

## **Appendix C. Factored Construction Cost Estimates for Alto Tunnel**

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McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **6/20/2017**  
**Tunnel Rehab Study** **4:19 PM**

**OPINION OF PROBABLE ESCALATED CONSTRUCTION BID INCLUDING OWNER CONTINGENCY**

No.	Item or Group Item Description	Group Item Cost	Item Quantity/Unit	Item Unit Cost	Status	Item Cost
001	South Site Preparation		LS			\$56,669
002	North Site Preparation		LS			\$56,669
	<b>Site Preparation</b>	<b>\$113,337</b>				
003	South Site-Excav./Supp. Collapsed w/o Spiles		377 lf	\$3,918 /lf		\$1,475,385
004	South Site-Excav./Supp. Collapsed w Spiles		488 lf	\$5,933 /lf		\$2,894,295
005	North Site - Existing Gunite Lined Section		140 lf	\$2,627 /lf		\$367,713
006	North Site Lean Concrete Backfilled Section		124 lf	\$4,577 /lf		\$567,492
007	North Site - Uncompacted Fill Section		170 lf	\$3,927 /lf		\$667,543
008	North Site Intact Tunnel Section		598 lf	\$2,758 /lf		\$1,649,326
009	North Site-Excav./Supp. Collapsed w/o Spiles		107 lf	\$3,933 /lf		\$422,590
010	North Site-Excav./Supp. Collapsed w Spiles		139 lf	\$5,950 /lf		\$828,190
	<b>Tunnel - Re-excavation and Support</b>	<b>\$8,872,533</b>	<b>2,173 LF</b>	<b>\$4,083 /LF</b>		
011	Tunnel Sub Base w/ Drainage		2,173 LF	\$380 /LF		\$826,391
012	Tunnel Agg Base		2,173 LF	\$84.19 /LF		\$182,941
013	Tunnel Paving		2,173 LF	\$211 /LF		\$457,899
	<b>Tunnel Invert</b>	<b>\$1,467,230</b>	<b>2,173 LF</b>	<b>\$675 /LF</b>		
014	Graffiti Protection		43,460 sf	\$4.12 /sf		\$178,925
015	Tunnel Water / Fire Protection		2,173 LF	\$380 /LF		\$825,740
016	Tunnel Power / Lighting / CCTV		2,173 LF	\$1,213 /LF		\$2,636,805
017	Tunnel Ventilation		2,173 LF	\$140 /LF		\$304,220
	<b>Tunnel Fire Life Safety</b>	<b>\$3,945,690</b>	<b>LS</b>			
018	Geotechnical Instrumentation		LS			\$200,000
	<b>Instrumentation and Monitoring</b>	<b>\$200,000</b>	<b>LS</b>			
019	Fill Existing boreholes		190 cf	\$137 /cf		\$26,023
020	South Portal Site Restoration		LS			\$41,809
021	North Portal Site Restoration		LS			\$41,809
	<b>Site Restoration</b>	<b>\$109,641</b>	<b>LS</b>			
022	Hazardous Material Allowance		Allowance			\$200,000
023	Portal Modifications		Allowance			\$200,000
				<b>Subtotal Direct Cost</b>		<b>\$15,108,432</b>
024	Equipment Ownership not in Direct Cost			2.4% directs		\$362,997
025	General Mobilization		0.5 mo	1.9% unesc.bid		\$465,681
026	Demobilization/Punchlist		0.5 mo	0.6% unesc.bid		\$156,781
027	General Plant Operation/Maintenance		23.8 mo	\$25,906 /mo		\$616,553
028	Field Supervision		26.8 mo	\$112,828 /mo		\$3,023,803
029	Overhead Maintenance/Service		26.8 mo	\$44,240 /mo		\$1,185,620
030	Bonds, Insurance, and Taxes not in General Mobilization			2.1% unesc.bid		\$517,144
031	Contractor Markup			12.7% of cost		\$2,820,597
032	Financing Charges			0.4% unesc.bid		\$88,047
033	Contractor Contingency			2.4% unesc.bid		\$604,337
				<b>Subtotal Indirect Cost</b>		<b>\$9,841,561</b>
034	Escalation from NTP			1.8% unesc.bid		\$461,432
	<b>26.75 mo project duration after NTP</b>			<b>Escalated Construction Bid</b>		<b>\$25,411,425</b>
035	Owner Contingency			19.7% esc.bid		\$5,002,300
	<b>Opinion of Probable Escalated Construction Bid including Owner Contingency</b>					<b>\$30,413,725</b>

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**Estimate Notes:**

0.651395





**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>001</b>	<b>South Site Preparation</b>	<b>1 LS</b>		<b>10 days</b>	<b>10 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>240</b>	<b>\$17,064</b>	<b>\$3,678</b>	<b>\$3,426</b>	<b>\$32,500</b>	<b>\$56,669</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	240.0 mhr	\$720
S	cg	Clearing and grubbing	2.00 acre			\$10,000 /acre	2.00 acre	\$20,000
S	tfnc	Temporary Construction Fenc	500.0 lf			\$25.00 /lf	500.0 lf	\$12,500
L	lab	General Labor (Grp 3)				\$63.14 /mhr	80.00 mhr	\$5,051
L	lfm	Labor FM				\$67.17 /mhr	80.00 mhr	\$5,374
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	80.00 mhr	\$6,639
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$45.98 /hr	80.00 hr	\$3,678
M	swppp	Silt Fence / Straw Waddles	500.0 lf			\$5.41 /lf	500.0 lf	\$2,706

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>002</b>	<b>North Site Preparation</b>	<b>1 LS</b>		<b>10 days</b>	<b>10 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>240</b>	<b>\$17,064</b>	<b>\$3,678</b>	<b>\$3,426</b>	<b>\$32,500</b>	<b>\$56,669</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	240.0 mhr	\$720
S	cg	Clearing and grubbing	2.00 acre			\$10,000 /acre	2.00 acre	\$20,000
S	tfnc	Temporary Construction Fenc	500.0 lf			\$25.00 /lf	500.0 lf	\$12,500
L	lab	General Labor (Grp 3)				\$63.14 /mhr	80.00 mhr	\$5,051
L	lfm	Labor FM				\$67.17 /mhr	80.00 mhr	\$5,374
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	80.00 mhr	\$6,639
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$45.98 /hr	80.00 hr	\$3,678
M	swppp	Silt Fence / Straw Waddles	500.0 lf			\$5.41 /lf	500.0 lf	\$2,706

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>003</b>	<b>South Site-Excav./Supp. Collapsed w/o Spiles</b>	<b>377 lf</b>	<b>3.68 lf/day</b>		<b>102 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>7,775</b>	<b>\$552,580</b>	<b>\$377,796</b>	<b>\$343,921</b>	<b>\$201,088</b>	<b>\$1,475,385</b>		
	20.647	\$1,467.47	\$1,003.30	\$913.34	\$534.02	\$3,918.14		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	7775 mhr	\$23,324
L	sh	Tunnel shifter				\$72.23 /mhr	818.4 mhr	\$59,114
L	min	Tunnel miner			4	\$68.45 /mhr	3274 mhr	\$224,090
L	lab	General Labor (Grp 3)				\$63.14 /mhr	818.4 mhr	\$51,671
L	att	Portal Attendant				\$66.60 /mhr	818.4 mhr	\$54,507
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	818.4 mhr	\$66,394
L	lo35-	Loader oper. <3.5cy (OG4)			0.5	\$79.39 /mhr	409.2 mhr	\$32,486
L	MW	HD Mech/Welder (OG4)			0.5	\$79.39 /mhr	409.2 mhr	\$32,486
L	conc	Concrete equip.oper. (OG5)			50%	\$77.79 /mhr	409.2 mhr	\$31,831
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	818.4 hr	\$49,004
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	818.4 hr	\$37,019
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	818.4 hr	\$18,896
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	818.4 hr	\$62,073
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	818.4 hr	\$34,876
M	8set	8-in. Steel Set	127.0 ea			\$1,984 /ea	127.0 ea	\$251,950
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	608.5 cy	\$63,306
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	3766 bf	\$5,340
S	muck	Muck disposal	2937 bcy	1.60 lcy/bcy		\$35.83 /lcy	4699 lcy	\$168,370
S	muckc	Muck disp. Contam. Non Haz.	320.8 bcy	1.60 lcy/bcy		\$63.75 /lcy	513.2 lcy	\$32,718
E	g210	Generator, skid 210kW				\$57.33 /hr	818.4 hr	\$46,921



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**DIRECT COST DETAIL**

E	p140	Pump, subm. 140gpm/20ft head		\$1.42 /hr	818.4 hr	\$1,161
E	wtp	Water Treatment Plant		\$3.58 /hr	818.4 hr	\$2,931
E	wd4	Welder 400A Diesel, trailer		\$12.02 /hr	818.4 hr	\$9,837
E	cp16	Compressor, trailer 1600cfm		\$127 /hr	818.4 hr	\$103,706
E	vf100	Ventilation fan 100hp		\$13.90 /hr	818.4 hr	\$11,373

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>004</b>	<b>South Site-Excav./Supp. Collapsed w Spiles</b>	<b>488 lf</b>	<b>2.375 lf/day</b>		<b>205 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>15,610</b>	<b>\$1,109,481</b>	<b>\$774,845</b>	<b>\$749,468</b>	<b>\$260,500</b>	<b>\$2,894,295</b>
	32.001	\$2,274.43	\$1,588.43	\$1,536.41	\$534.02	\$5,933.29
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	15610 mhr	\$46,831
L	sh	Tunnel shifter				\$72.23 /mhr	1643 mhr	\$118,691
L	min	Tunnel miner		4		\$68.45 /mhr	6573 mhr	\$449,932
L	lab	General Labor (Grp 3)				\$63.14 /mhr	1643 mhr	\$103,745
L	att	Portal Attendant				\$66.60 /mhr	1643 mhr	\$109,441
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	1643 mhr	\$133,308
L	lo35-	Loader oper. <3.5cy (OG4)		0.5		\$79.39 /mhr	821.6 mhr	\$65,226
L	MW	HD Mech/Welder (OG4)		0.5		\$79.39 /mhr	821.6 mhr	\$65,226
L	conc	Concrete equip.oper. (OG5)		0.5		\$77.79 /mhr	821.6 mhr	\$63,912
E	vh	Vibro Hammer				\$9.92 /hr	1643 hr	\$16,298
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	1643 hr	\$98,391
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	1643 hr	\$74,327
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	1643 hr	\$37,940
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	1643 hr	\$124,632
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	1643 hr	\$70,024
M	8set	8-in. Steel Set	164.0 ea			\$1,984 /ea	164.0 ea	\$325,353
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	788.3 cy	\$82,010
M	spile	C6x13 Channel Spile	3903 ea			\$73.88 /ea	3903 ea	\$288,356
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	4878 bf	\$6,917
S	muck	Muck disposal	3804 bcy	1.60 lcy/bcy		\$35.83 /lcy	6087 lcy	\$218,115
S	muckc	Muck disp. Contam. Non Haz.	415.5 bcy	1.60 lcy/bcy		\$63.75 /lcy	664.9 lcy	\$42,385
E	g210	Generator, skid 210kW				\$57.33 /hr	1643 hr	\$94,209
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	1643 hr	\$2,330
E	wtp	Water Treatment Plant				\$3.58 /hr	1643 hr	\$5,885
E	wd4	Welder 400A Diesel, trailer				\$12.02 /hr	1643 hr	\$19,752
E	cp16	Compressor, trailer 1600cfm				\$127 /hr	1643 hr	\$208,222
E	vf100	Ventilation fan 100hp				\$13.90 /hr	1643 hr	\$22,834

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>005</b>	<b>North Site - Existing Gunite Lined Section</b>	<b>140 lf</b>	<b>5.699 lf/day</b>		<b>24.6 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>1,870</b>	<b>\$132,878</b>	<b>\$95,970</b>	<b>\$126,700</b>	<b>\$12,164</b>	<b>\$367,713</b>
	13.354	\$949.13	\$685.50	\$905.00	\$86.89	\$2,626.52
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	1870 mhr	\$5,609
L	sh	Tunnel shifter				\$72.23 /mhr	196.8 mhr	\$14,215
L	min	Tunnel miner		4		\$68.45 /mhr	787.2 mhr	\$53,887
L	lab	General Labor (Grp 3)				\$63.14 /mhr	196.8 mhr	\$12,425
L	att	Portal Attendant				\$66.60 /mhr	196.8 mhr	\$13,107
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	196.8 mhr	\$15,966
L	lo35-	Loader oper. <3.5cy (OG4)		0.5		\$79.39 /mhr	98.40 mhr	\$7,812
L	MW	HD Mech/Welder (OG4)		0.5		\$79.39 /mhr	98.40 mhr	\$7,812
L	conc	Concrete equip.oper. (OG5)		0.5		\$77.79 /mhr	98.40 mhr	\$7,654
E	c76	Conc. pump, trailer 76cy/hr		0.5		\$52.05 /hr	98.40 hr	\$5,121



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**DIRECT COST DETAIL**

E	b320	Backhoe Cat 320, 44k/1.5cy			\$59.88 /hr	196.8 hr	\$11,784
E	lhd3	Load-Haul-Dump 4ton/2.5cy			\$45.23 /hr	196.8 hr	\$8,902
E	sp12	Shotcrete plant, skid 12cy/hr			\$23.09 /hr	196.8 hr	\$4,544
E	l950	Wheel Loader Cat 950/3.5cy			\$75.85 /hr	196.8 hr	\$14,927
E	bl3	Extension Boom, 3.0ton			\$42.61 /hr	196.8 hr	\$8,387
M	6set	6-in. Steel Set	36.00 ea		\$1,426 /ea	36.00 ea	\$51,320
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf	\$104 /cy	226.3 cy	\$23,537
M	clsc	Controlled Low Strength Conc		2.003 cy/lf	\$97.43 /cy	280.4 cy	\$27,321
M	sform	Stay-form		44.682 sf/lf	\$2.71 /sf	6256 sf	\$16,929
S	muck	Muck disp. Contam. Non Haz.	119.3 bcy	1.60 lcy/bcy	\$63.75 /lcy	190.8 lcy	\$12,164
M	lumb	Lumber for lagging/blocking		10.00 bf/lf	\$1.42 /bf	1400 bf	\$1,985
E	g210	Generator, skid 210kW			\$57.33 /hr	196.8 hr	\$11,283
E	p140	Pump, subm. 140gpm/20ft head			\$1.42 /hr	196.8 hr	\$279
E	wtp	Water Treatment Plant			\$3.58 /hr	196.8 hr	\$705
E	wd4	Welder 400A Diesel, trailer			\$12.02 /hr	196.8 hr	\$2,366
E	cp16	Compressor, trailer 1600cfm			\$127 /hr	196.8 hr	\$24,938
E	vf100	Ventilation fan 100hp			\$13.90 /hr	196.8 hr	\$2,735

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>006</b>	<b>North Site Lean Concrete Backfilled Section</b>	<b>124 lf</b>	<b>2.807 lf/day</b>		<b>44.2 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>3,359</b>	<b>\$238,749</b>	<b>\$184,223</b>	<b>\$78,301</b>	<b>\$66,219</b>	<b>\$567,492</b>
	27.090	\$1,925.40	\$1,485.67	\$631.46	\$534.02	\$4,576.55

	Status (Additive)	Work schedule	Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	3359 mhr	\$10,078
L	sh	Tunnel shifter				\$72.23 /mhr	353.6 mhr	\$25,541
L	min	Tunnel miner		4		\$68.45 /mhr	1414 mhr	\$96,821
L	lab	General Labor (Grp 3)				\$63.14 /mhr	353.6 mhr	\$22,325
L	att	Portal Attendant				\$66.60 /mhr	353.6 mhr	\$23,551
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	353.6 mhr	\$28,686
L	lo35-	Loader oper. <3.5cy (OG4)		0.5		\$79.39 /mhr	176.8 mhr	\$14,036
L	MW	HD Mech/Welder (OG4)		0.5		\$79.39 /mhr	176.8 mhr	\$14,036
L	conc	Concrete equip.oper. (OG5)		0.5		\$77.79 /mhr	176.8 mhr	\$13,753
E	ch	AQ1500 Cutterhead Attach.				\$59.36 /hr	353.6 hr	\$20,991
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	353.6 hr	\$21,173
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	353.6 hr	\$15,995
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	353.6 hr	\$8,164
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	353.6 hr	\$26,819
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	353.6 hr	\$15,068
M	6set	6-in. Steel Set	32.00 ea			\$1,426 /ea	32.00 ea	\$45,618
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	200.4 cy	\$20,847
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	1240 bf	\$1,758
S	muck	Muck disposal	967.1 bcy	1.60 lcy/bcy		\$35.83 /lcy	1547 lcy	\$55,445
S	muckc	Muck disp. Contam. Non Haz.	105.6 bcy	1.60 lcy/bcy		\$63.75 /lcy	169.0 lcy	\$10,774
E	g210	Generator, skid 210kW				\$57.33 /hr	353.6 hr	\$20,273
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	353.6 hr	\$501
E	wtp	Water Treatment Plant				\$3.58 /hr	353.6 hr	\$1,266
E	wd4	Welder 400A Diesel, trailer				\$12.02 /hr	353.6 hr	\$4,250
E	cp16	Compressor, trailer 1600cfm				\$127 /hr	353.6 hr	\$44,807
E	vf100	Ventilation fan 100hp				\$13.90 /hr	353.6 hr	\$4,914

