



# Building Permit Application

City of Portland, Oregon - Bureau of Development Services

1900 SW 4th Avenue, Portland, Oregon 97201 • 503-823-7310 • TTY 503-823-8868 • www.portlandoregon.gov/bds

## Type of work

☐ New construction ☐ Addition/alteration/replacement

☐ Demolition ☒ Other: **REPAIR**

## Category of construction

☐ 1 & 2 family dwelling ☐ Commercial/industrial ☐ Accessory building

☐ Multifamily ☐ Master builder ☒ Other: **SITWORK**

## Job site information and location

Job no.: Job address: **0615 SW PALATINE HILL ROAD**

City/State/ZIP: **PORTLAND, OR 97219**

Suite/bldg./apt. no.: Project name: **OUTFALL 10**

Cross street/directions to job site: **POOLHOUSE EAST OF SW FRANK**

**MANOR DR. CUL-DE-SAC**

Subdivision: Lot no. Tax map/parcel no.

## Description of work

**STABILIZE EXISTING SANITARY SEWER OUTFALL  
INSTALL NATIVE PLANTS AND DRAINAGE  
CHANNEL IMPROVEMENTS**

## Provide RS Permit no.

☒ Property owner ☐ Tenant

Name: **LEWIS & CLARK COLLEGE** Email: **CLARK LDE, PG**

Address: **0615 PALATINE HILL ROAD**

City/State/ZIP: **PORTLAND, OR 97219**

Phone: **503-768-7918** FAX/EMAIL: **cide@lclark.edu**

Owner installation: This installation is being made on property that I own, which is not intended for sale, lease, rent, or exchange.

Owner signature: Date:

## Contractor

Business name: **TD BID** E-mail:

Address:

City/State/ZIP:

Phone: FAX:

CCB lic. no.

Authorized signature:

Print name: Date:

☐ Applicant ☐ Contact Person

Business name: **FASTER PERMITS**

Contact name: **MIKE COYLE**

Address: **14334 NW EAGLERIDGE LANE**

City/State/ZIP: **PORTLAND, OR 97219**

Phone: **503-680-5497** FAX:

E-mail: **mike@fasterpermits**

Authorized signature: **M. Coyle**

Print name: **MIKE COYLE** Date: **6/16/15**

## Office Use Only

Permit no: **15-186839 SD**

Date received: **6/16/15**

By: **MJL**

## Required Data: One and Two Family Dwelling

Permit fees\* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation: **NA**  
Number of bedrooms:  
Number of bathrooms:  
Total number of floors:  
New dwelling area: square feet  
Garage/carport area: square feet  
Covered porch area: square feet  
Deck area: square feet  
Other structure area: square feet

## Required Data: Commercial Use

Permit fees\* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation: **NA \$60,000**  
Existing building area: **548,281** square feet  
New building area: square feet  
Number of stories:  
Type of construction:

## Occupancy groups

Existing:

New:

## Notice

All contractors and subcontractors are required to be licensed with the Oregon Construction Contractors Board under ORS 701 and may be required to be licensed in the jurisdiction in which work is being performed.

**Statement of Fact:** I certify that the facts and information set forth in this application are true and complete to the best of my knowledge. I understand that any falsification, misrepresentation or omission of fact (whether intentional or not) in this application or any other required document, as well as any misleading statement or omission, may be cause for revocation of permit and/or certificate of occupancy, regardless of how or when discovered.

I acknowledge that work related to this Building Permit Application may be subject to regulations governing the handling, removal and/or disposal of asbestos and/or lead-based paint. If the work is subject to regulations governing asbestos and/or lead-based paint, I will comply with all such regulations. **(initials)**

## Building Permit Fees\*

### Please refer to fee schedule

Fees due upon application  
Amount received  
Date received

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete.



