



Milwaukee County Parks

9480 Watertown Plank Rd
Wauwatosa, WI 53226

Permit Fee WAIVED

Right of Entry Permit

Restoration Bond Amount _____

Date: 05/22/18

Expiration Date of Permit: 12/31/21

Permittee: River Revitalization Foundation

Contractor: Applied Ecological Services

Contact: Aaron Zeleske Greenway Director

Contact: Tom Tilkens

Address: 2134 Riverboat Rd. Milwaukee, WI 53212

Address: 430 S Curtis Rd, West Allis, WI 53214

Phone: (414) 271-8000

Phone: (920) 606-8232

E-Mail: azeleske@riverrevitalizationfoundation.org

E-Mail: Tom.tilkens@appliedeco.com

To Enter: Milwaukee River

Location of Cross Streets: N. Humboldt Blvd, and E. of Capitol Drive

Purpose:

To gain access to Milwaukee County Parks land located along N. Humboldt Blvd, just SE of E. Capitol Drive for implementation of a bluff restoration and improvement project. Applied Ecological Service plans to complete slope stabilization to repair slope washouts, install stairway access to base of slope, and install a rustic trail along the Milwaukee River. Removal of invasive plant species, including the removal of all undesirable/invasive woody species and trees with a DBH of less than 6" will also be part of the project. Bluff and nearby areas will be seeded with native seed mixes and no native trees will be removed unless determined dead or will be a significant restraint to construction activities. The project will be implemented per the attached AES plans dated May 15, 2018, and related schematics. AES will maintain native plantings for a period of three years.

Conditions:

This Right-of-Entry Permit ("ROE") is issued by the Milwaukee County Department of Parks, Recreation and Culture (the "County") with the express condition that all work by Permittee be performed and completed according to submitted plans, specifications, information and all of the terms and conditions stated herein. Permittee, its agents and contractors agree to comply with all of the following conditions and requirements:

1. Permittee shall furnish to County any and all drawings, details and specifications as appropriate to identify the land to be entered, proposed access routes, proposed vegetation pruning or removal, the location and construction methods for any proposed work, and complete site restoration plan.
2. Permittee assumes all responsibility for and shall indemnify and hold Milwaukee County harmless from any claims, liability, loss, damage or expense for any person's injury or death or any damage to property either real or personal that results from any act or omission of the Permittee, or its agents or contractors which may arise out of or are connected with the activities covered by this ROE. This indemnification is unlimited as to dollar amount.



3. Permittee shall, to the fullest extent provided for under any environmental laws, rules and regulations, be responsible for any required repair, clean-up, remediation or detoxification arising out of (1) any Hazardous Materials brought onto or introduced into the Project Area or surrounding areas by Permittee, or its agents or (2) any Hazardous Materials whose presence pre-exists the commencement of Permittee's, or its agents construction activities located in and on the Project Area, that are discovered or disturbed as a result of Permittee's, or its agents construction activities on, at or near the Project Area. Permittee shall indemnify, defend and hold the County harmless from any liability, cost, damage, claim or injury (including reasonable attorney fees) arising therefrom. Moreover, Permittee shall remediate and restore any affected area to at least the minimum standards as required by the WDNR or other applicable regulatory agencies.

“Hazardous Materials” as the term is used herein shall mean any substance: (i) the presence of which requires investigation or remediation under any federal, state or local statute, regulation, ordinance, order, action, or policy; or (ii) which is or becomes defined as a “hazardous waste” or “hazardous substance” under any federal, state, or local statute, regulation, ordinance, or amendments thereto, including without limitation, the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. §9601 et seq.), or the Resource Conservation and Recovery Act (42 U.S.C. §6901, et seq.); or (iii) which is toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or otherwise hazardous and is or becomes regulated by any governmental authority, agency, department, commission, board, agency or instrumentality of the United States, the State of Wisconsin, or any political subdivision thereof; or (iv) the presence of which on lands within the Project Area causes or threatens to cause a nuisance upon the Project Area or surrounding area or poses or threatens to pose a hazard to the Project Area or surrounding areas or to the health or safety of persons on or about the Project Area; or (v) which contains gasoline, diesel fuel, or other petroleum hydrocarbons; or (vi) which contains polychlorinated biphenyls (PCBs), asbestos, or urea formaldehyde foam insulation.

“Environmental Regulations” means all applicable past, present, and future statutes, regulations, rules, ordinances, codes, licenses, permits, orders, approvals, plans, authorizations, concessions, franchises, and similar items of all governmental agencies, departments, commissions, boards, bureaus, or instrumentalities of the United States, the State of Wisconsin, and political subdivisions thereof and all applicable judicial and administrative and regulatory decrees, judgments, and orders related to the protection of human health or the environment, including, without limitation: (i) all requirements, including, but not limited to, those pertaining to reporting, licensing, permitting, investigation and remediation of emissions, discharges, releases or threatened releases of Hazardous Materials, chemicals, substances, pollutants, contaminants, or hazardous or toxic substances, materials, or wastes, whether solid, liquid, or gaseous in nature, and (ii) all requirements pertaining to the protection of the health and safety of employees or the public.

4. Permittee shall pay all costs associated with this ROE, including the costs related to obtaining any required permits or approvals required by any other government agencies or adjacent landowners, utilities or easement holders impacted by this work. Existing County owned utilities shall be located and identified by hot-lining prior to the start of proposed work, and properly protected, repaired or replaced if damaged during the work covered under this ROE.
5. Permittee or its agents shall comply with any and all laws, requirements, approvals, and obtain any licenses or permits, required by local municipalities or other regulatory agencies.
6. Permittee shall protect and avoid damage to any part of the Project Area and surrounding areas to ensure the safety of Permittee's or its agent's personnel, County staff and all park users. Permittee shall also provide and install all safety devices, barricades, signs, flag person(s) or other measures as needed to comply. Permittee shall conduct reasonable and appropriate restoration work to correct any rutting, re-seed disturbed areas, prevent the spread of invasive species, repair any damage to trails, and take the necessary steps to safely work in any environmentally sensitive areas. Permittee shall “decontaminate” their equipment before arriving and/or leaving a project area in order to prevent the spread of invasive species."
7. Permittee shall protect existing trees, shrubs, sensitive wildlife habitat, delineated wetlands and wetland plants, and other vegetation located at or near the Project Area and surrounding areas of the construction site that this ROE grants access to.



MilwaukeeCountyParks

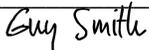
countyparks.com



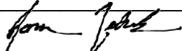
8. Roadways, parking lots, bicycle/recreation trails, sidewalks, and other County owned property located at or near the Project Area that this ROE grants Permittee access to must be kept clean and free of soil, rock, stone, and debris at all times. No materials or equipment may be placed, stockpiled, or stored on County owned property that is not included in this ROE. County owned and operated roadways, parking lots, bicycle/recreation trails, and sidewalks shall not be obstructed or closed without written permission from County.
9. Construction or work related vehicles and equipment shall not be operated upon County owned roadways, parking lots, bicycle/recreation trails, sidewalks, or surrounding areas of the Project Area not included in this ROE without prior written permission from County.
10. Upon completion of all work Permittee shall restore any and all damage to County owned property included in the ROE and surrounding areas of the Project Area caused by Permittee or its agents. Required repairs or restoration shall be made to a preconstruction condition, or better, at no expense to County and to the County's satisfaction.
11. In the event of an abandonment or non-use of any structures, improvements or facilities on County owned property allowed by this ROE, or if the County requires the relocation or removal of any structures, improvements or facilities, Permittee shall, within sixty (60) days after notification by County, remove or relocate them as directed at no cost to the County.
12. Permittee is required to contact **Diggers Hotline (1-800-242-8511)** regarding potential utilities located within the Project Area allowed by this ROE a minimum of five (5) business days before commencing work.
13. Permittee is required to contact **Blake Prusak, Parks Mechanical Services Manager, at phone number (414) 258-2322,** regarding potential County utilities located within the Project Area allowed by this ROE a minimum of five (5) business days before commencing work.
14. Permittee is required to contact, **Brad Drefcinski at 414-257-4772 OR Bradford.Drefcinski@milwaukeecountywi.gov** to schedule a site inspection before the start of any work to approve construction locations, access routes or any required tree or shrub pruning/removal within the area of construction allowed by this ROE a minimum of five (5) business days before commencing work, and upon completion to approve final restoration of the site.**Also please note if listed please contact the Natural Areas Coordinator below for a site review if the project area is located in one of the Park System's natural areas or agricultural fields. N/A
15. Permittee is required to contact the **Regional Manager** listed below a minimum of five (5) business days before commencing work to provide the anticipated start date and to receive any additional specific instructions. Permittee is also required to contact the **Regional Manager** upon completion to approve final restoration of the site.

Interim North Paul Corrao: 414-257-8078 OR Paul.Corrao@milwaukeecountywi.gov

Authorized Parks Department Representative:

DocuSigned by: _____ Date: 5/23/2018

 3C64EEF1D1CC409...

Permittee Approval and Acceptance of Conditions:

DocuSigned by: _____ Date: 5/24/2018

 DFFAE002A6A7468...

Approval upon satisfactory completion of all work:

_____ Date: _____



MilwaukeeCountyParks

countyparks.com





APPLIED ECOLOGICAL SERVICES

SPECIALISTS IN ECOLOGICAL SCIENCE, RESTORATION, MANAGEMENT, AND RESEARCH

17921 W SMITH ROAD • PO BOX 256 • BRODHEAD, WI 53520 • (608) 897-8641

April 18th, 2018

Milwaukee County Parks
9480 Watertown Plank Rd
Wauwatosa, WI 53226

Re: Right-of-Entry Permit for Humboldt Blvd Bluff Stabilization

Dear Mr. Drefcinski,

Applied Ecological Services is submitting this permit gain access to Milwaukee County Parks land located along Humboldt Blvd, just SE of Capital Drive (see maps attached). This permit application requests access for development of a stockpile area for stone material to be staged for use exclusively for this project site and for beginning work on tree removals within project disturbance limits. Overall, Applied Ecological Service, working for River Revitalization Foundation, plans to complete a slope stabilization to repair slope washouts, install stairway access to base of slope, and install a rustic trail along the Milwaukee River. Final plans for all features will be presented in early May 2018 for Milwaukee County Parks review. Design completion is estimated for the first week of May, 2018 and construction is proposed to take place from May 14th to June 30th.

For the purpose of this permit, Applied Ecological Services is requesting a staging area be allowed on the flat turf terrace along Humboldt Blvd for stockpiling clean stone material harvested from Estabrook Dam for use as fill in the ravine stabilization (see maps). This material will amount to a total of 250 CY of angular limestone, with an average size between 18"-24". For additional quantities of fill, fill depth and details, please see attached documentation.

In addition, Applied Ecological Service is requested access to begin site prep activities on the slope to the extent of vegetation and tree removal within ravine disturbance area. This would include the removal of all undesirable/invasive woody species and trees with a DBH of less than 6". No native trees will be removed unless determined dead or will be a significant restraint to construction activities. All larger woody removals will be called out and specified for removal on the Erosion Control and Demolition Plan.

Please feel free to contract me if you have questions or need additional information.