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>007</b>	<b>North Site - Uncompacted Fill Section</b>	<b>170 lf</b>	<b>3.68 lf/day</b>		<b>46.2 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>3,511</b>	<b>\$249,552</b>	<b>\$170,618</b>	<b>\$156,589</b>	<b>\$90,784</b>	<b>\$667,543</b>
	20.654	\$1,467.95	\$1,003.63	\$921.11	\$534.02	\$3,926.72

	Status (Additive)	Work schedule	Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	1 shift/day	5 day/week	0 hr/shift



**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**DIRECT COST DETAIL**

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	3511 mhr	\$10,534
L	sh	Tunnel shifter				\$72.23 /mhr	369.6 mhr	\$26,697
L	min	Tunnel miner			4	\$68.45 /mhr	1478 mhr	\$101,202
L	lab	General Labor (Grp 3)				\$63.14 /mhr	369.6 mhr	\$23,335
L	att	Portal Attendant				\$66.60 /mhr	369.6 mhr	\$24,616
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	369.6 mhr	\$29,984
L	lo35-	Loader oper. <3.5cy (OG4)			0.5	\$79.39 /mhr	184.8 mhr	\$14,671
L	MW	HD Mech/Welder (OG4)			0.5	\$79.39 /mhr	184.8 mhr	\$14,671
L	conc	Concrete equip.oper. (OG5)			0.5	\$77.79 /mhr	184.8 mhr	\$14,376
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	369.6 hr	\$22,131
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	369.6 hr	\$16,718
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	369.6 hr	\$8,534
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	369.6 hr	\$28,033
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	369.6 hr	\$15,750
M	8set	8-in. Steel Set	58.00 ea			\$1,984 /ea	58.00 ea	\$115,064
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	274.7 cy	\$28,581
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	1700 bf	\$2,411
S	muck	Muck disposal	1326 bcy	1.60 lcy/bcy		\$35.83 /lcy	2121 lcy	\$76,013
S	muck	Muck disp. Contam. Non Haz.	144.8 bcy	1.60 lcy/bcy		\$63.75 /lcy	231.7 lcy	\$14,771
E	g210	Generator, skid 210kW				\$57.33 /hr	369.6 hr	\$21,190
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	369.6 hr	\$524
E	wtp	Water Treatment Plant				\$3.58 /hr	369.6 hr	\$1,324
E	wd4	Welder 400A Diesel, trailer				\$12.02 /hr	369.6 hr	\$4,443
E	cp16	Compressor, trailer 1600cfm				\$127 /hr	369.6 hr	\$46,835
E	vf100	Ventilation fan 100hp				\$13.90 /hr	369.6 hr	\$5,136

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>008</b>	<b>North Site Intact Tunnel Section</b>	<b>598 lf</b>	<b>5.699 lf/day</b>		<b>105 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>7,972</b>	<b>\$566,624</b>	<b>\$409,237</b>	<b>\$621,506</b>	<b>\$51,960</b>	<b>\$1,649,326</b>
	13.332	\$947.53	\$684.34	\$1,039.31	\$86.89	\$2,758.07
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	7972 mhr	\$23,917
L	sh	Tunnel shifter				\$72.23 /mhr	839.2 mhr	\$60,617
L	min	Tunnel miner			4	\$68.45 /mhr	3357 mhr	\$229,785
L	lab	General Labor (Grp 3)				\$63.14 /mhr	839.2 mhr	\$52,984
L	att	Portal Attendant				\$66.60 /mhr	839.2 mhr	\$55,893
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	839.2 mhr	\$68,082
L	lo35-	Loader oper. <3.5cy (OG4)			50%	\$79.39 /mhr	419.6 mhr	\$33,312
L	MW	HD Mech/Welder (OG4)			0.5	\$79.39 /mhr	419.6 mhr	\$33,312
L	conc	Concrete equip.oper. (OG5)			0.5	\$77.79 /mhr	419.6 mhr	\$32,640
E	c76	Conc. pump, trailer 76cy/hr			0.5	\$52.05 /hr	419.6 hr	\$21,839
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	839.2 hr	\$50,249
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	839.2 hr	\$37,960
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	839.2 hr	\$19,376
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	839.2 hr	\$63,651
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	839.2 hr	\$35,762
M	8set	8-in. Steel Set	151.0 ea			\$1,984 /ea	151.0 ea	\$299,563
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	966.4 cy	\$100,536
M	clsc	Controlled Low Strength Conc		2.003 cy/lf		\$97.43 /cy	1198 cy	\$116,698
M	sform	Stay-form		44.682 sf/lf		\$2.71 /sf	26720 sf	\$72,311
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	5980 bf	\$8,480
S	muck	Muck disp. Contam. Non Haz.	509.4 bcy	1.60 lcy/bcy		\$63.75 /lcy	815.1 lcy	\$51,960
E	g210	Generator, skid 210kW				\$57.33 /hr	839.2 hr	\$48,114
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	839.2 hr	\$1,190
E	wtp	Water Treatment Plant				\$3.58 /hr	839.2 hr	\$3,006
E	wd4	Welder 400A Diesel, trailer				\$12.02 /hr	839.2 hr	\$10,088





**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**DIRECT COST DETAIL**

E	cp16	Compressor, trailer 1600cfm		\$127 /hr	839.2 hr	\$106,341
E	vf100	Ventilation fan 100hp		\$13.90 /hr	839.2 hr	\$11,662

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>009</b>	<b>North Site-Excav./Supp. Collapsed w/o Spiles</b>	<b>107 lf</b>	<b>3.68 lf/day</b>		<b>29.2 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>2,219</b>	<b>\$157,726</b>	<b>\$107,836</b>	<b>\$99,648</b>	<b>\$57,380</b>	<b>\$422,590</b>
	20.654	\$1,467.93	\$1,003.61	\$927.41	\$534.02	\$3,932.97

	Status (Additive)	Work schedule	Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week
			0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	2219 mhr	\$6,658
L	sh	Tunnel shifter				\$72.23 /mhr	233.6 mhr	\$16,873
L	min	Tunnel miner		4		\$68.45 /mhr	934.4 mhr	\$63,963
L	lab	General Labor (Grp 3)				\$63.14 /mhr	233.6 mhr	\$14,749
L	att	Portal Attendant				\$66.60 /mhr	233.6 mhr	\$15,558
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	233.6 mhr	\$18,951
L	lo35-	Loader oper. <3.5cy (OG4)		0.5		\$79.39 /mhr	116.8 mhr	\$9,273
L	MW	HD Mech/Welder (OG4)		0.5		\$79.39 /mhr	116.8 mhr	\$9,273
L	conc	Concrete equip.oper. (OG5)		50%		\$77.79 /mhr	116.8 mhr	\$9,086
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	233.6 hr	\$13,987
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	233.6 hr	\$10,567
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	233.6 hr	\$5,394
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	233.6 hr	\$17,718
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	233.6 hr	\$9,955
M	8set	8-in. Steel Set	37.00 ea			\$1,984 /ea	37.00 ea	\$73,403
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf		\$104 /cy	173.6 cy	\$18,064
M	lumb	Lumber for lagging/blocking		10.00 bf/lf		\$1.42 /bf	1074 bf	\$1,524
S	muck	Muck disposal	838.0 bcy	1.60 lcy/bcy		\$35.83 /lcy	1341 lcy	\$48,044
S	muckc	Muck disp. Contam. Non Haz.	91.53 bcy	1.60 lcy/bcy		\$63.75 /lcy	146.4 lcy	\$9,336
E	g210	Generator, skid 210kW				\$57.33 /hr	233.6 hr	\$13,393
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	233.6 hr	\$331
E	wtp	Water Treatment Plant				\$3.58 /hr	233.6 hr	\$837
E	wd4	Welder 400A Diesel, trailer				\$12.02 /hr	233.6 hr	\$2,808
E	cp16	Compressor, trailer 1600cfm				\$127 /hr	233.6 hr	\$29,601
E	vf100	Ventilation fan 100hp				\$13.90 /hr	233.6 hr	\$3,246

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>010</b>	<b>North Site-Excav./Supp. Collapsed w Spiles</b>	<b>139 lf</b>	<b>2.37 lf/day</b>		<b>58.6 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>4,454</b>	<b>\$316,532</b>	<b>\$221,061</b>	<b>\$216,264</b>	<b>\$74,333</b>	<b>\$828,190</b>
	31.996	\$2,274.03	\$1,588.15	\$1,553.69	\$534.02	\$5,949.90

	Status (Additive)	Work schedule	Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week
			0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	4454 mhr	\$13,361
L	sh	Tunnel shifter				\$72.23 /mhr	468.8 mhr	\$33,862
L	min	Tunnel miner		4		\$68.45 /mhr	1875 mhr	\$128,364
L	lab	General Labor (Grp 3)				\$63.14 /mhr	468.8 mhr	\$29,598
L	att	Portal Attendant				\$66.60 /mhr	468.8 mhr	\$31,223
L	eo35-	Excavator Operator (OG3)				\$81.13 /mhr	468.8 mhr	\$38,032
L	lo35-	Loader oper. <3.5cy (OG4)		0.5		\$79.39 /mhr	234.4 mhr	\$18,609
L	MW	HD Mech/Welder (OG4)		0.5		\$79.39 /mhr	234.4 mhr	\$18,609
L	conc	Concrete equip.oper. (OG5)		50%		\$77.79 /mhr	234.4 mhr	\$18,234
E	vh	Vibro Hammer				\$9.92 /hr	468.8 hr	\$4,650
E	b320	Backhoe Cat 320, 44k/1.5cy				\$59.88 /hr	468.8 hr	\$28,071
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	468.8 hr	\$21,205
E	sp12	Shotcrete plant, skid 12cy/hr				\$23.09 /hr	468.8 hr	\$10,824
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	468.8 hr	\$35,557
E	bl3	Extension Boom, 3.0ton				\$42.61 /hr	468.8 hr	\$19,978



McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel Tunnel Rehab Study** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **6/20/2017 4:19 PM**

**DIRECT COST DETAIL**

M	8set	8-in. Steel Set	48.00 ea		\$1,984 /ea	48.00 ea	\$95,225
M	s5	Shotcrete, 5000psi mix		1.616 cy/lf	\$104 /cy	225.0 cy	\$23,401
M	spile	C6x13 Channel Spile	1114 ea		\$73.88 /ea	1114 ea	\$82,303
M	lumb	Lumber for lagging/blocking		10.00 bf/lf	\$1.42 /bf	1392 bf	\$1,974
S	muck	Muck disposal	1086 bcy	1.60 lcy/bcy	\$35.83 /lcy	1737 lcy	\$62,239
S	muckc	Muck disp. Contam. Non Haz.	118.6 bcy	1.60 lcy/bcy	\$63.75 /lcy	189.7 lcy	\$12,094
E	g210	Generator, skid 210kW			\$57.33 /hr	468.8 hr	\$26,878
E	p140	Pump, subm. 140gpm/20ft head			\$1.42 /hr	468.8 hr	\$665
E	wtp	Water Treatment Plant			\$3.58 /hr	468.8 hr	\$1,679
E	wd4	Welder 400A Diesel, trailer			\$12.02 /hr	468.8 hr	\$5,635
E	cp16	Compressor, trailer 1600cfm			\$127 /hr	468.8 hr	\$59,405
E	vf100	Ventilation fan 100hp			\$13.90 /hr	468.8 hr	\$6,514

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>011</b>	<b>Tunnel Sub Base w/ Drainage</b>	<b>2173 LF</b>	<b>100 LF/day</b>		<b>21.7 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>1,215</b>	<b>\$86,393</b>	<b>\$65,304</b>	<b>\$87,983</b>	<b>\$586,710</b>	<b>\$826,391</b>
	0.559	\$39.76	\$30.05	\$40.49	\$270.00	\$380.30
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	1215 mhr	\$3,646
M	aggf	Fine aggregate	2331 ton			\$36.19 /ton	2331 ton	\$84,338
S	tds	Tunnel Drainage System				\$270 /lf	2173 LF	\$586,710
L	sh	Tunnel shifter				\$72.23 /mhr	173.6 mhr	\$12,539
L	min	Tunnel miner		2		\$68.45 /mhr	347.2 mhr	\$23,767
L	lab	General Labor (Grp 3)				\$63.14 /mhr	173.6 mhr	\$10,960
L	att	Portal Attendant				\$66.60 /mhr	173.6 mhr	\$11,562
L	lo35-	Loader oper. <3.5cy (OG4)				\$79.39 /mhr	173.6 mhr	\$13,782
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	173.6 mhr	\$13,782
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	173.6 hr	\$7,853
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	173.6 hr	\$13,167
E	c14	Compactor, BW11AS, 14t/54"				\$52.15 /hr	173.6 hr	\$9,053
E	g210	Generator, skid 210kW				\$57.33 /hr	173.6 hr	\$9,953
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	173.6 hr	\$246
E	wtp	Water Treatment Plant				\$3.58 /hr	173.6 hr	\$622
E	cp16	Compressor, trailer 1600cfm				\$127 /hr	173.6 hr	\$21,998
E	vf100	Ventilation fan 100hp				\$13.90 /hr	173.6 hr	\$2,412

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>012</b>	<b>Tunnel Agg Base</b>	<b>2173 LF</b>	<b>100 LF/day</b>		<b>21.7 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>1,215</b>	<b>\$86,393</b>	<b>\$65,304</b>	<b>\$31,244</b>	<b>\$0</b>	<b>\$182,941</b>
	0.559	\$39.76	\$30.05	\$14.38	\$0.00	\$84.19
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	1215 mhr	\$3,646
M	aggc	Coarse aggregate	882.8 ton			\$31.26 /ton	882.8 ton	\$27,598
L	sh	Tunnel shifter				\$72.23 /mhr	173.6 mhr	\$12,539
L	min	Tunnel miner		2		\$68.45 /mhr	347.2 mhr	\$23,767
L	lab	General Labor (Grp 3)				\$63.14 /mhr	173.6 mhr	\$10,960
L	att	Portal Attendant				\$66.60 /mhr	173.6 mhr	\$11,562
L	lo35-	Loader oper. <3.5cy (OG4)				\$79.39 /mhr	173.6 mhr	\$13,782
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	173.6 mhr	\$13,782
E	lhd3	Load-Haul-Dump 4ton/2.5cy				\$45.23 /hr	173.6 hr	\$7,853
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	173.6 hr	\$13,167
E	c14	Compactor, BW11AS, 14t/54"				\$52.15 /hr	173.6 hr	\$9,053
E	g210	Generator, skid 210kW				\$57.33 /hr	173.6 hr	\$9,953
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	173.6 hr	\$246



**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**DIRECT COST DETAIL**

E	wtp	Water Treatment Plant		\$3.58 /hr	173.6 hr	\$622
E	cp16	Compressor, trailer 1600cfm		\$127 /hr	173.6 hr	\$21,998
E	vf100	Ventilation fan 100hp		\$13.90 /hr	173.6 hr	\$2,412

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>013</b>	<b>Tunnel Paving</b>		<b>2173 LF</b>	<b>100 LF/day</b>		<b>21.7 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>521</b>	<b>\$35,062</b>	<b>\$13,233</b>	<b>\$1,562</b>	<b>\$408,041</b>	<b>\$457,899</b>
	0.240	\$16.14	\$6.09	\$0.72	\$187.78	\$210.72

Status (Additive)		Work schedule		Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	520.8 mhr	\$1,562
S	tp	Tunnel Paving	3139 sy			\$130 /sy	3139 sy	\$408,041
L	sh	Tunnel shifter				\$72.23 /mhr	173.6 mhr	\$12,539
L	lab	General Labor (Grp 3)				\$63.14 /mhr	173.6 mhr	\$10,960
L	att	Portal Attendant				\$66.60 /mhr	173.6 mhr	\$11,562
E	g210	Generator, skid 210kW				\$57.33 /hr	173.6 hr	\$9,953
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	173.6 hr	\$246
E	wtp	Water Treatment Plant				\$3.58 /hr	173.6 hr	\$622
E	vf100	Ventilation fan 100hp				\$13.90 /hr	173.6 hr	\$2,412

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>014</b>	<b>Graffiti Protection</b>		<b>43460 sf</b>		<b>10 days</b>	<b>10 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$178,925</b>	<b>\$178,925</b>
	0.000	\$0.00	\$0.00	\$0.00	\$4.12	\$4.12

Status (Additive)		Work schedule		Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
S	graff	Graffiti Protection				\$4.12 /sf	43460 sf	\$178,925

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>015</b>	<b>Tunnel Water / Fire Protection</b>		<b>2173.00 LF</b>		<b>30 days</b>	<b>30 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$825,740</b>	<b>\$825,740</b>
	0.000	\$0.00	\$0.00	\$0.00	\$380.00	\$380.00

Status (Additive)		Work schedule		Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
S	tfp	Tunnel Fire Protection				\$380 /lf	2173 LF	\$825,740

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>016</b>	<b>Tunnel Power / Lighting / CCTV</b>		<b>2173 LF</b>		<b>60 days</b>	<b>60 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>1,440</b>	<b>\$96,946</b>	<b>\$36,590</b>	<b>\$4,320</b>	<b>\$2,498,950</b>	<b>\$2,636,805</b>
	0.663	\$44.61	\$16.84	\$1.99	\$1,150.00	\$1,213.44

