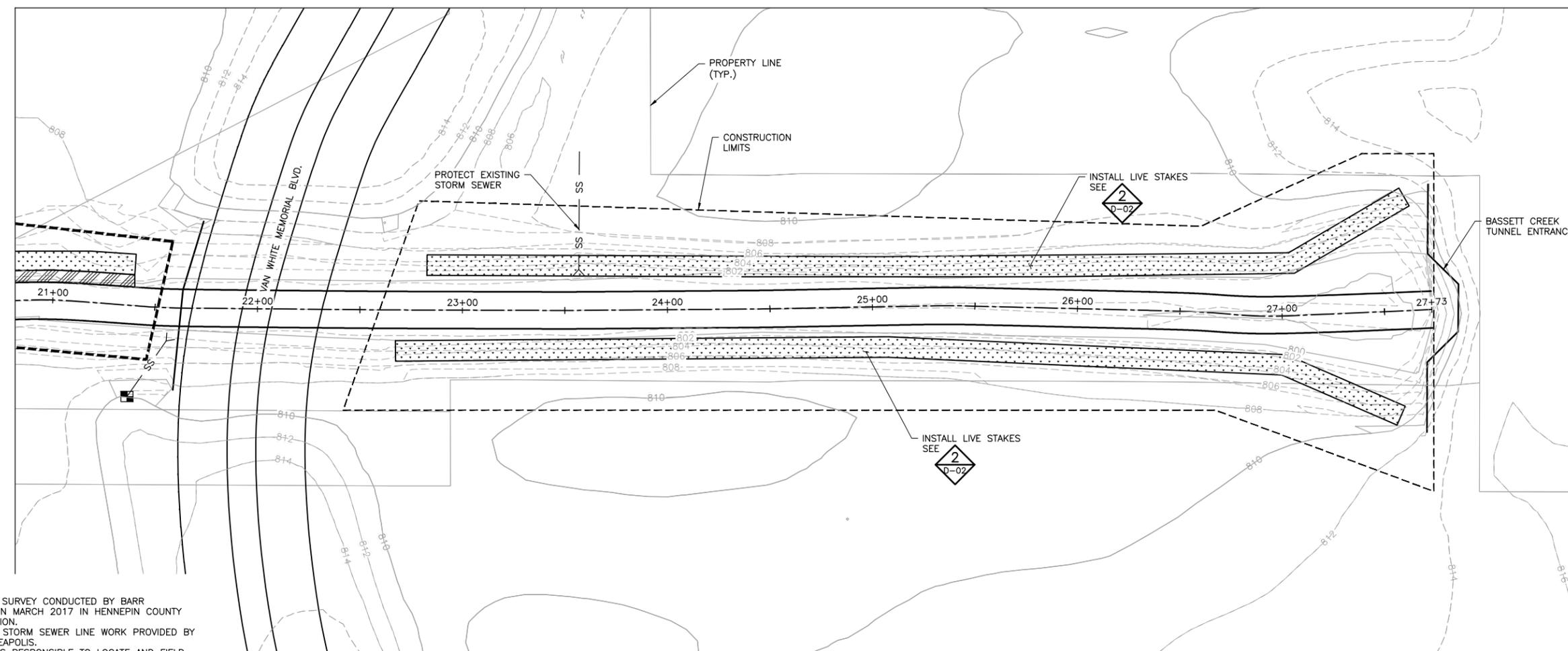
**BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN**

**PLAN AND PROFILE
REACH 1 (STA. 15+00 TO 21+00)**

BARR PROJECT No.	23/27-1579.00
CLIENT PROJECT No.	
DWG. No.	C-04
REV. No.	A

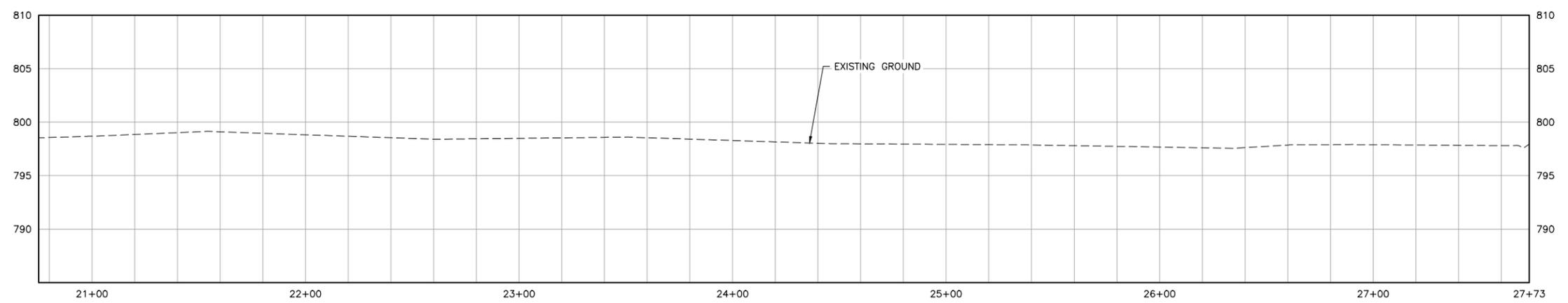
SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- - - EXISTING 2' CONTOUR
- - - CONSTRUCTION LIMITS
- SS CITY STORM SEWER
- SAN CITY SANITARY SEWER
- W WATERMAIN LINE
- [Grid Pattern] BANK GRADING
2H TO 1V TYP.
- [Riprap Pattern] RIPRAP STABILIZATION
- [Dotted Pattern] LIVE STAKES
- [Diagonal Lines] FASCINES
- [Hexagon Pattern] VRSS
- [Rectangular Pattern] DEBRIS REMOVAL
- [Boulder Pattern] ROCK CROSS VANE—SINGLE BOULDER



- NOTES**
1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
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1 PLAN: REACH 1 (STA. 21+00 TO 27+75) 0 30 60 SCALE IN FEET



2 PROFILE: REACH 1 (STA. 21+00 TO 27+75) 0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET

**50% PLAN SET
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PRINTED NAME: JEFFREY D. WEISS
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CLIENT	06/30/17						
BID							
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

BARR
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Scale	AS SHOWN
Date	06/30/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

**CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA**

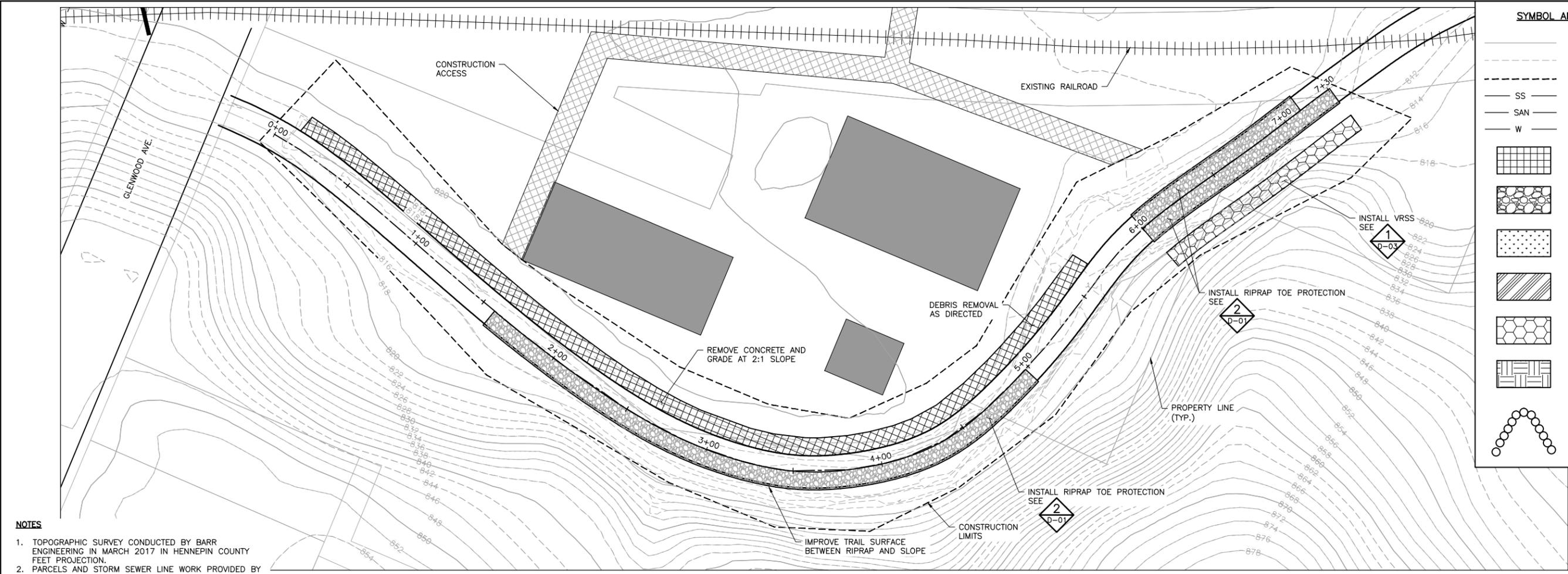
**BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN**

