Appendix B
Cost Estimates
(Preliminary and MCACES)

US Army Corps
of Engineers ®
Portland District

Oaks Bottom Wildlife Refuge Tidal Restoration Project
Portland, OR

COST ENGINEERING REPORT

July 2013

TETRA TECH

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WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

Project No. 117398

NWP – Oaks Bottom Aquatic Ecosystem Restoration Project – Section 206

The Oaks Bottom Aquatic Ecosystem Restoration Project, as presented by Portland District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of August 5, 2013, the Cost MCX certifies the estimated total project cost of:

FY 2013 Price Level: $6,902,000
Fully Funded Amount: $7,140,000 (Including Spent Costs)

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=CALLAN.KIM.C.1231558221
Date: 2013.08.05 15:12:59 -07'00'

Kim C. Callan, PE, CCE, PM1
Chief, Cost Engineering MCX
Walla Walla District

US Army Corps of Engineers®

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Oaks Bottom Wildlife Refuge Restoration**
LOCATION: Portland, OR

DISTRICT: Portland
POC: CHIEF, COST ENGINEERING, Eileen Horiuchi

PREPARED: 7/9/2013

This Estimate reflects the scope and schedule in report; Oaks Bottom Wildlife Refuge Tidal Restoration DDR

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2014 Effective Price Level Date: 1 OCT 13								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1-Oct-12 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*	*O*
02	RELOCATIONS	$344	$82	23.78%	$426	2.1%	$351	$83	$434			$356	$85	$440
06	FISH & WILDLIFE FACILITIES	$2,353	$559	23.78%	$2,912	2.1%	$2,401	$571	$2,972			$2,434	$579	$3,012
08	ROADS, RAILROADS & BRIDGES	$1,339	$318	23.78%	$1,657	2.1%	$1,367	$325	$1,691			$1,385	$329	$1,714
14	RECREATION FACILITIES	$105	$25	23.78%	$130	2.1%	$107	$25	$132			$108	$26	$134
	CONSTRUCTION ESTIMATE TOTALS:	$4,140	$985		$5,125	2.1%	$4,226	$1,005	$5,230			$4,283	$1,018	$5,301
01	LANDS AND DAMAGES	$650	$65	10.00%	$715	2.1%	$663	$66	$730			$663	$66	$730
22	FEASIBILITY STUDY (CAP studies)									$156				$156
30	PLANNING, ENGINEERING & DESIGN	$314	$39	12.50%	$353	1.8%	$320	$40	$359			$322	$40	$362
31	CONSTRUCTION MANAGEMENT	$518	$54	10.42%	$572	1.9%	$528	$55	$583			$535	$56	$591
	PROJECT COST TOTALS:	$5,622	$1,143	20.32%	$6,765		$5,736	$1,166	**$6,902**	$156		$5,803	$1,181	$7,140

CHIEF, COST ENGINEERING, Eileen Horiuchi

PROJECT MANAGER, James Adams

CHIEF, REAL ESTATE, Enrique Godinez

CHIEF, PLANNING, Laura Hicks

ESTIMATED FEDERAL COST:	65%	**$4,539**
ESTIMATED NON-FEDERAL COST:	35%	**$2,444**
FEDERAL FEASIBILITY CAP COSTS:	100%	**$156**
ESTIMATED TOTAL PROJECT COST:		**$7,140**

O&M OUTSIDE OF TOTAL PROJECT COST:

**** CONTRACT COST SUMMARY ****

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Oaks Bottom Wildlife Refuge Restoration
LOCATION: Portland, OR
This Estimate reflects the scope and schedule in report; Oaks Bottom Wildlife Refuge Tidal Restoration DDR

DISTRICT: Portland
POC: CHIEF, COST ENGINEERING, Eileen Horiuchi
PREPARED: 7/9/2013

Estimate Prepared: 30-Jan-13
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2014
Effective Price Level Date: 1 OCT 13

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
02	RELOCATIONS	$344	$82	23.78%	$426	2.1%	$351	$83	$434	2014Q4	1.3%	$356	$85	$440
06	FISH & WILDLIFE FACILITIES	$2,353	$559	23.78%	$2,912	2.1%	$2,401	$571	$2,972	2014Q4	1.3%	$2,434	$579	$3,012
08	ROADS, RAILROADS & BRIDGES	$1,339	$318	23.78%	$1,657	2.1%	$1,367	$325	$1,691	2014Q4	1.3%	$1,385	$329	$1,714
14	RECREATION FACILITIES	$105	$25	23.78%	$130	2.1%	$107	$25	$132	2014Q4	1.3%	$108	$26	$134
	CONSTRUCTION ESTIMATE TOTALS:	$4,140	$985	23.78%	**$5,125**		$4,226	$1,005	$5,230			$4,283	$1,018	$5,301
01	LANDS AND DAMAGES	$650	$65	10.00%	$715	2.1%	$663	$66	$730	2014Q1		$663	$66	$730
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	$41	$5	12.50%	$46	1.8%	$42	$5	$47	2014Q1		$42	$5	$47
0.1%	Planning & Environmental Compliance	$4	$1	12.50%	$5	1.8%	$4	$1	$5	2014Q1		$4	$1	$5
2.5%	Engineering & Design	$104	$13	12.50%	$117	1.8%	$106	$13	$119	2014Q1		$106	$13	$119
0.5%	Engineering Tech Review ITR & VE	$21	$3	12.50%	$24	1.8%	$21	$3	$24	2014Q1		$21	$3	$24
0.5%	Contracting & Reprographics	$21	$3	12.50%	$24	1.8%	$21	$3	$24	2014Q1		$21	$3	$24
1.0%	Engineering During Construction	$41	$5	12.50%	$46	1.8%	$42	$5	$47	2014Q4	2.6%	$43	$5	$48
1.0%	Planning During Construction	$41	$5	12.50%	$46	1.8%	$42	$5	$47	2014Q4	2.6%	$43	$5	$48
1.0%	Project Operations	$41	$5	12.50%	$46	1.8%	$42	$5	$47	2014Q1		$42	$5	$47
31	CONSTRUCTION MANAGEMENT													
8.0%	Construction Management	$331	$34	10.42%	$365	1.9%	$337	$35	$372	2014Q4	1.4%	$342	$36	$378
2.5%	Project Operation:	$104	$11	10.42%	$115	1.9%	$106	$11	$117	2014Q4	1.4%	$107	$11	$119
2.0%	Project Management	$83	$9	10.42%	$92	1.9%	$85	$9	$93	2014Q4	1.4%	$86	$9	$95
	CONTRACT COST TOTALS:	$5,622	$1,143		**$6,765**		$5,736	$1,166	$6,902			$5,803	$1,181	**$6,984**

