RED RIVER DIVERSION

FARGO – MOORHEAD METRO FLOOD RISK MANAGEMENT PROJECT, FEASIBILITY STUDY, PHASE 4

APPENDIX G – COST ESTIMATES
EXHIBIT L – ESTIMATE DETAIL FRAMEWORK

Report for the US Army Corps of Engineers, and the cities of Fargo, ND & Moorhead, MN

By: Barr Engineering Co.

FINAL – February 28, 2011

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ATTACHMENTS

APPENDIX G
COST ESTIMATES

EXHIBIT L – ESTIMATE DETAIL FRAMEWORK

G-L1.0 ESTIMATE DETAIL FRAMEWORK

Attachments G-L1.1 and G-L1.2 of this Exhibit L presents summary tables of the estimate detail framework using the Pareto Principle. In accordance with USACE guidance, the Pareto Principle determines items responsible for 80 percent of the costs and forms the basis for developing detail within the cost estimates. This analysis was completed using the Phase 2 cost estimates in order to formulate the approach that was used for Phase 3 cost estimating.

Fargo-Moorhead Metro Flood Risk Management Project, Feasibility Study, Phase 3

Red River Diversion

Phase 3

Exhibit G - L1.1 - Apply Pareto Principle: Determine Items Responsible for 80% of Costs (From All Items)

Draft - For Discussion Purposes Only - Last updated 2-June-2010 - ATS, PKN, MRM - Barr Engineering

Notes and Assumptions:

ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works; Requirement 3.2.5.2

Phase 2 shown below; Used to formulate approach to the Phase 3 estimate

Phase 2: MN Short 35K Costs	PHASE 2 COSTS USED BELOW	PHASE 2 COSTS USED BELOW
Item	Cost w/ Contingency	Cumulative
09 Main Channel and Berm Excavation	419,712,100	419,712,100
09 Red River Inlet Control Structure	49,282,800	468,994,900
09 Red River Outlet Control Structure	3,103,600	472,098,500
09 Diversion Extension	31,737,300	503,835,800
09 Wild Rice Breakout Excavation	4,112,500	507,948,300
11 Tie-back Levees	6,091,000	514,039,300
11 Non-Structural Floodproofing	6,590,500	520,629,800
09 FCS - Small Drains	697,500	521,327,300
09 FCS - Intercept Control Structures (1"x72")	3,242,800	524,570,100
09 FCS - Intercept Control Structures (2"x72")	9,758,100	534,328,200
09 Erosion Control	2,929,000	537,257,200
08 Roads, Railroads and Bridges	90,498,100	627,755,300
06 Fish and Wildlife Facilities	50,920,000	678,675,300
02 Relocations	94,050,000	772,725,300
01 Lands and Damages	57,007,000	829,732,300
14 Recreation Facilities	28,066,900	857,799,200
30 PED	120,118,900	977,918,100
31 CM	56,054,900	1,033,973,000
Total Cost	**$1,033,973,000**	
80% of Total Cost	827,178,400	

Phase 2: ND East 35K Costs

Item	Cost w/ Contingency	Cumulative
09 Main Channel and Berm Excavation - Stripping	42,864,500	42,864,500
09 Main Channel and Berm Excavation - Excavation	322,660,000	365,524,500
09 Main Channel and Berm Excavation - Topsoil	87,112,100	452,636,600
09 Main Channel and Berm Excavation - Seeding	16,162,100	468,798,700
09 Low Flow Channel	2,791,900	471,590,600
09 Red River Inlet Control Structure	47,933,700	519,524,300
09 Red River Outlet Control Structure	6,915,700	526,440,000
09 Wild Rice River Crossing	19,787,300	546,227,300
09 Sheyenne River Crossing	39,324,300	585,551,600
09 Maple River Crossing	38,887,400	624,439,000
09 Lower Rush River Crossing	7,280,600	631,719,600
09 Rush River Crossing	8,081,500	639,801,100
09 FCS - Small Drains	230,500	640,031,600
09 FCS - Large Drains	884,000	640,915,600
09 FCS - Intercept Control Structures (1"x72")	8,791,400	649,707,000
09 FCS - Intercept Control Structures (2"x72")	6,206,000	655,913,000
09 Erosion Control	4,476,600	660,389,600
11 Tie-back Levees	2,386,200	662,775,800
01 Lands and Damages	59,360,600	722,136,400
02 02 Utility Relocations & Roads	71,890,100	794,026,500
06 Fish and Wildlife Facilities	82,960,000	876,986,500
08 Roads, Railroads and Bridges	18,121,000	895,107,500
14 Recreation Facilities	28,485,900	923,593,400
30 PED	129,635,200	1,053,228,600
31 CM	60,496,900	1,113,725,500
Total Cost	**$1,113,725,500**	
80% of Total Cost	890,980,400	