Sincerely,

Tom Tilkens

Construction Manager
Applied Ecological Services
430 S Curtis Rd, West Allis, WI 53214
Tom.tilkens@appliedeco.com
(920) 606-8232



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Materials and Equipment to be Used:

1. Slope Stabilization

Equipment	Type	QTY	Duration of use/install
Heavy	Skid Loader	1	2-3 wks (full project duration)
Heavy	Excavator – Mini (90hp)	1	1 wk
Heavy	Excavator (<50,000lbs)	1	2 wk
Light	Mini-Track Loader	1	2 wk

Material	Type	QTY	Use
Geotextile	TerraTex N12	2500 SF	Place between native soil and stone fill
Aggregate	Sand	86 CY	Void space fill for stone layers
Aggregate	Reclaimed limestone/ concrete (18-24" avg)	172 Ton	Fill material from Estabrook Dam
Soil	Engineered Soil	39 CY	Grouting material for riprap stone
Aggregate	Riprap (12-18")	78 Ton	Top 18" of stabilization



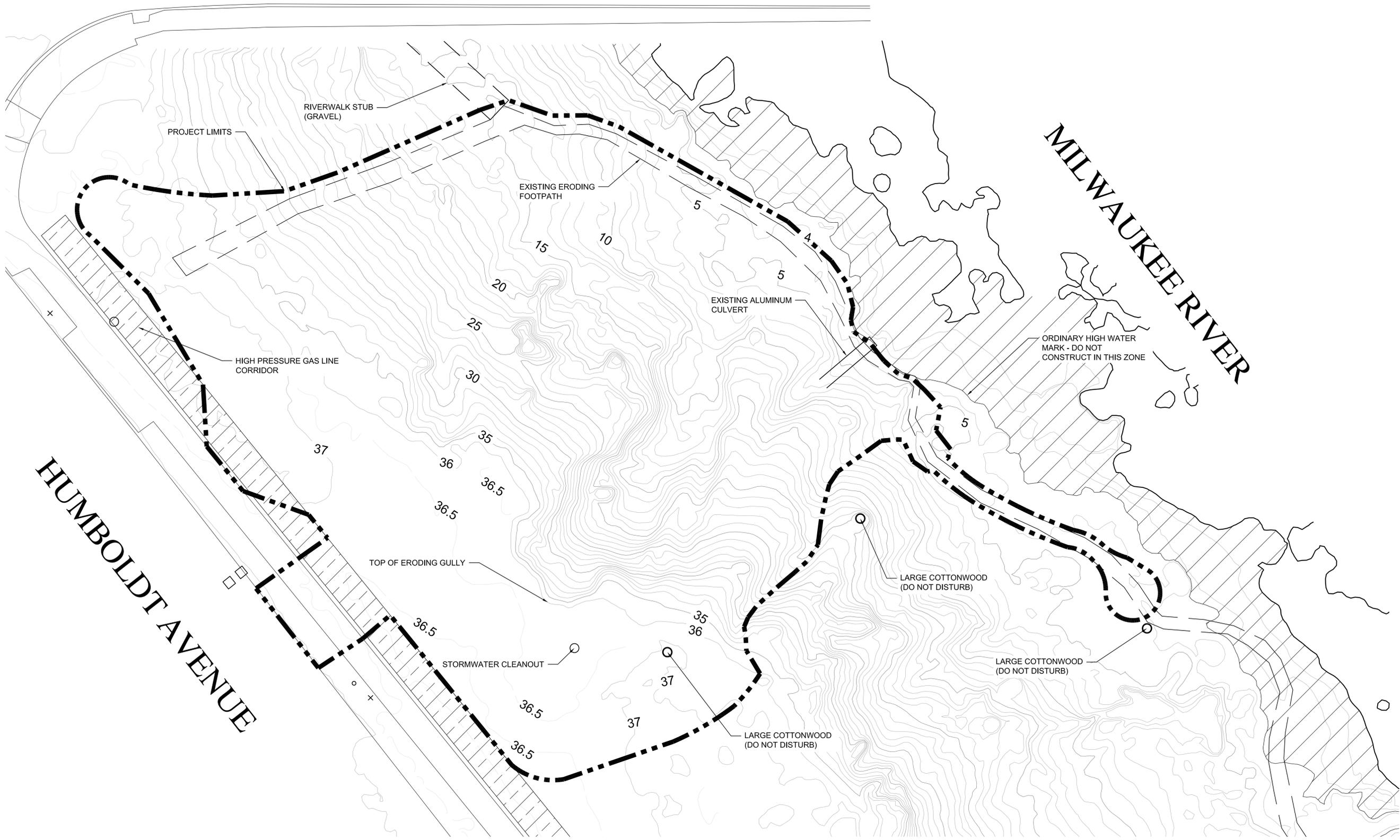
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Plans and Details:

(Please see attached)



Humboldt Avenue Bluff Stabilization
 City of Milwaukee, WI
River Revitalization Foundation
 2134 Riverboat Road
 Milwaukee, WI 53212

Preliminary Design Plans
**EXISTING
 CONDITIONS**

No.	Date	Revision Description	By

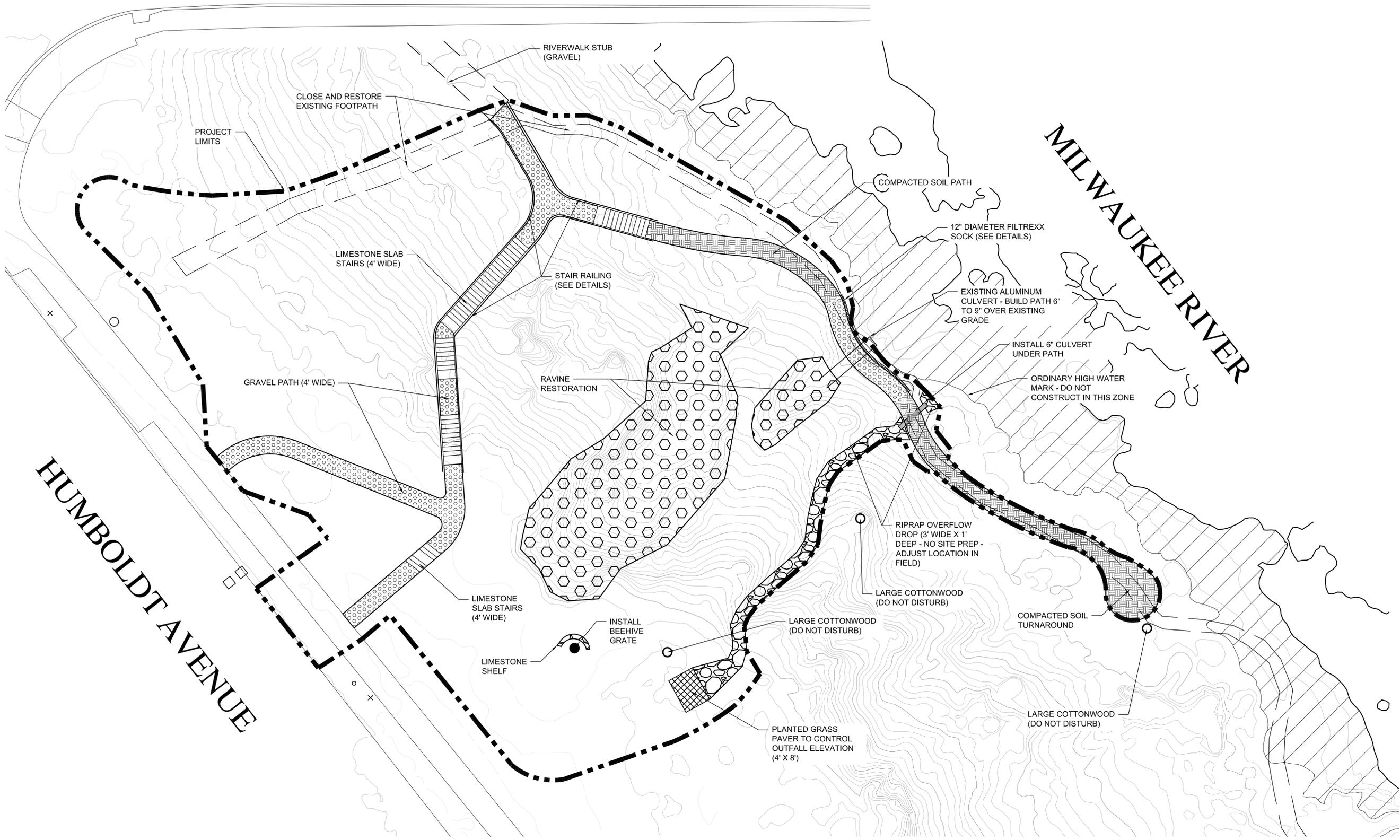
AES Proj. #: 17-0383
 Designed By: WCC
 Drawn By: WCC
 Checked By: SAD
 File: 02 existing conditions.dwg
 Date: May 15, 2018
 Coordinate System: NAD 83, WSP-E, US Ft.



Applied Ecological Services, Inc.
 120 West Main Street
 West Dundee, IL 60118
 Phone: 815.844.9385 Fax: 847.844.8759
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 Email: info@appliedeco.com

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HUMBOLDT AVENUE

MILWAUKEE RIVER

Humboldt Avenue Bluff Stabilization
 City of Milwaukee, WI
River Revitalization Foundation
 2134 Riverboat Road
 Milwaukee, WI 53212

Preliminary Design Plans
LAYOUT PLAN

No.	Date	Revision Description	By

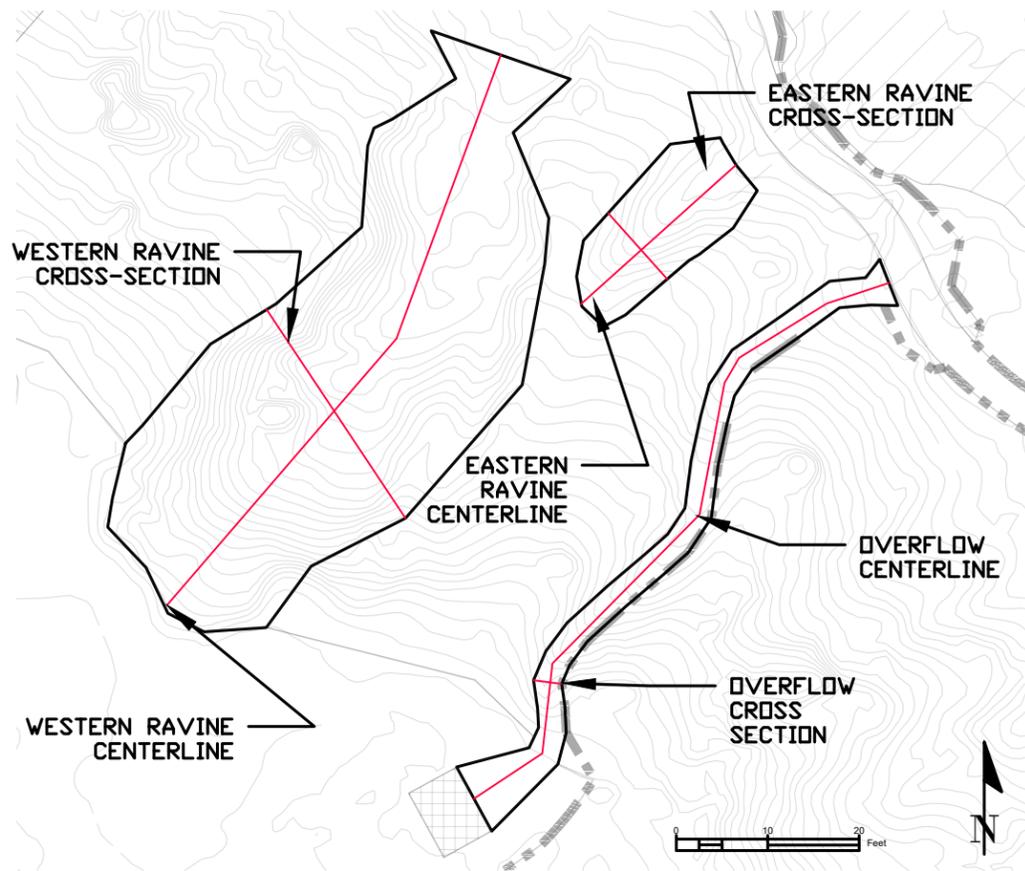
AES Proj. #: 17-0383
 Designed By: WCC
 Drawn By: WCC
 Checked By: SAD
 File: 04 layout plan.dwg
 Date: May 15, 2018
 Coordinate System: NAD 83, WSP-E, US Ft.



