



Pond / Detention Basin Examples

City of St. Peters, MO

Decision Factors

- Public input and preferences
- Soil infiltration capacity
- Storm Management
 - **Volume and rate of water**
- Maintenance evaluation
- Physical constraints of basins and pipes



Basin DB-7065-02

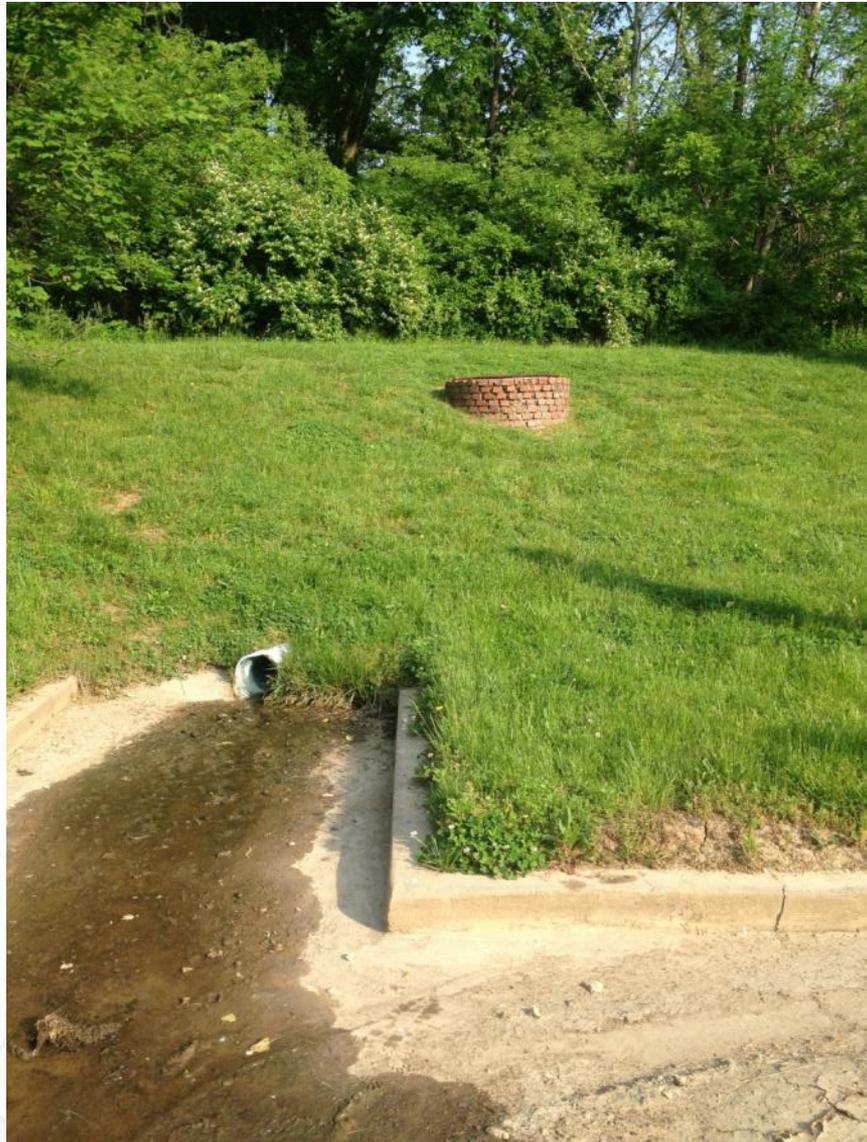












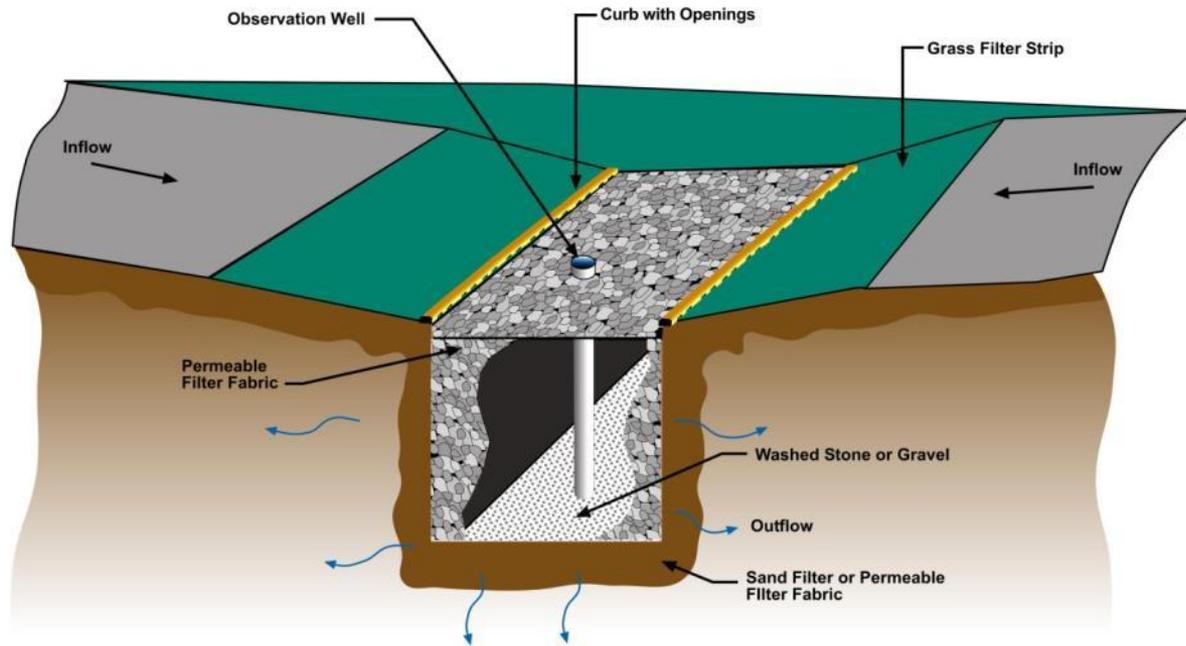


Possible Options to Treat Water Quality Volume

Linear System

Wetland

Filtration basin



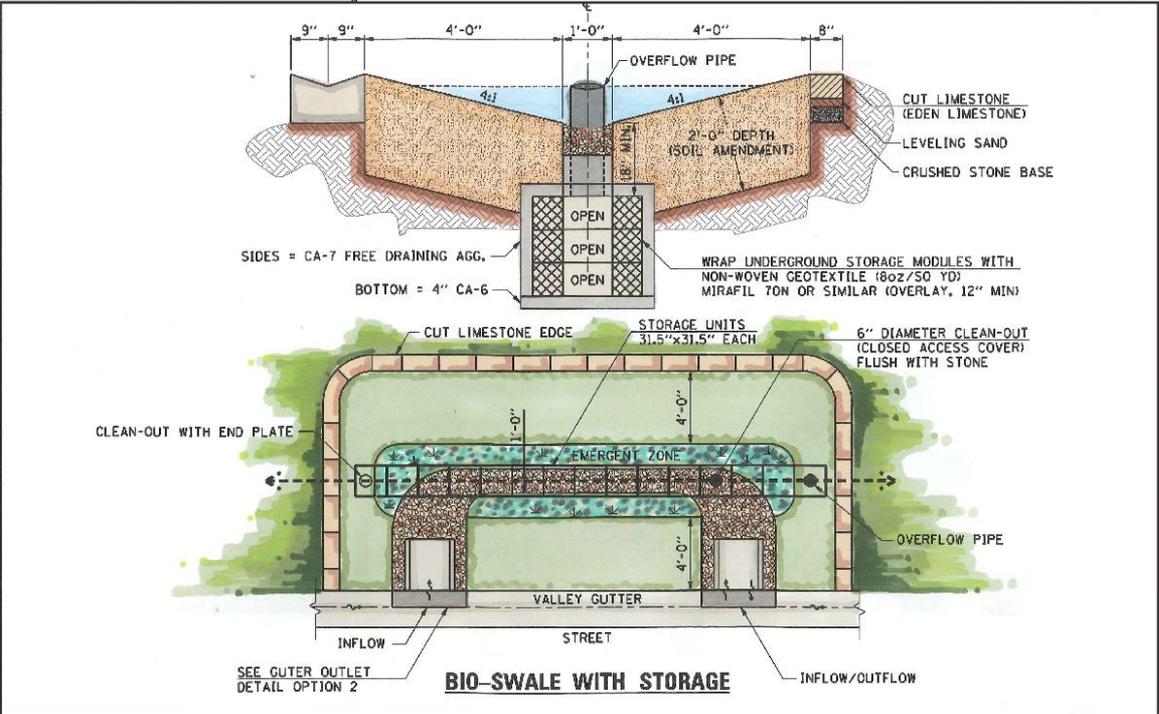
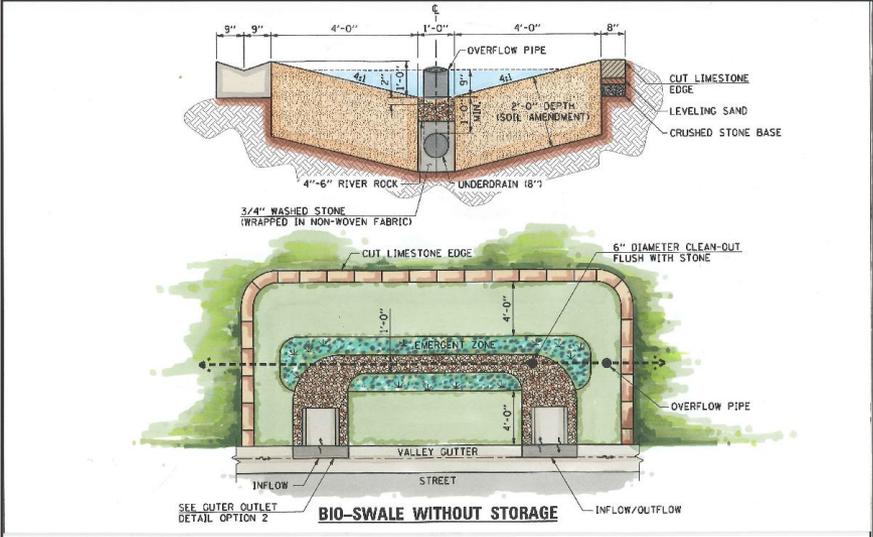
INFILTRATION TRENCH







Linear Systems







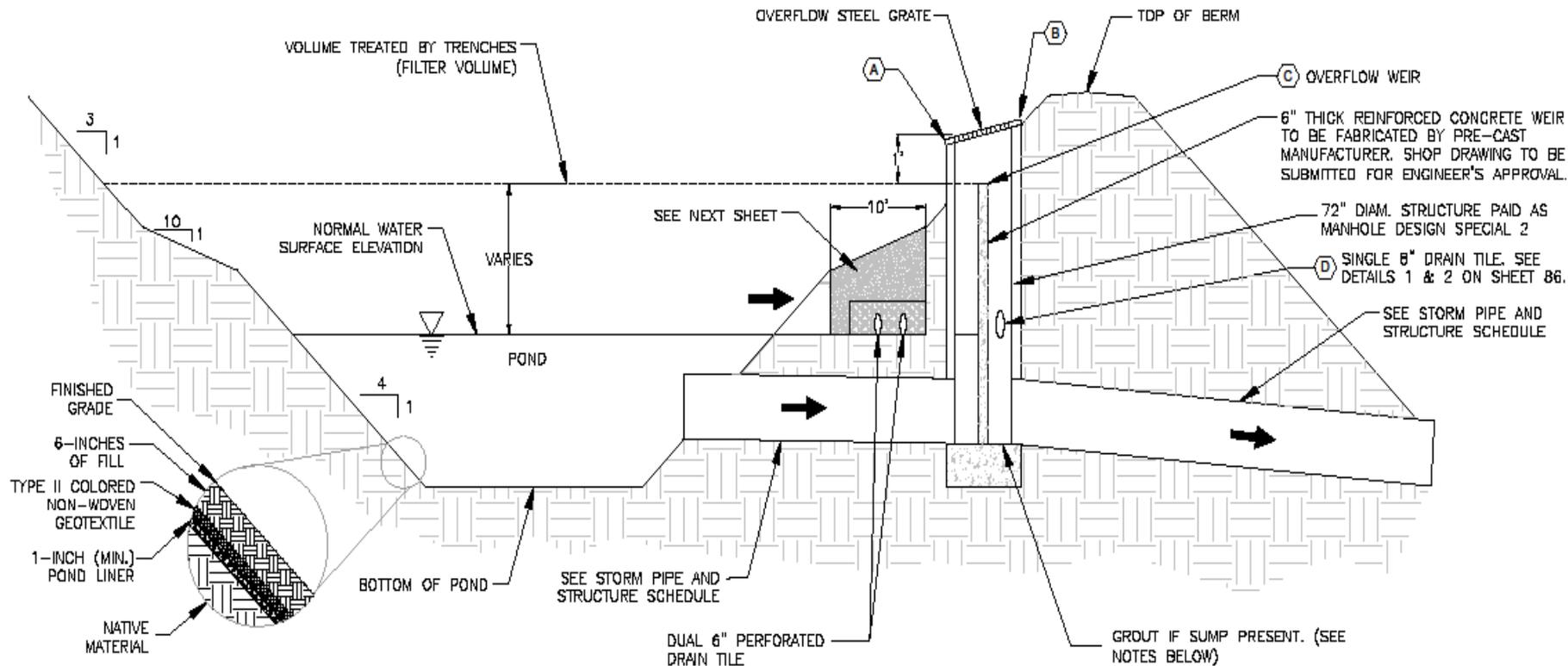






Enhanced Filters

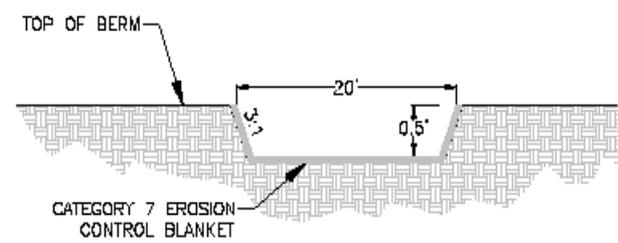




FINISHED GRADE
 6-INCHES OF FILL
 TYPE II COLORED NON-WOVEN GEOTEXTILE
 1-INCH (MIN.) POND LINER
 NATIVE MATERIAL

6" THICK REINFORCED CONCRETE WEIR TO BE FABRICATED BY PRE-CAST MANUFACTURER. SHOP DRAWING TO BE SUBMITTED FOR ENGINEER'S APPROVAL.
 72" DIAM. STRUCTURE PAID AS MANHOLE DESIGN SPECIAL 2
 SINGLE 6" DRAIN TILE. SEE DETAILS 1 & 2 ON SHEET 86.
 SEE STORM PIPE AND STRUCTURE SCHEDULE