# CITY OF PORTLAND, OREGON – BUREAU OF DEVELOPMENT SERVICES

1900 SW Fourth Avenue, Suite 5000 • Portland, Oregon 97201 • [www.portlandoregon.gov/bds](http://www.portlandoregon.gov/bds)



## 2<sup>ND</sup> ZONING PLAN EXAMINATION CHECK-SHEET

Application # **15-186839-000-00-SD**

Review Date **August 13, 2015**

To:	APPLICANT	<b>MIKE COYLE FASTER PERMITS 14334 NW EAGLERIDGE LANE PORTLAND, OR 97229</b>	Phone	503-680-5497
			E-mail	<a href="mailto:mike@fasterpermits.com">mike@fasterpermits.com</a>
From:	PLANNING & ZONING	<b>ANDREW GULIZIA</b>	Phone	503-823-7010
			E-mail	<a href="mailto:andrew.gulizia@portlandoregon.gov">andrew.gulizia@portlandoregon.gov</a>

### PROJECT INFORMATION

Street Address:	<b>0615 SW PALATINE HILL RD</b>
Description of Work:	<b>STABILIZE EXISTING SANITARY SEWER OUTFALL LOCATED AT STREAM BED, BRING IN 48 CY OF FILL, INSTALL NATIVE PLANTS AND DRAINAGE CHANNEL IMPROVEMENTS</b>

### PLAN REVIEW

Based on the plans and specifications submitted, the following items appear to be missing or not in conformance with the zoning code requirements.

#	Item	Clarification/Correction Required
1.	Tree preservation <u>11.50.040</u>	<p>The revised plans show more than 1/3 of trees 12" or larger in the "development impact area" preserved, as required. However, generally the tree protection fencing radius must be the same distance in feet from the trunk as the trunk diameter in inches. (There are some encroachments permitted per <u>11.60.030</u>.) Note 3 on Sheet L3 mentions this requirement, but the fencing locations measured on the plan do not comply. Maybe the 1:10 scale labeled on the plan is incorrect?</p> <p>If the scale is correct, and the proposed fencing locations are too close to the trunks to comply with 11.60.030, you could either revise the fencing locations for at least 1/3 of the trees 12" or larger, or you could submit a signed letter from a certified arborist explaining how the proposed fence locations will provide adequate tree protection.</p> <p>Also, tree protection fencing must be 6-foot-tall metal chain link, secured with metal posts. Please revise Sheet L2 to reflect this requirement.</p>

To respond to this checksheet, come to the Bureau of Development Services located at 1900 SW Fourth Ave. The Development Service Center (1st floor) and Permitting Services (2nd floor) are open Monday through Friday from 8:00 a.m. to 3:00 p.m. (close at noon on Thursday). Please update all sets of submitted drawings by either replacing the original sheets with new sheets, or editing the originally submitted sheets. You can review "How to Update Your Plans in Response to a Checksheet" at <http://www.portlandoregon.gov/bds/article/93028> Visit the BDS website for more helpful information and a current listing of services available in the Development Services Center.

Please complete the attached Checksheet Response Form and include it with your re-submittal.

If you have specific questions concerning this Checksheet, please call me at 503-823-7010. To check the status of your project, please call (503) 823-7000 and select option 4. Your Plan Review Status will be faxed to you, so please be ready to provide a fax number. If you don't have a fax number, you may dial (503) 823-7357 to request a Plan Review Status or visit Document Services.

You may receive separate Checksheets from other City agencies that will require separate responses.

Handwritten signature: *Handwritten signature*

## Zoning Plan Examination Checksheet Response

Permit #: 15-186839-000-00-SD

**Date: August 25, 2015**

**Customer name and phone number:** MIKE COYLE, 503-680-5497

**NOTE:** Please number each change in the '# ' column. Use as many lines as necessary to describe your changes. Indicate which reviewer's checksheet you are responding to and the item your change addresses. If the item is not in response to a checksheet, write **customer** in the last column.

[illegible]





# CITY OF PORTLAND, OREGON – BUREAU OF DEVELOPMENT SERVICES

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## ZONING PLAN EXAMINATION CHECKSHEET

Application # **15-186839-000-00-SD**

Review Date **July 13, 2015**

<b>To:</b>	<b>APPLICANT</b>	<b>MIKE COYLE FASTER PERMITS 14334 NW EAGLERIDGE LANE PORTLAND, OR 97229</b>	Phone	503-680-5497
			E-mail	mike@fasterpermits.com
<b>From:</b>	<b>PLANNING &amp; ZONING</b>	<b>ANDREW GULIZIA</b>	Phone	503-823-7010
			E-mail	andrew.gulizia@portlandoregon.gov

### PROJECT INFORMATION

Street Address:	<b>0615 SW PALATINE HILL RD</b>
Description of Work:	<b>STABILIZE EXISTING SANITARY SEWER OUTFALL LOCATED AT STREAM BED, BRING IN 48 CY OF FILL, INSTALL NATIVE PLANTS AND DRAINAGE CHANNEL IMPROVEMENTS</b>

### PLAN REVIEW

Based on the plans and specifications submitted, the following items appear to be missing or not in conformance with the zoning code requirements.