**PLAN AND PROFILE
REACH 1 (STA. 21+00 TO 27+75)**

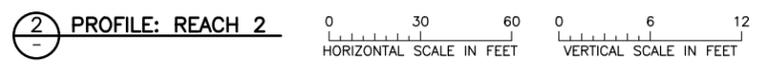
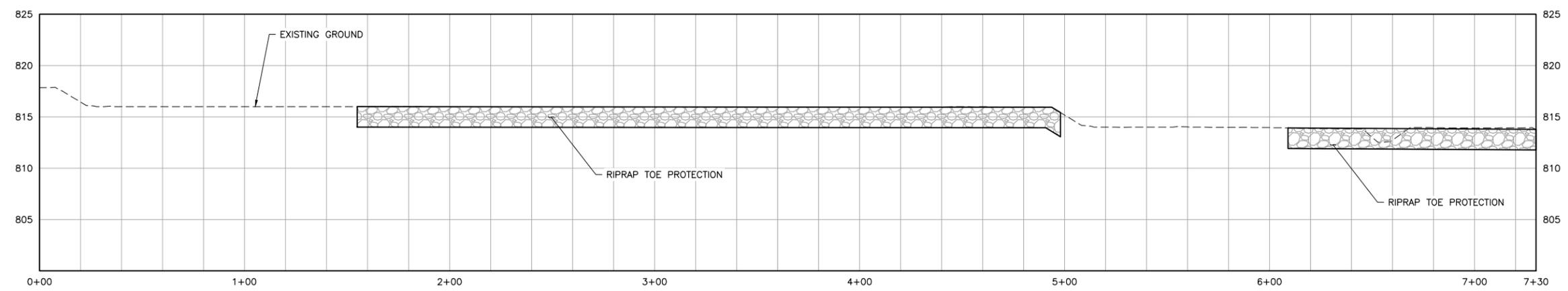
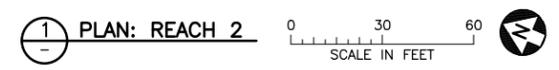
BARR PROJECT No.	23/27-1579.00
CLIENT PROJECT No.	-
DWG. No.	C-05
REV. No.	A

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- - - EXISTING 2' CONTOUR
- - - CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- SAN — CITY SANITARY SEWER
- W — WATERMAIN LINE
- [Grid Pattern] BANK GRADING
2H TO 1V TYP.
- [Riprap Pattern] RIPRAP STABILIZATION
- [Dotted Pattern] LIVE STAKES
- [Diagonal Lines] FASCINES
- [Hexagon Pattern] VRSS
- [Cross-hatch Pattern] DEBRIS REMOVAL
- [Rock Pattern] ROCK CROSS VANE—SINGLE BOULDER



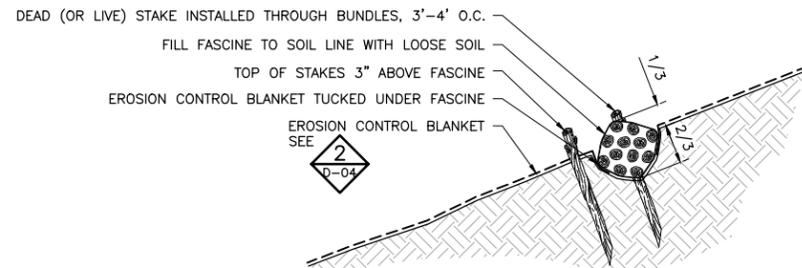
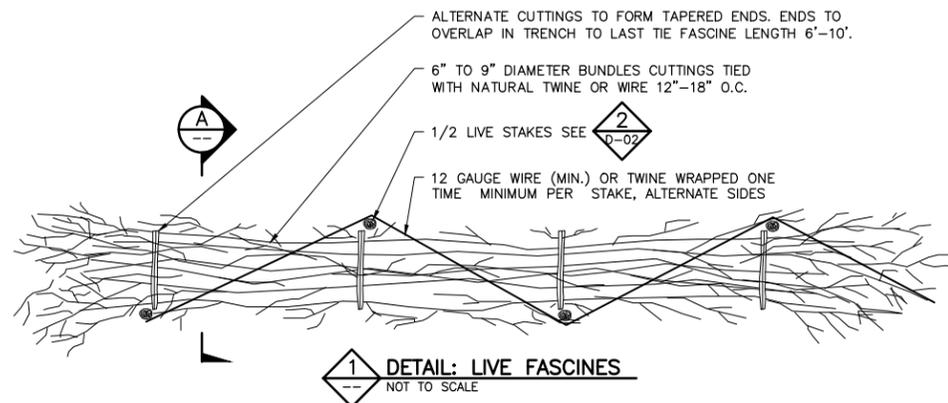
- NOTES**
1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
 2. PARCELS AND STORM SEWER LINE WORK PROVIDED BY CITY OF MINNEAPOLIS.
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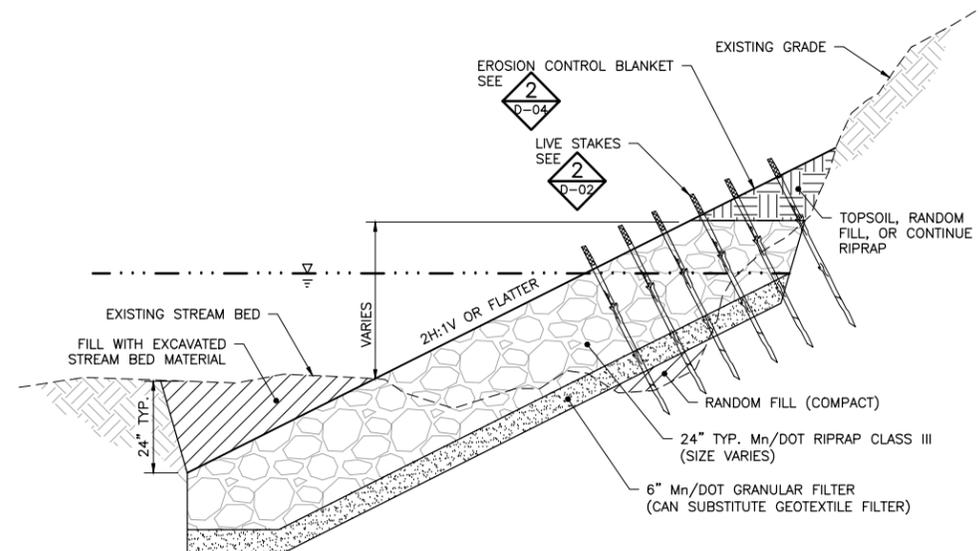
**50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION**

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 06/30/2017 LICENSE # 48031		CLIENT: 06/30/17 BID: _____ CONSTRUCTION: _____		BARR Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: 1-800-632-2277 www.barr.com		Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN PLAN AND PROFILE REACH 2		BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. -	
		RELEASED TO/FOR: A B C O 1 2 3 DATE RELEASED: _____				DWG. No. C-06 REV. No. A							



SECTION: LIVE FASCINES
NOT TO SCALE



DETAIL: RIPRAP TOE PROTECTION
NOT TO SCALE

GENERAL

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO FASCINES INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. THE DORMANT CUTTINGS FOR FASCINES SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING.
3. LIVE FASCINES ARE LIVE PLANT MATERIALS, HANDLE WITH CARE. SEE LIVE CUTTINGS DETAIL FOR SIZE, CARE, AND INSTALLATION METHODS.

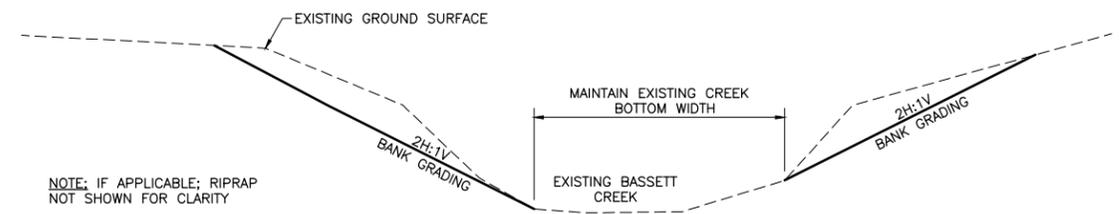
PREPARATION

4. BRANCHES FOR FASCINE SHALL BE 1/2"-2" MINIMUM BUTT DIAMETER.
5. SOAK THE LIVE BRANCHES FOR A MINIMUM OF 24 HOURS (IDEALLY 5-7 DAYS) IN FLOWING WATER BEFORE PLANTING.
6. ASSEMBLE THE WATTLE BY LAYING OUT LIVE BRANCHES WITH THE CUT ENDS PLACED IN OPPOSITE DIRECTIONS IN A LONG SAUSAGE-LIKE BUNDLE.

7. TIE BUNDLES WITH TWINE AT 12"-18" INCREMENTS. FINISHED BUNDLES SHOULD BE 6-9" IN DIAMETER.

PLACEMENT

8. CONSTRUCT FASCINES FROM LOWEST TO HIGHEST ELEVATION.
9. INSTALL FASCINES PARALLEL TO CONTOURS, UNLESS SPECIFIED OTHERWISE.
10. EXCAVATE A HORIZONTAL TRENCH ALONG THE SLOPE. THE TRENCH SHOULD BE ROUGHLY 2/3 THE DIAMETER OF THE FASCINE.
11. INSTALL EROSION CONTROL BLANKET ACROSS THE TRENCH AND CUT ALONG THE CENTERLINE OF THE TRENCH. STAKE ENDS OF BLANKET IN THE BOTTOM OF THE TRENCH. 6-8" OF THE BLANKET SHOULD BE TUCKED UNDER THE FASCINE.
12. PLACE BUNDLES IN TRENCH, BACKFILL, COMPACT, AND WATER.
13. PLACE WOODEN (OR LIVE) STAKES AT A 3-4' INTERVAL THROUGH THE CENTER OF THE BUNDLE. LEAVE 3 INCHES OF STAKES ABOVE THE BUNDLE.