1 DRAIN TILE, OUTLET WEIR & PIPING POND SECTION DETAIL
 SCALE: NONE, VERTICAL EXAGGERATION 4X



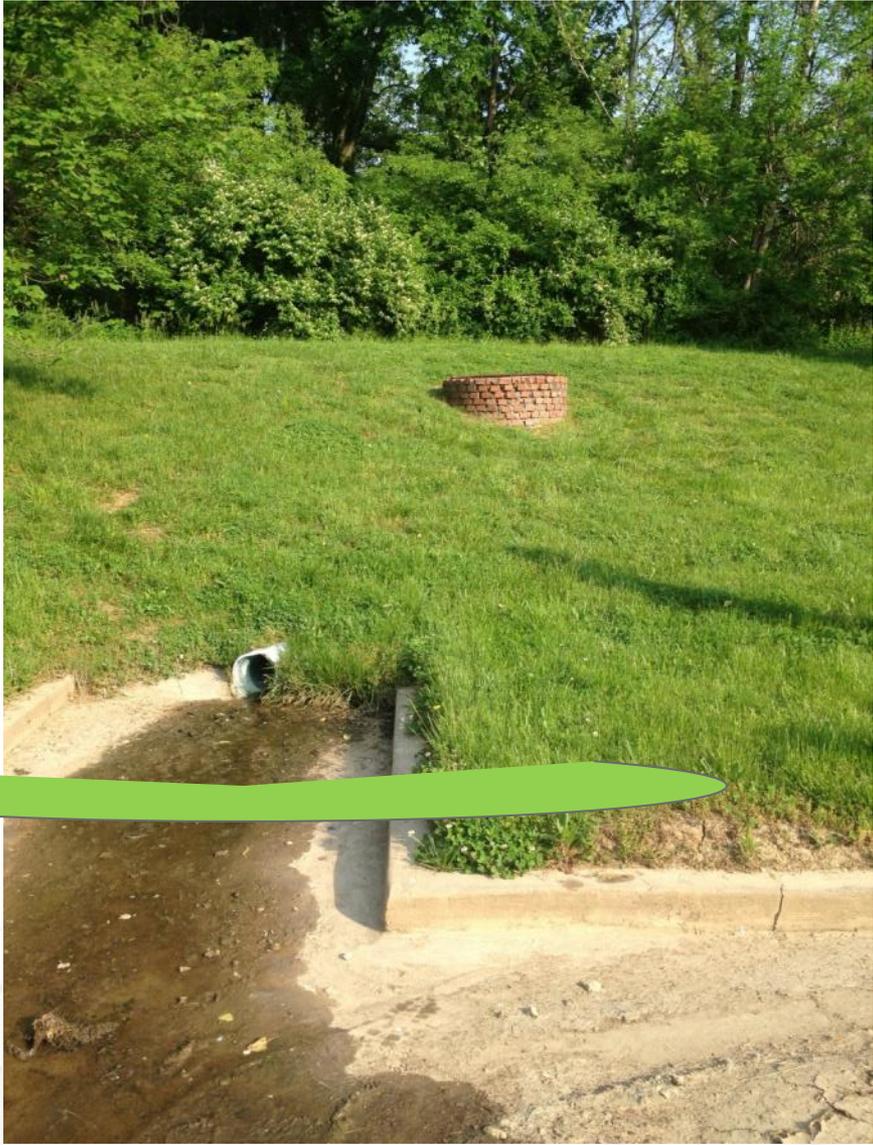
2 TYPICAL OF EMERGENCY OVERFLOW WEIR
 SCALE: NONE, VERTICAL EXAGGERATION 8X

LETTER	VALUE	JENKS POND	MAGNOLIA POND	MARYLAND POND
(A)	ELEVATION	99	127	120
(B)	ELEVATION	99.33	127.33	120.33
(C)	ELEVATION	98	126	119
(D)	DS INVERT	95.4	123.7	116.3

NOTES:
 1. IF SUMP IS PRESENT BELOW OUTLET INVERT, CONTRACTOR TO FILL DOWNSTREAM PORTION OF OUTLET STRUCTURE WITH GROUT AND TROWEL FLUSH WITH INVERT ELEVATION. TIME AND MATERIAL CONSIDERED INCIDENTAL TO POND OUTLET INSTALLATION - MANHOLE DESIGN SPECIAL 2 STRUCTURES.



Stormwater Berms?





Natives (or not?)







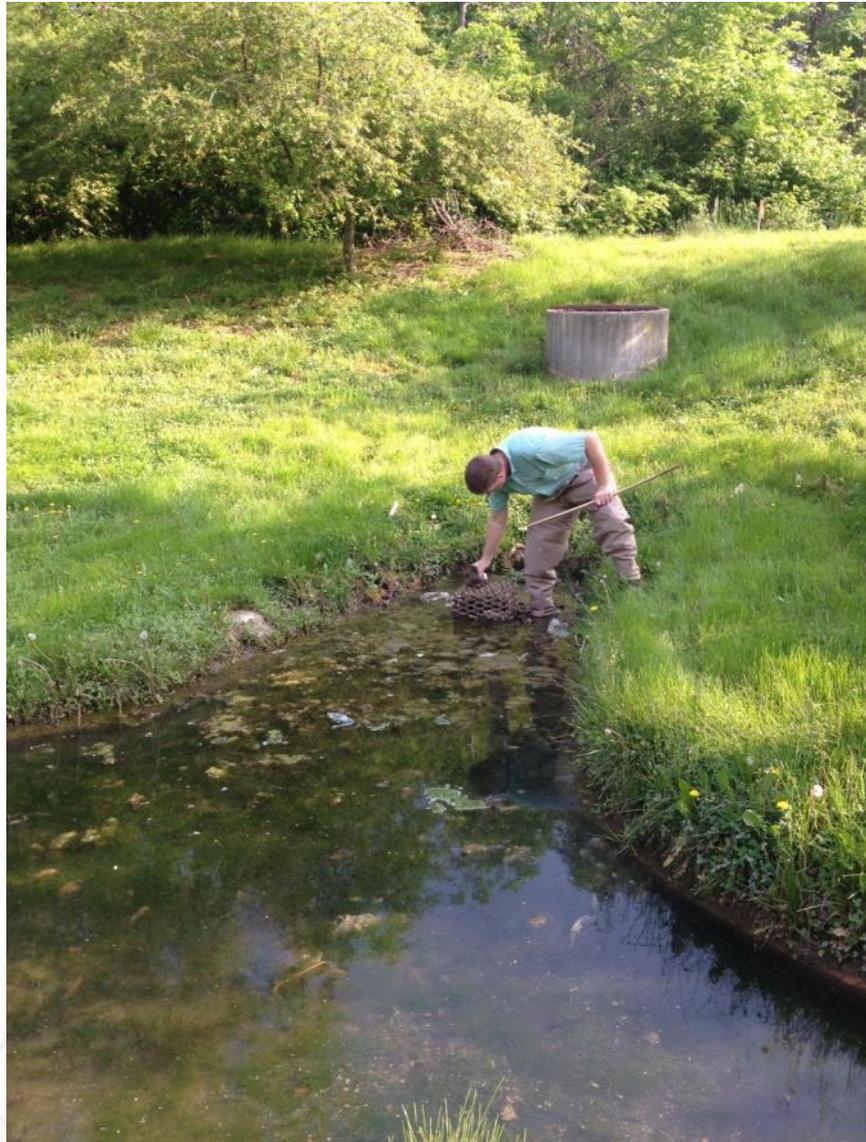
Defining the edge







Basin DB-7065-03



















Options

Linear Treatment

Infiltration Basin

Filtration basin with new drain tile discharge to creek

Water quality berm

Wetland or Pond



Basin DB-7065-04





Options

Linear Treatment

Infiltration Basin

Filtration basin with new drain tile discharge to creek

Water quality berm

Wetland or Pond



Basin DB-7065-06























Options

Due to wetland hillside seep – highly recommend wetland at South End of Site connected to hillside seep

Linear filtration area recommended at north end.



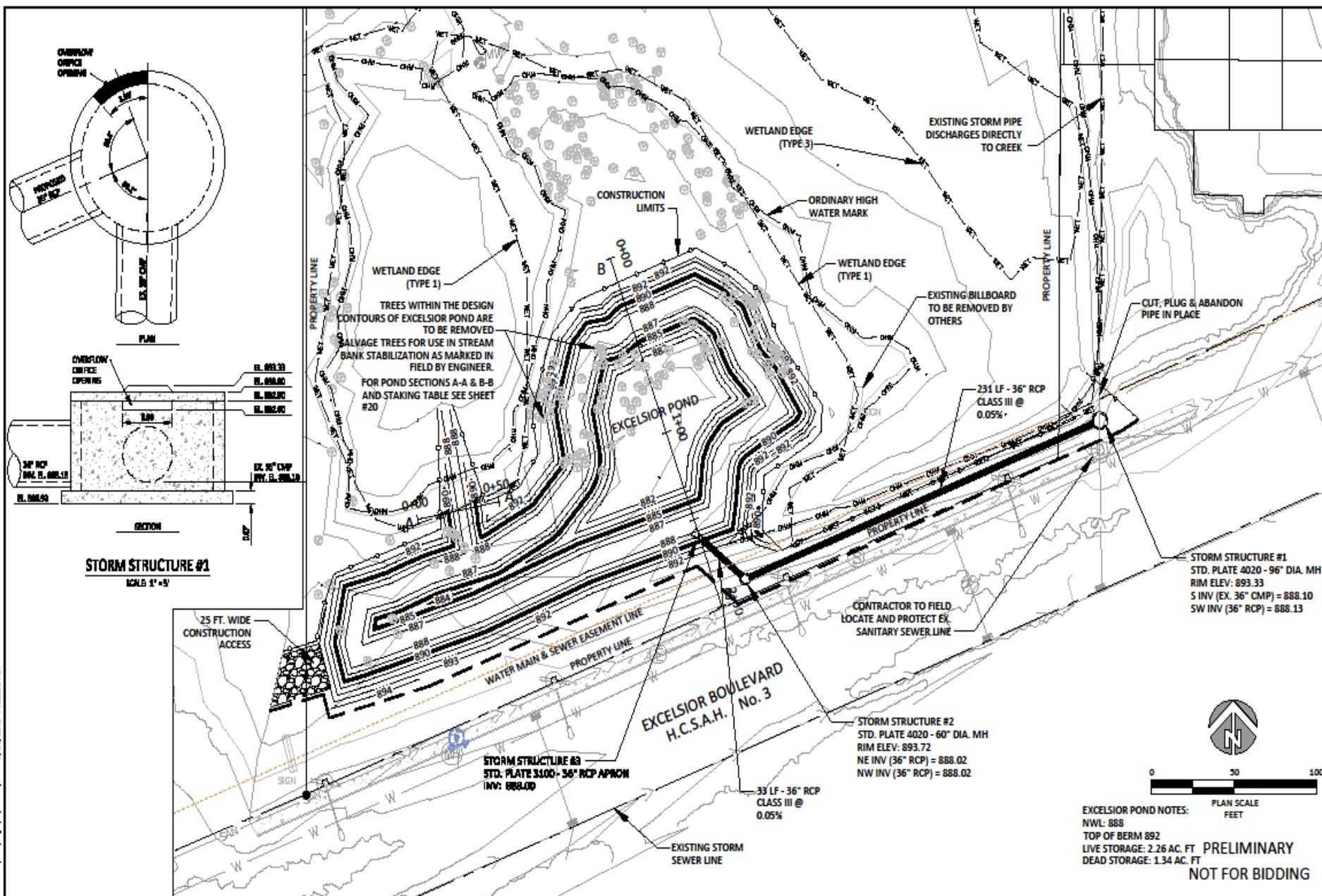
We may choose a wet meadow versus open water.



Our goal is to blend ecologically sensitive solutions with the preferred aesthetic of the residents







7/26/12 11:20:00 AM
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 7/26/12 11:20:00 AM

NO.	BY	DATE	REVISION DESCRIPTION

JC	DM	X
DRAWN	DESIGNED	CHECKED
JK	7/26/12	
APPROVED	DATE	PROJECT

Minnehaha Reach 20 Restoration
 Minnehaha Creek Watershed District
 St. Louis Park, MN

300 S. Washington St., Suite 200
 Minneapolis, MN 55402
 612-461-0999
 innovativemn.com



Other Projects



Mexico Road Extension Wentzville, MO

























Minnehaha Creek Restoration St. Louis Park, MN







PLAN LEGEND

- EXISTING 1 FT CONTOUR
- PROJECT BOUNDARY
- NEW BOARDWALK AND PATH
- NEW POND
- NEW CHANNEL
- EXISTING CHANNEL
- NEW NATURAL LEVEE FEATURE
- 100-YEAR FLOODPLAIN ELEVATION SEE NOTE 5
- SURVEY CONTROL POINTS
- EXISTING STORM DRAIN

GENERAL NOTES

1. BUILDING AND INFRASTRUCTURE LINEWORK SHOWN ON BASEMAP PROVIDED BY PARK NICOLLET HEALTH SERVICES. TOPOGRAPHIC SURVEY BY HR GREEN CO., OCTOBER 2008.