#	Item	Clarification/Correction Required
1.	Tree preservation <u>11.50.040</u>	<p>Please submit a tree plan which defines a "development impact area" around the project which encompasses the full area needed to stage and construct the improvements. Within the "development impact area," all trees which are 6" in diameter or greater must be shown and labeled, and trees proposed for removal must be identified. At least 1/3 of trees within the "development impact area" which are 12" in diameter or greater must be preserved and protected during construction with 6'-tall chain link fencing. The fencing must be located at least the same distance in feet from the trunk as the trunk diameter in inches. (For example, the fence should be 12' from the trunk of a 12" tree.) Some exceptions may apply, and are detailed in 11.50.040 and 11.50.060.</p> <p>Alternatively, you can submit a customized tree protection plan prepared by a certified arborist.</p>

To respond to this checksheet, come to the Bureau of Development Services located at 1900 SW Fourth Ave. The Development Service Center (1st floor) and Permitting Services (2nd floor) are open Monday through Friday from 8:00 a.m. to 3:00 p.m. (close at noon on Thursday). Please update all sets of submitted drawings by either replacing the original sheets with new sheets, or editing the originally submitted sheets. You can review "How to Update Your Plans in Response to a Checksheet" at <http://www.portlandoregon.gov/bds/article/93028> Visit the BDS website for more helpful information and a current listing of services available in the Development Services Center.

Please complete the attached Checksheet Response Form and include it with your re-submittal.

If you have specific questions concerning this Checksheet, please call me at 503-823-7010. To check the status of your project, please call (503) 823-7000 and select option 4. Your Plan Review Status will be faxed to you, so please be ready to provide a fax number. If you don't have a fax number, you may dial (503) 823-7357 to request a Plan Review Status or visit Document Services.

You may receive separate Checksheets from other City agencies that will require separate responses.





# Ed Matthews

## BES Plan Check Corrections Response

Permit #: 15-186839-000-00-SD

Date: AUGUST 5, 2015

Customer name and phone number: MIKE COLE, 503-680-5497

Note: In the spaces below, please provide specific information concerning the changes that you have made in response to the checksheet. Note the checksheet item number, your response or a description of the revision, and the location of the change on the plans (i.e. page number and/or detail number). Use as many lines as needed. If the item is not in response to a checksheet, write "Applicant" in the column labeled "Checksheet item number."

Checksheet item number	Description of changes, revisions, additions, etc.	Location on plans
1	NINE ALNUS RUBRA AND 35 LIVE STAKES WERE ADDED. 45 CORNUS SERICEA AND 30 SALIX SPECIES LIVE STAKES COMPOSE THE TOTAL. SALIX SPECIES REQUIRE FULL SUN TO THRIVE AND DO NOT TYPICALLY OCCUR IN CLOSED, OR NEARLY CLOSED CANOPY. CORNUS SERICEA HAS A GREATER TOLERANCE FOR SHADE AND WERE KEPT.	BES# 1
2	LEWIS & CLARK COLLEGE MONITORS OUTFALLS SINCE 2009 AND PROVIDES ANNUAL MONITORING REPORTS WITH RECOMMENDATIONS TO THE CITY OF PORTLAND. THE REPAIR OF OUTFALL #10 IS A PRODUCT OF THIS PROGRAM. STORMWATER MANAGEMENT UPGRADES WITH CAPITOL IMPROVEMENT PROJECTS ON THE CAMPUS, THE OUTFALL MONITORING AND REPAIR PROJECTS HAVE BEEN REVEGETATING EROSIONAL AREAS WITH NATIVE SPECIES. ACTIVE STORMWATER MANAGEMENT IS INCORPORATED INTO CAPITOL IMPROVEMENT PROJECTS WHERE FEASIBLE.	BES# 2 RECOMMENDATION

Plan Bin Location: 39CO

RECEIVED  
AUG 06 2015

BDS  
DOCUMENT SERVICES

SITE  
DEV

Date: 9/8/15

**Note:** Please number each change in the ‘#’ column. Use as many lines as necessary to describe your changes. Indicate which reviewer’s checksheet you are responding to and the item your change addresses. If the item is not in response to a checksheet, write **customer** in the last column.

