

OPERATION & MAINTENANCE
MANUAL
for
Falcon Ridge

**STORMWATER CONVEYANCE
AND
DRAINAGE POND
OPERATION & MAINTENANCE
MANUAL**

Falcon Ridge

County File P-1807
CLC No. S99398

July 02, 2002

**By
C.L.C. Associates, Inc.
707 West 7th Avenue, Suite 200
Spokane, WA 99204
(509) 458-6840**

1.00 PURPOSE

This document is intended to provide general operations and maintenance guidelines for the drainage ponds and other drainage facilities located within the Falcon Ridge single-family residential neighborhood and offsite improvements with respect to the Falcon Ridge Plat. Implementation of these guidelines will insure that the drainage facilities installed will function as intended in the plat design.

2.00 INTRODUCTION

Generally, the drainage system is intended to collect onsite stormwater runoff in the streets and convey into a detention pond. The drainage facilities consist primarily of a series of onsite drainage structures, manholes, storm pipes, detention ponds, sedimentation ponds, biofiltration swale and drywells. All drainage is conveyed to Pond 1, which will always have standing storm water up to a maximum of 3.5' or to the bottom of the outlet to Pond 2. When a storm occurs the water elevation will rise and the storm water will be released into Pond 2. Pond 2 is designed to be a dry pond because of the outlet structure has an orifice at the pond bottom. Once the storm water leaves Pond 2 it will be treated by the use of a Biofiltration Swale immediately following the release of the storm water. Once the storm water has been treated it will follow a natural drainage channel into two sedimentation control ponds in a series. The storm water once leaving the sedimentation ponds enters a storm pipe and exits into a swale that contains 4 drywells. Once the storm water enters the swale the storm water will be drywell discharged. It is of the utmost importance to provide adequate operations and maintenance activities to insure that the drainage facilities remain silt or dirt free, as this silt or dirt loading will affect the performance of the storm pipes, pond, and drywells. If these facilities were to become completely clogged, the only remedy would be to completely reconstruct the drainage facilities. Therefore, periodic maintenance is a must. A full set of engineering drawings for Falcon Ridge is available, for review at Spokane County Public Works under County file P-1807.

3.00 GENERAL OPERATIONAL CHARACTERISTICS

The drainage facilities for Falcon Ridge are simple, functional, and have low maintenance requirements. A periodic visual inspection of the facilities will identify any required maintenance. Most maintenance will consist of keeping the manholes, pipes, structures and ponds free of debris and sediment. A specific inspection schedule should be followed. See Section 4.0 for recommended maintenance schedules.

3.10 Drainage Structures and Storm Pipes

The drainage structures include concrete gutters, catch basins, discharge structures, manholes, piping and drywells. The concrete gutters, catch basins, discharge structures, manholes and piping convey stormwater runoff from the

surface of the streets to the detention ponds where the storm water is stored and then discharged through a discharge structure for subsurface disposal to the drywells.

3.20 Biofiltration Swale

A Biofiltration Swale has been installed within the storm drainage system just after the release of storm water from Pond 2. There is a specific seed mix that is to be used to achieve a low maintenance biofiltration swale. Please see seed mix requirements in the appendix section. A site map showing the biofiltration swale location and layout is attached to this document. The biofiltration swale will require once a year mowing to ensure that the biofiltration swale will work as planned.

3.30 Detention Ponds

Two detention ponds are located within a Tract A along the North side of Maxine Avenue. The purpose of these detention ponds is to provide attenuation of the peak storm water runoff rate prior to discharge. A site map showing the location and layout of the ponds is attached to this document.

The ponds have flat bottoms and are enclosed within earthen berms. The pond volumes and outlet structures were designed to address the runoff flow rate and volume for the 100-year design storm event.

Pond characteristic information is provided in Table 3.30. Additional information is provided in the engineering drawings on file at Spokane County Public Works, under file P-1807.

Table 3.30 - Pond Characteristics

| Pond Label | Pond Btm. Elev. | Pond Btm. Area (sf) | Outlet Structure | Outlet Elev. | Overflow Elev. |
|------------|-----------------|---------------------|---------------------|---------------------------|----------------|
| Pond 1 | 2346.80 | 18,617 | Discharge Structure | 2350.30 | 2355.00 |
| Pond 2 | 2339.20 | 5,519 | Discharge Structure | Rim=2346.00 IE=2339.20 | 2347.00 |

3.40 Sedimentation Ponds

Two sedimentation ponds are located just prior to the infiltration structures East of Phoebe Drive and North of Barnes Road. The purpose of these sedimentation ponds is to remove sediments from the storm water prior to subsurface infiltration with the use of drywells. A site map showing the location and layout of the sedimentation ponds is attached to this document.

3.50 Infiltration Structures

The infiltration outlet structures consist of (4) City of Spokane Standard Type "2" drywells that are used to infiltrate stormwater runoff at a rate of 1 cfs. A copy of the City of Spokane Standard Plan B-102D *Precast Drywell Type "2"* is attached for reference as well as Standard Plan B-102F. This structure consists of a grated inlet, perforated concrete barrel sections, and buried washed drain rock, wrapped in porous filter fabric. A site map showing the location and layout of the infiltration structures is attached to this document.

4.00 MAINTENANCE REQUIREMENTS AND SCHEDULES

Below is a maintenance description for each of the drainage system elements contained within the Falcon Ridge development, including the drainage structures, drywells, pipes, swales and ponds.

General

Proper maintenance procedures are necessary for the continued functioning of the drainage facilities. Improper maintenance, or lack of attentive maintenance measures, may result in negative drainage impacts.

Generally, maintenance personnel are to conduct a visual inspection of the drainage facilities immediately following a substantial rainfall event or snowmelt event. Substantial events include:

- Noticeably hard rain for a short period (30 minutes or more),
- Steady rain for a long period (6 hours or more), or
- Significant rainfall and/or snowmelt when the ground is frozen.

For long duration storms, longer than 24 hours, maintenance personnel are to inspect the drainage facilities during the storm event to identify any developing problems and correct them before they become major problems.

1. Inspect all concrete gutters, manholes and drainage structures (catch basins and drywells) to ensure they are clear of debris and obstructions.
2. Inspect all pond berms for breaches. Immediately repair any berm breaches with native sandy soil, compacted in place.

The above noted storm related visual inspections are in addition to the maintenance schedules noted for each item.

4.10 Drainage Structures and Storm Pipes

Catch basins, pipes, manholes, and discharge structures should be inspected every 3 months, or after every significant storm event (½") and/or snowmelt event, whichever is more frequent. Visually inspect the pipes, inlets and outlets, making sure they are clear of debris and check that the pipe is in good condition, without breaks or cracks. If there is any obstruction present it should be removed immediately.