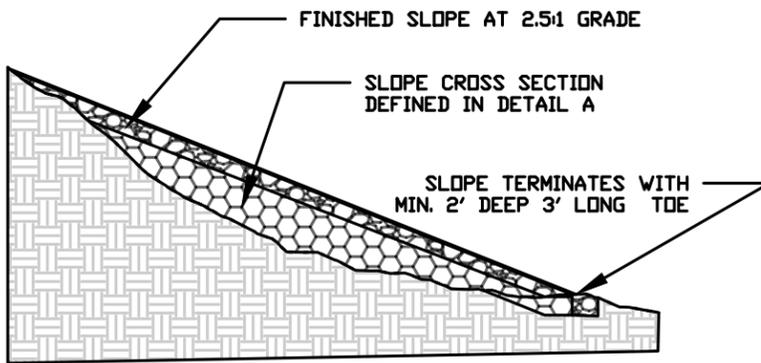
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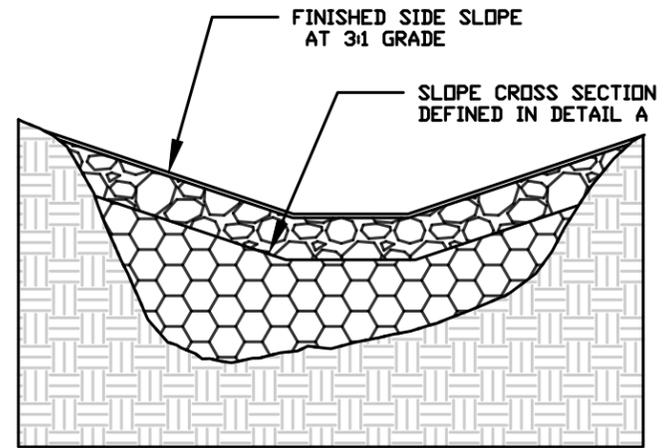




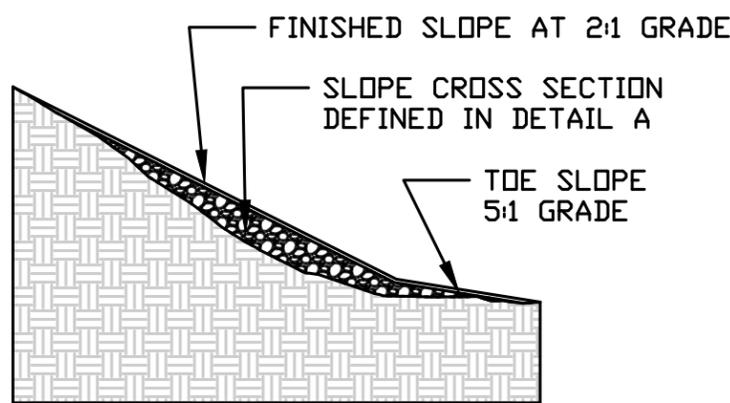
DETAIL - RAVINE PROFILE LOCATIONS
SCALE 1" = 20'-0"



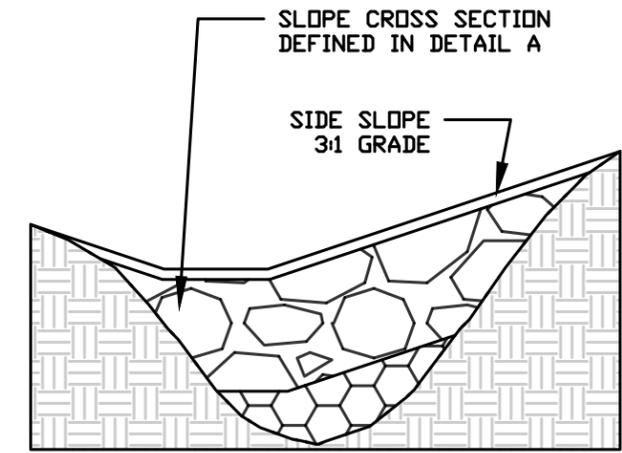
CENTERLINE - WESTERN RAVINE
SCALE 1" = 20'-0"



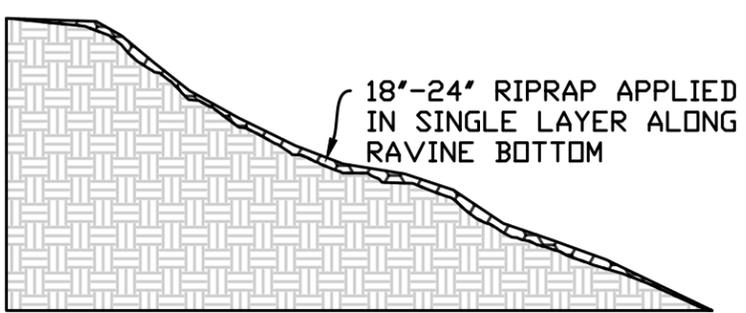
CROSS SECTION - WESTERN RAVINE
SCALE 1" = 8'-0"



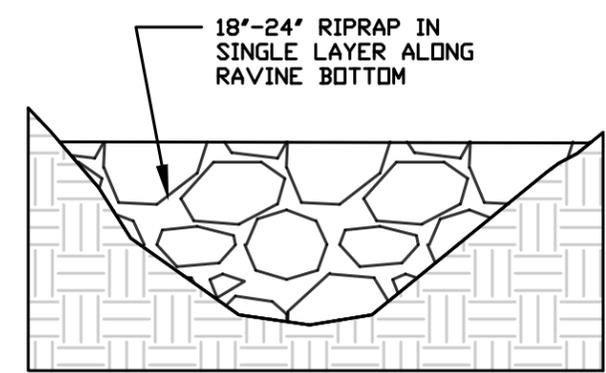
CENTERLINE - EASTERN RAVINE
SCALE 1" = 8'-0"



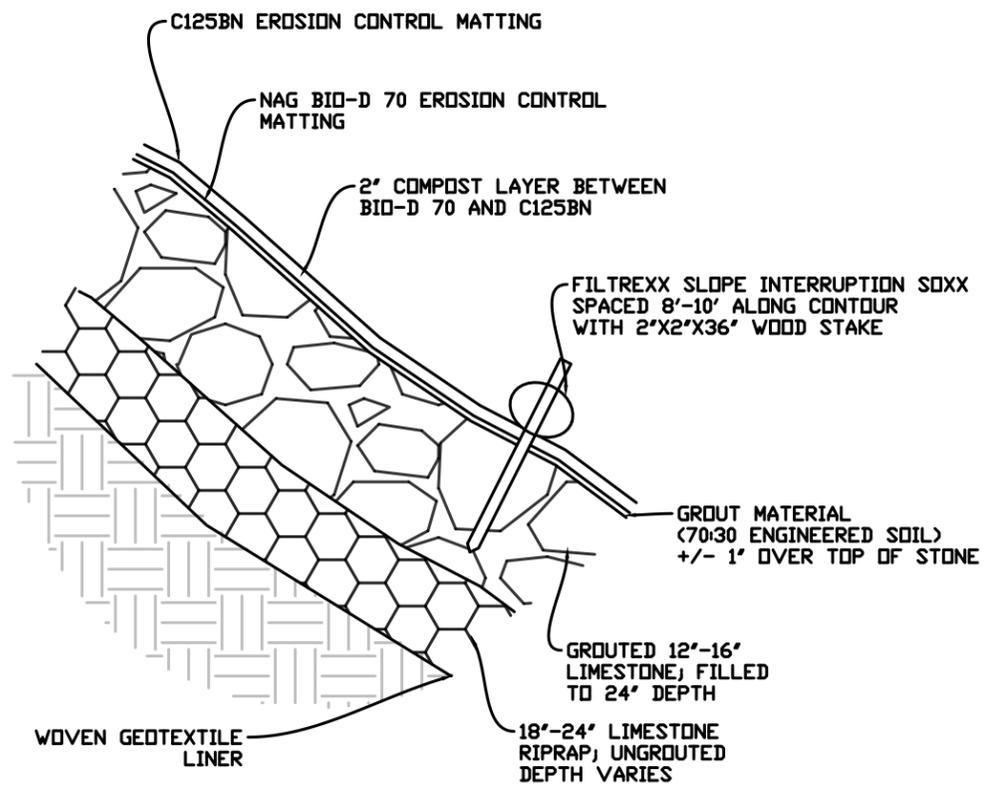
CROSS SECTION - EASTERN RAVINE
SCALE 1" = 3'-0"



CENTERLINE - OVERFLOW RAVINE
SCALE 1" = 20'-0"



CROSS SECTION - OVERFLOW RAVINE
SCALE 1" = 1'-0"



DETAIL - RAVINE INFILL CROSS SECTION
NOT TO SCALE

NOT FOR CONSTRUCTION

Humboldt Avenue Bluff Stabilization
City of Milwaukee, WI
River Revitalization Foundation
2134 Riverboat Road
Milwaukee, WI 53212

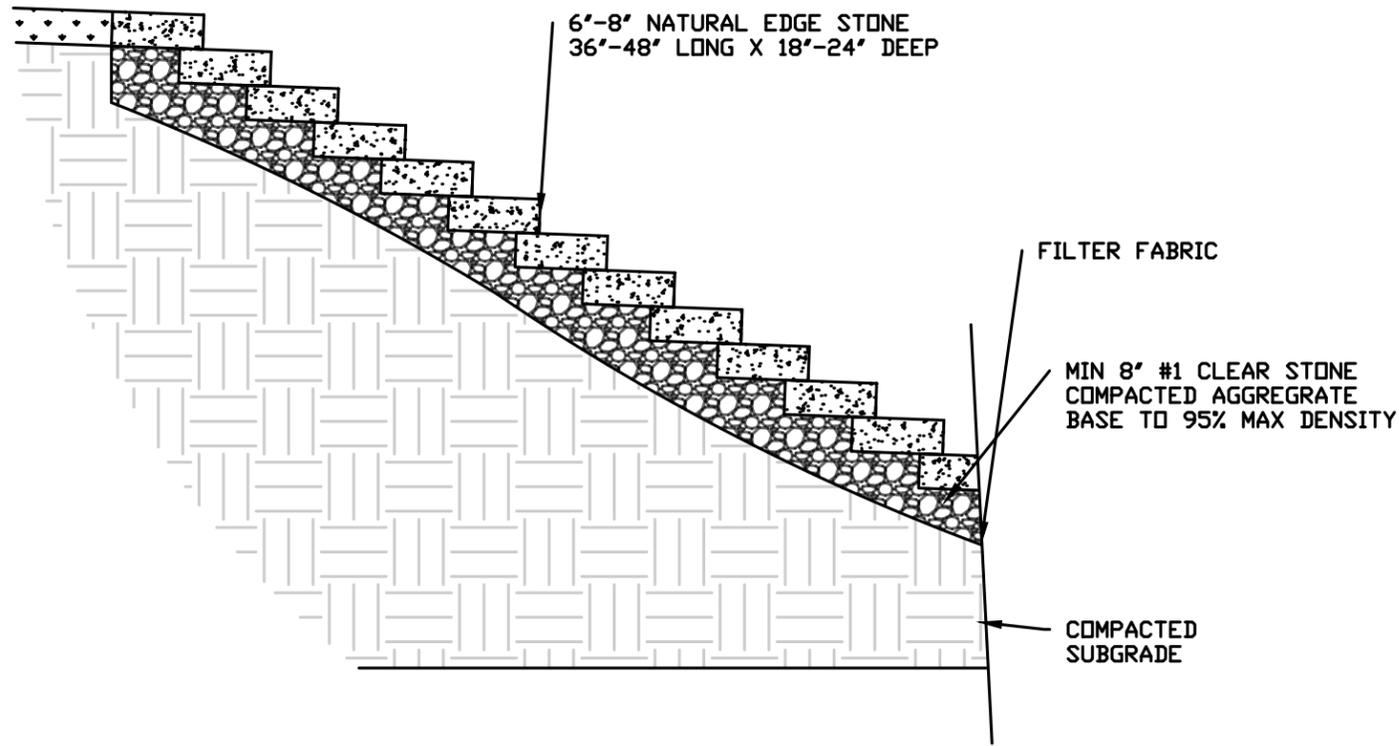
Preliminary Design Plans
RAVINE PROFILE VIEWS

AES Proj. #:	17-0383
Designed By:	WCC
Drawn By:	CRS
Checked By:	SAD
File:	cad_details.dwg
Date:	April 27, 2018