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Page 3 of 3





**City of Portland, Oregon**  
**Bureau of Development Services**  
**Site Development**

## FROM CONCEPT TO CONSTRUCTION

**Dan Saltzman, Commissioner**  
**Paul L. Scarlett, Director**  
**Phone: (503) 823-6892**  
**Fax: (503) 823-5433**  
**TTY: (503) 823-6868**  
**[www.portlandoregon.gov/bds](http://www.portlandoregon.gov/bds)**

## Site Development Checksheet Response

Permit #: 15-186839-000-00-SD

**Date: August 12, 2015**

**Customer name and phone number:** MIKE COYLE 503 680-5497

**Note:** Please number each change in the '# ' column. Use as many lines as necessary to describe your changes. Indicate which reviewer's checksheet you are responding to and the item your change addresses. If the item is not in response to a checksheet, write **customer** in the last column.

[illegible]

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(For office use only)

## Site Development Checksheet Response

**Date:** July 9, 2015

*Note: Please number each change in the '#' column. Use as many lines as necessary to describe your changes. Indicate which reviewer's checksheet you are responding to and the item your change addresses. If the item is not in response to a checksheet, write **customer** in the last column.*

[illegible]

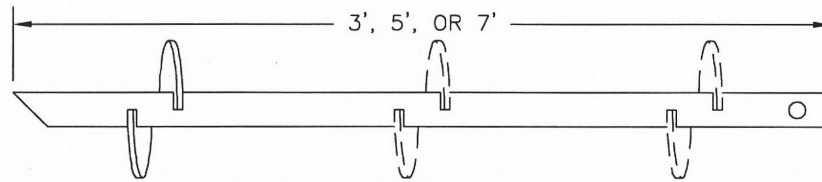
(For office use only)

THIS DRAWING AND THE INFORMATION CONTAINED HEREON ARE THE PROPERTY OF IMR, Inc. THIS DRAWING IS INTENDED FOR THE SOLE USE OF IMR, Inc. AND ITS AUTHORIZED CLIENTS ONLY.

## HPC-15

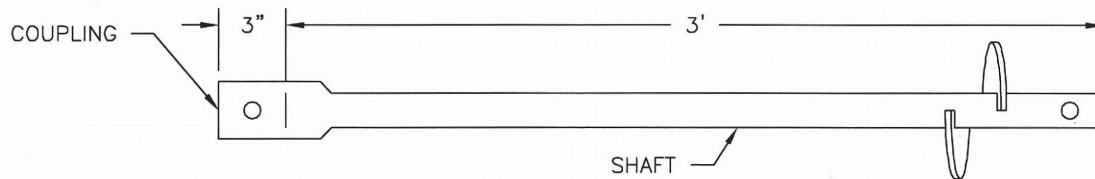
### 1.5" HELI-PILE® CONVENTIONAL HELICAL PILE

CATALOG NUMBERS BEGINNING WITH HPCL-15 AND HPCE-15  
(STANDARD HIGH STRENGTH SHAFT STEEL,  $F_y=70$  KSI)



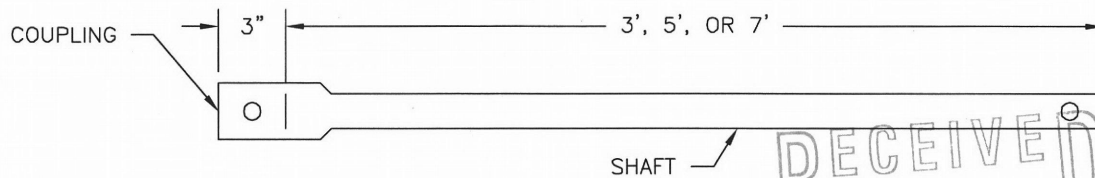
**LEAD SECTION**  
**SINGLE OR MULTIPLE HELIX**