Status (Additive)		Work schedule		Other ST pay	Other OT pay
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	1440 mhr	\$4,320
S	tlp	Power / Lighting / CCTV				\$1,150 /lf	2173 LF	\$2,498,950
L	sh	Tunnel shifter				\$72.23 /mhr	480.0 mhr	\$34,671
L	lab	General Labor (Grp 3)				\$63.14 /mhr	480.0 mhr	\$30,305
L	att	Portal Attendant				\$66.60 /mhr	480.0 mhr	\$31,969
E	g210	Generator, skid 210kW				\$57.33 /hr	480.0 hr	\$27,520
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	480.0 hr	\$681
E	wtp	Water Treatment Plant				\$3.58 /hr	480.0 hr	\$1,719
E	vf100	Ventilation fan 100hp				\$13.90 /hr	480.0 hr	\$6,670



**McMILLEN JACOBS ASSOCIATES**

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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>017</b>	<b>Tunnel Ventilation</b>	<b>2173 LF</b>		<b>60 days</b>	<b>60 work days</b>
	manhours	Labor	Equipment	Material	Subcontract
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$304,220</b>
	0.000	\$0.00	\$0.00	\$0.00	\$140.00
	Item Cost				\$140.00
	Status (Additive)	Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
S	tv	Tunnel Ventilation				\$140 /lf	2173 LF	\$304,220

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>018</b>	<b>Geotechnical Instrumentation</b>	<b>1 LS</b>		<b>320 days</b>	<b>320 work days</b>
	manhours	Labor	Equipment	Material	Subcontract
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$200,000</b>	<b>\$0</b>
	0.000	\$0.00	\$0.00	\$200.00	\$0.00
	Item Cost				\$200,000
	Status (Additive)	Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	xmisc	Miscellaneous material	200.0 lot			\$1,000 /lot	200.0 lot	\$200,000

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>019</b>	<b>Fill Existing boreholes</b>	<b>190 cf</b>		<b>5 days</b>	<b>5 work days</b>
	manhours	Labor	Equipment	Material	Subcontract
	<b>240</b>	<b>\$15,964</b>	<b>\$5,116</b>	<b>\$4,943</b>	<b>\$0</b>
	1.263	\$84.02	\$26.92	\$26.02	\$0.00
	Item Cost				\$136.96
	Status (Additive)	Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	240.0 mhr	\$720
M	cs	Cement, Portland 94lb sack	190.0 sack			\$11.70 /sack	190.0 sack	\$2,223
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687
L	lab	General Labor (Grp 3)		4		\$63.14 /mhr	160.0 mhr	\$10,102
L	lo35-	Loader oper. <3.5cy (OG4)				\$79.39 /mhr	40.00 mhr	\$3,176
E	l950	Wheel Loader Cat 950/3.5cy				\$75.85 /hr	40.00 hr	\$3,034
E	c76	Conc. pump, trailer 76cy/hr	<i>Substitute for grout mixer/pump</i>	1		\$52.05 /hr	40.00 hr	\$2,082
M	xmisc	Miscellaneous material	2.00 lot			\$1,000 /lot	2.00 lot	\$2,000
								<i>Hoses, etc.</i>

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>020</b>	<b>South Portal Site Restoration</b>	<b>1 LS</b>		<b>20 days</b>	<b>20 work days</b>
	manhours	Labor	Equipment	Material	Subcontract
	<b>320</b>	<b>\$20,849</b>	<b>\$0</b>	<b>\$960</b>	<b>\$20,000</b>
	0.000	\$0.00	\$0.00	\$960.00	\$20,000.00
	Item Cost				\$41,809
	Status (Additive)	Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	320.0 mhr	\$960
S	sr	Site restoration	2.00 acre			\$10,000 /acre	2.00 acre	\$20,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	160.0 mhr	\$10,102
L	lfm	Labor FM				\$67.17 /mhr	160.0 mhr	\$10,747

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>021</b>	<b>North Portal Site Restoration</b>	<b>1.00 LS</b>		<b>20 days</b>	<b>20 work days</b>
	manhours	Labor	Equipment	Material	Subcontract
	<b>320</b>	<b>\$20,849</b>	<b>\$0</b>	<b>\$960</b>	<b>\$20,000</b>
	0.000	\$0.00	\$0.00	\$960.00	\$20,000.00
	Item Cost				\$41,809
	Status (Additive)	Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	320.0 mhr	\$960
S	sr	Site restoration	2.00 acre			\$10,000 /acre	2.00 acre	\$20,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	160.0 mhr	\$10,102
L	lfm	Labor FM				\$67.17 /mhr	160.0 mhr	\$10,747

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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>022</b>	<b>Hazardous Material Allowance</b>	<b>1 LS</b>		<b>0 days</b>	<b>0 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$200,000</b>	<b>\$0</b>	<b>\$200,000</b>		
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	ai	Allowance Item	\$200,000	allowance		\$1.00	200000	\$200,000

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>023</b>	<b>Portal Modifications</b>	<b>1 LS</b>		<b>0 days</b>	<b>0 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$200,000</b>	<b>\$0</b>	<b>\$200,000</b>		
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	ai	Allowance Item	\$200,000	allowance		\$1.00	200000	\$200,000

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**INDIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	#N/A			
<b>024</b>	<b>Equipment Ownership not in Direct Cost</b>	<b>LS</b>				
	Equipment spread to Directs	Labor	Equipment	Material	Subcontract	Item Cost
	<b>\$626,600</b>	<b>\$0</b>	<b>\$149,700</b>	<b>\$213,297</b>	<b>\$0</b>	<b>\$362,997</b>
Notes:			Payment via Equipment Mobilization Bid Item			\$0
- Source Code: Fleet, Purchase, Mob Purchase, or Rental/lease.			Fleet Equipment	Purchased Equipment	Fleet + Purchase	Rental
- Ownership cost/hr is based on actual equipment months			Value W/O	Value W/O	Value W/O	Amount
on-site at a single-shift utilization rate of 173 hours/month.			<b>\$2,666K 23%</b>	<b>\$609K 60%</b>	<b>\$3,275K 30%</b>	<b>\$5K</b>

R/T	Resource Description	Source Code	Number of Units or Rental Period	Unit Purchase cost, Book value, or Rental Rate per period	Unit Write off	Unit Freight & Erection (carried in Mob/Demob) Freight in/out E/D mhr	Ownership Cost/hr	Equip. mos	Project Cost excluding freight/erection
M	Sales Tax			\$609,030	0.0%	(no sales tax)			\$0
	<i>Hourly Equipment used in Direct Cost Items: \$626,600</i>								
E	Cat 305 Mini-Exc 11k/1.17cy	R	1 mo	\$5,000		\$500	\$31.25	0.9	in directs
E	Backhoe Cat 320, 44k/1.5cy	F	2 ea	\$225,000	25%	\$1,000	\$22.85	28.4	in directs
E	Load-Haul-Dump 4ton/2.5cy	F	2 ea	\$190,000	25%	\$1,000	\$18.03	30.4	in directs
E	Shotcrete plant, skid 12cy/hr	F	2 ea	\$75,000	25%	\$500	\$7.62	28.4	in directs
E	Wheel Loader Cat 950/3.5cy	F	2 ea	\$217,000	25%	\$1,000	\$20.43	30.7	in directs
E	Extension Boom, 3.0ton	F	2 ea	\$158,000	25%	\$500	\$16.05	28.4	in directs
E	Vibro Hammer	F	2 ea	\$25,000	25%	\$500	\$5.92	12.2	in directs
E	Generator, skid 210kW	F	2 ea	\$50,000	25%	\$400	\$4.22	34.2	in directs
E	Pump, subm. 140gpm/20ft head	F	2 ea	\$5,000	50%	\$50.00	\$0.84	34.2	in directs
E	Water Treatment Plant	F	2 ea	\$40,000	10%	\$500	\$1.35	34.2	in directs
E	Welder 400A Diesel, trailer	F	2 ea	\$18,000	10%	\$200	\$0.73	28.4	in directs
E	Compressor, trailer 1600cfm	F	2 ea	\$180,000	25%	\$400	\$17.08	30.4	in directs
E	AQ1500 Cutterhead Attach.	F	1 ea	\$60,000	25%	\$500	\$42.42	2.0	in directs
E	Ventilation fan 100hp	F	2 ea	\$20,000	25%	\$400	\$1.69	34.2	in directs
E	Conc. pump, trailer 76cy/hr	F	1 ea	\$100,000	10%	\$500	\$17.92	3.2	in directs
E	Compactor, BW11AS, 14t/54"	F	1 ea	\$100,000	10%	\$500	\$28.80	2.0	in directs
	<i>General Plant: \$149,700</i>								
E	Pickups	P	8 ea	\$30,000	50%	\$400	\$3.65	190	\$120,000
E	Mechanics Truck	P	1 ea	\$50,000	33%	\$400	\$4.02	23.8	\$16,500
E	Street Sweep	P	1 ea	\$40,000	33%	\$400	\$3.21	23.8	\$13,200
	<i>Lineal Plant: \$173,297</i>								
M	Fanline, 24-in Metal Ducting	P	2,390 LF	\$25.00	100%	\$1.00			\$59,758
M	Temp Tunnel Lighting	P	2,390 LF	\$40.00	75%	\$1.00			\$71,709
M	4-In Air & Water Line	P	4,781 LF	\$10.00	50%	\$1.00			\$23,903
M	8-in Discharge Line	P	2,390 lf	\$15.00	50%	\$1.00			\$17,927
	<i>Other Plant: \$40,000</i>								
M	Fan Silencer	P	2 ea	\$20,000	100%	\$2,000			\$40,000

No.	Item Description	Item Quantity/Unit	Mob/demob paid as scheduled. Bond paid at NTP.			
<b>025</b>	<b>General Mobilization</b>	<b>0.5 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>522</b>	<b>\$33,238</b>	<b>\$10,051</b>	<b>\$422,392</b>	<b>\$0</b>	<b>\$465,681</b>
	1,044.000	\$66,475.22	\$20,102.82	\$844,783.50	\$0.00	\$931,361.53
		Work schedule	Other ST pay	Other OT pay		
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts Small tools and supplies				\$3.00 /mhr	522 mhr	\$1,566
M	Freight-see equipment ownership	50% of total (balance in Demobilization)			\$34,852 (3.5% of equip. cost)		\$17,426
M	Transfer from cost item 030 Bonds, Insurance, and Taxes not in General Mob				LS		\$199,600
M	Dryhouse	2 ea	400 sf/ea		\$20.00 /sf	800 sf	\$16,000
M	Fire protection system	2 loc			\$2,000 /loc	2 loc	\$4,000
M	First Aid trailer/furnishings	400 sf			\$40.00 /sf	400 sf	\$16,000
M	Fuel+Lube facilities	2 loc			\$5,000 /loc	2 loc	\$10,000
M	Job light and power system	2 loc			\$10,000 /loc	2 loc	\$20,000
M	Job sanitary system	2 loc			\$10,000 /loc	2 loc	\$20,000
M	Job water distribution	2 loc			\$10,000 /loc	2 loc	\$20,000
M	Office copier/computers/fax	1 sets			\$5,000 /sets	1 sets	\$5,000
M	Office furnishings	1 sets			\$2,000 /sets	1 sets	\$2,000



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**INDIRECT COST DETAIL**

M	Office trailers	1 ea	400 sf/ea	\$40.00 /sf	400 sf	\$16,000
M	Engineers Office Complex	1 ea	200 sf/ea	\$40.00 /sf	200 sf	\$8,000
M	Shop	2 loc	800 sf/loc	\$10.00 /sf	1600 sf	\$16,000
M	Signs	2 loc		\$5,000 /loc	2 loc	\$10,000
M	Superintendent/survey trailer	2 loc	200 sf/loc	\$30.00 /sf	400 sf	\$12,000
M	Warehouse	2 loc	800 sf/loc	\$10.00 /sf	1600 sf	\$16,000
L	Labor crew - 1 operator x 2 loc			2 \$75.41 /mhr	174 mhr	\$13,121
L	Labor crew - 2 laborers x 2 loc			4 \$57.81 /mhr	348 mhr	\$20,117
E	Wheel Loader Cat 966/4.8cy 2 loc			2 \$57.77 /hr	174 hr	\$10,051
M	Crushed Rock for Yard	400 ton		\$32.00 /ton	400 ton	\$12,800

No.	Item Description	Item Quantity/Unit	Mob/demob paid as scheduled. Bond paid at NTP.			
<b>026</b>	<b>Demobilization/Punchlist</b>	<b>0.5 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>522</b>	<b>\$32,873</b>	<b>\$9,416</b>	<b>\$114,492</b>	<b>\$0</b>	<b>\$156,781</b>
	1,044.000	\$65,746.48	\$18,832.89	\$228,983.50	\$0.00	\$313,562.87
		Work schedule		Other ST pay	Other OT pay	
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts Small tools and supplies				\$3.00 /mhr	522 mhr	\$1,566
M	Freight-see equipment ownership	50% of total (balance in Mobilization)			\$34,852 total		\$17,426
M	50% of Gen'l Mob matl less freight	1 LS		0.5	\$191,000 /LS	0.5 LS	\$95,500
L	Laborer			4	\$57.81 /mhr	348 mhr	\$20,117
L	Equipment Operator			2	\$73.31 /mhr	174 mhr	\$12,756
E	Wheel Loader Cat 966/4.8cy 2 loc			2	\$54.12 /hr	174 hr	\$9,416

No.	Item Description	Item Quantity/Unit	The duration is from the end of mob to the start of demob.			
<b>027</b>	<b>General Plant Operation/Maintenance</b>	<b>23.8 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>2,055</b>	<b>\$125,889</b>	<b>\$0</b>	<b>\$348,164</b>	<b>\$142,500</b>	<b>\$616,553</b>
	86.505	\$5,300.61	\$0.00	\$14,659.52	\$6,000.00	\$25,960.12
		Work schedule		Other ST pay	Other OT pay	
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts Small tools and supplies				\$3.00 /mhr	2054.5 mhr	\$6,164
M	Access road maintenance				\$2,500 /mo	23.75 mo	\$59,375
M	Cell phone/radio fees		10 umo/mo		\$120 /umo	237.5 umo	\$28,500
M	Craft shop maintenance				\$600 /mo	23.75 mo	\$14,250
M	Drinking water supplies				\$600 /mo	23.75 mo	\$14,250
M	Dryhouse supplies			2	\$1,000 /mo	47.5 mo	\$47,500
M	Fire Protection supplies			2	\$600 /mo	47.5 mo	\$28,500
M	First Aid supplies			2	\$1,000 /mo	47.5 mo	\$47,500
M	Job light and power supplies			2	\$500 /mo	47.5 mo	\$23,750
S	Job sanitary system maintenance			2	\$2,000 /mo	47.5 mo	\$95,000
S	Office cleaning			1	\$2,000 /mo	23.75 mo	\$47,500
M	Office copier/computers/fax supplies			1	\$500 /mo	23.75 mo	\$11,875
M	Office phone/fax/data line fees			1	\$200 /mo	23.75 mo	\$4,750
M	Office supplies			1	\$600 /mo	23.75 mo	\$14,250
M	Water treatment plant supplies			2	\$500 /mo	47.5 mo	\$23,750
L	Water truck/Sweeper driver			0.5	\$61.27 /mhr	2054.5 mhr	\$125,889
M	Cap Lamps & Chargers			20	\$50.00 /mo	475 mo	\$23,750

No.	Item Description	Item Quantity/Unit	The duration is from NTP to project completion.			
<b>028</b>	<b>Field Supervision</b>	<b>26.8 mo</b>				
	man-months	Labor	Equipment	Material	Subcontract	Item Cost
	<b>278</b>	<b>\$3,023,803</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,023,803</b>
	10.376	\$113,039.37	\$0.00	\$0.00	\$0.00	\$113,039.37
		Vehicles	8 ea	126 vmo	Relocations	0 ea

See the 'Resources' sheet for an explanation of field supervisory class codes, and associated labor burdens.  
'R?' and 'V?' codes denote if relocation expenses (both ways) are paid or a vehicle assigned, respectively - see cost item 029.  
15.25 mo. Tunneler's work



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**INDIRECT COST DETAIL**

R/T	Class	Resource Description	R? V?	Personnel	Duration	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
L	-	Labor burden for personnel below - see the 'Resources' sheet					31.4% weighted average		\$723,428
L	KP	Project Manager	y	1 ea		0.5	\$15,000 /mmo	13.375 mmo	\$200,625
L	EP	Project Engineer	y	1 ea			\$10,000 /mmo	26.75 mmo	\$267,500
L	EP	Field Engineer		1 ea	15.3 mmo/ea		\$6,000 /mmo	15.25 mmo	\$91,500
L	EP	Office Engineer		1 ea			\$5,000 /mmo	26.75 mmo	\$133,750
L	EP	Business Manager		1 ea		0.5	\$8,000 /mmo	13.375 mmo	\$107,000
L	EP	Safety Manager	y	1 ea		0.5	\$10,000 /mmo	13.375 mmo	\$133,750
L	NL	Warehouseman		1 ea	15.3 mmo/ea		\$5,000 /mmo	15.25 mmo	\$76,250
L	NL	Secretary/Clerk		1 ea			\$3,000 /mmo	26.75 mmo	\$80,250
L	KP	General Superintendent	y	1 ea			\$13,000 /mmo	26.75 mmo	\$347,750
L	EP	Walkers - Dayshift		2 ea	15.3 mmo/ea		\$9,000 /mmo	30.5 mmo	\$274,500
L	EP	Party Chief		1 ea		0.5	\$10,000 /mmo	13.375 mmo	\$133,750
L	NL	Instrumentman		1 ea	15.3 mmo/ea	0.5	\$9,000 /mmo	7.625 mmo	\$68,625
L	NL	1st Aid EMT - Dayshift	y	1 ea	15.3 mmo/ea		\$4,500 /mmo	15.25 mmo	\$68,625
L	NL	Town Runner	y	1 ea	15.3 mmo/ea		\$8,000 /mmo	15.25 mmo	\$122,000
L	KP	Equipment Supt	y	1 ea	15.3 mmo/ea	0.5	\$11,000 /mmo	7.625 mmo	\$83,875
L	EP	Subcontract Mgr		1 ea		0.1	\$10,000 /mmo	2.675 mmo	\$26,750
L	KP	Electrical Supt.	y	1 ea	15.3 mmo/ea	0.5	\$11,000 /mmo	7.625 mmo	\$83,875