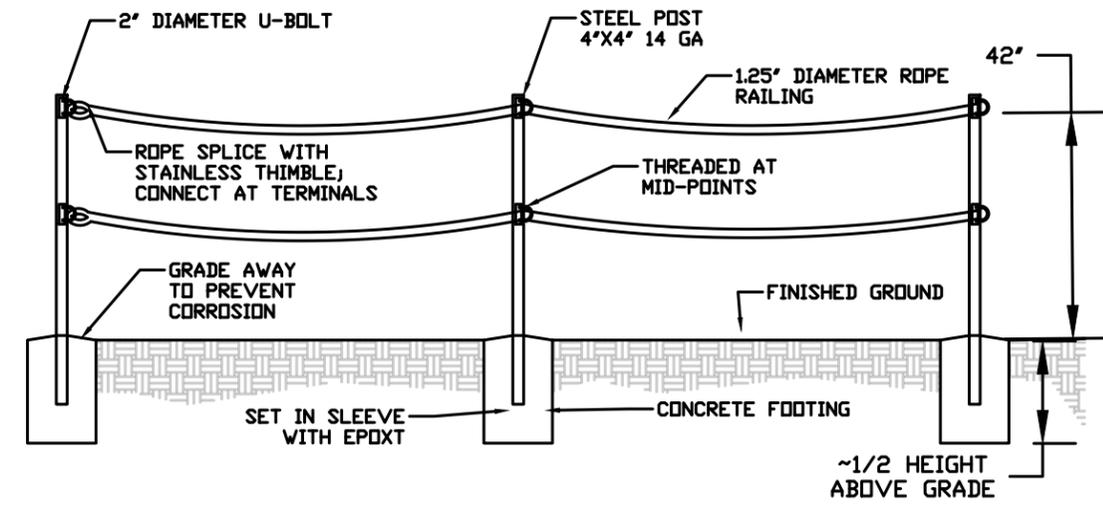


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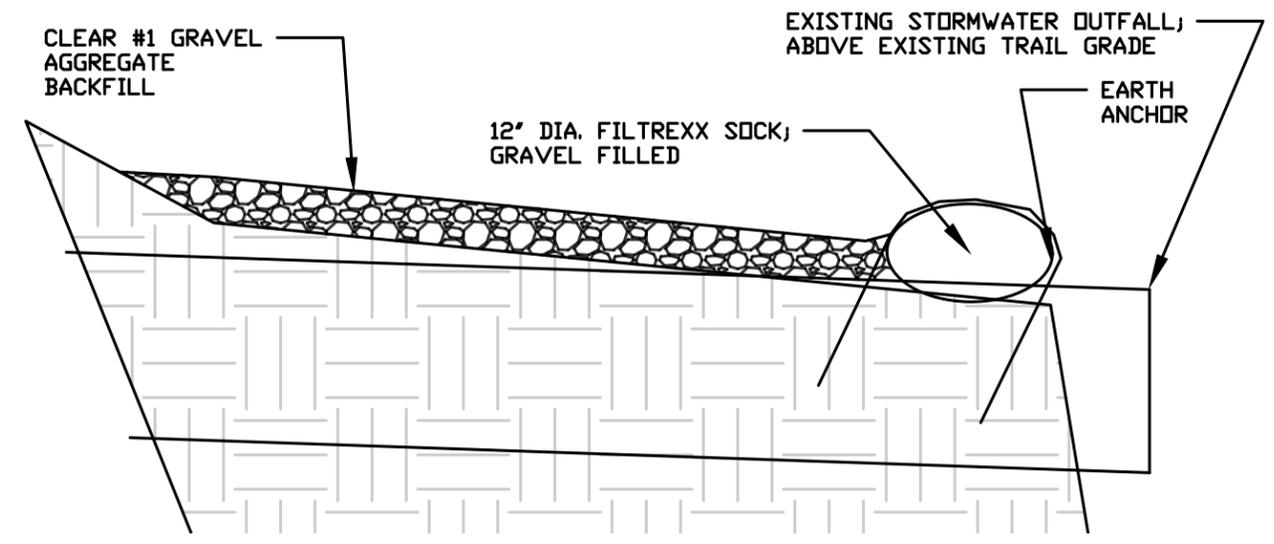
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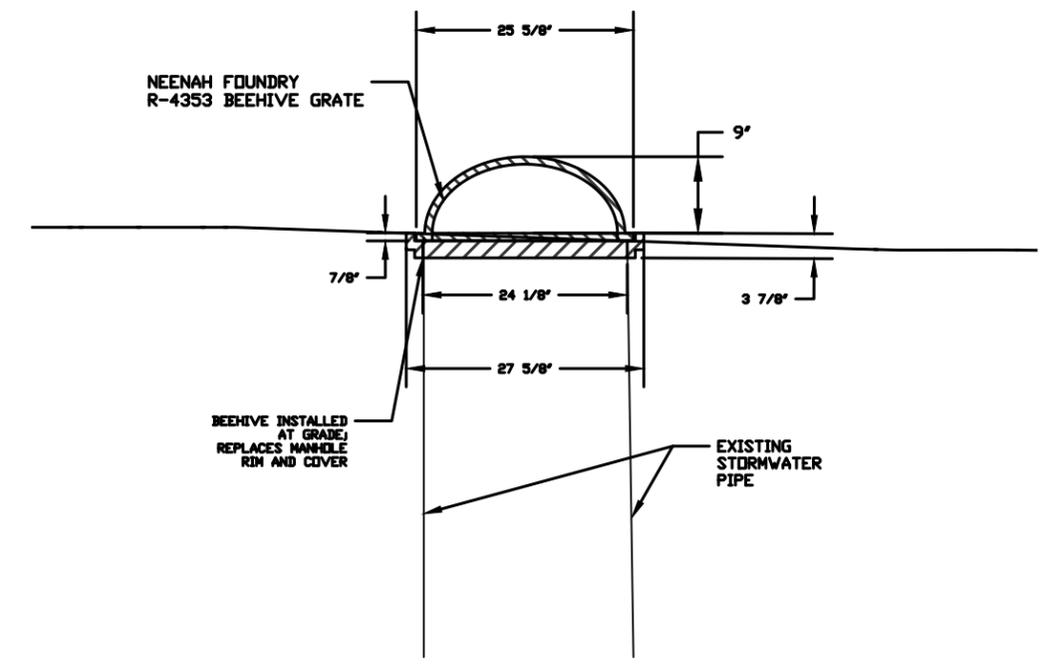
DETAIL - STONE STEPS 1
NOT TO SCALE



DETAIL - RAILING 2
NOT TO SCALE



DETAIL - TRAIL GRADING OVER OUTFALL 3
NOT TO SCALE



DETAIL - STORMWATER CONNECTION 4
NOT TO SCALE

Humboldt Avenue Bluff Stabilization

City of Milwaukee, WI
River Revitalization Foundation
2134 Riverboat Road
Milwaukee, WI 53212

Preliminary Design Plans
Trails And Inlet Details

AES Proj. #: 17-0383
Designed By: WCC
Drawn By: CRS
Checked By: SAD
File: cad_details.dwg
Date: 04/27/2018
Coordinate System: NAD 83, WISP-E, US Ft.



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Legend

- Hillside
- Shortgrass Prairie
- Grassed Overflow
- Swale

EXTEND/MAINTAIN EXISTING
SUMAC STAND TO CUT OFF
EXISTING TRAIL

Humboldt Blvd

Milwaukee River

Humboldt Avenue Bluff Stabilization

City of Milwaukee, WI
River Revitalization Foundation
2134 Riverboat Road
Milwaukee, WI 53212

Preliminary Design Plans SEEDING PLAN

AES Proj. #: 17-0383
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Date: April 27, 2018
Coordinate System: NAD 83, WSP-E, US ft.



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Scale 1" = 20'

Mesic Swale-120 sq. ft	Latin	Common	Plugs	Oz. Seed
Grass	<i>Elymus trachycaulus</i>	Slender wheatgrass		0.64
	<i>Carex bicknellii</i>	Short beak sedge	32	0.16
	<i>Dalea purpurea</i>	Purple prairie clover	64	0.04
Forbs	<i>Rudbeckia hirta</i>	Black-eyed susan		0.04
	<i>Asclepias syriaca</i>	Common milkweed	32	0.04

Short prairie-2800 sq. ft	Latin	Common	Plug	Oz. Seed
Grasses	<i>Carex bicknellii</i>	Bicknell sedge		0.22
	<i>Carex brevior</i>	Short beak sedge		0.22
	<i>Koeleria macrantha</i>	June grass		0.11
	<i>Sporobolus heterolepis</i>	Prairie dropseed		0.44
	<i>Bouteloua curtipendula</i>	Side oats		3.52
	<i>Schizachyrium scoparium</i>	Little bluestem		1.76
Forbs	<i>Allium cenuum</i>	Nodding wild onion		0.44
	<i>Asclepias tuberosa</i>	Butterfly weed	160	0.44
	<i>Asclepias verticillata</i>	Whorled milkweed	320	0.22
	<i>Coreopsis lanceolata</i>	Sand coreopsis		0.44
	<i>Echinacea pallida</i>	Pale purple coneflower		0.88
	<i>Dalea purpurea</i>	Purple prairie clover	320	0.44
	<i>Kuhnia eupatorioides</i>	False boneset		0.22
	<i>Lupinus perennis</i>	Wild lupine		0.44
	<i>Monarda punctata</i>	Horse mint		0.11
	<i>Rudbeckia hirta</i>	Black-eyed susan		0.66
	<i>Amorpha canescens</i>	Lead plant		0.22
	<i>Liatris cylindracea</i>	Cylindric blazing star	128	0.22
	<i>Liatris pycnostachya</i>	Prairie blazing star	128	0.22

Hillside-7200 sq. ft	Latin	Common	Oz. Seed
Grasses	<i>Bouteloua curtipendula</i>	Side oats grama	20.16
	<i>Schizachyrium scoparium</i>	Little bluestem	13.44
Forbs	<i>Chamaecrista fasciculata</i>	Partridge pea	1.68
	<i>Dalea purpurea</i>	Purple prairie clover	0.84
	<i>Echinacea pallida</i>	Pale purple coneflower	1.68
	<i>Lupinus perennis</i>	Wild lupine	0.84
	<i>Monarda punctata</i>	Horse mint	0.20
	<i>Oligoneuron rigidum</i>	Stiff goldenrod	0.44
	<i>Tradescantia ohiensis</i>	Spiderwort	0.84

Grassed Overflow-50 sq. ft	Latin	Common	Oz. Seed
Grasses	<i>Bouteloua curtipendula</i>	Side oats grama	0.96
	<i>Panicum virgatum</i>	Switch grass	0.64
Forbs	<i>Dalea purpurea</i>	Purple prairie clover	0.16
	<i>Chamaecrista fasciculata</i>	Partridge pea	0.16
	<i>Echinacea pallida</i>	Pale purple coneflower	0.08