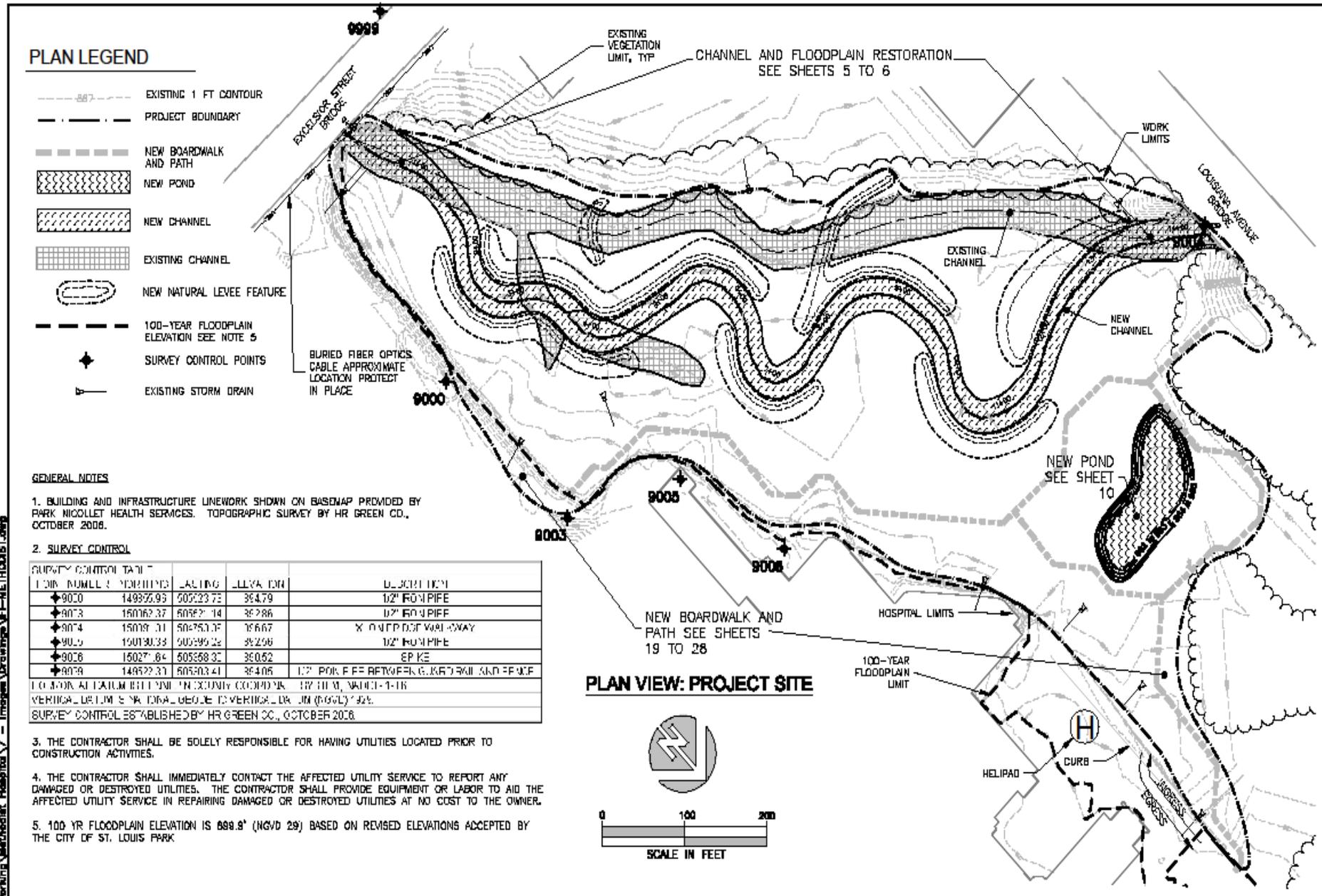
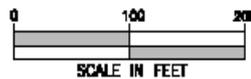
2. SURVEY CONTROL

POINT NUMBER	EASTING	NORTHING	ELEVATION	DESCRIPTION
9000	149825.99	505223.73	364.79	1/2" IRON PIPE
9003	150162.37	505237.14	362.86	1/2" IRON PIPE
9004	15019.31	504753.37	366.67	X OVERHEAD WIREWAY
9005	150130.33	505299.25	362.96	1/2" IRON PIPE
9006	150277.84	505268.31	360.62	EP KE
9008	149522.33	505303.41	364.06	1/2" POLY FIBER OPTIC CABLE

LOCATION OF POINTS IN COUNTY COORDINATE SYSTEM, NAD 83, UTM ZONE 18
 VERTICAL DATUM IS NA DATUM GEOID TO VERTICAL DATUM (GVD) 2011
 SURVEY CONTROL ESTABLISHED BY HR GREEN CO., OCTOBER 2008

3. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR HAVING UTILITIES LOCATED PRIOR TO CONSTRUCTION ACTIVITIES.
4. THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES. THE CONTRACTOR SHALL PROVIDE EQUIPMENT OR LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO COST TO THE OWNER.
5. 100 YR FLOODPLAIN ELEVATION IS 888.8' (NGVD 29) BASED ON REVISED ELEVATIONS ACCEPTED BY THE CITY OF ST. LOUIS PARK

PLAN VIEW: PROJECT SITE



Z:\Projects_Working\Minnehaha_Hospital_V7 - Images\Crawling\WP-METHUEN\Sheeting

<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>REVISION</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	BY	REVISION					<table border="1"> <tr> <th>REP. CO.</th> <th>NAME</th> <th>DATE</th> <th>PROJECT</th> </tr> <tr> <td>HR GREEN</td> <td>HR GREEN</td> <td>6/27/08</td> <td>MINNEHAHA CREEK RESTORATION</td> </tr> </table>	REP. CO.	NAME	DATE	PROJECT	HR GREEN	HR GREEN	6/27/08	MINNEHAHA CREEK RESTORATION	<table border="1"> <tr> <th>NAME</th> <th>DATE</th> <th>PROJECT</th> </tr> <tr> <td>MICHAEL BLISS</td> <td>6/27/08</td> <td>MINNEHAHA CREEK RESTORATION</td> </tr> </table>	NAME	DATE	PROJECT	MICHAEL BLISS	6/27/08	MINNEHAHA CREEK RESTORATION	<p>I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.</p> <p><i>Michael Bliss</i> MICHAEL BLISS REG. NO. 41592</p>	<p>Minnehaha Creek Restoration Park Nicollet Health Services St. Louis Park, MN</p>		<p>Site Plan</p>	<p>SHEET 2 of 28</p>
NO.	DATE	BY	REVISION																										
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Minnehaha Reach 20 Restoration MCWD St. Paul, MN

SUGGESTED GENERAL CONSTRUCTION SEQUENCING

1.0 MOBILIZATION:

- 1.1 INSTALL SILT FENCE ALONG TEMPORARY HAUL ROADS AND ALONG EXISTING CHANNEL WHERE NEW CHANNEL CONSTRUCTION OR GRADING DISTURBANCE WILL OCCUR.
- 1.2 REMOVE AND SALVAGE SOD MATS FROM SITE AS DIRECTED BY OWNER'S REPRESENTATIVE FOR USE DURING REVEGETATION.
- 1.3 CLEAR AND GRUB TREES AND SHRUBS DISTURBED BY NEW CHANNEL GRADING. PRESERVE EXISTING TREES WHEREVER POSSIBLE. SEE SPECIFICATIONS. TREES TO BE SALVAGED FOR LARGE WOOD PLACEMENT SHALL BE MARKED IN FIELD BY OWNER'S REPRESENTATIVE.
- 1.4 INSTALL TEMPORARY ACCESS ROADS AS NEEDED PER CURRENT CONDITIONS. LOCATE TEMPORARY ACCESS ROADS IN THE PROPOSED CHANNEL FOOTPRINT TO MINIMIZE DISTURBANCE TO EXISTING WETLANDS.

2.0 CHANNEL AND FLOODPLAIN CONSTRUCTION:

- 2.1 PERFORM CHANNEL CONSTRUCTION IN AN UPSTREAM TO DOWNSTREAM SEQUENCE. BEGIN WITH CHANNEL RECONSTRUCTION OF SEGMENT A-B, THEN C-D, BANK STABILIZATION AT E, AND CHANNEL RECONSTRUCTION AT F-G, THEN H-I.
- 2.2 PRIOR TO BEGINNING WORK IN EACH SEGMENT, INSTALL TEMPORARY CONTROLS TO ENSURE WORK AREA IS EXCLUDED FROM ACTIVE FLOW AND AS DRY AS POSSIBLE. EARTHEN BERMS USED TO EXCLUDE FLOW BETWEEN EXISTING CHANNEL AND NEW CHANNEL CONSTRUCTION MUST BE A MINIMUM OF 10 FT. SILT FENCE SHALL BE USED TO SEPARATE TEMPORARY SPOILS AREAS FROM ACTIVE CHANNEL.
- 2.3 COMPLETE ALL EXCAVATION AND BANK WORK IN NEW CHANNEL, INCLUDING SEEDING AND PLANTING BELOW THE TOP OF BANK. INSTALL AND MAINTAIN SILT FENCE IN TEMPORARY SPOILS AREAS.
- 2.4 INSPECT WORK FOR COMPLETENESS WITH OWNER'S REPRESENTATIVE. REMOVE THE DOWNSTREAM BERM THEN UPSTREAM BERM ALLOWING ACTIVE FLOW INTO NEW CHANNEL.

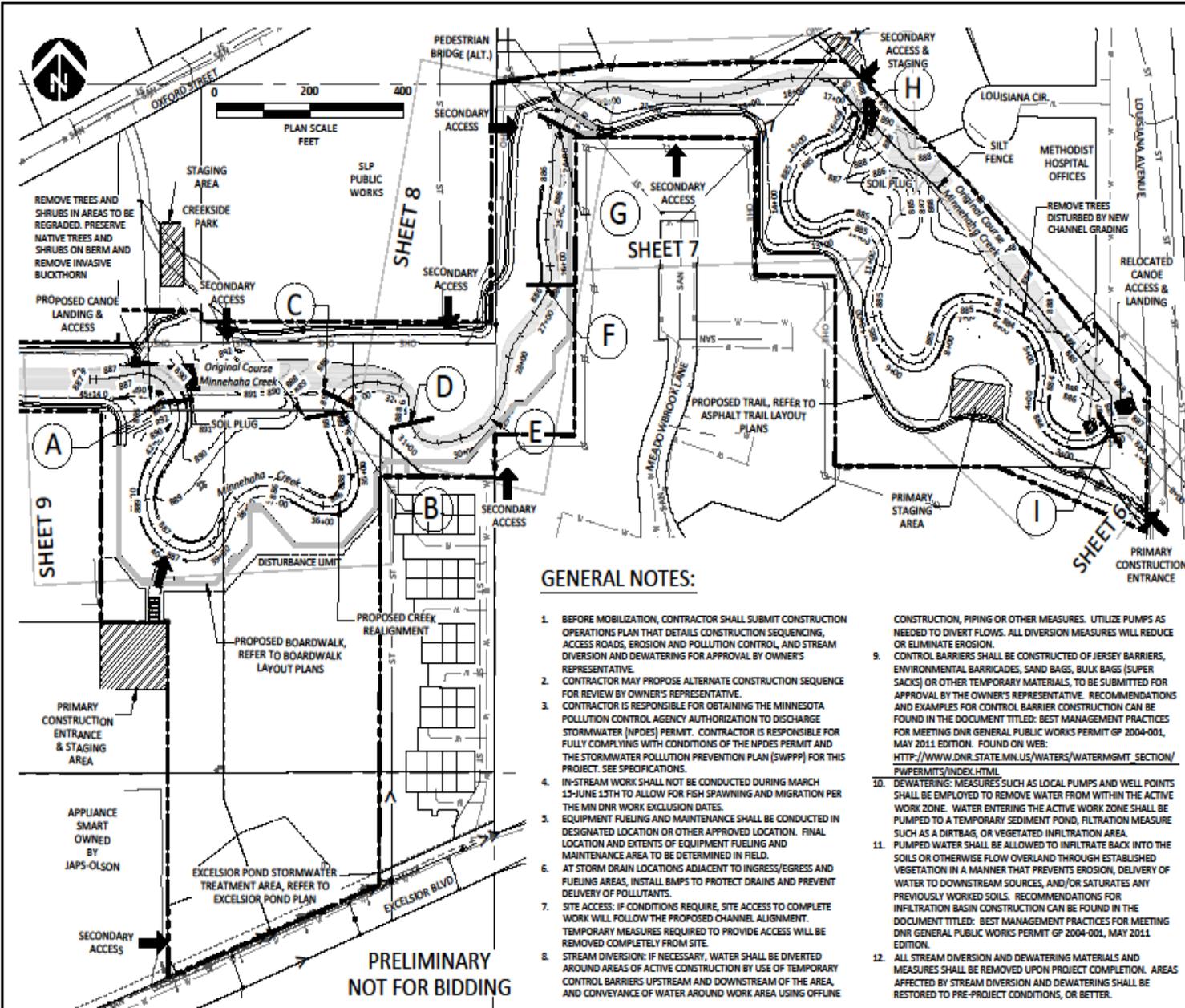
- 2.5 FILL OLD CHANNEL AS NOTED IN PLANS. INSPECT WORK FOR COMPLETENESS WITH OWNER'S REPRESENTATIVE.

3.0 STORMWATER BMP'S, TRAILS & STRUCTURES:

- 3.1 CONSTRUCT STORMWATER BMP'S (REFER BMP SHEETS FOR EROSION CONTROL AND CONSTRUCTION SEQUENCE NOTES). EXCAVATE AND DISPOSE SOILS IN EXISTING CHANNEL AND OTHER DESIGN FEATURES UNTIL DESIGN GRADES ARE ACHIEVED. DISPOSE EXCESS SOILS OFF-SITE.
- 3.2 CONSTRUCT CANOE LAUNCHES (BASE BID)
- 3.3 CONSTRUCT NEW BOARDWALK (BASE BID)
- 3.4 CONSTRUCT PEDESTRIAN BRIDGE (ADD ALTERNATE)
- 3.5 CONSTRUCT ASPHALT PATH (ADD ALTERNATE)

4.0 DEMOBILIZATION

- 4.1 DECOMMISSION HAUL ROADS AND RESTORE REMAINING DISTURBED AREAS TO PRE-PROJECT CONDITION.
- 4.2 REMOVE REMAINING SILT FENCE ALONG NEW AND EXISTING CHANNELS
- 4.3 REMOVE REMAINING EROSION CONTROL MEASURES.



