

Local Drainage Issues

Example Project No. 1: Tingstrom Lane Area

**Summary of Calculations
Order of Magnitude Cost Estimates**

GRAYLAND
Grays Harbor County
NPW34056.A0.A1
T. Piatin

Project = County Line Road - Tingstrom Lane

Drainage Area	Collecting Trench/Pipe	Drainage Area (ac)	C	Tc (min)	I (in/hr)	Q (cfs)	Routing (See attached basin layout)	Actual Pipe Dia (in)	Nominal Pipe Dia (in)	Actual Pipe Length (ft)	Trench Top Width (ft)	Trench Depth (ft)	Trench Length (ft)
ALTERNATIVE #1													
1	Tingstrom (N/S at west end of project)	6.0	0.30	n/a	n/a	n/a	Pooled -- overflow to Area 2 trench						
2	Tingstrom West (N-side)	12.5	0.30	41.1	1.3	7.42	(A1+A2)*C ¹²				17	2.5	820
	Pipe under Tingstrom West (runs N/S)					7.42	Flow from Areas 1 & 2	22	24	50			
3	Tingstrom West (S-side)	2.2	0.30	36.6	1.4	0.93	A3*C ¹³				11	1.5	850
4	Tingstrom East (N-side)	8.3	0.30	30.3	1.6	6.19	A4*C ¹⁴				17	2.5	370
	Pipe under Tingstrom East (runs N/S)					6.19	Flow from Area 4	21	24	50			
5	Tingstrom East (S-side)	1.0	0.30	11.5	2.5	0.75	A5*C ¹⁵				11	1.5	350
6	Tingstrom Lane (E-side)	0.1	0.30	3.7	4.3	4.14	(A4+A5+A6)*C ¹⁶ (I from T14 + T16)				14	2.0	150
7	Tingstrom Lane (W-side)	0.3	0.30	3.7	4.3	8.08	(A1+A2+A3+A7)*C ¹⁷ (I from T12 + T17)				17	2.5	150
8	County Line Road (West of Tingstr. Ln.)	2.9	0.30	17.3	2.0	9.98	(A1+A2+A3+A4+A5+A6+A7)*C ¹⁸ (I from T12+T17+T18)				11	1.5	910
ALTERNATIVE #2 - NOTE: THIS WAS THE RECOMMENDED ALTERNATIVE IN 6/8/95 DRAFT REPORT													
1	Tingstrom (N/S at west end of project)	6.0	0.30	n/a	n/a	n/a	Pooled -- overflow to Area 2 trench						
2	Tingstrom West (N-side)	12.5	0.30	33.5	1.5	8.20	(A1+A2)*C ¹²		24	800			
3	Tingstrom West (S-side)	2.2	0.30	36.6	1.4	9.18	A3*C ¹²	24	24	850			
4	Tingstrom East (N-side)	8.3	0.30	30.3	1.6	6.19	A4*C ¹⁴				17	2.5	370
	Pipe under Tingstrom East (runs N/S)					6.19	Flow from Area 4	21	24	50			
5	Tingstrom East (S-side)	1.0	0.30	11.5	2.5	0.75	A5*C ¹⁵				11	1.5	350
6	Tingstrom Lane (E-side)	0.1	0.30	3.7	4.3	4.14	(A4+A5+A6)*C ¹⁶ (I from T14 + T16)				14	2.0	150
7	Tingstrom Lane (W-side)	0.3	0.30	3.7	4.3	8.05	(A1+A2+A3+A7)*C ¹⁷ (I from T12 + T17)				17	2.5	150
8	County Line Road (West of Tingstr. Ln.)	2.9	0.30	17.3	2.0	1.77	A8*C ¹⁸				11	1.5	910
9	County Line Road (East of Tingstr. Ln.)	1.6	0.30	17.3	2.0	14.78	(A1+A2+A3+A4+A5+A6+A7+A8+A9)*C ¹⁹ (I from T12+T17)	28	30	1400			
ALTERNATIVE #3 - quick calcs...													
5	Tingstrom East (S-side)	1.0	0.30	11.5	2.5	0.75					11	1.5	400
	Pipe under Tingstrom (runs EW)					0.75		9	12	35			
4&2	Tingstrom (N-side)	20.8	0.30	41.1	1.3	8.35	Area 4 + Area 2, with longest Tc				17	2.5	1250
3&5	Tingstrom West (S-side)	3.2	0.30	36.6	1.4	1.36	Area 3 + Area 5, with longest Tc				14	2.0	850
	Existing Culvert (verification of size)							12	12	40			
5,4,3,2,1	Ditch to Beach (connected in dunes)	30.0	0.30	41.1	1.3	12.04	Areas 5+4+3+2+1, with longest Tc				20	3.0	700
8	County Line Road Ditch (West of Tingstr. Ln.)	2.9	0.30	17.3	2.0	1.77	A8*C ¹⁸				11	1.5	850
8&9	County Line Road Culvert	4.7	0.30	17.3	2.0	2.87	Areas 8 & 9 with longest travel time	15	15	800			

CALCS.

Area = determined by planimeter
 C = runoff coeff. for: Topography = flat, Type of Cover = single family residential (Table 2-3.2, Hydraulics Manual)
 I = runoff coeff. for: Topography = flat, Type of Cover = single family residential (Table 2-3.2, Hydraulics Manual)
 I = m/Tⁿ where m = 8.17 and n = 0.487 for the 25-year MRI in Aberdeen-Hoquiam (Table 2-3.4B, Hydraulics Manual)
 Pipe Dia. = 10.177 x (Q^{0.375}) (from Mannings Eq., using n=0.014 and s=0.002)
 Trench Depth and Top Width = determined using Haestad "Flowmaster" Program (Mannings Eq., with n=0.060, s=0.002, sides=3:1)