NO SCALE



**HELIX EXTENSION**

NO SCALE



**PLAIN EXTENSION**

NO SCALE

1. THIS DRAWING COVER 1.5" HELI-PILE® SOLID ROUND CORNER SQUARE SHAFT HELICAL PILES.  
(CATALOG NUMBERS BEGINNING WITH HPCL-15 & HPCE-15)
2. SOLID ROUND CORNER SQUARE SHAFT MATERIAL IS PER ASTM A29 OR AISI 1044,  $F_y=70$  KSI
3. ALL HELIX MATERIAL IS 0.5" THICK AND IS PER ASTM A656 Gr 80 TYPE 7 ( $F_y=80$  KSI).
4. CONNECTION BOLTS ARE 0.75" DIAMETER ASTM A449, 3" LONG, THREADS OUTSIDE THE SHEAR ZONE.
5. ALL WELDS MINIMUM 0.25" FILLET WITH ER70S ELECTRODE.
6. ALL STEEL IS GALVANIZED PER ASTM B633-85 FE/ZN 5, TYPE III
7. ULTIMATE AXIAL MECHANICAL CAPACITY IS 55,000 LBS.
8. ULTIMATE SHAFT TORQUE CAPACITY IS 5,500 FT-LBS.
9. ULTIMATE HELIX MECHANICAL CAPACITY: 6"-12" DIAMETER = 70,000 LBS, 14" DIAMETER = 56,000 LBS



# HELI-PILE®

IMR, Inc. - DENVER

5135 Ward Road, Wheat Ridge, Colorado, 80033 USA  
303-423-0591 Fax: 303-423-9155  
www.helipile.com

### SPECIFICATION SHEET

DRAWN BY:

RJV

ENGINEER:

JSP

1.5" CONVENTIONAL  
STANDARD HIGH STRENGTH  
HELICAL PILES

HPC-15.DWG

SHEET 1 OF 1

DATE:

05/19/09

REVISION:

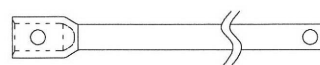
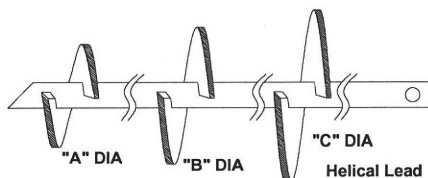
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15-186839-51

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## 1-1/2" Round Corner Square Bar Torque Anchors<sup>™</sup>



Extension (Supplied with hardware)

### Standard ECP Torque Anchor<sup>™</sup> Lead Configurations – 7,000 ft-lb\*

Product Designation	Plate Diameter - inches			Plate Area sq. ft.	Length
	"A"	"B"	"C"		
TAH-150-10 08	8	--	--	0.33	10"
TAH-150-10 10	10	--	--	0.53	10"
TAH-150-10 12	12	--	--	0.77	10"
TAH-150-60 08	8	--	--	0.33	60"
TAH-150-60 10	10	--	--	0.53	60"
TAH-150-60 12	12	--	--	0.77	60"
TAF-150-60 06-08	6	8	--	0.51	60"
TAF-150-60 08-10	8	10	--	0.86	60"
TAF-150-60 10-12	10	12	--	1.30	60"
TAH-150-84 12	12	--	--	0.77	84"
TAF-150-84 08-10-12	8	10	12	1.63	84"
TAF-150-84 10-12	10	12	--	1.30	84"
TAF-150-84 10-12-14	10	12	14	2.35	84"
TAF-150-120 8-10-12	8	10	12	1.63	120"
TAF-150-120 10-12-14	10	12	14	2.35	120"

### Standard ECP Torque Anchor<sup>™</sup> Extensions

Part Number			
36"	60"	84"	120"
TAE-150-36	TAE-150-60	TAE-150-84	TAE-150-120

**Note:** Products Listed Above Are Standard Items And Are Usually Available From Stock.  
Other Specialized Configurations Are Available As Special Order – Allow Extra Time For Processing.  
All Helical Plates Are Spaced At Three Times The Diameter Of The Preceding Plate  
Effective Length Of Extension Is 3" Less Than Overall Dimension Due To Coupling Overlap  
All Product Hot Dip Galvanized Per ASTM A123 Grade 100  
Shaft Weight per Foot – 7.7 lb.

\* Please see "IMPORTANT NOTES" on Table 2

**If a Torque Anchor<sup>™</sup> configuration is not shown above as a standard product; please see "How to Specify Special Order Torque Anchors<sup>™</sup>" on page 10.**



Job No.: LAC-31

Date: April 30, 2015

To: Denise King, Planning Specialist,  
Facilities Services, Lewis & Clark College

From: Scott Banker, HHPR Inc.



Harper  
Houf Peterson  
Righellis Inc.