A flow test in the pipe can be used to readily detect major obstructions or breaks in the pipe. This test requires a water source (hydrant or water truck) and a person at the downstream end of the pipe observing the flow exiting out of the pipe section.

All catch basins should be cleaned (vacuumed) every 6 months.

4.20 Ponds and Swales

The detention ponds and swales should be inspected every 3 months, or after every significant rainfall and/or snowmelt event, whichever is more frequent. The ponds and swales consist of an earthen depression constructed from native soils, enclosed within soil berms. The ponds and swales should be sodded and/or hydro-seeded with a dry land grass mixture, at a minimum; except for the Biofiltration Swale, which has a specific seed mix. A lawn sod can be used if regular irrigating is implemented.

Routine maintenance and inspections of the ponds and swales will include removal of any accumulated debris, such as leaves, weeds and trash. Any obstructions, which would not allow water to flow freely from the ponds and swales via the outlet structures, should be removed. Additionally, the pond and swale berms should be inspected to insure that they are in good repair and structurally sound and that no outflow has occurred other than through the outlet structure.

4.30 Infiltration Structures

The infiltration structures (drywells) consist of a grated inlet, perforated concrete barrel sections, and buried washed drain rock, wrapped in porous filter fabric. Drywells should be inspected every 3 months, or after every significant rainfall and/or snowmelt event, whichever is more frequent. During routine inspection, if standing water is found 72 hours or more after the last significant rainfall event, the infiltration structure is most likely clogged due to silt and sediment. The structure shall be vacuumed of standing water and sediment.

All drywells should be cleaned (vacuumed) every 6 months.

5.00 Recommended Set-Aside Funds for Maintenance & Future Replacement Costs

There will be annual maintenance costs, major renovation costs and future replacement costs of the drainage facilities. These costs are the responsibility of the Falcon Ridge Homeowner's. Major renovation and future replacement costs have been converted to annual costs, in the form of recommended set-aside funds. It is assumed that ¼ of the pipe and half of the structures will have to be replaced within 20 years.

The estimated annual maintenance cost and replacement cost calculations are listed in the appendix section of this document. The estimated annual set-aside funds are to ensure that adequate maintenance and replacement measures of the drainage facilities will be implemented. The estimated annual maintenance and replacement costs for both onsite and offsite are listed below in Table 5.00A and 5.00B.

Table 5.00A - Maintenance and Future Replacement Costs For Onsite Drainage

| Drainage Facility | Annual Maintenance Costs | Annual Set-Aside Funds for Future Replacement or Major Renovation ⁽¹⁾ |
|------------------------------------|--------------------------|--|
| Onsite Pipes & Drainage Structures | \$ 2,400.00 | \$2,397.56 |
| Sub-total Annual Costs | \$2,400.00 | \$2,397.56 |

Note: (1) Assume replacement in 20 yrs, with 4% inflation and a 6% rate of return on investments for set-aside account.

Grand Total/year = \$ 4,797.56
Cost per lot/year = \$ 92.26 (52 lots)

Table 5.00B - Maintenance and Future Replacement Costs For Offsite Drainage

| Drainage Facility | Annual Maintenance Costs | Annual Set-Aside Funds for Future Replacement or Major Renovation ⁽¹⁾ |
|-------------------------------------|--------------------------|--|
| Offsite Pipes & Drainage Structures | \$ 200 | \$121.94 |
| Drywells - Spokane County Type B | \$1,000 | \$238.39 |
| Offsite Ponds & Swales | \$ 100 | \$595.62 |
| Sub-total Annual Costs | \$1300 | \$955.95 |

Note: (1) Assume replacement in 20 yrs, with 4% inflation and a 6% rate of return on investments for set-aside account.

Grand Total/year = \$2255.95
Cost per lot/year = \$ 7.92 (285 lots)

Finally it is expected that a lot owner of Phase 1 of Falcon Ridge will pay (92.26 + 7.92) **\$100.18**, which is the annual set aside cost for maintenance and replacement for both onsite and offsite drainage facilities.