SUBJECT GRAYLAND

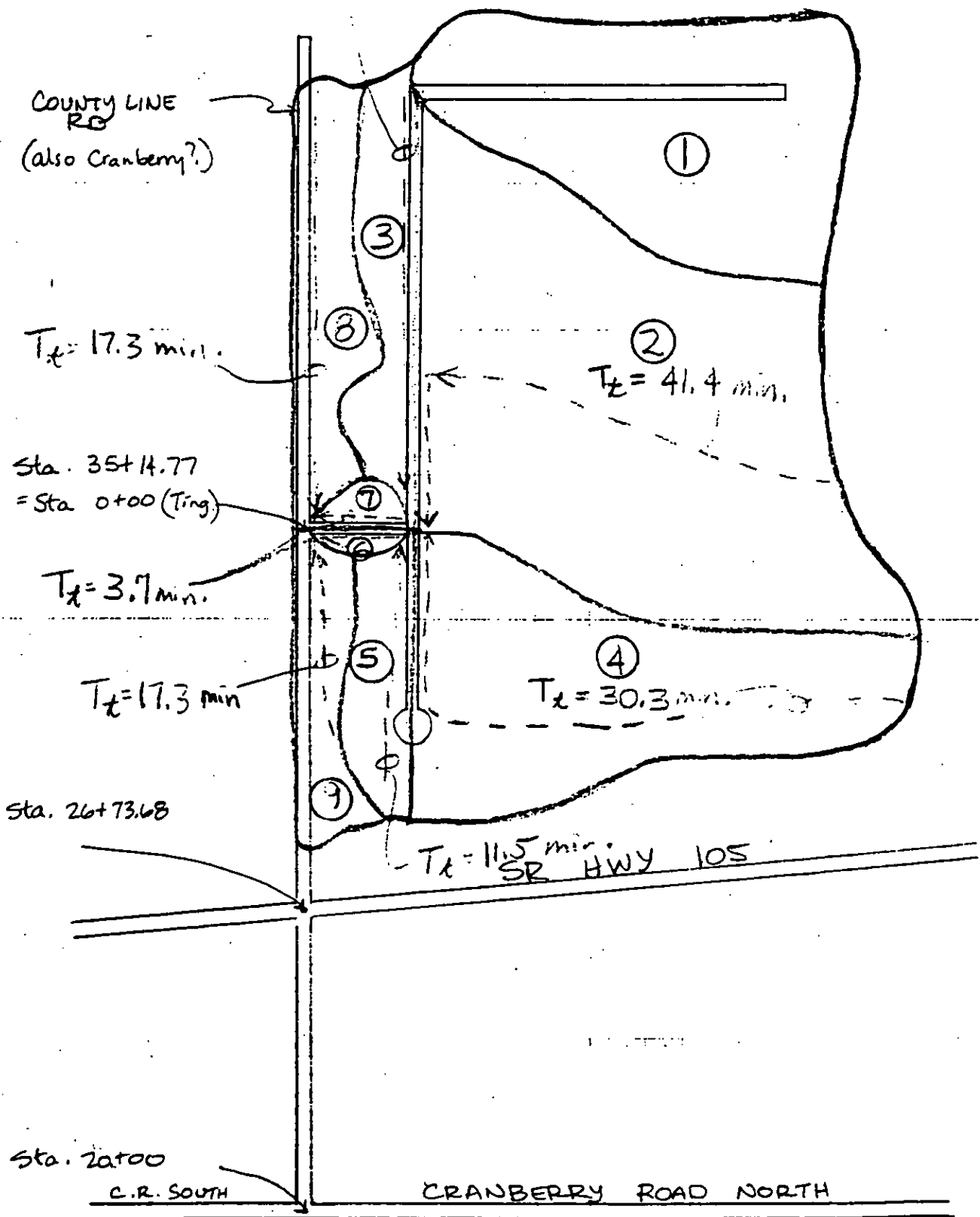
BY T. PLATIN

COUNTY LINE ROAD - TINGSTROM W.

SHEET NO. _____ of _____ DATE 9/14/94

PROJECT NO. _____

$T_x = 36.6 \text{ min.}$



GRAYS HARBOR
 COUNTY LINE ROAD - TINGSTROM LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 10/7/94
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\tingstrm2.xls

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
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ALTERNATIVE #1

2(a) - Tingstrom West (N-Side)

Excavation	CY	721	\$3.00	\$2,163
Waste	CY	721	\$3.00	\$2,163
Hydroseed Surface Restoration	SY	1,549	\$0.35	\$542
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 2(a)				\$4,881

2(b) - Pipe under Tingstrom West (runs N/S)

Excavation	CY	60	\$3.00	\$180
Imported Bed & Zone	CY	19	\$20.00	\$378
Native Backfill	CY	35	\$4.00	\$140
Waste	CY	25	\$3.00	\$74
ACP Surface Restoration	TN	10	\$60.00	\$626
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	50	\$27.15	\$1,358
SUBTOTAL ALT #1 - 2(b)				\$2,768

3 - Tingstrom West (S-Side)

Excavation	CY	307	\$3.00	\$921
Waste	CY	307	\$3.00	\$921
Hydroseed Surface Restoration	SY	1,039	\$0.35	\$364
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 3				\$2,218

4(a) - Tingstrom East (N-Side)

Excavation	CY	325	\$3.00	\$975
Waste	CY	325	\$3.00	\$975
Hydroseed Surface Restoration	SY	699	\$0.35	\$245
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 4(a)				\$2,207

4(b) - Pipe under Tingstrom East (runs N/S)

Excavation	CY	60	\$3.00	\$180
Imported Bed & Zone	CY	19	\$20.00	\$378
Native Backfill	CY	35	\$4.00	\$140
Waste	CY	25	\$3.00	\$74
ACP Surface Restoration	TN	10	\$60.00	\$626
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	50	\$27.15	\$1,358
SUBTOTAL ALT #1 - 4(b)				\$2,768

5 - Tingstrom East (S-Side)

Excavation	CY	126	\$3.00	\$378
Waste	CY	126	\$3.00	\$378
Hydroseed Surface Restoration	SY	428	\$0.35	\$150
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 5				\$918