Humboldt Avenue Bluff Stabilization

City of Milwaukee, WI

River Revitalization Foundation

2134 Riverboat Road

Milwaukee, WI 53212

Preliminary Design Plans

PLANT SPECIES LIST

AES Proj. #: 17-0383

Designed By: WCC

Drawn By: CRS

Checked By: SAD

File: cad_details.dwg

Date: April 27, 2018

Coordinate System: NAD-83, WSP-E, US ft



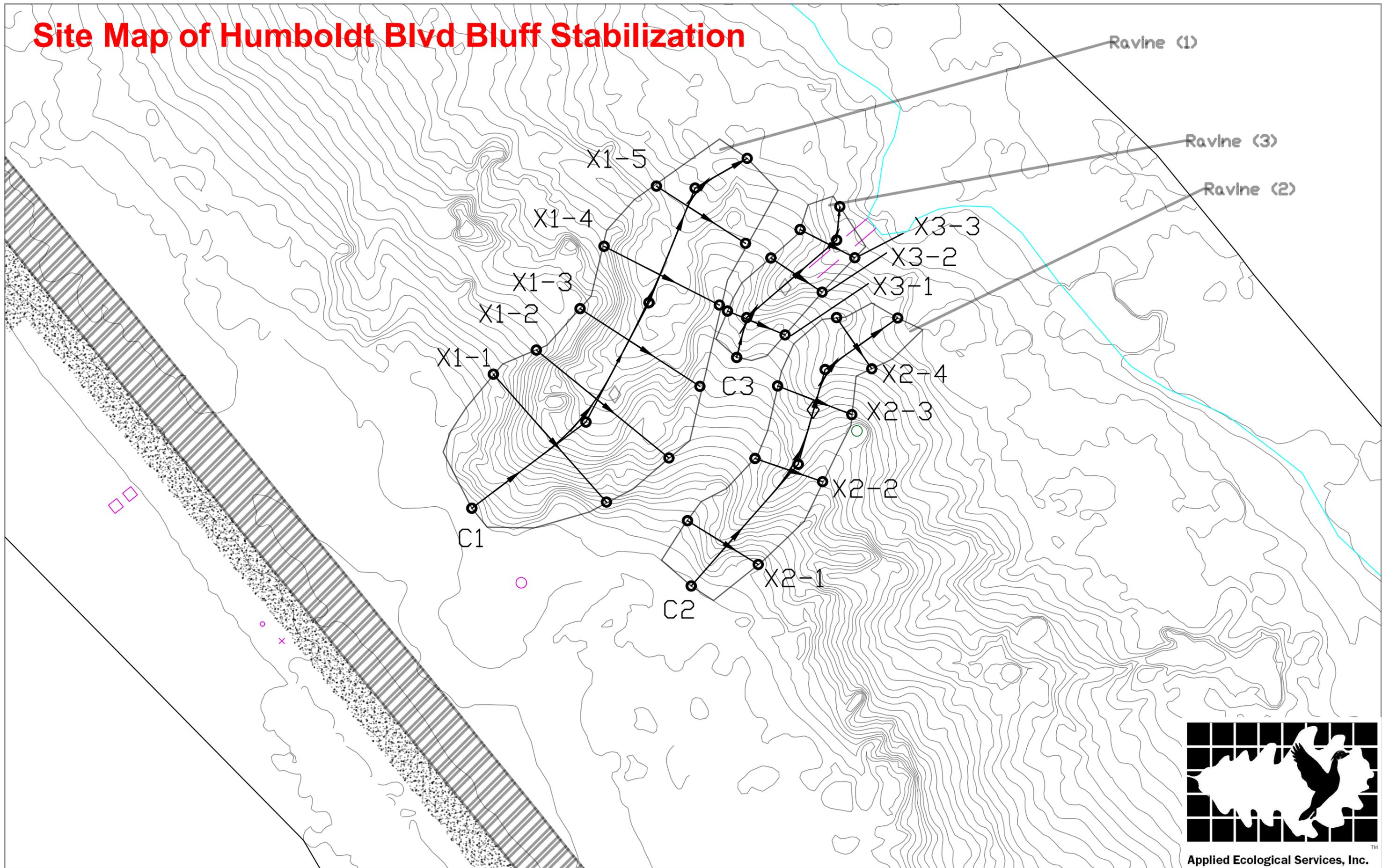
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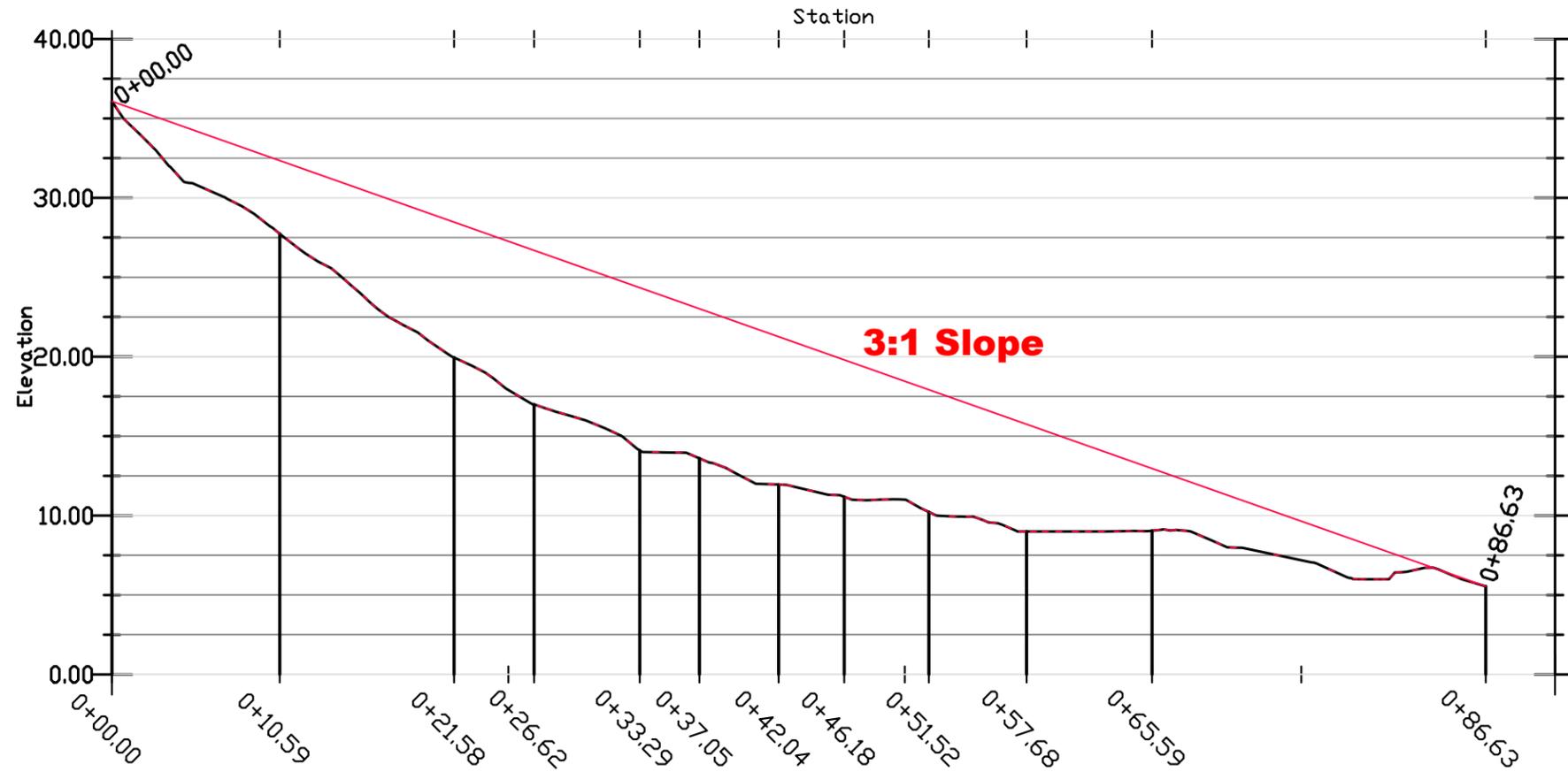
10
10 OF 10

Site Map of Humboldt Blvd Bluff Stabilization



Applied Ecological Services, Inc.™

Profile View of Centerline Ravine 1



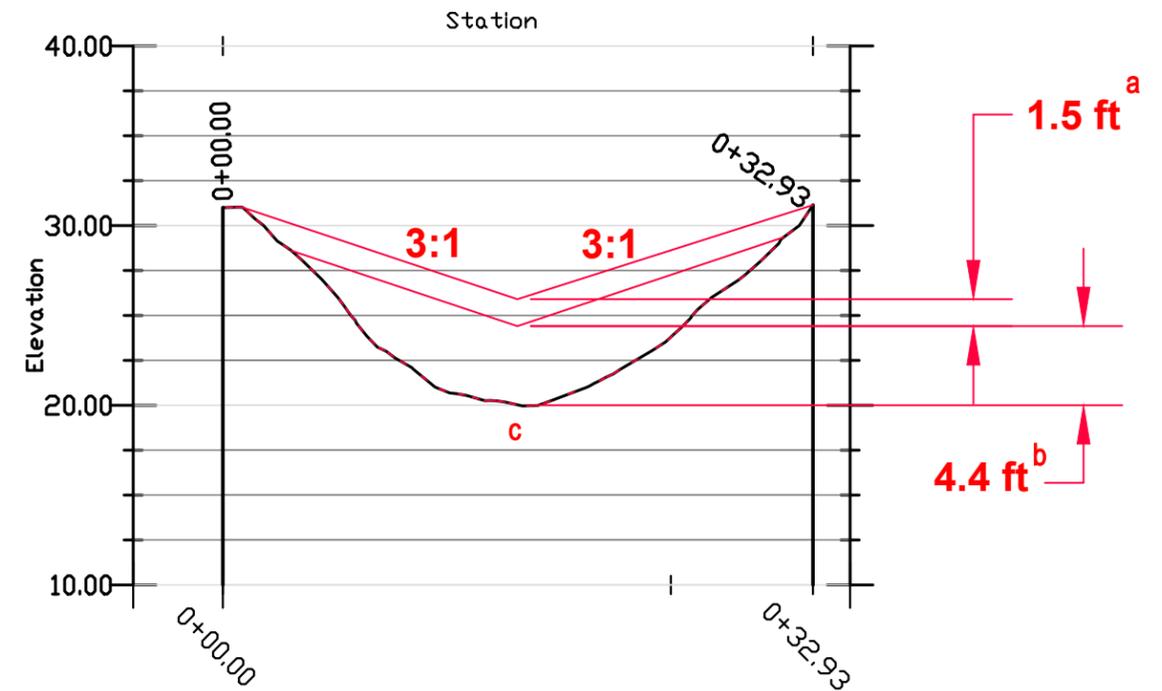
a - indicated 1.5 ft layer consists of 12-18" rip-rap grouted with 70-30 sand-compost engineered topsoil to be planted with slope stabilization mix

b - indicated 4.4 ft layer consists of 18-24" angular limestone grouted with sand

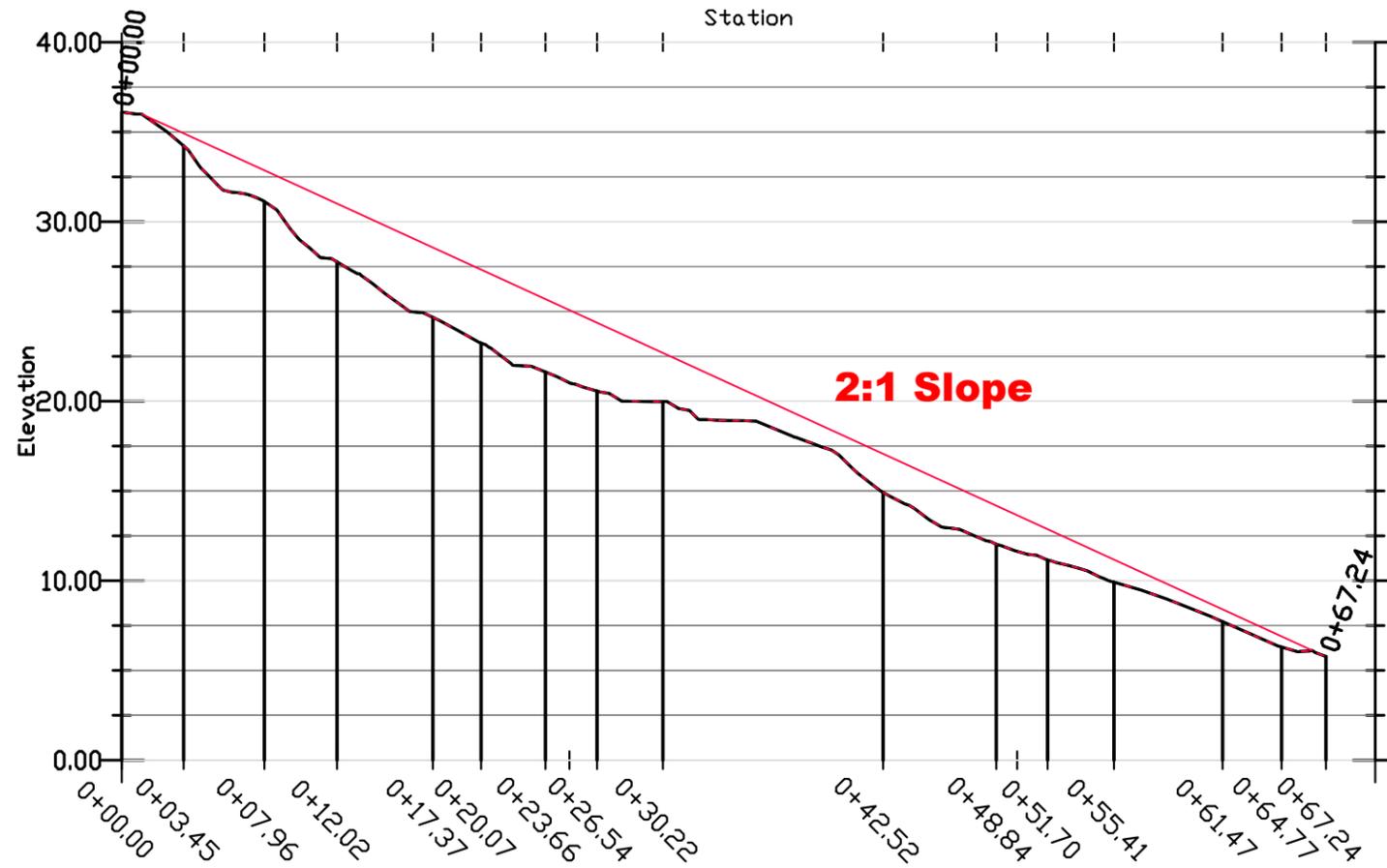
c - ravine to be lined with Terra-Tex N12 geo-textile material