APPENDICES

VICINITY MAP

OVERALL SITE MAP

DETENTION POND AND BIOFILTRATION SWALE SITE MAP

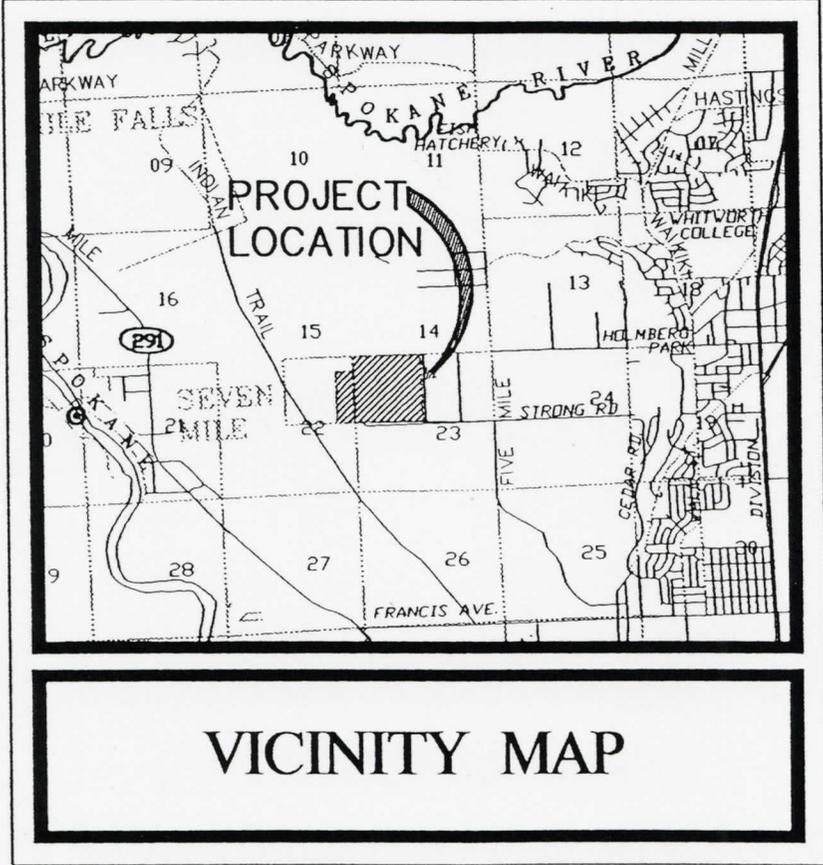
SEDIMENTATION POND AND INFILTRATION STRUCTURE SITE MAP

PRECAST DRYWELL, DETAIL B-102D AND B-102F

ANNUAL SET-ASIDE FUND CALCULATION SHEETS

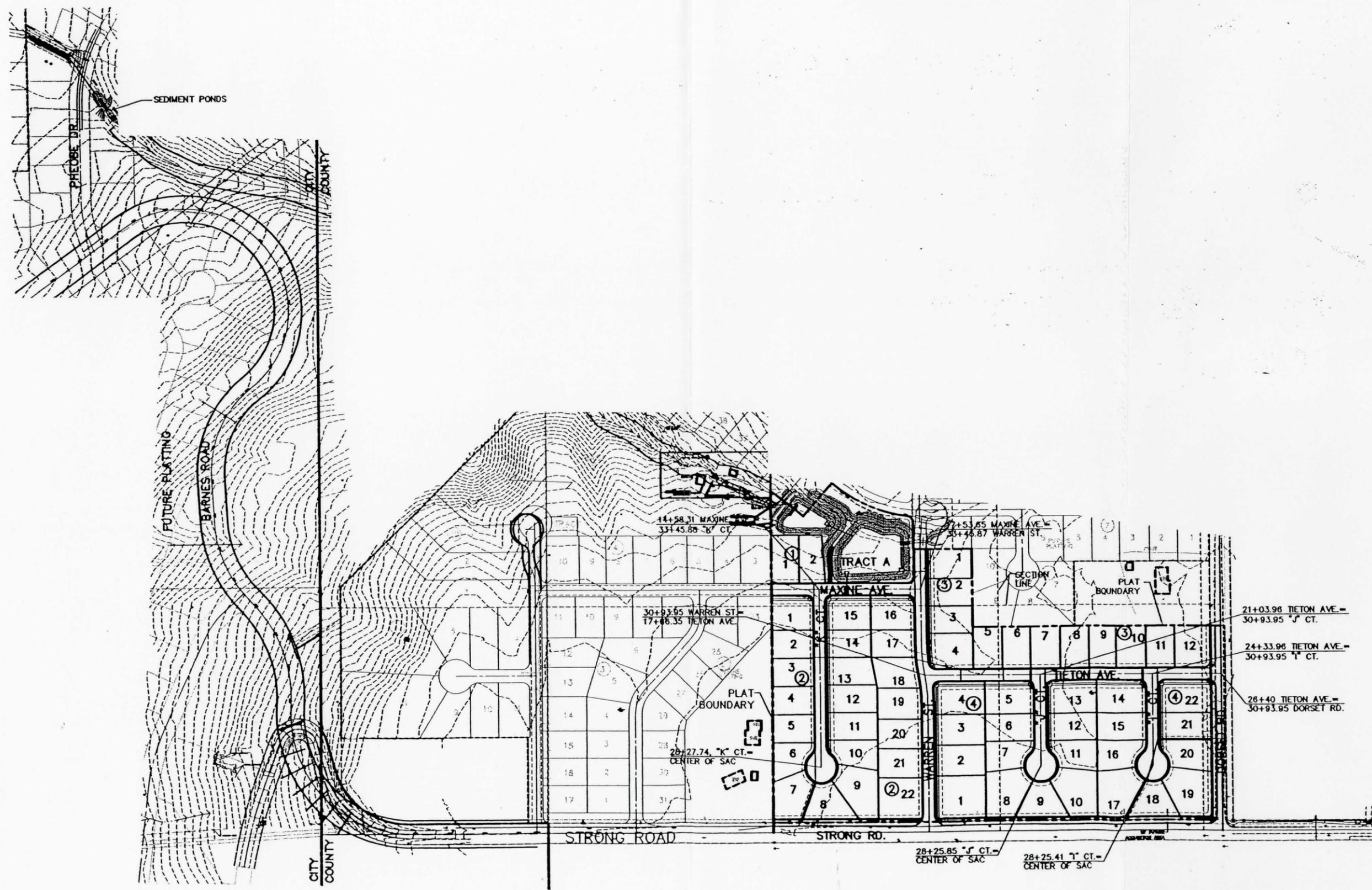
BIOFILTRATION SWALE SEED MIX

VICINITY MAP



VICINITY MAP

OVERALL SITE MAP



1:1.5

**DETENTION POND AND BIOFILTRATION
SWALE SITE MAP**

SECTION 23, T.26 N., R.42 E., W.M.
SPOKANE COUNTY, WASHINGTON

UNDER SERVICE ALERT
CALL NUMBER
456-8000
CALL TWO BUSINESS DAYS
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Associates, Inc.
Planning
Engineering
Architecture
Landscape Architecture
Land Surveying
207 W. 7th Avenue, Suite 200
Spokane, WA 99204
Phone: (509) 456-8000
Fax: (509) 456-8044



