

# Oak Glen Golf Course Stream and Buffer Improvement Project

## A. Project Location

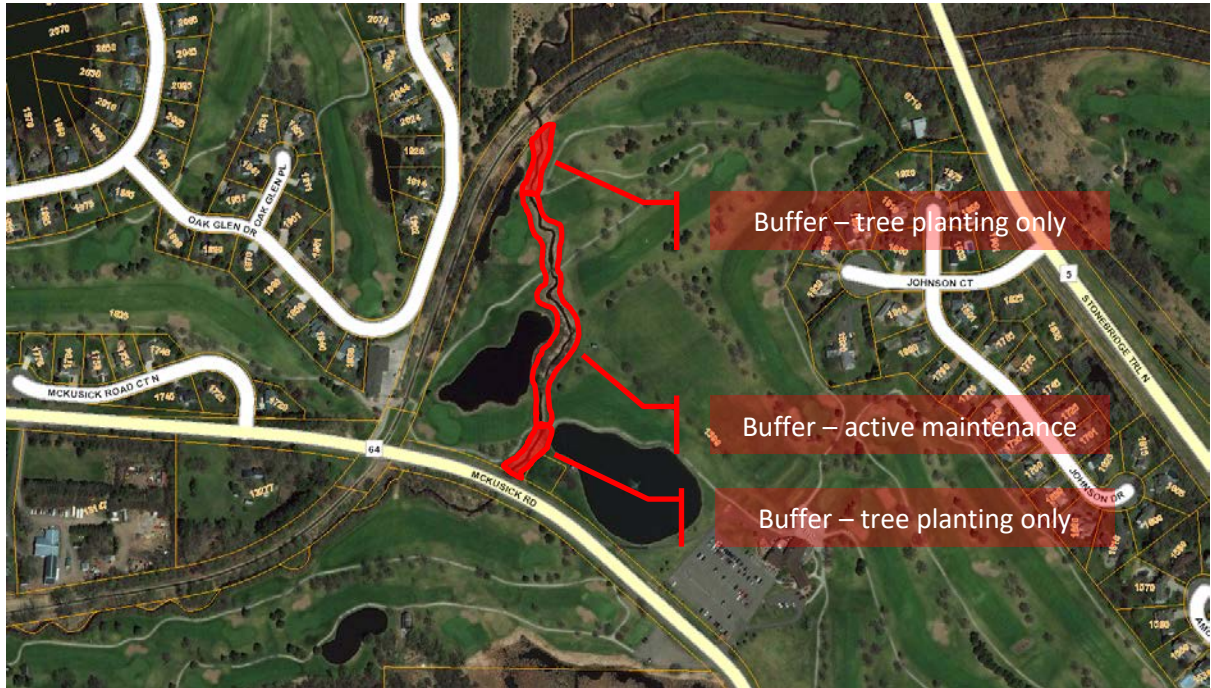


Figure 1. Location map for Oak Glen Golf Course Buffer Restoration Project.

Project Location	Immediate	BMP Performance	
		Estimated Thermal Local Reduction	Stream Habitat Improvement
<p>Oak Glen Golf Course Stream and Buffer Improvements are located between McKusick Road and Brown's Creek State Trail. (1599 McKusick Road in Stillwater, MN, 55082)</p> <p>(see Figure 1 for a Location Map).</p>	Brown's Creek	In-stream temperature reduction of 6°F on the warmest days	<ul style="list-style-type: none"> <li>• Meandering stream channel with well-defined pools and riffles</li> <li>• Undercut banks with sufficient vegetation to minimize erosion and bank failure</li> <li>• Improvement of stream bed materials (sand to gravel)</li> </ul>

## B. Description of Facility

### I. General Site Description

Restoration addressed a highly manicured reach of Brown’s Creek located within a public golf course that had become excessively wide & shallow. Monitoring had indicated that anthropogenic changes resulted in a substantial warming of the cold-water fishery. The completed project enhanced wildlife habitat, reduced instream warming, and improved course aesthetics while still meeting the strict playability standards of the golf course.

Partners	Project Purpose	Drainage Size	Project Completed	Maintenance Requirement
BCWD, Oak Glen Golf Course c/o Wilson Golf Group	The completed project enhanced wildlife habitat, reduced instream warming, and improved course aesthetics while still meeting the strict playability standards of the golf course.	NA	2011	BCWD direct maintenance responsibilities ended in 2017. Per binding agreement with the BCWD, the golf course owner is responsible for maintenance through 2027.
Note 1: Oak Glen Golf Course is responsible for maintenance.				
Costs				
Total Project Cost: \$320,000 (including design and construction)				
<ul style="list-style-type: none"> <li>Leveraged Clean Water Fund Grants: \$210,000 (65%)</li> <li>Local BCWD Tax Levy: \$110,000</li> </ul>				

### II. Parts Inventory

*Not Applicable for this project*

### III. Stormwater Management Facilities

The project converted 2.5 acres of irrigated turf grass (previously mowed to the stream banks) to a native buffer. The stream, which had historically been ditched and straightened, was reshaped to restore stream health and function.

### IV. Accessibility

To perform maintenance on the Oak Glen Buffer Restoration, three possible access routes are available; one through the Oak Glen Golf Course property, second along the DNR Brown’s Creek trail property, and third from McKusick Road North.

Before accessing the Oak Glen Buffer Restoration area, contact Pete Mogren, Golf Course Superintendent, and provide advanced notice of an upcoming inspection.

Contact Personnel	Contact Number	Organization	Advanced Notice
Pete Mogren, Golf Course Superintendent	651-689-0158	Oak Glen Golf Course	24-48 hours

## V. Start-Up and Operating Procedures

### a. Process Description

*Not Applicable for this project*

### b. Controls

*Not Applicable for this project*

### c. Start – Up Procedures

*Not Applicable for this project*

### d. Normal Operating Procedures

The following personnel can be contacted for normal operating procedure questions.

Contact Personnel		Contact Number	Organization
<b>Primary</b>	Karen Kill, Administrator	651-330-8220 x26	BCWD
<b>Secondary</b>	Mike Majeski, Conservation Biologist	612-500-5260	Emmons & Olivier Resources, Inc.
<b>Secondary</b>	Pete Mogren, Golf Course Superintendent	651-689-0158	Oak Glen Golf Course

### e. Common Operating Problems

*Not Applicable for this project*

## C. Maintenance and Inspection Requirements

### I. Planning Maintenance and Inspections

As of January 1, 2018, Oak Glen Golf Course is responsible for maintenance of the stream buffer. The buffer area should be managed for high quality native grasses and forbs; all invasive and aggressive species should be removed or treated promptly.

Given the specialized nature of the maintenance and critical timing of treatment the BCWD has recommended that the Golf Course contract this work out. In 2018 the work was completed by Landbridge Ecological.

Visual inspections by District personnel and/or agent should be made a minimum of twice per year between the months of April and November to ensure maintenance is occurring and relay deficiencies and/or recommendations.

### a. Inspection Procedures

Item	Item Location	Parameter Measured	Inspection Frequency
<b>Visual Inspection</b>	Extent of buffer	<ul style="list-style-type: none"> <li>Evaluation of recent maintenance activities by golf course and/or Contractor and forecasting future activities</li> <li>Stream stability/erosion</li> <li>Evidence of beaver activity</li> <li>Any golf course management activities that may be detrimental to buffer and/or creek</li> </ul>	Minimum of 2 times during growing season

Inspections should include the following documentation and measurement of the following BMP/project components:

1. *Evaluation of recent maintenance activities by Golf course and/or Contractor and forecasting future activities*
  - a. *Presence of invasive species*
  - b. *Presence of volunteer woody species*
  - c. *Inadequate vegetative cover*
2. *Stream stability/erosion*
3. *Evidence of beaver activity*
4. *Condition of planted trees and shrubs and identification of any necessary maintenance*
5. *Any golf course management activities that may be detrimental to the buffer and/or creek*

**b. Maintenance Procedures**

Maintenance of the buffer is the responsibility of the Oak Glen Golf Course. The District should dedicate personnel/budget to ensure adequate maintenance is completed.

Item	Corrective Action	Maintained by	Maintenance Frequency	Estimated Annual Cost (Based on 2026 Estimate)
Annual Inspection	N/A	BCWD	Twice per year	\$700
<b>Anticipated Total Yearly Cost:</b>				<b>\$700</b>

**II. Corrective Actions and Modifications**

*Necessary corrective action is directly tied to conditions of problem*

**III. In-house Verses Contracted Labor**

The District has strongly recommended that the Golf Course contract the specialized natural areas management work with a qualified contractor, as natural areas management is substantially different than traditional golf course maintenance. The Golf Course needs to proactively engage and manage the contractor.

**D. Maintenance Responsibilities and Agreements**

BCWD was responsible for completing regular vegetation maintenance to remove invasive and aggressive species through the year 2017. After 2017, the Oak Glen Golf Course is responsible for buffer vegetation maintenance responsibilities. The Oak Glen Golf Course Stream and Buffer Improvements Project received Clean Water Funds from the State of Minnesota, which requires the project to remain in place and be maintained for a minimum of 15 years.

**I. Manufacturer’s Recommendations**

*Not Applicable for this project*

## **II. Safety**

*Not Applicable for this project*

## **E. Records and Reporting**

Records and Reporting should be maintained either in the District's Fulcrum or MapFeeder online database. The following information should be recorded during all inspection visits.

## Record of Annual Inspection and Maintenance Program:

Inspector Information		
Visit Number:		
Name		
Date:		
Inspection Area	Structure Description	Notes/Condition
<b>1. Evaluation of recent maintenance activities by Golf course and/or Contractor and forecasting future activities</b>	Presence of invasive species Presence of volunteer woody species Inadequate vegetative cover	
<b>2. Buffer/Stream Assessment</b>	Stream stability/erosion Evidence of beaver activity Condition of planted trees and shrubs and identification of any necessary maintenance Any golf course management activities that may be detrimental to buffer and/or creek	
<i>Maintenance Description:</i>		
Contractor / Maintenance Crew Information		
Date:		
Name:		
Phone:		
Address:		
<i>Maintenance Description:</i>		

## I. Sampling and Performance Monitoring

### a. Sampling and Analysis

*Not Applicable for this project*

### b. Performance Monitoring

A geomorphic assessment was completed twice after the project was completed, the latest occurred in September 2013. It would be informative to reproduce the geomorphic survey again in 2020 to evaluate the long-term performance of the restoration and document the stream condition. The results of the survey will be important to determine if any repair or maintenance activities are required. The approximate cost for the District engineer to conduct the geomorphic survey and analyze the data is \$2,400. This cost includes a brief report detailing the pre and post project data results, comparative graphs, and recommendations.

The MN Department of Natural Resources completed a partial fish survey within the project reach on September 13, 2016. A complete fish survey and data analysis would be valuable to evaluate fish population trends over time following the stream restoration. The District should coordinate with the MNDNR to conduct the surveys on a biennial basis. If the DNR is able to conduct the surveys, there would be no cost to the District. If the DNR is unable to conduct the fish surveys, the District engineer could contract with a local university to conduct the surveys. Saint Mary's University has conducted fish surveys in the District over the last several years. The approximate cost for Saint Mary's fisheries staff to conduct a fish survey within the Oak Glen restoration reach is \$500.

## F. Emergency Plan and Operating Procedures

### I. Emergency Plan

Always call 911 in a situation that presents a risk of immediate bodily harm to yourself or the surrounding community.

### II. Emergency Operating Procedures

In the event on an operational emergency, please contact the following personnel for further assistance.

Contact Personnel		Contact Number	Organization
Primary	Karen Kill, Administrator	651-330-8220 x26	BCWD
Primary	Pete Mogren, Golf Course Superintendent	651-689-0158	Oak Glen Golf Course
Secondary	Kevin Biehn, Design Landscape Architect	651-770-8448	Emmons & Olivier Resources, Inc.

## **G. Appendices**

### **I. Construction Plans**

### **II. Agreements**

- a. Cooperative agreement between Oak Glen Golf Course and Brown's Creek Watershed District

# BROWN'S CREEK WATERSHED DISTRICT

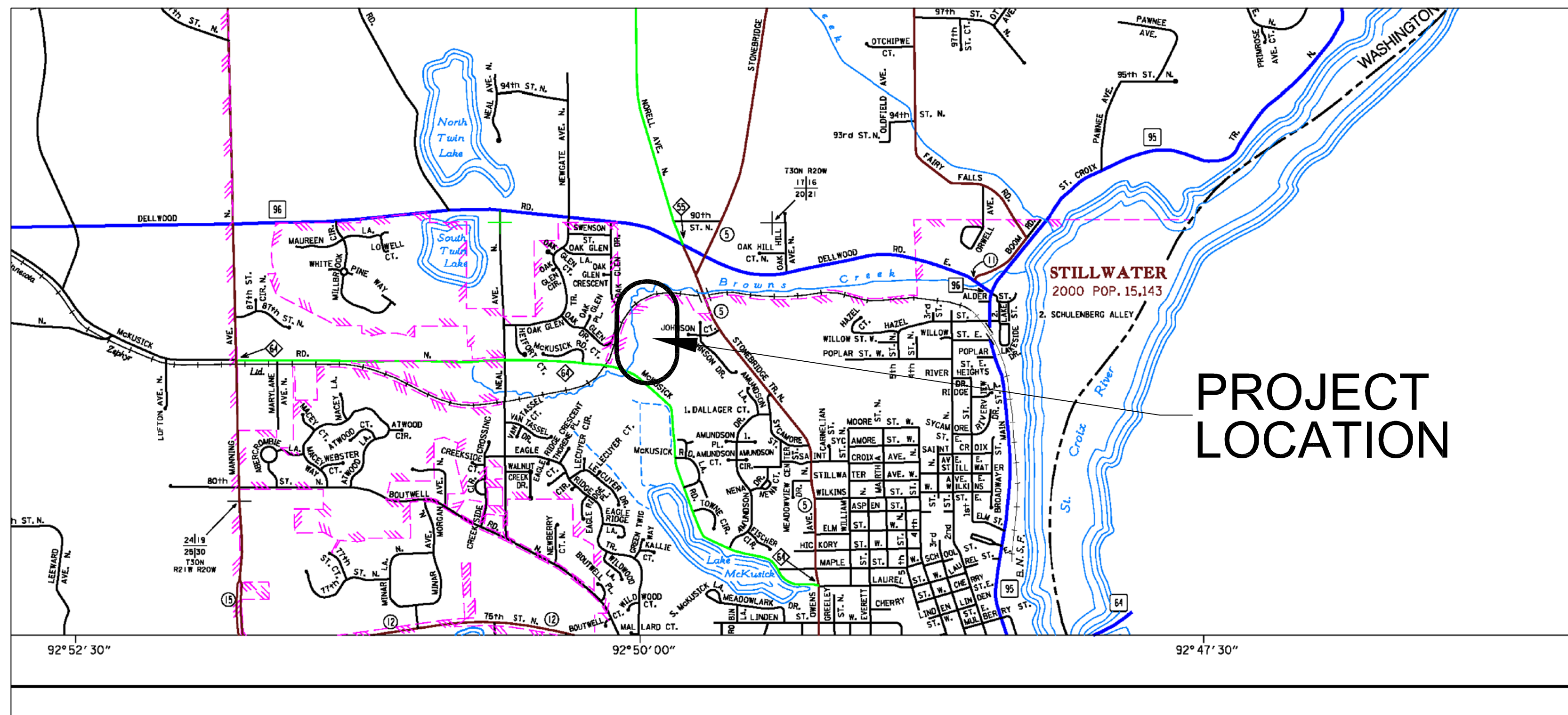
## BCWD - OAK GLEN GOLF COURSE

### STREAM AND BUFFER IMPROVEMENTS

#### STILLWATER, WASHINGTON CO., MN

Sheet List Table	
Sheet Number	Sheet Title
01	TITLE SHEET
02	SWPPP
03	SEQ AND GENERAL NOTES
04	PROJECT OVERVIEW
05	SEGMENT 1 PLAN
06	SEGMENT 2 PLAN
07	SEGMENT 3 PLAN
08	TREE PLANTING PLAN
09	PLANTING SCHEDULES
10	DETAILS - CROSS SECTIONS
11	DETAILS - INSTREAM MEASURES
12	DETAILS - GENERAL
13	DETAILS - OUTLET STRUCTURE