GENERAL NOTES:

1. BEFORE MOBILIZATION, CONTRACTOR SHALL SUBMIT CONSTRUCTION OPERATIONS PLAN THAT DETAILS CONSTRUCTION SEQUENCING, ACCESS ROADS, EROSION AND POLLUTION CONTROL, AND STREAM DIVERSION AND DEWATERING FOR APPROVAL BY OWNER'S REPRESENTATIVE.
2. CONTRACTOR MAY PROPOSE ALTERNATE CONSTRUCTION SEQUENCE FOR REVIEW BY OWNER'S REPRESENTATIVE.
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE MINNESOTA POLLUTION CONTROL AGENCY AUTHORIZATION TO DISCHARGE STORMWATER (NPDES) PERMIT. CONTRACTOR IS RESPONSIBLE FOR FULLY COMPLYING WITH CONDITIONS OF THE NPDES PERMIT AND THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR THIS PROJECT. SEE SPECIFICATIONS.
4. IN-STREAM WORK SHALL NOT BE CONDUCTED DURING MARCH 15-JUNE 15TH TO ALLOW FOR FISH SPAWNING AND MIGRATION PER THE MN DNR WORK EXCLUSION DATES.
5. EQUIPMENT FUELING AND MAINTENANCE SHALL BE CONDUCTED IN DESIGNATED LOCATION OR OTHER APPROVED LOCATION. FINAL LOCATION AND EXTENTS OF EQUIPMENT FUELING AND MAINTENANCE AREA TO BE DETERMINED IN FIELD.
6. AT STORM DRAIN LOCATIONS ADJACENT TO INGRESS/EGRESS AND FUELING AREAS, INSTALL BMP'S TO PROTECT DRAINS AND PREVENT DELIVERY OF POLLUTANTS.
7. SITE ACCESS: IF CONDITIONS REQUIRE, SITE ACCESS TO COMPLETE WORK WILL FOLLOW THE PROPOSED CHANNEL ALIGNMENT. TEMPORARY MEASURES REQUIRED TO PROVIDE ACCESS WILL BE REMOVED COMPLETELY FROM SITE.
8. STREAM DIVERSION: IF NECESSARY, WATER SHALL BE DIVERTED AROUND AREAS OF ACTIVE CONSTRUCTION BY USE OF TEMPORARY CONTROL BARRIERS UPSTREAM AND DOWNSTREAM OF THE AREA, AND CONVEYANCE OF WATER AROUND WORK AREA USING OFFLINE

- CONSTRUCTION, PIPING OR OTHER MEASURES. UTILIZE PUMPS AS NEEDED TO DIVERT FLOWS. ALL DIVERSION MEASURES WILL REDUCE OR ELIMINATE EROSION.
9. CONTROL BARRIERS SHALL BE CONSTRUCTED OF JERSEY BARRIERS, ENVIRONMENTAL BARRICADES, SAND BAGS, BULK BAGS (SUPER SACKS) OR OTHER TEMPORARY MATERIALS, TO BE SUBMITTED FOR APPROVAL BY THE OWNER'S REPRESENTATIVE. RECOMMENDATIONS AND EXAMPLES FOR CONTROL BARRIER CONSTRUCTION CAN BE FOUND IN THE DOCUMENT TITLED: BEST MANAGEMENT PRACTICES FOR MEETING DNR GENERAL PUBLIC WORKS PERMIT GP 2004-001, MAY 2011 EDITION. FOUND ON WEB: [HTTP://WWW.DNR.STATE.MN.US/WATERS/WATERMGMT_SECTION/PWPERMITS/INDEX.HTML](http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/index.html)
10. DEWATERING: MEASURES SUCH AS LOCAL PUMPS AND WELL POINTS SHALL BE EMPLOYED TO REMOVE WATER FROM WITHIN THE ACTIVE WORK ZONE. WATER ENTERING THE ACTIVE WORK ZONE SHALL BE PUMPED TO A TEMPORARY SEDIMENT POND, FILTRATION MEASURE SUCH AS A DIRT BAG, OR VEGETATED INFILTRATION AREA.
11. PUMPED WATER SHALL BE ALLOWED TO INFILTRATE BACK INTO THE SOILS OR OTHERWISE FLOW OVERLAND THROUGH ESTABLISHED VEGETATION IN A MANNER THAT PREVENTS EROSION, DELIVERY OF WATER TO DOWNSTREAM SOURCES, AND/OR SATURATES ANY PREVIOUSLY WORKED SOILS. RECOMMENDATIONS FOR INFILTRATION BASIN CONSTRUCTION CAN BE FOUND IN THE DOCUMENT TITLED: BEST MANAGEMENT PRACTICES FOR MEETING DNR GENERAL PUBLIC WORKS PERMIT GP 2004-001, MAY 2011 EDITION.
12. ALL STREAM DIVERSION AND DEWATERING MATERIALS AND MEASURES SHALL BE REMOVED UPON PROJECT COMPLETION. AREAS AFFECTED BY STREAM DIVERSION AND DEWATERING SHALL BE RESTORED TO PRE-PROJECT CONDITIONS, OR BETTER.

PRELIMINARY
NOT FOR BIDDING

NO.	BY	DATE	REVISION DESCRIPTION
1	SLP	07/26/12	ISSUE FOR PERMIT
2	SLP	07/26/12	REVISED

SI	LB	BL	SI	AS
DRAWN	DESIGNED	CHECKED	APPROVED	DATE
X				07/26/12

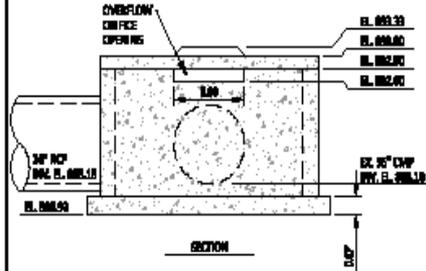
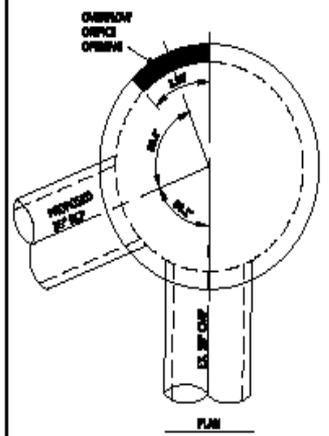
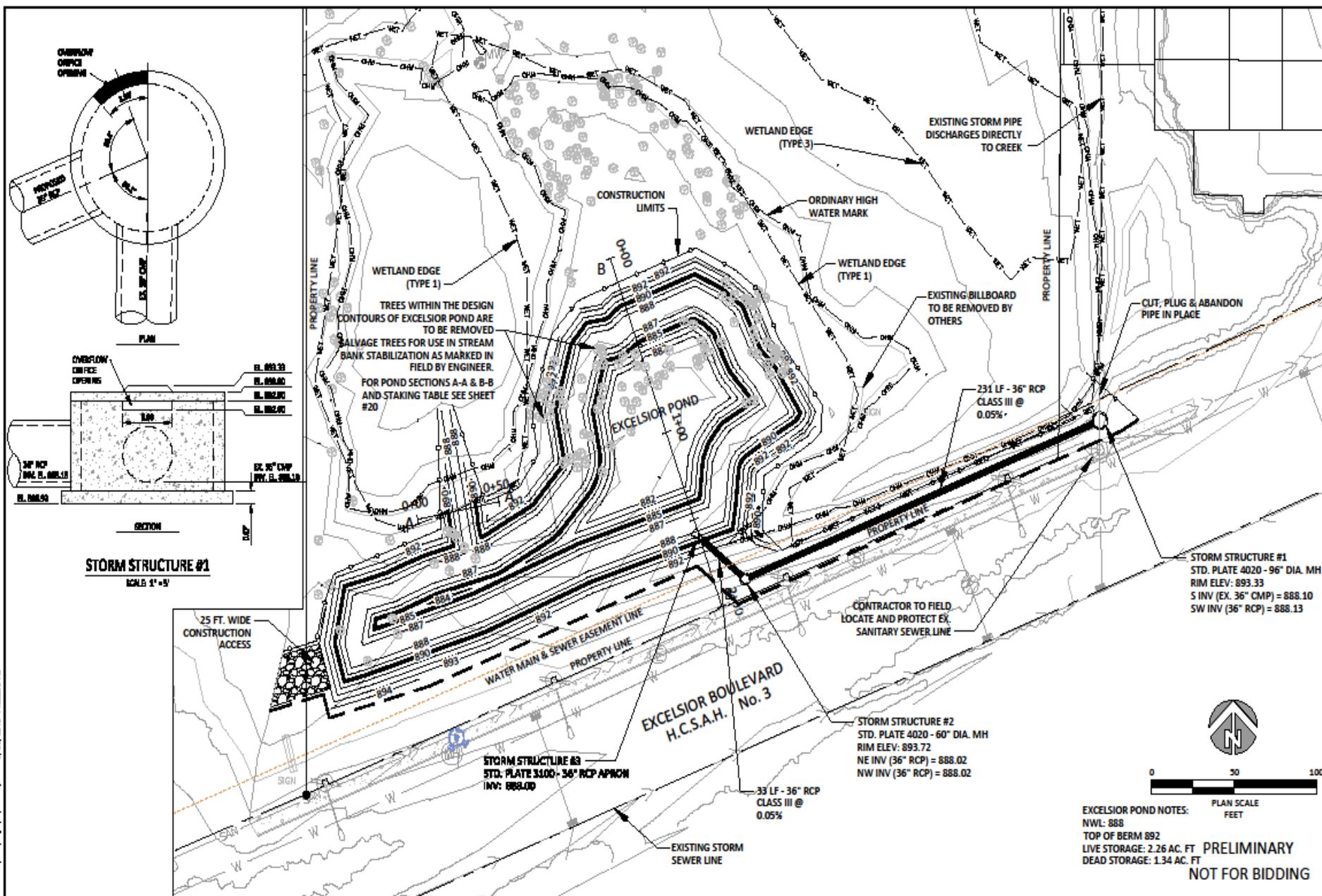
Minnehaha Reach 20 Restoration
Minnehaha Creek Watershed District
St. Louis Park, MN



310 E. Lakefront St., Suite 200
Minneapolis, MN 55401
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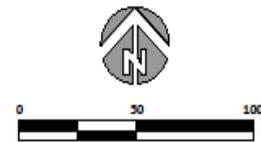


CONSTRUCTION SEQUENCE
& EROSION CONTROL PLAN



STORM STRUCTURE #1
 SCALE 1" = 4'

25 FT. WIDE CONSTRUCTION ACCESS

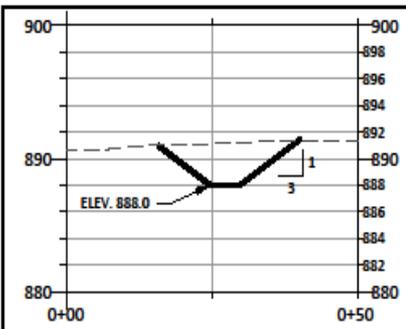


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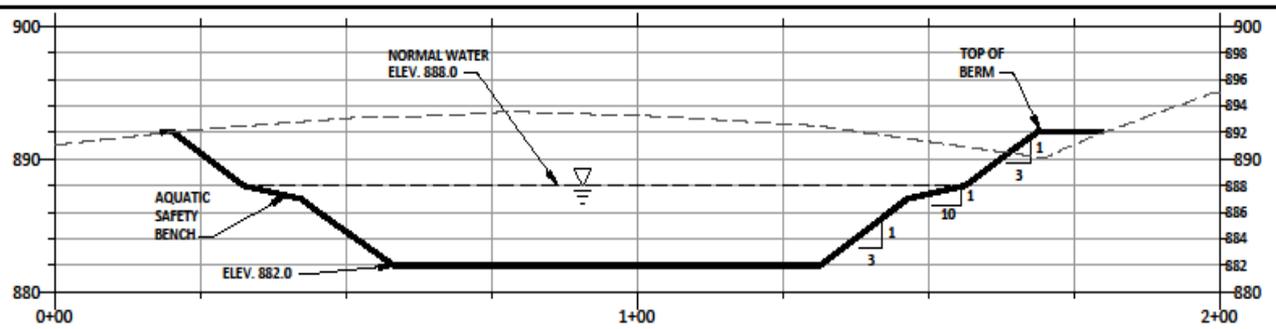
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JK	7/26/12	
APPROVED	DATE	PROJECT

Minnehaha Reach 20 Restoration
 Minnehaha Creek Watershed District
 St. Louis Park, MN

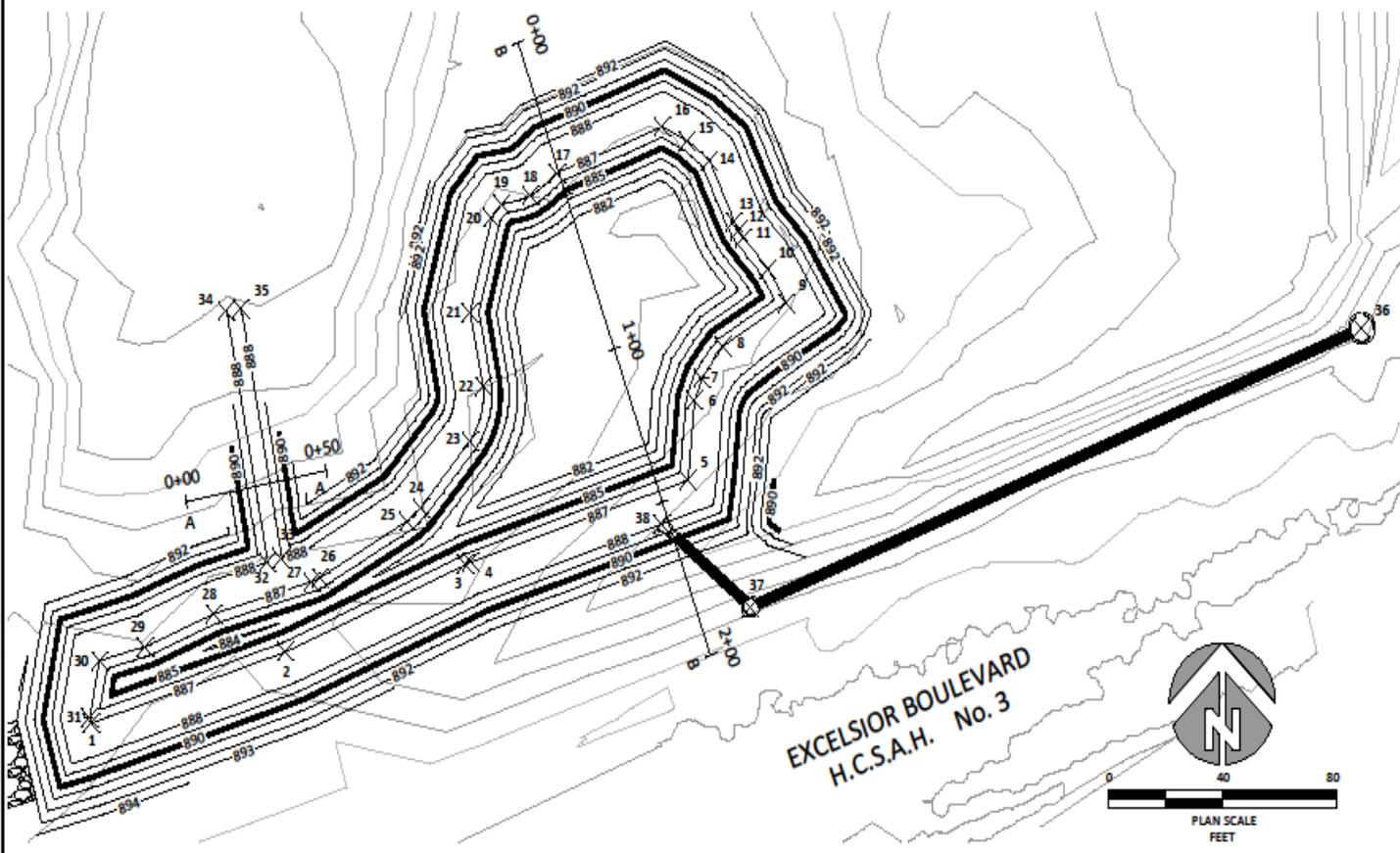
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 Minneapolis, MN 55407
 612-441-0599
 info@fiberfluve.com