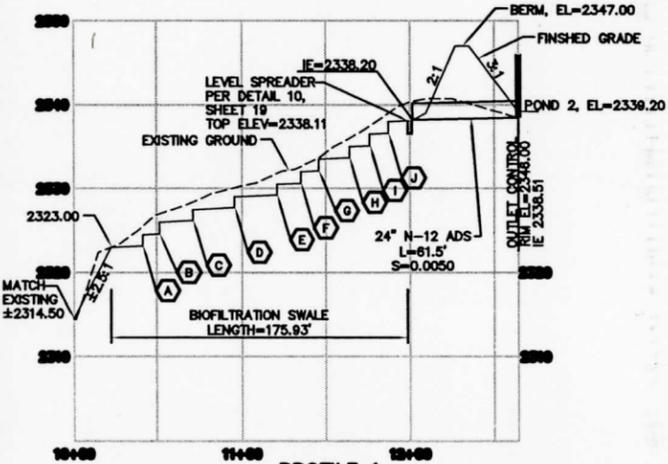
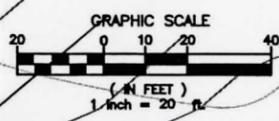
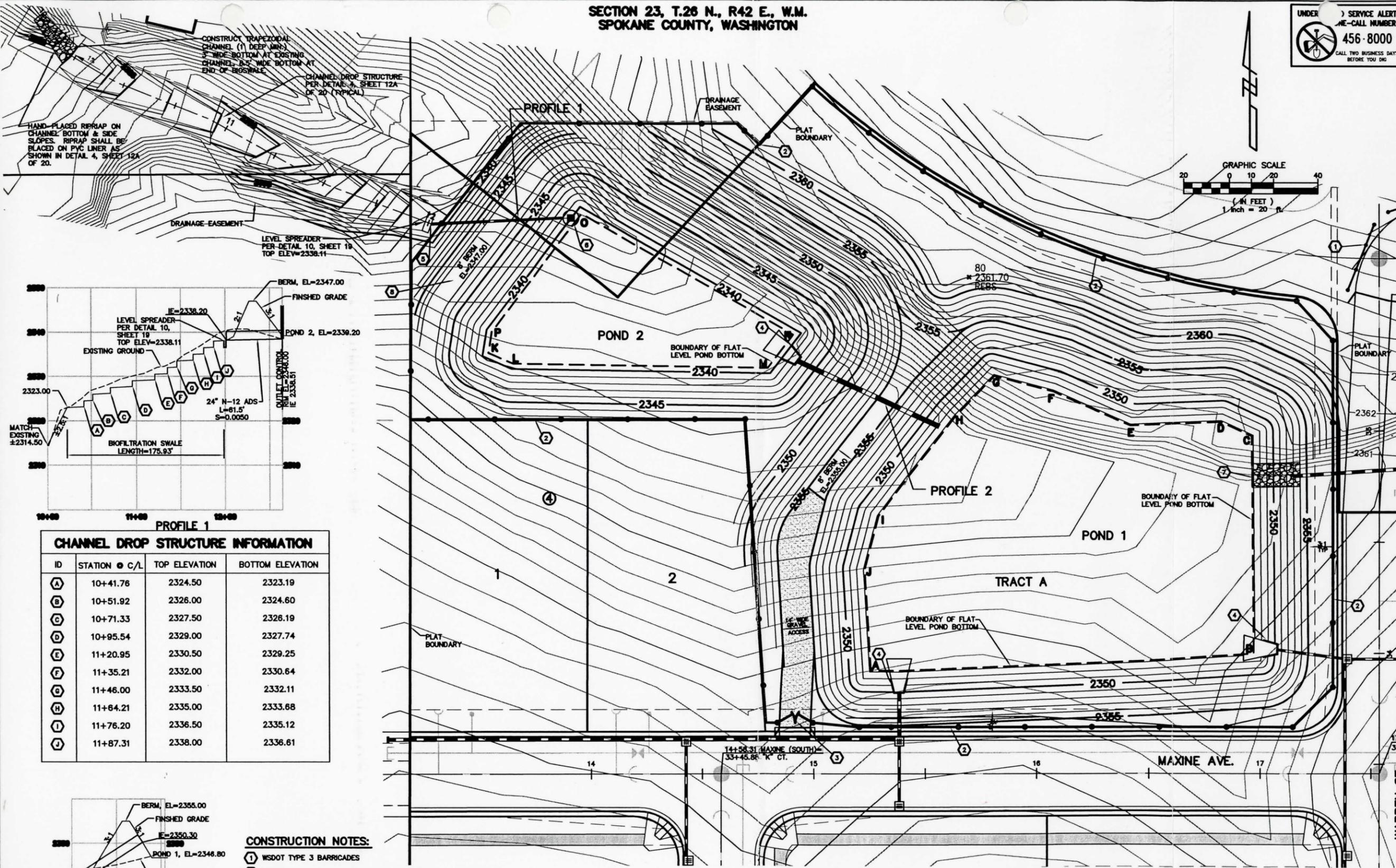
PREPARED UNDER THE DIRECT
SUPERVISION OF
SCOTT A. RIVAS, P.E.
WASHINGTON REGISTRATION
NO. 36905
FOR AND ON BEHALF OF
C.I.C. ASSOCIATES, INC.

Date: 07/20/21
Description: ORIGINAL PREPARATION
CITY OF SPOKANE
CITY COUNTY SUBMITTAL
08/26/23
09/29/23

County Plot No.: P-1807
CLC Job Number: 99398
Drawn By: JME, KJM
Designed By: SAR
Checked By: TRW
THESE PLANS ARE INSTRUMENTS OF PROFESSIONAL
SERVICE AND ARE PREPARED BY COMMON LAW,
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CONSENT OF C.I.C. ASSOCIATES, INC. (AN AFFILIATE
OF COLORADO LAND CONSULTANTS, INC.)

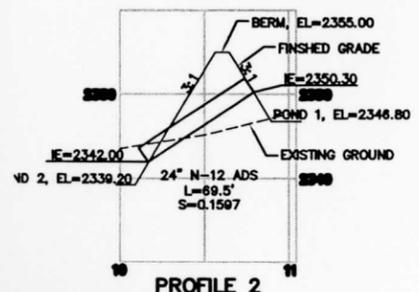
STREET CONSTRUCTION PLANS
FALCON RIDGE
STREET AND STORM DRAINAGE
DETAILS
SPOKANE COUNTY, WASHINGTON

Sheet Title
DETAILS
12 OF 20
Sheet Number



CHANNEL DROP STRUCTURE INFORMATION

| ID | STATION @ C/L | TOP ELEVATION | BOTTOM ELEVATION |
|----|---------------|---------------|------------------|
| A | 10+41.76 | 2324.50 | 2323.19 |
| B | 10+51.92 | 2326.00 | 2324.60 |
| C | 10+71.33 | 2327.50 | 2326.19 |
| D | 10+95.54 | 2329.00 | 2327.74 |
| E | 11+20.95 | 2330.50 | 2329.25 |
| F | 11+35.21 | 2332.00 | 2330.64 |
| G | 11+46.00 | 2333.50 | 2332.11 |
| H | 11+64.21 | 2335.00 | 2333.68 |
| I | 11+76.20 | 2336.50 | 2335.12 |
| J | 11+87.31 | 2338.00 | 2336.61 |



- CONSTRUCTION NOTES:**
- WSDOT TYPE 3 BARRICADES
 - INSTALL 6' HIGH CHAIN LINK FENCE. SEE DETAIL 5, SHEET 19 OF 20.
 - INSTALL 14' WIDE ACCESS GATE.
 - OUTLET STRUCTURE. SEE DETAIL 8, SHEET 19 OF 20.
 - TRASH RACK. SEE DETAIL 9, SHEET 19 OF 20.
 - OUTLET CONTROL STRUCTURE. SEE DETAIL 4, SHEET 19 OF 20.
 - INSTALL RIPRAP PAD NUM. 1 PER DETAIL 7, SHEET 19 OF 20.
 - INSTALL CHIMNEY DRAIN PER DETAIL 5, SHEET 12A OF 20.