FEATURE	EXISTING	PROPOSED
SILT FENCE		
CONSTRUCTION FENCE		
DELINEATED WETLAND		
WATERLINE/ShORELINE		
OVERHEAD ELECTRIC LINES		
BURIED ELECTRIC LINES		
FIBER OPTIC LINES		
GAS LINES		
PIPELINE		
OVERHEAD TELEPHONE		
BURIED TELEPHONE		
TELEPHONE MANHOLE		
TELEPHONE CABLE PEDESTAL		
OVERHEAD CABLE TV		
BURIED CABLE TV		
TV CABLE PEDESTAL		
BARBED WIRE FENCE		
CHAIN LINK FENCE		
STOCKADE/WOOD FENCE		
GUARD RAIL		
CENTER LINE ROADWAY		
CENTER LINE RAILROAD		
SANITARY SEWER LINE		
SANITARY SEWER FORCEMAIN		
SANITARY SEWER MANHOLE		
STORM SEWER LINE		
STORM SEWER CULVERT		
STORM SEWER FORCEMAIN		
STORM SEWER MANHOLE		
WATERMAIN		
WATERMAIN MANHOLE		
HYDRANT		
WATER VALVE		



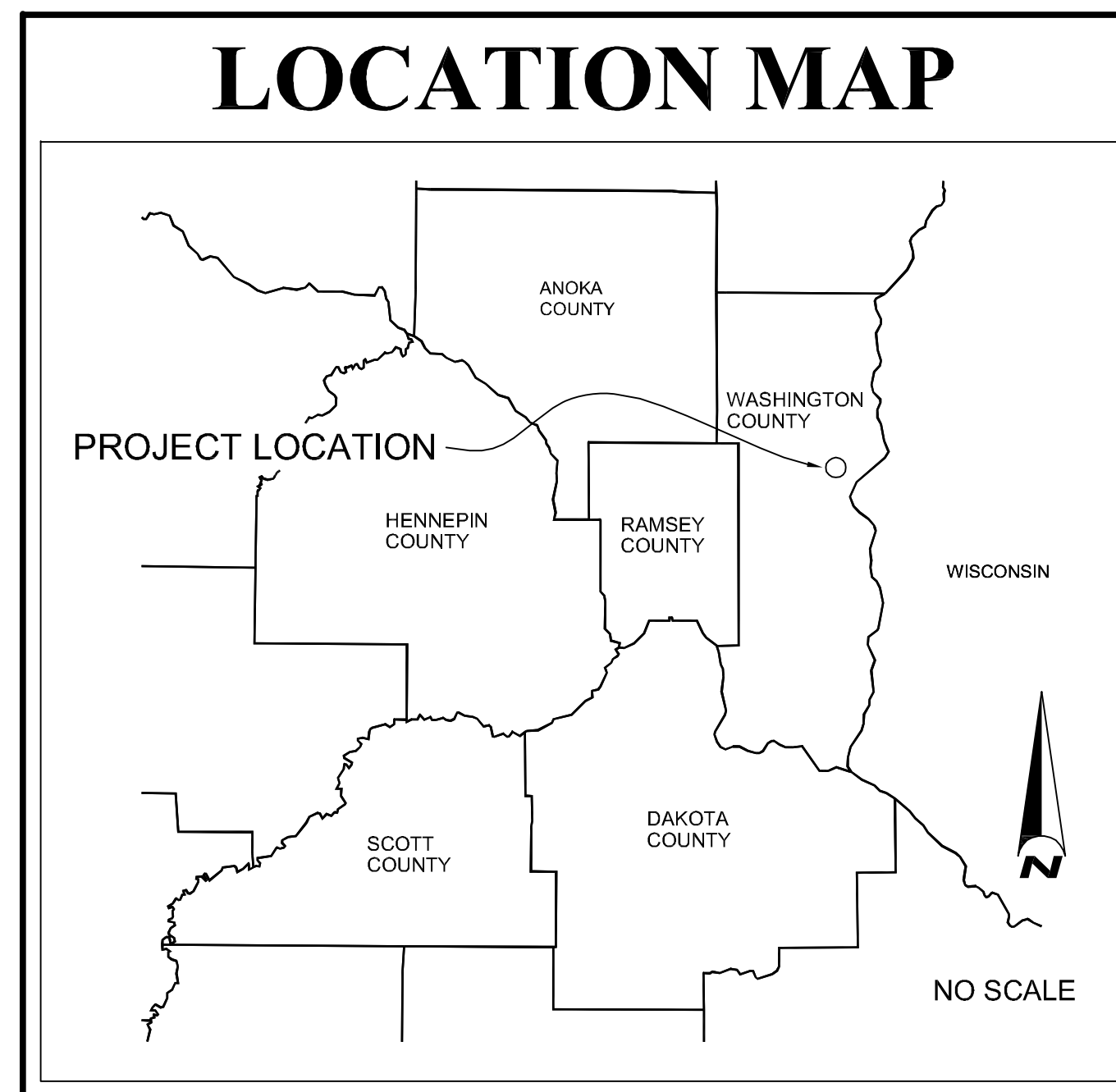
**PROJECT LOCATION**

**GOVERNING SPECIFICATIONS**  
 THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN  
 ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING FIELD MANUAL FOR TEMPORARY CONTROL ZONE LAYOUTS.

**EXISTING UTILITIES**  
 THE LOCATION OF UNDERGROUND FACILITIES AND/OR STRUCTURES AS SHOWN ON THE PLANS ARE BASED ON AVAILABLE RECORD AT THE TIME THE PLANS WERE PREPARED AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE SUBSURFACE UTILITY INFORMATION SHOWN IS UTILITY QUALITY LEVEL D, AS DETERMINED USING THE GUIDELINES OF "CI/ASCE 38-02 STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITIES 72 HOURS PRIOR TO CONSTRUCTION TO DETERMINE THE EXACT LOCATION OF ALL FACILITIES AND TO PROVIDE ADEQUATE PROTECTION OF SAID UTILITIES DURING THE COURSE OF WORK.

**CONSTRUCTION NOTE**  
 CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO MAINTAIN OPERATION OF EXISTING UTILITIES THROUGHOUT THE DURATION OF THE PROJECT. IN THE EVENT THAT AN INTERRUPTION OF SERVICE IS UNAVOIDABLE IN ORDER TO COMPLETE THE WORK, CONTRACTOR SHALL PROVIDE ADEQUATE NOTIFICATION TO ALL AFFECTED BUSINESSES A MINIMUM OF 3 WORKING DAYS IN ADVANCE OF ANY INTERRUPTION.

**GOPHER STATE ONE-CALL**  
 IT IS THE LAW THAT ANYONE EXCAVATING AT ANY SITE MUST NOTIFY GOPHER STATE ONE CALL (GSOC) SO THAT UNDERGROUND ELECTRIC, NATURAL GAS, TELEPHONE OR OTHER UTILITY LINES CAN BE MARKED ON OR NEAR YOUR PROPERTY BEFORE ANY DIGGING BEGINS. A 48-HOUR NOTICE, NOT INCLUDING WEEKENDS, IS REQUIRED. CALLS CAN BE MADE TO GSOC AT 1-800-252-1166 OR (651)454-0002, MONDAY THROUGH FRIDAY (EXCEPT HOLIDAYS) FROM 7 A.M. TO 5 P.M.



**PROJECT OWNER**  
**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE ROAD, HWY 36  
 STILLWATER, MN 55082  
 POINT OF CONTACT - KAREN KILL - DISTRICT ADMINISTRATOR  
 PHONE: 651-275-1254

**DISTRICT MANAGERS**  
 CRAIG LEISER - PRESIDENT  
 GAIL PUNDSACK - VICE PRESIDENT  
 RICK VANZWAL - VICE PRESIDENT  
 CONNIE TAILOR - TREASURER  
 GERALD JOHNSON - SECRETARY

**PROPERTY OWNER**  
**WILSON GOLF GROUP**  
 1599 MCKUSICK ROAD  
 STILLWATER, MN 55082  
 POINT OF CONTACT - PATRICK RENNER - DIRECTOR OF OPS.  
 PHONE: 651-439-6981

**ENGINEER**  
**EMMONS & OLIVIER RESOURCES, INC.**  
 651 HALE AVENUE NORTH  
 OAKDALE, MINNESOTA 55128-7534  
 POINT OF CONTACT - KEVIN BIEHN - PROJECT MANAGER  
 PHONE: 651-770-8448  
 FAX: 651-770-2552  
 www.eorinc.com

Plot Date: 09/15/2011  
 Drawing Name: X:\Clients\BCWD\0176\_2011\_CONF\_Grant\_Oak\_Glen\_Thermal\_Reductions\Oak\_Glen\0176\_TITLESHEET.dwg  
 User:

NO	DATE	BY	REVISION
6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT 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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

KEVIN D. BIEHN  
 DATE: 09-12-2011

LICENSE # 42629

SUBMISSION DATE:  
09-12-2011

DESIGN BY: KDB  
DRAWN BY: BA

EOR PROJECT NO.  
00041-0176

**Emmons & Olivier Resources, Inc.**  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE ROAD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE**  
**STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, WASHINGTON CO., MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

TITLE SHEET  
 SHEET 01 OF 13 SHEETS



**STATEMENT OF QUANTITIES:**

LINE ITEM	MN/DOT ITEM NO.	ITEM DESCRIPTION	UNIT	ENGINEERS ESTIMATED QUANTITIES
1	2021.501	MOBILIZATION	LS	1.0
2	2101.511	SITE CLEARING	LS	1.0
3	2104.509	REMOVE 12" DIA CMP	LF	52.0
4	2105.507	COMMON EXCAVATION - REMOVAL	CY	392.0
5	2105.507	COMMON EXCAVATION - EMBANKMENT	CY	32.0
6	2501.511	12" HDPE DUAL WALL PIPE	LF	64.0
7	2501.515	12" HDPE DUAL WALL FLARED END	EA	1.0
8	2506.502	DRAINAGE STRUCTURE (12" AGRI-DRAIN OR APPROVED EQUAL)	EA	1.0
9	2511.505	HAND-PLACED RIPRAP, CLASS II (Riprap Apron)	TON	12.0
10	2511.505	HAND-PLACED RIPRAP, CLASS IV (Boulder Toe)	TON	58.0
11	2511.505	HAND-PLACED RIPRAP, CLASS IV (Cross Vanes & Single Vanes)	TON	70.0
12	2540.601	BOULDER WALL	SF (FACE)	1125.0
13	2557.520	HAZARD STAKES-SHORT	EA	50.0
14	2557.520	HAZARD STAKES-TALL	EA	40.0
15	2557.502	FENCING, 5' HEIGHT EXTRUDED PLASTIC OHSA ORANGE COLOR	LF	65.0
16	2563.601	TRAFFIC CONTROL	LS	1.0
17	2571.502	DECIDUOUS TREE, NO. 20 CONTAINER	TREE	43.0
18	2571.502	DECIDUOUS TREE, 2.5" B&B	TREE	11.0
19	2571.503	ORNAMENTAL TREE, NO. 20 CONTAINER	TREE	12.0
20	2571.505	DECIDUOUS SHRUB NO. 5 CONTAINER	SHRUB	400.0
21	2571.507	PERENNIAL - 3.5" CONT. (1.5' O.C.)	PLANT	2934.0
22	2571.507	PERENNIAL - PLUG (1.5' O.C.)	PLANT	8524.0
23	2573.530	STORM DRAIN INLET PROTECTION	EA	3.0
24	2573.54	FILTER LOG, 9" DIA. COMPOST SOCK	LF	252.0
25	2573.602	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EA	2.0
26	2575.501	SEEDING	AC	0.2
27	2575.502	SEED, MIXTURE - MNDOT 260	LB	0.1
28	2575.505	SOD - MINERAL	SY	2098.0
29	2575.505	SOD - BENTGRASS	SY	200.0
30	2575.511	MULCH MATERIAL, TYPE 6 - SHREDDED HARDWOOD MULCH	CY	39.0
31	2575.511	MULCH MATERIAL, TYPE 3	TON	0.2
32	2575.523	EROSION CONTROL BLANKET, CATEGORY 4 (GEOCOIR/DEKOWE 700 OR APPROVED EQUAL)	SY	2105.0
33	2575.523	EROSION CONTROL BLANKET, CATEGORY 3 (ANTIWASH/GEOJUTE OR APPROVED EQUAL)	SY	745.0
34	2575.535	WATER (Sod)	M GAL	20.0
35	2575.551	COMPOST, GRADE 2	CY	300.0
36	2577.503	FIBER LOG, 18" DIA. COIR LOG	LF	245.0

**CONSTRUCTION SEQUENCING**

1. SUBSTANTIAL COMPLETION SHALL BE ACHIEVED FOR ALL WORK BETWEEN STATIONS 8+83.60 AND 14+55 BEFORE ANY WORK (OTHER THAN EROSION CONTROL, REMOVALS AND VEGETATION PREPARATION) CAN COMMENCE BETWEEN STATIONS 1+00 AND 8+83.60. SEE SHEET 2 FOR DETAILS ON SEQUENCING.
2. EROSION CONTROL BLANKET TO BE INSTALLED WITHIN 48 HOURS OF FINAL GRADING AND PRIOR TO TREE PLANTING.
3. INSTREAM MEASURES TO BE INSTALLED PRIOR TO SITE GRADING.

**CONSTRUCTION LIMITS AND ACCESS NOTES**

1. COURSE BRIDGES ARE NOT TO BE CROSSED OR OCCUPIED WITH ANY CONSTRUCTION EQUIPMENT.
2. THE STREAM IS NOT TO BE CROSSED OR OCCUPIED WITH ANY CONSTRUCTION EQUIPMENT.
3. INFRASTRUCTURE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: CART PATHS, WALLS, IRRIGATION, UTILITIES, CURB, GUTTER AND PAVEMENT IS TO BE PROTECTED BY THE CONTRACTOR AT THE COST OF THE CONTRACTOR. ANY DAMAGES SHALL BE REPAIRED PER THE DISCRETION OF THE LANDSCAPE ARCHITECT AT THE COST OF THE CONTRACTOR.
4. ANY DISTURBANCES OUTSIDE OF THE LIMITS OF CONSTRUCTION ARE TO BE REPAIRED BY THE CONTRACTOR, PER THE DISCRETION OF THE LANDSCAPE ARCHITECT AT THE COST OF THE CONTRACTOR.
5. USE OF EXCAVATORS OVER 40,000 LBS (OPERATION WEIGHT) ARE NOT PERMITTED ONSITE. EQUIPMENT SHALL HAVE A THUMB ATTACHEMENT FOR CONSTRUCTION OF INSTREAM MEASURES.