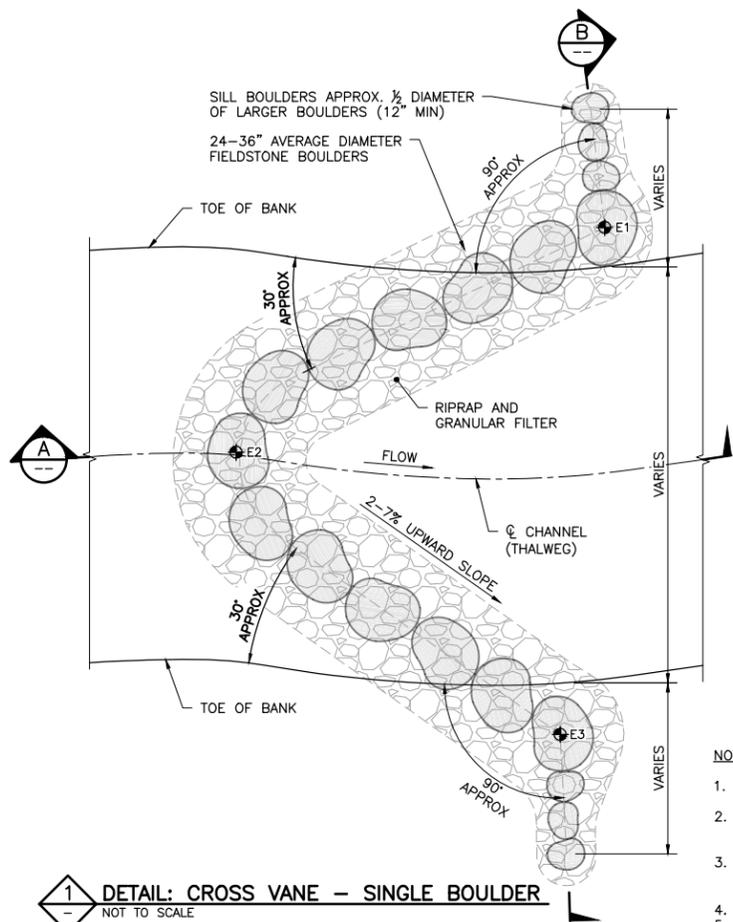
SECTION: BANK GRADING
NOT TO SCALE

50% PLAN SET
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NOT FOR CONSTRUCTION

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION	RELEASED TO/FOR	A B C 0 1 2 3	DATE RELEASED	DWG. No. D-01			REV. No. A	

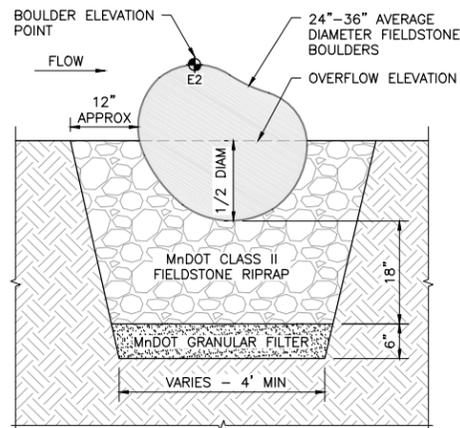
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SECTION: CROSS VANE - SINGLE BOULDER
NOT TO SCALE

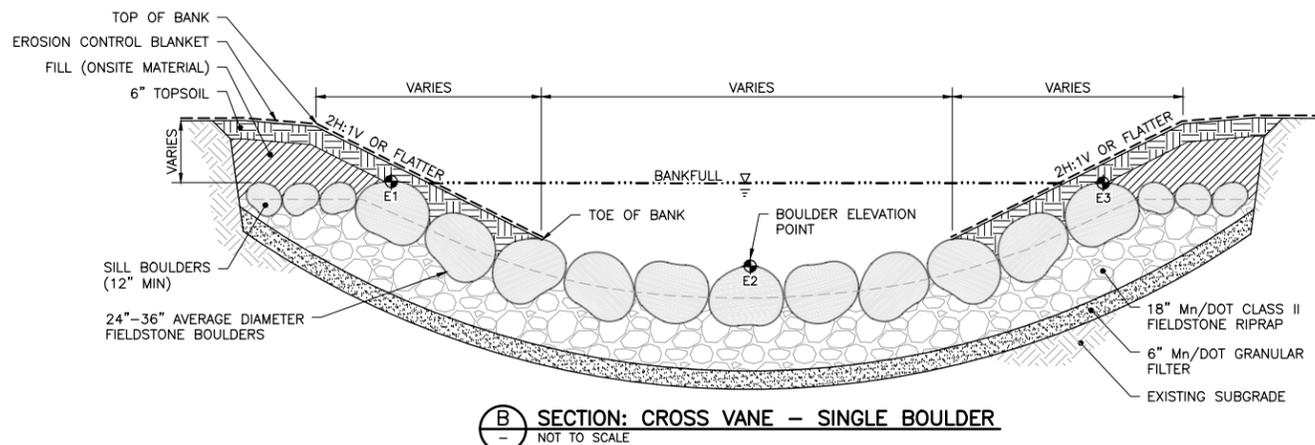
NOTES:

- CROSS VANE LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE ENGINEER.
- FINAL BOULDER PLACEMENT TO BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR MAY BE REQUIRED TO ADJUST BOULDER ELEVATIONS AND ROTATION.
- THERE SHALL BE NO SIGNIFICANT GAPS BETWEEN BOULDERS. RIPRAP BEDDING SHALL BE PLACED ON THE UPSTREAM SIDE OF THE BOULDERS TO PLUG SMALL GAPS (MAY REQUIRE HAND PLACEMENT).
- BOULDERS OF AN UNSUITABLE SHAPE MAY BE RE-LOCATED OR REJECTED.
- INSTALL EROSION CONTROL BLANKET ON DISTURBED BANKS.

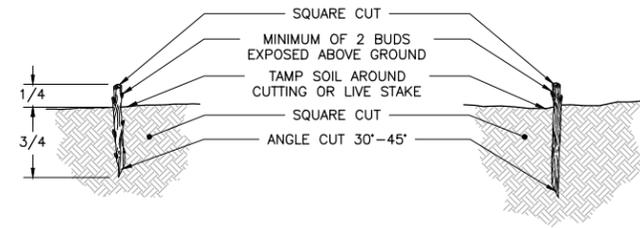


SECTION: CROSS VANE - SINGLE BOULDER
NOT TO SCALE

DETAIL: CROSS VANE - SINGLE BOULDER
NOT TO SCALE



SECTION: CROSS VANE - SINGLE BOULDER
NOT TO SCALE



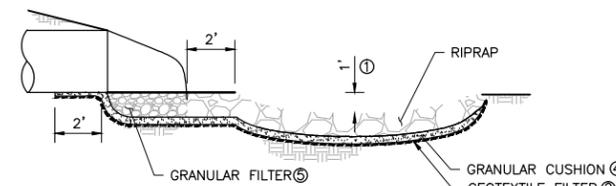
LIVE CUTTING

LIVE STAKE

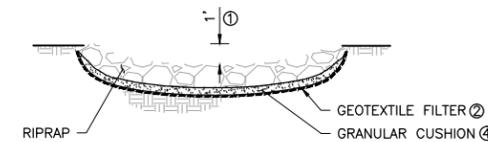
GENERAL NOTES:

- LIVE STAKE OR CUTTING PLANTED PERPENDICULAR TO GROUND SURFACE.
- SEE PLANT MATERIAL LIST FOR SPECIES LENGTH AND SPACING.
- LIVE STAKES SHALL BE 2\"/>

DETAIL: LIVE CUTTINGS OR LIVE STAKES
NOT TO SCALE



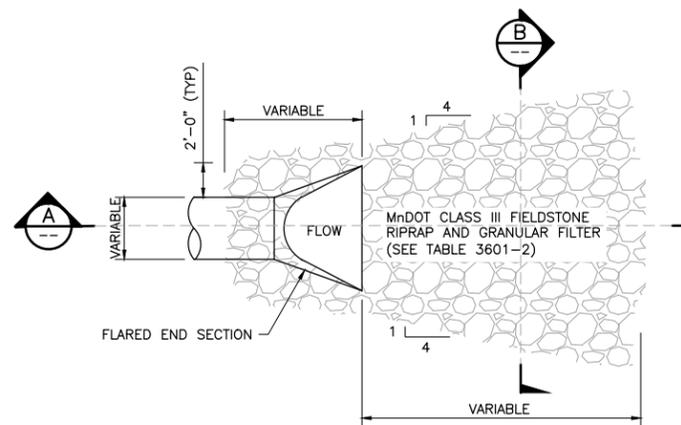
SECTION: RIPRAP APRON
NOT TO SCALE



SECTION: RIPRAP APRON
NOT TO SCALE

NOTES:

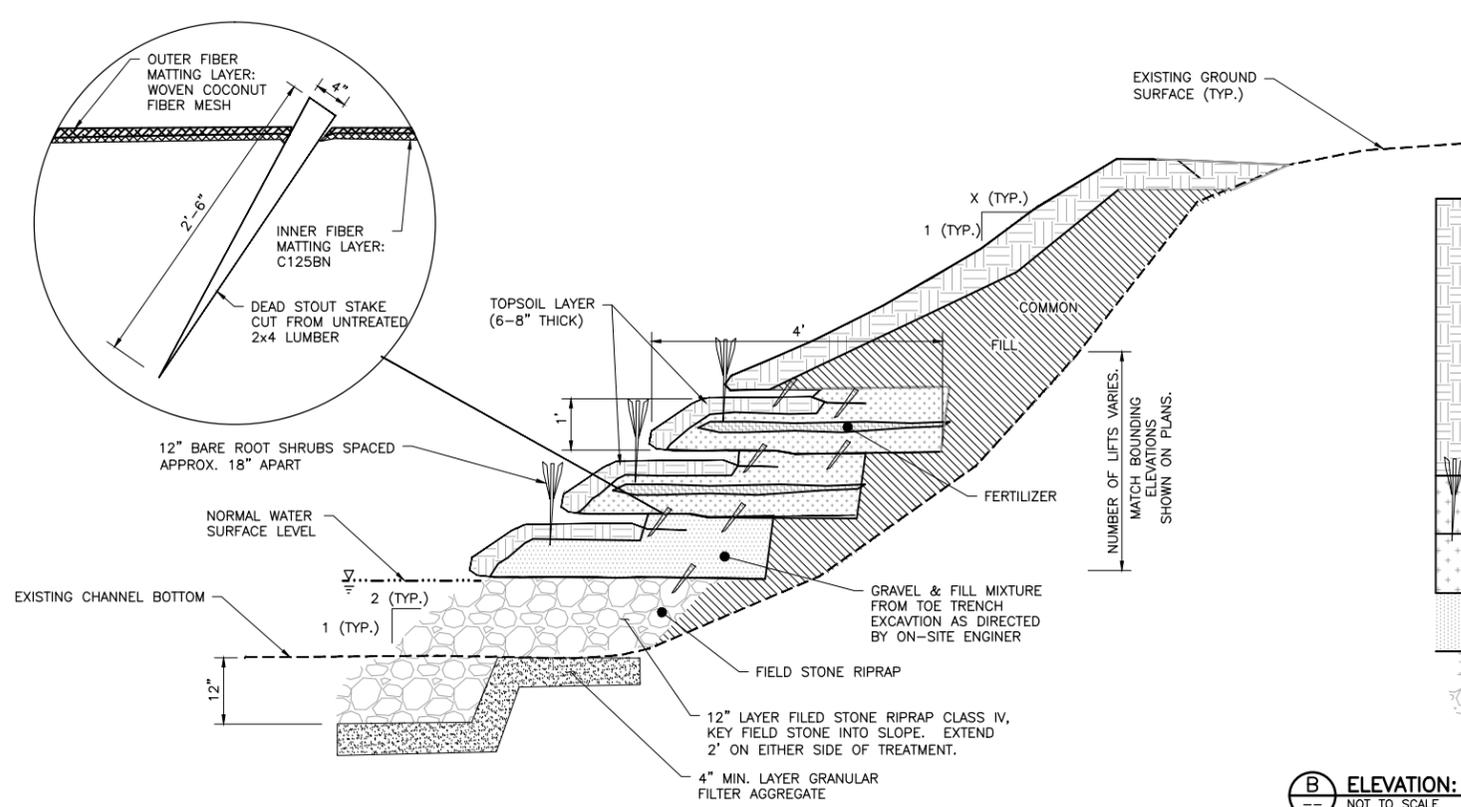
- REQUIREMENTS FOR GEOTEXTILE TYPE, RIPRAP SIZE AND THICKNESS SHALL BE DESIGNATED IN THE PLANS.
- PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.
- FOR PIPES GREATER THAN OR EQUAL TO 30\", USE 1.5'.
 - GEOTEXTILE FILTER, SPEC. 3733, SHALL COVER THE BOTTOM AND SIDES OF THE AREA EXCAVATED FOR THE RIPRAP.
 - DIMENSIONS W AND A ARE GIVEN ON STANDARD PLATES 3122 AND 3123.
 - GRANULAR FILTER, SPEC. 3601, MAY BE USED AS A CUSHION LAYER. PLACE FILTER PER SPEC. 2511. THE CUSHION LAYER IS INCIDENTAL.
 - GRANULAR FILTER OR RIPRAP, SPEC. 3601, TO EXTEND UNDER ENTIRE OPEN PORTION OF PIPE APRON. DEPTH OF MATERIAL UNDER APRON SHALL MATCH RIPRAP DEPTH. WHEN USING RIPRAP, INCREASE RIPRAP QUANTITY ACCORDINGLY AND PLACE A 3\"/>



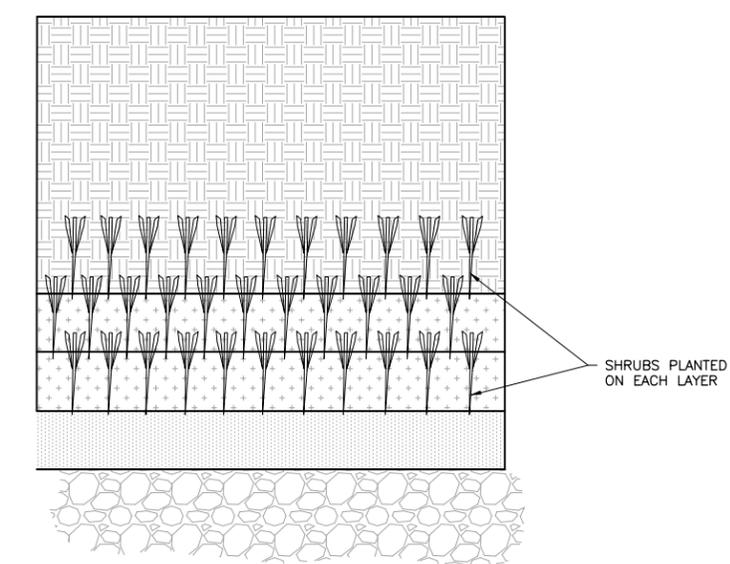
DETAIL: RIPRAP APRON
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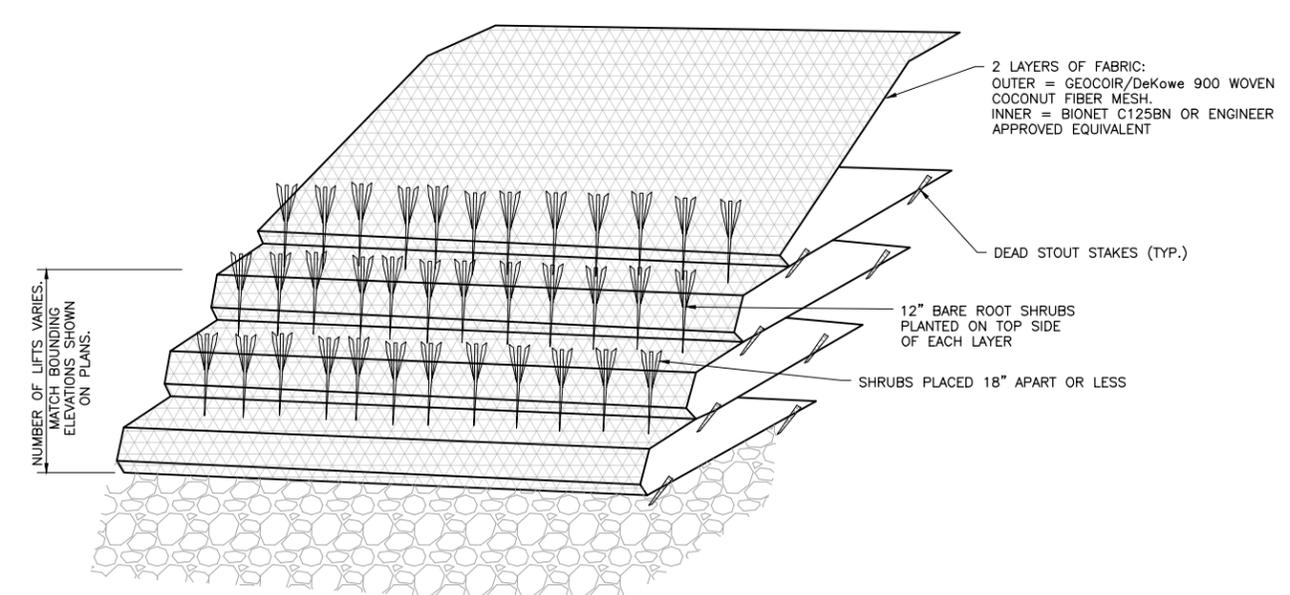
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PRINTED NAME: JEFFREY D. WEISS		RELEASED TO/FOR		Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com			Drawn EPF	STREAM RESTORATION DETAILS		CLIENT PROJECT No. -
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION	A	B	C	D	DWG. No. D-02
	EPF	PJH	JDW	06/30/2017						REV. No. A



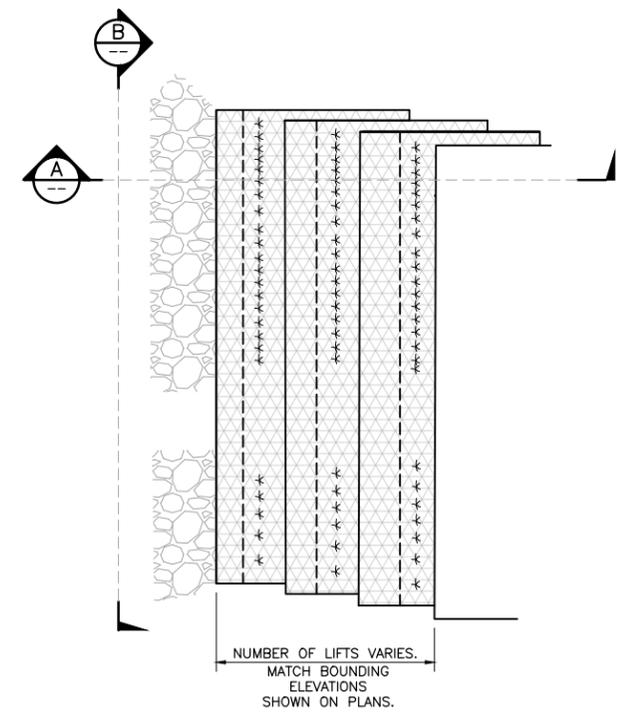
A SECTION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE



B ELEVATION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE



1 DETAIL: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE



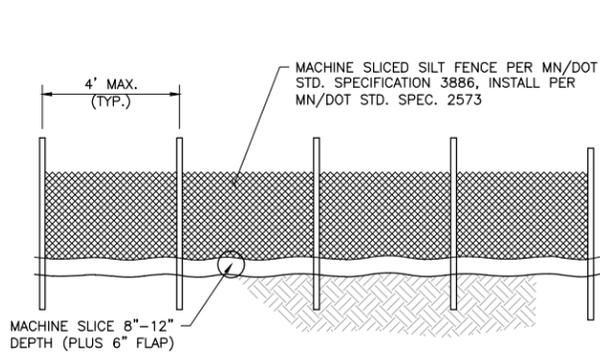
NOTES:

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO ROOT WAD INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. SOAK DORMANT CUTTINGS FOR A MINIMUM OF 24 HOURS IN 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. INSTALL RIPRAP AND GRANULAR FILTER AGGREGATE AS SPECIFIED IN SECTION 02375 AND AS SHOWN ON THE DRAWINGS.
4. EXCAVATE THE EXISTING STREAMBANK SLOPE SHOREWARD FROM AND LEVEL WITH THE TOP OF THE RIPRAP TO FORM A STABLE, UNDISTURBED SURFACE. A FLAT BENCH SHOULD BE CREATED FROM THE TOE OF THE STABLE CUT SLOPE TO THE TOE OF THE PROPOSED STREAM BANK RIPRAP.
5. DORMANT CUTTINGS ARE TO BE PLACED ON TOP OF THE RIPRAP EXCAVATED BENCH AT 3 BRANCHES PER LINEAR FOOT; THE BASAL END OF THE CUTTINGS SHOULD EXTEND AT LEAST 2 FOOT PAST THE BACK OF THE RIPRAP. NO MORE THAN 6 INCHES OF THE BUDDING END OF THE LIVE BRANCH SHOULD EXTEND PAST THE FRONT OF THE RIPRAP. COVER THE DORMANT CUTTINGS WITH TOPSOIL TO CREATE AN EVEN SURFACE FOR THE CONSTRUCTION OF THE FIRST SOIL LIFT.
6. 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 GEOCOIR/DEKOWE 900 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
7. THE INNER LAYER OF EACH SOIL LIFT SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUIVALENT. 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.
8. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRAVEL AND SAND MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 6 TO 8 INCHES ON THE FRONT OF SURFACE LAYER SHOULD BE COMPRISED OF TOPSOIL MIX AS SHOWN ON THE DRAWINGS.
9. THE TOPSOIL LAYER SHALL BE SEEDED WITH THE VRSS SEED MIX AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.
10. 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.

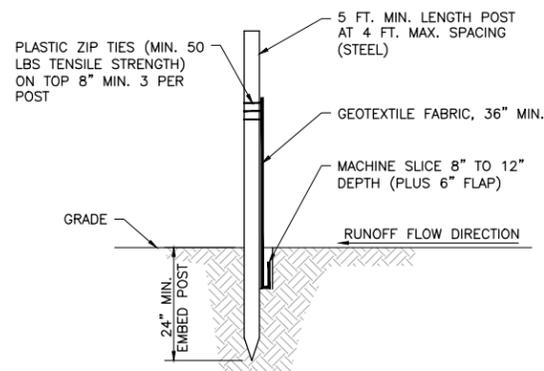
CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579\00\23271579_D-01_DETAILS.DWG PLOT SCALE: 1:2 PLOT DATE: 6/29/2017 1:55 PM
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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 06/30/2017 LICENSE # 48031				CLIENT: 06/30/17 BID: _____ CONSTRUCTION: _____ RELEASED TO/FOR: _____ DATE RELEASED: _____				Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com				Scale: AS SHOWN Date: 06/30/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN STREAM RESTORATION DETAILS		BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. _____ DWG. No. D-03 REV. No. A	
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION	A	B	C	0	1	2	3							
A	EPF	PJH	JDW	06/30/2017															

**50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION**



DOWNSTREAM VIEW

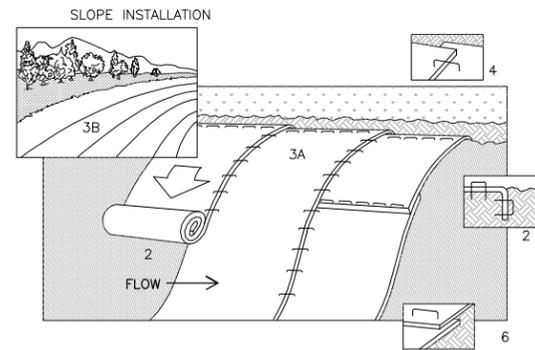


SECTION VIEW

NOTES:

1. INSTALL SILT FENCE PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD. REMOVE SILT FENCE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. SILT FENCE MATERIALS AND INSTALLATION SHALL MEET THE REQUIREMENTS OF MN/DOT SPECIFICATIONS 2573 AND 3886.
3. NO HOLES OR GAPS SHALL BE PRESENT IN/UNDER SILT FENCE. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
4. REMOVE ACCUMULATED SEDIMENT WHEN BUILD UP REACHES 1/3 OF FENCE HEIGHT. OR INSTALL A SECOND SILT FENCE DOWNSTREAM OF THE ORIGINAL FENCE AT A SUITABLE DISTANCE.
5. WHEN SPLICES ARE NECESSARY MAKE SPLICE AT POST ACCORDING TO SPLICE DETAIL. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE. ROTATE BOTH POSTS TOGETHER AT LEAST 180 DEGREES TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL. CUT THE FABRIC NEAR THE BOTTOM OF THE POSTS TO ACCOMMODATE THE 6 INCH FLAP, THEN DRIVE BOTH POSTS AND BURY THE FLAP AND COMPACT BACKFILL.

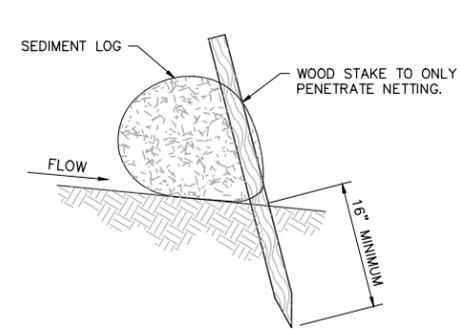
1 DETAIL: SILT FENCE - MACHINE SLICED
NOT TO SCALE
SEE ALSO CITY STD. PLATE NO. SEWR-8001



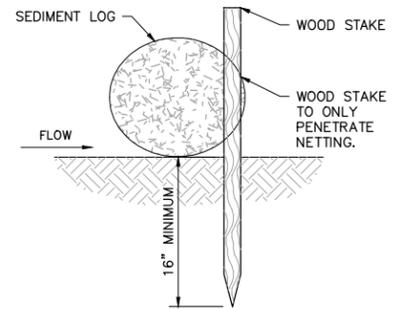
NOTES:

1. REFER TO MANUFACTURER RECOMMENDATIONS FOR STAPLE PATTERNS FOR SLOPE INSTALLATIONS.
2. PREPARE SOIL BY LOOSENING TOP 1-2 INCHES AND APPLY SEED (AND FERTILIZER WHERE REQUIRED) PRIOR TO INSTALLING BLANKETS. GROUND SHOULD BE SMOOTH AND FREE OF DEBRIS.
3. BEGIN (A) AT THE TOP OF THE SLOPE AND ROLL THE BLANKETS DOWN OR (B) AT ONE END OF THE SLOPE AND ROLL THE BLANKETS HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 6" OVERLAP, WITH THE UPHILL BLANKET ON TOP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
6. BLANKET MATERIALS SHALL BE AS SPECIFIED OR AS APPROVED BY ENGINEER.

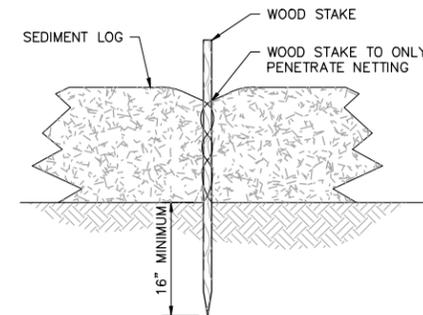
2 DETAIL: EROSION CONTROL BLANKET - INSTALLATION
NOT TO SCALE



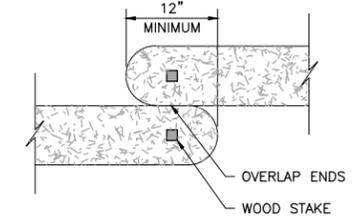
SIDE VIEW ON SLOPE



SIDE VIEW FLAT



FRONT VIEW

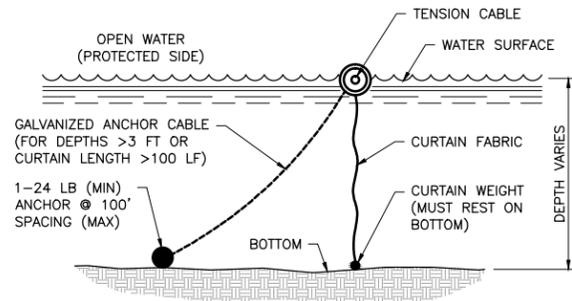


TOP VIEW

NOTES:

1. INSTALL SEDIMENT LOG ALONG CONTOURS (CONSTANT ELEVATION).
2. NO GAPS SHALL BE PRESENT UNDER SEDIMENT LOG. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
3. REMOVE ACCUMULATED SEDIMENT WHEN REACHING 1/3 OF LOG HEIGHT.
4. MAINTAIN SEDIMENT LOG THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACED AS REQUIRED.

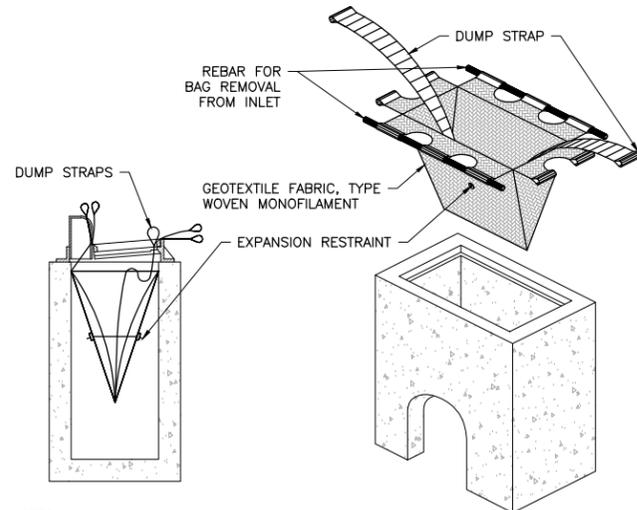
3 DETAIL: EROSION LOG - STAKING
NOT TO SCALE



NOTES:

1. INSTALL SILT CURTAIN PRIOR TO ANY CONSTRUCTION ACTIVITIES IN AREAS DRAINING TO OPEN WATER OR WORK IN WATER.
2. ANCHOR TENSION CABLE AT SHORE AT BOTH END WITH STEEL POSTS OF DIAMETER AND LENGTH SUFFICIENT TO PREVENT BENDING AND PULL-OUT.
3. ELIMINATE ANCHOR AND CABLE FOR WATER DEPTHS LESS THAN 3'-0" OR DISTANCE BETWEEN SHORE ANCHORS FOR TENSION CABLE OF LESS THAN 100'
4. CURTAIN WEIGHT SHALL BE HEAVY ENOUGH TO HOLD CURTAIN VERTICAL IN CURRENT AND WAVES TYPICAL FOR THE SITE.
5. SILT CURTAIN MATERIALS SHALL CONFORM TO MN/DOT SPECIFICATION 3887.
6. MAINTAIN SILT CURTAIN AND REPAIR OR REPLACE AS REQUIRED TO PREVENT DISCHARGE OF SEDIMENT TO PROTECTED WATER BODY.
7. REMOVE ANY ACCUMULATED SEDIMENT PRIOR TO REMOVAL OF SILT CURTAIN.
8. REMOVE SILT CURTAIN FOLLOWING SITE STABILIZATION OR AS DIRECTED BY ENGINEER.