No.	Item Description	Item Quantity/Unit	The duration is from NTP to project completion.				
<b>029</b>	<b>Overhead Maintenance/Service</b>	<b>26.8 mo</b>					
			Labor	Equipment	Material	Subcontract	Item Cost
			<b>\$0</b>	<b>\$0</b>	<b>\$273,033</b>	<b>\$912,588</b>	<b>\$1,185,620</b>
			\$0.00	\$0.00	\$10,187.79	\$34,051.77	\$44,239.57

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	Payroll processing, wage labor	322 mmo	4.33 chk/mmo		\$5.50 /chk	1393 chk	\$7,662
M	Payroll processing, salary labor	278 mmo	2 chk/mmo		\$5.50 /chk	556 chk	\$3,058
M	Drug tests	22 test			\$200 /test	22 test	\$4,400
M	Audit fees	2.2 yr			\$5,000 /yr	2.2 yr	\$11,000
M	Legal fees	2.2 yr			\$5,000 /yr	2.2 yr	\$11,000
M	Personnel recruiting	2.2 yr			\$1,000 /yr	2.2 yr	\$2,200
M	Design department charge	2.2 yr			\$10,000 /yr	2.2 yr	\$22,000
M	IT/EDP department charge	2.2 yr	Home Office Overhead items: 0.4% of bid.		\$2,000 /yr	2.2 yr	\$4,400
M	Equipment department charge	2.2 yr		\$10,000 /yr	2.2 yr	\$22,000	
M	Accounting department charge	2.2 yr		\$5,000 /yr	2.2 yr	\$11,000	
M	HR department charge	2.2 yr		\$2,000 /yr	2.2 yr	\$4,400	
M	Corporate department charge	2.2 yr		\$5,000 /yr	2.2 yr	\$11,000	
M	CPM scheduling charge	26.8 mo		\$500 /mo	26.8 mo	\$13,400	
M	Project website maintenance			\$2,000 /mo	26.8 mo	\$53,600	
M	Unreimbursed DRB expenses		3 mo/mtg		\$4,800 /mtg	8.933333 mtg	\$42,880
M	Unreimbursed partnering expenses		6 mo/mtg		\$3,500 /mtg	4.466667 mtg	\$15,633
M	Job photographs/video				\$500 /mo	26.8 mo	\$13,400
M	Pre-construction survey	1 LS			\$10,000 /LS	1 LS	\$10,000
M	Post-construction survey	1 LS			\$10,000 /LS	1 LS	\$10,000
S	Grouting Consultant	1 LS			\$10,000 /LS	1 LS	\$10,000
S	Environmental Consultant	26.80 mo	32 hr/mo		\$250 /hr	857.6 hr	\$214,400
S	Noise Monitoring Consultant	26.80 mo	32 hr/mo		\$250 /hr	857.6 hr	\$214,400
S	Security Service Day/Night/Weekend	26.80 mo			\$17,679 /mo	26.8 mo	\$473,788

No.	Item Description	Item Quantity/Unit					
<b>030</b>	<b>Bonds, Insurance, and Taxes not in General Mob</b>	<b>LS</b>					
			Labor	Equipment	Unclassified Material	Subcontract	Item Cost
			<b>\$0</b>	<b>\$0</b>	<b>\$517,144</b>	<b>\$0</b>	<b>\$517,144</b>

Items which are specified to be paid under General Mobilization are calculated here and flagged 'Y' in the 'Xfer to Mob?' field.  
 Basis of contractor's equipment insurance is \$2,666K fleet book value + \$609K new purchases.

R/T	Resource Description	Xfer to Mob?	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	Credit for items specified to be transferred to cost item 025, General Mobilization					LS		-\$199,600
M	Performance bond	Y	\$25.0 M unescalated bid			\$8.00 /K Bid	\$24,950 K bid	\$199,600
M	Builder's risk		\$25.0 M cost	2.3 yr		\$3.00 /K-yr	\$57,385 K-yr	\$172,155





**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**INDIRECT COST DETAIL**

M	Automobile/pickup insurance	126.0 vmo		\$70.00 /vmo	126 vmo	\$8,820
M	Contractor equip. insurance	2.3 yr	\$3,275 K/yr	\$10.00 /K	\$7,533 K	\$75,325
M	Excess liability umbrella	1 LS		\$100,000 /LS	1 LS	\$100,000
M	Incident deductibles	1 LS		\$50,000 /LS	1 LS	\$50,000
M	State/Local business tax	1 LS		\$10,000 /LS	1 LS	\$10,000
M	Permits and licenses	1 LS		\$50,000 /LS	1 LS	\$50,000
M	Personal property tax	2.3 yr	\$3,275 K/yr	0.45 \$15.00 /K	3389.625 K	\$50,844

No.	Item Description	Item Quantity/Unit				
<b>031</b>	<b>Contractor Markup</b>	<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$2,820,597</b>	<b>\$0</b>	<b>\$2,820,597</b>
R/T	Resource Description	Resource Quantity	Markup		12.7% of cost	Resource Cost
M	Direct Labor	\$3,912,706	30%		5.3%	\$1,173,812
M	Field Supervision	\$3,023,803	30%		4.1%	\$907,141
M	Equipment	\$2,703,658	5%		0.6%	\$135,183
M	Material (excluding allowance items)	\$5,312,128	5%		1.2%	\$265,606
M	Subcontract	\$6,777,101	5%		1.5%	\$338,855

No.	Item Description	Item Quantity/Unit				
<b>032</b>	<b>Financing Charges</b>	<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$88,047</b>	<b>\$0</b>	<b>\$88,047</b>
	Status (Additive)					
	Invoices	Securities ROR	Cost of capital	Progress payments	Retained earnings	
	Net 30 days	1.5%	3.0%	30 days	10% reduced to 5% at 75% of earned value	

Calculate finance charges on the time elapsed from expenditures to perform the work to revenue received from progress payments.

Equipment purchases financing \$609,030 + \$0 tax.  
(60 payments x \$10,943/mo - \$609,030 x 100% allocation) x 60% average job writeoff.

R/T	Description	Resource Quantity	Average Financing Period	Project Allocation	Notes	Resource Cost
M	Direct labor payroll/add-ons	\$3,546,030	43 days	100%	based on 4 payroll periods/mo	\$12,729
M	Field supervision payroll/add-ons	\$3,023,803	38 days	100%	based on 2 payroll periods/mo	\$9,590
M	Equipment purchases financing	\$609,030	5 years	100%	of purchase financed	\$28,358
M	Material purchases/tax	\$4,502,599	30 days	100%	of cost items 001-029	\$11,270
M	First retention release	\$935,625	19 mo	0%	cash; 100% securities; net 1.5% rate	\$15,574
M	Last retention release	\$311,875	27 mo	0%	cash; 100% securities; net 1.5% rate	\$10,525

No.	Item Description	Item Quantity/Unit				
<b>033</b>	<b>Contractor Contingency</b>	<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$604,337</b>	<b>\$0</b>	<b>\$604,337</b>
	Status (Additive)					
R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Cost
M	General Conditions	1 LS		0.02	\$15,108,432 /LS	\$302,169
M	Mitigation Measures	1 LS		0.02	\$15,108,432 /LS	\$302,169

No.	Item Description	Item Quantity/Unit				
<b>034</b>	<b>Escalation from NTP</b>	<b>LS</b>				
		Labor	Equipment	Material	Subcontract	Item Cost
	Status (Additive)					
	Escalation up to NTP (not applicable)	\$0	\$0	\$0	\$0	\$0
	Escalation after NTP	\$138,964	\$42,204	\$101,179	\$179,085	\$461,432
	<b>Total Escalation</b>	<b>\$138,964</b>	<b>\$42,204</b>	<b>\$101,179</b>	<b>\$179,085</b>	<b>\$461,432</b>

Since a fixed schedule date for NTP is not specified, escalation is calculated from NTP to the midpoint of each schedule activity for direct costs and on a yearly basis over the project duration for indirect costs. The average composite annual escalation rate is 3.0%.

R/T	Resource Description	Unescalated Cost	Escalation Rate/Year	Compounding Periods	(not applicable)	Escalated Cost
L	Direct Labor	\$3,912,706	3.0%	2	(semi-annually)	\$79,339
L	Field Supervision	\$3,023,803	3.0%	1	(annually)	\$59,625
E	Equipment	\$2,703,658	3.0%	1	(annually)	\$42,204
M	Material (including unclassified)	\$8,132,725	3.0%	4	(quarterly)	\$101,179
S	Subcontracts	\$6,777,101	3.0%	1	(annually)	\$179,085

**McMILLEN JACOBS ASSOCIATES**

Project	Client	Job No.	Estimator	Rev	Computed on
<b>Alto Tunnel</b>	<b>Marin County</b>	<b>5581.0</b>	<b>TLP</b>	<b>0</b>	<b>6/20/2017</b>
<b>Tunnel Rehab Study</b>					<b>4:19 PM</b>

**INDIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit				Item Cost
		<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
	Status (Additive)	<b>\$0</b>	<b>\$0</b>	<b>\$5,002,300</b>	<b>\$0</b>	<b>\$5,002,300</b>
C/T	Type of Contingency	Amount		Contingency Level	Resource Cost	
T	Design Definition	\$25,011,425		20.0% of total (less allowances)	\$5,002,300	

**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**RESOURCE RATE AND USAGE DETAIL**

**DIRECT LABOR**

Basis: Prevailing wage rates

Employer Insurance Add-ons	Ind. Rate	Exp. Mod	Eff Rate	<i>Memo: Estimate Total</i>	Employer Payroll Tax Add-ons	Tax Rate	Annual Inc. Cap
Workers' Compensation	6.0%		6.0%	\$129,415	Fed. Social Security Tax	6.200%	\$118,500
Commercial General Liability	10.0%		10.0%	\$215,691	Fed. Medicaid Tax	0.145%	
CIGA/Terrorism/Other Add-ons	1.0%		1.0%	\$21,569	Fed. Unemployment Tax	0.600%	\$7,000
					CA Unemployment Tax	3.400%	\$7,000
					CA SDI	1.100%	\$100,800

Overtime	Rate				Weighted average:	\$35.99 /mhr Base+Vac
General/Saturday overtime	1.5x					\$33.33 /mhr Fringes/Ins/Taxes
Sunday/Holiday overtime	2.0x					
Misc. General overtime	2.0% built in rates			\$54,287		

Code	Resource/Group Description	Hourly Base+Vac	Hourly Fringes	Daily Subsistence/Travel	Ins & Taxes	Misc. Gen'l OT	Adjusted Rate/mhr	Total mhrs	Total Cost
<b>Laborers</b>									
lfm	Labor FM	\$35.24	\$22.20		\$8.76	\$0.97	\$67.17	520	\$34,929
lab	General Labor (Grp 3)	\$32.04	\$22.20		\$7.97	\$0.92	\$63.14	6,564	\$414,425
<b>Operating Engineers</b>									
eo35+	Excavator >.5cy (OG2)	\$41.14	\$30.43		\$10.20	\$1.22	\$82.99	160	\$13,278
eo35-	Excavator Operator (OG3)	\$39.66	\$30.43		\$9.83	\$1.20	\$81.13	4,923	\$399,403
lo35-	Loader oper. <3.5cy (OG4)	\$38.28	\$30.43		\$9.50	\$1.18	\$79.39	2,849	\$226,163
mw	HD Mech/Welder (OG4)	\$38.28	\$30.43		\$9.50	\$1.18	\$79.39	2,809	\$222,988
conc	Concrete equip.oper. (OG5)	\$37.01	\$30.43		\$9.19	\$1.16	\$77.79	2,462	\$191,487
<b>Tunnel Laborers</b>									
sh	Tunnel shifter	\$38.89	\$22.66		\$9.65	\$1.04	\$72.23	5,924	\$427,901
min	Tunnel miner	\$35.89	\$22.66		\$8.91	\$0.99	\$68.45	20,387	\$1,395,579
att	Portal Attendant	\$34.42	\$22.66		\$8.55	\$0.97	\$66.60	5,924	\$394,553
	Mobilization Labor	\$32.34	\$22.45	\$0.00	\$7.95	\$0.93	\$63.67	522	\$33,238
	Demobilization Labor	\$31.98	\$22.20	\$0.00	\$7.87	\$0.92	\$62.98	522	\$32,873
	GP Operation/Maintenance Labor	\$31.12	\$21.60	\$0.00	\$7.65	\$0.90	\$61.27	2,055	\$125,889
	Craft Labor Escalation								\$79,339
<b>Total Craft Labor</b>		<b>\$2,041,429 escalated payroll</b>			<b>55,620 mhrs</b>		<b>\$3,992,044</b>		

**FIELD SUPERVISORY LABOR (see cost item 028)**

Employer Insurance Add-ons	Ind. Rate	Exp. Mod	Eff. Rate	<i>Memo: Estimate Total</i>	Permanent Employee Benefits	Rate	Applied to classifications
Workers' Compensation	1.8%		1.8%	\$41,407	Key empl. bonus plan	8.0%	KP
Commercial Gen'l Liability	5.0%		5.0%	\$115,019	Employee medical plan	10.0%	KP, EP, EL, NP, NL
					Retirement/Pension plan	5.0%	KP, EP, NP
					Non-exempt salaried OT	2.0%	NP, NL

Employer Payroll Tax Add-ons

7.7% payroll tax rate based on \$8,288/mmo weighted base salary.

Field Supervisory Labor Classification	Class	Total Burden
Key permanent employee	KP	37.5%
Exempt permanent employee	EP	29.5%
Exempt local hire employee	EL	24.5%
Non-exempt permanent employee	NP	31.5%
Non-exempt local hire employee	NL	26.5%

Supervisory Salaries		Total mmos	Total Cost
Supervisory Labor Escalation		278	\$3,023,803
<b>Total Supervisory Labor</b>	<b>\$2,345,735 escalated payroll</b>	<b>278 mmos</b>	<b>\$3,083,429</b>

**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**RESOURCE RATE AND USAGE DETAIL**

**EQUIPMENT (see Cost Item 024 for development of hourly ownership costs)**

Basis: COE Rates, Year 2011

Region 8

Fuel/Power Factor High

Unit Cost	<i>Memo: Total including General Plant Mob/O&amp;M</i>
Electricity \$0.12 /kWh	730,832 kWh \$87,700
Diesel \$3.89 /gal	305,431 gal \$1,188,127
Gas \$3.20 /gal	0 gal \$0

Code	Resource/Group Description	Air Elec	Diesel Gas	HP/CFM	HPF	Equipment Value	Parts Cost/hr	Elec/Fuel Cost/hr	Ownership Cost/hr	Total Cost/hr	Total hrs	Total Cost
b305	Cat 305 Mini-Exc 11k/1.17cy	D		47	65	\$72,813	\$7.77	\$6.96	\$31.25	\$45.98	160	\$7,357
b320	Backhoe Cat 320, 44k/1.5cy	D		128	65	\$217,913	\$18.07	\$18.96	\$22.85	\$59.88	4,923	\$294,789
<b>Loaders</b>												
L950	Wheel Loader Cat 950/3.5cy	D		197	65	\$217,586	\$26.24	\$29.18	\$20.43	\$75.85	5,310	\$402,777
<b>Haul Units</b>												
lhd3	Load-Haul-Dump 4ton/2.5cy	D		82	70	\$186,000	\$14.13	\$13.08	\$18.03	\$45.23	5,270	\$238,398
<b>Concrete Equipment</b>												
c76	Conc. pump, trailer 76cy/hr	D		127	70	\$93,635	\$13.87	\$20.26	\$17.92	\$52.05	558	\$29,042
sp12	Shotcrete plant, skid 12cy/hr	E		80	75	\$52,467	\$10.00	\$5.47	\$7.62	\$23.09	4,923	\$113,672
<b>Compactors</b>												
c14	Compactor, BW11AS, 14t/54"	D		70	80	\$107,377	\$10.59	\$12.76	\$28.80	\$52.15	347	\$18,107
<b>Plant Equipment</b>												
cp16	Compressor, trailer 1600cfm	D		500	75	\$180,565	\$24.20	\$85.44	\$17.08	\$126.72	5,270	\$667,852
g210	Generator, skid 210kW	D		314	65	\$37,885	\$6.61	\$46.50	\$4.22	\$57.33	5,924	\$339,640
p140	Pump, subm. 140gpm/20ft he:	E		2	90	\$4,135	\$0.41	\$0.16	\$0.84	\$1.42	5,924	\$8,401
vf100	Ventilation fan 100hp	E		100	90	\$5,500	\$4.00	\$8.21	\$1.69	\$13.90	5,924	\$82,320
wd4	Welder 400A Diesel, trailer	D		48	80	\$17,797	\$2.54	\$8.75	\$0.73	\$12.02	4,923	\$59,179
wtp	Water Treatment Plant	E		15	90	\$350,000	\$1.00	\$1.23	\$1.35	\$3.58	5,924	\$21,218
<b>Utility Equipment</b>												
bl3	Extension Boom, 3.0ton	D		84	85	\$158,400	\$10.30	\$16.27	\$16.05	\$42.61	4,923	\$209,799
<b>Attachments</b>												
ch	AQ1500 Cutterhead Attach.	E		160	75	\$55,000	\$6.00	\$10.94	\$42.42	\$59.36	354	\$20,991
vh	Vibro Hammer	A		200	75	\$25,000	\$4.00		\$5.92	\$9.92	2,112	\$20,948
Equipment Ownership (excludes \$626,600 componant spread to Direct Costs)												\$149,700
Mobilization Equipment											174	\$10,051
Demobilization Equipment											174	\$9,416
Equipment Escalation												\$42,204
<b>Total Equipment</b>									<b>67,353 hrs</b>		<b>\$2,745,862</b>	