PONDS 1 & 2 DETAILS
SCALE: 1" = 20'

POND 1
POND BOTTOM ELEV = 2346.80
POND BOTTOM AREA = 18,617 S.F.
MINIMUM BERM ELEV = 2355.00

POND BOTTOM LOCATION TABLE
MAXINE AVE. STATION & OFFSET

| POINT | STATION | OFFSET |
|-------|----------|------------|
| A | 15+25.47 | 46.48' LT |
| B | 16+97.01 | 54.10' LT |
| C | 16+96.37 | 151.86' LT |
| D | 16+82.40 | 158.24' LT |
| E | 16+42.04 | 156.58' LT |
| F | 16+07.51 | 171.96' LT |
| G | 15+81.27 | 178.95' LT |
| H | 15+83.90 | 161.06' LT |
| I | 15+29.03 | 115.88' LT |
| J | 15+22.83 | 91.88' LT |

POND 2
POND BOTTOM ELEV = 2339.20
POND BOTTOM AREA = 5519 S.F.
MINIMUM BERM ELEV = 2347.00

POND BOTTOM LOCATION TABLE
MAXINE AVE. STATION & OFFSET

| POINT | STATION | OFFSET |
|-------|----------|------------|
| K | 13+54.29 | 189.42' LT |
| L | 13+65.31 | 184.82' LT |
| M | 14+79.51 | 182.85' LT |
| N | 14+91.09 | 197.88' LT |
| O | 13+96.37 | 252.25' LT |
| P | 13+55.84 | 189.00' LT |

NAV 88 DATUM
BASED ON CBM # 95 BEING A
BRASS CAP IN MONUMENT CASE
LOCATED AT THE INTERSECTION OF
JOHNSON ROAD AND FIVE MILE ROAD.
ELEV=2388.56

DEVELOPER'S APPROVAL _____ DATE _____

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1:2.19

**SEDIMENTATION POND AND INFILTRATION
STRUCTURE SITE MAP**

SECTION 23, T.26 N., R.42 E., W.M.
SPOKANE COUNTY, WASHINGTON

UNDER SERVICE ALERT
ONE-CALL NUMBER
456-8000
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BEFORE YOU DIG

Associates, Inc.
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707 E. 7th Avenue, Suite 200
Spokane, WA 99204
Phone (509) 456-6840
Fax (509) 456-6844

SCOTT A. RIVAS
PROFESSIONAL ENGINEER
EXPIRES 01/26/2019

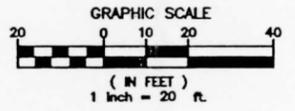
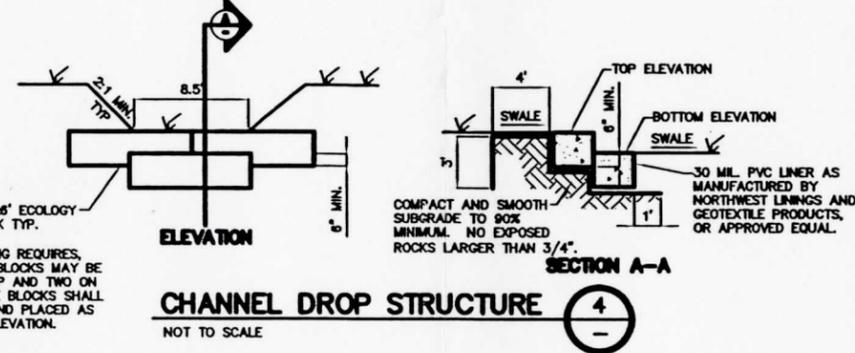
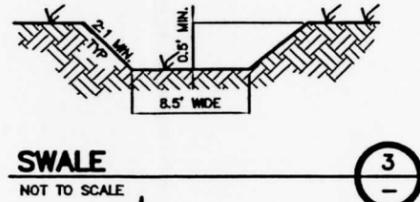
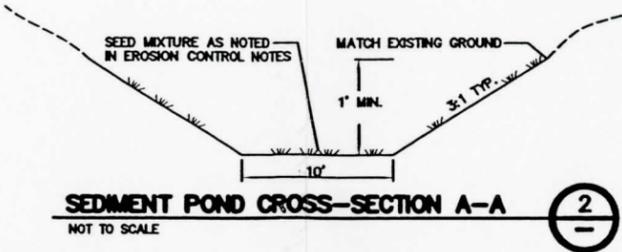
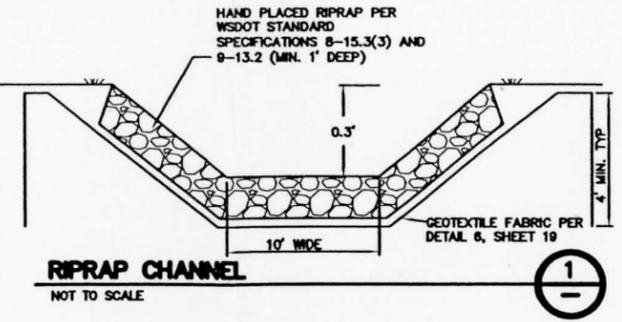
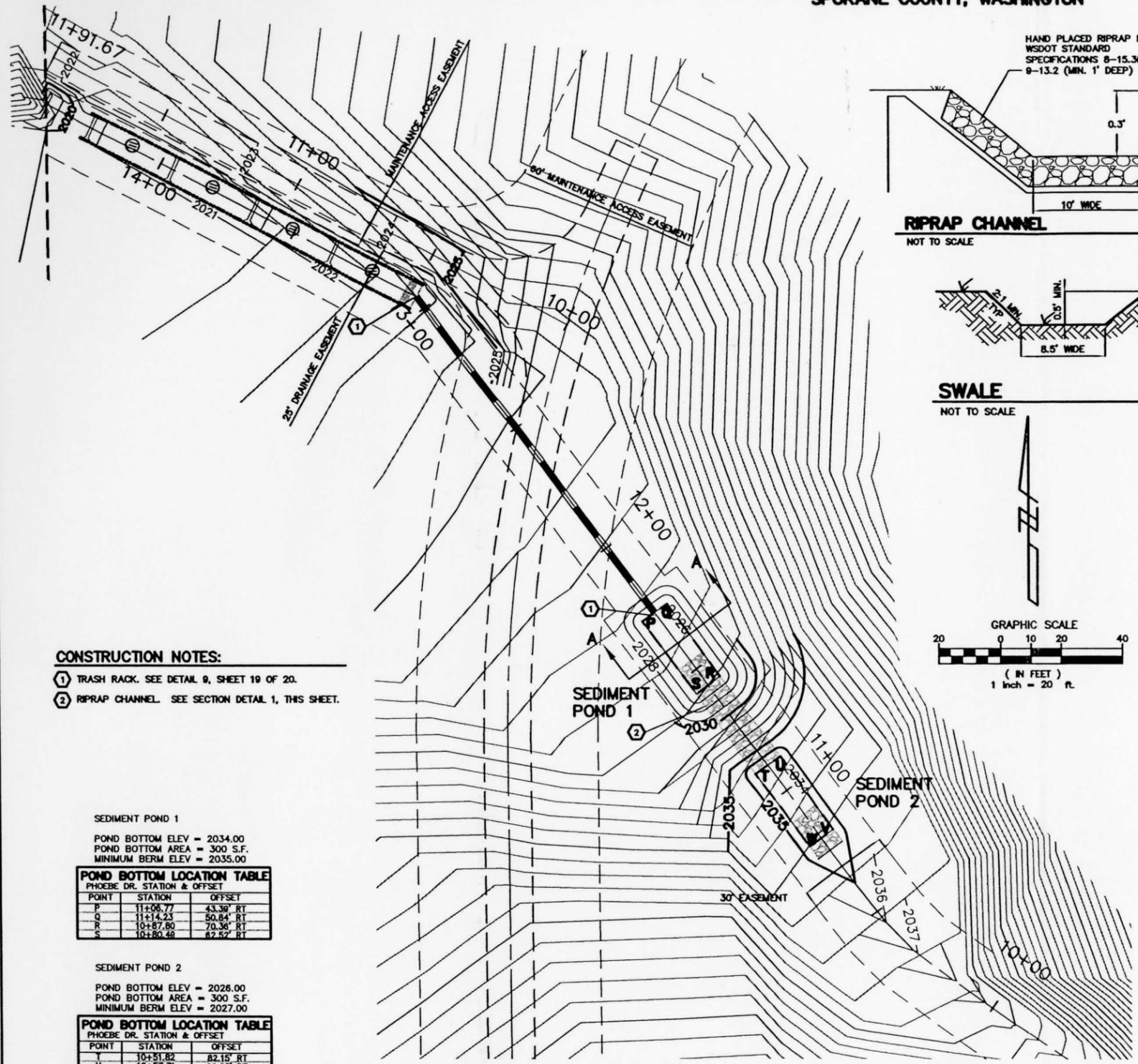
PREPARED UNDER THE DIRECT
SUPERVISION OF
SCOTT A. RIVAS, P.E.
WASHINGTON LICENSE NUMBER
001 28008
FOR AND ON BEHALF OF
C/O ASSOCIATES, INC.