Oaks Bottom Feasibility Study, March 2011

Feature	No.	Item	Unit	Unit Cost	Measure 1 Replace Culvert Qty	Measure 1 Cost	Measure 2 Remove WCS Qty	Measure 2 Cost	Measure 3 Replace WCS Qty	Measure 3 Cost	Measure 4 Construct Berm / New WCS Qty	Measure 4 Cost	Measure 5 Revegetate Reservoir Qty	Measure 5 Cost	Measure 6 Revegetate Pond Area Qty	Measure 6 Cost	Measure 7 Channel To Reservoir Qty	Measure 7 Cost	Notes	References
Site Preparation	1	Mobilization / Demobilization	LS	10%	1	$ 212,100	1	$ 29,900	1	$ 72,500	1	$ 43,700	1	$ 24,500	1	$ 20,500	1	$ 82,300	Assumed 10% of direct construction costs	PBOT std pecent of direct construction costs
	2	Temporary Work Zone Traffic Control, Comple	LS	4%	1	$ 84,900	1	$ 12,000	1	$ 29,000	1	$ 17,500	0	$ -	0	$ -	1	$ 33,000	Signage for trail closure, constr traffic at staging/access areas & bike detour	PBOT std pecent of direct construction costs
	3	Temporary Work Access	LS	Varies	1	$ 40,000	1	$ 20,000	1	$ 20,000	1	$ 40,000	1	$ 5,000	1	$ 5,000	1	$ 40,000	Construct access ramps and other gravel for wetland access	Engineers estimate
	4	Temporary Type Orange Plastic Mesh Fence	FT	$ 2.50	500	$ 1,250	2000	$ 5,000	2000	$ 5,000	3500	$ 8,750	0	$ -	0	$ -	3500	$ 8,750	Place orange, mesh safety/exclusion fence, both ends of trails, around site perimeter	PBOT std unit cost
	5	Temporary 6 FT Chain Link Fence	FT	$ 8.00	1000	$ 8,000	0	$ -	1000	$ 8,000	1000	$ 8,000	0	$ -	0	$ -	1000	$ 8,000	Staging area, Springwater Trail to North and South limits of work	PBOT std unit cost
	6	Erosion Control	LS	1.5%	1	$ 31,900	1	$ 5,000	1	$ 10,900	1	$ 10,000	0	$ -	0	$ -	1	$ 10,000	Incl. silt fence, straw, wattles, check dams as needed to comply w/ erosion control plan	PBOT std pecent of direct construction costs
	7	Construction Entrance	EA	$ 1,200	1	$ 1,200	1	$ 1,200	1	$ 1,200	1	$ 1,200	0	$ -	0	$ -	1	$ 1,200	Standard item - located at OYC	PBOT std unit cost
	8	Pollution Control Plan	LS	1.0%	1	$ 21,300	1	$ 4,000	1	$ 7,300	1	$ 4,400	0	$ -	0	$ -	1	$ 8,300	Standard item	Engineers estimate
	9	Clearing and Grubbing	LS	Varies	1	$ 20,000	1	$ 20,000	1	$ 25,000	1	$ 50,000	1	$ -	1	$ -	1	$ 40,000	Clear and grub excavation limits, incl haul away	Engineers estimate
	10	Tire Wash Facility	EA	$ 5,000	1	$ 5,000	1	$ 5,000	1	$ 5,000	1	$ 5,000	0	$ -	0	$ -	1	$ 5,000	Located near wetland area to reduce sediment runoff along Springwater	Engineers estimate
	11	Dewatering Plan and System	LS	Varies	1	$ 130,000	1	$ 5,000	1	$ 30,000	1	$ 50,000	0	$ -	0	$ -	1	$ 50,000	Cofferdams (Willamete R & reservoir), pumps, perc. pipes, pumped diversion/pipeline, includes DP	
Channel / Reservior Improvements	12	Removal of Surfacings	SQYD	$ 6.50	160	$ 1,100	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Remove asphalt trail paving, 120 feet of trail, 12' width	PBOT std unit cost
	13	Removal of Structures & Obstructions	LS	$ 60,000	1	$ 60,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Gas main (18-in stl pipe, plug ends); conc culvert, headwall, apron, wtr ctrl strct (180'x10'), railroad	Based on 90 TN WCS at $500/TN
	14	Temporary Railroad Bridge	LS	$ 200,000	1	$ 200,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Cost of steel fabricated bridge (by OPRR)	
	15	Temporary Railroad Bridge Substructure	LS	$ 200,000	1	$ 200,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Steel piles driven into embankment	
	16	Excavation - Reuse	CY	$ 22	2800	$ 61,600	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Assumes 35' shored excavation width, 25% material resused onsite for culvert backfill	PBOT std unit cost
	17	Excavation - Haul	CY	$ 65	1100	$ 71,500	700	$ 45,500	700	$ 45,500	0	$ -	0	$ -	0	$ -	5600	$ 364,000	Assumes 35' shored width, 75% material hauled away, includes channel material	Unit cost - disposal for non-clean material
	18	Excavation - Haul (Reservoir Material)	CY	$ 85	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Assumes difficult excavation in reservoir, requires specialized equipment and slower production rate	
	19	Trench Backfill	CY	$ 30	2800	$ 84,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Backfill with suitable material and compact in lifts while pulling shoring	
	20	Trench Foundation Stabilization	TN	$ 120	198	$ 23,760	0	$ -	50	$ 6,000	0	$ -	0	$ -	0	$ -	0	$ -	Grannular structure backfill, 16' width (2 ft beyond culvert) 2 ft depth, 90' length	
	21	Structural Shoring	LS	$ 400,000	1	$ 400,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Assume braced/tie-back system, ~70' pile length, done as lump sum shoring	Assume half DEA (Aug 2009) cost b/c salvage mat's used
	22	Precast Reinforced Concrete Culvert	LS	$ 319,000	1	$ 319,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Furnish, install culvert sections, including headwalls, wingwalls	Hanson and Contech - 2011 costs
	23	Precast Reinforced Concrete Stemwall	CY	$ 600	150	$ 90,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Furnishing and placing concrete wall	
	24	Reinforced Concrete WCS	TN	$ 2,000	0	$ -	0	$ -	200	$ 400,000	0	$ -	0	$ -	0	$ -	0	$ -	Aillow $2000/TN reinforced concrete structure cost	
	25	Resurface Trail - HMA	AC	$ 8	20,000	$ 160,000	2,000	$ 16,000	4,000	$ 32,000	10,000	$ 80,000	0	$ -	0	$ -	10,000	$ 80,000	Repave and stripe , 1600 LF of trail, approx 10' width + overage	
	26	Timber Viewing Platforms	LS	$ 135,000	1	$ 135,000	1	$ 135,000	1	$ 135,000		$ -		$ -		$ -		$ -	Platform nr culver and nr Oaks Park: approx 8'x30' platform, railing, signage, racks	Engineers estimate
	27	Type CL-4R Coated Chain Link Fence	LF	$ 45	140	$ 6,300	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Commercial grade, coated black 4' tall, at culvert walls, molly-type bolt wall connection	2010 Production Fenceworks est. ($20/LF) plus coating, install
	28	Class 100 Riprap	TN	$ 95	240	$ 22,800	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	540	$ 51,300	Well-graded mix of riprap (ODOT CL100) round cobble/gravel - culvert /inlet/outlet & riffles	July 2010 quotes (CEMEX, other local quarries), incl mix, placement & handling
	29	Cobble and Gravel	TN	$ 55	120	$ 6,600	55	$ 3,025	0	$ -	55	$ 3,025	0	$ -	0	$ -	270	$ 14,850	Round river run rock	July 2010 quotes (CEMEX, other local quarries), incl mix, placement & handling
	30	Sand	TN	$ 75	108	$ 8,100	75	$ 5,625	0	$ -	75	$ 5,625	0	$ -	0	$ -	240	$ 18,000	Coarse (concrete) sand to fill voids in Streambed Material	July 2010 quotes (CEMEX, other local quarries), incl mix, placement & handling
	31	Boulders	TN	$ 125	220	$ 27,500	125	$ 15,625	0	$ -	125	$ 15,625	0	$ -	0	$ -	0	$ -	All habitat, ballast & boater exclusion boulders	July 2010 quotes (CEMEX, other local quarries), allow for placement & handling
	32	Import Topsoil for Islands	TN	$ 35	0	$ -	0	$ -	0	$ -	1,400	$ 49,000	0	$ -	0	$ -	0	$ -	Import clean material, mix of topsoil and fine sediments (silts, clays) to place for berm and/or islands	
	33	Geotextile	SY	$ 80	370	$ 29,600	80	$ 6,400	0	$ -	80	$ 6,400	0	$ -	0	$ -	690	$ 55,200	Non-woven fabric below rock fill - riffles & culvert	Unit cost per recent bid tab
	34	Bedding Rock	TN	$ 60	49	$ 2,920	60	$ 3,600	0	$ -	60	$ 3,600	0	$ -	0	$ -	169	$ 10,120	Granular drainage blanket below streambed material	Unit cost per recent bid tab
	35	Vegetation Type 1	AC	$ 12,000	0.4	$ 4,800	0.0	$ -	0.0	$ -	0.0	$ -	10.0	$ 120,000	0.0	$ -	1.0	$ 12,000	Riparian plantings and willow cuttings/tubelings	
	36	Vegetation Type 2	AC	$ 20,000	0.0	$ -	0.6	$ 12,000	0.6	$ 12,000	3.0	$ 60,000	6.0	$ 120,000	10.0	$ 200,000	1.0	$ 20,000	Wetland seed mix & willow cuttings/tubelings	
	37	Vegetation Type 3	LF	$ 30	0.0	$ -	0.0	$ -	0.0	$ -	1000.0	$ 30,000	0.0	$ -	0.0	$ -	800	$ 24,000	Pre-vegetated margins	Coir pads - $4/LF, allow $25/LF nursery and install, total $30/LF
	38	Large Woody Debris	EA	$ 300	0.0	$ -	0.0	$ -	0.0	$ -	68.0	$ 20,400	0.0	$ -	0.0	$ -	68	$ 20,400	Cost for placement only, assumed all salvaged from clearing/grubbing	City BES Tenino Project - rootwads w/ logs
		Construction Subtotal	LS			**$ 2,470,230**		**$ 349,875**		**$ 844,400**		**$ 512,225**		**$ 269,500**		**$ 225,500**		**$ 956,420**		
Other		Contingency	LS	25%	1	$ 617,558	1	$ 87,469	1	$ 211,100	1	$ 128,056	1	$ 26,950	1	$ 22,550	1	$ 239,105	Construction contingency & changes in scope; contingency for reveg measures only is 10%, limited risk	
		Design	LS	3%	1	$ 74,107	1	$ 10,496	1	$ 25,332	1	$ 15,367	1	$ 8,085	1	$ 6,765	1	$ 28,693		
		Real Estate	LS	Varies	1	$ 25,000	1	$ 10,000	1	$ 10,000	1	$ 45,000	1	$ 165,000	1	$ 105,000	1	$ 35,000	Real estate investigations, ROW negotiations w/ RR, COP, OYC	
		Engineering During Construction	LS	2.5%	1	$ 61,756	1	$ 8,747	1	$ 21,110	1	$ 12,806	1	$ 6,738	1	$ 5,638	1	$ 23,911		
		Construction Inspection and Administration	LS	8%	1	$ 197,618	1	$ 27,990	1	$ 67,552	1	$ 40,978	1	$ 21,560	1	$ 18,040	1	$ 76,514		
		Post Construction Effectiveness Monitoring	LS	5%	1	$ 123,512	1	$ 17,494	1	$ 42,220	1	$ 25,611	1	$ 13,475	1	$ 11,275	1	$ 47,821	General allowance, to occur annually over first 7 yrs	
O&M		Plant maintenance/irrigation	AC	$ 5,000	0.4	$ 2,000	0.6	$ 3,000	0.6	$ 3,000	3.0	$ 15,000	10.0	$ 50,000	10.0	$ 50,000	0.0	$ -	Annual cost first 5 years	
		Weed removal	AC	$ 2,500	0.4	$ 1,000	0.6	$ 1,500	0.6	$ 1,500	3.0	$ 7,500	6.0	$ 15,000	10.0	$ 25,000	0.0	$ -	Annual cost first 5 years	
		Sediment/debris removal - culverts/channel	LS	$ 5,000	1.0	$ 5,000	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	1.0	$ 5,000	Cost every 10 years	
		Large event culvert maintenance	LS	$ 5,000	1.0	$ 5,000	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Cost every 10 years	
		Annual water control management	LS	$ 5,000	0.0	$ -	0.0	$ -	1.0	$ 5,000	1.0	$ 5,000	0.0	$ -	0.0	$ -	0.0	$ -	Annual cost throughout project life	
		Maintenance of rock riffles	LS	$ 10,000	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	1.0	$ 10,000	Cost every 10 years	
		NPV O&M Cost				**$30,724**		**$19,963**		**$125,113**		**$204,966**		**$288,355**		**$332,717**		**$26,122**	Over a 50 year project life	5.7 %
TOTAL COST						**$ 3,601,000**		**$ 533,000**		**$ 1,347,000**		**$ 986,000**		**$ 800,000**		**$ 728,000**		**$ 1,434,000**	**(Rounded up - does not include O&M)**	
		Discounted O&M Costs			**Year**	**Cost**	**Year**	**Cost**	**Year**	**Cost**	**Year**	**Cost**	**Year**	**Cost**	**Year**	**Cost**	**Year**	**Cost**		
		Interest Rate		4.125%	1	$ 3,000	1	$ 4,500	1	$ 9,500	1	$ 27,500	1	$ 65,000	1	$ 75,000	1	$ -		
		Project life		50	2	$ 3,000	2	$ 4,500	2	$ 9,500	2	$ 27,500	2	$ 65,000	2	$ 75,000	2	$ -		
					3	$ 3,000	3	$ 4,500	3	$ 9,500	3	$ 27,500	3	$ 65,000	3	$ 75,000	3	$ -		
					4	$ 3,000	4	$ 4,500	4	$ 9,500	4	$ 27,500	4	$ 65,000	4	$ 75,000	4	$ -		
		Real Estate Costs:			5	$ 3,000	5	$ 4,500	5	$ 9,500	5	$ 27,500	5	$ 65,000	5	$ 75,000	5	$ -		
		City of Portland	/AC	*$ 10,000*	6	$ -	6	$ -	6	$ 5,000	6	$ 5,000	6	$ -	6	$ -	6	$ -		
		Trail & Railroad	*EA*	*$ 5,000*	7	$ -	7	$ -	7	$ 5,000	7	$ 5,000	7	$ -	7	$ -	7	$ -		
		OYC Staging	*EA*	*$ 10,000*	8	$ -	8	$ -	8	$ 5,000	8	$ 5,000	8	$ -	8	$ -	8	$ -		
					9	$ -	9	$ -	9	$ 5,000	9	$ 5,000	9	$ -	9	$ -	9	$ -		
					10	$ 10,000	10	$ -	10	$ 5,000	10	$ 5,000	10	$ -	10	$ -	10	$ 15,000		
					11	$ -	11	$ -	11	$ 5,000	11	$ 5,000	11	$ -	11	$ -	11	$ -		
					12	$ -	12	$ -	12	$ 5,000	12	$ 5,000	12	$ -	12	$ -	12	$ -		
					13	$ -	13	$ -	13	$ 5,000	13	$ 5,000	13	$ -	13	$ -	13	$ -		
					14	$ -	14	$ -	14	$ 5,000	14	$ 5,000	14	$ -	14	$ -	14	$ -		
					15	$ -	15	$ -	15	$ 5,000	15	$ 5,000	15	$ -	15	$ -	15	$ -		
					16	$ -	16	$ -	16	$ 5,000	16	$ 5,000	16	$ -	16	$ -	16	$ -		
					17	$ -	17	$ -	17	$ 5,000	17	$ 5,000	17	$ -	17	$ -	17	$ -		
					18	$ -	18	$ -	18	$ 5,000	18	$ 5,000	18	$ -	18	$ -	18	$ -		
					19	$ -	19	$ -	19	$ 5,000	19	$ 5,000	19	$ -	19	$ -	19	$ -		
					20	$ 10,000	20	$ -	20	$ 5,000	20	$ 5,000	20	$ -	20	$ -	20	$ 15,000		
					21	$ -	21	$ -	21	$ 5,000	21	$ 5,000	21	$ -	21	$ -	21	$ -		
					22	$ -	22	$ -	22	$ 5,000	22	$ 5,000	22	$ -	22	$ -	22	$ -		
					23	$ -	23	$ -	23	$ 5,000	23	$ 5,000	23	$ -	23	$ -	23	$ -		
					24	$ -	24	$ -	24	$ 5,000	24	$ 5,000	24	$ -	24	$ -	24	$ -		
					25	$ -	25	$ -	25	$ 5,000	25	$ 5,000	25	$ -	25	$ -	25	$ -		
					26	$ -	26	$ -	26	$ 5,000	26	$ 5,000	26	$ -	26	$ -	26	$ -		
					27	$ -	27	$ -	27	$ 5,000	27	$ 5,000	27	$ -	27	$ -	27	$ -		
					28	$ -	28	$ -	28	$ 5,000	28	$ 5,000	28	$ -	28	$ -	28	$ -		
					29	$ -	29	$ -	29	$ 5,000	29	$ 5,000	29	$ -	29	$ -	29	$ -		
					30	$ 10,000	30	$ -	30	$ 5,000	30	$ 5,000	30	$ -	30	$ -	30	$ 15,000		
					31	$ -	31	$ -	31	$ 5,000	31	$ 5,000	31	$ -	31	$ -	31	$ -		
					32	$ -	32	$ -	32	$ 5,000	32	$ 5,000	32	$ -	32	$ -	32	$ -		
					33	$ -	33	$ -	33	$ 5,000	33	$ 5,000	33	$ -	33	$ -	33	$ -		
					34	$ -	34	$ -	34	$ 5,000	34	$ 5,000	34	$ -	34	$ -	34	$ -		
					35	$ -	35	$ -	35	$ 5,000	35	$ 5,000	35	$ -	35	$ -	35	$ -		
					36	$ -	36	$ -	36	$ 5,000	36	$ 5,000	36	$ -	36	$ -	36	$ -		
					37	$ -	37	$ -	37	$ 5,000	37	$ 5,000	37	$ -	37	$ -	37	$ -		
					38	$ -	38	$ -	38	$ 5,000	38	$ 5,000	38	$ -	38	$ -	38	$ -		
					39	$ -	39	$ -	39	$ 5,000	39	$ 5,000	39	$ -	39	$ -	39	$ -		
					40	$ 10,000	40	$ -	40	$ 5,000	40	$ 5,000	40	$ -	40	$ -	40	$ 15,000		
					41	$ -	41	$ -	41	$ 5,000	41	$ 5,000	41	$ -	41	$ -	41	$ -		
					42	$ -	42	$ -	42	$ 5,000	42	$ 5,000	42	$ -	42	$ -	42	$ -		
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					45	$ -	45	$ -	45	$ 5,000	45	$ 5,000	45	$ -	45	$ -	45	$ -		
					46	$ -	46	$ -	46	$ 5,000	46	$ 5,000	46	$ -	46	$ -	46	$ -		
					47	$ -	47	$ -	47	$ 5,000	47	$ 5,000	47	$ -	47	$ -	47	$ -		
					48	$ -	48	$ -	48	$ 5,000	48	$ 5,000	48	$ -	48	$ -	48	$ -		
					49	$ -	49	$ -	49	$ 5,000	49	$ 5,000	49	$ -	49	$ -	49	$ -		
					50	$ 10,000	50	$ -	50	$ 5,000	50	$ 5,000	50	$ -	50	$ -	50	$ 15,000		
					Sum	$ 65,000	Sum	$ 22,500	Sum	$ 272,500	Sum	$ 362,500	Sum	$ 325,000	Sum	$ 375,000	Sum	$ 75,000		
					NPV	$30,724	NPV	$19,963	NPV	$125,113	NPV	$204,966	NPV	$288,355	NPV	$332,717	NPV	$26,122		
					PMT	($1,461)	PMT	($949)	PMT	($5,949)	PMT	($9,746)	PMT	($13,712)	PMT	($15,821)	PMT	($1,242)		

OAKS BOTTOM WILDLIFE REFUGE TIDAL RESTORATION PROJECT

COST ESTIMATE NARRATIVE

1. Project Description

A. General: The project is located in Portland, Oregon along the Willamette River.

B. Purpose: The purpose of this work is to develop a detailed cost estimate – consistent to the level of design – for the cost and quantities of the project features using Micro-Computer Aided Cost Estimating System (MCACES).

C. Design Features: Features include replacement of the culvert under the railroad berm/Springwater Trail with a larger culvert, removal of the water control structure, excavation of a tidal slough, removal of invasive plant species, revegetation with native plant species, and recreational enhancements along the Springwater Trail.

2. Basis of Estimate

A. Basis of Design: The project's design documents are listed below. The project site plan is presented in Appendix A.

- Oaks Bottom Wildlife Refuge Tidal Restoration Project 90% Design Report
- Oaks Bottom Wildlife Refuge Tidal Restoration Project 90% Design Drawings

B. Basis of Quantities: The cost estimate is based on project quantity take-offs that have been calculated from the documents listed above. A quantity summary along with detailed quantity take-offs are presented in Appendix B.

3. Construction Schedule

It is estimated that overall construction would take approximately six (8) months, including planting. A simplified tentative project schedule is presented in Appendix C.

4. Acquisition Plan

The cost estimate is based on a single contract being awarded to a prime contractor with a subcontractor for the concrete, pile driving and landscaping items. The prime contractor would be responsible for the preparatory work, and placing all associated site work as well as overseeing the subcontractors' work on required items.

5. Project Construction

A. Mobilization/Demobilization: Mobilization costs account for the transportation of all construction equipment and personnel to the project site. All equipment and labor is assumed to be available in the greater Portland area.

B. Staging and Site Access: The project will have one temporary staging area constructed on City property located south of the work area.

C. Borrow/Disposal Areas and Materials: Borrow stone materials are available from commercial sources nearby in the Portland area and would be trucked to the project site.

Any excess earthen material is assumed to be hauled off-site by the contractor. This material would then become the property and responsibility of the contractor. Contaminated material is required to be disposed at the landfill in Hillsboro, Oregon. The estimate assumes a haul of 20 miles for disposal at this location.