ENGINEERS • PLANNERS  
LANDSCAPE ARCHITECTS • SURVEYORS

**Project/Subject: Lewis & Clark College – Annual Outfall Monitoring Work Plan  
Outfall 10 Sewer Pipe Crossing**

☐ Fax - Number: \_\_\_\_\_; Number of pages \_\_\_\_\_  
(If you did not receive the correct number of pages, please call 503-221-1131)  
☒ E-mail ☐ Mail ☐ Hand Deliver ☐ Interoffice

Please find following our recommendations addressing 2014 Outfalls Monitoring based on our site visits, coordination with GeoDesign, and review of their report and subsurface investigation.

#### **Project Background**

Pursuant to the 2009 master plan approval, Lewis & Clark College (LCC) is required to repair outfalls ranked "Urgent" and "Important" by the College's geotechnical engineer as well as provide an annual update of those ranked "Low Priority" or "Not Located." If the status of an outfall changes to "Urgent" or "Important" as a result of annual monitoring, the outfall is required to be repaired. The College's geotechnical engineer, GeoDesign Inc., performed a site visit and prepared an updated memo dated March 10, 2015. The memo concludes the following:

Outfall 4 – Low Priority. We concur with GeoDesign assessment and recommend that LCC have the outfall videotaped and have a contractor or staff repair the separated pipe section(s).

Outfall 7 – Important. We concur with GeoDesign assessment and recommend that LCC have the outfall videotaped and have a contractor or staff repair the separated pipe section(s).

Outfall 10 – Important. Further site reconnaissance was conducted on March 11, 2015 by Harper Houf Peterson Righellis Inc. (HHPR) staff Scott Banker and Jeff Schwindt to review the 8" sanitary sewer pipe crossing the drainage. HHPR and GeoDesign made an additional site reconnaissance visit on March 18, 2015 to develop a work plan for geotechnical investigation of soil conditions at the sanitary sewer crossing.

Outfalls 15, 16, 18, 19, 20 and 26 No Longer Monitored. No further action required for these outfalls.

Please refer to attached 2014 Lewis & Clark College – Storm System Inventory memorandum by GeoDesign Inc. dated March 10, 2015.

205 SE Spokane Street  
Suite 200  
Portland, OR 97202  
PHONE 503.221.1131  
FAX 503.221.1171  
www.hhpr.com

15-186839 SD

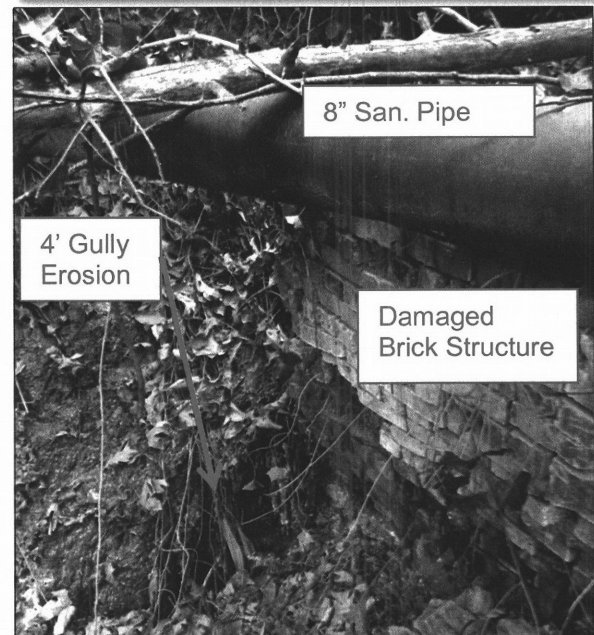
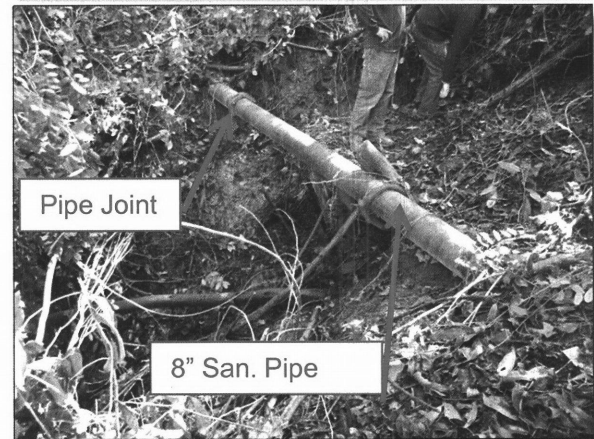
## **OUTFALL 10 / SEWER PIPE CROSSING**