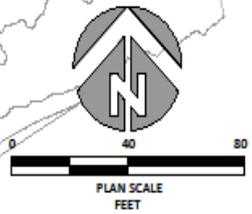
EXCELSIOR POND OUTLET SECTION A-A
HORIZONTAL SCALE 1" = 25'
VERTICAL EXAGGERATION IS 2:1



EXCELSIOR POND BASIN SECTION B-B
HORIZONTAL SCALE 1" = 25'
VERTICAL EXAGGERATION IS 2:1



POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
1	149544.7796	502611.2384	887.00
2	149566.7580	502679.4125	887.00
3	149583.5164	502762.4442	887.00
4	149584.3147	502744.3804	887.00
5	149613.4663	502820.2174	887.00
6	149644.0321	502822.6295	887.00
7	149650.9865	502825.2372	887.00
8	149660.5554	502832.6947	887.00
9	149673.8254	502854.6963	887.00
10	149684.1845	502848.3892	887.00
11	149693.8077	502839.7904	887.00
12	149696.1067	502838.0076	887.00
13	149698.6722	502836.5762	887.00
14	149717.6361	502827.7961	887.00
15	149723.6566	502820.0653	887.00
16	149727.9232	502811.3095	887.00
17	149713.8261	502774.6164	887.00
18	149706.7734	502765.1814	887.00
19	149704.2817	502755.0987	887.00
20	149700.1066	502751.6870	887.00
21	149671.0391	502744.0714	887.00
22	149648.2717	502748.5224	887.00
23	149631.5162	502744.1632	887.00
24	149610.9640	502726.8938	887.00
25	149606.8643	502722.2040	887.00
26	149586.3203	502691.5345	887.00
27	149588.2038	502688.6423	887.00
28	149578.2573	502654.2326	887.00
29	149568.1855	502630.1722	887.00
30	149563.8803	502614.1191	887.00
31	149546.5181	502610.7497	887.00
32	149584.1305	502673.0936	888.00
33	149595.5620	502677.9777	888.00
34	149671.4253	502658.7201	888.00
35	149672.1444	502663.7387	888.00
36	149666.1423	502656.5461	893.33
37	149580.4571	502842.2988	893.72
38	149606.0136	502811.2159	888.00



EXCELSIOR BOULEVARD
H.C.S.A.H. No. 3

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NO.	BY	DATE	REVISION DESCRIPTION

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APPROVED	DATE	PROJECT

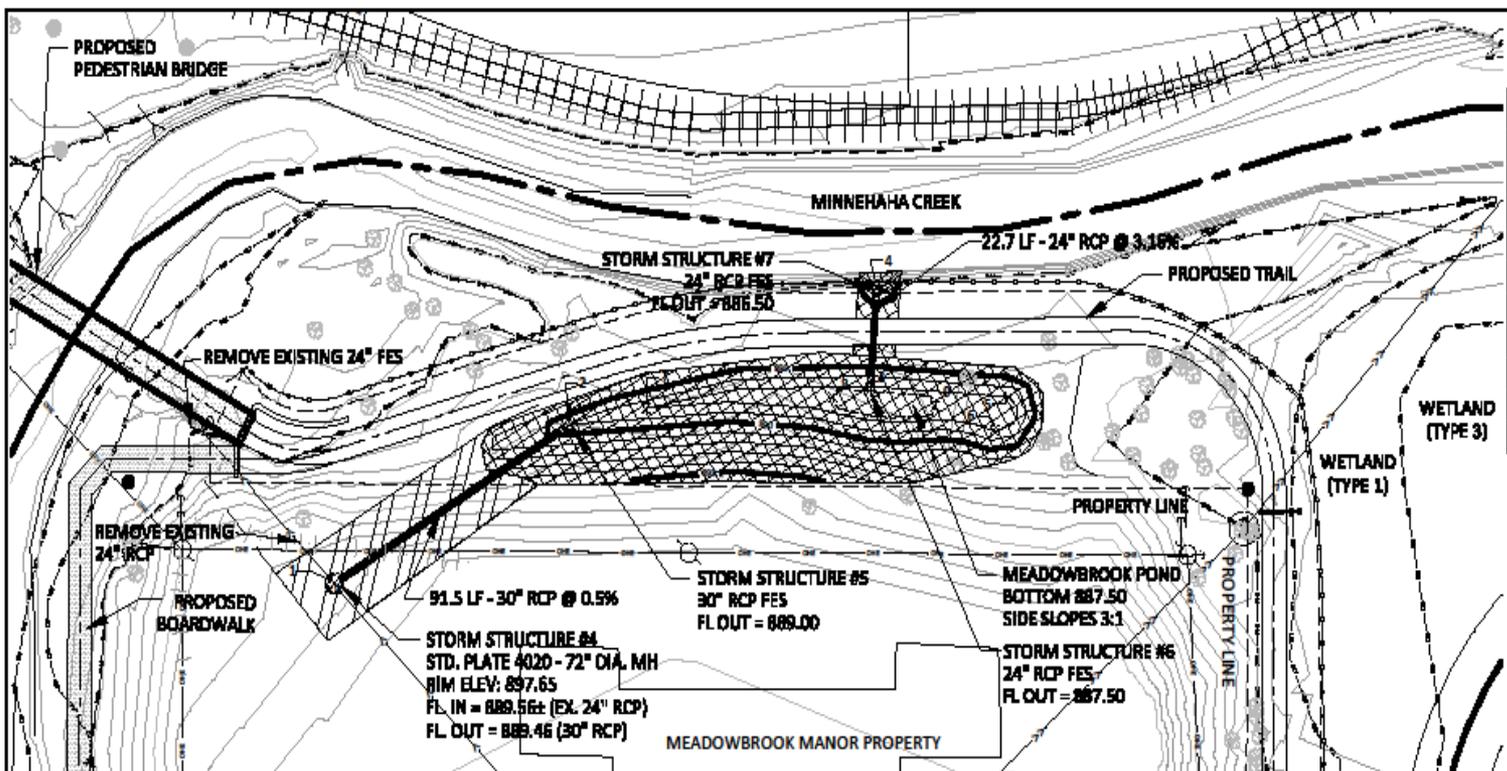
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307 S. Cleveland St., Suite 200
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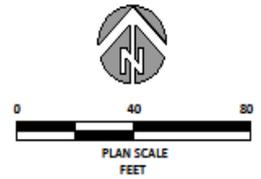
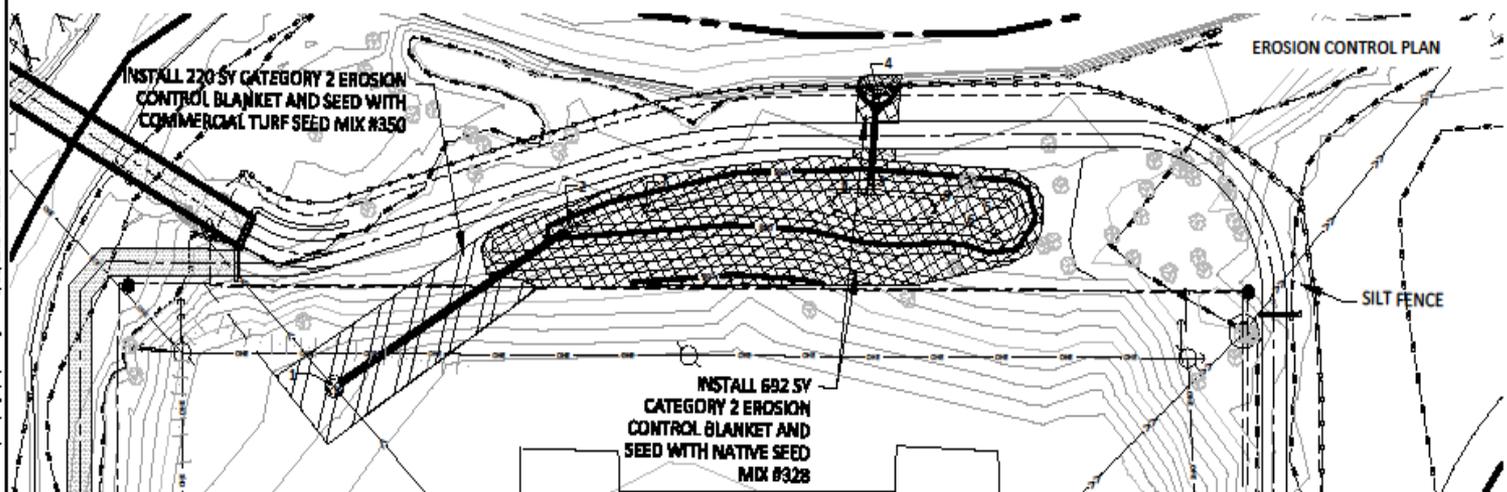
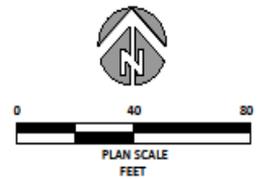


EXCELSIOR POND DETAILS

PRELIMINARY
NOT FOR BIDDING



POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
1	151028.37	503525.98	889.50
2	151076.43	503606.78	889.00
3	151086.31	503709.14	887.50
4	151117.83	503711.52	887.00
5	151084.55	503756.87	888.00
6	151074.46	503751.66	888.00
7	151081.17	503632.49	888.00
8	151084.36	503696.56	887.50
9	151081.96	503731.54	887.50



PRELIMINARY
NOT FOR BIDDING

NO.	BY	DATE	REVISION DESCRIPTION

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DRAWN	DESIGNED	CHECKED
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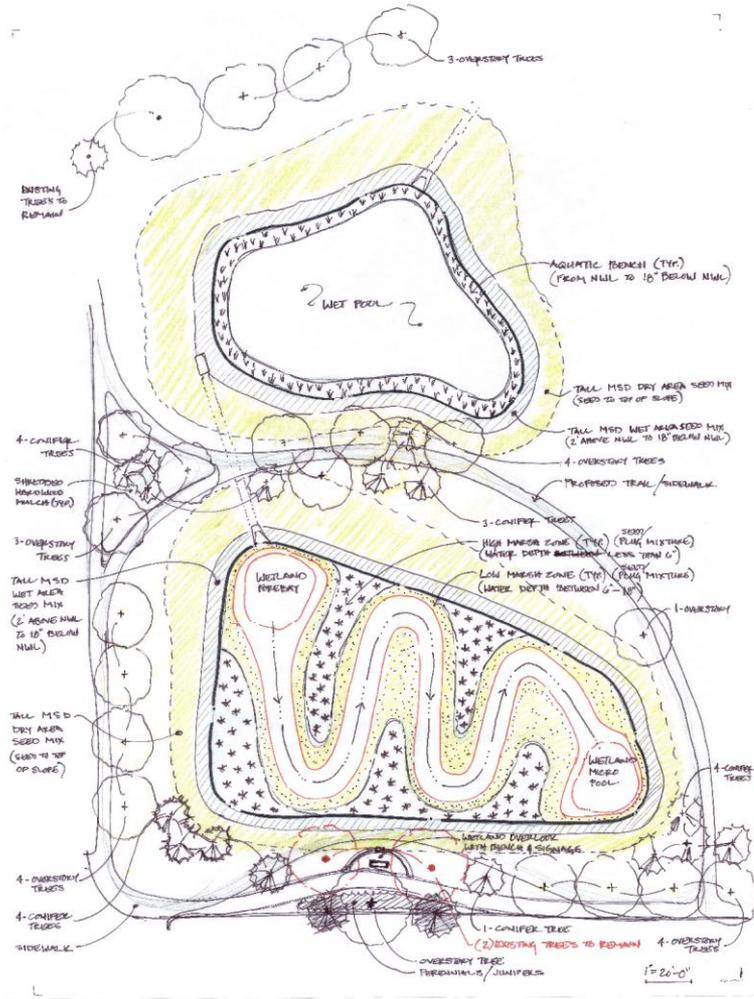
MEADOWBROOK POND PLAN