**GENERAL NOTES**

1. CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO THE NATURE AND SCOPE OF WORK.
2. CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BRING TO THE ATTENTION OF THE LANDSCAPE ARCHITECT DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.
3. CONTRACTOR SHALL ASSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK AND MATERIALS SUPPLIED.
4. UNDERGROUND UTILITIES SHALL BE INSTALLED SO THAT TRENCHES DO NOT CUT THROUGH ROOT SYSTEMS OF EXISTING TREES TO REMAIN.
5. CONTRACTOR SHALL REVIEW THE SITE FOR DEFICIENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT PLANT ESTABLISHMENT, SURVIVAL OR WARRANTY. UNDESIRABLE SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING OF WORK.
6. CONTRACTOR IS RESPONSIBLE FOR ONGOING MAINTENANCE OF NEWLY INSTALLED MATERIALS UNTIL TIME OF SUBSTANTIAL COMPLETION. REPAIR OF ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR PRIOR TO SUBSTANTIAL COMPLETION SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.
7. EXISTING TREES OR SIGNIFICANT SHRUB MASSINGS FOUND ON SITE SHALL BE PROTECTED AND SAVED UNLESS NOTED TO BE REMOVED OR ARE LOCATED IN AN AREA TO BE GRADED. QUESTIONS REGARDING EXISTING PLANT MATERIAL SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO REMOVAL.
8. SYMBOLS ON PLAN DRAWING TAKE PRECEDENCE OVER SCHEDULES IF DISCREPANCIES IN QUANTITIES EXIST. SPECIFICATIONS AND DETAILS TAKE PRECEDENCE OVER NOTES.

**LANDSCAPE PLANTING NOTES**

1. NO PLANTS WILL BE INSTALLED UNTIL FINAL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
2. NO PLANT MATERIAL SUBSTITUTIONS WILL BE ACCEPTED UNLESS APPROVAL IS GRANTED BY THE LANDSCAPE ARCHITECT TO THE CONTRACTOR PRIOR TO THE SUBMISSION OF BID.
3. ADJUSTMENTS IN LOCATION OF PROPOSED PLANT MATERIALS MAY BE NEEDED IN FIELD. LANDSCAPE ARCHITECT MUST BE NOTIFIED PRIOR TO ADJUSTMENT OF PLANTS.
4. PLANT MATERIALS TO BE INSTALLED PER PLANTING DETAILS.
5. PLANTING AREAS TO RECEIVE APPLICATION OF PRE-EMERGENT HERBICIDE SEE SPECIFICATION 02905. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION REGARDING USE OF HERBICIDES.
6. CONIFEROUS & DECIDUOUS TREES ARE TO RECEIVE 3" DEEP SHREDDED HARDWOOD MULCH AND SHALL HAVE NO MULCH IN DIRECT CONTACT WITH THE TREE TRUNK. SHRUB AREAS TO RECEIVE BY 3" DEEP SHREDDED HARDWOOD MULCH.
7. UNLESS NOTED OTHERWISE, THE APPROPRIATE DATES FOR SPRING PLANT MATERIAL INSTALLATION IS FROM THE TIME GROUND HAS THAWED TO JUNE 15.
8. FALL DECIDUOUS PLANTING IS ACCEPTABLE FROM THE FIRST FROST UNTIL NOVEMBER 30. ADJUSTMENTS TO PLANTING DATES MUST BE APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT.

**SOD NOTES**

1. SOD DISTURBED AREAS UNLESS NOTED OTHERWISE.
2. WHERE SOD ABUTS PAVED SURFACES, FINISHED GRADE OF SOD/SEED SHALL BE HELD 1" BELOW SURFACE ELEVATION OF TRAIL, SLAB, CURB, ETC.
3. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND SHALL HAVE STAGGERED JOINTS. ON SLOPES STEEPER THAN 3:1 OR IN DRAINAGE SWALES, SOD SHALL BE STAKED SECURELY.
4. UNLESS NOTED OTHERWISE, THE APPROPRIATE DATES FOR SPRING SEED & SOD PLACEMENT IS FROM THE TIME GROUND HAS THAWED TO JUNE 15.
5. FALL SODDING IS ACCEPTABLE FROM AUGUST 15 TO NOVEMBER 1. FALL SEEDING IS ACCEPTABLE FROM AUGUST 15 TO SEPTEMBER 15. ADJUSTMENTS TO SOD/SEED PLANTING DATES MUST BE APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT.

Plot Date: 09/15/2011  
 Drawing: W0301 - BASE WORKING  
 Path: \\B:\BASE\WORKING\W0301\_01\_BCMD00176\_2011\_CNF\_Cant\_Cak\_Glen\_Thermal\_ReductionsOak\_Glen.dwg

6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*K. B.*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

SUBMISSION DATE:  
09-12-2011

DESIGN BY: KDB DRAWN BY: BA

EOR PROJECT NO.  
00041-0176

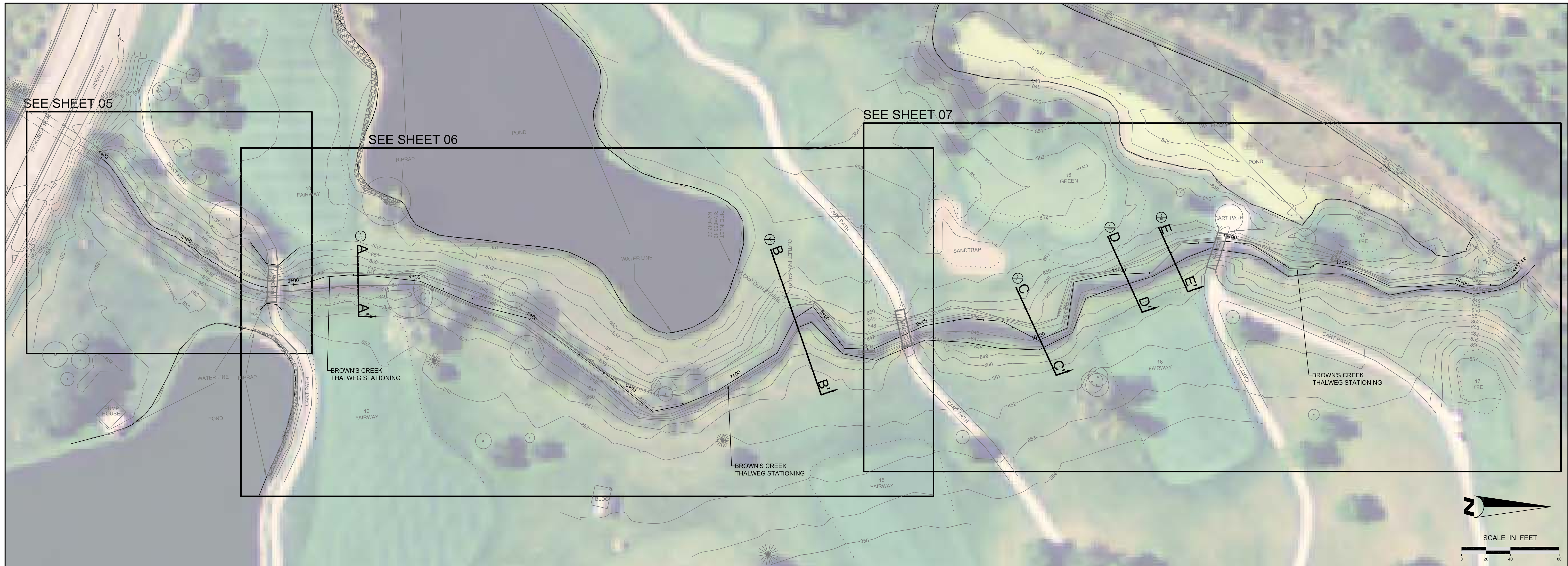
**EOR** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA


SEQ AND GENERAL NOTES

SHEET 03 OF 13 SHEETS



Plot Date: 09/15/2011  
 Drawing Name: X:\Clients\X:\Clients\_WD041\_BCWD0176\_2011\_OWE\_Grant\_Oak\_Glen\_Thermal\_Reductions\Oak Glen\dwg\OVERVIEW.dwg  
 Xrefs: X:BASE

6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.  
  
 KEVIN D. BIEHN  
 DATE: 09-12-2011      LICENSE # 42629

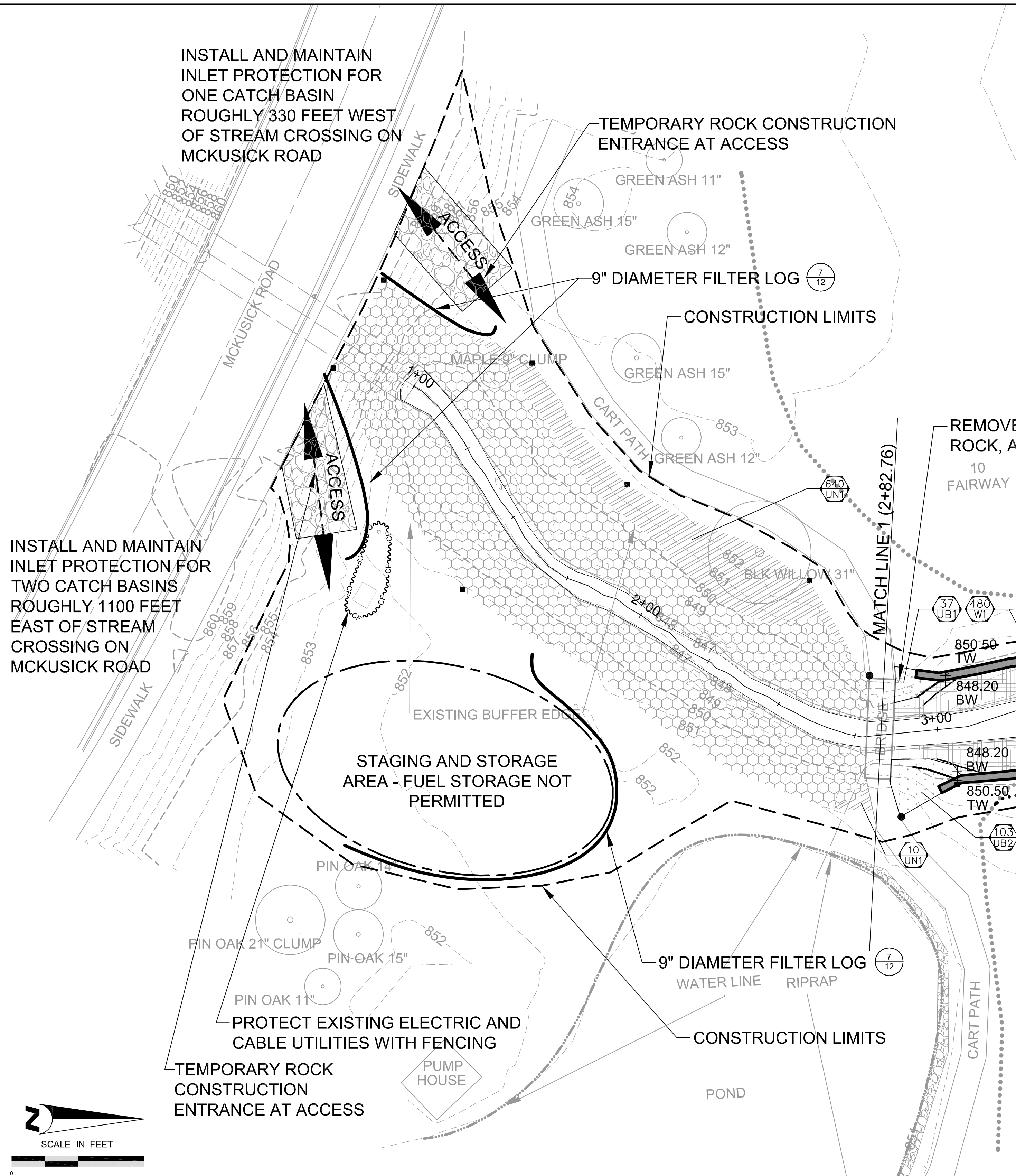
SUBMISSION DATE:  
 09-12-2011  
 DESIGN BY    DRAWN BY  
 KDB            BA  
 EOR PROJECT NO.  
 NA

 **Emmons & Olivier Resources, Inc.**  
 water ecology community  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE ROAD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, WASHINGTON CO., MN  
 STATE PROJECT NO. NA    CITY PROJECT NO. NA

PROJECT OVERVIEW  
 SHEET 04 OF 13 SHEETS



- PLAN LEGEND:**
- BUFFER MAINTENANCE ZONE
  - WETLAND PERENNIAL ZONES - GEOCOIR/DEKOWE 700 EROSION CONTROL BLANKET OR APPROVED EQUAL
  - UPLAND PERENNIAL ZONES - ANTIWASH/ GEOJUTE EROSION CONTROL BLANKET OR APPROVED EQUAL
  - UPLAND PERENNIAL ZONES - GEOCOIR/ DEKOWE 700 EROSION CONTROL BLANKET OR APPROVED EQUAL
  - FIELDSTONE RETAINING WALL
  - BOULDER TOE
  - HAZARD STAKE - TALL (TYP.)
  - HAZARD STAKE - SHORT (TYP.)
  - FIBER LOGS
  - CROSS VANE
  - SINGLE VANE
  - # OF PERENNIALS PLANT BED ID
  - EXISTING TREES

INSTALL AND MAINTAIN INLET PROTECTION FOR TWO CATCH BASINS ROUGHLY 1100 FEET EAST OF STREAM CROSSING ON MCKUSICK ROAD

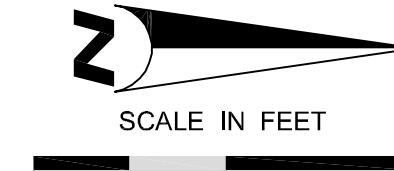
INSTALL AND MAINTAIN INLET PROTECTION FOR ONE CATCH BASIN ROUGHLY 330 FEET WEST OF STREAM CROSSING ON MCKUSICK ROAD

STAGING AND STORAGE AREA - FUEL STORAGE NOT PERMITTED

PROTECT EXISTING ELECTRIC AND CABLE UTILITIES WITH FENCING

TEMPORARY ROCK CONSTRUCTION ENTRANCE AT ACCESS

TEMPORARY ROCK CONSTRUCTION ENTRANCE AT ACCESS



6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Kevin D. Biehn*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