### **Existing Conditions**

A six (6) inch diameter vitrified clay storm outfall is located below the Pool House and is located at the head of the drainage channel. There is an approximate 1.5 feet deep erosion scarp located immediately below the outfall, indicating gully erosion in the drainage channel. The drainage channel is not mapped in the E-Zone (C or P). Approximately 110 feet downslope of the six (6) inch storm outfall in the channel is the 8" steel sanitary sewer pipe crossing the drainage channel. It is not located in the E-Zone (C or P). The sanitary sewer outfall is minimally supported on a brick structure in the center of the drainage. It has an exposed support on the east side and no support was observed on the west side of the crossing. This sewer pipe serves much of the southern and eastern portion of the campus and ties into the public sanitary sewer to the east and off campus. The gully erosion is approximately four (4) feet deep at the sewer crossing with over-steepened side slopes approaching vertical. Vegetation has been undermined and fallen into the channel. The area outside of the channel is generally wooded with steep slopes. The channel slope gradient is approximately 32%.

No as-built sanitary sewer plans or documents were found to document the design of the pipe and brick support structure. It is not known whether the pipe was designed to span the drainage channel, or if the brick pier was embedded in the channel and has been exposed due to the ongoing gully erosion. The pipe may have buried prior to the erosion. Gully erosion usually occurs at a relatively fast rate compared with deep seated slope instability. Gully erosion reflects an eroded channel bed, over-steepened slopes, and adjacent vegetation falling into the channel. Slope movement occurs much slower and trees with "S" shapes in their trunks are often field indicators.

The gully erosion will continue to advance upslope toward the six (6) inch storm outfall without mitigation. Gully erosion typically erodes deeper in a channel, collapsing the side banks until the side bank material fills the channel bottom. The gully advance could potentially undermine the sewer outfall further causing pipe





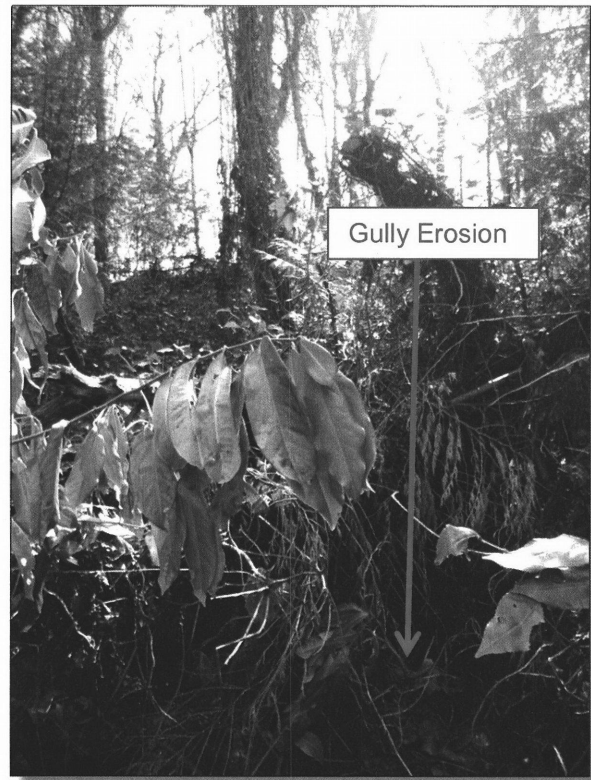
failure as the channel widens and the structural span length of the pipe is exceeded. This could cause a sewerage spill in the steep channel and cut off service to several campus buildings.

### **Geotechnical Investigation**

Due to steep slopes and the close proximity of buildings, access to the site with a standard drill rig is not practical. Three hand augers were advanced adjacent to the sewer crossing to investigate and categorize soil conditions to develop a repair solution. Refer to attached Geotechnical Investigation Report by GeoDesign dated April 22, 2015.

### **Gully Erosion Repair**

Stabilizing gully erosion generally requires energy dissipation measures at the outfall location, constructing a channel bed which minimizes infiltration of runoff and prevents subsurface flow, and installing grade control to arrest gully advancement/regrade and bed erosion. Decreasing side slope steepness is often employed to reduce further side slope erosion and to create a slope that allows for revegetation and bioengineering measures. Following are our proposed methods of arresting and mitigating the advancing gully erosion.