4 DETAIL: FLOTATION SILT CURTAIN
NOT TO SCALE

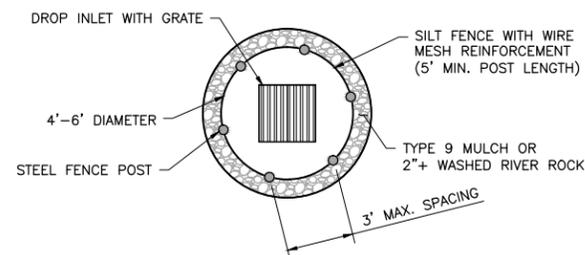


NOTES:

1. INSTALL INLET PROTECTION PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED OR IMMEDIATELY FOLLOWING ANY CATCHBASIN INSTALLATION AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD.
2. MATERIALS SHALL BE SUFFICIENT TO ALLOW FLOW WHILE BLOCKING SEDIMENT. NO HOLES OR GAPS SHALL BE PRESENT IN/AROUND FILTER SACK.
3. CLEAN FILTER SACK AND REMOVE ACCUMULATED SEDIMENT AS REQUIRED TO ALLOW FLOW INTO THE CATCHBASIN AND PREVENT SEDIMENT FROM LEAVING THE DEVICE.
4. REMOVE DEVICE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.

TYPE C (FILTER SACK)

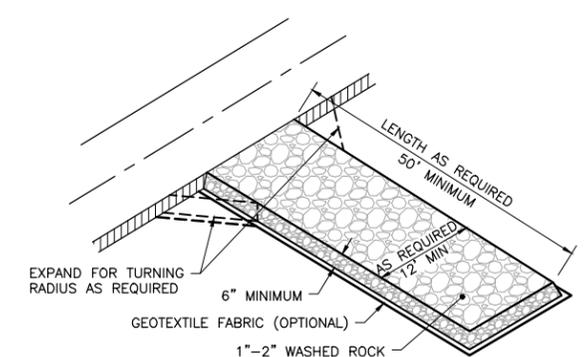
5 DETAIL: INLET PROTECTION
NOT TO SCALE
SEE ALSO CITY STD. PLATE NO. SEWR-8003



NOTES:

1. THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHELENE RISER SIZED TO FIN INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.
2. USE INLET PROTECTION TYPE A OR TYPE 9 MULCH AS DIRECTED BY THE ENGINEER.
3. PAID FOR AS SEDIMENT CONTROL BARRIER.

PLAN VIEW - TYPE A (SILT FENCE)



NOTES:

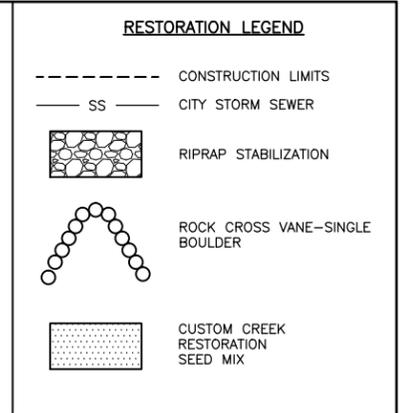
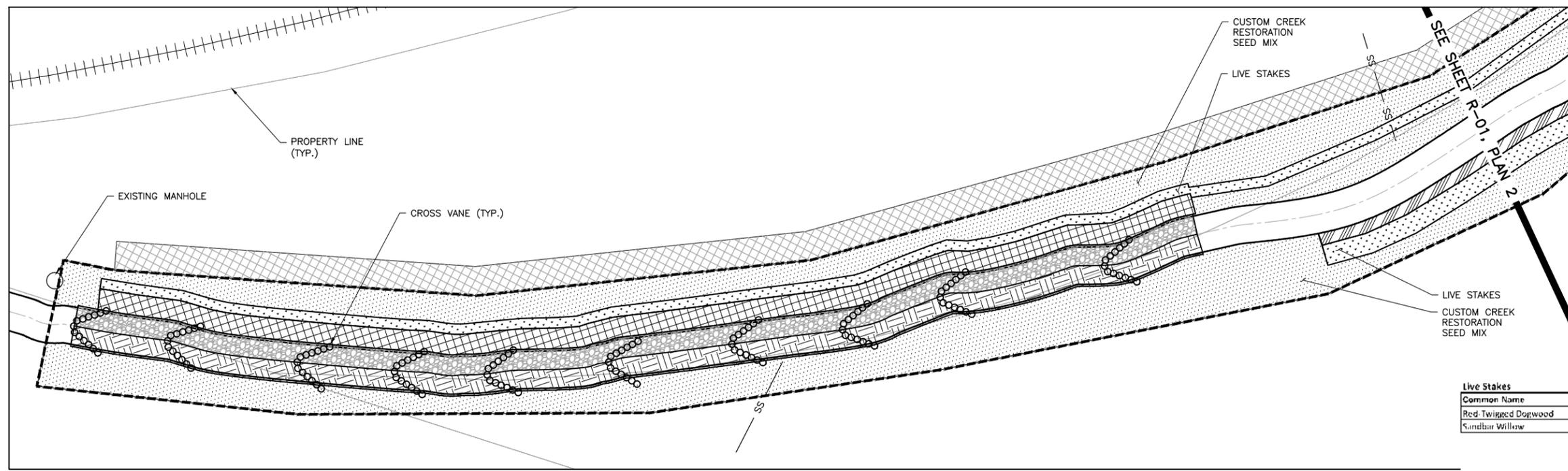
1. MAINTAIN ENTRANCE THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACE AS REQUIRED TO PREVENT TRACKING OFFSITE.
2. REMOVE ENTRANCE IN CONJUNCTION WITH FINAL GRADING AND SITE STABILIZATION.

6 DETAIL: CONSTRUCTION ENTRANCE - ROCK
NOT TO SCALE
SEE ALSO CITY STD. PLATE NO. SEWR-8002

**50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION**

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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.		CLIENT BID CONSTRUCTION	06/30/17	Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435			Scale AS SHOWN	BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN		BARR PROJECT No. 23/27-1579.00
PRINTED NAME JEFFREY D. WEISS		RELEASED TO/FOR	A B C O 1 2 3	Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: 1-800-632-2277 www.barr.com			Date 06/30/2017	EROSION CONTROL DETAILS		CLIENT PROJECT No. -
SIGNATURE _____		DATE RELEASED		Ph: 1-800-632-2277 Fax: (952) 832-2601			Drawn EPF	DWG. No. D-04		REV. No. A
DATE 06/30/2017 LICENSE # 48031							Checked AKH			
NO. BY CHK. APP. DATE REVISION DESCRIPTION							Designed BARR			
							Approved JDW			

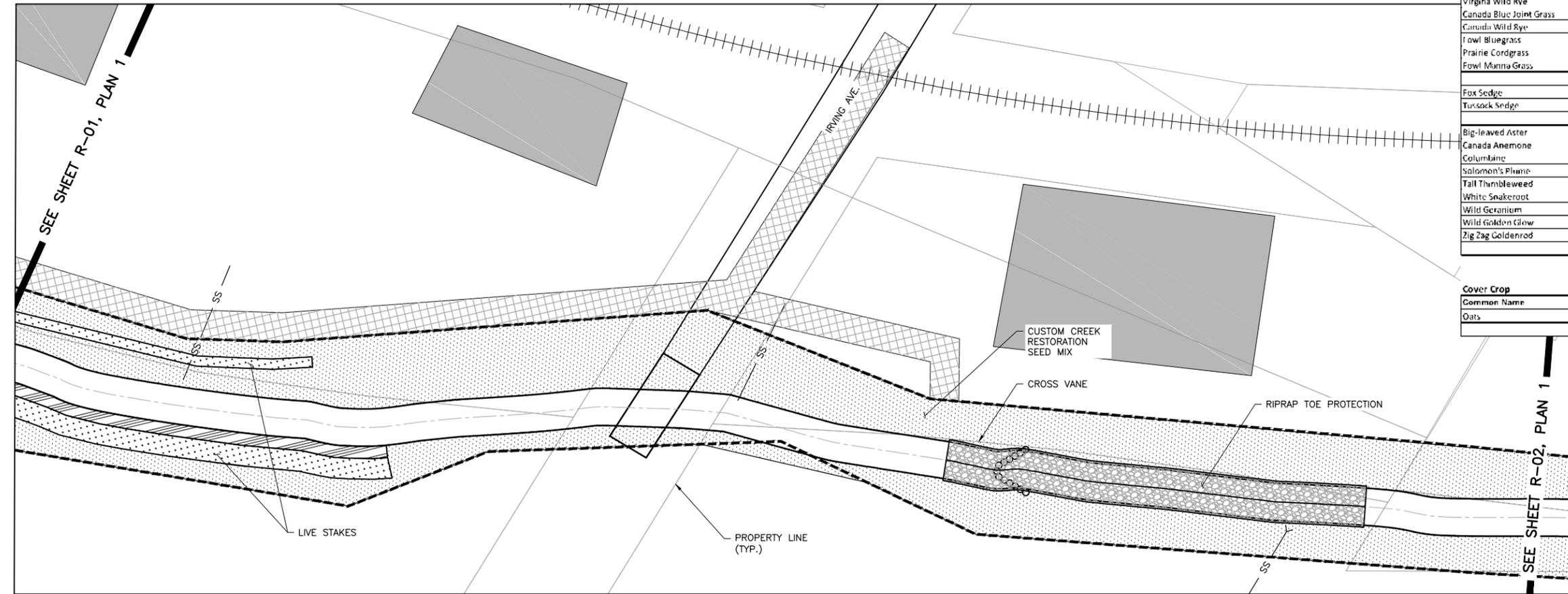


Common Name	Botanic Name	Quantity	Spacing	Size
Red-Twigged Dogwood	<i>Cornus sericea</i>		3' O.C.	Live Stake
Sandbar Willow	<i>Salix interior</i>		7' O.C.	Live Stake
Total Live Stakes				