SUBMISSION DATE:  
09-12-2011

DESIGN BY: KDB DRAWN BY: BA

EOR PROJECT NO. NA

**EOR** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

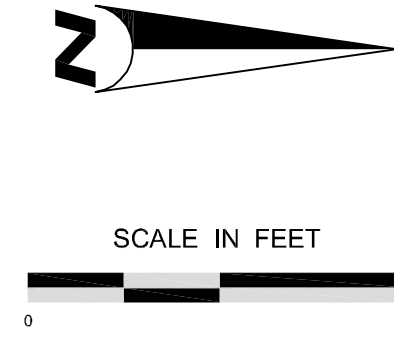
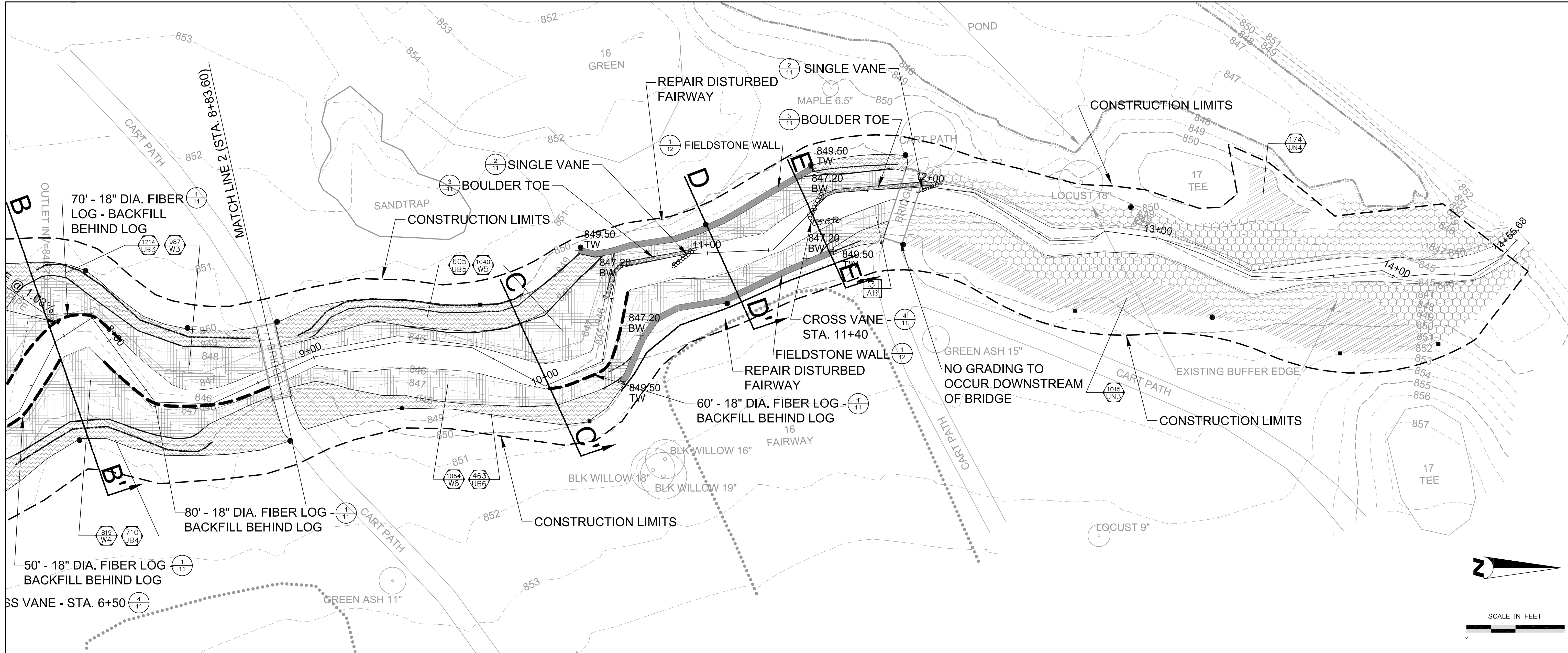
**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE ROAD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, WASHINGTON CO., MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

**BROWN'S CREEK**  
 Sta. 1+00 to Sta. 2+82.76  
 THALWEG  
 SHEET 05 OF 13 SHEETS

Plot Date: 09/15/2011  
 Drawing Path: \\s:\projects\2011\BCWD\0176\_2011\_CWF\_Grant\_Oak\_Glen\_Thermal\_Reductions\Oak\_Glen\Thalweg\_Plan & Profile.dwg  
 User: kdb  
 Title: BCWD0176\_2011\_CWF\_Grant\_Oak\_Glen\_Thalweg\_Plan & Profile.dwg





**PLAN LEGEND:**

- |  |                                                                                        |  |                                 |
|--|----------------------------------------------------------------------------------------|--|---------------------------------|
|  | BUFFER MAINTENANCE ZONE                                                                |  | FIBER LOGS                      |
|  | WETLAND PERENNIAL ZONES - GEOCOIR/DEKOWE 700 EROSION CONTROL BLANKET OR APPROVED EQUAL |  | CROSS VANE                      |
|  | UPLAND PERENNIAL ZONES - ANTIWASH/ GEOJUTE EROSION CONTROL BLANKET OR APPROVED EQUAL   |  | SINGLE VANE                     |
|  | UPLAND PERENNIAL ZONES - GEOCOIR/ DEKOWE 700 EROSION CONTROL BLANKET OR APPROVED EQUAL |  | FIELDSTONE RETAINING WALL       |
|  | SHRUB PLANTING ZONE                                                                    |  | BOULDER TOE                     |
|  | HAZARD STAKE - TALL (TYP.)                                                             |  | # OF PERENNIALS<br>PLANT BED ID |
|  | HAZARD STAKE - SHORT (TYP.)                                                            |  |                                 |

6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Kevin D. Biehn*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

SUBMISSION DATE:  
09-12-2011

DESIGN BY: KDB DRAWN BY: BA

EOR PROJECT NO. NA

**EOR** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE ROAD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, WASHINGTON CO., MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

STREET NAME  
Sta. 8+83.60 to Sta. 14+55.68  
THALWEG

SHEET 07 OF 13 SHEETS

Plot Date: 09/15/2011  
 Drawing Path: W:\0141\_BCMD\0176\_2011\_CNF\_Grnt\_Crk\_Glen\_Thermal\_Reductions\Oak Glen.dwg  
 User: KDB  
 Title: BROWN'S CREEK WATERSHED DISTRICT



## TREE SCHEDULE

Symbol	Quantity	Scientific Name	Common Name	Size	Type	Container
AB	6	<i>Amelanchier x grandiflora 'Autumn Brilliance'</i>	Autumn Brilliance Serviceberry	na	#20 Cont.	Pot
TH	6	<i>Crataegus crusgalli</i>	Hawthorn	na	#20 Cont.	Pot
RM	10	<i>Acer rubrum</i>	Red Maple	na	#20 Cont.	Pot
RB	3	<i>Betula nigra</i>	River Birch	na	#20 Cont.	Pot
KC	11	<i>Gymnocladus occidentalis</i>	Kentucky Coffeetree	2.5" cal. In.	B&B	NA
TX	5	<i>Larix laricina</i>	Tamarack	na	#20 Cont.	Pot
SW	13	<i>Quercus bicolor</i>	Swamp White Oak	na	#20 Cont.	Pot
	<b>54</b>					

## SHRUB SCHEDULE

%	Quantity	Scientific Name	Common Name	Size	Type	Spacing
20%	80	<i>Cephalanthus occidentalis</i>	Buttonbush	24" HEIGHT	#5 Cont.	5' O.C.
25%	100	<i>Cornus sericea</i>	Red Osier Dogwood	24" HEIGHT	#5 Cont.	5' O.C.
20%	80	<i>Cornus racemosa</i>	Gray Dogwood	24" HEIGHT	#5 Cont.	5' O.C.
20%	80	<i>Amelanchier alnifolia</i>	Regent Serviceberry	24" HEIGHT	#5 Cont.	5' O.C.
15%	60	<i>Rosa palustris</i>	Swamp Rose	24" HEIGHT	#5 Cont.	5' O.C.
<b>100%</b>	<b>400</b>					

- SHRUB ZONE SHALL BE PLANTED IN GROUPS OF 9-21 LIKE SPECIES GROUPED TOGETHER.
- PLANT SHRUBS IN A 5'-5' GRID TO ALLOW FOR MOWING/ MAINTENANCE.

## UPLAND PERENNIAL ZONES

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
40%	90	<i>Arunco dioicous</i>	White Goat's Beard	0	90	2.5' O.C.
20%	130	<i>Echinacea purpurea</i>	Purple Coneflower	98	33	1.5' O.C.
20%	130	<i>Chelone obliqua</i>	Rose Turtlehead	98	33	1.5' O.C.
20%	130	<i>Zizia aurea</i>	Golden Alexanders	98	33	1.5' O.C.
<b>100%</b>	<b>650</b>	<b>Perennial Total</b>		<b>293</b>	<b>188</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	297	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	223	74	1.5' O.C.
40%	792	<i>Schizachyrium scoparium</i>	Little Bluestem	594	198	1.5' O.C.
15%	297	<i>Echinacea purpurea</i>	Purple Coneflower	223	74	1.5' O.C.
10%	198	<i>Monarda fistulosa</i>	Bee Balm	149	50	1.5' O.C.
10%	198	<i>Zizia aurea</i>	Golden Alexanders	149	50	1.5' O.C.
10%	198	<i>Solidago speciosa</i>	Showy Goldenrod	149	50	1.5' O.C.
<b>100%</b>	<b>1980</b>	<b>Perennial Total</b>		<b>1485</b>	<b>495</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	152	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	114	38	1.5' O.C.
30%	305	<i>Schizachyrium scoparium</i>	Little Bluestem	228	76	1.5' O.C.
15%	152	<i>Echinacea purpurea</i>	Purple Coneflower	114	38	1.5' O.C.
15%	152	<i>Monarda fistulosa</i>	Bee Balm	114	38	1.5' O.C.
10%	102	<i>Zizia aurea</i>	Golden Alexanders	76	25	1.5' O.C.
15%	152	<i>Solidago speciosa</i>	Showy Goldenrod	114	38	1.5' O.C.
<b>100%</b>	<b>1015</b>	<b>Perennial Total</b>		<b>761</b>	<b>254</b>	

UPLAND PERENNIAL ZONES SHALL BE PLANTED RANDOMLY WITH NO MORE THAN 5 SPECIES GROUPED TOGETHER.

## UPLAND PERENNIAL ZONES

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	6	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	4	1	1.5' O.C.
25%	9	<i>Schizachyrium scoparium</i>	Little Bluestem	7	2	1.5' O.C.
10%	4	<i>Echinacea purpurea</i>	Purple Coneflower	3	1	1.5' O.C.
10%	4	<i>Monarda fistulosa</i>	Bee Balm	3	1	1.5' O.C.
25%	9	<i>Bouteloua curtipendula</i>	Sideoats Grama	7	2	1.5' O.C.
15%	6	<i>Dalea purpurea</i>	Purple Prairie Clover	4	1	1.5' O.C.
<b>100%</b>	<b>37</b>	<b>Perennial Total</b>		<b>28</b>	<b>9</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	15	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	12	4	1.5' O.C.
25%	26	<i>Schizachyrium scoparium</i>	Little Bluestem	19	6	1.5' O.C.
10%	10	<i>Echinacea purpurea</i>	Purple Coneflower	8	3	1.5' O.C.
10%	10	<i>Monarda fistulosa</i>	Bee Balm	8	3	1.5' O.C.
25%	26	<i>Bouteloua curtipendula</i>	Sideoats Grama	19	6	1.5' O.C.
15%	15	<i>Dalea purpurea</i>	Purple Prairie Clover	12	4	1.5' O.C.
<b>100%</b>	<b>103</b>	<b>Perennial Total</b>		<b>77</b>	<b>26</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	182	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	137	46	1.5' O.C.
25%	304	<i>Schizachyrium scoparium</i>	Little Bluestem	228	76	1.5' O.C.
10%	121	<i>Echinacea purpurea</i>	Purple Coneflower	91	30	1.5' O.C.
10%	121	<i>Monarda fistulosa</i>	Bee Balm	91	30	1.5' O.C.
25%	304	<i>Bouteloua curtipendula</i>	Sideoats Grama	228	76	1.5' O.C.
15%	182	<i>Dalea purpurea</i>	Purple Prairie Clover	137	46	1.5' O.C.
<b>100%</b>	<b>1214</b>	<b>Perennial Total</b>		<b>911</b>	<b>304</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	107	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	80	27	1.5' O.C.
25%	178	<i>Schizachyrium scoparium</i>	Little Bluestem	133	44	1.5' O.C.
10%	71	<i>Echinacea purpurea</i>	Purple Coneflower	53	18	1.5' O.C.
10%	71	<i>Monarda fistulosa</i>	Bee Balm	53	18	1.5' O.C.
25%	178	<i>Bouteloua curtipendula</i>	Sideoats Grama	133	44	1.5' O.C.
15%	107	<i>Dalea purpurea</i>	Purple Prairie Clover	80	27	1.5' O.C.
<b>100%</b>	<b>710</b>	<b>Perennial Total</b>		<b>533</b>	<b>178</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	91	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	68	23	1.5' O.C.
25%	151	<i>Schizachyrium scoparium</i>	Little Bluestem	113	38	1.5' O.C.
10%	61	<i>Echinacea purpurea</i>	Purple Coneflower	45	15	1.5' O.C.
10%	61	<i>Monarda fistulosa</i>	Bee Balm	45	15	1.5' O.C.
25%	151	<i>Bouteloua curtipendula</i>	Sideoats Grama	113	38	1.5' O.C.
15%	91	<i>Dalea purpurea</i>	Purple Prairie Clover	68	23	1.5' O.C.
<b>100%</b>	<b>605</b>	<b>Perennial Total</b>		<b>454</b>	<b>151</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
15%	69	<i>Rudbeckia fulgida 'Goldsturm'</i>	Black Eyed Susan	52	17	1.5' O.C.
25%	116	<i>Schizachyrium scoparium</i>	Little Bluestem	87	29	1.5' O.C.
10%	46	<i>Echinacea purpurea</i>	Purple Coneflower	35	12	1.5' O.C.
10%	46	<i>Monarda fistulosa</i>	Bee Balm	35	12	1.5' O.C.
25%	116	<i>Bouteloua curtipendula</i>	Sideoats Grama	87	29	1.5' O.C.
15%	69	<i>Dalea purpurea</i>	Purple Prairie Clover	52	17	1.5' O.C.
<b>100%</b>	<b>463</b>	<b>Perennial Total</b>		<b>347</b>	<b>116</b>	

UPLAND PERENNIAL ZONES SHALL BE PLANTED RANDOMLY WITH NO MORE THAN 5 SPECIES GROUPED TOGETHER.