D. Construction Methodology:

The initial site preparation construction items include (1) construction of the staging area, (2) construction of the temporary earthen access ramp adjacent to the staging area and temporary earthen access ramp adjacent to the wetland, (3) placement of the erosion control measures, (4) clearing and grubbing of the wetland area, (5) construction of the earthen dam at the upstream end of the proposed channel, (6) construction the cofferdam in the Willamette River adjacent to the outlet of the proposed culvert, and (7) dewatering.

The construction of the culvert includes (1) excavation of the existing railroad/Springwater Trail embankment, (2) disposal of excess and/or unusable material, (3) demolition of the existing 18-inch-diameter steel gas line, existing 60-inch-diameter RCP culvert, and existing water control structure, (4) installation of the temporary shoring, (5) installation of the temporary railroad bridge substructure and bridge (the installation of the temporary railroad bridge will be performed by the Oregon Pacific Railroad), (6) installation of the precast arch culvert (includes headwalls, wingwalls, footings, and stemwalls), (7) removal of the temporary structures, (8) backfilling the embankment, (9) repaving, restriping, and re-fencing the Springwater Trail, (10) replacing the railroad tracks (also to be completed by Oregon Pacific Railroad, estimated at $10,000 and currently part of the contingency), and (11) installation of two timber viewing platforms.

The channel restoration includes (1) excavation along the proposed channel alignment, (2) disposal of excess and/or unusable material, (3) lining the channel with large woody debris, (4) armoring channel with geotextile material, gravel, cobbles, riprap, and boulders, (5) placement of native plantings, and (6) hydroseeding.

E. Unusual Conditions: (Soil, Water, Weather, Traffic). High-water levels, site access, and traffic. The railroad owner may desire to fabricate and install a temporary railroad bridge to be placed one day per week (Sundays) over the open cut for the culvert replacement. Construction equipment will need to be parked out of the way at the end of each week to allow this placement (placement to be done via crane on a railroad car by Oregon Pacific Railroad, no trail access is required).

F. Unique Construction Techniques: A portion of the work will need to occur on areas of soft ground (upper end of channel). Spring flow will be diverted around the work area, but pumping may be required. Additionally, matting or low ground pressure equipment might be necessary depending on specific conditions at the time of construction.

G. Equipment/Labor Availability and Distance Traveled: All equipment and labor is assumed to be available in the Portland area.

6. Effective Dates for Labor, Equipment and Material Pricing

The labor, equipment, and material pricing were developed using the MCACES 2010 English Unit Cost Library, 2013 Labor Library for Multnomah County (Appendix D), and the 2011

Equipment Library (Region VIII) for the base cost estimates. The index pricing data has been prepared in January 2013 dollars.

The cost estimate has been updated with current quoted fuel prices of $3.50/gallon for off-road diesel, $3.99/gallon for on-road diesel and $3.43/gallon for gasoline in the Portland area.

7. Estimated Production Rates

The estimate contains many user created cost items that were developed outside of the MCACES Unit Cost Library. These developed cost items have had crews and production rates created in order to accurately calculate unit costs. See Appendix E for the Estimated Production Rate Calculations for these construction items.

8. Direct and Contractor Markups

A. Direct Markups: The cost estimate does not include any direct markups.

B. Contractor Markups: The prime contractor Job Office Overhead (JOOH) markup is a calculated percentage within MCACES. The JOOH calculation is based on the estimated duration for construction. A 10% running percentage has been used in the estimate for the prime contractor Home Office Overhead (HOOH) markup. Profit is included for the prime contractor and is calculated using the profit weighted guidelines calculation within MCACES.

9. Project Markups

A. Escalation: Price levels have been escalated from effective price levels of the construction cost estimate for January (2013Q2) to the mid-point of construction. The mid-point of construction is 2014Q4. The cost factors for each feature account have been calculated within the Total Project Cost Summary.

B. Contingency: A 23.78% contingency has been included in the estimate. Planning, Engineering and Design has a 12.50% contingency, and Construction Management has a 10.42% contingency. An abbreviated Cost and Schedule Risk Analysis (CSRA) has been performed to calculate the contingencies listed above. The abbreviated CSRA is presented in Appendix G.

10. Functional Costs

Functional costs associated with this work were estimated as follows:

A. 01 Account – Lands and Damages: An estimate of $650,000 was included. As the temporary railroad bridge relocation is shown in the 02 account, it is not included in the 01 account.

B. 02 Account – Relocations: The Relocations costs shown in the TPCS account for the costs to place the temporary railroad bridge and the temporary bridge's substructure.

C. 30 Account – Planning, Engineering, and Design: Costs for this account were estimated at 7.6% of the construction costs. This account covers the preparation of plans and specifications that have already been advanced beyond the feasibility level by the City.

D. 31 Account – Construction Management: Costs for this account were estimated to be 12.5% of the construction costs. This account covers construction management during construction.

11. MCACES Construction Cost Estimate

The construction cost estimate was developed using MCACES 2nd Generation (MII) cost estimating software in accordance with guidance contained in ER 1110-2-1302, Civil Works Cost Engineering. See Appendix H for the MCACES construction cost estimate summary output report.

12. Total Project Cost Summary (TPCS)

The TPCS was prepared using the latest TPCS excel spreadsheet provided by the USACE, Walla Walla District. The TPCS incorporates the construction costs developed in the MII, the project markups, and the functional costs.

13. References

U.S. Army Corps of Engineers, 1993, *Engineering and Design Cost Engineering Policy and General Requirements, Engineering Regulation 1110-1-1300,* Department of the Army, Washington D.C., 26 March 1993.

U.S. Army Corps of Engineers, 1999, *Engineering and Design for Civil Works Projects, Engineering Regulation 1110-2-1150,* Department of the Army, Washington D.C., 31 August 1999.

U.S. Army Corps of Engineers, 2008a, *Civil Works Cost Engineering, Engineering Regulation 1110-2-1302,* Department of the Army, Washington D.C., 15 September 2008.

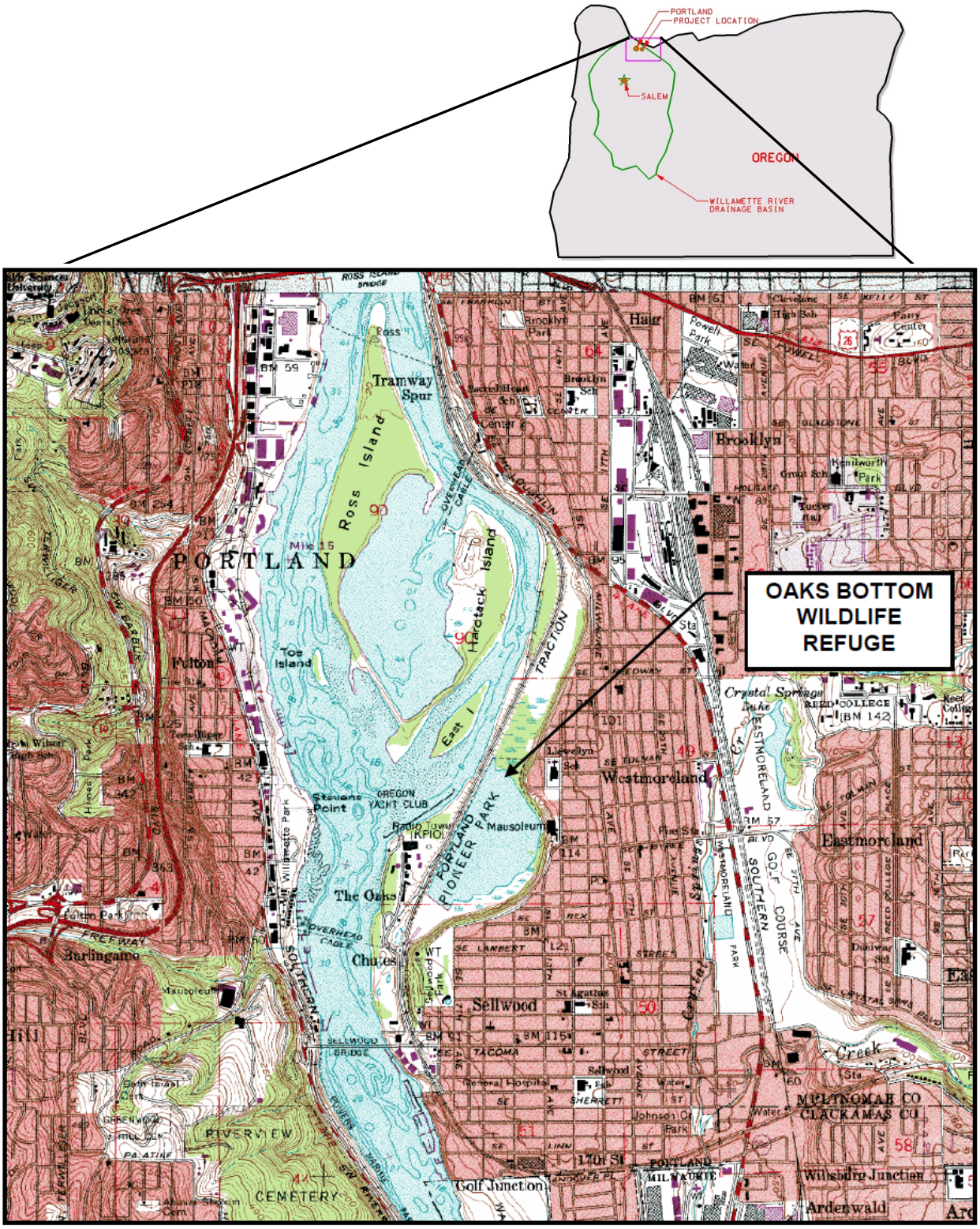
U.S. Army Corps of Engineers, 2008b, *Construction Cost Estimating Guide For Civil Works, Engineering Technical Letter 1110-2-573,* Department of the Army, Washington D.C., 30 September 2008.

U.S. Army Corps of Engineers, 2009, *Civil Works Construction Cost Index System, Engineering Manual 1110-2-1304,* Department of the Army, Washington D.C., 31 March 2009.