Fargo-Moorhead Metro Flood Risk Management Project, Feasibility Study, Phase 3

Red River Diversion

Phase 3

Exhibit G - L1.2 - Apply Pareto Principle: Determine Items Responsible for 80% of Costs (From Selected Construction Items)

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Notes and Assumptions:

ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works; Requirement 3.2.5.2
Phase 2 shown below; Used to formulate approach to the Phase 3 estimate
Consider 2 categories of costs: General Costs (for which work analysis with less design at this stage) and Construction Cost

Phase 2: MN Short 35K Costs

Item	Cost w/ Contingency	Cumulative	Phase 3 Work Analysis Proposed
	PHASE 2 COSTS USED BELOW	PHASE 2 COSTS USED BELOW	
01 Lands and Damages	57,007,000	not included in this 80-20 analysis	
02 02 Utility Relocations & Roads	94,050,000	not included in this 80-20 analysis	
06 Fish and Wildlife Facilities	50,920,000	not included in this 80-20 analysis	
08 Roads, Railroads and Bridges	90,498,100	not included in this 80-20 analysis	
11 Non-Structural Floodproofing	6,590,500	not included in this 80-20 analysis	
14 Recreation Facilities	28,066,900	not included in this 80-20 analysis	
30 PED	120,118,900	not included in this 80-20 analysis	
31 CM	56,054,900	not included in this 80-20 analysis	
General Cost Subtotal	**503,306,300**		
09 Main Channel and Berm Excavation - Stripping	36,515,000	36,515,000	yes
09 Main Channel and Berm Excavation - Excavation	299,751,300	336,266,300	yes
09 Main Channel and Berm Excavation - Topsoil	69,791,200	406,057,500	yes
09 Main Channel and Berm Excavation - Seeding	13,654,600	419,712,100	yes
09 Red River Inlet Control Structure	49,282,800	468,994,900	yes
09 Red River Outlet Control Structure	3,103,600	472,098,500	yes
09 Diversion Extension	31,737,300	503,835,800	yes
09 Wild Rice Breakout Excavation	4,112,500	507,948,300	yes
11 Tie-back Levees	6,091,000	514,039,300	yes
09 FCS - Small Drains	697,500	514,736,800	no
09 FCS - Intercept Control Structures (1"x72")	3,242,800	517,979,600	no
09 FCS - Intercept Control Structures (2"x72")	9,758,100	527,737,700	no
09 Erosion Control	2,929,000	530,666,700	no
Construction Cost Subtotal	**530,666,700**		
80% of Construction Subtotal	424,533,360		
Total Cost	**$1,033,973,000**		

Phase 2: ND East 35K Costs

Item	Cost w/ Contingency	Cumulative	Phase 3 Work Analysis Proposed
01 Lands and Damages	59,360,600	not included in this 80-20 analysis	
02 02 Utility Relocations & Roads	71,890,100	not included in this 80-20 analysis	
06 Fish and Wildlife Facilities	82,960,000	not included in this 80-20 analysis	
08 Roads, Railroads and Bridges	18,121,000	not included in this 80-20 analysis	
14 Recreation Facilities	28,485,900	not included in this 80-20 analysis	
30 PED	129,635,200	not included in this 80-20 analysis	
31 CM	60,496,900	not included in this 80-20 analysis	
General Cost Subtotal	**450,949,700**		
09 Main Channel and Berm Excavation - Stripping	42,864,500	42,864,500	yes
09 Main Channel and Berm Excavation - Excavation	322,660,000	365,524,500	yes
09 Main Channel and Berm Excavation - Topsoil	87,112,100	452,636,600	yes
09 Main Channel and Berm Excavation - Seeding	16,162,100	468,798,700	yes
09 Low Flow Channel	2,791,900	471,590,600	yes
09 Red River Inlet Control Structure	47,933,700	519,524,300	yes
09 Red River Outlet Control Structure	6,915,700	526,440,000	yes
09 Wild Rice River Crossing	19,787,300	546,227,300	yes
09 Sheyenne River Crossing	39,324,300	585,551,600	yes
09 Maple River Crossing	38,887,400	624,439,000	yes
09 Lower Rush River Crossing	7,280,600	631,719,600	yes
09 Rush River Crossing	8,081,500	639,801,100	yes
09 FCS - Small Drains	230,500	640,031,600	no
09 FCS - Large Drains	884,000	640,915,600	no
09 FCS - Intercept Control Structures (1"x72")	8,791,400	649,707,000	no
09 FCS - Intercept Control Structures (2"x72")	6,206,000	655,913,000	no
09 Erosion Control	4,476,600	660,389,600	no
11 Tie-back Levees	2,386,200	658,299,200	yes
Construction Cost Subtotal	**662,775,800**		
80% of Construction Subtotal	530,220,640		
Total Cost	**$1,113,725,500**		