Route 109 – Wet Pond Wildwood, MO



Shakelford Road, MO

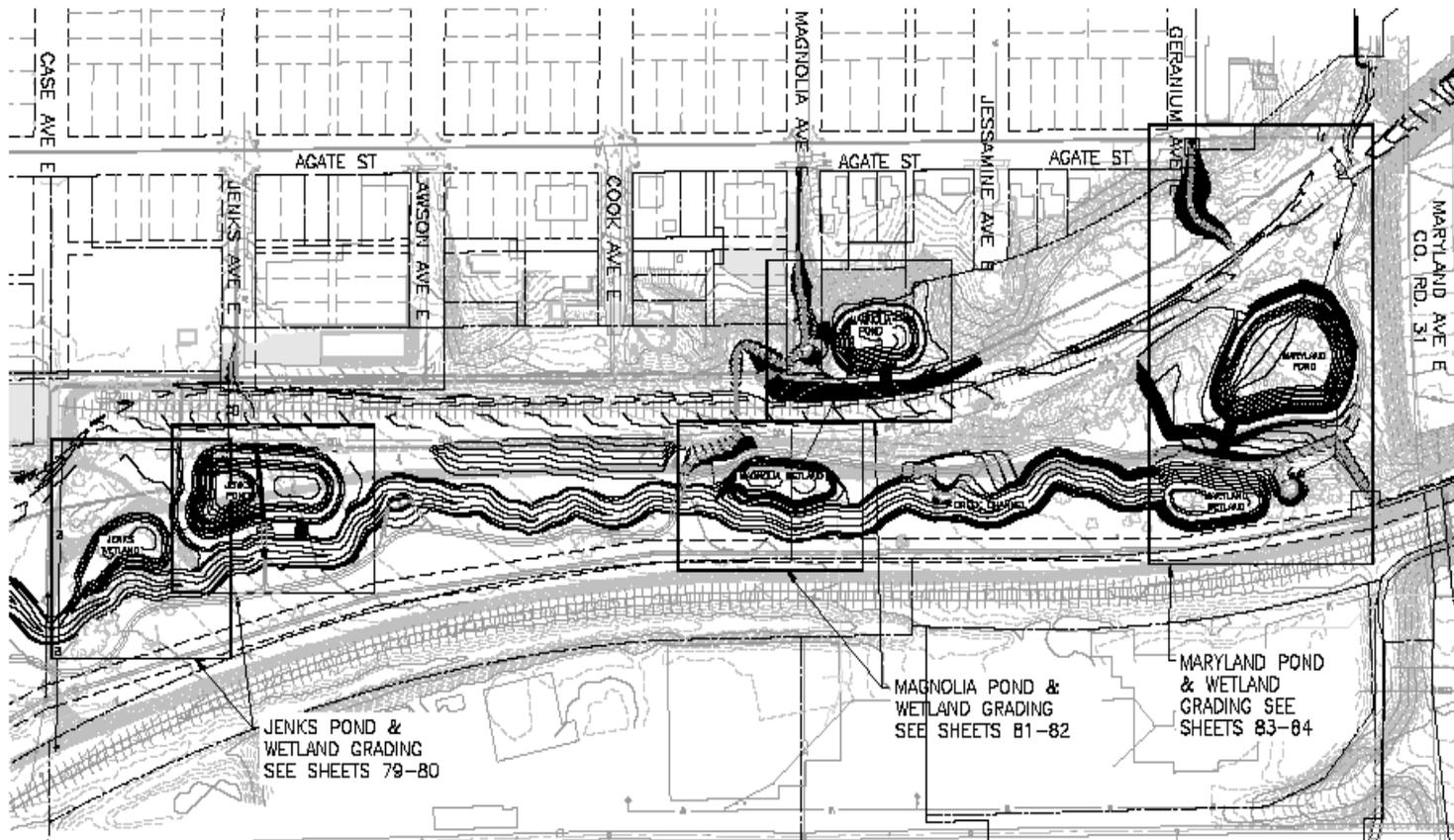




Spellman Wet Pond Crestwood, MO



Trout Brook St. Paul, MN



DRAWN BY: AJC
 APPROVED: _____
 DATE: 4/28/2013 3:18:01 PM
 CAD FILE: Q:\2011\9772\245\Drawings\01_S1.dwg

NO.	DATE	BY	REVISION DESCRIPTION

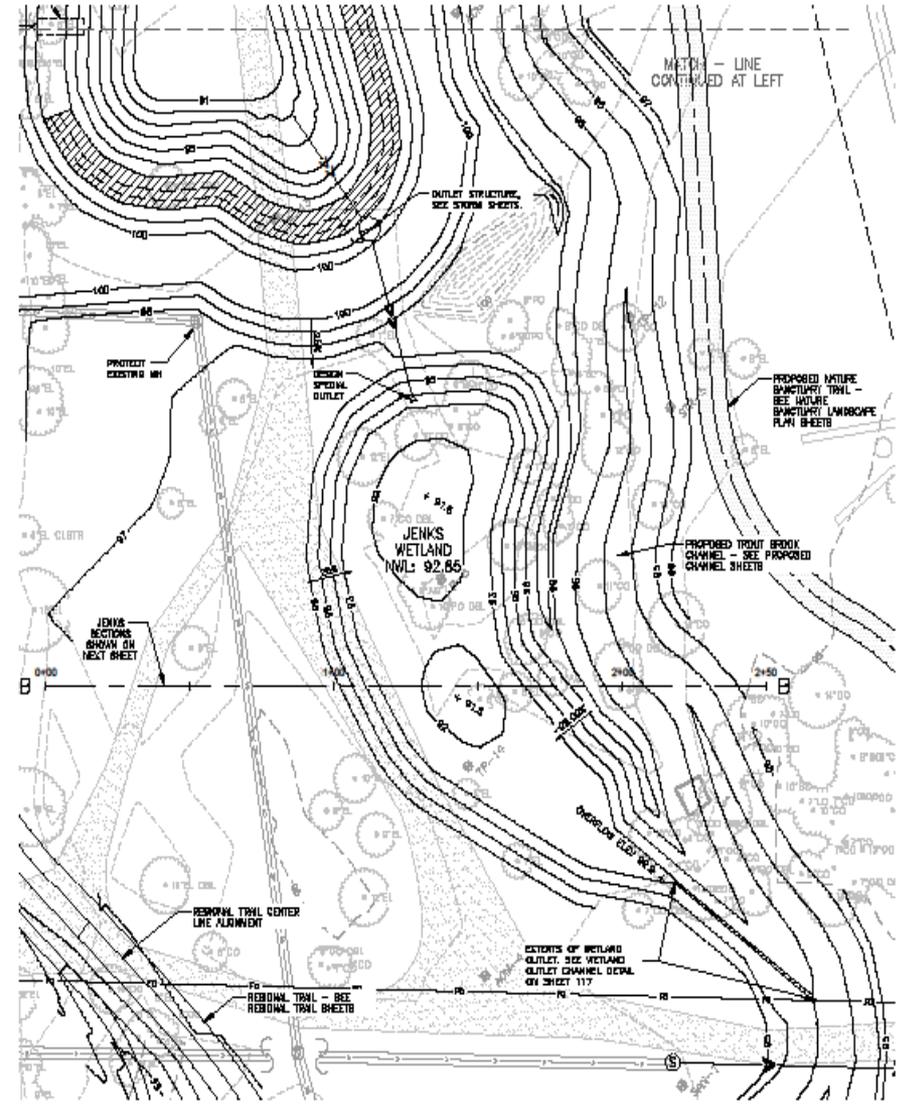
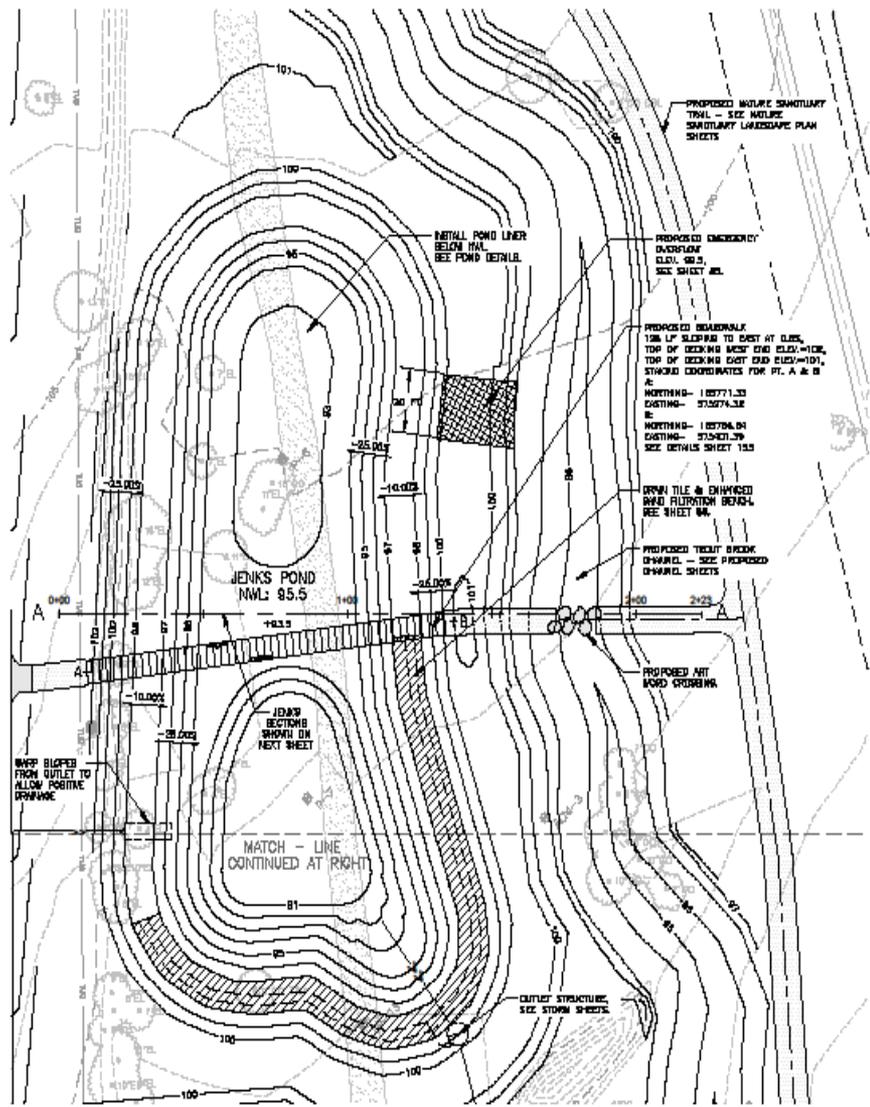
I HEREBY CERTIFY THAT THE PLANS SUBMITTED BY ME OR MY EMPLOYER
 IN ACCORDANCE WITH THE PROFESSIONAL ENGINEERING ACT AND THE
 PROFESSIONAL ENGINEERING BOARD OF THE STATE OF MINNESOTA.
 SIGNATURE: *[Signature]*
 DATE: 04-27-2013



TROUT BROOK REGIONAL TRAIL AND
 NATURE SANCTUARY
 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

OVERVIEW OF POND & WETLAND SITE PLAN
 S.P. 164-090-013

SHEET NO.
 78 OF 153



1 JENKS POND
SCALE

2 JENKS WETLAND
SCALE

OWNER: JLC	JOB DATE: 05/13
APPROVED: JLC	JOB NUMBER: 324110772
GRID DATE: 4/28/2013 3:25:12 PM	
GRID FILE: 60-31150723.SXD	Drawn: JLC, G. J. G. J. G.

NO.	DATE	BY	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THE PLANS SUBMITTED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

ENGINEER: *[Signature]*
 DATE: 05-03-2013 10:57:04 AM REG. NO. 43146



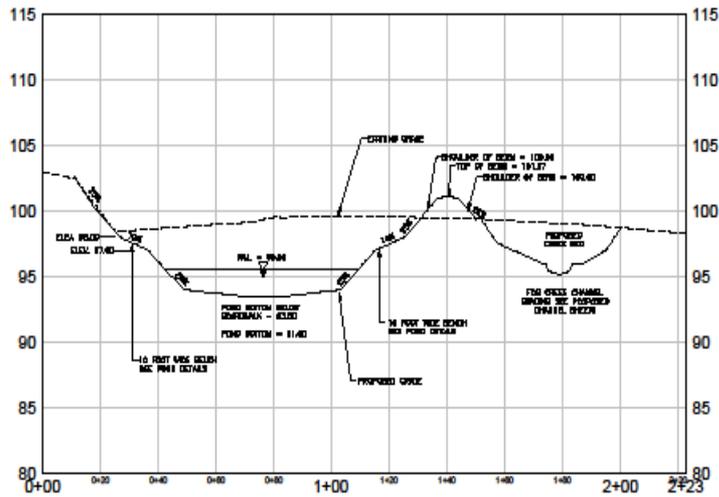
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 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

JENKS POND & WETLAND DETAILS
 S.P. 184-090-013

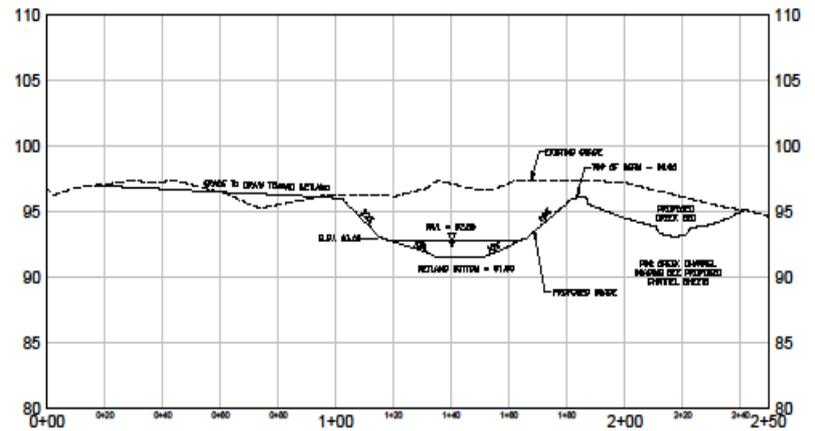
SHEET NO.
 79 OF 153

SECTION A-A



JENKS POND

SECTION B-B



JENKS WETLAND

NOTES:

1. SEE PREVIOUS SHEET FOR SECTION LOCATIONS.



VERTICAL EXAGGERATION 8 X

DRAWN BY: JAC	JOB DATE: 2013
APPROVED: JAC	JOB NUMBER: 320119772
DATE: 1/28/2013 3:26:00 PM	
DATE PLO: 01/30/2013 12:42:00 PM	

NO.	DATE	BY	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THE PLANS AND SPECIFICATIONS HEREON WERE PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: *[Signature]*
 DATE: 02-01-2013 2:07:00 PM PER NO. 4410M