GRAYS HARBOR
 COUNTY LINE ROAD - TINGSTROM LANE
 ORDER OF MAGNITUDE COST ESTIMATE

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DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
6 - Tingstrom Lane (E-Side)				
Excavation	CY	89	\$3.00	\$267
Waste	CY	89	\$3.00	\$267
Hydroseed Surface Restoration	SY	233	\$0.35	\$82
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 6				\$628
7 - Tingstrom Lane (W-Side)				
Excavation	CY	132	\$3.00	\$396
Waste	CY	132	\$3.00	\$396
Hydroseed Surface Restoration	SY	283	\$0.35	\$99
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 7				\$904
8(a) - County Line Road (West of Tingstrom Lane)				
Excavation	CY	888	\$3.00	\$2,664
Waste	CY	888	\$3.00	\$2,664
Hydroseed Surface Restoration	SY	1,908	\$0.35	\$668
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #1 - 8(a)				\$6,008
8(b) - Culvert/Ocean Outfall				
Excavation	CY	1,697	\$3.00	\$5,091
Imported Bed & Zone	CY	187	\$20.00	\$3,746
Native Backfill	CY	1,475	\$4.00	\$5,900
Waste	CY	222	\$3.00	\$667
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	300	\$27.15	\$8,145
SUBTOTAL ALT #1 - 8(b)				\$23,561
9 - County Line Road (East of Tingstrom Lane)				
Excavation	CY	48	\$3.00	\$144
Imported Bed & Zone	CY	15	\$20.00	\$302
Native Backfill	CY	28	\$4.00	\$112
Waste	CY	20	\$3.00	\$59
ACP Surface Restoration	TN	8	\$60.00	\$502
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	40	\$27.15	\$1,086
SUBTOTAL ALT #1 - 9				\$2,218
Driveway Culverts				
12" RCP	LS	1	\$7,656.00	\$7,656
18" RCP	LS	1	\$7,659.00	\$7,659
21" RCP	LS	1	\$3,205.00	\$3,205
SUBTOTAL DRIVEWAY CULVERTS				\$18,520
Elevated Catch Basins				
Elevated Catch Basin	EA	4	\$3,000.00	\$12,000
Quarry Spall	CY	1.5	\$25.00	\$38
SUBTOTAL ELEVATED CATCH BASINS				\$12,038

GRAYS HARBOR
 COUNTY LINE ROAD - TINGSTROM LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 10/7/94
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:vingstrm2.xls

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
SUBTOTAL ALTERNATIVE #1 (ROUNDED)				\$80,000
ALLOWANCE	10%			\$8,000
SUBTOTAL				\$88,000
CONTINGENCY	30%			\$26,400
SUBTOTAL				\$114,400
MOBILIZATION	10%			\$11,440
CONSTRUCTION TOTAL ALTERNATIVE #1 (ROUNDED)				\$130,000
ENGINEERING	15%			\$19,500
CONSTRUCTION MANAGEMENT	5%			\$6,500
SALES TAX	7.9%			\$10,270
PROJECT TOTAL ALTERNATIVE #1 (ROUNDED)				\$166,000

ASSUMPTIONS:

- Trench safety accounted for by 1:1 slope
- Dewatering is not substantial; therefore, not accounted for
- Permits and scheduling conflicts are the responsibility of the owner
- 4' cover for culverts

NOTE:

The above cost opinion is in June 1995 dollars and does not include escalation, permitting, land acquisition, financial costs or operations and maintenance costs. In addition, there are no costs for the mitigation or remediation associated with the potential discovery of hazardous materials. The order of magnitude cost opinion shown has been prepared for guidance in project evaluation at the time of the estimate. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the estimate presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

GRAYS HARBOR
COUNTY LINE ROAD - TINGSTROM LANE
ORDER OF MAGNITUDE COST ESTIMATE

DATE: 10/7/94
REVISED DATE: 6/2/95
PROJECT NO.: NPW34056.A0.A1
FILE: grays harbor a:tingstrm2.xls

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
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ALTERNATIVE #2

1 - Ditch to Beach (Connected in Dunes)				
Excavation	CY	856	\$3.00	\$2,568
Waste	CY	856	\$3.00	\$2,568
Hydroseed Surface Restoration	SY	1,556	\$0.35	\$545
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #2 - 1				\$5,693
3 - Tingstrom West (S-Side)				
Excavation	CY	504	\$3.00	\$1,512
Waste	CY	504	\$3.00	\$1,512
Hydroseed Surface Restoration	SY	1,322	\$0.35	\$463
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #2 - 3				\$3,499
4 - Tingstrom (N-Side)				
Excavation	CY	1,100	\$3.00	\$3,300
Waste	CY	1,100	\$3.00	\$3,300
Hydroseed Surface Restoration	SY	2,361	\$0.35	\$826
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #2 - 4				\$7,439
5(a) - Tingstrom East (S-Side)				
Excavation	CY	144	\$3.00	\$432
Waste	CY	144	\$3.00	\$432
Hydroseed Surface Restoration	SY	489	\$0.35	\$171
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #2 - 5(a)				\$1,048
5(b) - Pipe under Tingstrom (runs E/W)				
Excavation	CY	24	\$3.00	\$72
Imported Bed & Zone	CY	8	\$20.00	\$162
Native Backfill	CY	15	\$4.00	\$60
Waste	CY	9	\$3.00	\$27
ACP Surface Restoration	TN	5	\$60.00	\$318
Quarry Spall	CY	0.5	\$25.00	\$13
12" RCP	LF	35	\$16.10	\$564
SUBTOTAL ALT #2 - 5(b)				\$1,215
8(a) - County Line Road - Ditch				
Excavation	CY	217	\$3.00	\$651
Waste	CY	217	\$3.00	\$651
Hydroseed Surface Restoration	SY	733	\$0.35	\$257
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL ALT #2 - 8(a)				\$1,571

GRAYS HARBOR
 COUNTY LINE ROAD - TINGSTROM LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 10/7/94
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\tingstrm2.xls

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
8(b) - County Line Road - Culvert	CY	139	\$3.00	\$417
Excavation	CY	46	\$20.00	\$920
Imported Bed & Zone	CY	87	\$4.00	\$348
Native Backfill	CY	52	\$3.00	\$156
Waste	SY	300	\$0.35	\$105
Hydroseed Surface Restoration	TN	3	\$60.00	\$182
ACP Surface Restoration	CY	1.0	\$25.00	\$25
Quarry Spall	EA	1	\$2,000.00	\$2,000
Manhole	LF	200	\$16.10	\$3,220
12" RCP				\$7,373
SUBTOTAL ALT #2 - 8(b)				
Driveway Culverts				
12" RCP	LS	1	\$4,926.00	\$4,926
15" RCP	LS	1	\$3,102.00	\$3,102
21" RCP	LS	1	\$3,205.00	\$3,205
24" RCP	LS	1	\$10,036.00	\$10,036
SUBTOTAL DRIVEWAY CULVERTS				\$21,269
SUBTOTAL ALTERNATIVE #2 (ROUNDED)				\$50,000
ALLOWANCE	10%			\$5,000
SUBTOTAL				\$55,000
CONTINGENCY	30%			\$16,500
SUBTOTAL				\$71,500
MOBILIZATION	10%			\$7,150
CONSTRUCTION TOTAL ALTERNATIVE #2 (ROUNDED)				\$80,000
ENGINEERING	25%			\$20,000
CONSTRUCTION MANAGEMENT	5%			\$4,000
SALES TAX	7.9%			\$6,320
PROJECT TOTAL ALTERNATIVE #2 (ROUNDED)				\$110,000