1 RESTORATION PLAN: REACH 1 0 30 60 SCALE IN FEET

Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Riparian Restoration			
Bottlebrush Grass	<i>Elymus hystrix</i>	0.500	4.0
Virginia Wild Rye	<i>Elymus virginicus</i>	2.000	19.0
Canada Blue Joint Grass	<i>Calamagrostis canadensis</i>	2.000	5.0
Canada Wild Rye	<i>Elymus canadensis</i>	1.000	9.0
Tawl Bluegrass	<i>Poa palustris</i>	1.000	15.0
Prairie Cordgrass	<i>Spartina pectinata</i>	1.400	14.0
Fowl Manna Grass	<i>Glyceria striata</i>	1.000	12.0
Total Grasses		8.900	78.0
Fox Sedge	<i>Carex stipata</i>	1.000	4.5
Tussock Sedge	<i>Carex stricta</i>	0.800	3.0
Total Sedges		1.800	7.5
Big-leaved Aster	<i>Aster macrophyllus</i>	0.080	1.0
Canada Anemone	<i>Anemone canadensis</i>	0.080	1.0
Columbine	<i>Aquilegia canadensis</i>	0.125	1.5
Solomon's Plume	<i>Simulacra racemosa</i>	0.250	2.4
Tall Thimbleweed	<i>Anemone virginiana</i>	0.080	0.5
White Snakeroot	<i>Eupatorium rugosum</i>	0.125	1.0
Wild Geranium	<i>Geranium maculatum</i>	0.080	1.1
Wild Golden Glow	<i>Rudbeckia laciniata</i>	0.250	3.0
Zig Zag Goldenrod	<i>Solidago flexicaulis</i>	0.125	3.0
Total Forbs		1.195	14.5
Total		11.90	100.00

Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Cover Crop			
Oats	<i>Avena sativa</i>	25.000	100.0
Total Cover Crop		25.000	100.0

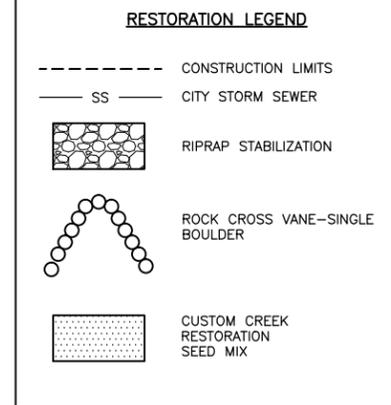
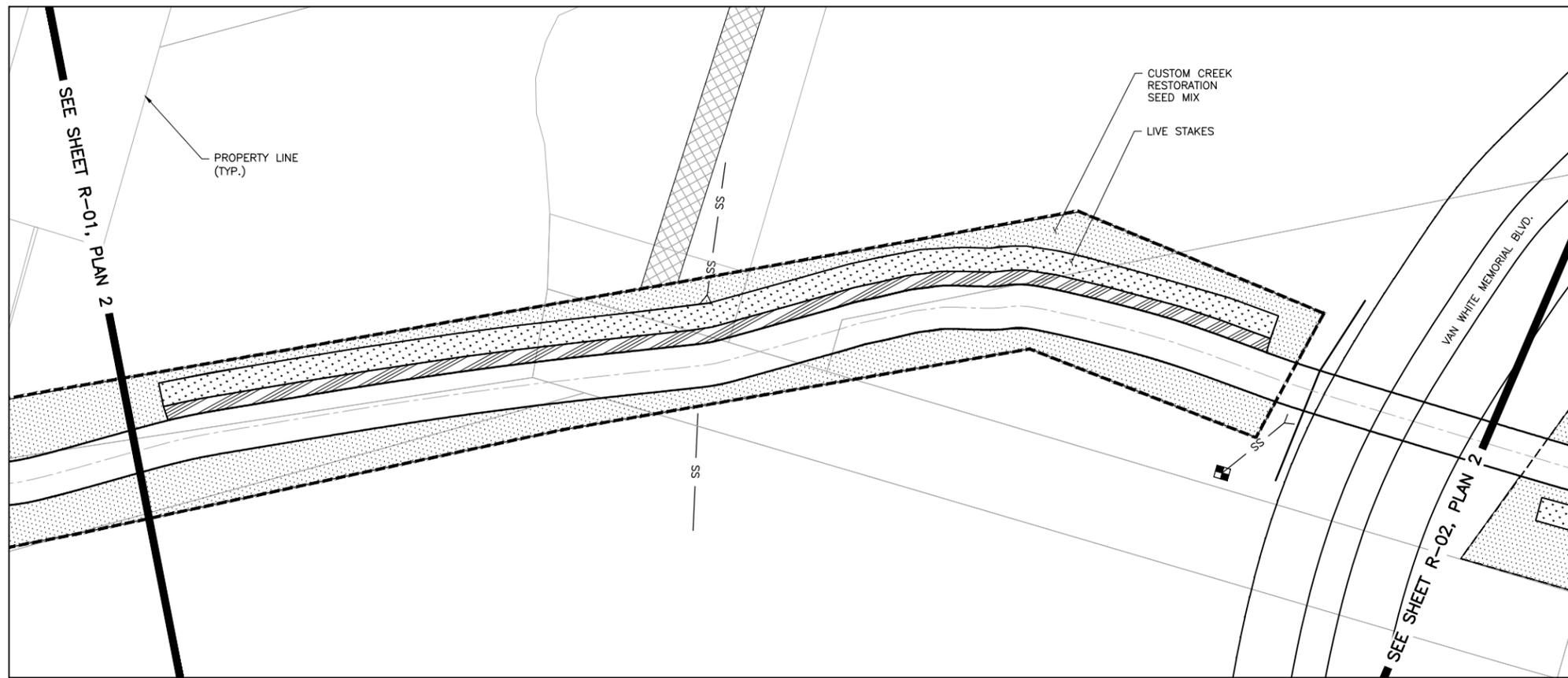


1 RESTORATION PLAN: REACH 1 0 30 60 SCALE IN FEET

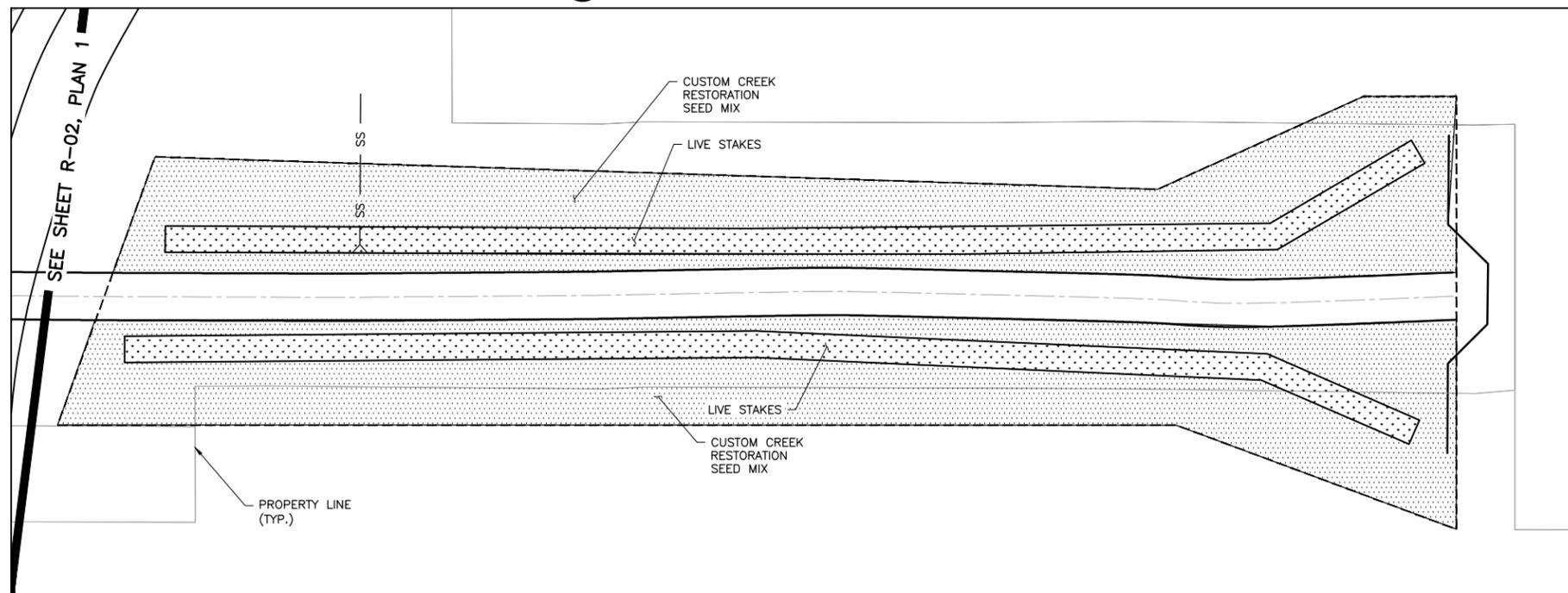
50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 07/17/2017 LICENSE # 48031		CLIENT: 07/07/17 BID: _____ CONSTRUCTION: _____ RELEASED TO/FOR: A B C O 1 2 3 DATE RELEASED: _____	BARR Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Ph: 1-800-632-2277 www.barr.com	Scale: AS SHOWN Date: 07/07/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW	CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA	BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN RESTORATION PLAN REACH 1	BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. _____ DWG. No. R-01 REV. No. A		
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION				
A	EPF	AKH	JDW	07/07/2017	ISSUED FOR REVIEW				