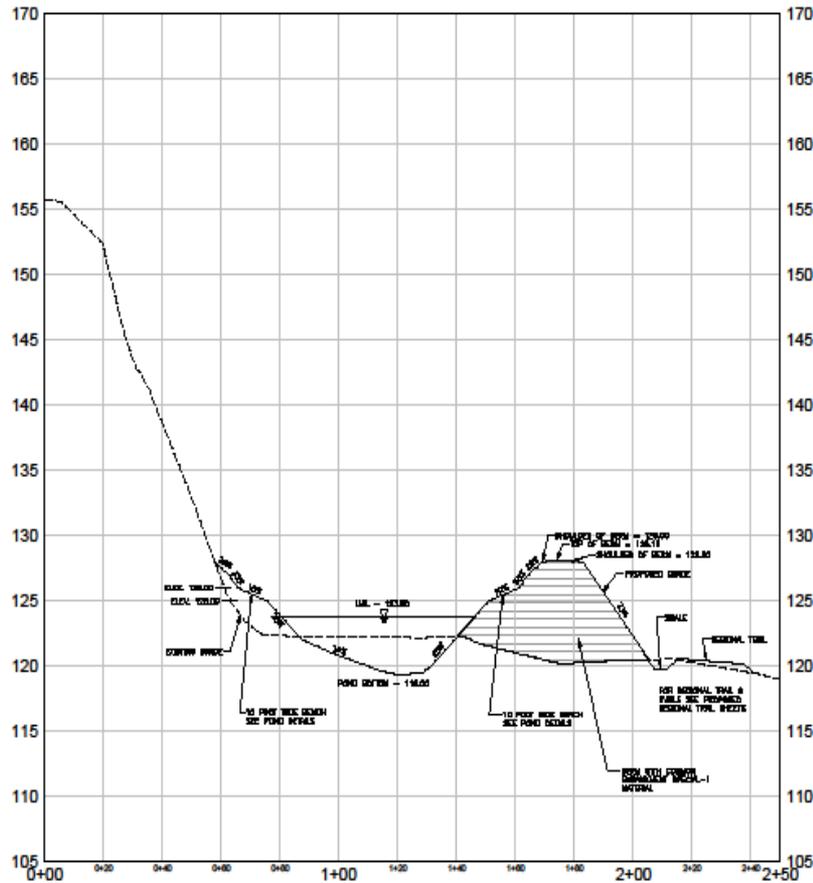
HRGreen.com

TROUT BROOK REGIONAL TRAIL AND NATURE SANCTUARY
 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

JENKS SECTIONS
 S.P. 164-090-013

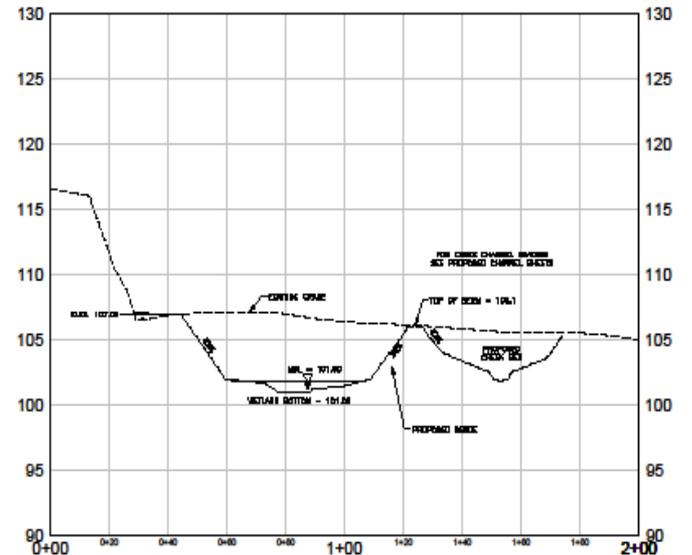
SHEET NO.
 80 OF 153

SECTION C-C



MAGNOLIA POND

SECTION D-D



MAGNOLIA WETLAND

NOTE:
1. SEE PREVIOUS SHEET FOR SECTION LOCATIONS.



DRAWN BY: JAC
 APPROVED: JAC
 DATE: 4/28/2013 3:12:49 PM
 DWG FILE: G:\31119272\SMP\Drawings\02.dwg

NO.	DATE	BY	REVISION DESCRIPTION

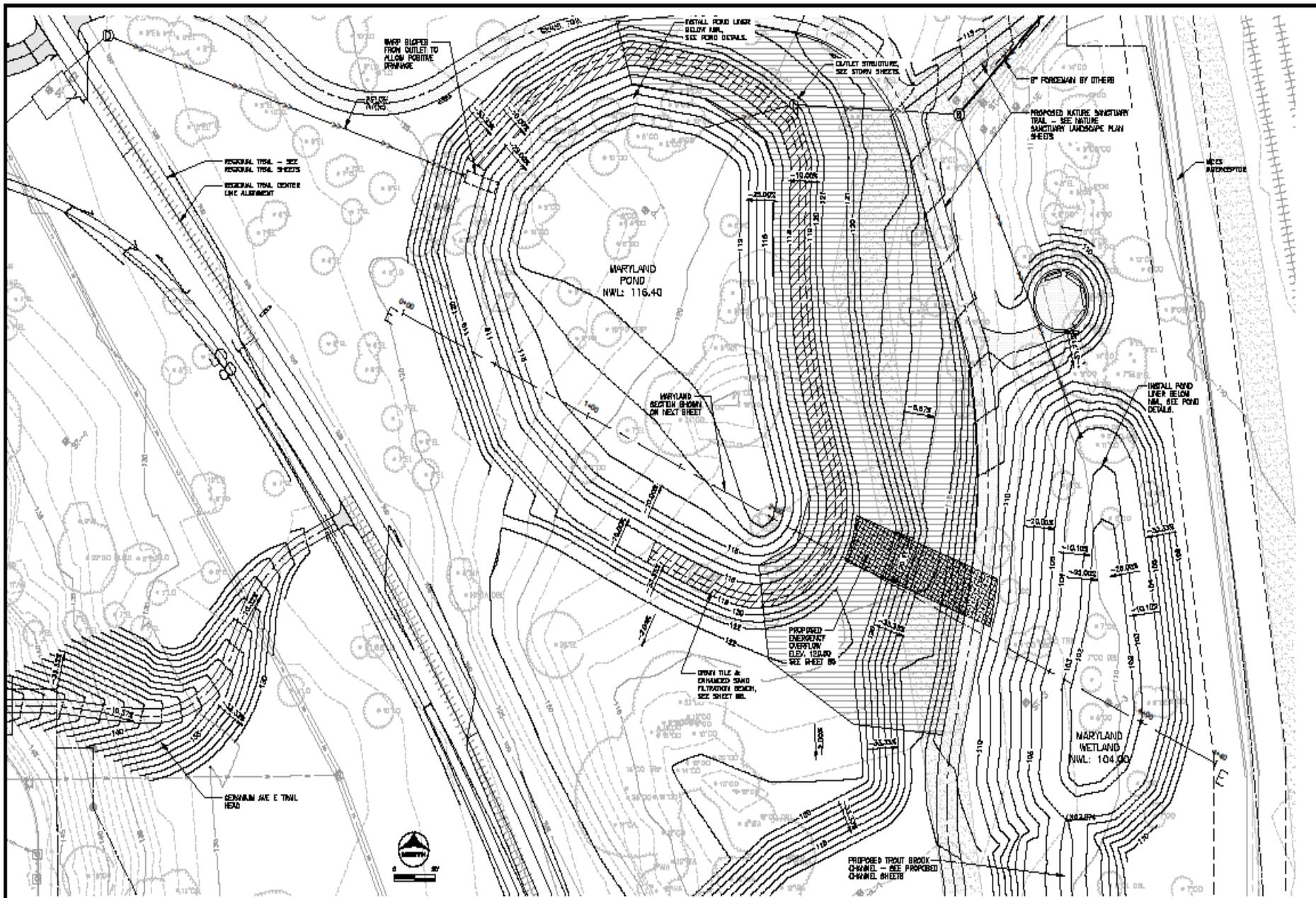
I HEREBY CERTIFY THAT THE PLANS SUBMITTED ON BEHALF OF THE CITY OF ST. PAUL ARE THE WORK OF ME OR UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
 SIGNATURE: [Signature]
 DATE: 04-27-2013
 LICENSE NO.: 42108

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 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

MAGNOLIA SECTIONS
 S.P. 184-090-013

SHEET NO.
 B2 OF 153



DESIGNED BY: JLC
 APPROVED BY: JLC
 DATE: 4/28/2013 11:26 AM
 CAD FILE: 04.20130725.SWP.DWG

NO.	DATE	BY	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
 SIGNATURE: *[Signature]*
 DATE: 04-27-2013 2:07:04 PM REG. NO.: 4114

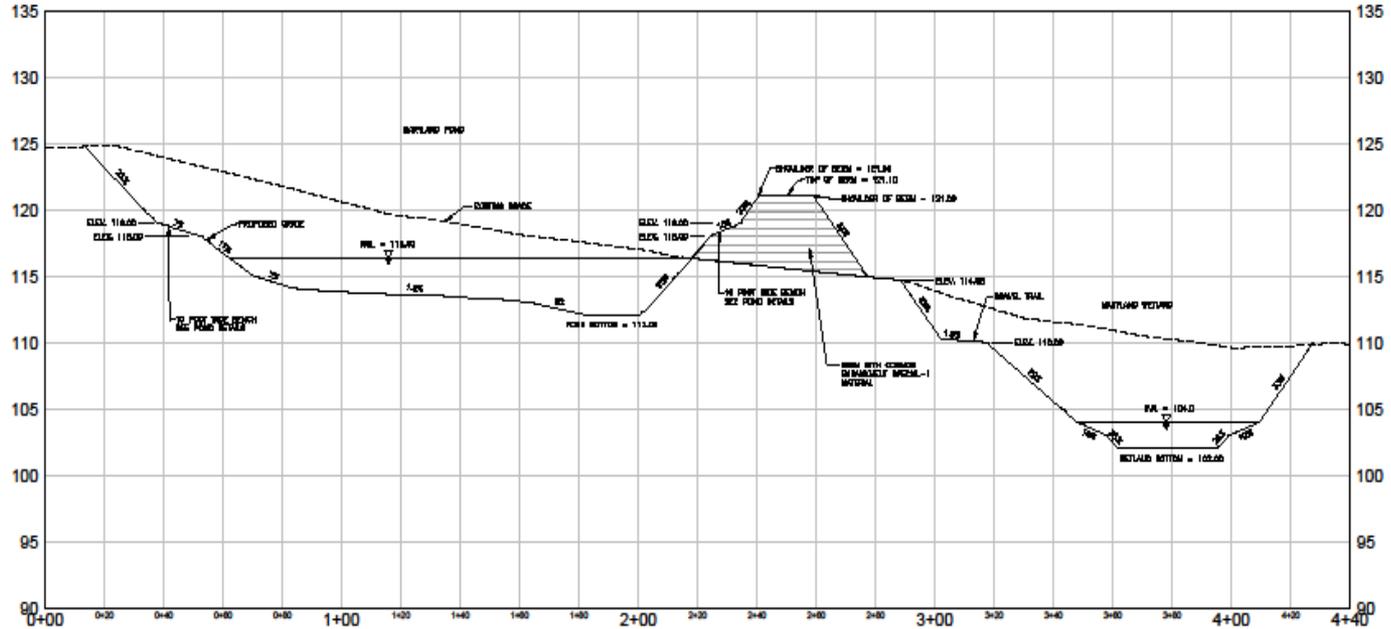

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TROUT BROOK REGIONAL TRAIL AND NATURE SANCTUARY
 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

MARYLAND POND & WETLAND DETAIL
 S.P. 164-090-013

SHEET NO.
 B3 OF 153

SECTION E-E



MARYLAND POND & WETLAND



VERTICAL DIMENSIONS IS 4'

DESIGN BY: JAC	JOB DATE: 2013
APPROVED: JAC	JOB NUMBER: 20110772
DATE: 4/29/2013 3:18:57 PM	
FILE: Q:\20110772\2013\Drawings\2013\086.dwg	

NO.	DATE	BY	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THE PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

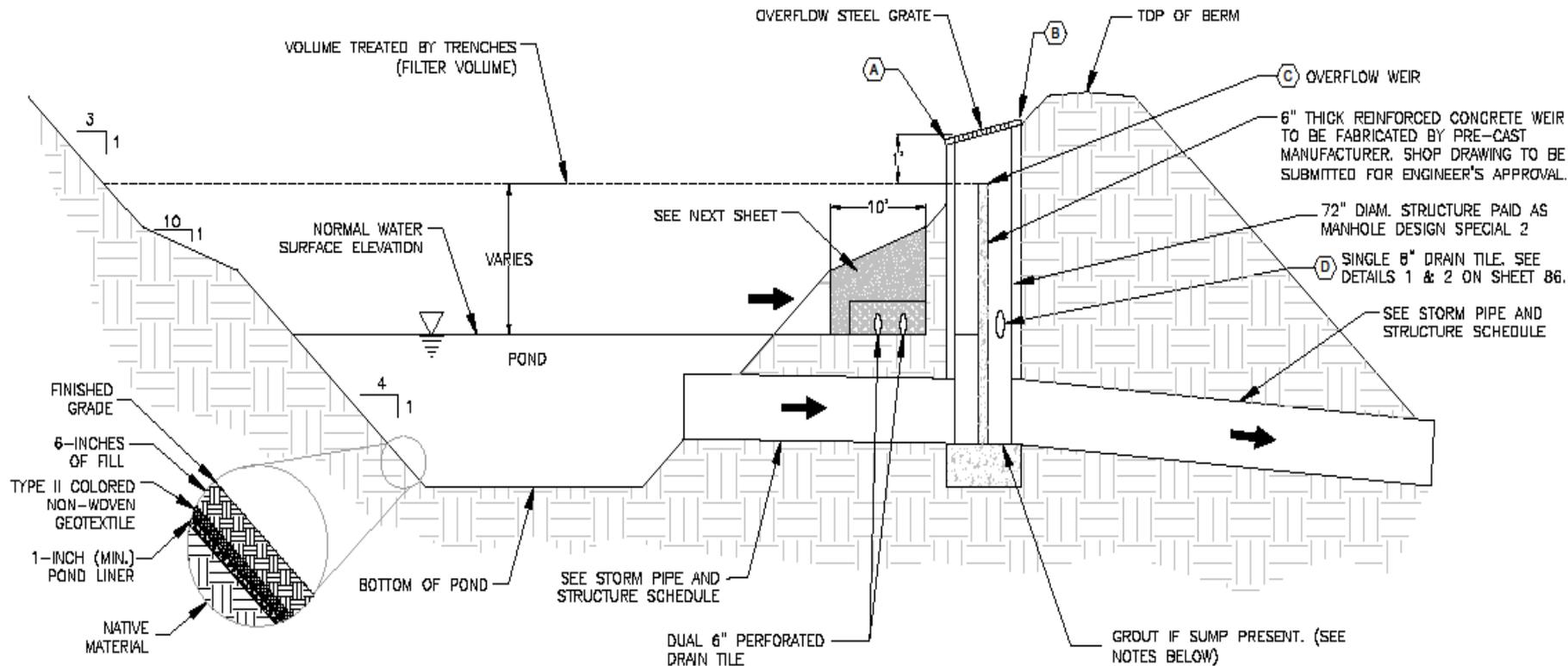
SIGNATURE: *[Signature]*
 DATE: 02-07-2013 2:00:00 PM PLS. NO. 42108