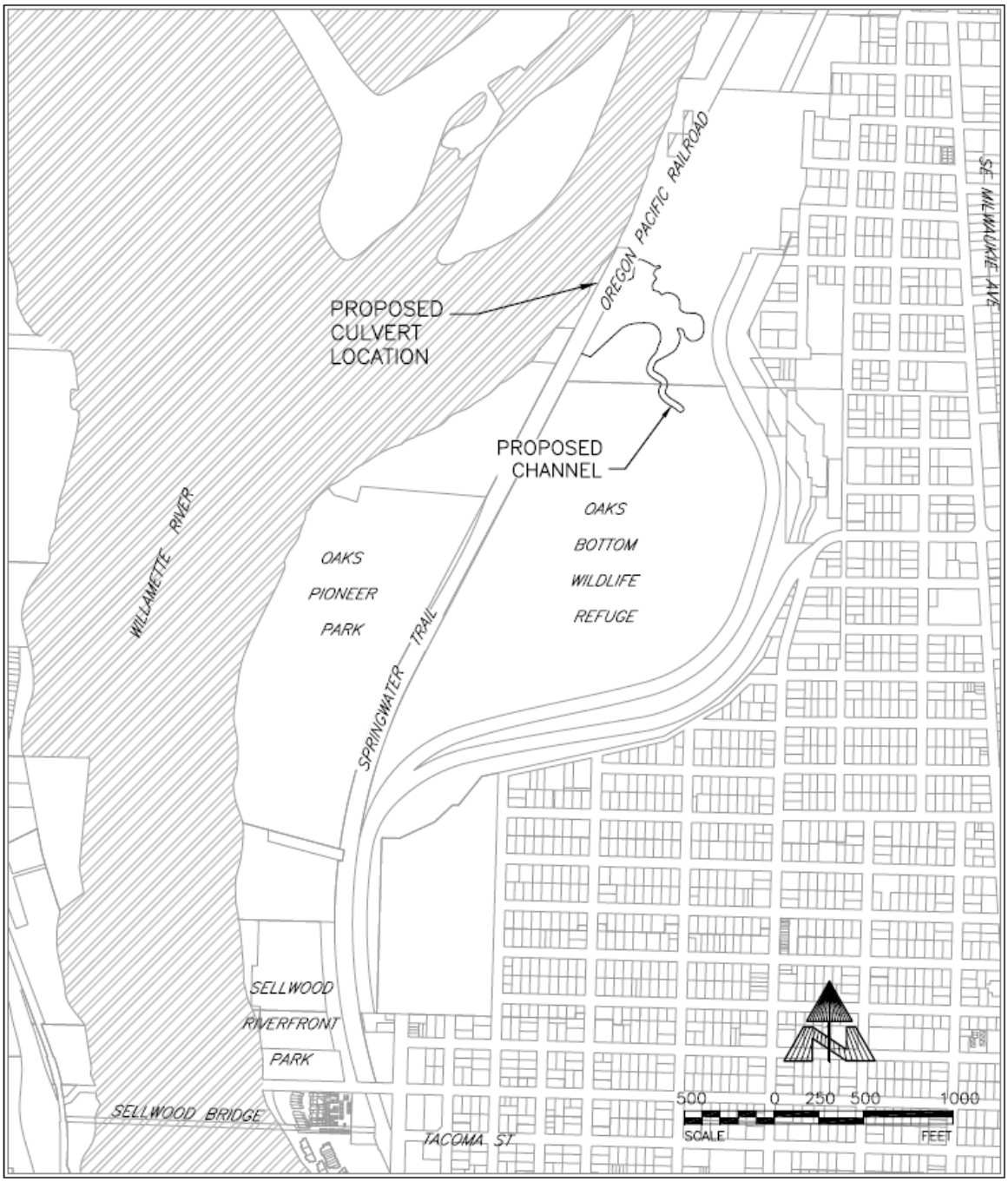
APPENDIX A

Site Plan

Project Vicinity Map



Project Site Plan



APPENDIX B

Project Quantity Take-Offs

MCACES Source Tag	Item Description	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Oaks Bottom Restoration	**-**	**LS**	**1**
[01]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[01 01]	**Mobilization**	**-**	**LS**	**1**
[01 02]	**Demobilization**	**-**	**LS**	**1**
[02]	**Temporary Work Zone Traffic Control**	**-**	**LS**	**1**
	Signs	-	EA	6
	Wood Fences	-	EA	6
	Flagman	-	HRS	240
[03]	**Temporary Work Access**	**-**	**EA**	**2**
[03 01]	**Wetland Area**	**-**	**EA**	**1**
	Rough Grading	-	CSY	23.8
	Fill and Compact	-	LCY	5,433
	Geotextile	5%	SY	2,497
	6" layer of 1.5" Minus Gravel Surface	15%	TON	674
[03 02]	**Staging Area**	**-**	**EA**	**1**
	Rough Grading	-	CSY	73
	Geotextile	5%	SY	3,812
	6" layer of 1.5" Minus Gravel Surface	15%	TON	686
[04]	**Temporary Type Orange Plastic Mesh Fence**	**-**	**LF**	**3,500**
	Orange Safety Fence, Material	-	LF	3,500
	Orange Safety Fence, Placement	-	LF	3,500
[05]	**Temporary 6-feet Chain Link Fence**	**-**	**LF**	**1,000**
	Temporary Chain Link Fence	-	LF	1,000
[06]	**Erosion Control**	**-**	**EA**	**1**
	Silt Fence	-	LF	4,100
	Gravel Material	15%	TON	42.6
	Gravel Placement	15%	TON	42.6
	Synthetic Erosion Control	-	LF	300
[07]	**Construction Entrance**	**-**	**EA**	**1**
	Clearing and Grubbing	-	AC	0.014
	Fine Grading	-	SY	67
	Gravel, Material	15%	TON	19
	Gravel, Placement	15%	TON	19
	Load and Haul	-	CY	13
	Tipping Fee	-	CY	13
[08]	**Pollution Control Plan**	**-**	**EA**	**1**
	Project Engineer	-	HRS	300
[09]	**Clearing and Grubbing**	**-**	**AC**	**4.12**
	Clearing and Grubbing	-	AC	4.12
	Load and Haul	-	CY	309
	Tipping Fee	-	TON	309
[10]	**Tire Wash Facility**	**-**	**EA**	**1**
	Excavation	-	CY	39
	Cushed Aggregate, Material	15%	TON	13.5
	Gravel, Placement	15%	TON	13.5
	Geotextile Fabric, Material	5%	SY	49
	Geotextile Fabric, Placement	5%	SY	49
	Load and Haul	-	CY	9
	Tipping Fee	-	CY	9
[11]	**Dewatering Plan and System**	**-**	**EA**	**1**
[11 01]	**Temporary Earthen Dam**	**-**	**EA**	**1**
	Excavate, Place, and Compact	15%	CY	1,065
[11 03]	**Sheet Piling**	**-**	**SF**	**3,960**
	Sheet Piling	-	VLF	2,640
[11 04]	**Dewater Pumping**	**-**	**DAY**	**90**
	Dewater Pump	-	DAY	90
	Additional Pumps	-	DAY	360
	PVC Pipe	-	LF	2,000
[12]	**Contaminated Media Excavation & Disposal**	**-**	**TON**	**11,100**
	Excavation	-	CY	6,050
	Trench Excavation	-	CY	2,100
	Load and Haul	-	CY	9,373
	Tipping Fee	-	TON	11,100
[13]	**Contaminated Media Disposal Plan (CMDP)**	**-**	**EA**	**1**
	Project Engineer	-	HRS	80
[14]	**Removal of Surfacings**	**-**	**SY**	**160**
	Demo Pavement	-	SY	160
	Concrete Load and Haul	-	CY	27
	Tipping Fee	-	TON	53
[15]	**Removal of Structures & Obstructions**	**-**	**EA**	**1**
[15 01]	**Demo Existing 18" Steel Gas Line**	**-**	**EA**	**1**
	Trench	-	CY	89
	Demo Pipe	-	LF	100
[15 02]	**Demo Existing 60" RCP Culvert**	**-**	**EA**	**1**
	Trench	-	CY	124
	Demo Culvert	-	LF	120
[15 03]	**Demo Existing Water Control Structure**	**-**	**EA**	**1**

	Demo Reinforced Concrete	-	CY	23
	Load and Haul	-	CY	23
	Tipping Fee	-	TON	47
[16]	**Temporary Railroad Bridge**	**-**	**EA**	**1**
[17]	**Temporary Railroad Bridge Substructure**	**-**	**EA**	**1**
[17 01]	**Piling**	**-**	**EA**	**10**
	HP 14x73 Pilecap	-	VLF	50
	HP 14x73 Piling	-	VLF	450
[17 02]	**Secondary Shoring**	**-**	**SF**	**2,250**
	AZ-28 Sheet Piles	-	VLF	1,089
[18]	**General Excavation - Reuse**	**-**	**TON**	**1,000**
	Trench Excavation	-	CY	741
[19]	**Trench Backfill**	**-**	**CY**	**2,800**
	Trench Structural Backfill	15%	CY	3,220
[20]	**Trench Foundation Stabilization**	**-**	**CY**	**200**
	Crushed Aggregate	15%	TON	345
	Trench Structural Backfill	15%	CY	230
[21]	**Structural Shoring**	**-**	**LS**	**1**
[21 01]	**Sheet Piling**	**-**	**SF**	**12,600**
	Sheet Pile AZ-28, Material	-	VLF	6,097
	Steel Sheet Piles Driven, AZ-28	-	VLF	6,097
	Steel Sheet Pile Removal, AZ-28	-	VLF	6,097
[21 02]	**HP 14x73 Piling**	**-**	**EA**	**10**
	Steel Pile HP 14x73, Material	-	VLF	700
	Steel HP 14x73 Pile, Driven	-	VLF	700
	Steel HP 14x73 Pile, Removal	-	VLF	700
[21 03]	**HP 14x73 Waler**	**-**	**LF**	**180**
	HP 14 x 73 Waler	-	VLF	180
	Brace Placement	-	EA	2
[22]	**Precast Reinforced Concrete Culvert**	**-**	**LS**	**1**
[22 01]	**CIP Footings**	**-**	**CY**	**113**
	Forms	-	SF	1,020
	Concrete	10%	CY	125
	Reinforcing Steel	-	TON	9
[22 02]	**CIP Stemwall**	**-**	**CY**	**90**
	Forms	-	SF	3,240
	Concrete	10%	CY	99
	Reinforcing Steel	-	TON	7
[22 03]	**Precast Concrete Arch Culvert**	**-**	**LF**	**90**
	Precast Box Culvert, Material	-	EA	1
	Precast Box Culvert, Placement	-	LF	90
[23]	**2-Inch AC Pavement Repair**	**-**	**SY**	**5,289**
	Asphalt Pavement, Binder Course	10%	SY	5,818
	Asphalt Pavement, Wear Course	10%	SY	5,818
[24]	**Longitudinal Pavement Markings - Paint**	**-**	**LF**	**3,200**
	Painted Pavement Marking	-	LF	3,200
[25]	**Timber Viewing Platforms**	**-**	**EA**	**2**
[25 01]	**Timber Viewing Platform #1**	**-**	**EA**	**1**
[25 01 01]	**Posts and Bracing**	**-**	**LS**	**1**
	6x6 Wood Column Framing	-	MBF	0.71
	Joists	-	LF	210
	Bolts	-	EA	56
	Timber Connectors	-	CCT	0.56
[25 01 02]	**Decking**	**-**	**SF**	**508**
	Sill and Ledger Framing	-	LF	166
	Misc Wood Blocking	-	LF	83
	Joists	-	LF	199
	Porch or Deck Framing	-	SF	508
[25 01 03]	**Timber Railing**	**-**	**LF**	**179**
	Light Framing	-	MBF	0.27
	Misc Wood Blocking	-	MBF	0.24
	Joists	-	MBF	0.18
	Wood Framing	-	MBF	0.30
	Bolts	-	EA	89
[25 02]	**Timber Viewing Platform #2**	**-**	**EA**	**1**
[25 02 01]	**Posts and Bracing**	**-**	**LS**	**1**
	6x6 Wood Column Framing	-	MBF	0.71
	Joists	-	LF	210
	Bolts	-	EA	56
	Timber Connectors	-	CCT	0.56
[25 02 02]	**Decking**	**-**	**SF**	**508**
	Sill and Ledger Framing	-	LF	166
	Misc Wood Blocking	-	LF	83
	Joists	-	LF	199
	Porch or Deck Framing	-	SF	508
[25 02 03]	**Timber Railing**	**-**	**LF**	**179**
	Light Framing	-	MBF	0.27
	Misc Wood Blocking	-	MBF	0.24
	Joists	-	MBF	0.18

	Wood Framing	-	MBF	0.30
	Bolts	-	EA	89
[26]	**Type CL-4R Coated Chain Link Fence**	**-**	**LF**	**140**
	Chain-Link Fence	-	LF	140
	First Latex Fence Coating	-	SF	840
	Second Latex Fence Coating	-	SF	840
[27]	**Remove and Rebuild Fence**	**-**	**LF**	**1,600**
[28]	**Class 100 Riprap**	**-**	**TON**	**780**
	Placement	15%	CY	598
[29]	**Cobble and Gravel**	**-**	**TON**	**390**
	Gravel	15%	TON	449
[30]	**Sand**	**-**	**TON**	**348**
	Sand	15%	TON	400
[31]	**Boulders**	**-**	**TON**	**220**
	Boulders	15%	TON	253
[32]	**Geotextile**	**-**	**SY**	**1,060**
	Geotextile	5%	SY	1,113
[33]	**Bedding Rock**	**-**	**TON**	**170**
	Bedding Rock	15%	TON	196
[34]	**Vegetation Type 1**	**-**	**AC**	**0.70**
	Seeding	-	SY	3,388
[35]	**Vegetation Type 2**	**-**	**AC**	**4.60**
	Seeding	-	SY	22,264
	Soil Prep	-	SY	22,264
	Plantings/Cuttings (4000 ea/acre)	-	EA	18,400
[36]	**Vegetation Type 3**	**-**	**AC**	**0.10**
	Coir Pads	5%	SY	560
	Imported Topsoil	15%	CY	102
	Vegetative Cover	-	SF	4,800
	Plantings/Cuttings (4000 ea/acre)	-	EA	386
[37]	**Vegetation Type 4**	**-**	**AC**	**10.70**
	Seeding	-	SY	51,788
	Soil Prep	-	SY	51,788
	Plantings/Cuttings (4000 ea/acre)	-	EA	42,800
[37]	**Large Woody Debris**	**-**	**EA**	**68**
	Large Woody Debris Placement	-	EA	68

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs — JOB NO.: T27574
COMPUTED BY: NS — DATE: 4/9/2012
CHECKED BY: IP

[03] Temporary Work Access
[03 01] Wetland Area

Rough Grading

Surface Area = 21398.6 SF (scaled from design drawings using ACAD)
Area = **24 CSY**

Fill & Compact (Create 50' wide access ramp at 5% slope)

Ramp Height = 18 ft (scaled from design drawings using ACAD)
Ramp Length = 360 ft
Ramp Width = 50 ft
Existing embankment height = 18 ft (scaled from design drawings using ACAD)
Existing embankment length = 34 ft (scaled from design drawings using ACAD)
Existing embankment width = 50 ft
Volume = **5,433 LCY**

Geotextile

Surface Area = 21398.6 SF (scaled from design drawings using ACAD)
Waste/Loss Factor = 5%
Area = **2,497 SY**

1.5" Minus Gravel Surface

Surface Area = 21399 SF (scaled from design drawings using ACAD)
Thickness = 6 in
Waste/Loss = 15 %
Unit Weight = 1.48 tons/CY
Area = **674 tons**

[03 02] Staging Area

Rough Grading

Staging Area = 1.50 acre (measured from design drawings)
Area = **72.6 CSY**

Geotextile

Area = 32,670 sf (Assumes 1/2 area covered with geotextile)
Waste/Loss Factor = 5%
Area = **3,812 SY**

1.5" Minus Gravel Surface

Area = 32,670 sf (Assumes 1/2 area covered with stone)
Thickness = 4 in
Waste/Loss = 15%
Unit Weight = 1.48 tons/CY
Weight = **686 tons**

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs
COMPUTED BY: NS
CHECKED BY: IP

JOB NO.: T27574
DATE: 4/9/2012

[11] Dewatering Plan and System
[11 01] Temporary Earthen Dam

Excavation, Placement, and Compaction

Dam Height =	10 ft	
Dam Length =	100 ft	(scaled from design drawings using ACAD)
Dam Crest Width =	10 ft	
Side Slope =	1.5H:1V	
Shrink/Swell =	15 %	
		Volume = **1,065 CY**

[11 02] Sheet Piling

Cofferdam Sheet Piling

Cofferdam Height =	10 ft	
Cofferdam Depth =	20 ft	
Cofferdam Width =	132 ft	(scaled from design drawings using ACAD)
Width of a single PZ-27 Sheet Pile =	18 inch	(from Skyline Steel, LLC product manual)
		Length = **2,640 VLF**

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs JOB NO.: T27574
COMPUTED BY: NS DATE: 4/9/2012
CHECKED BY: IP

[15] Removal of Structures and Obstructions
[15 01] Demo Existing 18" Steel Gas Line

Trench Excavation

Length = 100 ft
Width = 5.5 ft
Avg. Depth = 1.5 ft

Volume = **31 CY**

Load and Haul

Diameter = 18 in
Wall Thickness = 0.5 in
Length = 100 ft
Density = 105 lbs/ft

Volume = **19 CY**
Weight = **5 tons**

[15 02] Demo Existing 60" RCP Culvert

Trench Excavation

Length = 120 ft
Width = 9 ft
Avg. Depth = 5 ft

Volume = **200 CY**

Load and Haul

Diameter = 60 in
Wall Thickness = 6 in
Length = 120 ft
Density = 1,295 lbs/ft

Volume = **848 CY**
Weight = **78 tons**

[15 03] Demo Existing Water Control Structure

Removal

Cross Sectional Area = 52 SF
Height = 12 ft
Unit Weight Concrete = 2.05 tons/CY

Volume = **23 CY**
Weight = **47 tons**

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs JOB NO.: T27574
COMPUTED BY: NS DATE: 4/9/2012
CHECKED BY: IP

[17] Railroad Bridge Substructure

[17 01] Piling

Piling

Depth = 45 ft (per sheet 23 of the plans)
Number of Piles = 10 ea (per sheet 23 of the plans)

Length = **450 VLF**

Piling Brace

Length = 25 ft
Number of Braces = 2 ea

Length = **50 VLF**

[17 02] Secondary Shoring

AZ-28 Sheet Piling

Depth = 45 ft
Width = 25 ft
Sheet Pile Width = 24.8 inch/sheet pile (from Skyline Steel, LLC product manual)
Number of shoring locations = 2 ea

Length = **1,089 VLF**

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs JOB NO.: T27574
COMPUTED BY: NS DATE: 4/9/2012
CHECKED BY: IP

[22] Precast Reinforced Concrete Culvert
[22 01] CIP Footings

Concrete for Culvert Footings

Length = 90 ft
Width = 6 ft
Height = 1.5 ft
Number = 2

Subtotal Volume = **60 CY**

Waste/Loss = 10%

Subtotal Volume incl. Waste/Loss = **66 CY**

Concrete for Wingwall Footings

Length = 18 ft
Width = 5 ft
Height = 4.0 ft
Number = 4

Subtotal Volume = **53 CY**

Waste/Loss = 10%

Subtotal Volume incl. Waste/Loss = **59 CY**

TOTAL VOLUME = **113 CY**

TOTAL VOLUME INCL. WASTE/LOSS = **125 CY**

[22 02] CIP Stemwalls

Concrete

Length = 90 ft
Width = 3 ft
Height = 4.5 ft
Number = 2

Volume = **90 CY**

Waste/Loss = 10%

Volume = **99 CY**

TETRA TECH, INC.