Date: 07/20/21
Description: ORIGINAL PREPARATION
CITY/COUNTY RESUBMITTAL

County Plot No.: P-1807
CLC Job Number: 99398
Drawn By: J.M.E., K.M.
Designed By: SAR
Checked By: TRW

STREET CONSTRUCTION PLANS
FALCON RIDGE
STREET AND STORM DRAINAGE
DETAILS
SPOKANE COUNTY, WASHINGTON

Sheet Title
DETAILS
12A OF 20
Sheet Number



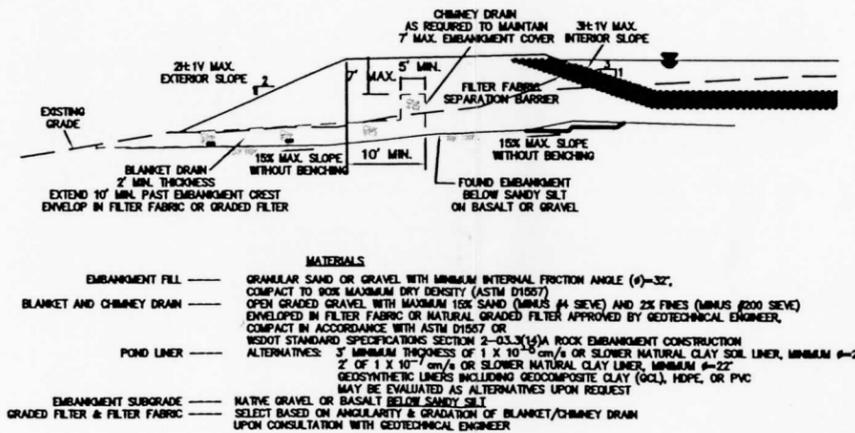
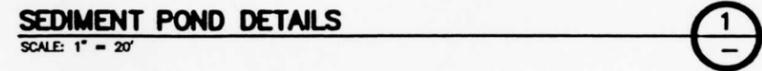
- CONSTRUCTION NOTES:**
- 1 TRASH RACK. SEE DETAIL 9, SHEET 19 OF 20.
 - 2 RIPRAP CHANNEL. SEE SECTION DETAIL 1, THIS SHEET.

SEDIMENT POND 1
POND BOTTOM ELEV = 2034.00
POND BOTTOM AREA = 300 S.F.
MINIMUM BERM ELEV = 2035.00

| POINT | STATION | OFFSET |
|-------|----------|-----------|
| P | 11+06.77 | 43.39' RT |
| Q | 11+14.23 | 50.84' RT |
| R | 10+57.80 | 70.36' RT |
| S | 10+50.48 | 62.52' RT |

SEDIMENT POND 2
POND BOTTOM ELEV = 2026.00
POND BOTTOM AREA = 300 S.F.
MINIMUM BERM ELEV = 2027.00

| POINT | STATION | OFFSET |
|-------|----------|------------|
| T | 10+51.82 | 82.15' RT |
| U | 10+57.71 | 90.23' RT |
| V | 10+33.48 | 107.90' RT |
| W | 10+27.57 | 89.82' RT |



SEE SEDIMENT POND PROFILE, SHEET 13

NAV 88 DATUM
BASED ON CBM # 95 BEING A
BRASS CAP IN MONUMENT CASE
LOCATED AT THE INTERSECTION OF
JOHNSON ROAD AND FIVE MILE ROAD.
ELEV=2388.56

DEVELOPER'S APPROVAL _____ DATE _____

J:\Land Project\09398\Drawings\1_Pond Details.dwg, 07/02/2023 02:59:16 PM, NATHANPR 1:2.19

Precast Drywell, Detail B-102D and B-102F

NOTE: BACKFILL W/ CRUSHED SURFACING
BASE COURSE ABOVE GEOTEXTILE FABRIC
TO BTM OF PAVEMENT.

MANHOLE FRAME & COVER

3'-0" MIN. FOR PVC PIPE
1'-0" MIN. FOR DUCTILE
IRON PIPE

GROUT & SEAL 8" ADJUSTMENT
SECTION (NEW CONSTRUCTION)
SEE NOTE 8

2'-0"
CONC. I.D.

T.O. PIPE

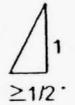
8"
DIA.

GEOTEXTILE
FABRIC

1'-6"
MIN.

EXTEND
GEOTEXTILE
FABRIC AROUND
& ABOVE PIPE

SLOPE AT
 $\geq 1/2 H TO 1V$



GEOTEXTILE
FABRIC

1" TO 3" WASHED
RIVER ROCK

11'-10" (SEE NOTE 8)

2'-0"

4'-4"

4'-4"

6"

TYPE-2 1000 GALLONS

SECTION

2'-0" MIN.
TYP.