Energy Dissipation – An energy dissipater shall be constructed at the invert of the six (6) inch storm outfall. Minimal excavation will be employed and the subgrade will be compacted. A 12" thick sub base of 4" -0" aggregate will be placed and compacted. The compacted fines will reduce runoff infiltration and subsurface flow. The brick structure could be demolished and the bricks incorporated into the energy dissipater due to the difficult construction equipment access and the level of effort required to remove the bricks.

Channel Side Slopes – The side slopes will be scaled off and rounded to decrease erosion potential and to provide a slope suitable for revegetation and bioengineering methods. Removed soil material will be placed in the channel bed, if deemed suitable by the geotechnical engineer for compaction. It will be leveled to the bed form and compacted.

Channel Bed – Minimal excavation will be employed in the channel bed, primarily to move scaled material around and remove unstable soils. The soil will be placed, leveled and compacted in the channel bed to a smooth slope line. After installation of grade control boulders, a 15 – 18" thick layer of 4" -0" aggregate will be placed and compacted. A roughened channel mix will be installed, compacted, and watered in so that fines seal the bed armoring. The 4" -0" aggregate and roughened channel mix material should extend a minimum of one foot up the side slopes.

Grade Control – Grade control will consist of hard, angular and non-fractured boulders and be installed to an elevation 5 feet below the proposed finished grade of the channel bed. They will protrude above finished grade 3" to 6" to provide channel roughness and energy dissipation.

Trenches will be excavated for the grade control. After the grade control is placed, it will be backfilled with 4" -0" aggregate to seal the trenches.

**Impact Mitigation** – The impacts created by the gully erosion and its repair will be mitigated with native plant materials. Trees downed from the gully erosion and/or repair efforts will be incorporated onto side slope or be placed across the channel in non-erosive conditions. Invasive plant species removal will occur in the work area. Please refer to attached sheet L-2 for native revegetation plan view and plant schedule.

### **Structural Pipe Support**

Structural support for the existing sewer pipe shall be provided through construction of a new cast-in-place continuous concrete beam immediately below the full length of the pipe which is then supported off of drilled concrete piers. Adequate concrete pier foundation depth embedment shall be determined per a geotechnical engineers recommendations in order to sufficiently support both vertical and any code required seismic loading. Please see sheets C-3 & C-4 for plan view and proposed preliminary elevation.

### **Drainage Reserve Code**

Our proposed gully repair solution meets the Goals and Objectives of the Appendix A.3: Proposed Drainage Reserve Administrative Rules.

- I.A. The repair work will maintain the location of stormwater discharges and flows.*
- I.B. The repair work will limit current and future impacts to offsite areas by stabilizing erosion onsite.*
- I.C. No changes in runoff will occur.*
- I.D. The repair will prevent and reduce long-term, scour related erosion within the drainageway.*
- I.E. The drainageway will be maintained as an open system.*
- I.F. The repair will not reduce capacity of the drainageway.*
- V. Environmental Zones. The repair work takes place upslope of the IRcd zone.*

### **Summary**

The roughened channel mix, grade control and native revegetation concept presented herein is very similar in concept and some details of prior permitted and constructed Outfall Repairs 1, 2, 3, and 4. All outfalls mentioned exhibited some form of channel incision/gully erosion, involved steep slopes, and potential for ongoing erosion to affect one or more factors of: infrastructure stability, slope stability, health and welfare of users adjacent to the erosion areas. The gully repair concept will stabilize erosion and reduce the input of sediment downstream of the outfall. Reduced and mitigated erosion will protect existing utility infrastructure such as the 8" sanitary sewer line. Gully stabilization and structural pipe support will prevent the potential collapse of the sanitary sewer and sewerage leaks into the drainage channel. The gully repair will additionally prevent further damage to the grounds of the L&CC pool house facility in the immediate vicinity. The revegetation of the side slopes and replanting of the immediate work zone will stabilize surficial soil erosion, provide native conifer trees to shade the drainage channel, and provide plant species which provide habitat enhancement for wildlife.

Attachments: Engineering plans and details, HHPR. Lewis & Clark College – Storm System Inventory and Report of Geotechnical Engineering Services Outfall 10/Sewer Pipe Crossing, GeoDesign.