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Detailed Quantity Take-Offs JOB NO.: T27574
COMPUTED BY: NS DATE: 4/9/2012
CHECKED BY: IP

[36] Vegetation Type 3

Plantings

Length = 700 ft
Width = 6 ft
Density = 4,000/acre (per sheet 20 of the plans)

Number of plantings = **386**

Topsoil

Length = 700 ft
Width = 6 ft

Volume = **467 CY**

Coir Fabric

Length = 700 ft
Width = 6 ft
Waste/Loss = 5%

Volume = **490 SY**

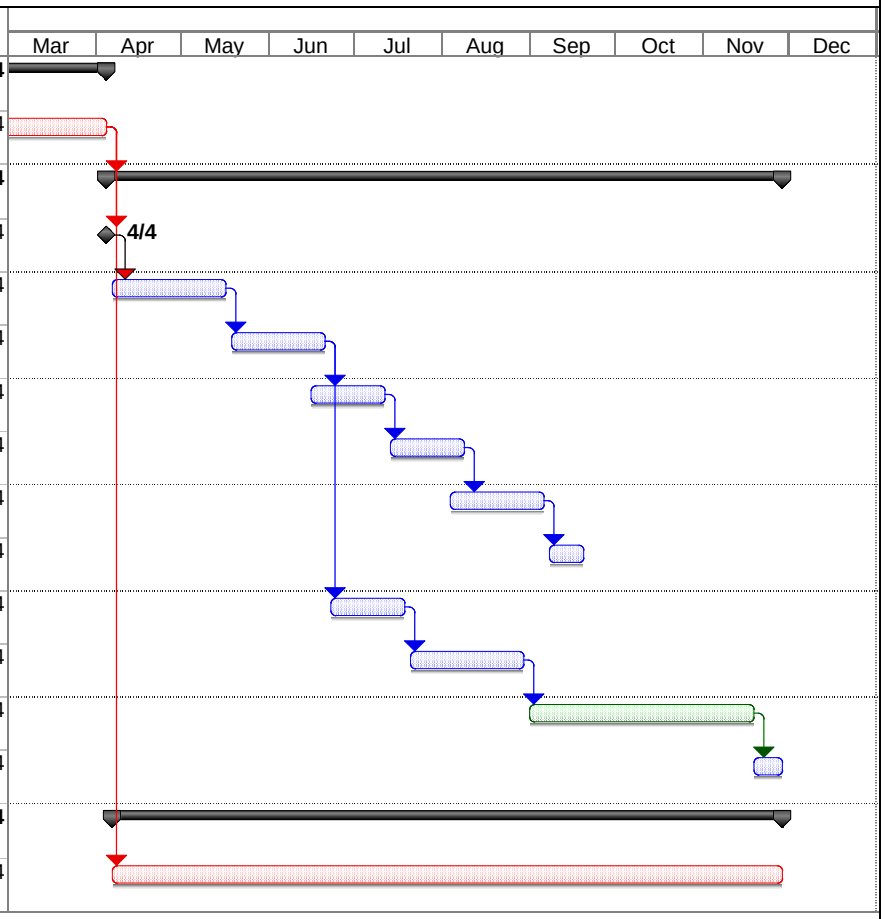
APPENDIX C

Project Schedule

Oaks Bottom Wildlife Refuge Tidal Restoration Project
Tentative Project Schedule

Wed 1/30/13

ID	Task Name	Duration	Start	Finish
1	**Planning Engineering and Design**	**265 days**	**Mon 4/1/13**	**Fri 4/4/14**
2	Planning Engineering and Design	265 days	Mon 4/1/13	Fri 4/4/14
3	**Construction**	**175 days**	**Fri 4/4/14**	**Fri 11/28/14**
4	Notice to Proceed	0 days	Fri 4/4/14	Fri 4/4/14
5	Mobilization	30 days	Mon 4/7/14	Fri 5/16/14
6	Embankment Excavation	25 days	Mon 5/19/14	Fri 6/20/14
7	Install Shoring and Temp RR Substructure	20 days	Mon 6/16/14	Fri 7/11/14
8	Install Culvert	20 days	Mon 7/14/14	Fri 8/8/14
9	Backfill Embankment	25 days	Mon 8/4/14	Fri 9/5/14
10	Recreation Items	10 days	Mon 9/8/14	Fri 9/19/14
11	Channel Excavation	20 days	Mon 6/23/14	Fri 7/18/14
12	Channel Restoration	30 days	Mon 7/21/14	Fri 8/29/14
13	Revegetation	60 days	Mon 9/1/14	Tue 11/18/14
14	Demobilization	10 days	Wed 11/19/14	Fri 11/28/14
15	**Construction Management**	**175 days**	**Mon 4/7/14**	**Fri 11/28/14**
16	Construction Management	175 days	Mon 4/7/14	Fri 11/28/14



Task		Milestone		External Tasks	
Split		Summary		External MileTask	
Progress		Project Summary		Split	

APPENDIX D

Local Market Labor Rates

General Decision Number: OR130059 01/18/2013 OR59

Superseded General Decision Number: OR20120059

State: Oregon

Construction Type: Heavy

County: Multnomah County in Oregon.

HEAVY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/04/2013
1	01/11/2013
2	01/18/2013

BROR0001-013 06/01/2012

	Rates	Fringes
BRICKLAYER	$ 32.75	15.80

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* CARP0001-035 06/01/2012

	Rates	Fringes
CARPENTER (Including Form Work)	$ 32.61	14.44
MILLWRIGHT	$ 33.11	14.44
PILEDRIVERMAN	$ 33.61	14.44

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* ELEC0048-018 01/01/2013

	Rates	Fringes
ELECTRICIAN	$ 38.05	18.44

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* ELEC0048-026 01/01/2013

	Rates	Fringes
ELECTRICIAN		
Low voltage wiring installer for all other work	$ 22.50	13.83
Low voltage wiring installer for fire alarm, nurse call, burglar alarm, security and voice evacuation systems and other systems that are part of a fire or life safety system	$ 28.75	14.96

ENGI0701-034 01/01/2013

	Rates	Fringes
Power equipment operators:		

GROUP 1	$ 37.63	13.55
GROUP 1A	$ 39.51	13.55
GROUP 1B	$ 41.39	13.55
GROUP 2	$ 35.97	13.55
GROUP 3	$ 34.96	13.55
GROUP 4	$ 34.00	13.55
GROUP 5	$ 32.88	13.55
GROUP 6	$ 29.84	13.55

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: CRANE: Helicopter Operator, when used in erecting work; Whirley Operator, 90 ton and over; LATTICE BOOM CRANE: Operator 200 tons through 299 tons, and/or over 200 feet boom; HYDRAULIC CRANE: Hydraulic Crane Operator 90 tons through 199 tons with luffing or tower attachments;

GROUP 1A: HYDRAULIC CRANE: Hydraulic Operator, 200 tons and over (with luffing or tower attachment); LATTICE BOOM CRANE: Operator, 200 tons through 299 tons, with over 200 feet boom;

GROUP 1B: LATTICE BOOM CRANE: Operator, 300 tons through 399 tons with over 200 feet boom; Operator 400 tons and over

GROUP 2: CRANE: Cableway Operator, 25 tons and over; HYDRAULIC CRANE: Hydraulic crane operator 90 tons through 199 tons (without luffing or tower attachment); TOWER/WHIRLEY OPERATOR: Tower Crane Operator; Whirley Operator, under 90 tons; LATTICE BOOM CRANE: 90 through 199 tons and/or 150 to 200 feet boom; HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (with luffing or tower attachment); Rubber tired scraper with tandom scrapers, multi-engineTrenching Machine-Wheel Operator; Loader 120,000 lbs and above; BLADE: Auto Grader; Blade Operator-Robotic; Bulldozer over 120,000 lbs and above; CRANE: Derrick Barge Operator 30 ton but less than 150 ton; Excavator over 130,000 lbs and above

GROUP 3: HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (without luffing or tower attachment); LATTICE BOOM CRANES: Lattice Boom Crane-50 through 89 tons (and less than 150 feet boom); Rubber Tired Scraper: with tandom scrapers; self loading, paddle wheel, auger type, finish and/or 2 or more units; Loader 60,000 lbs and less than 120,000 lbs; Bulldozer over 70,000 lbs up to and including 120,000 lbs; Excavator over 80,000 lbs through 130,000 lbs

GROUP 4: CRANE: Hydraulic Crane Operator, under 50 tons; LATTICE BOOM CRANE OPERATOR: Lattice Boom Crane Operator, under 50 tons; TRACKHOE/BACKHOE-ROBOTIC: track and wheel type, up to and including 20,0000 lbs. with any or all attachments; BLADE: Blade Operator; Tractor operator with boom attachment; DRILLING: Churm Drill and Earth Boring Machine Operator; Directional Drill Operator over 20,000 lbs pullback; CRANE: Chicago boom and similar types; Boom type lifting device, 5 ton capacity or less; Asphalt Paver; Rubber-Tired Scraper, single engine, single scraper; Compactor-Self Propelled; Loaders 25,000 lbs and less than

60,000 lbs; Bulldozer over 20,000 lbs and more than 100 horse up to 70,000 lbs; Mechanic;CRANE: Derrick Barge Operator less than 30 ton; Piledriver; Excavator over 20,000 lbs through 80,000 lbs; Screed; compactor with blade

GROUP 5: TRACKHOE/BACKHOE HYDRAULIC: Track type up to and including 20,000 lbs, Wheel type (Ford, John Deer, Case Type); Boom truck operator; DRILLING: Churm Drill and Earth Boring Machine Operator; Directional Drill Operator less than 20,000 lbs pullback; Concrete Pumper; Concrete Paver: Compactor; Loaders, rubber tired type , less than 25,00 lbs; Forklift over 5 ton, Bulldozer 20,000 lbs or 100 horses or less; Mixer operator; Roller; Compactor without blade

GROUP 6: LOADERS: (less than 1 cu yd.); Oiler; Bobcat/Skid Loader; Grade Checker; Crane oiler; Drill Assistant; Forklift; Asphalt Spreader; Broom Operator; Forklift; Roller (non-asphalt)

IRON0029-011 01/01/2012

	Rates	Fringes
IRONWORKER (Ornamental, Reinforcing, and Structural).....	$ 33.87	20.12

LABO0001-030 06/01/2008

	Rates	Fringes
Laborers: (Mason Tender-Cement/Concrete).....	$ 25.75	11.25

LABO0001-031 06/01/2008

	Rates	Fringes
Laborers: (Mason Tender-Brick)...	$ 25.75	11.25

LABO0003-023 06/01/2010

	Rates	Fringes
Laborers:		
GROUP 1.....	$ 24.76	12.10
GROUP 2.....	$ 25.39	12.10
GROUP 3.....	$ 25.85	12.10
GROUP 4.....	$ 26.25	12.10
GROUP 5.....	$ 21.61	12.10

LABORER CLASSIFICATIONS

GROUP 1: Blaster, Demolition; General Laborer

GROUP 2: Chain Saw

GROUP 3: Vibrating Plate

GROUP 4: Pipelayer; Grade Checker

GROUP 5: Traffic Control-Cone Setter

PAIN0055-005 07/01/2011

	Rates	Fringes
PAINTER		
HIGHWAY & PARKING LOT STRIPER	$ 33.19	9.05

PAIN0055-025 07/01/2009

	Rates	Fringes
PAINTER		
BRUSH, ROLLER AND SPRAY	$ 19.59	7.24

PLAS0555-006 06/01/2012

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 29.98	17.76

PLUM0290-012 04/01/2011

	Rates	Fringes
PIPEFITTER	$ 36.69	20.09

SUOR2009-057 11/23/2009

	Rates	Fringes
LABORER: Asphalt Spreader	$ 22.18	9.39
LABORER: Flagger	$ 20.85	7.40
LABORER: Form-Stripping	$ 19.27	6.32
LABORER: Landscape	$ 22.18	7.45
LABORER: Water, Sewer, Underground	$ 17.00	1.75
OPERATOR: Rotomill	$ 28.25	9.70
OPERATOR: Tractor	$ 20.00	0.73
TRUCK DRIVER: Dump Truck	$ 18.11	5.50
TRUCK DRIVER: Lowboy Truck	$ 17.07	5.50

TEAM0037-010 06/01/2012

	Rates	Fringes
TRUCK DRIVER		
GROUP 1	$ 26.90	13.25
GROUP 2	$ 27.02	13.25

GROUP 3.....$ 27.15 13.25
GROUP 4.....$ 27.41 13.25

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Flatbed Truck; Off the Road Truck; Water Truck up to 3,000 gallons

GROUP 2: Vactor Truck; Water Truck over 3,000 to 5,000 gallons

GROUP 3: Water Truck over 5,000 to 10,000 gallons

GROUP 4: Water Truck over 10,000 to 15,000 gallons

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

APPENDIX E

Estimated Production Rates

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

CSI TASK:

EXCAVATION
[1.5-cy Hydraulic Excavator, Dry Conditions]

CREW:

1.5-CY Hydraulic Excavator Crew — 3 crew members

1 Equip. Oper. Heavy
1 Equip. Oper. Med.
1 Oiler
1 Hydraul. Excavator, 1.5-cy Bucket
1 Front End Loader

PRODUCTION

1.5	cy bucket
0.90	% fill
50	min/hr
0.70	cycle/min

OVERALL PRODUCTION RATE 47 cy/crew hr

CSI TASK:

EXCAVATION
[2.5-cy Hydraulic Excavator, Open Site]

CREW:

2.5-CY Hydraulic Excavator Crew — 3 crew members

1 Equip. Oper. Heavy
1 Equip. Oper. Med.
1 Oiler
1 Hydraul. Excavator, 3/4-cy Bucket
1 Front End Loader

PRODUCTION

2.5	cy bucket
0.90	% fill
50	min/hr
0.65	cycle/min

OVERALL PRODUCTION RATE 73 cy/crew hr

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

CSI TASK:

LOAD AND HAUL EXCAVATED MATERIAL
[3-cy Loader, 12-cy Dump Truck, 20 Mile Haul, 30-mph Avg.]