TROUT BROOK REGIONAL TRAIL AND NATURE SANCTUARY
 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

MARYLAND SECTIONS
 S.P. 164-090-013

SHEET NO.
 84 OF 153



FINISHED GRADE
 6-INCHES OF FILL
 TYPE II COLORED NON-WOVEN GEOTEXTILE
 1-INCH (MIN.) POND LINER
 NATIVE MATERIAL

VOLUME TREATED BY TRENCHES (FILTER VOLUME)

NORMAL WATER SURFACE ELEVATION

VARIES

POND

BOTTOM OF POND

SEE STORM PIPE AND STRUCTURE SCHEDULE

DUAL 6" PERFORATED DRAIN TILE

GROUT IF SUMP PRESENT. (SEE NOTES BELOW)

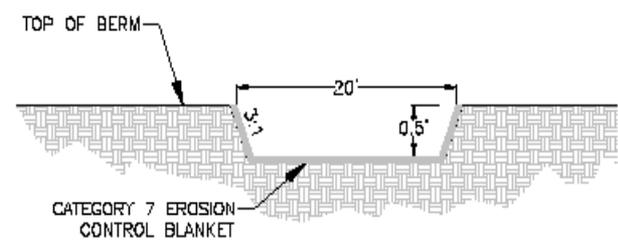
DRAIN TILE, OUTLET WEIR & PIPING POND SECTION DETAIL

SCALE: NONE, VERTICAL EXAGGERATION 4X

LETTER	VALUE	JENKS POND	MAGNOLIA POND	MARYLAND POND
(A)	ELEVATION	99	127	120
(B)	ELEVATION	99.33	127.33	120.33
(C)	ELEVATION	98	126	119
(D)	DS INVERT	95.4	123.7	116.3

NOTES:

- IF SUMP IS PRESENT BELOW OUTLET INVERT, CONTRACTOR TO FILL DOWNSTREAM PORTION OF OUTLET STRUCTURE WITH GROUT AND TROWEL FLUSH WITH INVERT ELEVATION. TIME AND MATERIAL CONSIDERED INCIDENTAL TO POND OUTLET INSTALLATION - MANHOLE DESIGN SPECIAL 2 STRUCTURES.



2 TYPICAL OF EMERGENCY OVERFLOW WEIR

SCALE: NONE, VERTICAL EXAGGERATION 8X

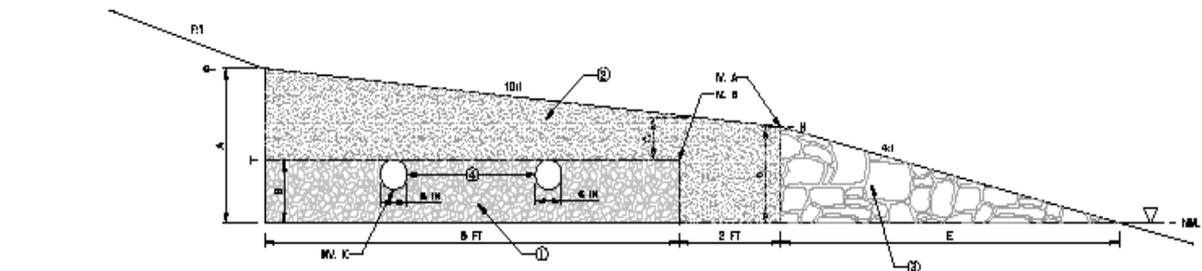
	LETTER	JENKS POND	MAGNOLIA POND	MARYLAND POND
DIMENSION	A	2.5 FT	2.2 FT	2.6 FT
	B	1 FT	9 IN	1.2 FT
	C	8 IN	8 IN	7 IN
	D	1.5 FT	1.2 FT	1.6 FT
	E	6 FT	4.8 FT	6 FT
	F	3 FT	4 FT	3 FT
ELEVATION	G	98	126	119
	H	97	125	118
	I	96.5	124.6	117.6
	J	95.5	123.8	116.4
	K	96	124.1	117.1
	L	95.5	123.8	116.4

NOTES

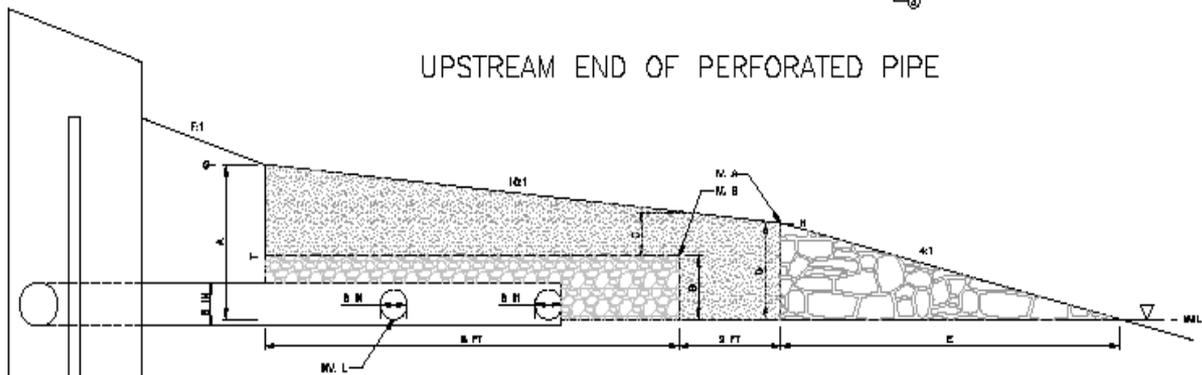
- ① WASHED COARSE FILTER AGGREGATE
- ② IRON FILINGS/FINE FILTER AGGREGATE. IRON FILINGS (5% BY WEIGHT) SHALL CONSIST OF ETI-CC-1004 (-8+50) CONNELLY GPM, INC. OR APPROVED EQUAL
- ③ 4"-8" WASHED LIMESTONE CLASS II RIP RAP WITH FINE FILTER AGGREGATE & SEED MIX SPECIAL 1
- ④ 6" PERFORATED PIPE WITH CLEANOUTS SPACED EVERY 75'-80". PIPES INSTALLED 3 FEET APART AT SPECIFIED SLOPE, BASE OF COARSE FILTER AGGREGATE REMAINS CONSTANT WITH THE NWL

CONSTRUCTION SEQUENCE:

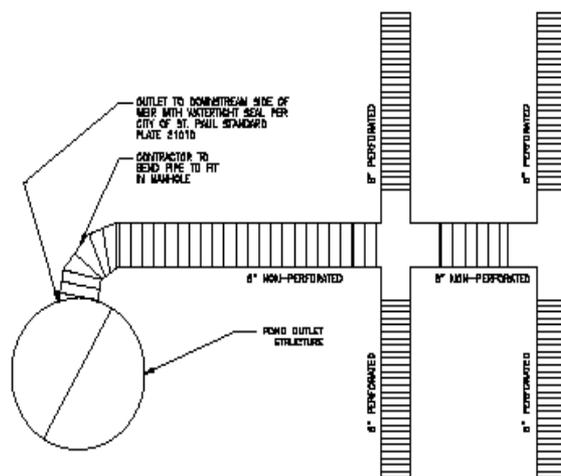
- I. EXCAVATE POND AND BENCH AND COMPACT SOIL TO 95% STANDARD PROCTOR.
- II. INSTALL 6" PERFORATED PIPES AT A 0.3% SLOPE (FOR MARYLAND POND: 0.25% FOR SOUTHERN PIPE & 0.4% FOR NORTHERN PIPE) AND CLEANOUTS. CONNECT 6" PIPES TO OUTLET STRUCTURE WITH 8" NON-PERFORATED PIPE @ 0.5% SLOPE.
- III. PLACE COARSE FILTER AGGREGATE AROUND PERFORATED PIPES.
- IV. PLACE 2 SHEETS OF TEMPORARY PLYWOOD TO SEPARATE A) LIMESTONE RIP RAP FROM IRON/FINE FILTER AGGREGATE AND B) IRON/FINE FILTER AGGREGATE FROM COARSE FILTER AGGREGATE.
- V. PLACE WASHED LIMESTONE CLASS II RIP RAP.
- VI. PLACE FINE FILTER AGGREGATE IN ALL AREAS AND SEED LIMESTONE RIP RAP W/FINE FILTER AGGREGATE WITH SEED MIX SPECIAL 1.
- VII. PLACE IRON FILINGS ON TOP OF FINE FILTER AGGREGATE. (10 TONS - JENKS, 5 TONS - MAGNOLIA, & 15 TONS - MARYLAND).
- VIII. TILL IN IRON FILINGS TO 4-INCH DEPTH USING SMALL GARDEN STYLE TILLER.
- IX. HAND MIX SIDE NEAR TEMPORARY PLYWOOD.
- X. SET TILLER DEPTH DIMENSION C ABOVE AND MIX AGAIN WITH SAME PROCESS.
- XI. REMOVE TEMPORARY PLYWOOD.
- XII. RAKE SAND/IRON SURFACE SMOOTH TO A 10:1 SLOPE.



UPSTREAM END OF PERFORATED PIPE

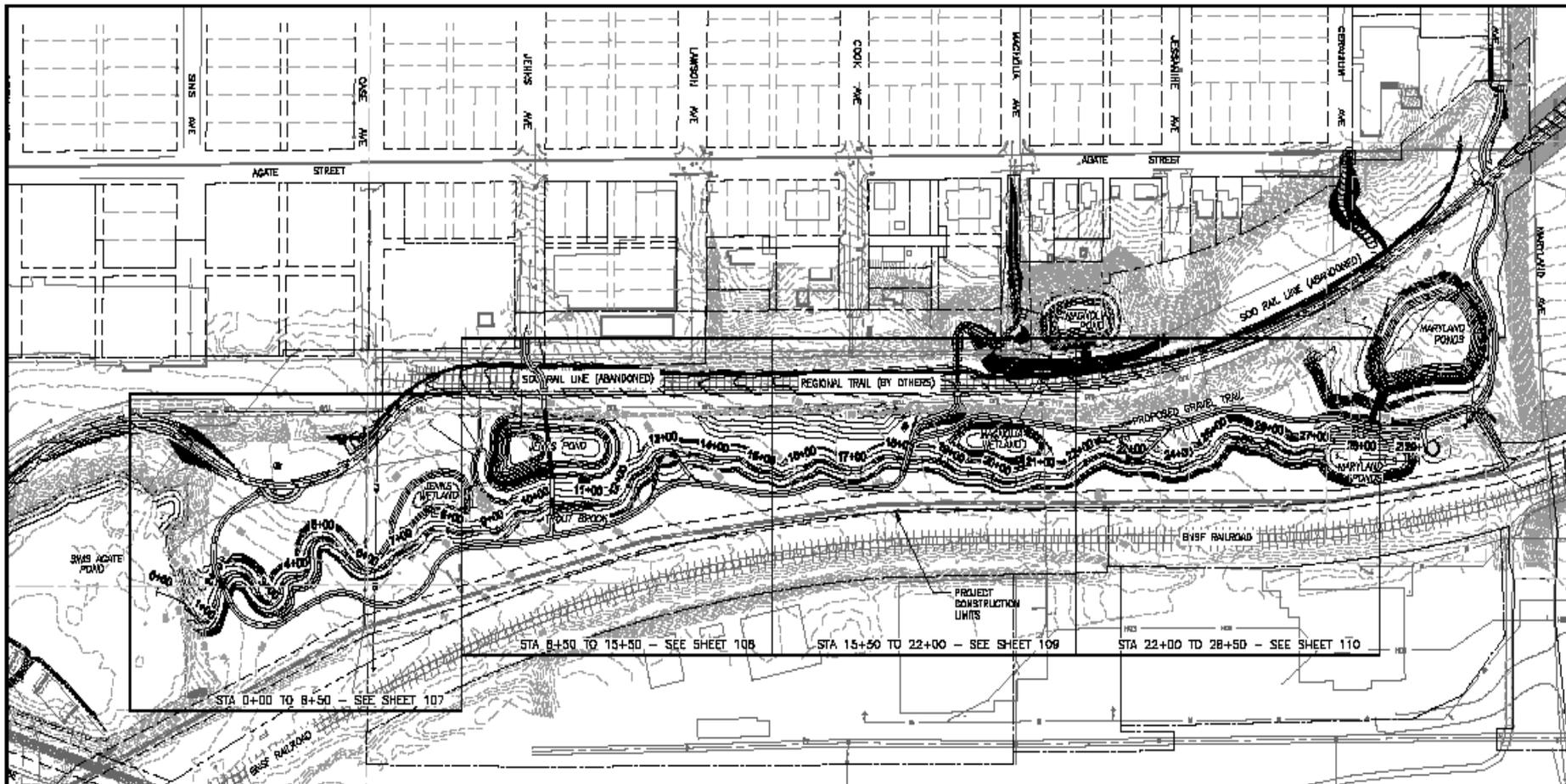


DOWNSTREAM END OF PERFORATED PIPE



2 SAND FILTER OUTLET CONNECTIONS
SCALE: NO SCALE PLAN VIEW

1 SAND FILTER DETAILS
SCALE: NO SCALE CROSS SECTION VIEW



DRAWN BY: SEJ JOB DATE: 2013
 APPROVED: CSB JOB NUMBER: 20110672
 CND DATE: 4/29/2013 8:22 AM
 CND FILE: D:\PROJECTS\20110672\20110672.dwg

NO. DATE BY REVISION DESCRIPTION

I HEREBY CERTIFY THAT THE PLAN, SPECIFICATIONS OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.
 SIGNATURE: _____
 DATE: 4/29/2013 PROJECT NO. 20110672



TROUT BROOK REGIONAL TRAIL AND NATURE SANCTUARY
 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

PROPOSED CHANNEL POND AND WETLAND COMPLEX
 S.P. 164-090-013

SHEET NO.
 106 OF 153



Dell Webb, IL





Edge of BMP Options



HRGreen

100+

Est. 1913





10/30/2008 11:19







Swale (channel) Options



Filtration Area Options







Enhanced Filters