ASSUMPTIONS:

- Trench safety accounted for by 1:1 slope
- Dewatering is not substantial; therefore, not accounted for
- Permits and scheduling conflicts are the responsibility of the owner
- 4' cover for culverts

NOTE:

The above cost opinion is in June 1995 dollars and does not include escalation, permitting, land acquisition, financial costs or operations and maintenance costs. In addition, there are no costs for the mitigation or remediation associated with the potential discovery of hazardous materials. The order of magnitude cost opinion shown has been prepared for guidance in project evaluation at the time of the estimate. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the estimate presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

Local Drainage Issues

Example Project No. 2: Post Office Site

**Summary of Calculations
Order of Magnitude Cost Estimates**

GRAYLAND
Grays Harbor County
NPW34058.A0.A1
T. Platin

POST OFFICE SITE: The design for improvements at this site are conceptual, based on upgrades to the existing drainage system. Flow capacities of the existing culverts and ditches were approximated using Manning's equation, and upgrades were suggested based on this information and engineering judgement. More detailed topography data is required to determine the contributing watershed for this area. Costs were approximated based on the upgrades.

GRAYS HARBOR
 POST OFFICE SITE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/28/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\pstoffc2.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
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ALTERNATIVE NO. 1

1 - Area 1 - Pipe & Catch Basin Installation

Excavation	CY	18	\$3.00	\$54
Imported Bed & Zone	CY	6	\$20.00	\$114
Concrete Bed & Zone	CY	5	\$80.00	\$370
Native Backfill	CY	6	\$4.00	\$24
Waste	CY	12	\$3.00	\$35
Imported Flood Protection Berm	CY	135	\$14.00	\$1,890
Hydroseed Surface Restoration	SY	42	\$0.35	\$15
ACP Surface Restoration	TN	2	\$60.00	\$91
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin	EA	1	\$1,000.00	\$1,000
12" RCP	LF	45	\$16.10	\$725
SUBTOTAL 1 - Area 1				\$4,329

2 - Area 2 - Channel Regrade

Excavation	CY	73	\$3.00	\$219
Waste	CY	73	\$3.00	\$219
Hydroseed Surface Restoration	SY	133	\$0.35	\$47
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL 2 - Area 2				\$497

3 - Area 2 - Culvert Replacement

Excavation	CY	95	\$3.00	\$285
Imported Bed & Zone	CY	31	\$20.00	\$610
Native Backfill	CY	56	\$4.00	\$224
Waste	CY	39	\$3.00	\$116
Hydroseed Surface Restoration	SY	117	\$0.35	\$41
ACP Surface Restoration	TN	4	\$60.00	\$227
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin with Skimmer	EA	1	\$1,000.00	\$1,000
Flap Gate	EA	1	\$1,000.00	\$1,000
21" RCP	LF	90	\$23.45	\$2,111
SUBTOTAL 3 - Area 2				\$5,626

4 - Eliminate Sag

Imported Fill *	CY	120	\$18.00	\$2,160
ACP Surface	TN	87	\$40.00	\$3,496
SUBTOTAL 4				\$5,656

SUBTOTAL (ROUNDED)				\$16,100
ALLOWANCE	10%			\$1,610
SUBTOTAL				\$17,710
CONTINGENCY	30%			\$5,313
SUBTOTAL				\$23,023
MOBILIZATION	10%			\$2,302
CONSTRUCTION TOTAL (ROUNDED)				\$25,000
ENGINEERING	25%			\$6,250
CONSTRUCTION MANAGEMENT	5%			\$1,250
SALES TAX	7.9%			\$1,975
ALTERNATE NO. 1 TOTAL (ROUNDED)				\$34,000

GRAYS HARBOR
 POST OFFICE SITE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/28/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\pstoffc2.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
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ALTERNATIVE NO. 2

1 - Area 1 - Pipe & Catch Basin Installation

Excavation	CY	18	\$3.00	\$54
Imported Bed & Zone	CY	6	\$20.00	\$114
Concrete Bed & Zone	CY	5	\$80.00	\$370
Native Backfill	CY	6	\$4.00	\$24
Waste	CY	12	\$3.00	\$35
Imported Flood Protection Berm	CY	135	\$14.00	\$1,890
Hydroseed Surface Restoration	SY	42	\$0.35	\$15
ACP Surface Restoration	TN	2	\$60.00	\$91
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin	EA	1	\$1,000.00	\$1,000
12" RCP	LF	45	\$16.10	\$725
SUBTOTAL 1 - Area 1				\$4,329

2 - Area 2 - Channel Regrade

Excavation	CY	73	\$3.00	\$219
Waste	CY	73	\$3.00	\$219
Hydroseed Surface Restoration	SY	133	\$0.35	\$47
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL 2 - Area 2				\$497

3 - Area 2 - Culvert Replacement

Excavation	CY	95	\$3.00	\$285
Imported Bed & Zone	CY	31	\$20.00	\$610
Native Backfill	CY	56	\$4.00	\$224
Waste	CY	39	\$3.00	\$116
Hydroseed Surface Restoration	SY	117	\$0.35	\$41
ACP Surface Restoration	TN	4	\$60.00	\$227
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin with Skimmer	EA	1	\$1,000.00	\$1,000
Flap Gate	EA	1	\$1,000.00	\$1,000
21" RCP	LF	90	\$23.45	\$2,111
SUBTOTAL 3 - Area 2				\$5,626

4 - Fill to 10-yr Storm & 10' Tide Level

Imported Fill	CY	200	\$18.00	\$3,600
ACP Surface	TN	106	\$40.00	\$4,256
SUBTOTAL 4				\$7,856