CREW NAME: *Excavate, Load and Haul Crew* 2 crew members

1	Eq. Oper. Heavy
1.00	Oilers
0	Truck Driver, Heavy
1.00	Front End Loader, 3-cy Bucket
5	12-cy Dump Trucks

OVERALL PRODUCTION RATE **135 cy/crew hr**

LOADING

SUB-CREW: Loading Crew 2 crew members

1	Equip. Oper. Heavy
1	Oiler
1	Front End Loader, 3-cy Bucket

PRODUCTION

3	cy bucket
0.90	% fill
50	min/hr
1.00	cycle/min

135 cy/crew hr 135 cy/crew hr

1.00 crews/equipment members to match overall production rate

1.00 total number of crews needed

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

HAUL TO DISPOSAL SITE

SUB-CREW:

	Truck Haul Crew	1 crew members
1	Truck Driver, Heavy	
1	12-cy Dump Truck	

PRODUCTION

12	cy truck
0.90	% fill
5.3	min. for loading
20	mi. to disposal location
30	mph haul speed
2.7	min. dump time
55	min/hr

QUANTITY PER TRUCK 10.8 cy/truck

DURATION OF HAULING 1.60 hr

6.8 cy/hr →

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

CSI TASK:

COIR FABRIC, PLACEMENT

CREW:

Geotextile Fabric Crew — 6 crew members

1 Equip. Oper. Heavy
5 Laborers
1 Crane, 25-ton w/ 80-ft Boom

0.40 min/sy

OVERALL PRODUCTION RATE **150 sy/hr**

CSI TASK:

GEOTEXTILE FABRIC PLACEMENT

CREW:

Geotextile Fabric Crew — 6 crew members

1 Equip. Oper. Heavy
5 Laborers
1 Crane, 25-ton w/ 80-ft Boom

0.33 min/sy

OVERALL PRODUCTION RATE **180 sy/hr**

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

Sheet No. 1 of 1

CSI TASK:

CLEARING AND GRUBBING [MEDIUM BRUSH INCLUDING TREES]

CREW: *Clearing and Grubbing Crew (Dozer)* 3 crew members

2 Laborer
1 Equip. Oper. Medium
2 Chainsaw
1 Dozer with Land Clearing Equip.

PRODUCTION 0.10 min/sy

OVERALL PRODUCTION RATE **0.125 acre/hr**

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

Sheet No. 1 of 1

CSI TASK:

PLANTINGS, CUTTINGS

CREW: Plantings Crew — 3 crew members

3 Laborers
1 Pickup Truck

PRODUCTION 1.00 min/ea per person

OVERALL PRODUCTION RATE **180 ea/hr**

Sheet No. 2 of 2

LARGE WOODY DEBRIS PLACEMENT

CREW: Lagre Woody Debris Crew — 3 crew members

2 Laborers
1 Equip. Oper. Medium
1 Front End Loader

PRODUCTION 120.00 min/ea

OVERALL PRODUCTION RATE **0.50 ea/hr**

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

Sheet No. 1 of 1

CSI TASK:

GRAVEL, CRUSHED AGGREGATE PLACEMENT

CREW:

Aggregate Base Crew — 4 crew members

2 Equip. Oper. Medium
1 Labor Foreman
1 Laborers
1 Vibratory Roller
1 Front End Loader, 3-cy Bucket

3	cy bucket
0.90	% fill
50	min/hr
0.80	cycle/min

OVERALL PRODUCTION RATE **108 cy/hr**

CSI TASK:

CLASS-100 RIPRAP & BOULDER, PLACEMENT

CREW:

Aggregate Base Crew — 3 crew members

1 Equip. Oper. Medium
1 Labor Foreman
1 Laborers
1 Front End Loader, 3-cy Bucket

3	cy bucket
0.60	% fill
50	min/hr
0.68	cycle/min

OVERALL PRODUCTION RATE **61 cy/hr**

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

CSI TASK:

CONCRETE LOAD AND HAUL
12-cy Dump Truck, 20-mile Haul, 45-mph Avg.

CREW:

Load and Haul Concrete Crew — 2 crew members

1	Equip. Oper. Heavy
1	Oiler
0	Truck Driver, Heavy
1	Front End Loader, 3-cy Bucket
4	12-cy Dump Truck

OVERALL PRODUCTION RATE — **75 cy/crew hr**

LOADING

SUB-CREW:

Loading Crew — 2 crew members

1	Equip. Oper. Heavy
1	Oiler
1	Front End Loader, 3-cy Bucket

PRODUCTION

3	cy bucket
0.50	% fill
50	min/hr
1.00	cycle/min

75 cy/crew hr — 75 cy/crew hr

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

HAUL TO DISPOSAL SITE

SUB-CREW:

	Truck Haul Crew	1 crew members
1	Truck Driver, Heavy	
1	12-cy Dump Truck	

PRODUCTION

12	cy truck
0.80	% fill
9.6	min. for loading
20	mi. to disposal location
45	mph haul speed
4.8	min. dump time
55	min/hr

QUANTITY PER TRUCK 9.6 cy/truck

DURATION OF HAULING 1.23 hr

7.8 cy/hr →

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

Sheet No. 1 of 1

CSI TASK:

PRECAST BOX CULVERT, PLACEMENT

SUB-CREW: *Box Culvert Placement Crew* 7 crew members

1 Equip. Oper. Heavy
1 Oiler
4 Laborers
1 Labor Foreman
1 60-ton Crane

PRODUCTION 60.00 min/lf

OVERALL PRODUCTION RATE **1.00 lf/crew hr**

PROJECT: Oaks Bottom Wildlife Refuge Tidal Restoration Project
DETAIL: Output Rates
COMPUTED BY: SV
CHECKED BY: IP

JOB NO.: T22762
DATE: 4/13/2012

Sheet No. 1 of 1

PZ & PS STEEL SHEET PILE

CREW:	Z4 Steel Set Pile Crew	12.25 crew members
PRODUCTION	0.21 mh/vlf	
Output	12.25 mh/crew hr / 0.21 mh/vlf	60 vlf/crew hr

APPENDIX F

Phone Logs and Emails

9025 Centre Pointe Drive, Suite 400
West Chester, OH 45069
Phone: (513) 645-7000
Toll Free: (800) 338-1122
www.ContechES.com

April 13, 2012

Nathan Schreiner, PE
Tetra Tech
1020 SW Taylor Street
Suite 530
Portland, OR 97205

Project: Oaks Bottom Wildlife Restoration, Portland, OR

The following is a CON/SPAN Bridge System ENGINEER'S COST ESTIMATE for your project. This ESTIMATE is intended for preliminary estimating purposes only and should **not** be interpreted as a final QUOTATION. The information presented is based on the most current data made available to CONTECH.

CONTECH will fabricate and deliver the following described CON/SPAN Bridge components and appurtenances:

DESCRIPTION OF SUPPLIED MATERIALS:

- 90 L.F. of 16 FT. span x 10 FT. rise CON/SPAN Precast Concrete units (8 FT. Typical Lay Length)
- Two (2) precast attached parapet headwalls, 2' Tall at Crown, 12" thick
- Four (4) precast wingwalls with mounting hardware, 10" Thick, lengths/heights in accordance with provided plans
- Joint sealant material
- Masonite shims
- Filter fabric and perforated drain tile
- On-site consultation during installation
- Freight for precast components to the job site (or nearest truck-accessible location)

ESTIMATE - $ 170,000 Delivered (F.O.B.)

ESTIMATED HEAVIEST CRANE PICK = 21.5 TONS

These costs do not include the foundation, or installation costs. As part of the construction process, the contractor is to perform the items listed below in accordance with the installation drawings:

- Excavate for the structure & foundations
- Construct cast-in-place foundations
- Unload and set structure utilizing crane
- Grout the unit legs and wingwalls into the keyway
- Apply all joint sealing material
- Backfill the structure

Please contact me at (503) 258-3104 should you have any questions or need additional information. Thank you for your interest in the CON/SPAN Bridge System.

Respectfully,

Matthew Stovall, PE, LEED AP BD+C
Inside Project Consultant
MStovall@ContechES.com

Your Local Contact:
Sig Fransen – Project Consultant
11835 NE Glenn Widing Dr.
Portland, OR 97220
(503) 807-2322
SFransen@ContechES.com

OREGON PACIFIC RAILROAD COMPANY

OAKS BOTTOM CULVERT REPLACEMENT PROJECT

SUMMER 2012

DESCRIPTION OF PROJECT:

The City of Portland plans to replace the existing culvert extending underneath the berm that supports the Springwater Trail and Oregon Pacific Railroad track. The Springwater Trail is able to be closed during construction; however, rail service to the Milwaukie Industrial Park must be maintained but on a reduced basis / frequency.

Oregon Pacific and the City have devised a plan in which a temporary removable bridge will be placed over the construction area to allow rail service to be conducted over the weekend and removed to allow construction activities to continue during the week.

Construction activities affecting railroad operations are scheduled to begin approximately June 15, 2012 and be completed by approximately August 15, 2012; a period of two months which will require removal and replacement of the bridge on a weekly basis.

SCOPE OF WORK:

The City of Portland's contractor will drive ten HP 14 x 73 piles, five on the north and five on the south, to support the removable bridge section as well as sufficient sheet piling to support the embankment. Oregon Pacific Railroad will cut the piling at the proper height and install the W14 x 90 cap which will support both the bridge and railroad track at each abutment. Subject to structural engineer approval, it is intended to use two W27 x 84 wide flange beams under each rail with crosspieces of sufficient strength and spacing to support the track rails. With the proposed configuration, the capacity of the bridge is 544,000 pounds; approximately twice the capacity of any proposed loading. Since the bridge will be removed and replaced by a 30-ton capacity on track crane, total weight of the bridge is an important consideration.

OREGON PACIFIC RAILROAD COMPANY

OAKS BOTTOM CULVERT REPLACEMENT PROJECT

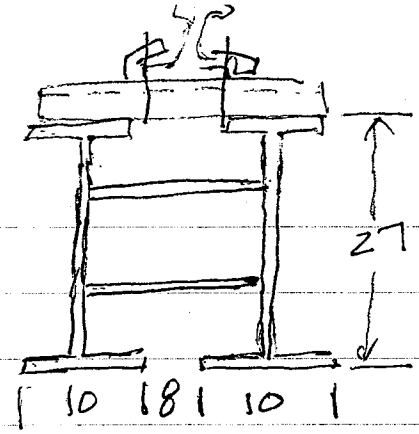
COST ESTIMATE

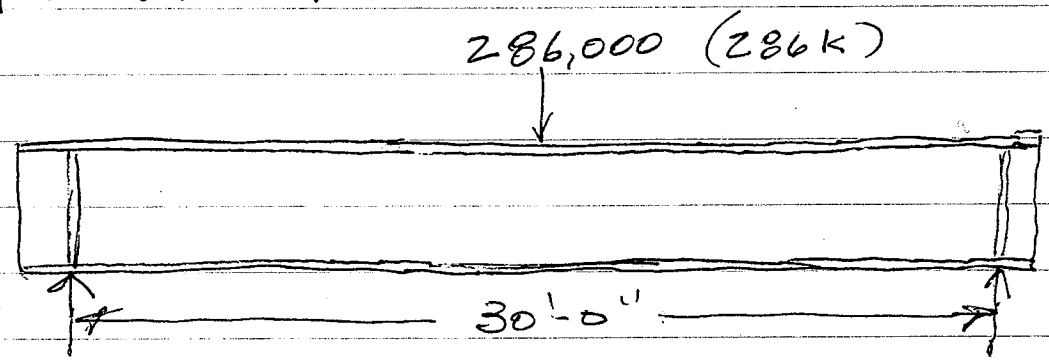
BRIDGE STRUCTURE

Design and fabricate removable bridge section, including structural engineering; estimate 8,000#		$ 75,000.00
Transport to jobsite		5,000.00
Labor to remove sufficient track ties to enable pile driving keeping rail line in service prior to bridge installation		5,000.00
Remove track, cut piles to length, excavate around piling, install W14 x 90 cap assemblies		20,000.00

BRIDGE REMOVAL / REPLACEMENT

June 16-17; June 23-24; June 30-July 1		
July 7-8; July 14-15; July 21-22; July 28-29		
August 4-5; August 11-12; August 18-19	10 weekends @ $3,500 per weekend	35,000.00
Train crew overtime		5,000.00
Administration and supervision @ 10%		14,500.00
	ESTIMATED TOTAL	**$ 159,500.00**