Material	Ravine 1 Volume	Ravine 2 Volume	Ravine 3 Volume	Total Volume
18-24" Angular Limestone	157 tons	12 tons	3 tons	172 tons
12-18" Riprap	60 tons	13 tons	5 tons	78 tons
Sand	78.5 cubic yards	6 cubic yards	1.5 cubic yards	86 cubic yards
Engineered Soil (70-30 sand-compost)	30 cubic yards	6.5 cubic yards	2.5 cubic yards	39 cubic yards
Terra-Tex N12 geo-textile				2500 sq feet

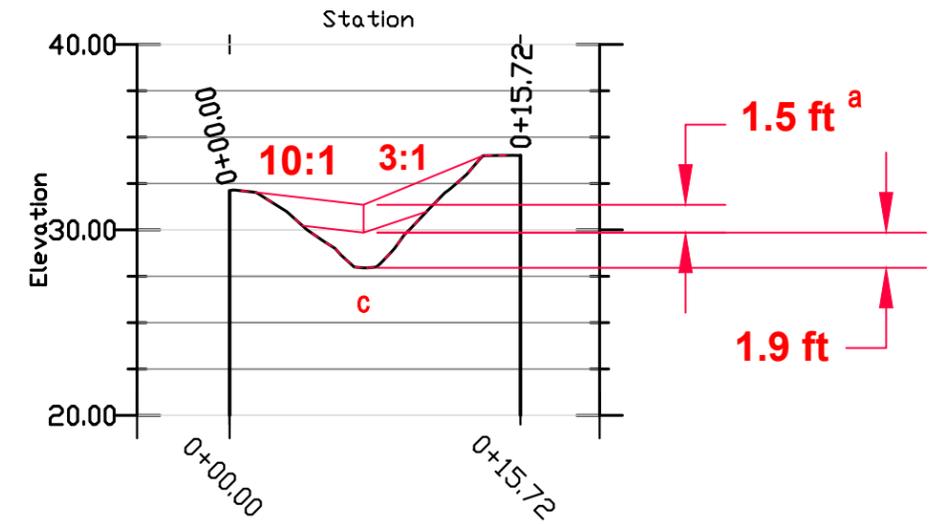
Profile View of Cross Section 1-1



Profile View of Centerline Ravine 2



Profile View of Cross Section 2-1



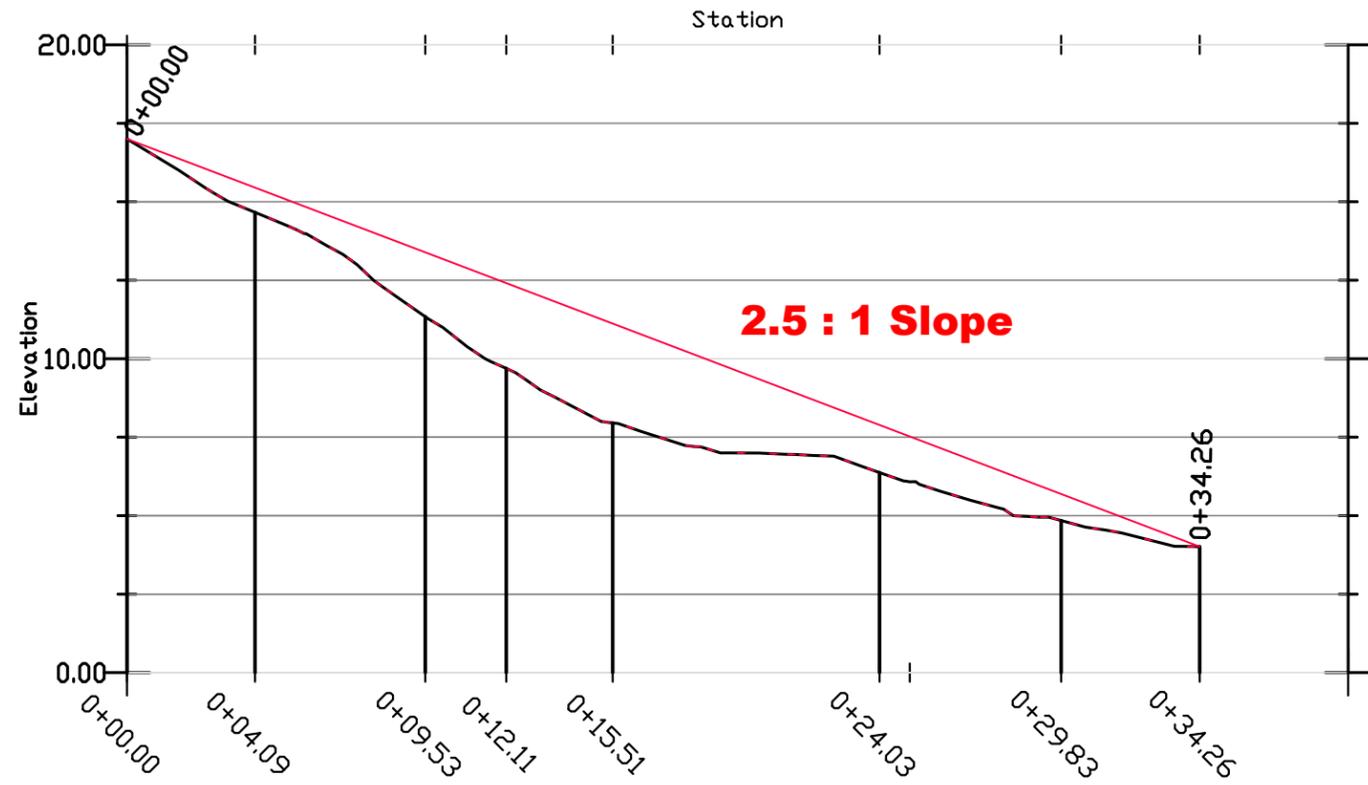
Material	Ravine 1 Volume	Ravine 2 Volume	Ravine 3 Volume	Total Volume
18-24" Angular Limestone	157 tons	12 tons	3 tons	172 tons
12-18" Riprap	60 tons	13 tons	5 tons	78 tons
Sand	78.5 cubic yards	6 cubic yards	1.5 cubic yards	86 cubic yards
Engineered Soil (70-30 sand-compost)	30 cubic yards	6.5 cubic yards	2.5 cubic yards	39 cubic yards
Terra-Tex N12 geo-textile				2500 sq feet

a - indicated 1.5 ft layer consists of 12-18" rip-rap grouted with 70-30 sand-compost engineered topsoil to be planted with slope stabilization mix

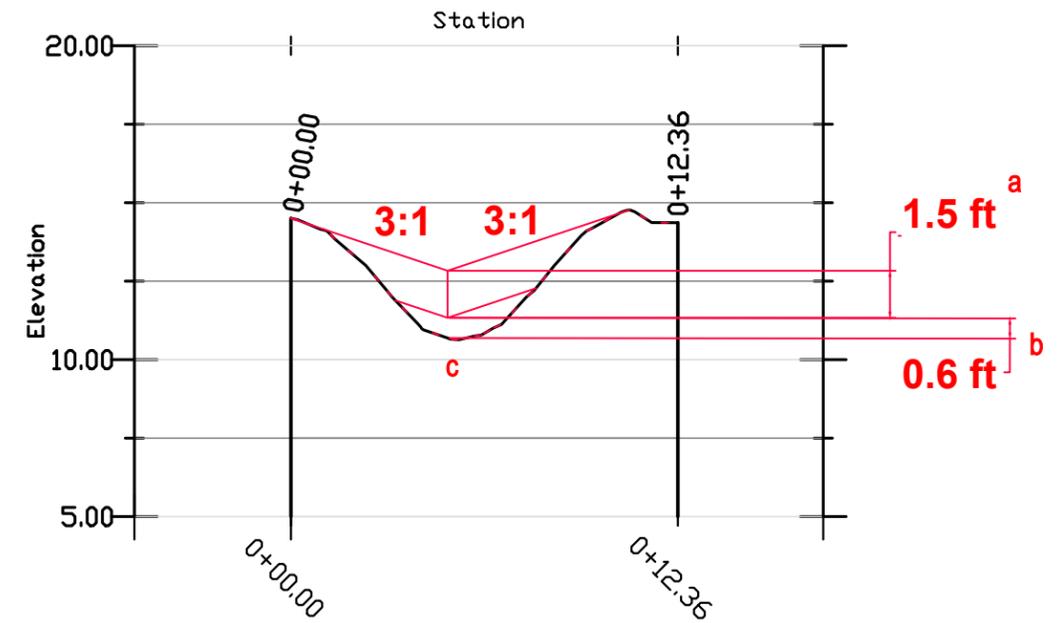
b - indicated 1.9 ft layer consists of 18-24" angular limestone grouted with sand

c - ravine to be lined with Terra-Tex N12 geo-textile material

Profile View of Ravine Centerline 3



Profile View of Cross Section 3-1

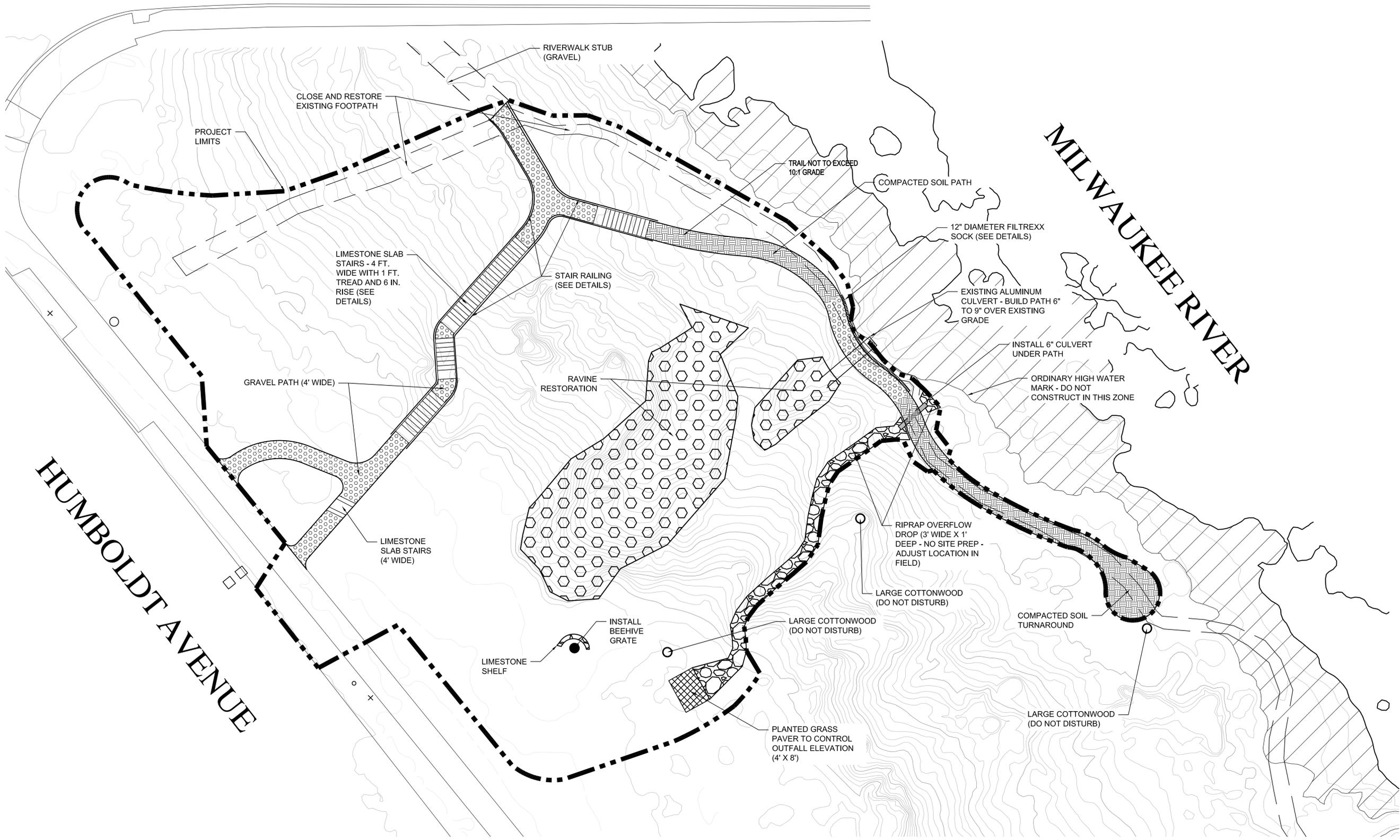


Material	Ravine 1 Volume	Ravine 2 Volume	Ravine 3 Volume	Total Volume
18-24" Angular Limestone	157 tons	12 tons	3 tons	172 tons
12-18" Riprap	60 tons	13 tons	5 tons	78 tons
Sand	78.5 cubic yards	6 cubic yards	1.5 cubic yards	86 cubic yards
Engineered Soil (70-30 sand-compost)	30 cubic yards	6.5 cubic yards	2.5 cubic yards	39 cubic yards
Terra-Tex N12 geo-textile				2500 sq feet

a - indicated 1.5 ft layer consists of 12-18" rip-rap grouted with 70-30 sand-compost engineered topsoil to be planted with slope stabilization mix

b - indicated 0.6 ft layer consists of 18-24" angular limestone grouted with sand

c - ravine to be lined with Terra-Tex N12 geo-textile material



HUMBOLDT AVENUE

MILWAUKEE RIVER

Humboldt Avenue Bluff Stabilization
 City of Milwaukee, WI
River Revitalization Foundation
 2134 Riverboat Road
 Milwaukee, WI 53212