NOTES:

1. SEE SECTION 9-03.12 FOR GRAVEL BACKFILL FOR DRYWELLS.
2. SEE SECTION 9-04 FOR ADJUSTMENT SECTION MORTAR.
3. SEE SECTION 9-12 FOR PRECAST CONCRETE DRYWELLS.
4. SEE SECTION 9-33 FOR GEOTEXTILE FABRIC. OVERLAP ALL FABRIC JOINTS 1'-6" MIN.
5. SEE STANDARD PLANS B-112 & B-112A FOR MANHOLE FRAME & COVER.
6. SEE STANDARD PLANS B-102C & B-122 FOR BASE & FOUNDATION DETAILS.
7. CONE & BASE SECTION JOINT MAY BE EITHER TONGUE & GROOVE OR REVERSE TONGUE & GROOVE.
8. ADJUSTMENT SECTION HEIGHT FOR EXISTING STRUCTURES TO MATCH FIELD CONDITIONS AS REQUIRED (4" MIN.-12" MAX.).

APPROVED BY

Dave Nakagawara
DIRECTOR, ENGINEERING SERVICES DAVE NAKAGAWARA, P.E.

Ken Brown
PRINCIPAL ENGINEER, DESIGN KEN BROWN, P.E.

ADOPTED: 2/86

REVISED: 7/02

SUPERSEDES: 12/98

SCALE: 1"=2'-0"

DWG./REV. BY: MDH

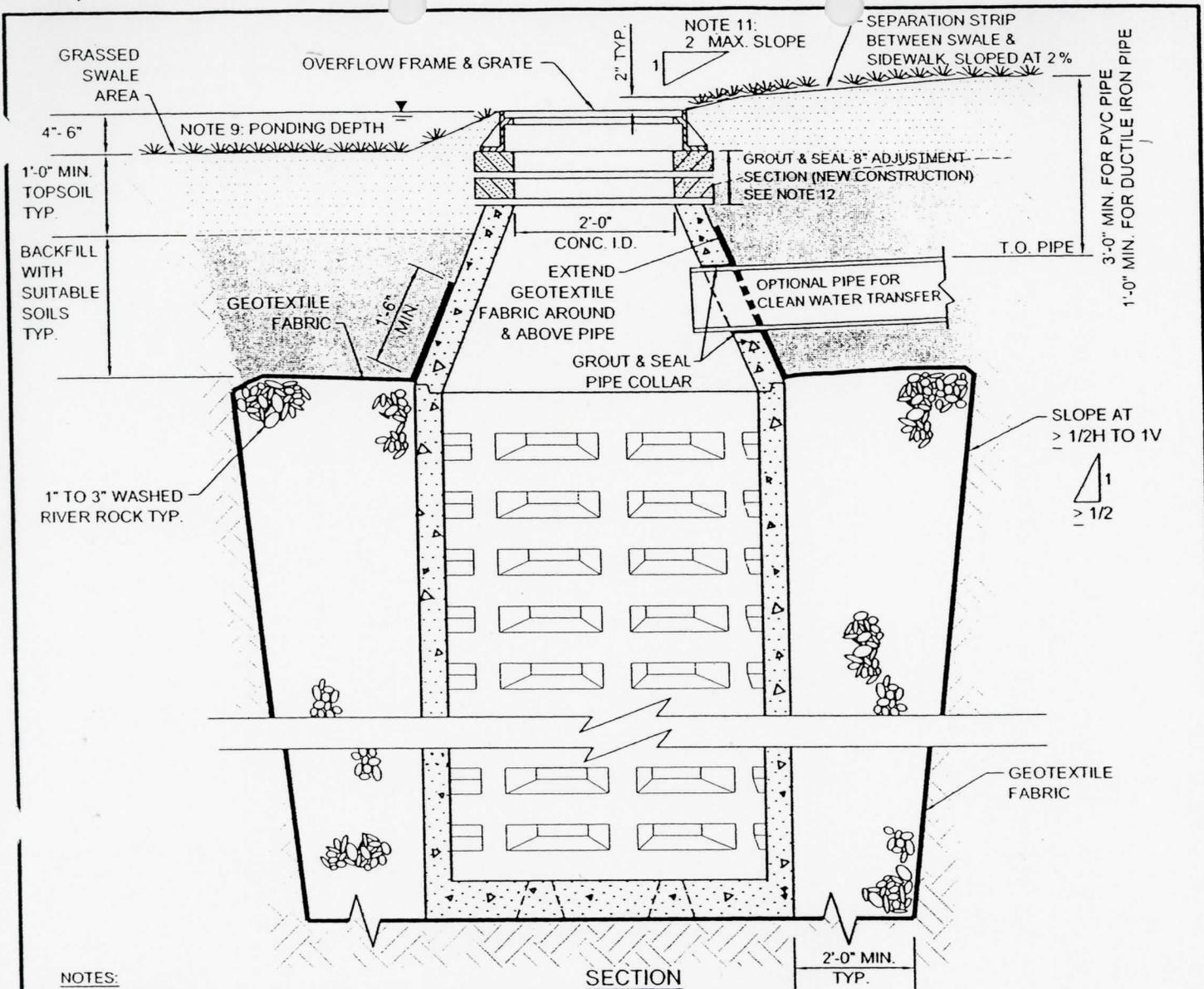
PRECAST DRYWELL TYPE 2

FOR STORM DRAINAGE



ENGINEERING SERVICES
CITY OF SPOKANE, WASHINGTON

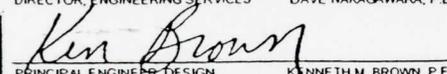
STANDARD
PLAN No.
B-102D



NOTES:

1. SEE SECTION 9-03.12 FOR GRAVEL BACKFILL FOR DRYWELLS.
2. SEE SECTION 9-04 FOR ADJUSTMENT SECTION & PIPE COLLAR MORTAR.
3. SEE SECTION 9-12 FOR PRECAST CONCRETE DRYWELLS.
4. SEE SECTION 9-33 FOR GEOTEXTILE FABRIC. OVERLAP ALL FABRIC JOINTS 1'-6" MINIMUM.
5. SEE STANDARD PLANS B-112 & B-112A FOR MANHOLE FRAME & COVER.
6. SEE STANDARD PLAN B-113 FOR FRAME & GRATE.
7. SEE STANDARD PLANS B-102C & B-122 FOR BASE & FOUNDATION DETAILS.
8. CONE & BASE SECTION JOINT MAY BE EITHER TONGUE & GROOVE OR REVERSE TONGUE & GROOVE.
9. PONDING DEPTH WILL VARY WITH REQUIRED DESIGN VOLUME & SWALE GEOMETRY. DEPTH MAY BE INCREASED UP TO 8", IF DOCUMENTATION IS PROVIDED & PRE-APPROVED BY THE ENGINEER WHICH DEMONSTRATES THE SOIL'S ABILITY TO ASSIMILATE THE STORMWATER CONTAMINANTS. DOCUMENTATION SHALL BE PER 'SPOKANE COUNTY GUIDELINES FOR STORMWATER MANAGEMENT' (CATION EXCHANGE CAPACITY).
10. DRYWELL(S) SHALL BE INSTALLED AT SUFFICIENT DISTANCE FROM STORMWATER INLETS IN ORDER TO PREVENT DIRECT INFLOW INTO THE OVERFLOW GRATE.
11. SWALES ADJACENT TO SIDEWALKS SHALL HAVE A 1'-0" MINIMUM WIDE SEPARATION STRIP BETWEEN THE SWALE & SIDEWALK SLOPED AT 2%. IN ABSENCE OF THIS STRIP, THE MAXIMUM SWALE SLOPE ADJACENT TO THE SIDEWALK SHALL BE 4H : 1V. SWALES NOT ADJACENT TO SIDEWALKS SHALL HAVE A MAXIMUM SLOPE OF 2H : 1V.
12. ADJUSTMENT SECTION HEIGHT FOR EXISTING STRUCTURES TO MATCH FIELD CONDITIONS AS REQUIRED (4" MIN. - 12" MAX.).

APPROVED BY

 DIRECTOR, ENGINEERING SERVICES DAVE NAKAGAWA, P.E.

 PRINCIPAL ENGINEER, DESIGN KENNETH M. BROWN, P.E.

ADOPTED: 6/94
 REVISED: 7/02
 SUPERSEDES: 12/98
 SCALE: 1" = 2'-0"
 DWG./REV. BY: MDH

DRYWELL IN SWALE
 FOR STORM DRAINAGE
 **ENGINEERING SERVICES**
 CITY OF SPOKANE, WASHINGTON

STANDARD PLAN No.
B-102F

ANNUAL SET-ASIDE FUND CALCULATION SHEETS



CLC ASSOCIATES

707 WEST 7TH AVENUE
SUITE 200
SPOKANE
WASHINGTON 99204
P 509 458 6840
F 509 458 6844

DESIGN PAD

DENVER
SPOKANE
SALT LAKE CITY

| | | | | | |
|----------|----------------------|-------|--------------|---------|-------|
| PROJECT: | Falcon Ridge | DATE: | 7/9/13 | | |
| SUBJECT: | D;M Manual Am. Costs | BY: | Nathan Primm | JOB NO: | 79398 |

Falcon Ridge Phase 1 Onsite Replacement Cost Calculations

Pipe

| | | | |
|-----------------------------|----------|-------------------|--------------------|
| 0.25 * 151 L.F. = 38 L.F. | 10" Pipe | 38 * \$12/L.F. = | \$ 456.00 |
| 0.25 * 1470 L.F. = 368 L.F. | 12" Pipe | 368 * \$18/L.F. = | \$ 6,624.00 |
| 0.25 * 803 L.F. = 201 L.F. | 18" Pipe | 201 * \$25/L.F. = | \$ 5,025.00 |
| 0.25 * 1131 L.F. = 283 L.F. | 21" Pipe | 283 * \$28/L.F. = | \$ 7,924.00 |
| | | | total \$ 20,029.00 |

Structures

| | | | |
|--------------------------------------|------|-------------|--------------------|
| WSDOT 48" Catch Basin Type 2 | # 5 | 5 * 1000 = | \$ 5,000.00 |
| SPOKANE County catch Basin Type 1 | # 10 | 10 * 1200 = | \$ 12,000.00 |
| SPOKANE County Concrete Inlet Type 2 | # 4 | 4 * 800 = | \$ 3,200.00 |
| | | | total \$ 20,200.00 |

PV = 40,229.00

FV = PV (F/P, 4%, 20) = 40,229.00 (2.1911)

Grand total \$ 40,229.00

FV = 88,145.76

A = FV (A/F, 6%, 20) = 88,145.76 (0.0272)

A = 2397.56

Falcon Ridge Phase 1 Onsite Maintenance Costs

| | | |
|-----------------------|-------------|-------------------|
| Vacuum Truck two days | 2 * 1000.00 | \$ 2000.00 |
| Water Truck two days | 2 * 200.00 | \$ 400.00 |
| | | <u>\$ 2400.00</u> |



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|----------|-----------------------|-------|---------------|---------|-------|
| PROJECT: | Falcon Ridge | DATE: | 7/9/03 | | |
| SUBJECT: | Dim Manual Ann. Costs | BY: | Nathan Primer | JOB NO: | 99398 |

Falcon Ridge Overall offsite Replacement Cost Calculations

Pipe

025*265 L.F. = 66 L.F. 24" Pipe 66 L.F. * \$31/L.F. = \$ 2046.00

Drywells

Double Depth Drywell 2000.00 PER 2(2000.00) = \$ 4000.00

Ponds & Swales

13,400 S.F. Pond Bottom Area \$0.75/SF. 13,400 * 0.75 = \$ 9,994.00

Pipe

PV = 2046.00

FV = PV (F/P, 4%, 20) = 2046 (2.1911) = 4482.99

A = FV (A/P, 6%, 20) = 4482.99 (0.0272) = 121.94

Drywell

PV = 4000.00

FV = PV (F/P, 4%, 20) = 4000 (2.1911) = 8764.40

A = FV (A/P, 6%, 20) = 8764.40 (0.0272) = 238.39

Ponds & Swales

PV = 9994.00

FV = PV (F/P, 4%, 20) = 9994 (2.1911) = 21,897.85

A = FV (A/P, 6%, 20) = 21,897.85 (0.0272) = 595.62

Grand total \$16,040.00

Falcon Ridge Overall offsite Maintenance Cost Calculations

Vacuum Truck one day \$1000.00/day \$1000.00

Water Truck one day \$200.00/day \$200.00

\$1200.00

Biofiltration Swale Seed Mix

Spokane area biofiltration swale

Needed for:

No watering
Low growing
No mowing
Stay alive

I called Rainier Seed and talked with Kevin who suggested the following seed mix. This seed mix should be hydroseeded and will probably need to be mowed about once a year.

Hard fescue @ 25%
Sheep fescue @ 25%
Tall fescue @ 25%
Upland bluegrass @ 25%

Application rate should be 3-4# per thousand.

I hope this will help you.

Susan Moss