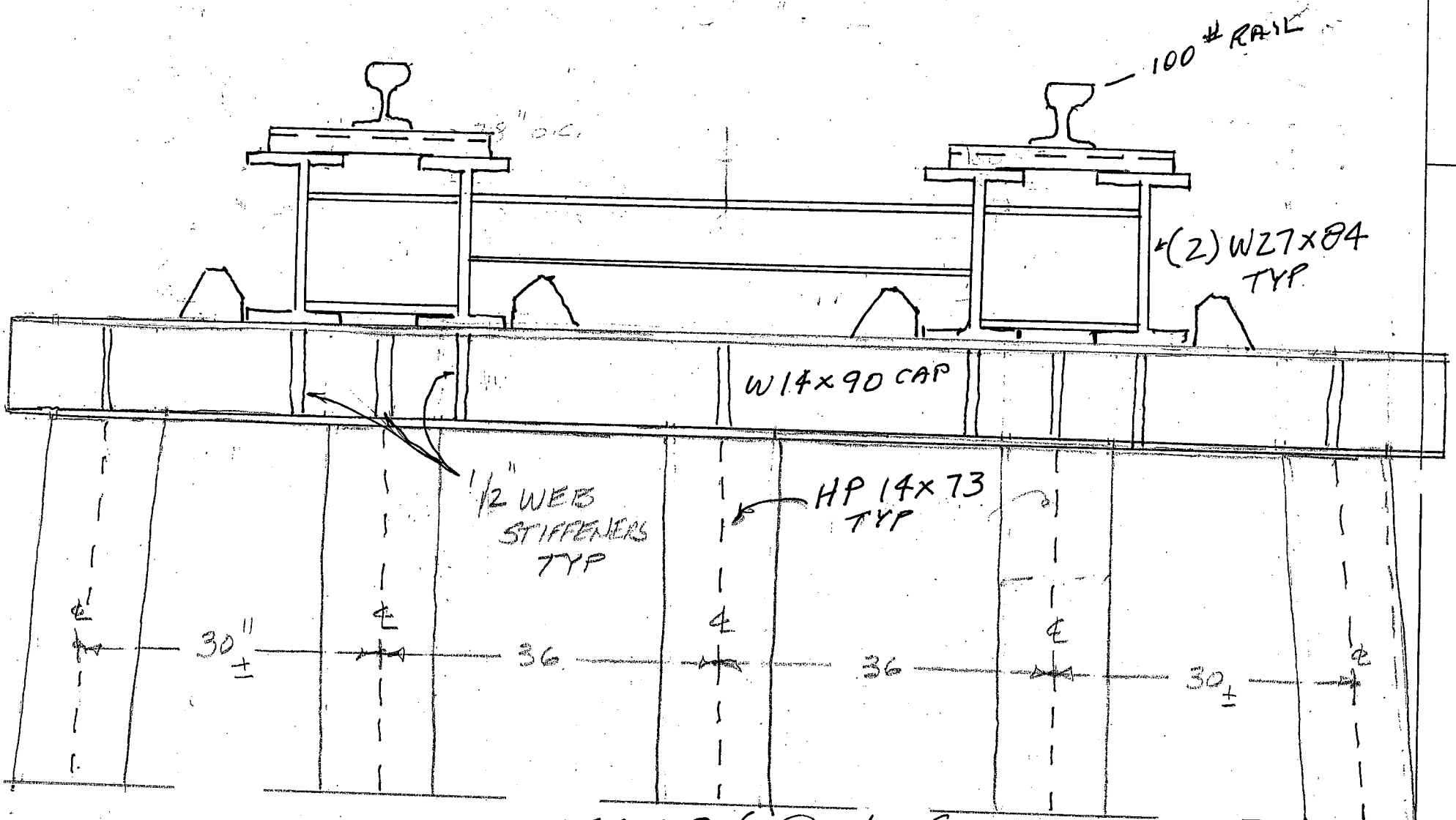


286K x 2 = 572k ÷ 4 = 143K

W27 x 84 → x 30/2 = 154K →

(2) BEAMS = 5040#
(1) 100# RAIL = 1000#
MISC = 1000#
7040#

AMPAD 22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS



SECTION @ N & S BULKHEAD

F5

Loeb, Curtis

From: Easley, Michael G. [MEasley@cemexusa.com]
Sent: Friday, July 23, 2010 12:44 PM
To: Loeb, Curtis
Subject: Oaks Bottom Wildlife Restoration Project.xls
Attachments: Canby 1 to 6 Drain July 2010.htm; Canby Concrete Sand May 2010.pdf; Coyote Springs Fine Sand Gradation SE.xls

Here it is Curtis.

CEMEX

8705 NE 117th Avenue
Vancouver, WA 98662

WA 360-254-7770
OR 877-974-6537
Fax 360-253-3794

Quote Confirmation

To:	Curtis	**From:**	Michael
Company:	Tetra Tech	**Pages:**	1
Phone #	503-223-5388	**Date:**	7/23/2010
Fax #		**Bid Date:**	7/23/2010
Email	curtis.loeb@tetratech.com		

(Dump, mix, rehandle, place)

Project: Oaks Bottom Wildlife Restoration Project

Address: SE Carlton St & SE Spokane St **City:** Portland

PLACEMENT ASSUME 150% (incl. m/u)

Pit/Quarry	Quantity	Unit	Product	Delivered Truck & Pup	Delivered Transfer	Delivered Solo *	Picked Up /FOB	TOT Round up
Canby	400	Ton	6 X 1	$15.94	$16.44	$20.67	$10.00	#31 #55
Canby	100	Ton	Con Sand	$18.94	$19.44	$23.67	$13.00	#35.50 #60
Port/Port		Ton	Fill Sand	$11.69	$12.19	$15.83	$6.50	
Fisher	400	Ton	Class 100	$30.92		$36.44	$23.00	#55 #95
Fisher	200	Ton	2'-4' Boulders	$36.15		$43.44	$26.00	#65 $110

Dirt, Concrete and Asphalt Dump

		Ton	Dirt Dump	----------		
		Box	Dirt Dump	----------		
		Load	Dirt Back Haul		(Per Truck and Trailer Load)	
		Ton	Asphalt Dump	----------		$1.00
		Ton	Concrete Dump	----------		$1.00

Concrete

Quote

Quote Number:	1130	**Attention:**	Maria
Date:	07/21/2010	**Authorized By:**	Jag

Bill To:	Tetra Tech	**Ship To:**	Portland, OR
Address:		**Address:**	
City, State:		**City, State:**	Portland, OR
Zip Code:		**Zip Code:**	
Phone:		**Phone:**	
Fax:		**Fax:**	
Email:	maria@riverodesign.com	**Estimated Project Date:**	

Valid For: Pick up from Portland OR 97209.

GeoVireo, Inc.
2001 NW York St.
Portland, OR 97209

Phone: 503-284-6373
Fax: 503-284-6383

www.geovireo.com
info@geovireo.com

Product	Description	Quantity	Unit Price	Amount
BioD-Pillow	3' x 15' 1"-2" thickness	54	$51.00	$2,754.00
	810 lf			
			Sub-total	**$2,754.00**
			Freight	**$0.00**
			Grand Total	**$2,754.00**

Notes:

☒ Job Site or Residential

☐ Warehouse or Office

Estimate Delivery/ETA: 7 weeks

☐ **In Stock** and available for immediate pick up or delivery ☒ Out of Stock

Pick up/Delivery only upon receipt of written purchase order for materials in stock. To guarantee availability, please call or go online and place your order.

Payment Terms: ☒ Prepayment ☒ Net 30-day only with approved credit ☐ Government P.O. ☐ Other, See Notes

We Accept All Major Credit Cards.

All products are guaranteed to be free from defects by their respective manufactures. Due to variables such as weather, soil conditions, type installation, ect., GeoVireo, Inc. cannot guarantee that the products perform under unlimited conditions. GeoVireo, Inc. is not liable for any direct, indirect or consequential damages or losses occurred by any failure of any product sold by GeoVireo, Inc.

Thank you for the opportunity to provide you with a quote!

APPENDIX G

Abbreviated Cost and Schedule Risk Analysis

Abbreviated Risk Analysis

Springwater Corridor Wetlands
Feasibility Level

Meeting Date: 1-May-13

PDT Members (Typical Recommended)

Project Management:	James Adams, USACE
Technical Lead:	Michael Gross, USACE
City of Portland:	Sean Bistoff
Project Management:	Merri Martz, Tetra Tech
Cost Engineering:	Ike Pace, Tetra Tech
Cost Engineering:	Scott Vose, Tetra Tech

Abbreviated Risk Analysis

Project (less than $40M): **OAKS BOTTOM HABITAT RESTORATION**
Project Development Stage: Feasibility Level

Total Construction Contract Cost = $ 4,140,399

	WBS	Potential Risk Areas	Contract Cost		% Contingency	$ Contingency	Total
1	06 FISH AND WILDLIFE FACILITIES	**Site Preparation**	$ 522,131		12.50%	$ 65,266	$ 587,398
2	06 FISH AND WILDLIFE FACILITIES	**Dewatering**	$ 292,339		29.17%	$ 85,266	$ 377,605
3	06 FISH AND WILDLIFE FACILITIES	**Channel Earthwork/Restoration**	$ 774,225		22.92%	$ 177,426	$ 951,651
4	06 FISH AND WILDLIFE FACILITIES	**Revegetation**	$ 764,228		20.83%	$ 159,214	$ 923,442
5	08 ROADS, RAILROADS, AND BRIDGES	**Temp RR Bridge/Culvert**	$ 1,682,845		29.17%	$ 490,830	$ 2,173,675
6	14 RECREATION FACILITIES	**Recreation Items**	$ 104,631		6.25%	$ 6,539	$ 111,171
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12		**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 314,000		12.50%	$ 39,250	$ 353,250
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 518,000		10.42%	$ 53,958	$ 571,958

Totals					
Total Construction Estimate	$ 4,140,399	23.78%	$ 984,542	$ 5,124,941
Total Planning, Engineering & Design	$ 314,000	12.50%	$ 39,250	$ 353,250
Total Construction Management	$ 518,000	10.42%	$ 53,958	$ 571,958
Total	$ 4,972,399		$ 1,077,750	$ 6,050,149

OAKS BOTTOM HABITAT RESTORATION
Feasibility Level
Abbreviated Risk Analysis

Meeting Date: 1-May-13

Risk Level

	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	2	3	4	5	5
Likely	1	2	4	5	5
Unlikely	0	1	3	3	4
Very Unlikely	0	0	1	2	4

Risk Element	Potential Risk Areas	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Project Scope						
PS-1	Site Preparation	Site Preparation assumptions	The amount of construction activities needed for site preparation could vary and affect costs.	Unlikely	Significant	3
PS-2	Dewatering	Dewatering assumptions	The amount of construction activities that need to occur to satisfy dewatering requirements could vary and affect costs.	Unlikely	Significant	3
PS-3	Channel Earthwork/Restoration	Earthwork accomplishing intent	In future investigation, the current earthwork design could prove inadequate for what is needed.	Unlikely	Marginal	1
PS-4	Revegetation	No significant risk anticipated to increased scope	The project is being designed to a proposed budget and aggreement with non-Federal sponsor such that changes can be made to design if costs are beyond non-Federal sponsor capabilities. So contingency could be lower than typical feasibility level projects of this nature.	Very Unlikely	Negligible	0
PS-5	Temp RR Bridge/Culvert	Culvert replacement assumptions	The amount of construction activities that need to occur for the culvert replacement requirements could vary and affect costs.	Unlikely	Significant	3
PS-6	Recreation Items			Very Unlikely	Negligible	0
PS-7	0			Very Unlikely	Negligible	0
PS-8	0			Very Unlikely	Negligible	0
PS-9	0			Very Unlikely	Negligible	0
PS-10	0			Very Unlikely	Negligible	0
PS-11	0			Very Unlikely	Negligible	0
PS-12	Remaining Construction Items			Very Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	Investigations remaining	Design is currently approaching 90%, so there is more information than typically available at the feasibility level. Estimate is based on higher level of detail and have much higher level of confidence in estimate. Contingency anticipated to be lower, and no significant impacts anticipated to scope.	Unlikely	Marginal	1
PS-14	Construction Management			Very Unlikely	Negligible	0

Acquisition Strategy						
AS-1	Site Preparation			Very Unlikely	Negligible	0
AS-2	Dewatering			Very Unlikely	Negligible	0
AS-3	Channel Earthwork/Restoration			Very Unlikely	Negligible	0
AS-4	Revegetation			Very Unlikely	Negligible	0
AS-5	Temp RR Bridge/Culvert	Contracting Plan	If the assumed contracting plan changes where a different contractor does the culvert installation, costs and schedule would be effect.	Unlikely	Marginal	1
AS-6	Recreation Items			Very Unlikely	Negligible	0
AS-7	0			Very Unlikely	Negligible	0
AS-8	0			Very Unlikely	Negligible	0
AS-9	0			Very Unlikely	Negligible	0
AS-10	0			Very Unlikely	Negligible	0
AS-11	0			Very Unlikely	Negligible	0
AS-12	Remaining Construction Items			Very Unlikely	Negligible	0
AS-13	Planning, Engineering, & Design	Contracting Plan	If the assumed contracting plan changes costs and schedule would be effect.	Unlikely	Marginal	1
AS-14	Construction Management	Contracting Plan	If the assumed contracting plan changes costs and schedule would be effect.	Unlikely	Marginal	1

Construction Complexity						
CC-1	Site Preparation			Very Unlikely	Negligible	0
CC-2	Dewatering	Diversion of water	Water control could cause some problems to the contractor, depending on conditions at time of construction	Unlikely	Significant	3
CC-3	Channel Earthwork/Restoration			Very Unlikely	Negligible	0
CC-4	Revegetation			Very Unlikely	Negligible	0
CC-5	Temp RR Bridge/Culvert	Coodination with the RR in placement of the Temporary Bidge	The temporary railroad bridge placement/removal by the railroad owner each Sunday is a potential risk for delay of work. If the owner does not complete placement/removal on time delays could occur.	LIKELY	Significant	4
CC-6	Recreation Items			Very Unlikely	Negligible	0
CC-7	0			Very Unlikely	Negligible	0
CC-8	0			Very Unlikely	Negligible	0
CC-9	0			Very Unlikely	Negligible	0
CC-10	0			Very Unlikely	Negligible	0
CC-11	0			Very Unlikely	Negligible	0
CC-12	Remaining Construction Items			Very Unlikely	Negligible	0
CC-13	Planning, Engineering, & Design			Very Unlikely	Negligible	0
CC-14	Construction Management			Very Unlikely	Negligible	0

Volatile Commodities						
VC-1	Site Preparation			Very Unlikely	Negligible	0
VC-2	Dewatering	Price of materials	The price of sheet piling could change.	LIKELY	Marginal	2
VC-3	Channel Earthwork/Restoration	Fuel Prices	Price of fuel could have some impact on costs. Changes in the prices of rock and gravel.	LIKELY	Marginal	2
VC-4	Revegetation	Price of plantings	Price of plantings could vary which would impact costs	LIKELY	Marginal	2
VC-5	Temp RR Bridge/Culvert	Price of materials	The price of sheet piling could change.	LIKELY	Marginal	2
VC-6	Recreation Items			Unlikely	Negligible	0
VC-7	0			Unlikely	Negligible	0
VC-8	0			Very Unlikely	Negligible	0
VC-9	0			Very Unlikely	Negligible	0
VC-10	0			Very Unlikely	Negligible	0
VC-11	0			Very Unlikely	Negligible	0
VC-12	Remaining Construction Items			Very Unlikely	Negligible	0
VC-13	Planning, Engineering, & Design			Very Unlikely	Negligible	0
VC-14	Construction Management			Very Unlikely	Negligible	0