Preliminary Design Plans
LAYOUT PLAN

No.	Date	Revision Description	By

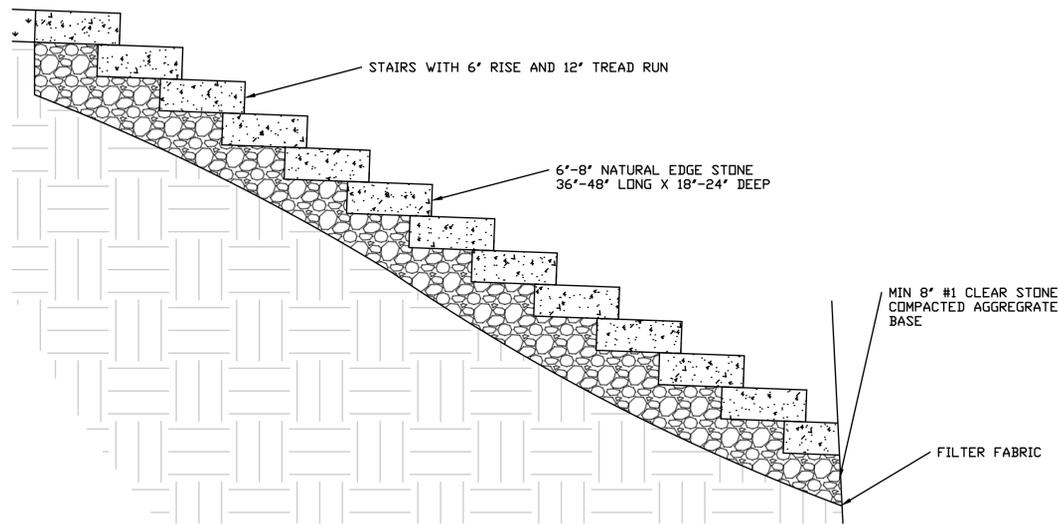
AES Proj. #: 17-0383
 Designed By: WCC
 Drawn By: WCC
 Checked By: SAD
 File: 04 layout plan.dwg
 Date: May 23, 2018
 Coordinate System: NAD 83, WSP-E, US Ft.



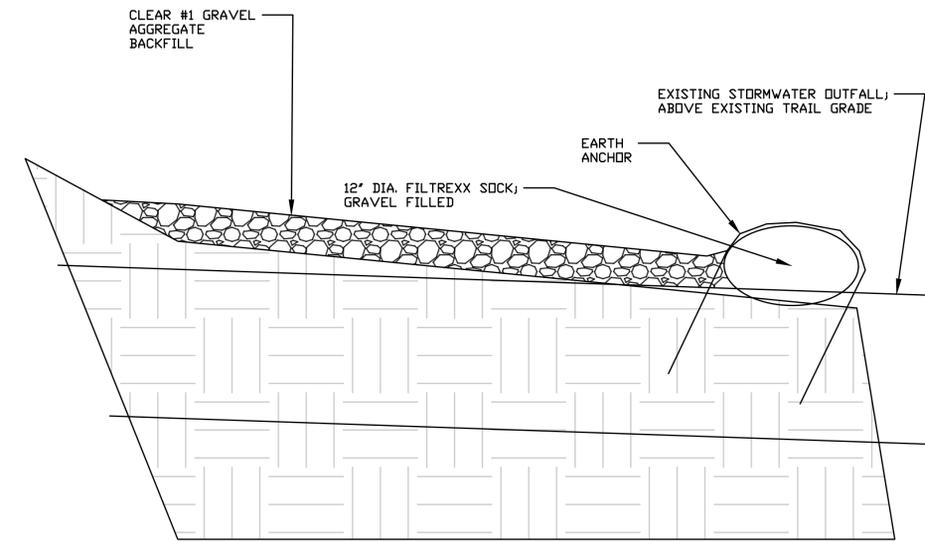
Applied Ecological Services, Inc.
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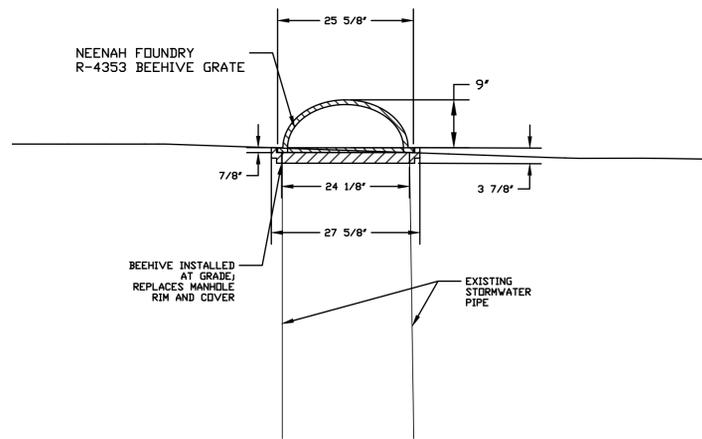




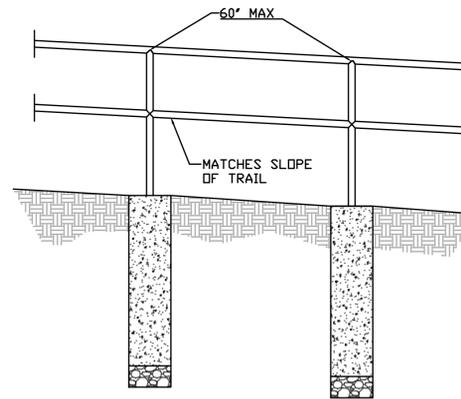
DETAIL - STONE STEPS
NOT TO SCALE



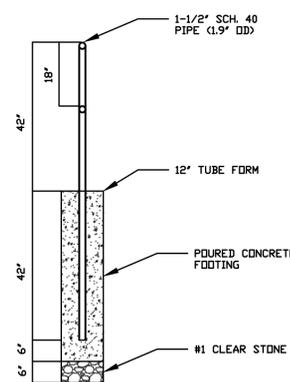
DETAIL - TRAIL GRADING OVER OUTFALL
NOT TO SCALE



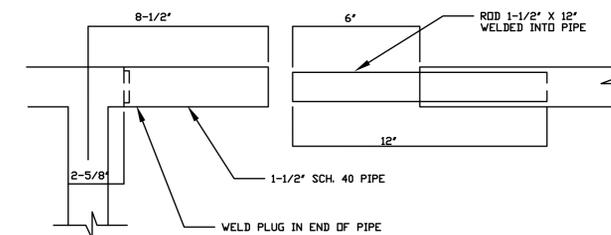
DETAIL - STORMWATER CONNECTION
NOT TO SCALE



DETAIL - RAILING FRONT
NOT TO SCALE



DETAIL - RAILING SIDE
NOT TO SCALE



TYPICAL SLIP CONNECTION - 1-1/2" SCH. 40 (1.9" OD)
PIPE REQUIRED EVERY 20' MAX

DETAIL - RAILING SLIP CONNECTIONS
NOT TO SCALE

Humboldt Avenue Bluff Stabilization

City of Milwaukee, WI
River Revitalization Foundation
2134 Riverboat Road
Milwaukee, WI 53212

Preliminary Design Plans Trails And Inlet Details

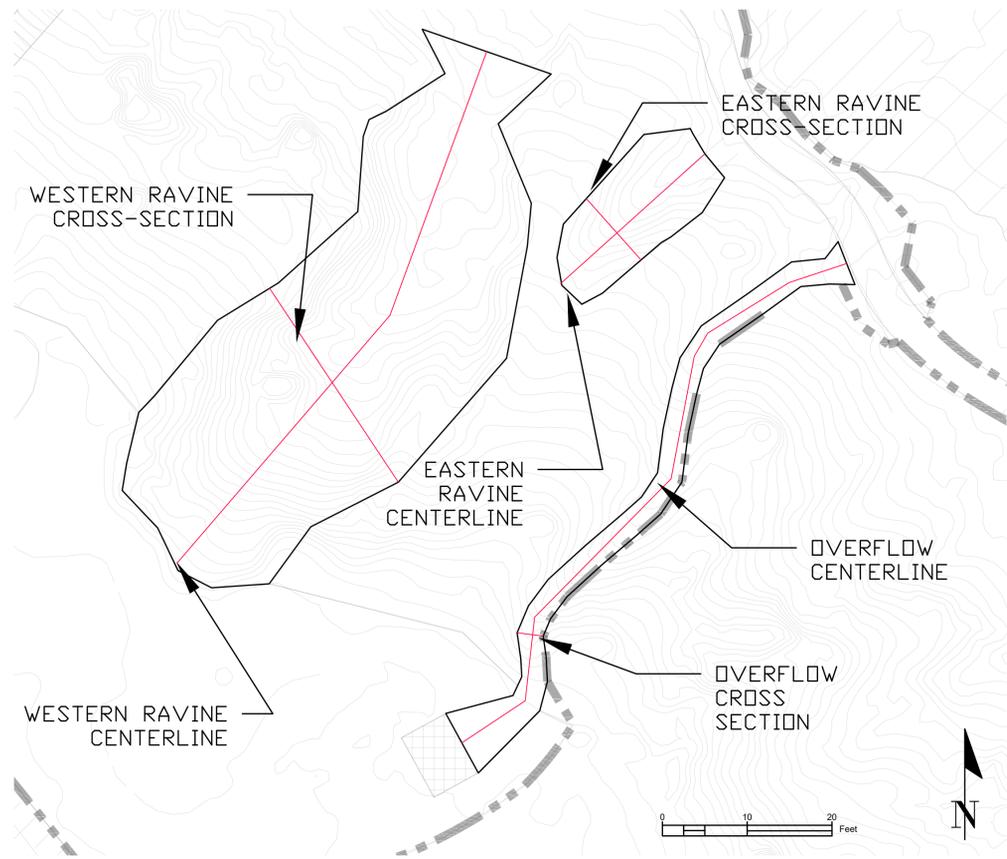
AES Proj. #: 17-0383
Designed By: WCC
Drawn By: CRS
Checked By: SAD
File: caid_details.dwg
Date: 04/27/2018
Coordinate System: NAD 83, WSP-E, US PL