**McMILLEN JACOBS ASSOCIATES**

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**RESOURCE RATE AND USAGE DETAIL**

**MATERIALS**

Code	Resource/Group Description	Unit Cost/Measure	Notes	Add Tax (-/N)?	Unit Cost F.O.B Job	Total Quantity	Total Cost
<b>Add-ons</b>							
tax	Sales Tax	8.250%	<i>Memo: Tax on Material ...and Equipment Purchases</i>	<b>\$180,750</b>			
			(4.6% of raw direct labor rate)	<b>\$0</b>			
sts	Small tools and supplies	\$3.00 mhr			\$3.00	55,620	\$166,860
<b>Concrete/Cement</b>							
cs	Cement, Portland 94lb sack	\$10.81 sack	RSMeans		\$11.70	190	\$2,223
aggf	Fine aggregate	\$33.43 ton	Means 310516100400 / 2012 C		\$36.19	2,331	\$84,338
aggc	Coarse aggregate	\$28.88 ton	Means 310516100300 / 2012 C		\$31.26	883	\$27,598
s5	Shotcrete, 5000psi mix	\$96.10 cy			\$104.03	3,463	\$360,283
clsc	Controlled Low Strength Conc	\$90.00 cy			\$97.43	1,478	\$144,019
<b>Formwork</b>							
lumb	Lumber for lagging/blocking	\$1.31 bf			\$1.42	21,430	\$30,389
sform	Stay-form	\$2.50 sf			\$2.71	32,975	\$89,240
<b>Permanent Materials</b>							
swppp	Silt Fence / Straw Waddles	\$5.00 lf	plug		\$5.41	1,000	\$5,413
8set	8-in. Steel Set	\$1,833 ea	plug		\$1,984	585	\$1,160,559
6set	6-in. Steel Set	\$1,317 ea	plug		\$1,426	68	\$96,937
spile	C6x13 Channel Spile	\$68.25 ea	plug		\$73.88	5,017	\$370,659
xmisc	Miscellaneous material	\$1,000 lot		N	\$1,000	202	\$202,000
ai	Allowance Item	\$1.00 LS		n	\$1.00	400,000	\$400,000
Equipment Ownership not in Direct Cost Materials and Taxes							\$213,297
Mobilization Freight and Materials							\$420,826
Demobilization Freight and Materials							\$112,926
General Plant Operation/Maintenance Materials							\$342,000
Overhead Maintenance/Service Materials							\$273,033
Bonds, Insurance, and Taxes not in General N (unclassified)							\$517,144
Contractor Markup (unclassified)							\$2,820,597
Financing Charges (unclassified)							\$88,047
Contractor Contingency (unclassified)							\$604,337
Material Escalation							\$101,179
<b>Total Material</b>							<b>\$8,633,903</b>

**SUBCONTRACTS**

Code	Resource/Group Description	Unit Cost/Measure	Notes	Total Quantity	Total Cost
<b>Sitework</b>					
cg	Clearing and grubbing	\$10,000.00 acre		4	\$40,000
muck	Muck disposal	\$35.83 lcy		17,532	\$628,225
muckc	Muck disp. Contam. Non Haz.	\$63.75 lcy		2,921	\$186,203
sr	Site restoration	\$10,000.00 acre	Plug Price	4	\$40,000
tfnc	Temporary Construction Fenc	\$25.00 lf		1,000	\$25,000
<b>Specialty Subcontracts</b>					
graff	Graffiti Protection	\$4.12 sf		43,460	\$178,925
tds	Tunnel Drainage System	\$270.00 lf		2,173	\$586,710
tfp	Tunnel Fire Protection	\$380.00 lf		2,173	\$825,740
tlp	Power / Lighting / CCTV	\$1,150.00 lf		2,173	\$2,498,950
tp	Tunnel Paving	\$130.00 sy		3,139	\$408,041
tv	Tunnel Ventilation	\$140.00 lf		2,173	\$304,220
General Plant Operation/Maintenance Subcontracts					\$142,500
Overhead Maintenance/Service Subcontracts					\$912,588
Subcontract Escalation					\$179,085
<b>Total Subcontract</b>					<b>\$6,956,186</b>
<b>Escalated Construction Bid</b>					<b>\$25,411,425</b>

**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Rehab Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:19 PM</b>
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**RESOURCE RATE AND USAGE DETAIL**

**SUMMARY BY RESOURCE TYPE**

Cost Type	Labor	Equipment	Material	Subcontract	Total
Direct* Cost	\$3,720,705	\$2,534,491	\$2,731,223	\$5,722,014	\$14,708,432
Indirect* Cost	\$3,215,803	\$169,168	\$1,371,377	\$1,055,088	\$9,841,561
Indirect Cost (unclassified)	-	-	\$4,030,125	-	
Owner Allowances	\$0	\$0	\$400,000	\$0	\$400,000
Escalation from NTP	\$138,964	\$42,204	\$101,179	\$179,085	\$461,432
<b>Escalated Construction Bid</b>	<b>\$7,075,473</b>	<b>\$2,745,862</b>	<b>\$8,633,903</b>	<b>\$6,956,186</b>	<b>\$25,411,425</b>
Relative Direct* + Indirect* Costs	34%	13%	20%	33%	100% on \$20,519,868

**SUMMARY BY COST TYPE**

Cost Type	Total	% Total Estimate	% Direct, Equipment and Plant Cost	Applicable Cost Items
Mobilization/Demobilization	\$622,462	2.5%	4.0%	025 - 026
Directs, Equipment, and Plant	\$15,687,982	62.9%	100.0%	From 001 - 024, 027 -
Overhead/Profit	\$8,239,549	33.0%	52.5%	028 - 033
Owner Allowances	\$400,000	1.6%	2.5%	Between 022 - 023
<b>Unescalated Construction Bid</b>	<b>\$24,949,993</b>		<b>159.0%</b>	

**UNESCALATED TIME-RELATED INDIRECT COST BREAKDOWN**

Cost Type	Average Cost/month	Exclude?	
Lineal/Other Plant Equipment CFC	\$546 /mo		Monthly costs include adjustments totalling 2.4% for: - bonds, insurance, and taxes - financing charges but exclude contractor contingency
GP operation/maintenance	\$26,534 /mo		
Weekend maintenance			
Field supervision	\$115,565 /mo		
OH maintenance/service	\$45,313 /mo		
<b>Total</b>	<b>\$187,958 /mo (excluding markup)</b>		<b>\$227,268 /mo (including markup)</b>

**DISTRIBUTION OF PROJECT NON-WORKDAYS**

Type of non-workday	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar Year	Total Project	
Holiday		1	1	0	0	1	0	1	0	1	0	2	2	9	19
Incllement Weather Day		2	2	1	0	0	0	0	0	0	2	2		9	21
<b>Total</b>		<b>3</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>18</b>	<b>40</b>

McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **9/22/2017**  
**Tunnel Rehab Study - BEST CASE Ground Support** **6:57 AM**

**OPINION OF PROBABLE ESCALATED CONSTRUCTION BID INCLUDING OWNER CONTINGENCY**

No.	Item or Group Item Description	Group Item Cost	Item Quantity/Unit	Item Unit Cost	Status	Item Cost
001	South Site Preparation		LS			\$56,669
002	North Site Preparation		LS			\$56,669
	<b>Site Preparation</b>	<b>\$113,337</b>				
003	South Site-Excav./Supp. Collapsed w/o Spiles		211 lf	\$3,922 /lf		\$829,151
004	South Site-Excav./Supp. Collapsed w Spiles		275 lf	\$5,947 /lf		\$1,632,914
005	South Type 3 - Site Intact Tunnel Section		450 lf	\$2,754 /lf		\$1,239,483
006	North Site - Existing Gunite Lined Section		140 lf	\$2,620 /lf		\$366,787
007	North Site Lean Concrete Backfilled Section		124 lf	\$4,553 /lf		\$564,605
008	North Site Intact Tunnel Section		843 lf	\$2,750 /lf		\$2,317,984
009	North Site-Excav./Supp. Collapsed w/o Spiles		44 lf	\$3,974 /lf		\$172,859
010	North Site-Excav./Supp. Collapsed w Spiles		57 lf	\$5,979 /lf		\$337,833
	<b>Tunnel - Re-excavation and Support</b>	<b>\$7,461,616</b>	<b>2,143 LF</b>	<b>\$3,482 /LF</b>		
011	Tunnel Sub Base w/ Drainage		2,143 LF	\$380 /LF		\$814,925
012	Tunnel Agg Base		2,143 LF	\$84.16 /LF		\$180,359
013	Tunnel Paving		2,143 LF	\$211 /LF		\$451,578
	<b>Tunnel Invert</b>	<b>\$1,446,862</b>	<b>2,143 LF</b>	<b>\$675 /LF</b>		
014	Graffiti Protection		42,860 sf	\$4.12 /sf		\$176,455
015	Tunnel Water / Fire Protection		2,143 LF	\$380 /LF		\$814,340
016	Tunnel Power / Lighting / CCTV		2,143 LF	\$1,214 /LF		\$2,602,311
017	Tunnel Ventilation		2,143 LF	\$140 /LF		\$300,020
	<b>Tunnel Fire Life Safety</b>	<b>\$3,893,126</b>	<b>LS</b>			
018	Geotechnical Instrumentation		LS			\$200,000
	<b>Instrumentation and Monitoring</b>	<b>\$200,000</b>	<b>LS</b>			
019	Fill Existing boreholes		190 cf	\$135 /cf		\$25,677
020	South Portal Site Restoration		LS			\$41,809
021	North Portal Site Restoration		LS			\$41,809
	<b>Site Restoration</b>	<b>\$109,296</b>	<b>LS</b>			
022	Hazardous Material Allowance		Allowance			\$200,000
023	Portal Modifications		Allowance			\$200,000
				<b>Subtotal Direct Cost</b>		<b>\$13,624,236</b>
024	Equipment Ownership not in Direct Cost			2.0% directs		\$272,321
025	General Mobilization		0.5 mo	2.0% unesc.bid		\$440,300
026	Demobilization/Punchlist		0.5 mo	0.7% unesc.bid		\$153,655
027	General Plant Operation/Maintenance		20.5 mo	\$25,961 /mo		\$532,192
028	Field Supervision		23.5 mo	\$110,213 /mo		\$2,590,001
029	Overhead Maintenance/Service		23.5 mo	\$44,541 /mo		\$1,046,720
030	Bonds, Insurance, and Taxes not in General Mobilization			2.1% unesc.bid		\$456,094
031	Contractor Markup			12.4% of cost		\$2,437,169
032	Financing Charges			0.3% unesc.bid		\$70,381
033	Contractor Contingency			2.5% unesc.bid		\$544,969
				<b>Subtotal Indirect Cost</b>		<b>\$8,543,802</b>
034	Escalation from NTP			1.6% unesc.bid		\$358,392
	<b>23.5 mo project duration after NTP</b>			<b>Escalated Construction Bid</b>		<b>\$22,526,430</b>
035	Owner Contingency			19.6% esc.bid		\$4,425,300
				<b>Opinion of Probable Escalated Construction Bid including Owner Contingency</b>		<b>\$26,951,730</b>

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 Summary p1; Schedule p2

**Estimate Notes:**

0.627103



McMILLEN JACOBS ASSOCIATES

Project  
**Alto Tunnel**  
**Tunnel Rehab Study - BEST CASE Ground Support**

Client  
**Marin County**

Job No. Estimator Rev Computed on  
**5581.0 TLP 0 9/22/2017 6:57 AM**

**CONSTRUCTION SCHEDULE AND MONTHLY PROGRESS PAYMENTS**

Activity No. and Description	Bid Amount	Dur. (mos)	Start mo	End mo	YEAR 1												YEAR 2												YEAR 3												YEAR 4												YEAR 5											
					J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
					NTP: Month 1.0																																																											
NTP			1.00		▼																																																											
Preliminary Submittals		2.00	1.00	3.00	■																																																											
024 Equipment Mobilization	\$0	1.00	3.00	4.00	■																																																											
025 General Mobilization	\$440,300	0.50	3.00	3.50	■																																																											
026 Demobilization/Punchlist	\$153,655	0.50	24.00	24.50	■																																																											
001 South Site Preparation	\$108,305	0.50	4.00	4.50	■																																																											
002 North Site Preparation	\$108,305	0.50	4.00	4.50	■																																																											
003 South Site-Excav./Supp. Collapsed w/o Spiles	\$1,584,671	2.75	4.50	7.25	■																																																											
004 South Site-Excav./Supp. Collapsed w Spiles	\$3,120,821	6.00	7.25	13.25	■																																																											
005 South Type 3 - Site Intact Tunnel Section	\$2,368,897	3.75	13.25	17.00	■																																																											
006 North Site - Existing Gunite Lined Section	\$701,002	1.25	4.50	5.75	■																																																											
007 North Site Lean Concrete Backfilled Section	\$1,079,072	2.00	5.75	7.75	■																																																											
008 North Site Intact Tunnel Section	\$4,430,125	7.50	7.75	15.25	■																																																											
009 North Site-Excav./Supp. Collapsed w/o Spiles	\$330,367	0.50	15.25	15.75	■																																																											
010 North Site-Excav./Supp. Collapsed w Spiles	\$645,665	1.25	15.75	17.00	■																																																											
011 Tunnel Sub Base w/ Drainage	\$1,557,482	1.00	17.00	18.00	■																																																											
012 Tunnel Agg Base	\$344,701	1.00	18.00	19.00	■																																																											
013 Tunnel Paving (Note 4b)	\$474,157	1.00	19.00	20.00	■																																																											
014 Graffiti Protection (Note 4b)	\$185,277	0.50	20.00	20.50	■																																																											
015 Tunnel Water / Fire Protection (Note 4b)	\$855,057	1.50	20.00	21.50	■																																																											
016 Tunnel Power / Lighting / CCTV (Note 4b)	\$2,732,427	3.00	20.00	23.00	■																																																											
017 Tunnel Ventilation (Note 4b)	\$315,021	3.00	20.00	23.00	■																																																											
018 Geotechnical Instrumentation	\$382,239	15.75	3.50	19.25	■																																																											
019 Fill Existing boreholes	\$49,074	0.25	17.00	17.25	■																																																											
020 South Portal Site Restoration	\$79,905	1.00	23.00	24.00	■																																																											
021 North Portal Site Restoration	\$79,905	1.00	23.00	24.00	■																																																											
022 Hazardous Material Allowance (Note 4a)	\$200,000																																																															
023 Portal Modifications (Note 4a)	\$200,000																																																															
<b>Opinion of Probable Escalated Construction Bid, Duration, and Monthly Progress Payments</b>	<b>\$22,526,430</b>	<b>23.5 months</b>						\$407.2K	\$728.5K	\$1,040.4K	\$1,026.0K	\$999.7K	\$1,021.6K	\$1,021.6K	\$1,021.6K	\$1,021.6K	\$1,096.9K	\$1,122.0K	\$1,136.8K	\$1,055.3K	<b>\$2,311.5K</b>	\$350.5K	\$456.2K	\$1,682.6K	\$1,235.8K	\$965.0K	<b>\$1,252.3K</b>																																					
							\$7,266.5K													\$13,455.8K								\$1,404.1K	\$0.0K	\$0.0K																																		

- 1. Project calendar is based on 9 observed holidays and 9 critical inclement weather days per year distributed monthly as shown on 'Resources' sheet.
- 2. Payments are made 30 days after pay applications including 10% retention which is reduced to 5% after 75% is earned, 17 months after NTP. Payments releasing retention bolded. 50% of the contract is earned 15 months after NTP.
- 3. Spread \$8.5M indirects + \$0.4M escalation - \$0.6M mob. Mob/demob paid as scheduled. Bond paid at NTP.
- 4. (a) Allowances cannot be scheduled so progress payments do not reflect their payment and sum to the total bid amount less the \$400K in Allowances. (b) Indirect costs spread limited to a 5% subcontract markup.





McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **9/22/2017 7:30 AM**  
**Tunnel Rehab Study - Worst Case Ground Support**

**OPINION OF PROBABLE ESCALATED CONSTRUCTION BID INCLUDING OWNER CONTINGENCY**

No.	Item or Group Item Description	Group Item Cost	Item Quantity/Unit	Item Unit Cost	Status	Item Cost
001	South Site Preparation		LS			\$56,669
002	North Site Preparation		LS			\$56,669
	<b>Site Preparation</b>	<b>\$113,337</b>				
003	South Site-Excav./Supp. Collapsed w/o Spiles		428 lf	\$3,919 /lf		\$1,678,495
004	South Site-Excav./Supp. Collapsed w Spiles		556 lf	\$5,931 /lf		\$3,299,373
005	North Site - Existing Gunite Lined Section		140 lf	\$2,639 /lf		\$369,497
006	North Site Lean Concrete Backfilled Section		124 lf	\$4,596 /lf		\$569,928
007	North Site Intact Tunnel Section		220 lf	\$2,775 /lf		\$610,541
008	North Site-Excav./Supp. Collapsed w/o Spiles		293 lf	\$3,920 /lf		\$1,150,180
009	North Site-Excav./Supp. Collapsed w Spiles		381 lf	\$5,937 /lf		\$2,262,575
	<b>Tunnel - Re-excavation and Support</b>	<b>\$9,940,588</b>	<b>2,143 LF</b>	<b>\$4,639 /LF</b>		
010	Tunnel Sub Base w/ Drainage		2,143 LF	\$380 /LF		\$815,187
011	Tunnel Agg Base		2,143 LF	\$84.28 /LF		\$180,621
012	Tunnel Paving		2,143 LF	\$211 /LF		\$451,584
	<b>Tunnel Invert</b>	<b>\$1,447,392</b>	<b>2,143 LF</b>	<b>\$675 /LF</b>		
013	Graffiti Protection		42,860 sf	\$4.12 /sf		\$176,455
014	Tunnel Water / Fire Protection		2,143 LF	\$380 /LF		\$814,340
015	Tunnel Power / Lighting / CCTV		2,143 LF	\$1,214 /LF		\$2,602,327
016	Tunnel Ventilation		2,143 LF	\$140 /LF		\$300,020
	<b>Tunnel Fire Life Safety</b>	<b>\$3,893,141</b>	<b>LS</b>			
017	Geotechnical Instrumentation		LS			\$200,000
	<b>Instrumentation and Monitoring</b>	<b>\$200,000</b>	<b>LS</b>			
018	Fill Existing boreholes		190 cf	\$140 /cf		\$26,684
019	South Portal Site Restoration		LS			\$41,809
020	North Portal Site Restoration		LS			\$41,809
	<b>Site Restoration</b>	<b>\$110,302</b>	<b>LS</b>			
021	Hazardous Material Allowance	Allowance	LS			\$200,000
022	Portal Modifications	Allowance	LS			\$200,000
				<b>Subtotal Direct Cost</b>		<b>\$16,104,761</b>
023	Equipment Ownership not in Direct Cost			2.2% directs		\$360,604
024	General Mobilization		0.5 mo	1.8% unesc.bid		\$478,729
025	Demobilization/Punchlist		0.5 mo	0.6% unesc.bid		\$156,699
026	General Plant Operation/Maintenance		25.3 mo	\$25,908 /mo		\$655,477
027	Field Supervision		28.3 mo	\$114,527 /mo		\$3,241,104
028	Overhead Maintenance/Service		28.3 mo	\$44,318 /mo		\$1,254,208
029	Bonds, Insurance, and Taxes not in General Mobilization			2.0% unesc.bid		\$542,442
030	Contractor Markup			13.0% of cost		\$3,058,189
031	Financing Charges			0.4% unesc.bid		\$94,956
032	Contractor Contingency			2.4% unesc.bid		\$644,190
				<b>Subtotal Indirect Cost</b>		<b>\$10,486,598</b>
033	Escalation from NTP			2.4% unesc.bid		\$644,977
	<b>28.25 mo project duration after NTP</b>			<b>Escalated Construction Bid</b>		<b>\$27,236,336</b>
034	Owner Contingency			19.7% esc.bid		\$5,367,300
				<b>Opinion of Probable Escalated Construction Bid including Owner Contingency</b>		<b>\$32,603,636</b>

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 Summary p1; Schedule p2

**Estimate Notes:**

0.651149





McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel  
Tunnel Abandonment Study** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **6/20/2017  
4:05 PM**

**OPINION OF PROBABLE ESCALATED CONSTRUCTION BID INCLUDING OWNER CONTINGENCY**

No.	Item or Group Item Description	Group Item Cost	Item Quantity/Unit	Item Unit Cost	Status	Item Cost
001	South Portal Site Preparation		LS			\$33,646
002	North Portal Site Preparation		LS			\$33,646
003	Underhill Site Preparation		LS			\$28,646
004	Camino Alto Site Preparation		LS			\$28,646
005	Stetson Ave. Site Preparation		LS			\$28,646
	<b>Site Preparation</b>	<b>\$153,231</b>				
006	Fill Intact Tunnel w/ CLSM 267+00 to 272+98		6,205 cy	\$116 /cy		\$719,034
007	Fill Intact Tunnel w/ CLSM 276+00 to 277+62		1,764 cy	\$120 /cy		\$212,160
008	Fill Collapse Tunnel w/ Grout 258+75 to 267+00		5,736 cy	\$57.83 /cy		\$331,691
	<b>Phase 1 Backfill</b>	<b>\$1,262,885</b>	<b>LS</b>			
009	Drill New Boreholes		2,160 lf	\$98.00 /lf		\$211,680
010	Contact Grout Remaining Voids		7,016 cy	\$80.36 /cy		\$563,816
011	Drill New Tertiary Boreholes		432 lf	\$98.00 /lf		\$42,336
012	Tertiary Grouting		213 cy	\$768 /cy		\$163,340
	<b>Phase 2 / 3 Tunnel Backfill</b>	<b>\$981,172</b>	<b>LS</b>			
013	South Portal Site Restoration		LS			\$15,452
014	North Portal Site Restoration		LS			\$15,452
015	Underhill Site Restoration		LS			\$10,452
016	Camino Alto Site Restoration		LS			\$10,452
017	Stetson Ave. Site Restoration		LS			\$10,452
	<b>Site Restoration</b>	<b>\$62,261</b>	<b>LS</b>			
				<b>Subtotal Direct Cost</b>		<b>\$2,459,549</b>
018	Equipment Ownership not in Direct Cost			3.4% directs		\$82,500
019	General Mobilization		0.5 mo	3.9% unesc.bid		\$173,274
020	Demobilization/Punchlist		0.5 mo	1.8% unesc.bid		\$81,853
021	General Plant Operation/Maintenance		5.5 mo	\$18,863 /mo		\$103,745
022	Field Supervision		8.5 mo	\$44,734 /mo		\$380,238
023	Overhead Maintenance/Service		8.5 mo	\$43,176 /mo		\$366,992
024	Bonds, Insurance, and Taxes not in General Mobilization			5.3% unesc.bid		\$238,389
025	Contractor Markup			12.3% of cost		\$490,309
026	Financing Charges			0.3% unesc.bid		\$14,593
027	Contractor Contingency			2.2% unesc.bid		\$98,382
				<b>Subtotal Indirect Cost</b>		<b>\$2,030,274</b>
028	Escalation from NTP			0.4% unesc.bid		\$18,939
	<b>8.5 mo project duration after NTP</b>			<b>Escalated Construction Bid</b>		<b>\$4,508,761</b>
029	Owner Contingency			20.0% esc.bid		\$901,800
						<b>Opinion of Probable Escalated Construction Bid including Owner Contingency</b>
						<b>\$5,410,561</b>

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**Estimate Notes:**

0.825466





**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Abandonment Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:05 PM</b>
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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>001</b>	<b>South Portal Site Preparation</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>120</b>	<b>\$8,532</b>	<b>\$2,589</b>	<b>\$2,525</b>	<b>\$20,000</b>	<b>\$33,646</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
	1.000 Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	120.0 mhr	\$360
S	cg	Clearing and grubbing	1.00 acre			\$10,000 /acre	1.00 acre	\$10,000
S	tfnc	Temporary Construction Fenc	400.0 lf			\$25.00 /lf	400.0 lf	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	40.00 mhr	\$3,320
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$64.73 /hr	40.00 hr	\$2,589
M	swppp	Silt Fence / Straw Waddles	400.0 lf			\$5.41 /lf	400.0 lf	\$2,165

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>002</b>	<b>North Portal Site Preparation</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>120</b>	<b>\$8,532</b>	<b>\$2,589</b>	<b>\$2,525</b>	<b>\$20,000</b>	<b>\$33,646</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
	1.000 Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	120.0 mhr	\$360
S	cg	Clearing and grubbing	1.00 acre			\$10,000 /acre	1.00 acre	\$10,000
S	tfnc	Temporary Construction Fenc	400.0 lf			\$25.00 /lf	400.0 lf	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	40.00 mhr	\$3,320
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$64.73 /hr	40.00 hr	\$2,589
M	swppp	Silt Fence / Straw Waddles	400.0 lf			\$5.41 /lf	400.0 lf	\$2,165

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>003</b>	<b>Underhill Site Preparation</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>120</b>	<b>\$8,532</b>	<b>\$2,589</b>	<b>\$2,525</b>	<b>\$15,000</b>	<b>\$28,646</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
	1.000 Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	120.0 mhr	\$360
S	cg	Clearing and grubbing	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
S	tfnc	Temporary Construction Fenc	400.0 lf			\$25.00 /lf	400.0 lf	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	40.00 mhr	\$3,320
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$64.73 /hr	40.00 hr	\$2,589
M	swppp	Silt Fence / Straw Waddles	400.0 lf			\$5.41 /lf	400.0 lf	\$2,165

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>004</b>	<b>Camino Alto Site Preparation</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>120</b>	<b>\$8,532</b>	<b>\$2,589</b>	<b>\$2,525</b>	<b>\$15,000</b>	<b>\$28,646</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
	1.000 Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	120.0 mhr	\$360
S	cg	Clearing and grubbing	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
S	tfnc	Temporary Construction Fenc	400.0 lf			\$25.00 /lf	400.0 lf	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687



McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **6/20/2017 4:05 PM**  
**Tunnel Abandonment Study**

**DIRECT COST DETAIL**

L	eo35+ Excavator >.5cy (OG2)		\$82.99 /mhr	40.00 mhr	\$3,320
E	b305 Cat 305 Mini-Exc 11k/.17cy		\$64.73 /hr	40.00 hr	\$2,589
M	swppp Silt Fence / Straw Waddles	400.0 lf	\$5.41 /lf	400.0 lf	\$2,165

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>005</b>	<b>Stetson Ave. Site Preparation</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>120</b>	<b>\$8,532</b>	<b>\$2,589</b>	<b>\$2,525</b>	<b>\$15,000</b>	<b>\$28,646</b>
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	120.0 mhr	\$360
S	cg	Clearing and grubbing	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
S	tfnc	Temporary Construction Fenc	400.0 lf			\$25.00 /lf	400.0 lf	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687
L	eo35+	Excavator >.5cy (OG2)				\$82.99 /mhr	40.00 mhr	\$3,320
E	b305	Cat 305 Mini-Exc 11k/.17cy				\$64.73 /hr	40.00 hr	\$2,589
M	swppp	Silt Fence / Straw Waddles	400.0 lf			\$5.41 /lf	400.0 lf	\$2,165

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>006</b>	<b>Fill Intact Tunnel w/ CLSM 267+00 to 272+98</b>	<b>6,205 cy</b>	<b>400 cy/day</b>	<b>2 days</b>	<b>17.5 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>980</b>	<b>\$71,092</b>	<b>\$35,475</b>	<b>\$612,467</b>	<b>\$0</b>	<b>\$719,034</b>
	0.158	\$11.46	\$5.72	\$98.70	\$0.00	\$115.88
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

		2 days setup/takedown							
		598 LF							
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost	
M	sts	Small tools and supplies				\$3.00 /mhr	980.0 mhr	\$2,940	
L	lfm	Labor FM				\$67.17 /mhr	140.0 mhr	\$9,404	
L	lab	General Labor (Grp 3)			2	\$63.14 /mhr	280.0 mhr	\$17,678	
L	lo35-	Loader oper. <3.5cy (OG4)				\$79.39 /mhr	140.0 mhr	\$11,114	
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	140.0 mhr	\$11,114	
L	conc	Concrete equip.oper. (OG5)			2	\$77.79 /mhr	280.0 mhr	\$21,781	
M	clsm	Controlled Low Strength Material				\$97.43 /cy	6205 cy	\$604,527	
E	l950	Wheel Loader Cat 950/3.5cy				\$99.13 /hr	140.0 hr	\$13,878	
E	c76	Conc. pump, trailer 76cy/hr			2	\$51.78 /hr	280.0 hr	\$14,499	
E	g210	Generator, skid 210kW				\$40.29 /hr	140.0 hr	\$5,641	
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	140.0 hr	\$199	
E	wtp	Water Treatment Plant				\$8.99 /hr	140.0 hr	\$1,258	
M	xmisc	Miscellaneous material	<i>Hoses, pipes, etc</i> 5.00 lot			\$1,000 /lot	5.00 lot	\$5,000	

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>007</b>	<b>Fill Intact Tunnel w/ CLSM 276+00 to 277+62</b>	<b>1,764 cy</b>	<b>400 cy/day</b>	<b>2 days</b>	<b>6.4 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>307</b>	<b>\$22,017</b>	<b>\$10,322</b>	<b>\$179,821</b>	<b>\$0</b>	<b>\$212,160</b>
	0.174	\$12.48	\$5.85	\$101.94	\$0.00	\$120.27
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

		2 days build portal bulkhead							
		170 LF							
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost	
M	sts	Small tools and supplies				\$3.00 /mhr	307.2 mhr	\$922	
L	lfm	Labor FM				\$67.17 /mhr	51.20 mhr	\$3,439	
L	lab	General Labor (Grp 3)			2	\$63.14 /mhr	102.4 mhr	\$6,465	
L	lo35-	Loader oper. <3.5cy (OG4)				\$79.39 /mhr	51.20 mhr	\$4,065	
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	51.20 mhr	\$4,065	



McMILLEN JACOBS ASSOCIATES

Project **Alto Tunnel** Client **Marin County** Job No. **5581.0** Estimator **TLP** Rev **0** Computed on **6/20/2017 4:05 PM**  
**Tunnel Abandonment Study**

**DIRECT COST DETAIL**

L	conc	Concrete equip.oper. (OG5)		\$77.79 /mhr	51.20 mhr	\$3,983
M	clsm	Controlled Low Strength Material		\$97.43 /cy	1764 cy	\$171,856
M	lumb	Lumber for lagging/blocking	1121 bf	\$1.42 /bf	1121 bf	\$1,589
M	ply1	Plywood MDO 1"	280.2 sf	\$1.62 /sf	280.2 sf	\$455
E	I950	Wheel Loader Cat 950/3.5cy		\$99.13 /hr	51.20 hr	\$5,075
E	c76	Conc. pump, trailer 76cy/hr		\$51.78 /hr	51.20 hr	\$2,651
E	g210	Generator, skid 210kW		\$40.29 /hr	51.20 hr	\$2,063
E	p140	Pump, subm. 140gpm/20ft head		\$1.42 /hr	51.20 hr	\$73
E	wtp	Water Treatment Plant		\$8.99 /hr	51.20 hr	\$460
M	xmisc	Miscellaneous material	<i>Hoses, pipes, etc.</i> 5.00 lot	\$1,000 /lot	5.00 lot	\$5,000

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>008</b>	<b>Fill Collapse Tunnel w/ Grout 258+75 to 267+00</b>	<b>5,736 cy</b>	<b>450 cy/day</b>	<b>2 days</b>	<b>14.7 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>1,529</b>	<b>\$106,652</b>	<b>\$51,072</b>	<b>\$173,967</b>	<b>\$0</b>	<b>\$331,691</b>
	0.267	\$18.59	\$8.90	\$30.33	\$0.00	\$57.83
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

		2 days setup/takedown						
		825 LF						
		67% Void Percentage						
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	1529 mhr	\$4,586
L	lfm	Labor FM			2	\$67.17 /mhr	235.2 mhr	\$15,799
L	lab	General Labor (Grp 3)			6	\$63.14 /mhr	705.6 mhr	\$44,549
L	lo35-	Loader oper. <3.5cy (OG4)			2	\$79.39 /mhr	235.2 mhr	\$18,672
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	117.6 mhr	\$9,336
L	conc	Concrete equip.oper. (OG5)			2	\$77.79 /mhr	235.2 mhr	\$18,296
M	cb	Cement, bulk	713.6 ton			\$119 /ton	713.6 ton	\$84,968
M	h20	Water	113.9 kgal			\$108 /kgal	113.9 kgal	\$12,326
M	xg	Grout Admixtures				\$10.83 /cy	5736 cy	\$62,087
E	I950	Wheel Loader Cat 950/3.5cy			2	\$99.13 /hr	235.2 hr	\$23,315
E	gsm	Grout Slurry Mixer, 4cy			2	\$20.74 /hr	235.2 hr	\$4,877
E	c76	Conc. pump, trailer 76cy/hr			2	\$51.78 /hr	235.2 hr	\$12,179
E	g210	Generator, skid 210kW			2	\$40.29 /hr	235.2 hr	\$9,477
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	117.6 hr	\$167
E	wtp	Water Treatment Plant				\$8.99 /hr	117.6 hr	\$1,057
M	xmisc	Miscellaneous material	<i>Hoses, pipes, etc.</i> 10.00 lot			\$1,000 /lot	10.00 lot	\$10,000