Quantities						
Q-1	Site Preparation	Site Prep assumptions	The assumed quantities for site preparation could be different once the contractor gets out into the field.	Unlikely	Marginal	1
Q-2	Dewatering	Dewatering assumptions	The assumed quantities for dewatering could be different once the contractor gets out into the field.	Unlikely	Significant	3
Q-3	Channel Earthwork/Restoration	Quantity calculation assumptions	More detailed analysis could lead to an increase in the amount of earthwork that needs to be done.	Unlikely	Significant	3
Q-4	Revegetation	Vegetation plan could change	If vegetation planting plan changes, costs would be effected.	Unlikely	Significant	3
Q-5	Temp RR Bridge/Culvert	Shoring assumptions	The assumed quantities for shoring could be different once the contractor gets out into the field.	Unlikely	Marginal	1
Q-6	Recreation Items			Very Unlikely	Negligible	0
Q-7	0			Very Unlikely	Negligible	0
Q-8	0			Very Unlikely	Negligible	0
Q-9	0			Very Unlikely	Negligible	0
Q-10	0			Very Unlikely	Negligible	0
Q-11	0			Very Unlikely	Negligible	0
Q-12	Remaining Construction Items			Very Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design			Very Unlikely	Negligible	0
Q-14	Construction Management			Very Unlikely	Negligible	0

Fabrication & Project Installed Equipment						
FI-1	Site Preparation			Very Unlikely	Negligible	0
FI-2	Dewatering			Very Unlikely	Negligible	0
FI-3	Channel Earthwork/Restoration			Very Unlikely	Negligible	0
FI-4	Revegetation			Very Unlikely	Negligible	0
FI-5	Temp RR Bridge/Culvert			Very Unlikely	Negligible	0
FI-6	Recreation Items			Very Unlikely	Negligible	0
FI-7	0			Very Unlikely	Negligible	0
FI-8	0			Very Unlikely	Negligible	0
FI-9	0			Very Unlikely	Negligible	0
FI-10	0			Very Unlikely	Negligible	0
FI-11	0			Very Unlikely	Negligible	0
FI-12	Remaining Construction Items			Very Unlikely	Negligible	0
FI-13	Planning, Engineering, & Design			Very Unlikely	Negligible	0
FI-14	Construction Management			Very Unlikely	Negligible	0

Cost Estimating Method						
CE-1	Site Preparation			Very Unlikely	Negligible	0
CE-2	Dewatering	Assumptions for dewatering	Estimate assumes creating sheet pile cofferdams and dewatering pumps for construction of water control structures. Assumptions on the cofferdam and dewatering duration could affect costs.	Unlikely	Marginal	1
CE-3	Channel Earthwork/Restoration	Earthwork production rates; Contaminated Soils	Actual production rates in the field could vary from those used in the estimate; Contaminated soils, could increase increase costs.	Unlikely	Significant	3
CE-4	Revegetation	Production rates on plantings	Actual production rates in the field could vary from those used in the estimate.	Unlikely	Significant	3
CE-5	Temp RR Bridge/Culvert	Production rate for installation, and the material cost for the culvert.	If the installation differs in the field, and/or the cost of culvert varies, then overall costs for this structure would change.	Unlikely	Marginal	1
CE-6	Recreation Items	Production rates on recreation item installation	Actual production rates in the field could vary from those used in the estimate.	Unlikely	Marginal	1
CE-7	0			Very Unlikely	Negligible	0
CE-8	0			Very Unlikely	Negligible	0
CE-9	0			Very Unlikely	Negligible	0
CE-10	0			Very Unlikely	Negligible	0
CE-11	0			Very Unlikely	Negligible	0
CE-12	Remaining Construction Items			Very Unlikely	Negligible	0
CE-13	Planning, Engineering, & Design			Very Unlikely	Negligible	0
CE-14	Construction Management			Very Unlikely	Negligible	0

External Project Risks						
EX-1	Site Preparation	Lack of funding; Bid volatility	Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-2	Dewatering	Flooding; Lack of funding, Bid volatility	Small potential for large flows during construction window; Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-3	Channel Earthwork/Restoration	Flooding; Lack of funding, Bid volatility	Small potential for large flows during construction window; Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-4	Revegetation	Flooding; Lack of funding, Bid volatility	Small potential for large flows during construction window; Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-5	Temp RR Bridge/Culvert	Flooding; Lack of funding, Bid volatility	Small potential for large flows during construction window; Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-6	Recreation Items	Lack of funding; Bid volatility	Lack of federal funding has a high likelihood of occuring, which could delay construction and increase costs; bid volatility is also likely, but would not have significant impact.	LIKELY	Marginal	2
EX-7	0			Very Unlikely	Negligible	0
EX-8	0			Very Unlikely	Negligible	0
EX-9	0			Very Unlikely	Negligible	0
EX-10	0			Very Unlikely	Negligible	0
EX-11	0			Very Unlikely	Negligible	0
EX-12	Remaining Construction Items			Very Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	Lack of funding	Could push project design out, and raise costs.	LIKELY	Significant	4
EX-14	Construction Management	Flooding; Bid volatility	Small potential for large flows during construction window	LIKELY	Significant	4

OAKS BOTTOM HABITAT RESTORATION
Feasibility Level
Abbreviated Risk Analysis

Typical Risk Elements	Potential Risk Areas													
	Site Preparation	Dewatering	Channel Earthwork/Restor n	Revegetation	Temp RR Bridge/Culvert	Recreation Items	0	0	0	0	0	Remaining Construction Iter	Planning, Engineering, & Design	Construction Management
Project Scope	3	3	1	-	3	-	-	-	-	-	-	-	1	-
Acquisition Strategy	-	-	-	-	1	-	-	-	-	-	-	-	1	1
Construction Complexity	-	3	-	-	4	-	-	-	-	-	-	-	-	-
Volatile Commodities	-	2	2	2	2	-	-	-	-	-	-	-	-	-
Quantities	1	3	3	3	1	-	-	-	-	-	-	-	-	-
Fabrication & Project Installed Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost Estimating Method	-	1	3	3	1	1	-	-	-	-	-	-	-	-
External Project Risks	2	2	2	2	2	2	-	-	-	-	-	-	4	4
Weighted Summation	6	14	11	10	14	3	0	0	0	0	0	0	6	5
Weighted %	12.5%	29.2%	22.9%	20.8%	29.2%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	10.4%

APPENDIX H

MCACES Construction Cost Estimate

Estimated by	Tetra Tech, Inc
Designed by	Tetra Tech, Inc
Prepared by	Tetra Tech, Inc
Preparation Date	1/30/2013
Effective Date of Pricing	1/30/2013
Estimated Construction Time	245 Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
Project Cost Summary Report			**4,140,399**	**4,140,399**	
Oaks Bottom Restoration	**1.00**	**LS**	**4,140,399**	**4,140,399**	
01 Mobilization / Demobilization	**1.00**	**LS**	**235,871**	**235,871**	
01 01 Mobilization	**1.00**	**LS**	**152,553**	**152,553**	
01 02 Demobilization	**1.00**	**LS**	**83,318**	**83,318**	
			44,913.28	*44,913.28*	
02 Temporary Work Zone Traffic Control	**1.00**	**EA**	**44,913**	**44,913**	
			73,725.73	*73,725.73*	
03 Temporary Work Access	**2.00**	**EA**	**147,451**	**147,451**	
			83,308.84	*83,308.84*	
03 01 Wetland Area	**1.00**	**EA**	**83,309**	**83,309**	
			48,594.60	*48,594.60*	
03 02 Staging Area	**1.00**	**EA**	**48,595**	**48,595**	
03 03 Temporary Shoring Crossing	**1.00**	**LS**	**15,548**	**15,548**	
			5.60	*5.60*	
04 Temporary Type Orange Plastic Mesh Fence	**3,500.00**	**LF**	**19,604**	**19,604**	
			9.61	*9.61*	
05 Temporary 6-feet Chain Link Fence	**1,000.00**	**LF**	**9,606**	**9,606**	
			20,450.88	*20,450.88*	
06 Erosion Control	**1.00**	**EA**	**20,451**	**20,451**	
			3,408.93	*3,408.93*	
07 Construction Entrance	**1.00**	**EA**	**3,409**	**3,409**	
			17,954.06	*17,954.06*	
08 Pollution Control Plan	**1.00**	**EA**	**17,954**	**17,954**	
			4,842.52	*4,842.52*	
09 Clearing and Grubbing	**4.12**	**ACR**	**19,951**	**19,951**	
			2,921.31	*2,921.31*	
10 Tire Wash Facility	**1.00**	**EA**	**2,921**	**2,921**	
			292,339.18	*292,339.18*	
11 Dewatering Plan and System	**1.00**	**EA**	**292,339**	**292,339**	
			8,204.31	*8,204.31*	
11 01 Temporary Earthen Cofferdam	**1.00**	**EA**	**8,204**	**8,204**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			42.56	*42.56*	
11 02 Sheet Piling	**3,960.00**	**SF**	**168,542**	**168,542**	
			1,284.36	*1,284.36*	
11 03 Dewater Pumping	**90.00**	**DAY**	**115,593**	**115,593**	
			54.17	*54.17*	
12 Contaminated Media Excavation & Disposal	**11,100.00**	**TON**	**601,318**	**601,318**	
			4,787.75	*4,787.75*	
13 Contaminated Media Disposal Plan (CMDP)	**1.00**	**EA**	**4,788**	**4,788**	
			46.60	*46.60*	
14 Removal of Surfacings	**160.00**	**SY**	**7,456**	**7,456**	
			35,986.80	*35,986.80*	
15 Removal of Structures & Obstructions	**1.00**	**EA**	**35,987**	**35,987**	
			3,021.87	*3,021.87*	
15 01 Demo Existing 18" Steel Gas Line	**1.00**	**EA**	**3,022**	**3,022**	
			22,649.59	*22,649.59*	
15 02 Demo Existing 60" RCP Culvert	**1.00**	**EA**	**22,650**	**22,650**	
			10,315.34	*10,315.34*	
15 03 Demo Existing Water Control Structure	**1.00**	**EA**	**10,315**	**10,315**	
			200,000.00	*200,000.00*	
16 Temporary Railroad Bridge	**1.00**	**EA**	**200,000**	**200,000**	
			143,879.39	*143,879.39*	
17 Temporary Railroad Bridge Substructure	**1.00**	**EA**	**143,879**	**143,879**	
			4,819.11	*4,819.11*	
17 01 Piling	**10.00**	**EA**	**48,191**	**48,191**	
			42.53	*42.53*	
17 02 Secondary Shoring	**2,250.00**	**SF**	**95,688**	**95,688**	
			13.96	*13.96*	
18 General Excavation	**1,000.00**	**TON**	**13,959**	**13,959**	
			28.73	*28.73*	
19 Trench Backfill	**2,800.00**	**CY**	**80,453**	**80,453**	
			109.71	*109.71*	
20 Trench foundation Stabilization	**200.00**	**CY**	**21,942**	**21,942**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
21 Structural Shoring	**1.00**	**LS**	**619,359**	**619,359**	
			42.52	*42.52*	
21 01 Sheet Piling	**12,600.00**	**SF**	**535,732**	**535,732**	
			6,746.75	*6,746.75*	
21 02 HP 14 x 73 Piling	**10.00**	**EA**	**67,468**	**67,468**	
			89.78	*89.78*	
21 03 HP 14 x 73 Waler	**180.00**	**LF**	**16,160**	**16,160**	
22 Precast Reinforced Concrete Culvert	**1.00**	**LS**	**449,499**	**449,499**	
			585.95	*585.95*	
22 01 CIP Footings	**113.30**	**CY**	**66,388**	**66,388**	
			935.62	*935.62*	
22 02 CIP Stemwall	**90.00**	**CY**	**84,206**	**84,206**	
			3,321.16	*3,321.16*	
22 03 Precast Concrete Arch Culvert	**90.00**	**LF**	**298,904**	**298,904**	
			19.93	*19.93*	
23 2-Inch AC Pavement Repair	**5,289.00**	**SY**	**105,404**	**105,404**	
			1.53	*1.53*	
24 Longitudinal Pavement Markings - Paint	**3,200.00**	**LF**	**4,906**	**4,906**	
			25,698.75	*25,698.75*	
25 Timber Viewing Platforms	**2.00**	**EA**	**51,397**	**51,397**	
			25,696.85	*25,696.85*	
25 01 Timber Viewing Platform #1	**1.00**	**EA**	**25,697**	**25,697**	
25 01 01 Posts and Bracing	**1.00**	**LS**	**10,509**	**10,509**	
			20.43	*20.43*	
25 01 02 Decking	**508.00**	**SF**	**10,378**	**10,378**	
			26.87	*26.87*	
25 01 03 Timber Railing	**179.00**	**LF**	**4,810**	**4,810**	
			25,700.64	*25,700.64*	
25 02 Timber Viewing Platform #2	**1.00**	**EA**	**25,701**	**25,701**	
25 02 01 Posts and Bracing	**1.00**	**LS**	**10,509**	**10,509**	
			20.43	*20.43*	
25 02 02 Decking	**508.00**	**SF**	**10,378**	**10,378**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			26.89	*26.89*	
25 02 03 Timber Railing	**179.00**	**LF**	**4,814**	**4,814**	
			63.84	*63.84*	
26 Type CL-4R Coated Chain Link Fence	**140.00**	**LF**	**8,938**	**8,938**	
			27.68	*27.68*	
27 Remove and Rebuild Fence	**1,600.00**	**LF**	**44,295**	**44,295**	
			63.28	*63.28*	
28 Class 100 Riprap	**780.00**	**TON**	**49,357**	**49,357**	
			41.84	*41.84*	
29 Cobble and Gravel	**390.00**	**TON**	**16,316**	**16,316**	
			35.61	*35.61*	
30 Sand	**348.00**	**TON**	**12,392**	**12,392**	
			136.90	*136.90*	
31 Boulders	**220.00**	**TON**	**30,117**	**30,117**	
			3.88	*3.88*	
32 Geotextile	**1,060.00**	**SY**	**4,116**	**4,116**	
			63.51	*63.51*	
33 Bedding Rock	**170.00**	**TON**	**10,797**	**10,797**	
			13,423.57	*13,423.57*	
34 Vegetation Type 1	**0.60**	**ACR**	**8,054**	**8,054**	
			16,531.08	*16,531.08*	
35 Vegetation Type 2	**33.90**	**ACR**	**560,404**	**560,404**	
			187,002.27	*187,002.27*	
36 Vegetation Type 3	**0.10**	**ACR**	**18,887**	**18,887**	
			16,531.11	*16,531.11*	
37 Vegetation Type 4	**10.70**	**ACR**	**176,883**	**176,883**	
			662.10	*662.10*	
38 Large Woody Debris	**68.00**	**EA**	**45,023**	**45,023**	