SUBTOTAL (ROUNDED)				\$18,300
ALLOWANCE	10%			\$1,830
SUBTOTAL				\$20,130
CONTINGENCY	30%			\$6,039
SUBTOTAL				\$26,169
MOBILIZATION	10%			\$2,617
CONSTRUCTION TOTAL (ROUNDED)				\$28,000
ENGINEERING	25%			\$6,250
CONSTRUCTION MANAGEMENT	5%			\$1,250
SALES TAX	7.9%			\$1,975
ALTERNATE NO. 2 TOTAL (ROUNDED)				\$38,000

GRAYS HARBOR
 POST OFFICE SITE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/28/95
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 FILE: grays harbor a:\pstoffc2.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
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ALTERNATIVE NO. 3

1 - Area 1 - Pipe & Catch Basin Installation

Excavation	CY	18	\$3.00	\$54
Imported Bed & Zone	CY	6	\$20.00	\$114
Concrete Bed & Zone	CY	5	\$80.00	\$370
Native Backfill	CY	6	\$4.00	\$24
Waste	CY	12	\$3.00	\$35
Imported Flood Protection Berm	CY	135	\$14.00	\$1,890
Hydroseed Surface Restoration	SY	42	\$0.35	\$15
ACP Surface Restoration	TN	2	\$60.00	\$91
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin	EA	1	\$1,000.00	\$1,000
12" RCP	LF	45	\$16.10	\$725
SUBTOTAL 1 - Area 1				\$4,329

2 - Area 2 - Channel Regrade

Excavation	CY	73	\$3.00	\$219
Waste	CY	73	\$3.00	\$219
Hydroseed Surface Restoration	SY	133	\$0.35	\$47
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL 2 - Area 2				\$497

3 - Area 2 - Culvert Replacement

Excavation	CY	95	\$3.00	\$285
Imported Bed & Zone	CY	31	\$20.00	\$610
Native Backfill	CY	56	\$4.00	\$224
Waste	CY	39	\$3.00	\$116
Hydroseed Surface Restoration	SY	117	\$0.35	\$41
ACP Surface Restoration	TN	4	\$60.00	\$227
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin with Skimmer	EA	1	\$1,000.00	\$1,000
Flap Gate	EA	1	\$1,000.00	\$1,000
21" RCP	LF	90	\$23.45	\$2,111
SUBTOTAL 3 - Area 2				\$5,626

4 - Fill to 100-yr Storm & 10' Tide Level

Imported Fill	CY	400	\$18.00	\$7,200
ACP Surface	TN	133	\$40.00	\$5,320
SUBTOTAL 4				\$12,520

SUBTOTAL (ROUNDED)				\$23,000
ALLOWANCE	10%			\$2,300
SUBTOTAL				\$25,300
CONTINGENCY	30%			\$7,590
SUBTOTAL				\$32,890
MOBILIZATION	10%			\$3,289
CONSTRUCTION TOTAL (ROUNDED)				\$36,000
ENGINEERING	25%			\$6,250
CONSTRUCTION MANAGEMENT	5%			\$1,250
SALES TAX	7.9%			\$1,975
ALTERNATE NO. 3 TOTAL (ROUNDED)				\$45,000

GRAYS HARBOR
POST OFFICE SITE
ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/28/95
REVISED DATE: 6/2/95
PROJECT NO.: NPW34056.A0.A1
FILE: grays harbor a:\pstoffc2.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
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ASSUMPTIONS:

- Trench safety accounted for by 1:1 slope
- Dewatering is not substantial; therefore, not accounted for
- Permits and scheduling conflicts are the responsibility of the owner
- 2' cover for culvert 1-Area-1; 4' cover for culvert 3 - Area 2

NOTE:

The above cost opinion is in June 1995 dollars and does not include escalation, permitting, land acquisition, financial costs or operations and maintenance costs. In addition, there are no costs for the mitigation or remediation associated with the potential discovery of hazardous materials. The order of magnitude cost opinion shown has been prepared for guidance in project evaluation at the time of the estimate. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the estimate presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

** Note impacted fill -- priced higher to include base course, too.*

Local Drainage Issues

Example Project No. 3: Mutiny Lane/Lamplighter Area

**Summary of Calculations
Order of Magnitude Cost Estimates**

GRAYLAND
 Grays Harbor County
 NPW34086.A0.A1
 T. Platin

Note: This is the BASE CASE – additional culverts have been added.
 See next sheet for culvert and ditch dimensions.

Project = Mutiny Lane/Lampighter

Drainage Area	Collecting Trench/Pipe	Drainage Area (ac)	C	Tc (min)	L (in/ft)	Q (cfs)	Routing (See attached basin layout)
ALTERNATIVE #1a							
A	West Side of SR105 (S. of Schmid) Culv. #1: N/S under Schmid	8.0	0.62	37.2	1.4	7.0	AreaA*C*I Transports runoff from AreaA
B	East Side of SR105 (S. of Schmid) Culv. #2: N/S under Schmid	5.0	0.66	35.2	1.4	4.8	AreaB*C*I Transports runoff from AreaB
C	West Side of SR105 (N. of Schmid)	1.1	0.43	24.6	1.7	0.8	AreaC*C*I
D	East Side of SR105 (N. of Schmid) Culv.#3:EW under SR105,along Sch.	4.3	0.70	20.4	1.9	5.7	AreaD*C*I
E	N. Side of Schmid	0.8	0.33	13.0	2.3	17.0	Sum of All Areas*Wtd. Avg.C*(L w/LongestTc)

GRAYLAND
 Grays Harbor County
 NPW34056.A0.A1
 T. Platin

Project = Lamplighter/Mutiny Lane						
Drainage Area	Collecting Trench/Pipe	Pipe Dia (ft)	Pipe Length (ft)	Trench Top Width (ft)	Trench Depth (ft)	Trench Length (ft)
A	West Side of SR105 (S. of Schmid)			17	2.5	1400
	Culv. #1: N/S under UNNAMED ROAD?	1.00	40			
	Culv. #2: N/S under Mutiny	1.50	60			
	Culv. #3: N/S under Jado	1.75	40			
	Culv. #4: N/S under Ewart	1.50	40			
B	East Side of SR105 (S. of Schmid)			17	2.5	1350
	Culv. #5: N/S under Smith (Ewart)	1.25	30			
C	West Side of SR105 (N. of Schmid)			11	1.5	1350
D	East Side of SR105 (N. of Schmid)			17	2.5	1300
	Culv.#8: E/W under SR105, along Sch. w/2 stubouts from #2 & #4	2.00	300			
E	N. Side of Schmid			17	2.5	750