## WETLAND PERENNIAL ZONES

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	168	<i>Carex vulpinoidea</i>	Fox Sedge	126	42	1.5' O.C.
10%	48	<i>Carex stricta</i>	Tussock Sedge	36	12	1.5' O.C.
5%	24	<i>Calamagrostis canadensis</i>	Blue Joint Grass	18	6	1.5' O.C.
10%	48	<i>Iris versicolor</i>	Blue Flag Iris	36	12	1.5' O.C.
35%	168	<i>Juncus effusus</i>	Soft Rush	126	42	1.5' O.C.
5%	24	<i>Physostegia virginiana</i>	Obedient Plant	18	6	1.5' O.C.
<b>100%</b>	<b>480</b>	<b>Perennial Total</b>		<b>360</b>	<b>120</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	163	<i>Carex vulpinoidea</i>	Fox Sedge	123	41	1.5' O.C.
10%	47	<i>Carex stricta</i>	Tussock Sedge	35	12	1.5' O.C.
5%	23	<i>Calamagrostis canadensis</i>	Blue Joint Grass	18	6	1.5' O.C.
10%	47	<i>Iris versicolor</i>	Blue Flag Iris	35	12	1.5' O.C.
35%	163	<i>Juncus effusus</i>	Soft Rush	123	41	1.5' O.C.
5%	23	<i>Physostegia virginiana</i>	Obedient Plant	18	6	1.5' O.C.
<b>100%</b>	<b>467</b>	<b>Perennial Total</b>		<b>350</b>	<b>117</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	345	<i>Carex vulpinoidea</i>	Fox Sedge	259	86	1.5' O.C.
10%	99	<i>Carex stricta</i>	Tussock Sedge	74	25	1.5' O.C.
5%	49	<i>Calamagrostis canadensis</i>	Blue Joint Grass	37	12	1.5' O.C.
10%	99	<i>Iris versicolor</i>	Blue Flag Iris	74	25	1.5' O.C.
35%	345	<i>Juncus effusus</i>	Soft Rush	259	86	1.5' O.C.
5%	49	<i>Physostegia virginiana</i>	Obedient Plant	37	12	1.5' O.C.
<b>100%</b>	<b>987</b>	<b>Perennial Total</b>		<b>740</b>	<b>247</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	287	<i>Carex vulpinoidea</i>	Fox Sedge	215	72	1.5' O.C.
10%	82	<i>Carex stricta</i>	Tussock Sedge	61	20	1.5' O.C.
5%	41	<i>Calamagrostis canadensis</i>	Blue Joint Grass	31	10	1.5' O.C.
10%	82	<i>Iris versicolor</i>	Blue Flag Iris	61	20	1.5' O.C.
35%	287	<i>Juncus effusus</i>	Soft Rush	215	72	1.5' O.C.
5%	41	<i>Physostegia virginiana</i>	Obedient Plant	31	10	1.5' O.C.
<b>100%</b>	<b>819</b>	<b>Perennial Total</b>		<b>614</b>	<b>205</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	364	<i>Carex vulpinoidea</i>	Fox Sedge	273	91	1.5' O.C.
10%	104	<i>Carex stricta</i>	Tussock Sedge	78	26	1.5' O.C.
5%	52	<i>Calamagrostis canadensis</i>	Blue Joint Grass	39	13	1.5' O.C.
10%	104	<i>Iris versicolor</i>	Blue Flag Iris	78	26	1.5' O.C.
35%	364	<i>Juncus effusus</i>	Soft Rush	273	91	1.5' O.C.
5%	52	<i>Physostegia virginiana</i>	Obedient Plant	39	13	1.5' O.C.
<b>100%</b>	<b>1040</b>	<b>Perennial Total</b>		<b>780</b>	<b>260</b>	

%	Quantity	Scientific Name	Common Name	Plug	3.5" Pot	Spacing
35%	369	<i>Carex vulpinoidea</i>	Fox Sedge	277	92	1.5' O.C.
10%	105	<i>Carex stricta</i>	Tussock Sedge	79	26	1.5' O.C.
5%	53	<i>Calamagrostis canadensis</i>	Blue Joint Grass	40	13	1.5' O.C.
10%	105	<i>Iris versicolor</i>	Blue Flag Iris	79	26	1.5' O.C.
35%	369	<i>Juncus effusus</i>	Soft Rush	277	92	1.5' O.C.
5%	53	<i>Physostegia virginiana</i>	Obedient Plant	40	13	1.5' O.C.
<b>100%</b>	<b>1054</b>	<b>Perennial Total</b>		<b>791</b>	<b>264</b>	

WETLAND PERENNIAL ZONES SHALL BE PLANTED RANDOMLY WITH NO MORE THAN 5 SPECIES GROUPED TOGETHER.

6				
5				
4	9-12-2011	BA		FINAL
3	8-18-2011	BA		100% DRAFT REVIEW
2	DATE	BA		75% DRAFT REVIEW
1	DATE	BA		40% DRAFT REVIEW
NO	DATE	BY		REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*K. B.*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011

SUBMISSION DATE:  
09-12-2011

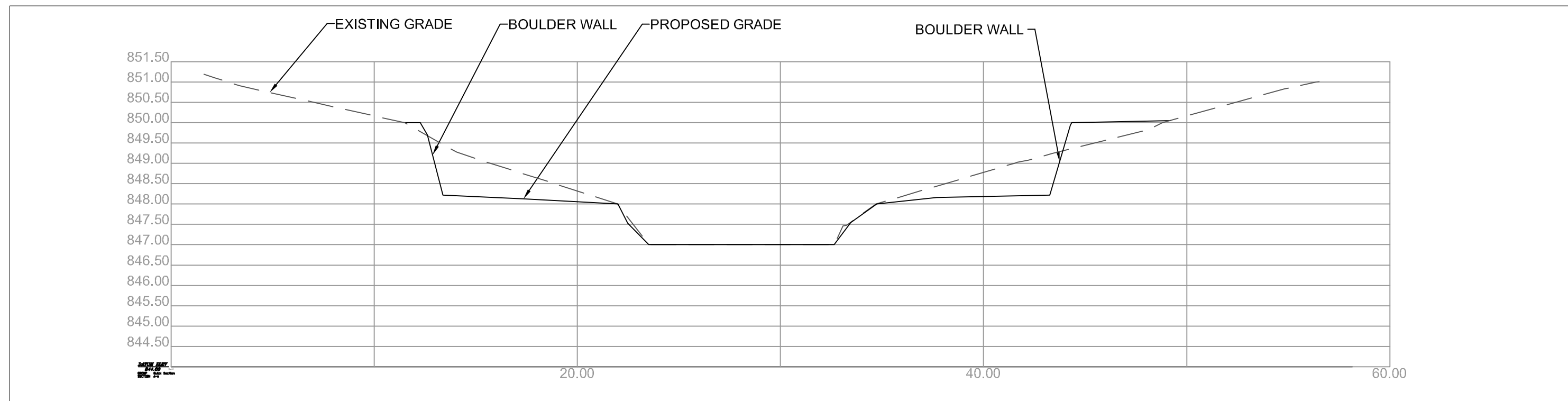
DESIGN BY: KDB  
DRAWN BY: BA

EOR PROJECT NO.  
00041-0176

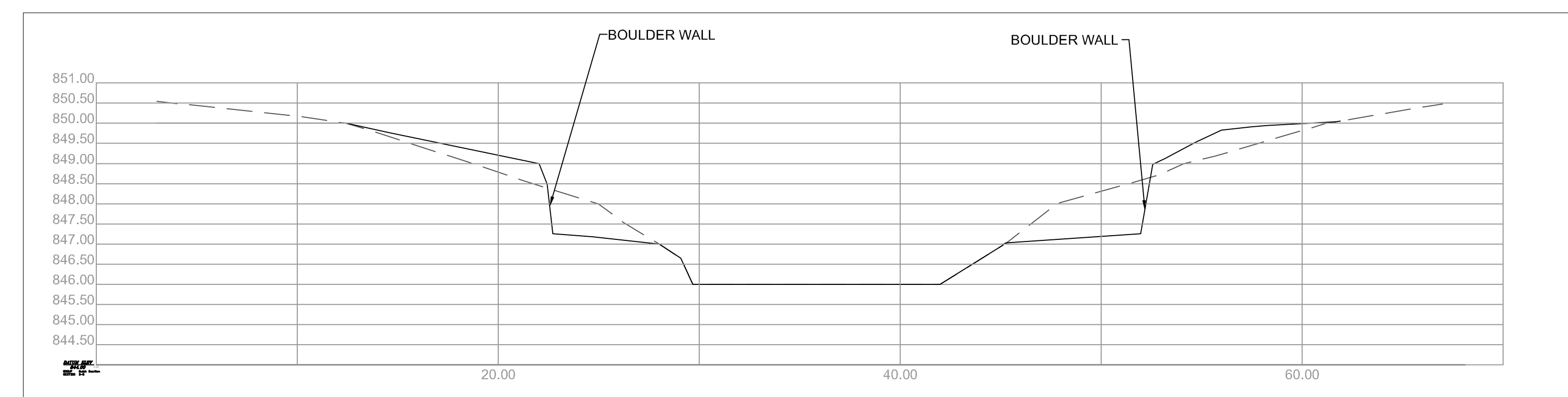
**EOR** Emmons & Olivier  
 Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK  
 WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

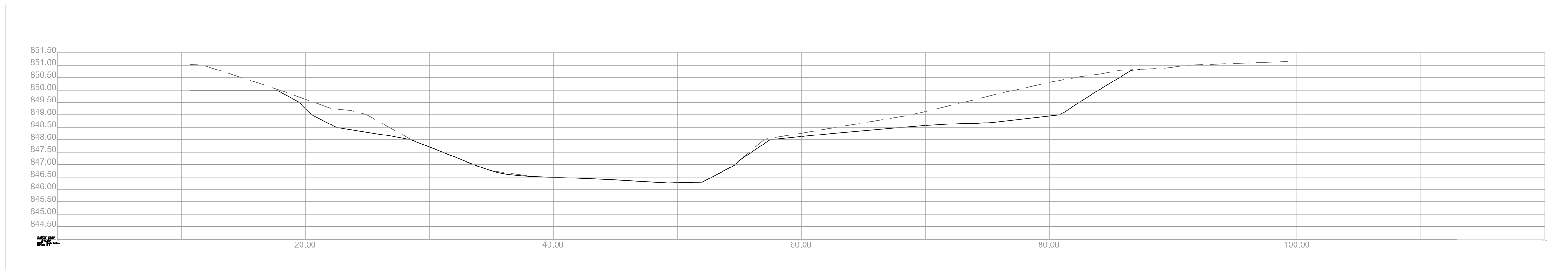
**BCWD - OAK GLEN GOLF COURSE**



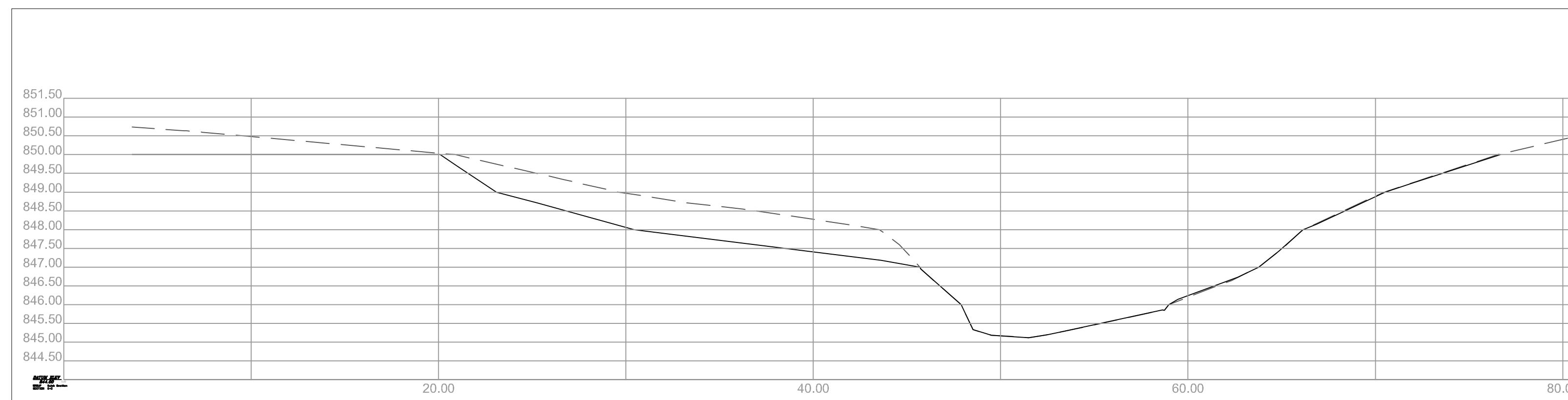
1  
10 CROSS SECTION A-A'  
HORIZONTAL SCALE: 1" = 5'-0"



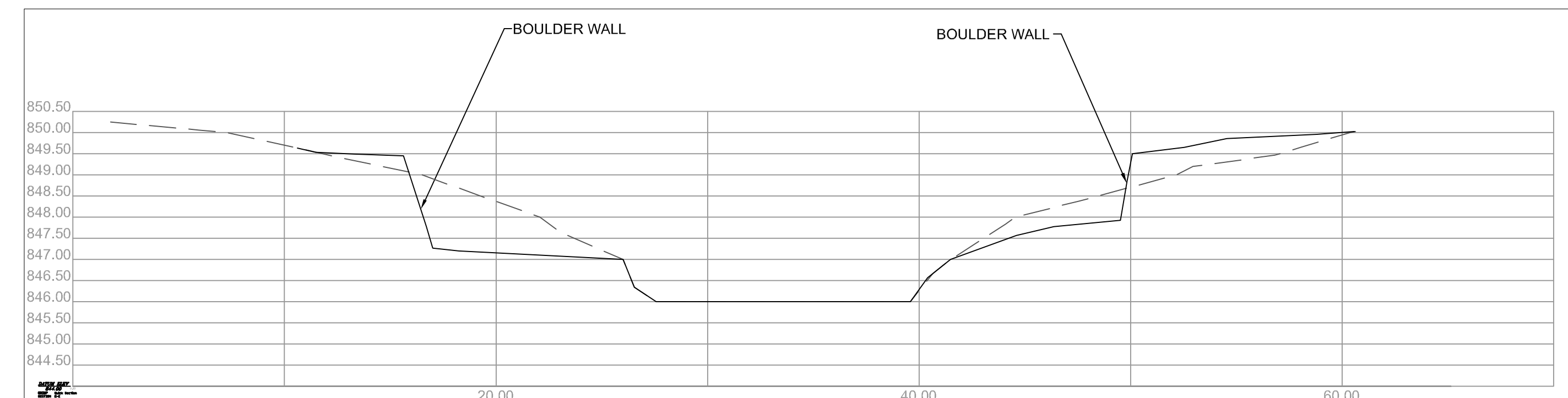
4  
10 CROSS SECTION D-D'  
HORIZONTAL SCALE: 1" = 5'-0"



2  
10 CROSS SECTION B-B'  
HORIZONTAL SCALE: 1" = 5'-0"



3  
10 CROSS SECTION C-C'  
HORIZONTAL SCALE: 1" = 5'-0"



5  
10 CROSS SECTION E-E'  
HORIZONTAL SCALE: 1" = 5'-0"

Plot Date: 09/15/2011  
 Drawing Path: \\P01\041\_BCHWD0176\_2011\_CWF\_Grnt\_Crk\_Ckm\_Thermal\_ReductionsOak Glen.dwg(ETALS.dwg)  
 User: BASS-MORNING

6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.  
  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