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>009</b>	<b>Drill New Boreholes</b>	<b>2160 lf</b>	<b>100 lf/day</b>		<b>21.6 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$211,680</b>	<b>\$211,680</b>
	0.000	\$0.00	\$0.00	\$0.00	\$98.00	\$98.00
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
S	drill	Drilling Subcontractor				\$98.00 /lf	2160 lf	\$211,680



**McMILLEN JACOBS ASSOCIATES**

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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>010</b>	<b>Contact Grout Remaining Voids</b>	<b>7016.17 cy</b>	<b>230 cy/day</b>	<b>2 days</b>	<b>32.5 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>3,380</b>	<b>\$235,795</b>	<b>\$112,913</b>	<b>\$215,108</b>	<b>\$0</b>	<b>\$563,816</b>
	0.482	\$33.61	\$16.09	\$30.66	\$0.00	\$80.36
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

2 days setup/takedown  
2049 LF  
33% Void Percentage

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	3380 mhr	\$10,140
L	lfm	Labor FM			2	\$67.17 /mhr	520.0 mhr	\$34,929
L	lab	General Labor (Grp 3)			6	\$63.14 /mhr	1560 mhr	\$98,492
L	lo35-	Loader oper. <3.5cy (OG4)			2	\$79.39 /mhr	520.0 mhr	\$41,282
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	260.0 mhr	\$20,641
L	conc	Concrete equip.oper. (OG5)			2	\$77.79 /mhr	520.0 mhr	\$40,451
M	cb	Cement, bulk	872.9 ton			\$119 /ton	872.9 ton	\$103,940
M	h20	Water	139.3 kgal			\$108 /kgal	139.3 kgal	\$15,078
M	xg	Grout Admixtures				\$10.83 /cy	7016 cy	\$75,950
E	I950	Wheel Loader Cat 950/3.5cy			2	\$99.13 /hr	520.0 hr	\$51,548
E	gsm	Grout Slurry Mixer, 4cy			2	\$20.74 /hr	520.0 hr	\$10,782
E	c76	Conc. pump, trailer 76cy/hr			2	\$51.78 /hr	520.0 hr	\$26,926
E	g210	Generator, skid 210kW			2	\$40.29 /hr	520.0 hr	\$20,952
E	p140	Pump, subm. 140gpm/20ft head				\$1.42 /hr	260.0 hr	\$369
E	wtp	Water Treatment Plant				\$8.99 /hr	260.0 hr	\$2,337
M	xmisc	Miscellaneous material <i>Hoses, pipes, etc.</i>	10.00 lot			\$1,000 /lot	10.00 lot	\$10,000

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>011</b>	<b>Drill New Tertiary Boreholes</b>	<b>432 lf</b>	<b>100 lf/day</b>		<b>4.3 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$42,336</b>	<b>\$42,336</b>
	0.000	\$0.00	\$0.00	\$0.00	\$98.00	\$98.00
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
S	drill	Drilling Subcontractor				\$98.00 /lf	432.0 lf	\$42,336

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time	
<b>012</b>	<b>Tertiary Grouting</b>	<b>212.611 cy</b>	<b>230 cy/day</b>	<b>2 days</b>	<b>2.9 work days</b>	
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>302</b>	<b>\$21,040</b>	<b>\$10,075</b>	<b>\$132,225</b>	<b>\$0</b>	<b>\$163,340</b>
	1.419	\$98.96	\$47.39	\$621.91	\$0.00	\$768.26
	Status (Additive)	Work schedule	Other ST pay	Other OT pay		
1.000	Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

2 days setup/takedown  
2049 LF  
1% Void Percentage

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	301.6 mhr	\$905
L	lfm	Labor FM			2	\$67.17 /mhr	46.40 mhr	\$3,117
L	lab	General Labor (Grp 3)			6	\$63.14 /mhr	139.2 mhr	\$8,789
L	lo35-	Loader oper. <3.5cy (OG4)			2	\$79.39 /mhr	46.40 mhr	\$3,684
L	MW	HD Mech/Welder (OG4)				\$79.39 /mhr	23.20 mhr	\$1,842
L	conc	Concrete equip.oper. (OG5)			2	\$77.79 /mhr	46.40 mhr	\$3,609
M	cb	Cement, bulk	872.9 ton			\$119 /ton	872.9 ton	\$103,940
M	h20	Water	139.3 kgal			\$108 /kgal	139.3 kgal	\$15,078
M	xg	Grout Admixtures				\$10.83 /cy	212.6 cy	\$2,302
E	I950	Wheel Loader Cat 950/3.5cy			2	\$99.13 /hr	46.40 hr	\$4,600





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**DIRECT COST DETAIL**

E	gsm	Grout Slurry Mixer, 4cy		2	\$20.74 /hr	46.40 hr	\$962
E	c76	Conc. pump, trailer 76cy/hr		2	\$51.78 /hr	46.40 hr	\$2,403
E	g210	Generator, skid 210kW		2	\$40.29 /hr	46.40 hr	\$1,870
E	p140	Pump, subm. 140gpm/20ft head			\$1.42 /hr	23.20 hr	\$33
E	wtp	Water Treatment Plant			\$8.99 /hr	23.20 hr	\$209
M	xmisc	Miscellaneous material	<i>Hoses, pipes, etc.</i>	10.00 lot	\$1,000 /lot	10.00 lot	\$10,000

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>013</b>	<b>South Portal Site Restoration</b>		<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>80</b>	<b>\$5,212</b>	<b>\$0</b>	<b>\$240</b>	<b>\$10,000</b>	<b>\$15,452</b>
	Status (Additive)		Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)		1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	80.00 mhr	\$240
S	sr	Site restoration	1.00 acre			\$10,000 /acre	1.00 acre	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>014</b>	<b>North Portal Site Restoration</b>		<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>80</b>	<b>\$5,212</b>	<b>\$0</b>	<b>\$240</b>	<b>\$10,000</b>	<b>\$15,452</b>
	Status (Additive)		Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)		1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	80.00 mhr	\$240
S	sr	Site restoration	1.00 acre			\$10,000 /acre	1.00 acre	\$10,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>015</b>	<b>Underhill Site Restoration</b>		<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>80</b>	<b>\$5,212</b>	<b>\$0</b>	<b>\$240</b>	<b>\$5,000</b>	<b>\$10,452</b>
	Status (Additive)		Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)		1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	80.00 mhr	\$240
S	sr	Site restoration	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687

No.	Item Description		Item Quantity/Unit	Production rate	Other fixed time	Total time
<b>016</b>	<b>Camino Alto Site Restoration</b>		<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>80</b>	<b>\$5,212</b>	<b>\$0</b>	<b>\$240</b>	<b>\$5,000</b>	<b>\$10,452</b>
	Status (Additive)		Work schedule	Other ST pay	Other OT pay	
1.000	Schedule factor (Normal)		1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	80.00 mhr	\$240
S	sr	Site restoration	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687

**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Abandonment Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:05 PM</b>
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**DIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	Production rate	Other fixed time	Total time			
<b>017</b>	<b>Stetson Ave. Site Restoration</b>	<b>1 LS</b>		<b>5 days</b>	<b>5 work days</b>			
	manhours	Labor	Equipment	Material	Subcontract	Item Cost		
	<b>80</b>	<b>\$5,212</b>	<b>\$0</b>	<b>\$240</b>	<b>\$5,000</b>	<b>\$10,452</b>		
	Status (Additive)	Work schedule	Other ST pay	Other OT pay				
	1.000 Schedule factor (Normal)	8 hr/shift	1 shift/day	5 day/week	0 hr/shift			
R/T	Code	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies				\$3.00 /mhr	80.00 mhr	\$240
S	sr	Site restoration	0.50 acre			\$10,000 /acre	0.50 acre	\$5,000
L	lab	General Labor (Grp 3)				\$63.14 /mhr	40.00 mhr	\$2,525
L	lfm	Labor FM				\$67.17 /mhr	40.00 mhr	\$2,687

**McMILLEN JACOBS ASSOCIATES**

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**INDIRECT COST DETAIL**

No.	Item Description	Item Quantity/Unit	#N/A			
<b>018</b>	<b>Equipment Ownership not in Direct Cost</b>	<b>LS</b>				
	Equipment spread to Directs	Labor	Equipment	Material	Subcontract	Item Cost
	<b>\$95,900</b>	<b>\$0</b>	<b>\$82,500</b>	<b>\$0</b>	<b>\$0</b>	<b>\$82,500</b>
Notes:			Payment via Equipment Mobilization Bid Item			\$0
- Source Code: Fleet, Purchase, Mob Purchase, or Rental/lease.			Fleet Equipment	Purchased Equipment	Fleet + Purchase	Rental
- Ownership cost/hr is based on actual equipment months on-site at a single-shift utilization rate of 173 hours/month.			Value W/O	Value W/O	Value W/O	Amount
			\$859K 10%	\$330K 25%	\$1,189K 14%	\$10K

R/T	Resource Description	Source Code	Number of Units or Rental Period	Unit Purchase cost, Book value, or Rental Rate per period	Unit Write off	Unit Freight & Erection (carried in Mob/Demob) Freight in/out E/D mhr	Ownership Cost/hr	Equip. mos	Project Cost excluding freight/erection
M	Sales Tax			\$330,000	0.0%	(no sales tax)			\$0
	<i>Hourly Equipment used in Direct Cost Items: \$95,900</i>								
E	Cat 305 Mini-Exc 11k/.17cy	R	2 mo	\$5,000		\$500	\$50.00	1.2	in directs
E	Wheel Loader Cat 950/3.5cy	F	2 ea	\$217,000	10%	\$1,000	\$43.71	5.7	in directs
E	Generator, skid 210kW	F	2 ea	\$50,000	10%	\$400	\$10.07	5.7	in directs
E	Pump, subm. 140gpm/20ft head	F	1 ea	\$5,000	10%	\$50.00	\$0.84	3.4	in directs
E	Water Treatment Plant	F	1 ea	\$40,000	10%	\$500	\$6.76	3.4	in directs
E	Grout Slurry Mixer, 4cy	F	2 ea	\$40,000	10%	\$500	\$9.98	4.6	in directs
E	Conc. pump, trailer 76cy/hr	F	2 ea	\$100,000	10%	\$500	\$17.66	6.5	in directs
	<i>General Plant: \$82,500</i>								
E	Pickups	P	8 ea	\$30,000	25%	\$400	\$7.88	44.0	\$60,000
E	Mechanics Truck	P	1 ea	\$50,000	25%	\$400	\$13.14	5.5	\$12,500
E	Street Sweep	P	1 ea	\$40,000	25%	\$400	\$10.51	5.5	\$10,000

No.	Item Description	Item Quantity/Unit	Mob/demob paid as scheduled. Bond paid at NTP.			
<b>019</b>	<b>General Mobilization</b>	<b>0.5 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>261</b>	<b>\$16,619</b>	<b>\$5,026</b>	<b>\$151,630</b>	<b>\$0</b>	<b>\$173,274</b>
	522.000	\$33,237.61	\$10,051.41	\$303,259.20	\$0.00	\$346,548.22
		Work schedule		Other ST pay	Other OT pay	
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts Small tools and supplies				\$3.00 /mhr	261 mhr	\$783
M	Freight-see equipment ownership	50% of total (balance in Demobilization)			\$9,850 (5.5% of equip. cost)		\$4,925
M	Transfer from cost item 024 Bonds, Insurance, and Taxes not in General Mob				LS		\$35,922
M	Dryhouse	1 ea	400 sf/ea		\$20.00 /sf	400 sf	\$8,000
M	Fire protection system	1 loc			\$2,000 /loc	1 loc	\$2,000
M	First Aid trailer/furnishings	400 sf			\$40.00 /sf	400 sf	\$16,000
M	Fuel+Lube facilities	1 loc			\$5,000 /loc	1 loc	\$5,000
M	Job light and power system	1 loc			\$10,000 /loc	1 loc	\$10,000
M	Job sanitary system	1 loc			\$10,000 /loc	1 loc	\$10,000
M	Job water distribution	1 loc			\$10,000 /loc	1 loc	\$10,000
M	Office copier/computers/fax	1 sets			\$5,000 /sets	1 sets	\$5,000
M	Office furnishings	1 sets			\$2,000 /sets	1 sets	\$2,000
M	Office trailers	1 ea	400 sf/ea		\$40.00 /sf	400 sf	\$16,000
M	Shop	1 loc	800 sf/loc		\$10.00 /sf	800 sf	\$8,000
M	Signs	5 loc			\$2,000 /loc	5 loc	\$10,000
M	Warehouse	1 loc	800 sf/loc		\$10.00 /sf	800 sf	\$8,000
L	Labor crew - 1 operator x 2 loc			1	\$75.41 /mhr	87 mhr	\$6,560
L	Labor crew - 2 laborers x 2 loc			2	\$57.81 /mhr	174 mhr	\$10,058
E	Wheel Loader Cat 966/4.8cy 2 loc			1	\$57.77 /hr	87 hr	\$5,026

No.	Item Description	Item Quantity/Unit	Mob/demob paid as scheduled. Bond paid at NTP.			
<b>020</b>	<b>Demobilization/Punchlist</b>	<b>0.5 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost
	<b>261</b>	<b>\$16,437</b>	<b>\$4,708</b>	<b>\$60,708</b>	<b>\$0</b>	<b>\$81,853</b>
	522.000	\$32,873.24	\$9,416.45	\$121,416.00	\$0.00	\$163,705.68
		Work schedule		Other ST pay	Other OT pay	
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
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**INDIRECT COST DETAIL**

M	sts	Small tools and supplies			\$3.00 /mhr	261 mhr	\$783
M		Freight-see equipment ownership	50% of total (balance in Mobilization)		\$9,850 total		\$4,925
M		50% of Gen'l Mob matl less freight	1 LS	0.5	\$110,000 /LS	0.5 LS	\$55,000
L		Laborer		2	\$57.81 /mhr	174 mhr	\$10,058
L		Equipment Operator		1	\$73.31 /mhr	87 mhr	\$6,378
E		Wheel Loader Cat 966/4.8cy 2 loc		1	\$54.12 /hr	87 hr	\$4,708

No.	Item Description		Item Quantity/Unit		The duration is from the end of mob to the start of demob.		
<b>021</b>	<b>General Plant Operation/Maintenance</b>		<b>5.5 mo</b>				
	manhours	Labor	Equipment	Material	Subcontract	Item Cost	
	<b>476</b>	<b>\$29,167</b>	<b>\$0</b>	<b>\$55,328</b>	<b>\$19,250</b>	<b>\$103,745</b>	
	86.545	\$5,303.07	\$0.00	\$10,059.64	\$3,500.00	\$18,862.71	
		Work schedule			Other ST pay	Other OT pay	
		8 hr/shift	1 shift/day	5 day/week	0 hr/shift	0 hr/shift	
R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	sts	Small tools and supplies			\$3.00 /mhr	476 mhr	\$1,428
M		Access road maintenance			\$2,500 /mo	5.5 mo	\$13,750
M		Cell phone/radio fees	10 umo/mo		\$120 /umo	55 umo	\$6,600
M		Craft shop maintenance			\$600 /mo	5.5 mo	\$3,300
M		Drinking water supplies			\$600 /mo	5.5 mo	\$3,300
M		Dryhouse supplies		1	\$1,000 /mo	5.5 mo	\$5,500
M		Fire Protection supplies		1	\$600 /mo	5.5 mo	\$3,300
M		First Aid supplies		1	\$1,000 /mo	5.5 mo	\$5,500
M		Job light and power supplies		1	\$500 /mo	5.5 mo	\$2,750
S		Job sanitary system maintenance		1	\$2,000 /mo	5.5 mo	\$11,000
S		Office cleaning		1	\$1,500 /mo	5.5 mo	\$8,250
M		Office copier/computers/fax supplies		1	\$500 /mo	5.5 mo	\$2,750
M		Office phone/fax/data line fees		1	\$200 /mo	5.5 mo	\$1,100
M		Office supplies		1	\$600 /mo	5.5 mo	\$3,300
M		Water treatment plant supplies		1	\$500 /mo	5.5 mo	\$2,750
L		Water truck/Sweeper driver		0.5	\$61.27 /mhr	476 mhr	\$29,167

No.	Item Description		Item Quantity/Unit		The duration is from NTP to project completion.		
<b>022</b>	<b>Field Supervision</b>		<b>8.5 mo</b>				
	man-months	Labor	Equipment	Material	Subcontract	Item Cost	
	<b>32</b>	<b>\$380,238</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$380,238</b>	
	3.765	\$44,733.82	\$0.00	\$0.00	\$0.00	\$44,733.82	
		Vehicles	5 ea	24 vmo	Relocations	0 ea	

See the 'Resources' sheet for an explanation of field supervisory class codes, and associated labor burdens.  
'R?' and 'V?' codes denote if relocation expenses (both ways) are paid or a vehicle assigned, respectively - see cost item 023.  
5.50 mo end of mobe to beginning of demob