SUBJECT GRAYS HARBOR COUNTY : DRAINAGE

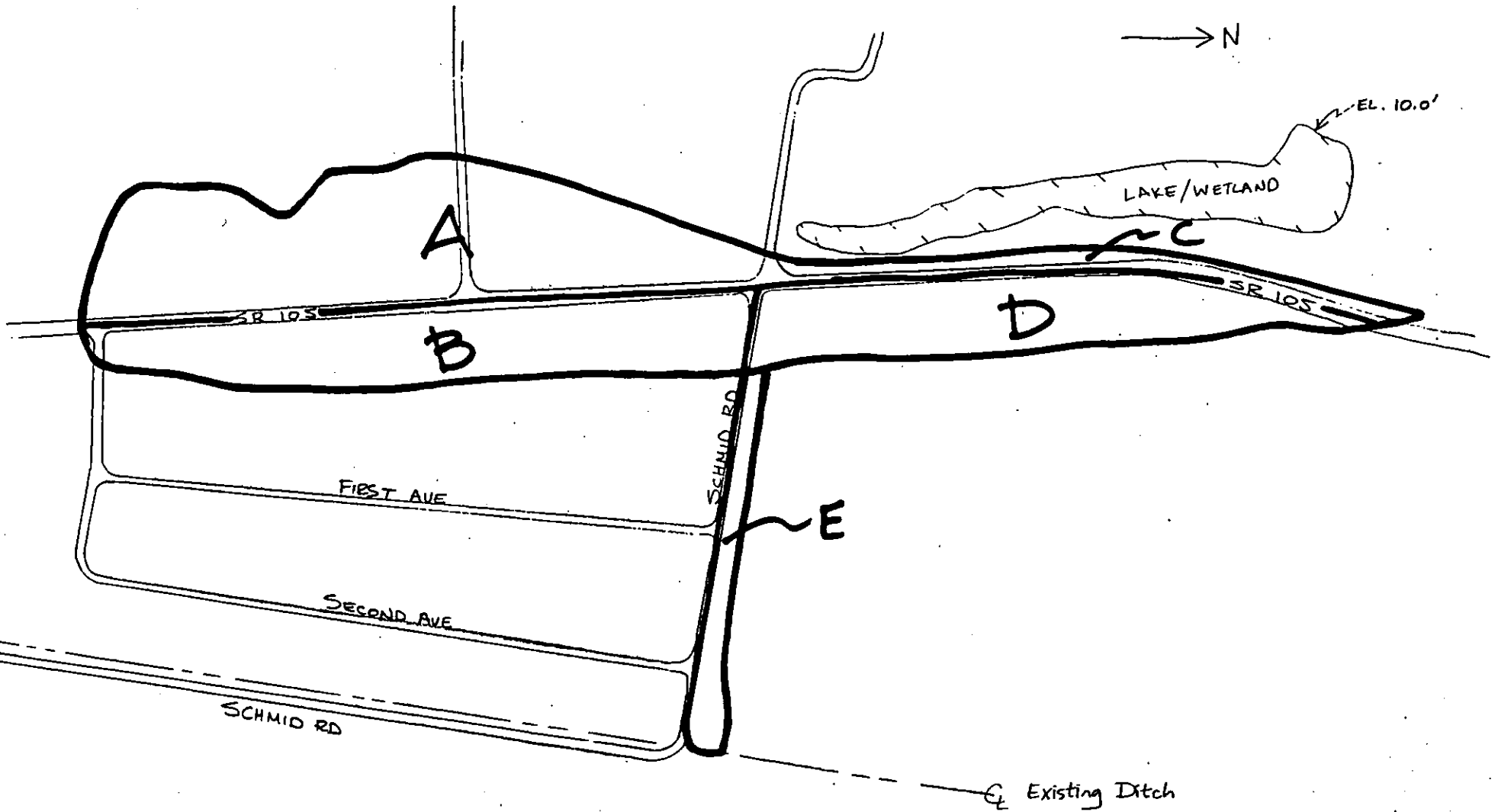
BY T. PLATIN

PROJECT NO: NPW34056.A0.A1

DATE 1/11/95

SHT OF

LAMPLIGHTER / MUTINY LANE
PROJECT



GRAYS HARBOR
 LAMPLIGHTER/MUTINY LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/27/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\lampmtny.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
A(1) - West Side of SR 105 (S of Schmid)				
Excavation	CY	1,231	\$3.00	\$3,693
Waste	CY	1,231	\$3.00	\$3,693
Hydroseed Surface Restoration	SY	2,644	\$0.35	\$925
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL A(1)				\$8,324
A(2) - Culvert #1 (N/S under Mutiny)				
Excavation	CY	28	\$3.00	\$84
Imported Bed & Zone	CY	9	\$20.00	\$184
Native Backfill	CY	17	\$4.00	\$68
Waste	CY	10	\$3.00	\$31
Gravel Surface Restoration	CY	4	\$18.00	\$80
Quarry Spall	CY	0.5	\$25.00	\$13
12" RCP	LF	40	\$16.10	\$644
SUBTOTAL A(2)				\$1,104
A(3) - Culvert #2 (N/S under Jado)				
Excavation	CY	333	\$3.00	\$999
Imported Bed & Zone	CY	109	\$20.00	\$2,174
Native Backfill	CY	201	\$4.00	\$804
Waste	CY	132	\$3.00	\$397
Hydroseed Surface Restoration	SY	500	\$0.35	\$175
ACP Surface Restoration	TN	11	\$60.00	\$660
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin	EA	1	\$1,000.00	\$1,000
18" RCP	LF	360	\$20.10	\$7,236
SUBTOTAL A(3)				\$13,457
A(4) - Culvert #3 (N/S under Unknown Rd.)				
Excavation	CY	42	\$3.00	\$126
Imported Bed & Zone	CY	14	\$20.00	\$272
Native Backfill	CY	25	\$4.00	\$100
Waste	CY	17	\$3.00	\$51
ACP Surface Restoration	TN	8	\$60.00	\$480
Quarry Spall	CY	0.5	\$25.00	\$13
21" RCP	LF	40	\$23.45	\$938
SUBTOTAL A(4)				\$1,980
A(5) - Culvert #10				
Excavation	CY	211	\$3.00	\$633
Imported Bed & Zone	CY	68	\$20.00	\$1,356
Native Backfill	CY	125	\$4.00	\$500
Waste	CY	86	\$3.00	\$257
ACP Surface Restoration	TN	39	\$60.00	\$2,339
Quarry Spall	CY	0.5	\$25.00	\$13
21" RCP	LF	200	\$23.45	\$4,690
SUBTOTAL A(5)				\$9,787