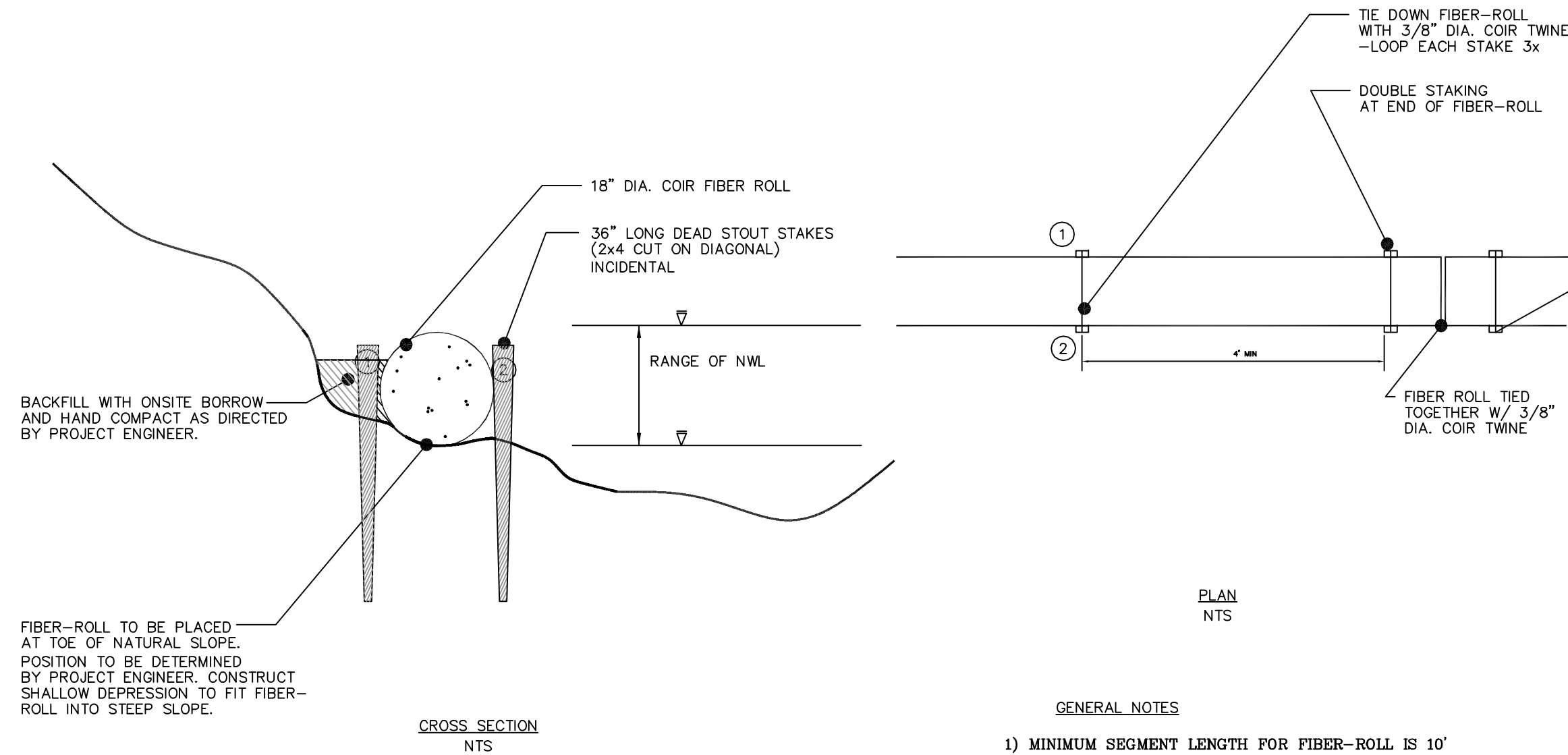
SUBMISSION DATE:  
 09-12-2011  
 DESIGN BY: KDB  
 DRAWN BY: BA  
 EOR PROJECT NO.  
 00041-0176

**EOE** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

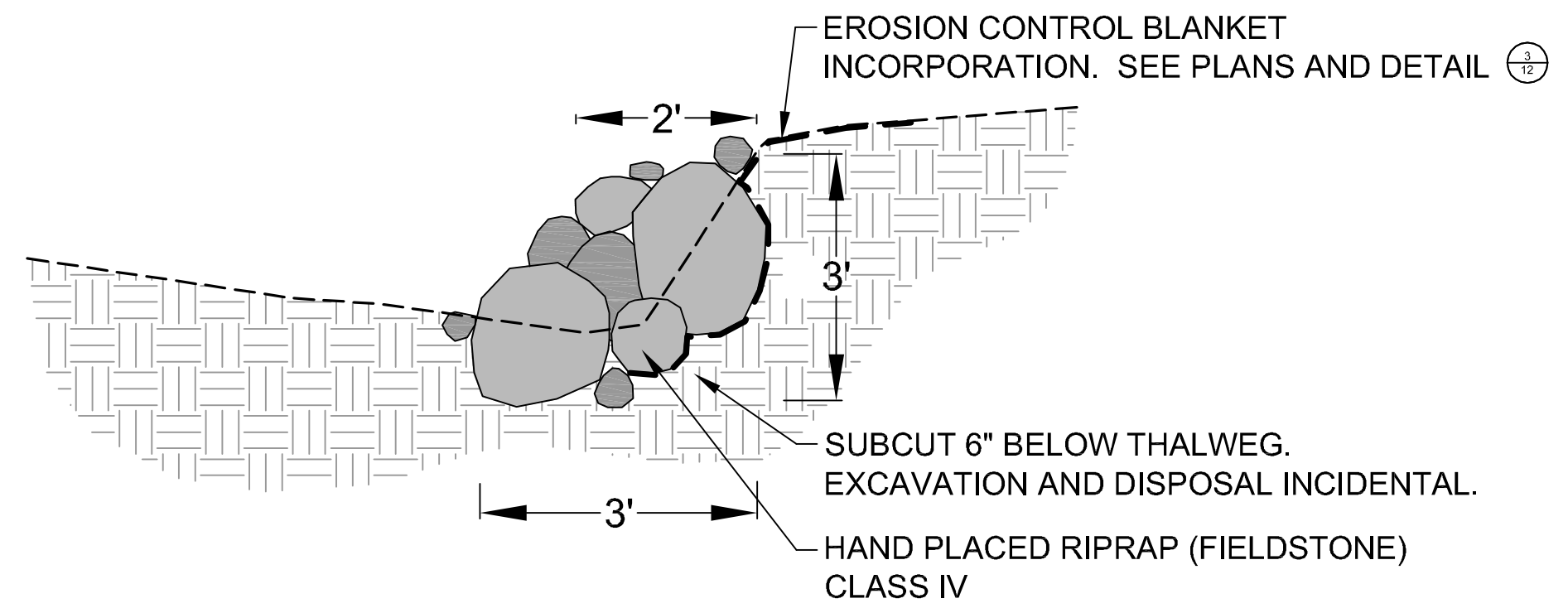
**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

DETAILS - CROSS SECTIONS  
 SHEET 10 OF 13 SHEETS

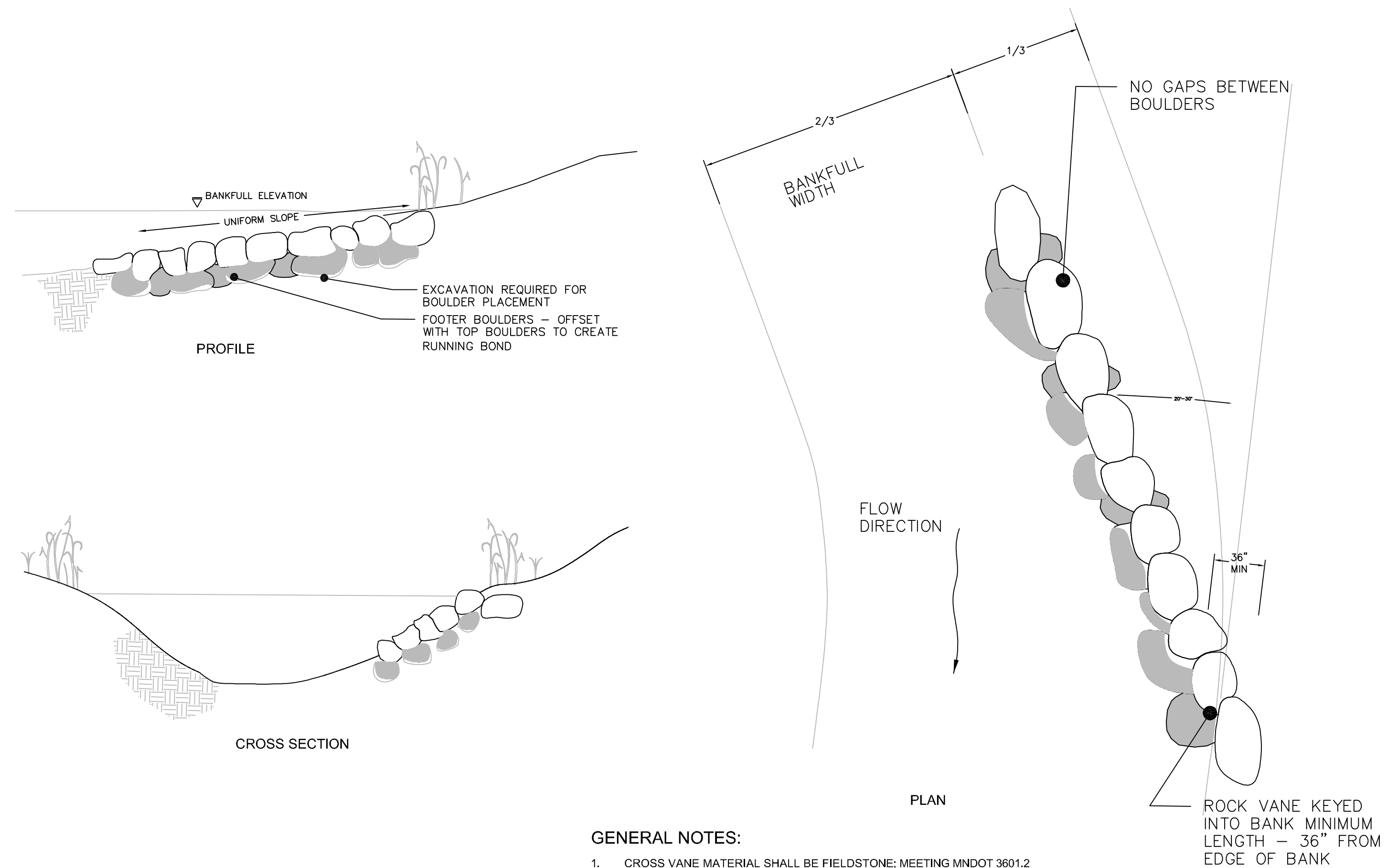


- GENERAL NOTES**
- 1) MINIMUM SEGMENT LENGTH FOR FIBER-ROLL IS 10'
  - 2) COIR FIBER-ROLLS SHALL CONTAIN NO SYNTHETIC MATERIALS
  - 3) LOCATION/POSITION TO BE APPROVED BY PROJECT ENGINEER

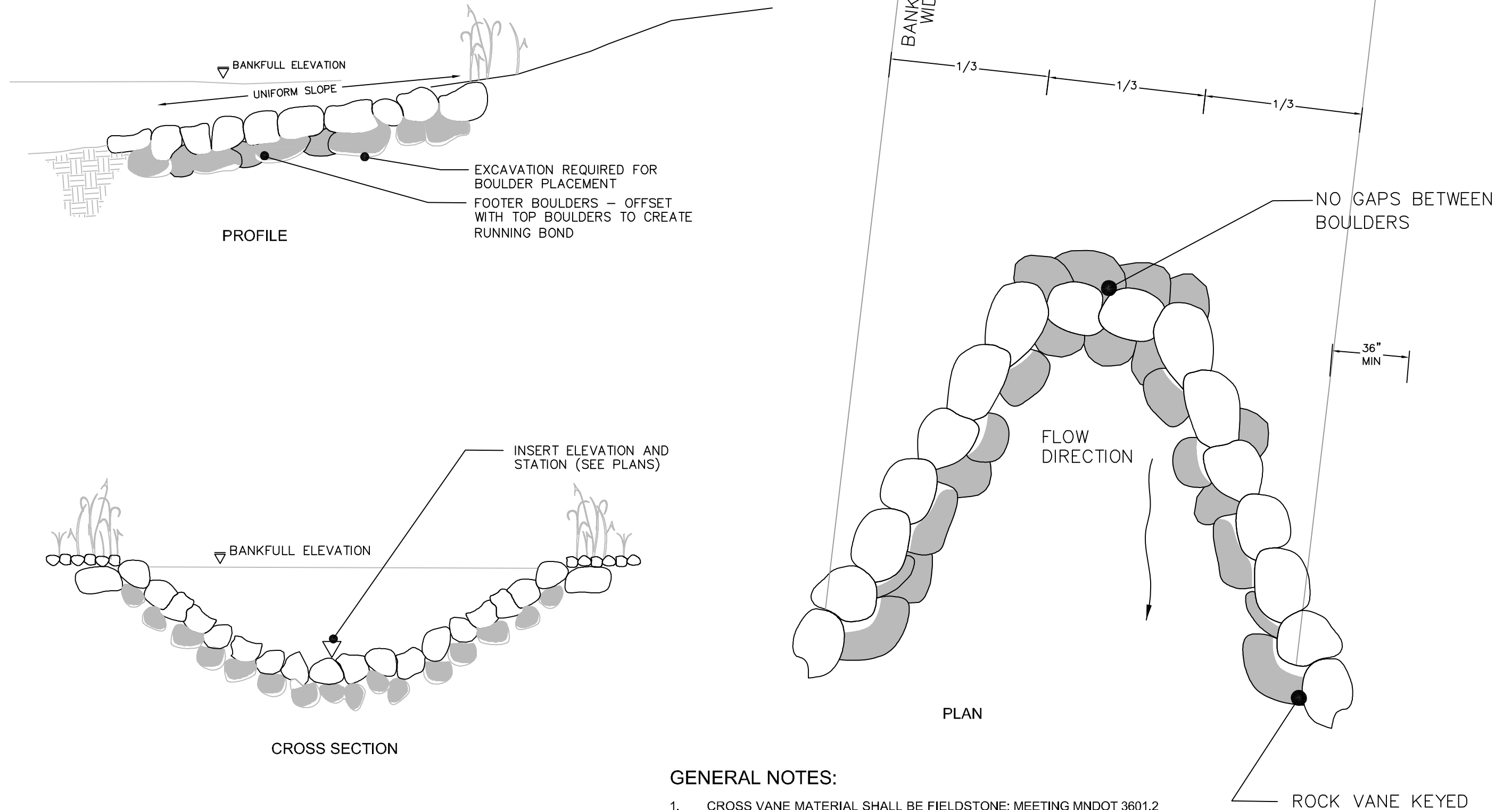


**3 BOULDER TOE DETAIL (TYPICAL)**  
11 NTS

**1 FIBER LOG (TYPICAL)**  
11 NTS



- GENERAL NOTES:**
1. CROSS VANE MATERIAL SHALL BE FIELDSTONE; MEETING MNDOT 3601.2 SPECIFICATIONS
  2. FIELDSTONE RIPRAP SHALL CONFORM TO SPECIFIED SIZE CLASS
  3. POSITION OF SINGLE VANE TO BE APPROVED BY PROJECT ENGINEER



- GENERAL NOTES:**
1. CROSS VANE MATERIAL SHALL BE FIELDSTONE; MEETING MNDOT 3601.2 SPECIFICATIONS
  2. FIELDSTONE RIPRAP SHALL CONFORM TO SPECIFIED SIZE CLASS
  3. POSITION OF CROSS VANE TO BE APPROVED BY PROJECT ENGINEER

**4 CROSS VANE DETAILS**  
11 NTS

**2 SINGLE VANE DETAILS**  
11 NTS

Plot Date: 09/15/2011  
 Drawing Path: \\P01\work\1101\1101\_041\_BCD\1101\_041\_CNF\_Cant\_Coat\_Glen\_Thermal\_Reductions\Oak\_Glen\1101\_041\_CNF\_Cant\_Coat\_Glen\_Thermal\_Reductions.dwg  
 User: BASS-MORNING