1 RESTORATION PLAN: REACH 1
 0 30 60
 SCALE IN FEET



1 RESTORATION PLAN: REACH 1
 0 30 60
 SCALE IN FEET

Live Stakes				
Common Name	Botanic Name	Quantity	Spacing	Size
Red-Twigged Dogwood	<i>Cornus sericea</i>		3' O.C.	Live Stake
Sandbar Willow	<i>Salix interior</i>		3' O.C.	Live Stake
Total Live Stakes				

Riparian Restoration			
Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Bottlebrush Grass	<i>Elymus hystrix</i>	0.500	4.0
Virginia Wild Rye	<i>Elymus virginicus</i>	2.000	19.0
Canada Blue Joint Grass	<i>Calamagrostis canadensis</i>	2.000	5.0
Canada Wild Rye	<i>Elymus canadensis</i>	1.000	9.0
Fowl Bluegrass	<i>Poa palustris</i>	1.000	15.0
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Total Grasses		8.900	78.0
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Total Forbs		1.195	14.5
Total		11.90	100.0

Cover Crop			
Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Oats	<i>Avena sativa</i>	25.000	100.0
Total Cover Crop		25.000	100.0

50% PLAN SET
 ISSUED FOR REVIEW
 NOT FOR CONSTRUCTION

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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.
 PRINTED NAME: JEFFREY D. WEISS
 SIGNATURE: [Signature]
 DATE: 07/17/2017 LICENSE # 48031

CLIENT	DATE	DESCRIPTION
BARR ENGINEERING CO.	07/07/17	CONSTRUCTION

BARR
 BARR ENGINEERING CO.
 4300 MARKETPOINTE DRIVE
 Suite 200
 MINNEAPOLIS, MN 55435
 Corporate Headquarters:
 Minneapolis, Minnesota
 Ph: 1-800-632-2277
 Ph: (952) 832-2601
 www.barr.com

Scale	AS SHOWN
Date	07/07/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

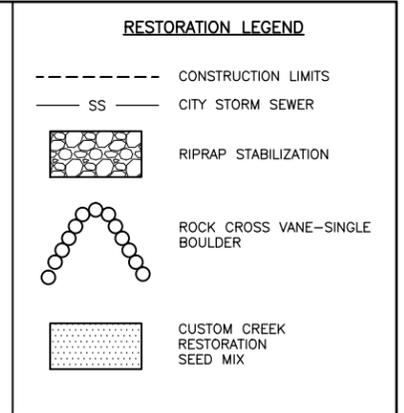
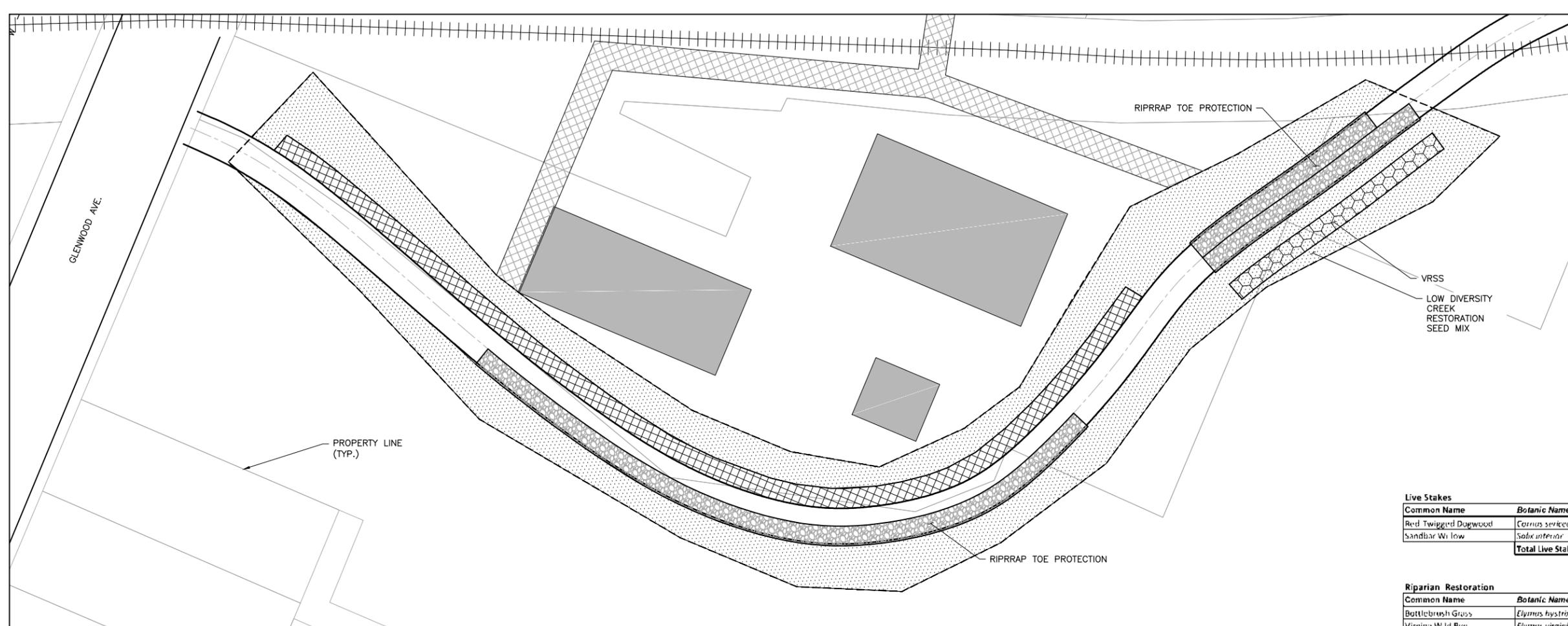
CITY OF MINNEAPOLIS
 MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
 MINNEAPOLIS, MN
 RESTORATION PLAN
 REACH 1

BARR PROJECT No.	
23/27-1579.00	
CLIENT PROJECT No.	
-	
DWG. No.	REV. No.
R-02	A

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	AKH	JDW	07/07/2017	ISSUED FOR REVIEW

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1 RESTORATION PLAN: REACH 2

Live Stakes

Common Name	Botanic Name	Quantity	Spacing	Size
Red Twigged Dogwood	<i>Cornus sericea</i>		3' O.C.	Live Stake
Sandbar Willow	<i>Salix interior</i>		3' O.C.	Live Stake
Total Live Stakes				

Riparian Restoration

Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Bottlebrush Grass	<i>Elymus hystrix</i>	0.500	4.0
Virginia Wild Rye	<i>Elymus virginicus</i>	2.000	19.0
Canada Blue Joint Grass	<i>Calamagrostis canadensis</i>	2.000	5.0
Canada Wild Rye	<i>Elymus canadensis</i>	1.000	9.0
Fowl Bluegrass	<i>Poa polystris</i>	1.000	15.0
Prairie Cordgrass	<i>Spartina pectinata</i>	1.400	14.0
Fowl Manna Grass	<i>Glyceria striata</i>	1.000	12.0
Total Grasses		8.900	78.0
Fox Sedge	<i>Carex stipata</i>	1.000	4.5
Tussock Sedge	<i>Carex stricta</i>	0.800	3.0
Total Sedges		1.800	7.5
Big-leaved Aster	<i>Aster macrophyllus</i>	0.080	1.0
Canada Anemone	<i>Anemone canadensis</i>	0.080	1.0
Columbine	<i>Aquilegia canadensis</i>	0.125	1.5
Solomon's Plume	<i>Smilax racemosa</i>	0.250	2.4
Tall Thimbleweed	<i>Anemone virginiana</i>	0.080	0.5
White Snake-root	<i>Eupatorium rugosum</i>	0.125	1.0
Wild Geranium	<i>Geranium maculatum</i>	0.080	1.1
Wild Golden Glow	<i>Rudbeckia laciniata</i>	0.250	3.0
Zig Zag Groundrod	<i>Solidago flexicaulis</i>	0.125	3.0
Total Forbs		1.195	14.5
Total		11.90	100.00

Cover Crop

Common Name	Botanic Name	Rate (lb/ac)	% of Mix (% by Wt)
Oats	<i>Avena sativa</i>	25.000	100.0
Total Cover Crop		25.000	100.0

50% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

		I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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. PRINTED NAME: JEFFREY D. WEISS SIGNATURE: _____ DATE: 07/17/2017 LICENSE # 48031		CLIENT: 07/07/17 BID: _____ CONSTRUCTION: _____ RELEASED TO/FOR: A B C O 1 2 3 DATE RELEASED: _____		BARR BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com		Scale: AS SHOWN Date: 07/07/2017 Drawn: EPF Checked: AKH Designed: BARR Approved: JDW		CITY OF MINNEAPOLIS MINNEAPOLIS, MINNESOTA		BASSETT CREEK MAIN STEM STABILIZATION MINNEAPOLIS, MN RESTORATION PLAN REACH 2		BARR PROJECT No. 23/27-1579.00 CLIENT PROJECT No. - DWG. No. R-03 REV. No. A	
NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION										
	A	EPF	AKH	JDW	07/07/2017	ISSUED FOR REVIEW									