GRAYS HARBOR
 LAMPLIGHTER/MUTINY LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/27/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\vampmtny.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
A(6) - Culvert #4 (N/S under Ewart)				
Excavation	CY	37	\$3.00	\$111
Imported Bed & Zone	CY	12	\$20.00	\$242
Native Backfill	CY	22	\$4.00	\$88
Waste	CY	15	\$3.00	\$44
ACP Surface Restoration	TN	7	\$60.00	\$420
Quarry Spall	CY	0.5	\$25.00	\$13
18" RCP	LF	40	\$20.10	\$804
SUBTOTAL A(6)				\$1,722
B(1) - East Side of SR 105 (S of Schmid)				
Excavation	CY	1,188	\$3.00	\$3,564
Waste	CY	1,188	\$3.00	\$3,564
Hydroseed Surface Restoration	SY	2,550	\$0.35	\$893
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL B(1)				\$8,033
B(2) - Culvert #9				
Excavation	CY	81	\$3.00	\$243
Imported Bed & Zone	CY	27	\$20.00	\$532
Native Backfill	CY	49	\$4.00	\$196
Waste	CY	31	\$3.00	\$93
ACP Surface Restoration	TN	17	\$60.00	\$995
Quarry Spall	CY	0.5	\$25.00	\$13
15" RCP	LF	100	\$18.00	\$1,800
SUBTOTAL B(2)				\$3,872
B(3) - Culvert #8				
Excavation	CY	40	\$3.00	\$120
Imported Bed & Zone	CY	13	\$20.00	\$266
Native Backfill	CY	25	\$4.00	\$100
Waste	CY	16	\$3.00	\$47
ACP Surface Restoration	TN	8	\$60.00	\$503
Quarry Spall	CY	0.5	\$25.00	\$13
15" RCP	LF	50	\$18.00	\$900
SUBTOTAL B(3)				\$1,948
B(4) - Culvert #5 (N/S under Smith [Ewart])				
Excavation	CY	24	\$3.00	\$72
Imported Bed & Zone	CY	8	\$20.00	\$160
Native Backfill	CY	15	\$4.00	\$60
Waste	CY	9	\$3.00	\$28
ACP Surface Restoration	TN	5	\$60.00	\$300
Quarry Spall	CY	0.5	\$25.00	\$13
15" RCP	LF	30	\$18.00	\$540
SUBTOTAL B(4)				\$1,172

GRAYS HARBOR
 LAMPLIGHTER/MUTINY LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/27/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\ampmtny.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
C - West Side of SR 105 (N of Schmid)				
Excavation	CY	488	\$3.00	\$1,464
Waste	CY	488	\$3.00	\$1,464
Hydroseed Surface Restoration	SY	1,650	\$0.35	\$578
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL C				\$3,518
D(1) - East Side of SR 105 (N of Schmid)				
Excavation	CY	1,144	\$3.00	\$3,432
Waste	CY	1,144	\$3.00	\$3,432
Hydroseed Surface Restoration	SY	2,456	\$0.35	\$860
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL D(1)				\$7,736
D(2) - Culvert #7 (Beneath Lamplighter Restaurant Driveway)				
Excavation	CY	141	\$3.00	\$423
Imported Bed & Zone	CY	47	\$20.00	\$930
Native Backfill	CY	87	\$4.00	\$348
Waste	CY	54	\$3.00	\$163
ACP Surface Restoration	TN	22	\$60.00	\$1,344
Quarry Spall	CY	0.5	\$25.00	\$13
Type 2 Catch Basin	EA	1	\$1,000.00	\$1,000
15" RCP	LF	175	\$18.00	\$3,150
SUBTOTAL D(2)				\$7,371
D(3) - Culvert #6 (EW under SR 105; along Schmid)				
Excavation	CY	358	\$3.00	\$1,074
Imported Bed & Zone	CY	113	\$20.00	\$2,264
Native Backfill	CY	210	\$4.00	\$840
Waste	CY	148	\$3.00	\$444
Hydroseed Surface Restoration	SY	433	\$0.35	\$152
ACP Surface Restoration	TN	8	\$60.00	\$480
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	300.0	\$27.15	\$8,145
Type 2 Catch Basin with Skimmer	EA	1	\$1,000.00	\$1,000
SUBTOTAL D(3)				\$14,411
E - North Side of Schmid				
Excavation	CY	660	\$3.00	\$1,980
Waste	CY	660	\$3.00	\$1,980
Hydroseed Surface Restoration	SY	1,417	\$0.35	\$496
Quarry Spall	CY	0.5	\$25.00	\$13
SUBTOTAL E				\$4,468
Driveway Culverts				
12" RCP	LS	1	\$1,651.00	\$1,651
15" RCP	LS	1	\$4,337.00	\$4,337
18" RCP	LS	1	\$2,100.00	\$2,100
30" RCP	LS	1	\$4,117.00	\$4,117
SUBTOTAL DRIVEWAY CULVERTS				\$12,205

GRAYS HARBOR
 LAMPLIGHTER/MUTINY LANE
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 2/27/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\ampmntny.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
SUBTOTAL (ROUNDED)				\$101,100
ALLOWANCE	10%			\$10,110
SUBTOTAL				\$111,210
CONTINGENCY	30%			\$33,363
SUBTOTAL				\$144,573
MOBILIZATION	10%			\$14,457
CONSTRUCTION TOTAL (ROUNDED)				\$159,000
ENGINEERING	15%			\$23,850
CONSTRUCTION MANAGEMENT	5%			\$7,950
SALES TAX	7.9%			\$12,561
PROJECT TOTAL (ROUNDED)				\$203,000

ASSUMPTIONS:

- Trench safety accounted for by 1:1 slope
- Dewatering is not substantial; therefore, not accounted for
- Permits and scheduling conflicts are the responsibility of the owner
- 4' cover for culverts

NOTE:

The above cost opinion is in June 1995 dollars and does not include escalation, permitting, land acquisition, financial costs or operations and maintenance costs. In addition, there are no costs for the mitigation or remediation associated with the potential discovery of hazardous materials. The order of magnitude cost opinion shown has been prepared for guidance in project evaluation at the time of the estimate. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the estimate presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