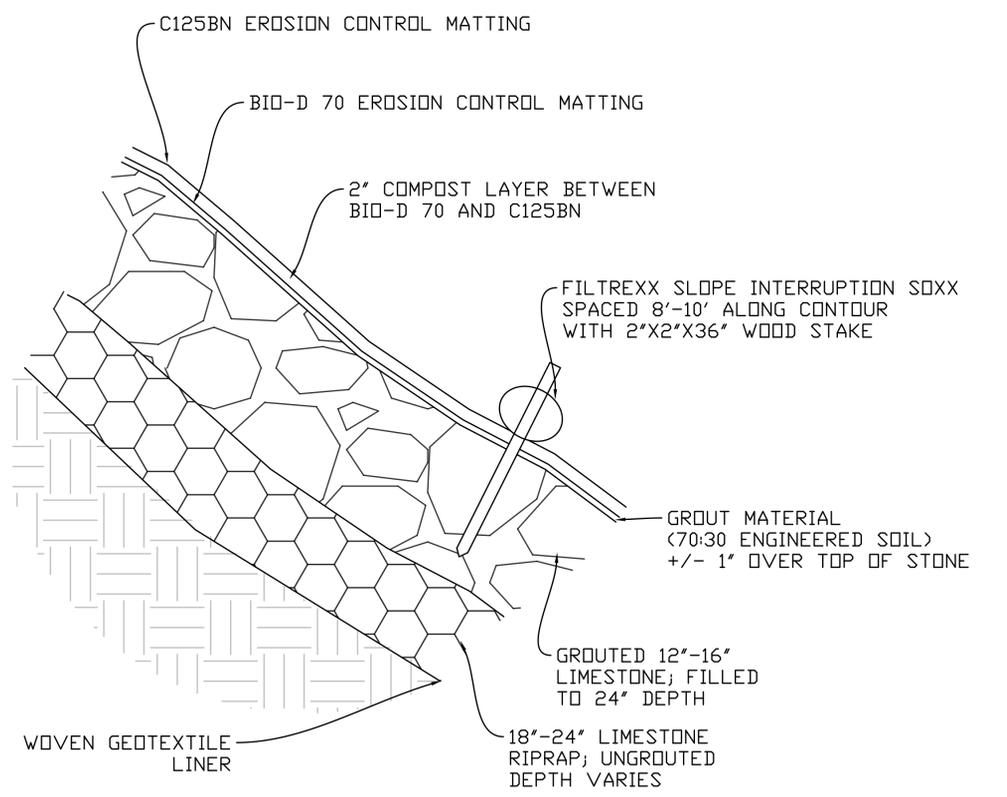
Applied Ecological Services, Inc.
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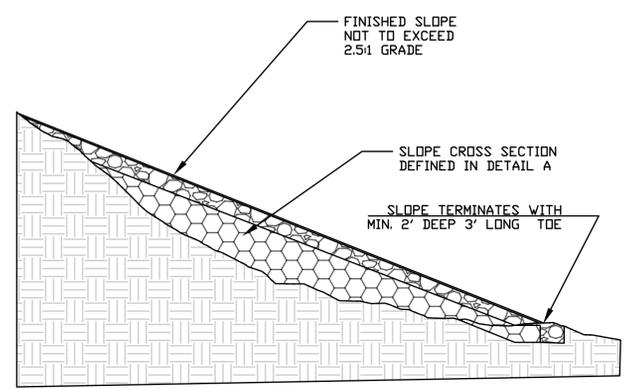
Sheet Number
07
07 OF 10



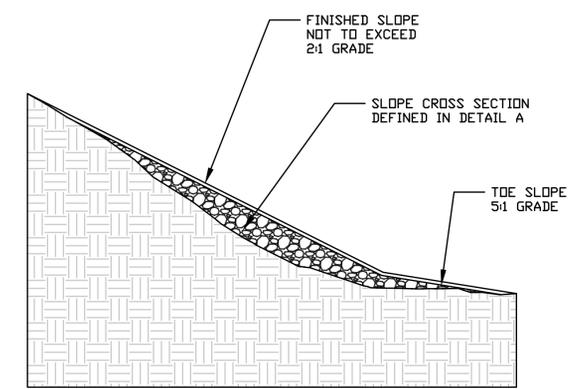
DETAIL - RAVINE PROFILE LOCATIONS
SCALE 1" = 10'-0"



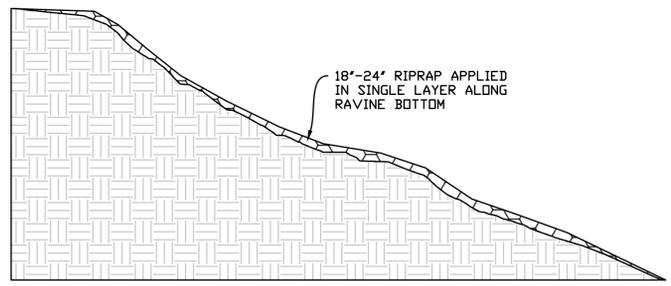
DETAIL - RAVINE INFILL CROSS SECTION
NOT TO SCALE



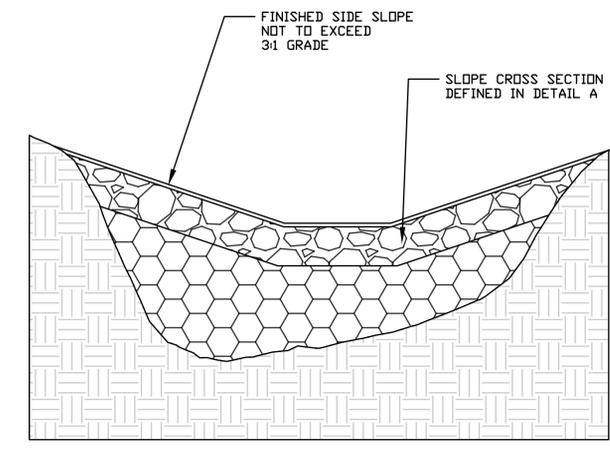
CENTERLINE - WESTERN RAVINE
SCALE 1" = 10'-0"



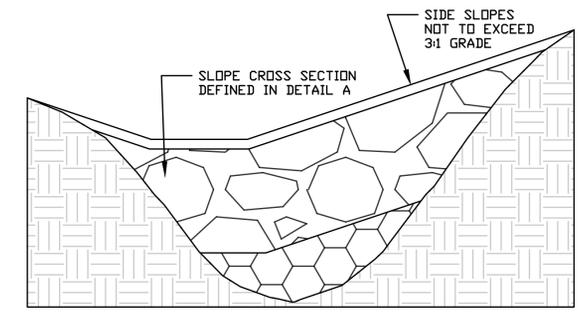
CENTERLINE - EASTERN RAVINE
SCALE 1" = 4'-0"



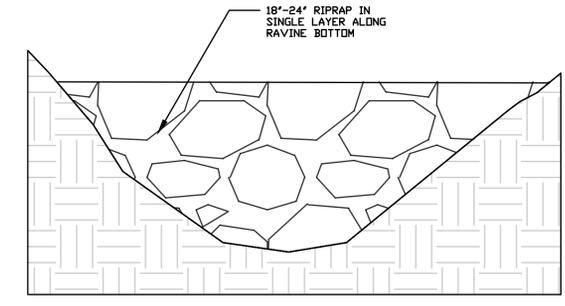
CENTERLINE - OVERFLOW RAVINE
SCALE 1" = 10'-0"



CROSS SECTION - WESTERN RAVINE
SCALE 1" = 4'-0"



CROSS SECTION - EASTERN RAVINE
SCALE 1" = 1'-6"



CROSS SECTION - OVERFLOW RAVINE
SCALE 1" = 0'-6"



Legend

	Hillside
	Shortgrass Prairie
	Grassed Overflow
	Swale

Humboldt Avenue Bluff Stabilization
 City of Milwaukee, WI
River Revitalization Foundation
 2134 Riverboat Road
 Milwaukee, WI 53212

Preliminary Design Plans
SEEDING PLAN

AES Proj. #: 17-0383
 Designed By: WCC
 Drawn By: CRS
 Checked By: SAD
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0 10 20 Feet
 Scale 1" = 10'

Mesic Swale	Latin	Common	Plugs	Oz. Seed
Grass	<i>Elymus trachycaulus</i>	Slender wheatgrass		0.64
	<i>Carex bicknellii</i>	Short beak sedge	32	0.16
	<i>Dalea purpurea</i>	Purple prairie clover	64	0.04
Forbs	<i>Rudbeckia hirta</i>	Black-eyed susan		0.04
	<i>Asclepias syriaca</i>	Common milkweed	32	0.04

Hillside	Latin	Common	Oz. Seed
Grasses	<i>Bouteloua curtipendula</i>	Side oats grama	20.16
	<i>Schizachirum scoparium</i>	Little bluestem	13.44
Forbs	<i>Chamaecrista fasciculata</i>	Partridge pea	1.68
	<i>Dalea purpurea</i>	Purple prairie clover	0.84
	<i>Echinacea pallida</i>	Pale purple coneflower	1.68
	<i>Lupinus perennis</i>	Wild lupine	0.84
	<i>Monarda punctata</i>	Horse mint	0.20
	<i>Oligoneuron rigidum</i>	Stiff goldenrod	0.44
	<i>Tradescantia ohiensis</i>	Spiderwort	0.84

Short prairie	Latin	Common	Plug	Oz. Seed
Grasses	<i>Carex bicknellii</i>	Bicknell sedge		0.22
	<i>Carex brevior</i>	Short beak sedge		0.22
	<i>Koeleria macrantha</i>	June grass		0.11
	<i>Sporobolus heterolepis</i>	Prairie dropseed		0.44
	<i>Bouteloua curtipendula</i>	Side oats		3.52
	<i>Schizachyrium scoparium</i>	Little bluestem		1.76
Forbs	<i>Allium cenum</i>	Nodding wild onion		0.44
	<i>Asclepias tuberosa</i>	Butterfly weed	160	0.44
	<i>Asclepias verticillata</i>	Whorled milkweed	320	0.22
	<i>Coreopsis lanceolata</i>	Sand coreopsis		0.44
	<i>Echinacea pallida</i>	Pale purple coneflower		0.88
	<i>Dalea purpurea</i>	Purple prairie clover	320	0.44
	<i>Kuhnia eupatorioides</i>	False boneset		0.22
	<i>Lupinus perennis</i>	Wild lupine		0.44
	<i>Monarda punctata</i>	Horse mint		0.11
	<i>Rudbeckia hirta</i>	Black-eyed susan		0.66
	<i>Amorpha canescens</i>	Lead plant		0.22
	<i>Liatris cylindracea</i>	Cylindric blazing star	128	0.22
	<i>Liatris pycnostachya</i>	Prairie blazing star	128	0.22

Grassed Overflow	Latin	Common	Oz. Seed
Grasses	<i>Bouteloua curtipendula</i>	Side oats grama	0.96
	<i>Panicum virgatum</i>	Switch grass	0.64
Forbs	<i>Dalea purpurea</i>	Purple prairie clover	0.16
	<i>Chamaecrista fasciculata</i>	Partridge pea	0.16
	<i>Echinacea pallida</i>	Pale purple coneflower	0.08

Humboldt Avenue Bluff Stabilization

City of Milwaukee, WI

River Revitalization Foundation

2134 Riverboat Road
Milwaukee, WI 53212

Preliminary Design Plans

PLANT SPECIES LIST

AES Proj. #: 17-0383

Designed By: WCC

Drawn By: CRS

Checked By: SAD

File: cad_details.dwg

Date: April 27, 2018

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Sheet Number



BioD-Mat® 70

Semi-Permanent Woven
Brown Bristle Coir Mat
Sri Lanka patent # 11159
Completely Wildlife Safe!

The Highest Quality Woven Coir Mat on the Market!

Description

The BioD-Mat® 70 blanket is woven from machine twisted bristle coir twines, the best quality coir fiber. This 100% biodegradable, strong and durable blanket provide higher erosion resistance while supporting growth and development of vegetation. These semi-permanent mats have functional field longevity of 4-6 years. If the vegetation fails to establish, the open weave in the mat allows seeding over the mat. BioD-Mat®70 blankets are manufactured to conform to the following physical properties.

Specifications

Property	Test Method	BioD-Mat® 70
Weight	ASTM D 3776	23 oz/SY (780 g/m ²)
Wide width tensile strength Wet Machine direction Cross direction	ASTM D 4595	1488 lbs/ft (21.7 kN/m) 1032 lbs/ft (15.1 kN/m)
Wide width tensile strength Dry Machine direction Cross direction	ASTM D 4595	1740 lbs/ft (25.4 kN/m) 1176 lbs/ft (17.2 kN/m)
Elongation at failure Wet Machine direction Cross direction	ASTM D 4595	38% 25%
Open area	Calculated	48%
Thickness	ASTM D 1777	0.35 inch (9 mm)
Recommended shear stress		4.5lbs./sq. ft. (215N/sq.m.)
Recommended flow		12 fps (3.7m/s)
Recommend slope		1:1
Minimum twine count per foot MD x CD		27 x 18

BioD-Mat® 70 is available in following roll sizes:

- 3.28ft x 83ft (30SY) = 1m x 25m (25 sq. m)
- 6.5ft x 166ft (120SY) = 2m x 50m (100 sq. m)
- 9.8ft x 166ft (180SY) = 3m x 50m (150 sq. m)
- 13.1ft x 83ft (120SY) = 4m x 25m (100 sq. m)



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SBA's 8(a) & SDB and DOT DBE Certified