NO	DATE	BY	REVISION
6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT 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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*K. D. Biehn*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

SUBMISSION DATE:  
09-12-2011

DESIGN BY: KDB DRAWN BY: BA

EOR PROJECT NO.  
00041-0176

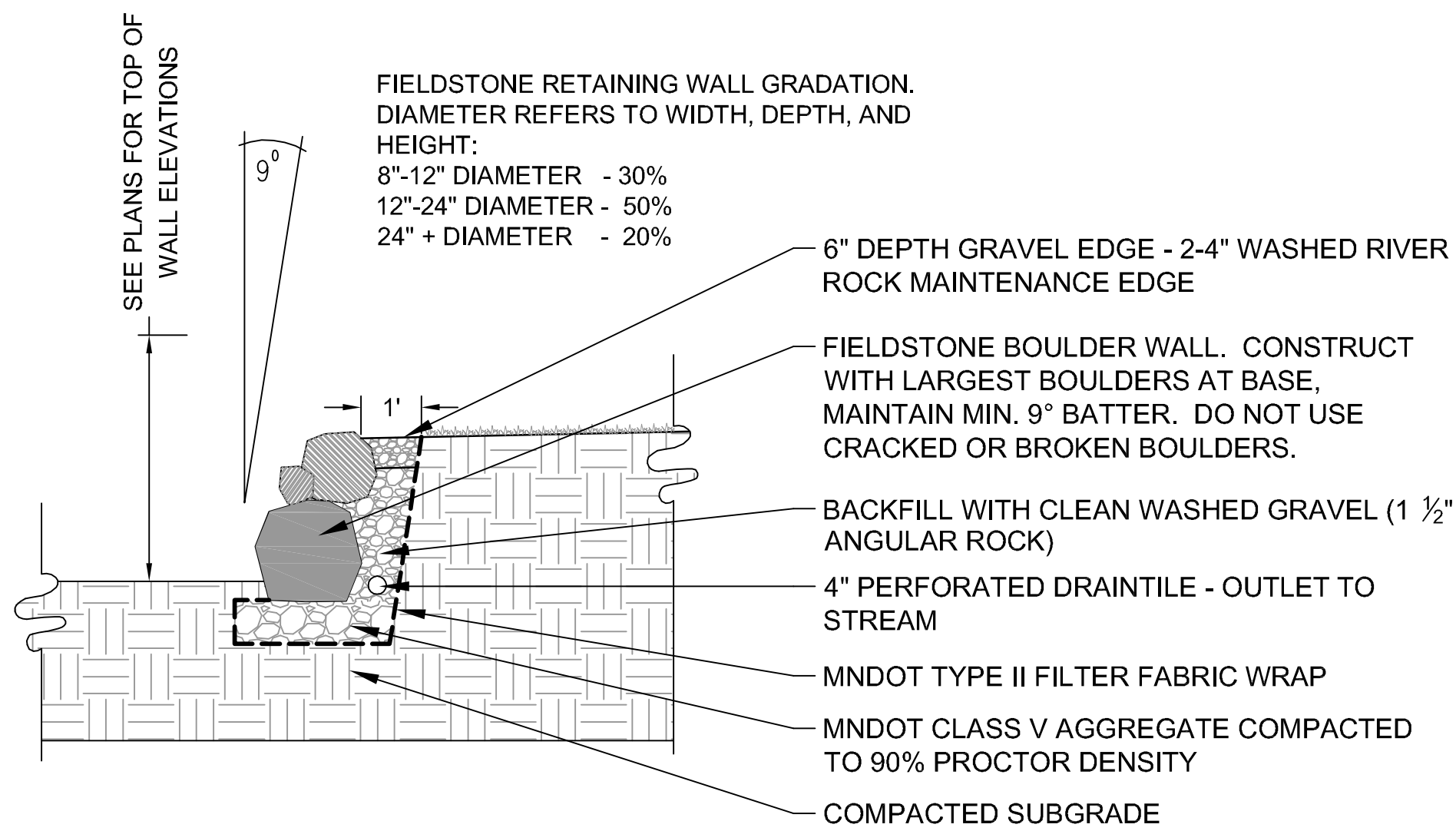
**EOR** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

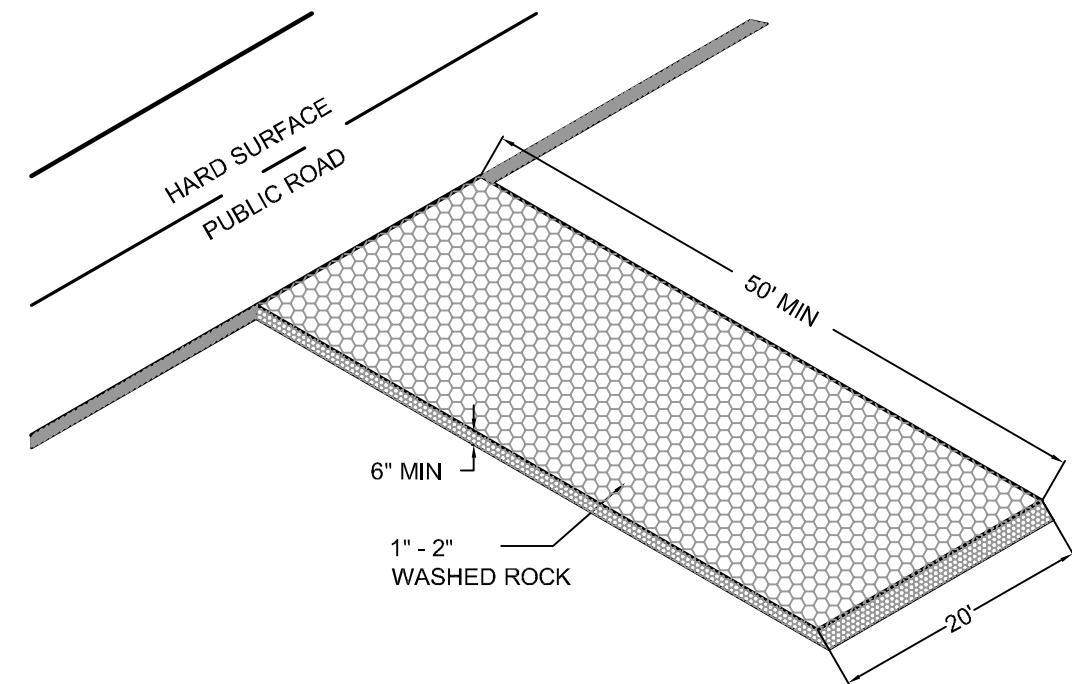
DETAILS - INSTREAM MEASURES

SHEET 11 OF 13 SHEETS

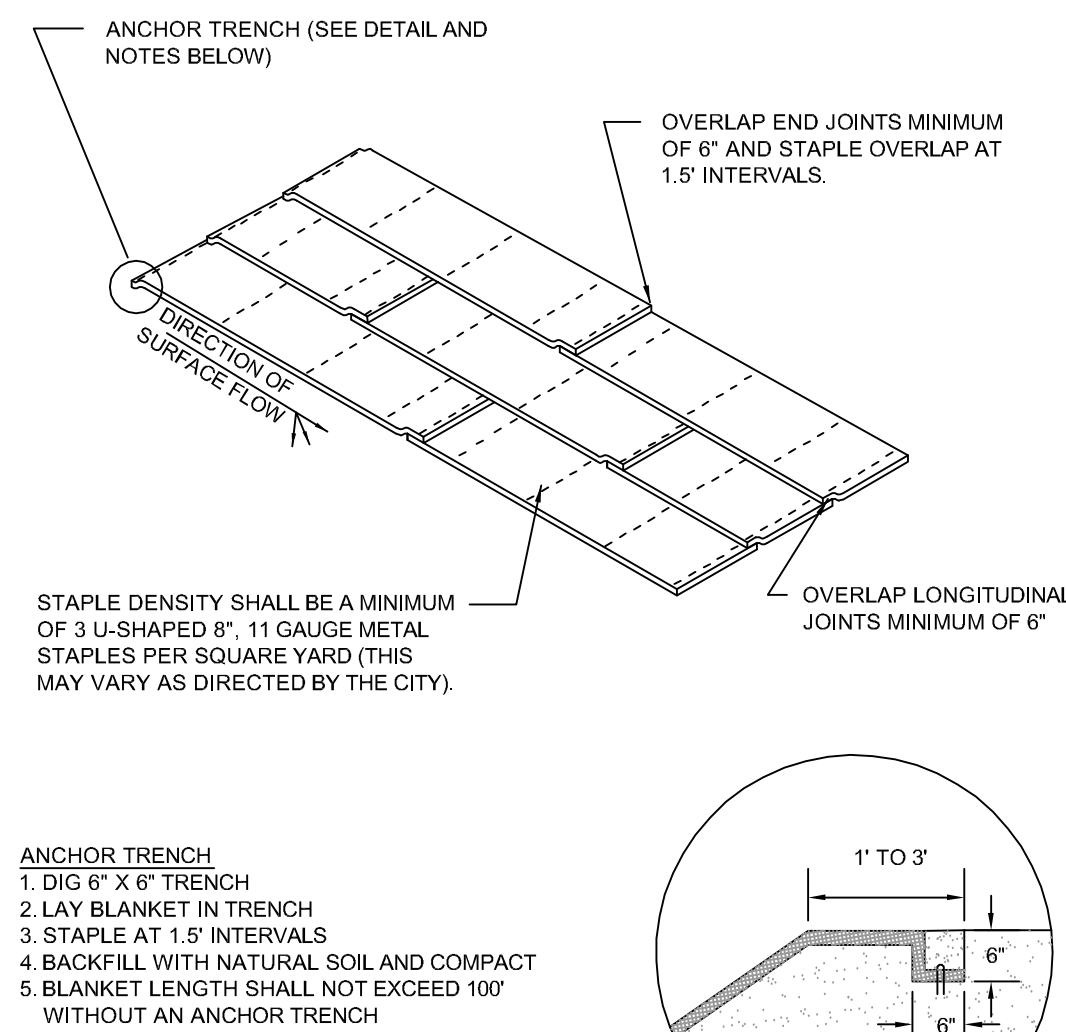


NOTE: ALL ELEMENTS SHOWN IN BOULDER WALL CONSTRUCTION DETAIL ARE INCIDENTAL TO COST.

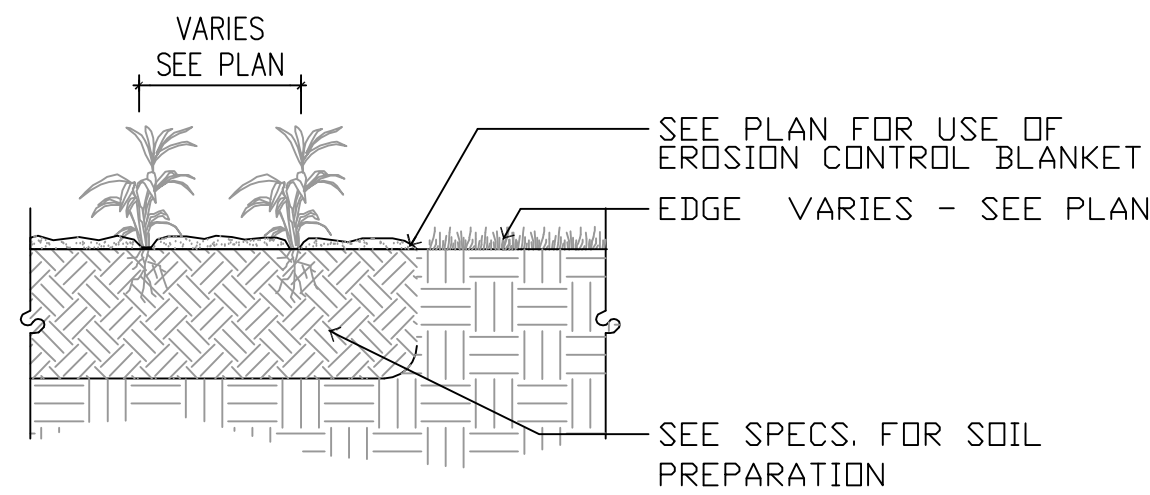
1  
12 NTS  
**FIELDSTONE BOULDER RETAINING WALL**



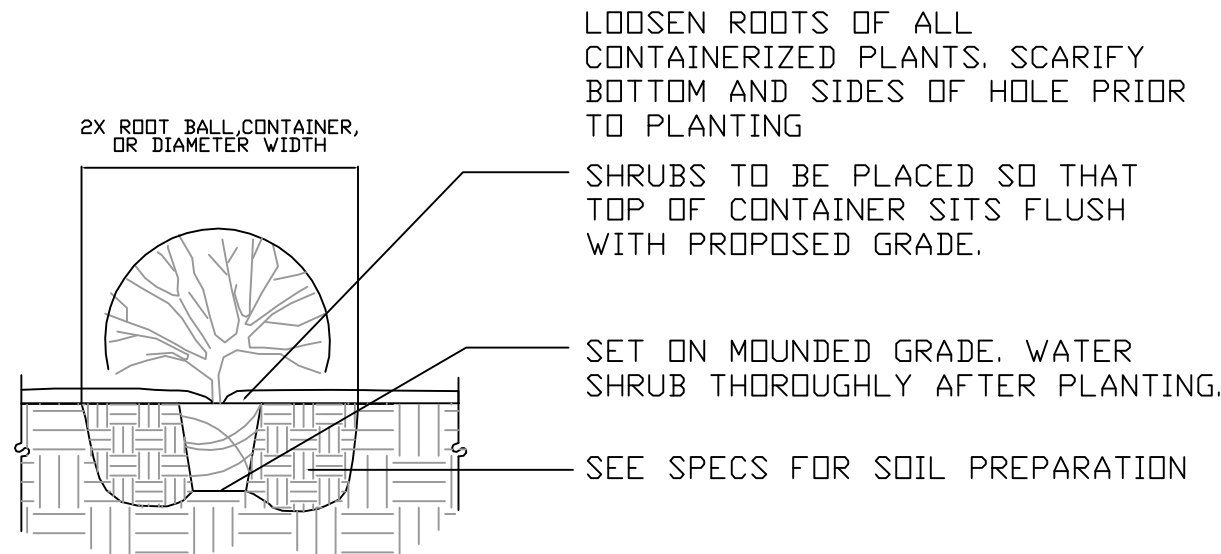
2  
12 NTS  
**ROCK CONSTRUCTION ENTRANCE**