GRAYS HARBOR
 ADDITIONAL DRIVEWAY CULVERTS
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 4/25/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\driveway.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
<i>Tingstrom: Alt 1 (12" RCP)</i>				
Excavation	CY	194	\$3.00	\$582
Imported Bed & Zone	CY	64	\$20.00	\$1,288
Native Backfill	CY	122	\$4.00	\$488
Waste	CY	73	\$3.00	\$218
Gravel Surface Restoration	CY	31	\$18.00	\$560
Quarry Spall	CY	0.5	\$25.00	\$13
12" RCP	LF	280	\$16.10	\$4,508
SUBTOTAL 12" RCP				\$7,656
<i>Tingstrom: Alt 1 (18" RCP)</i>				
Excavation	CY	204	\$3.00	\$612
Imported Bed & Zone	CY	66	\$20.00	\$1,328
Native Backfill	CY	123	\$4.00	\$492
Waste	CY	81	\$3.00	\$242
Gravel Surface Restoration	CY	31	\$18.00	\$550
Quarry Spall	CY	0.5	\$25.00	\$13
18" RCP	LF	220	\$20.10	\$4,422
SUBTOTAL 18" RCP				\$7,659
<i>Tingstrom: Alt 1 (21" RCP)</i>				
Excavation	CY	84	\$3.00	\$252
Imported Bed & Zone	CY	27	\$20.00	\$542
Native Backfill	CY	50	\$4.00	\$200
Waste	CY	34	\$3.00	\$103
Gravel Surface Restoration	CY	12	\$18.00	\$220
Quarry Spall	CY	0.5	\$25.00	\$13
21" RCP	LF	80	\$23.45	\$1,876
SUBTOTAL 21" RCP				\$3,205
<i>Tingstrom: Alt 2 (12" RCP)</i>				
Excavation	CY	125	\$3.00	\$375
Imported Bed & Zone	CY	41	\$20.00	\$828
Native Backfill	CY	78	\$4.00	\$312
Waste	CY	47	\$3.00	\$140
Gravel Surface Restoration	CY	20	\$18.00	\$360
Quarry Spall	CY	0.5	\$25.00	\$13
12" RCP	LF	180	\$16.10	\$2,898
SUBTOTAL 12" RCP				\$4,926
<i>Tingstrom: Alt 2 (15" RCP)</i>				
Excavation	CY	81	\$3.00	\$243
Imported Bed & Zone	CY	27	\$20.00	\$532
Native Backfill	CY	49	\$4.00	\$196
Waste	CY	31	\$3.00	\$93
Gravel Surface Restoration	CY	13	\$18.00	\$225
Quarry Spall	CY	0.5	\$25.00	\$13
15" RCP	LF	100	\$18.00	\$1,800
SUBTOTAL 15" RCP				\$3,102

GRAYS HARBOR
 ADDITIONAL DRIVEWAY CULVERTS
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 4/25/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\driveway.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
Tingstrom: Alt 2 (21" RCP)				
Excavation	CY	84	\$3.00	\$252
Imported Bed & Zone	CY	27	\$20.00	\$542
Native Backfill	CY	50	\$4.00	\$200
Waste	CY	34	\$3.00	\$103
Gravel Surface Restoration	CY	12	\$18.00	\$220
Quarry Spall	CY	0.5	\$25.00	\$13
21" RCP	LF	80	\$23.45	\$1,876
SUBTOTAL 21" RCP				\$3,205
Tingstrom: Alt 2 (24" RCP)				
Excavation	CY	263	\$3.00	\$789
Imported Bed & Zone	CY	83	\$20.00	\$1,660
Native Backfill	CY	154	\$4.00	\$616
Waste	CY	109	\$3.00	\$328
Gravel Surface Restoration	CY	37	\$18.00	\$660
Quarry Spall	CY	0.5	\$25.00	\$13
24" RCP	LF	220	\$27.15	\$5,973
SUBTOTAL 24" RCP				\$10,036
Mutiny/Lamplighter (12" RCP)				
Excavation	CY	42	\$3.00	\$126
Imported Bed & Zone	CY	14	\$20.00	\$276
Native Backfill	CY	26	\$4.00	\$104
Waste	CY	16	\$3.00	\$47
Gravel Surface Restoration	CY	7	\$18.00	\$120
Quarry Spall	CY	0.5	\$25.00	\$13
12" RCP	LF	60	\$16.10	\$966
SUBTOTAL 12" RCP				\$1,651
Mutiny/Lamplighter (15" RCP)				
Excavation	CY	113	\$3.00	\$339
Imported Bed & Zone	CY	37	\$20.00	\$744
Native Backfill	CY	69	\$4.00	\$276
Waste	CY	44	\$3.00	\$131
Gravel Surface Restoration	CY	18	\$18.00	\$315
Quarry Spall	CY	0.5	\$25.00	\$13
15" RCP	LF	140	\$18.00	\$2,520
SUBTOTAL 15" RCP				\$4,337
Mutiny/Lamplighter (18" RCP)				
Excavation	CY	56	\$3.00	\$168
Imported Bed & Zone	CY	18	\$20.00	\$362
Native Backfill	CY	34	\$4.00	\$136
Waste	CY	22	\$3.00	\$66
Gravel Surface Restoration	CY	8	\$18.00	\$150
Quarry Spall	CY	0.5	\$25.00	\$13
18" RCP	LF	60	\$20.10	\$1,206
SUBTOTAL 18" RCP				\$2,100

GRAYS HARBOR
 ADDITIONAL DRIVEWAY CULVERTS
 ORDER OF MAGNITUDE COST ESTIMATE

DATE: 4/25/95
 REVISED DATE: 6/2/95
 PROJECT NO.: NPW34056.A0.A1
 FILE: grays harbor a:\driveway.xls

DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
Mutiny/Lamplighter (30" RCP)				
Excavation	CY	90	\$3.00	\$270
Imported Bed & Zone	CY	27	\$20.00	\$548
Native Backfill	CY	52	\$4.00	\$208
Waste	CY	38	\$3.00	\$115
Gravel Surface Restoration	CY	12	\$18.00	\$210
Quarry Spall	CY	0.5	\$25.00	\$13
30" RCP	LF	60	\$45.90	\$2,754
SUBTOTAL 30" RCP				\$4,117