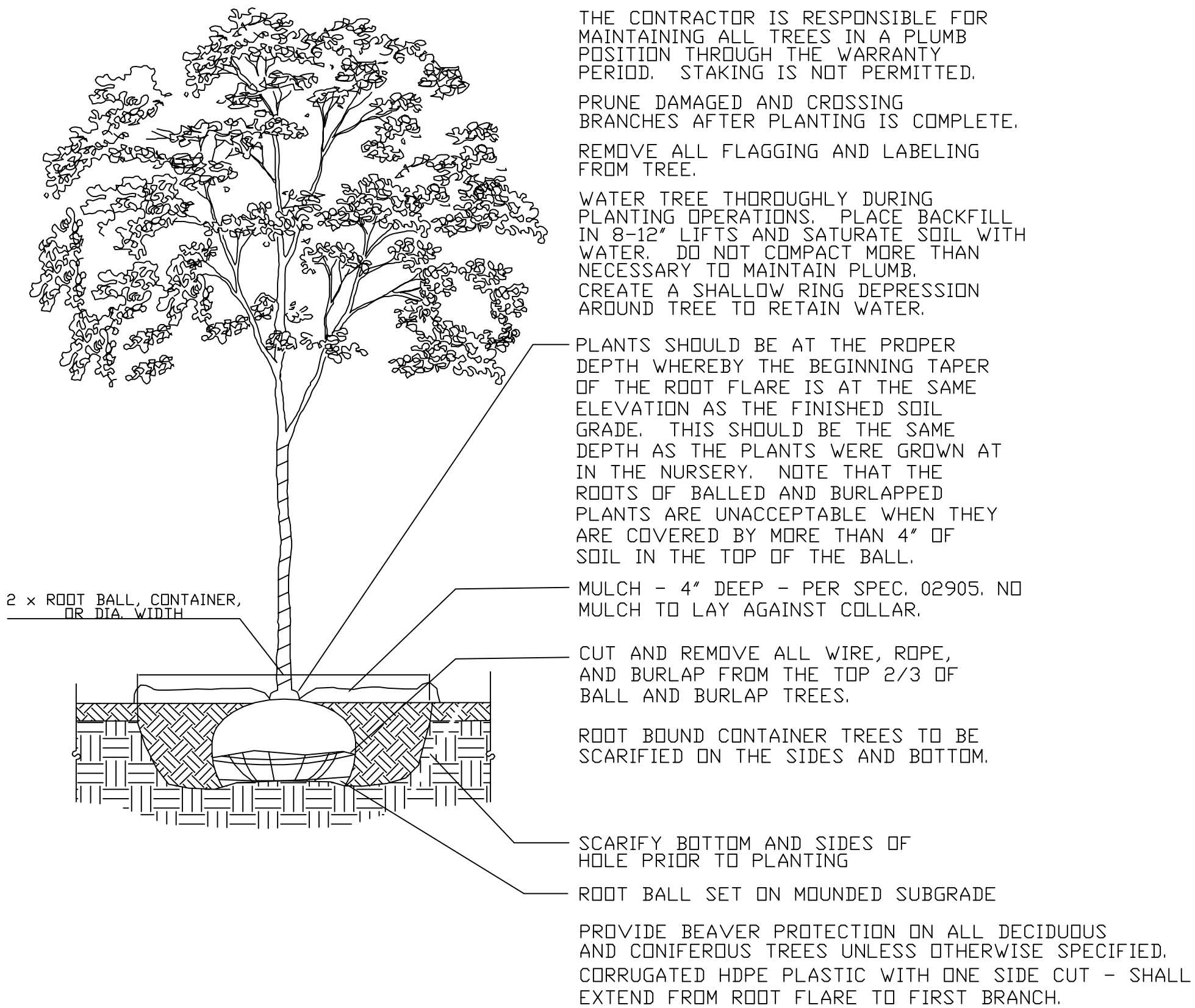
3  
12 NTS  
**EROSION CONTROL BLANKET INSTALLATION**



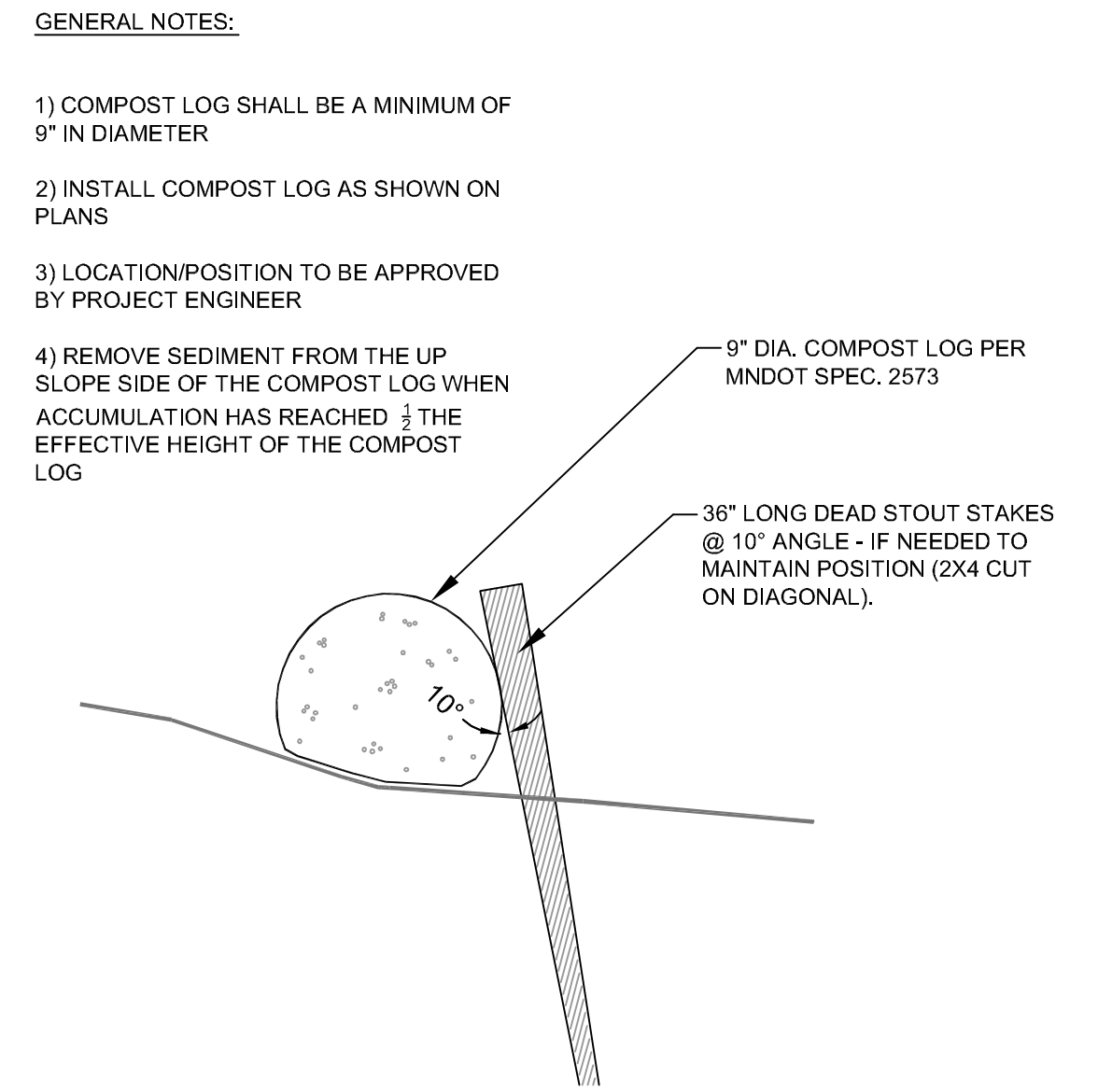
4  
12 NTS  
**PERENNIAL PLANTING DETAIL**



5  
12 NTS  
**DECIDUOUS SHRUB PLANTING DETAIL**



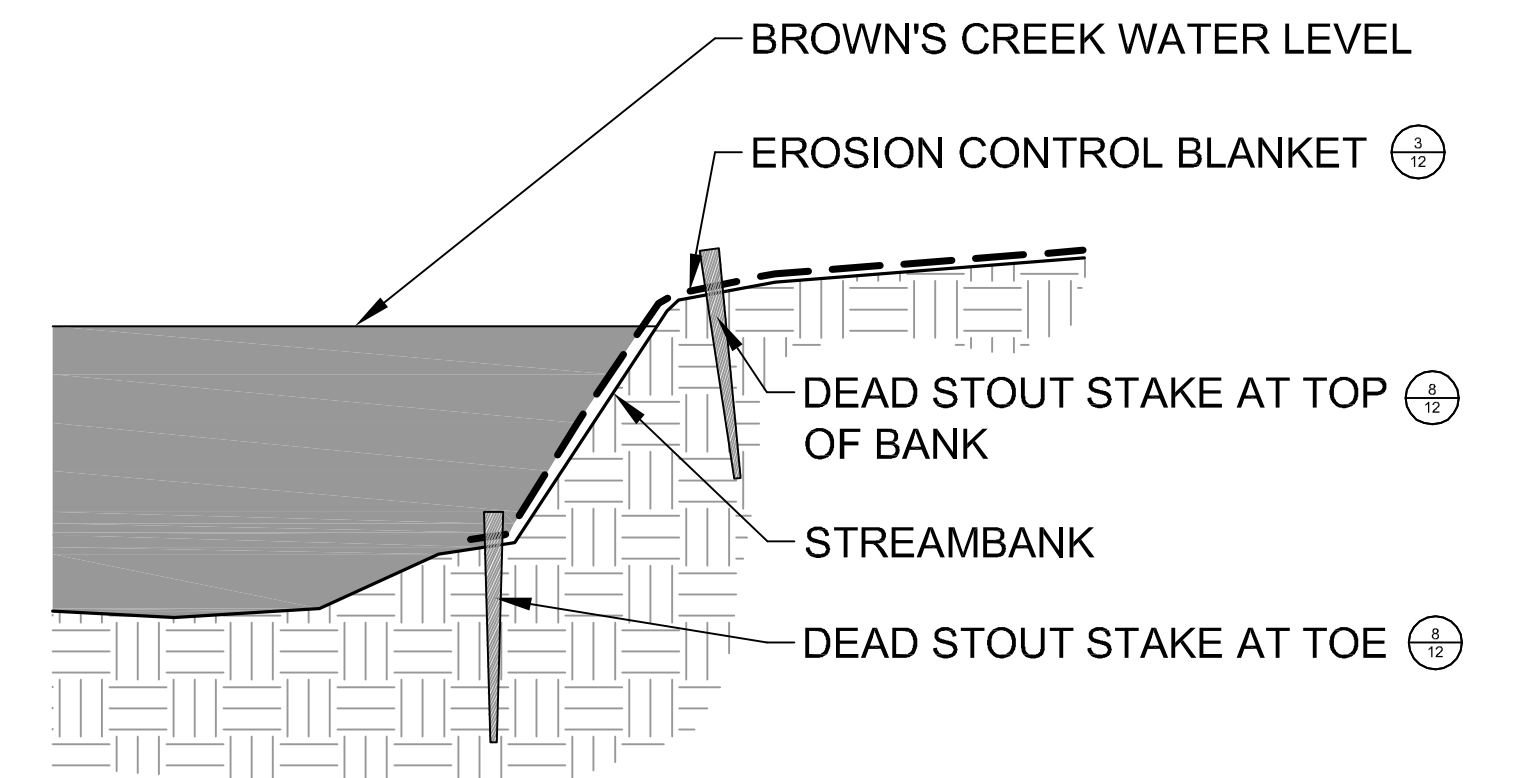
6  
12 NTS  
**DECIDUOUS TREE PLANTING DETAIL**



7  
12 NTS  
**COMPOST SOCK DETAIL**



8  
12 NTS  
**DEAD STOUT STAKE DETAIL**



9  
12 NTS  
**EROSION CONTROL BLANKET INSTALLATION ON STREAM BANK**

Plot Date: 09/15/2011  
 Drawing Path: \\P01\work\2011\BCWD\0176\_2011\_CNF\_Grant\_Coak\_Glen\_Thermal\_Reductions\Oak\_Glen\Drawings\DETAILS.dwg  
 User: J. BASS-MORNING

6				
5				
4	9-12-2011	BA		FINAL
3	8-18-2011	BA		100% DRAFT REVIEW
2	DATE	BA		75% DRAFT REVIEW
1	DATE	BA		40% DRAFT REVIEW
NO	DATE	BY		REVISION

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*K. D. Biehn*  
 KEVIN D. BIEHN  
 DATE: 09-12-2011 LICENSE # 42629

SUBMISSION DATE:  
 09-12-2011

DESIGN BY: KDB DRAWN BY: BA

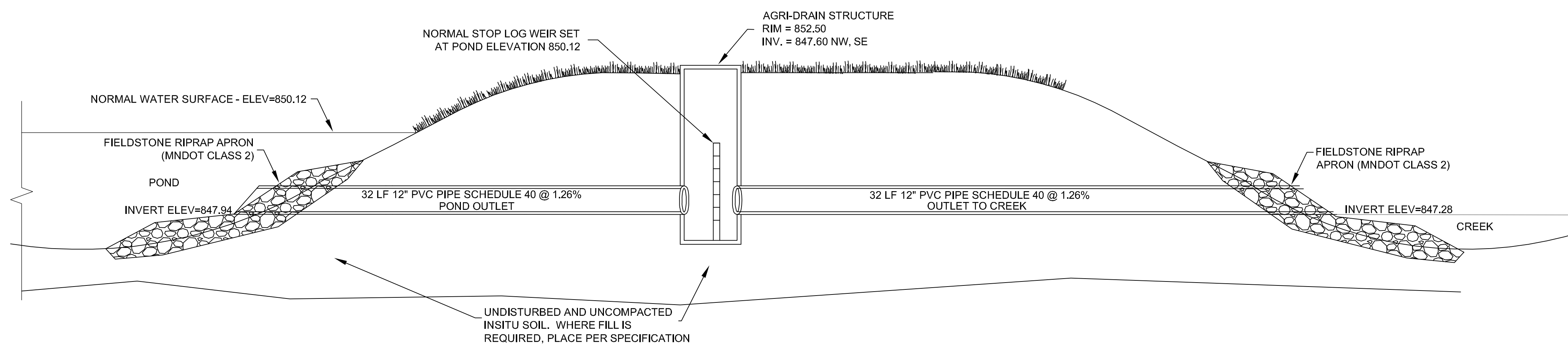
EOR PROJECT NO.  
 00041-0176

**EOR** Emmons & Olivier Resources, Inc.  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA


DETAILS - GENERAL  
 SHEET 12 OF 13 SHEETS



1  
13 POND OUTLET CONTROL STRUCTURE DETAIL  
NTS

Plot Date: 09/16/2011  
 Drawing Path: \\P01\Projects\2011\BCWD\016\_2011\_CWF\_Grant\_Cork\_Site\_Thermal\_Reductions\Oak\_Glen\dwg\DET\ALS.dwg  
 User: BUSEY\BUSEY

6			
5			
4	9-12-2011	BA	FINAL
3	8-18-2011	BA	100% DRAFT REVIEW
2	DATE	BA	75% DRAFT REVIEW
1	DATE	BA	40% DRAFT REVIEW
NO	DATE	BY	REVISION

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.  
  
 Rich Romness  
 DATE: 8/11/2011 LICENSE # 22921

SUBMISSION DATE:  
 09-12-2011  
 DESIGN BY: KDB DRAWN BY: BA  
 EOR PROJECT NO.  
 00041-0176


**Emmons & Olivier Resources, Inc.**  
 651 Hale Avenue North  
 Oakdale, MN 55128  
 Tele: 651.770.8448  
 www.eorinc.com

**BROWN'S CREEK WATERSHED DISTRICT**  
 1380 W. FRONTAGE RD, HWY 36  
 STILLWATER, MN 55082

**BCWD - OAK GLEN GOLF COURSE STREAM AND BUFFER IMPROVEMENTS**  
 STILLWATER, MN  
 STATE PROJECT NO. NA CITY PROJECT NO. NA

DETAILS - OUTLET STRUCTURE  
 SHEET 13 OF 13 SHEETS