R/T	Class	Resource Description	R? V?	Personnel	Duration	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
L	-	Labor burden for personnel below - see the 'Resources' sheet					32.8% weighted average		\$93,988
L	KP	Project Manager	y	1 ea		0.5	\$15,000 /mmo	4.25 mmo	\$63,750
L	EP	Project Engineer	y	1 ea		0.5	\$10,000 /mmo	4.25 mmo	\$42,500
L	EP	Field Engineer		1 ea	5.5 mmo/ea		\$6,000 /mmo	5.5 mmo	\$33,000
L	EP	Safety Manager	y	1 ea		0.5	\$10,000 /mmo	4.25 mmo	\$42,500
L	NL	Secretary/Clerk		1 ea	5.5 mmo/ea	0.5	\$3,000 /mmo	2.75 mmo	\$8,250
L	KP	General Superintendent	y	1 ea	5.5 mmo/ea		\$13,000 /mmo	5.5 mmo	\$71,500
L	NL	1st Aid EMT - Dayshift	y	1 ea	5.5 mmo/ea		\$4,500 /mmo	5.5 mmo	\$24,750

No.	Item Description		Item Quantity/Unit		The duration is from NTP to project completion.		
<b>023</b>	<b>Overhead Maintenance/Service</b>		<b>8.5 mo</b>				
		Labor	Equipment	Material	Subcontract	Item Cost	
		<b>\$0</b>	<b>\$0</b>	<b>\$70,724</b>	<b>\$296,268</b>	<b>\$366,992</b>	
		\$0.00	\$0.00	\$8,320.41	\$34,855.11	\$43,175.52	
R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	Payroll processing, wage labor	49 mmo	4.33 chk/mmo		\$5.50 /chk	213 chk	\$1,172
M	Payroll processing, salary labor	32 mmo	2 chk/mmo		\$5.50 /chk	64 chk	\$352
M	Drug tests	10 test			\$200 /test	10 test	\$2,000
M	Audit fees	0.7 yr			\$4,000 /yr	0.7 yr	\$2,800



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**INDIRECT COST DETAIL**

M	Legal fees	0.7 yr		\$4,000 /yr	0.7 yr	\$2,800
M	Personnel recruiting	0.7 yr		\$1,000 /yr	0.7 yr	\$700
M	Design department charge	0.7 yr	Home Office Overhead items: 0.5% of bid.	\$5,000 /yr	0.7 yr	\$3,500
M	IT/EDP department charge	0.7 yr		\$2,000 /yr	0.7 yr	\$1,400
M	Equipment department charge	0.7 yr		\$5,000 /yr	0.7 yr	\$3,500
M	Accounting department charge	0.7 yr		\$4,000 /yr	0.7 yr	\$2,800
M	HR department charge	0.7 yr		\$2,000 /yr	0.7 yr	\$1,400
M	Corporate department charge	0.7 yr		\$4,000 /yr	0.7 yr	\$2,800
M	CPM scheduling charge	8.5 mo			\$500 /mo	8.5 mo
M	Project website maintenance			\$2,000 /mo	8.5 mo	\$17,000
M	Job photographs/video			\$500 /mo	8.5 mo	\$4,250
M	Pre-construction survey	1 LS		\$10,000 /LS	1 LS	\$10,000
M	Post-construction survey	1 LS		\$10,000 /LS	1 LS	\$10,000
S	Grouting Consultant	1 LS		\$10,000 /LS	1 LS	\$10,000
S	Environmental Consultant	8.50 mo	32 hr/mo	\$250 /hr	272 hr	\$68,000
S	Noise Monitoring Consultant	8.50 mo	32 hr/mo	\$250 /hr	272 hr	\$68,000
S	Security Service Day/Night/Weekend	8.50 mo		\$17,679 /mo	8.5 mo	\$150,268

No.	Item Description	Item Quantity/Unit				
	<b>024 Bonds, Insurance, and Taxes not in General Mob</b>	<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$238,389</b>	<b>\$0</b>	<b>\$238,389</b>

Items which are specified to be paid under General Mobilization are calculated here and flagged 'Y' in the 'Xfer to Mob?' field.  
Basis of contractor's equipment insurance is \$859K fleet book value + \$330K new purchases.

R/T	Resource Description	Xfer to Mob?	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	Credit for items specified to be transferred to cost item 019, General Mobilization					LS		-\$35,922
M	Performance bond	Y	\$4.5 M unescalated bid			\$8.00 /K Bid	\$4,490 K bid	\$35,922
M	Builder's risk		\$4.5 M cost	0.8 yr		\$3.00 /K-yr	\$3,592 K-yr	\$10,776
M	Automobile/pickup insurance		24.0 vmo			\$70.00 /vmo	24 vmo	\$1,680
M	Contractor equip. insurance		0.8 yr	\$1,189 K/yr		\$10.00 /K	\$951 K	\$9,512
M	Excess liability umbrella		1 LS			\$100,000 /LS	1 LS	\$100,000
M	Incident deductibles		1 LS			\$50,000 /LS	1 LS	\$50,000
M	State/Local business tax		1 LS			\$10,000 /LS	1 LS	\$10,000
M	Permits and licenses		1 LS			\$50,000 /LS	1 LS	\$50,000
M	Personal property tax		0.8 yr	\$1,189 K/yr	0.45	\$15.00 /K	428.04 K	\$6,421

No.	Item Description	Item Quantity/Unit				
	<b>025 Contractor Markup</b>	<b>LS</b>				
		Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$490,309</b>	<b>\$0</b>	<b>\$490,309</b>

R/T	Resource Description	Resource Quantity	Markup	12.3% of cost	Resource Cost
M	Direct Labor	\$587,539	35%	5.1%	\$205,639
M	Field Supervision	\$380,238	35%	3.3%	\$133,083
M	Equipment	\$325,037	5%	0.4%	\$16,252
M	Material	\$2,017,167	5%	2.5%	\$100,858
M	Subcontract	\$689,534	5%	0.9%	\$34,477

No.	Item Description	Item Quantity/Unit				
	<b>026 Financing Charges</b>	<b>LS</b>				
	Status (Additive)	Labor	Equipment	Unclassified Material	Subcontract	Item Cost
		<b>\$0</b>	<b>\$0</b>	<b>\$14,593</b>	<b>\$0</b>	<b>\$14,593</b>

Invoices	Securities ROR	Cost of capital	Progress payments	Retained earnings
Net 30 days	1.5%	3.0%	30 days	10% reduced to 5% at 75% of earned value

Calculate finance charges on the time elapsed from expenditures to perform the work to revenue received from progress payments.

Equipment purchases financing \$330,000 + \$0 tax.  
(60 payments x \$5,930/mo - \$330,000 x 100% allocation) x 25% average job writeoff.

R/T	Description	Resource Quantity	Average Financing Period	Project Allocation	Notes	Resource Cost
M	Direct labor payroll/add-ons	\$531,532	43 days	100% based on 4 payroll periods/mo		\$1,908
M	Field supervision payroll/add-ons	\$380,238	38 days	100% based on 2 payroll periods/mo		\$1,206



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**INDIRECT COST DETAIL**

M	Equipment purchases financing	\$330,000	5 years	100% of purchase financed	\$6,445
M	Material purchases/tax	\$1,665,803	30 days	100% of cost items 001-023	\$4,170
M	First retention release	\$168,383	6 mo	0% cash; 100% securities; net 1.5% rate	\$232
M	Last retention release	\$56,128	9 mo	0% cash; 100% securities; net 1.5% rate	\$632

No.	Item Description	Item Quantity/Unit				
<b>027 Contractor Contingency</b>						
		<b>LS</b>				
	Status (Additive)	Labor <b>\$0</b>	Equipment <b>\$0</b>	Unclassified Material <b>\$98,382</b>	Subcontract <b>\$0</b>	Item Cost <b>\$98,382</b>

R/T	Resource Description	Resource Qty/Unit	Production rate	Factor	Resource Unit Cost	Resource Quantity	Resource Cost
M	General Conditions	1 LS		0.02	\$2,459,549 /LS	0.02 LS	\$49,191
M	Mitigation Measures	1 LS		0.02	\$2,459,549 /LS	0.02 LS	\$49,191

No.	Item Description	Item Quantity/Unit				
<b>028 Escalation from NTP</b>						
		<b>LS</b>				
	Status (Additive)	Labor	Equipment	Material	Subcontract	Item Cost
	Escalation up to NTP (not applicable)	\$0	\$0	\$0	\$0	\$0
	Escalation after NTP	\$4,490	\$0	\$14,449	\$0	\$18,939
	<b>Total Escalation</b>	<b>\$4,490</b>	<b>\$0</b>	<b>\$14,449</b>	<b>\$0</b>	<b>\$18,939</b>

Since a fixed schedule date for NTP is not specified, escalation is calculated from NTP to the midpoint of each schedule activity for direct costs and on a yearly basis over the project duration for indirect costs. The average composite annual escalation rate is 3.0%.

R/T	Resource Description	Unescalated Cost	Escalation Rate/Year	Compounding Periods	(not applicable)	Escalated Cost
L	Direct Labor	\$587,539	3.0%	2 (semi-annually)	6/20/2017	\$4,490
L	Field Supervision	\$380,238	3.0%	1 (annually)	6/20/2017	\$0
E	Equipment	\$325,037	3.0%	1 (annually)	6/20/2017	\$0
M	Material (including unclassified)	\$2,507,475	3.0%	4 (quarterly)	6/20/2017	\$14,449
S	Subcontracts	\$689,534	3.0%	1 (annually)	6/20/2017	\$0

No.	Item Description	Item Quantity/Unit				
<b>029 Owner Contingency</b>						
		<b>LS</b>				
	Status (Additive)	Labor <b>\$0</b>	Equipment <b>\$0</b>	Unclassified Material <b>\$901,800</b>	Subcontract <b>\$0</b>	Item Cost <b>\$901,800</b>

C/T	Type of Contingency	Amount	Contingency Level	Resource Cost
T	Design Definition	\$4,508,762	20.0% of total	\$901,800

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**RESOURCE RATE AND USAGE DETAIL**

**DIRECT LABOR**

Basis: Prevailing wage rates

Employer Insurance Add-ons	Ind. Rate	Exp. Mod	Eff Rate	<b>Memo: Estimate Total</b>	Employer Payroll Tax Add-ons	Tax Rate	Annual Inc. Cap
Workers' Compensation	6.0%		6.0%	<b>\$19,767</b>	Fed. Social Security Tax	6.200%	\$118,500
Commercial General Liability	10.0%		10.0%	<b>\$32,945</b>	Fed. Medicaid Tax	0.145%	
CIGA/Terrorism/Other Add-ons	1.0%		1.0%	<b>\$3,295</b>	Fed. Unemployment Tax	0.600%	\$7,000
					CA Unemployment Tax	3.400%	\$7,000
					CA SDI	1.100%	\$100,800

Overtime	Rate						
General/Saturday overtime	1.5x						
Sunday/Holiday overtime	2.0x						
Misc. General overtime	2.0% built in rates			<b>\$7,731</b>	Weighted average:	\$34.56 /mhr Base+Vac	
						\$33.58 /mhr Fringes/Ins/Taxes	

Code	Resource/Group Description	Hourly Base+Vac	Hourly Fringes	Daily Subsistence/Travel	Ins & Taxes	Misc. Gen'l OT	Adjusted Rate/mhr	Total mhrs	Total Cost
<b>Laborers</b>									
lfm	Labor FM	\$35.24	\$22.20		\$8.76	\$0.97	\$67.17	1,393	\$93,556
lab	General Labor (Grp 3)	\$32.04	\$22.20		\$7.97	\$0.92	\$63.14	3,187	\$201,227
<b>Operating Engineers</b>									
eo35+	Excavator >.5cy (OG2)	\$41.14	\$30.43		\$10.20	\$1.22	\$82.99	200	\$16,598
lo35-	Loader oper. <3.5cy (OG4)	\$38.28	\$30.43		\$9.50	\$1.18	\$79.39	993	\$78,817
mw	HD Mech/Welder (OG4)	\$38.28	\$30.43		\$9.50	\$1.18	\$79.39	592	\$46,998
conc	Concrete equip.oper. (OG5)	\$37.01	\$30.43		\$9.19	\$1.16	\$77.79	1,133	\$88,120
	Mobilization Labor	\$32.34	\$22.45	\$0.00	\$7.95	\$0.93	\$63.67	261	\$16,619
	Demobilization Labor	\$31.98	\$22.20	\$0.00	\$7.87	\$0.92	\$62.98	261	\$16,437
	GP Operation/Maintenance Labor	\$31.12	\$21.60	\$0.00	\$7.65	\$0.90	\$61.27	476	\$29,167
	Craft Labor Escalation								\$4,490
<b>Total Craft Labor</b>		<b>\$295,853 escalated payroll</b>			<b>8,496 mhrs</b>				<b>\$592,029</b>

**FIELD SUPERVISORY LABOR (see cost item 022)**

Employer Insurance Add-ons	Ind. Rate	Exp. Mod	Eff. Rate	<b>Memo: Estimate Total</b>	Permanent Employee Benefits	Rate	Applied to classifications
Workers' Compensation	1.8%		1.8%	<b>\$5,153</b>	Key empl. bonus plan	8.0%	KP
Commercial Gen'l Liability	5.0%		5.0%	<b>\$14,313</b>	Employee medical plan	10.0%	KP, EP, EL, NP, NL
					Retirement/Pension plan	5.0%	KP, EP, NP
					Non-exempt salaried OT	2.0%	NP, NL

Employer Payroll Tax Add-ons  
7.6% payroll tax rate based on \$8,945/mmo weighted base salary.

Field Supervisory Labor Classification	Class	Total Burden
Key permanent employee	KP	37.4%
Exempt permanent employee	EP	29.4%
Exempt local hire employee	EL	24.4%
Non-exempt permanent employee	NP	31.4%
Non-exempt local hire employee	NL	26.4%

Supervisory Salaries						Total mmos	Total Cost
						32	\$380,238
<b>Total Supervisory Labor</b>	<b>\$286,250 escalated payroll</b>			<b>32 mmos</b>			<b>\$380,238</b>

**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Abandonment Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:05 PM</b>
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**RESOURCE RATE AND USAGE DETAIL**

**EQUIPMENT (see Cost Item 018 for development of hourly ownership costs)**

Basis: COE Rates, Year 2011

Region 8

Fuel/Power Factor High

Unit Cost

Electricity \$0.12 /kWh

Diesel \$3.89 /gal

Gas \$3.20 /gal

*Memo: Total including General Plant Mob/O&M*

*65,369 kWh*

*\$7,844*

*20,391 gal*

*\$79,321*

*0 gal*

*\$0*

Code	Resource/Group Description	Air Elec	Diesel Gas	HP/CFM	HPF	Equipment Value	Parts Cost/hr	Elec/Fuel Cost/hr	Ownership Cost/hr	Total Cost/hr	Total hrs	Total Cost
b305	Cat 305 Mini-Exc 11k/.17cy	D		47	65	\$72,813	\$7.77	\$6.96	\$50.00	\$64.73	200	\$12,946
	<b>Loaders</b>											
L950	Wheel Loader Cat 950/3.5cy	D		197	65	\$217,586	\$26.24	\$29.18	\$43.71	\$99.13	993	\$98,416
	<b>Concrete Equipment</b>											
c76	Conc. pump, trailer 76cy/hr	D		127	70	\$93,635	\$13.87	\$20.26	\$17.66	\$51.78	1,133	\$58,657
gsm	Grout Slurry Mixer, 4cy	E		120	80	\$40,000	\$2.00	\$8.76	\$9.98	\$20.74	802	\$16,621
	<b>Plant Equipment</b>											
g210	Generator, skid 210kW	D		314	33	\$37,885	\$6.61	\$23.61	\$10.07	\$40.29	993	\$40,001
p140	Pump, subm. 140gpm/20ft he:	E		2	90	\$4,135	\$0.41	\$0.16	\$0.84	\$1.42	592	\$840
wtp	Water Treatment Plant	E		15	90	\$350,000	\$1.00	\$1.23	\$6.76	\$8.99	592	\$5,321
	Equipment Ownership (excludes \$95,900 componant spread to Direct Costs)											\$82,500
	Mobilization Equipment										87	\$5,026
	Demobilization Equipment										87	\$4,708
	<b>Total Equipment</b>										<b>6,284 hrs</b>	<b>\$325,037</b>



**McMILLEN JACOBS ASSOCIATES**

Project <b>Alto Tunnel Tunnel Abandonment Study</b>	Client <b>Marin County</b>	Job No. <b>5581.0</b>	Estimator <b>TLP</b>	Rev <b>0</b>	Computed on <b>6/20/2017 4:05 PM</b>
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**RESOURCE RATE AND USAGE DETAIL**

**MATERIALS**

Code	Resource/Group Description	Unit Cost/Measure	Notes	Add Tax (-/N)?	Unit Cost F.O.B Job	Total Quantity	Total Cost
<b>Add-ons</b>							
tax	Sales Tax	8.250%	<i>Memo: Tax on Material ...and Equipment Purchases</i>	<b>\$96,403</b>			
			(4.6% of raw direct labor rate)	<b>\$0</b>			
sts	Small tools and supplies	\$3.00 mhr			\$3.00	8,496	\$25,487
<b>Concrete/Cement</b>							
cb	Cement, bulk	\$110.00 ton	Ashgrove Cement 10/2012		\$119.08	2,459	\$292,848
clsm	Controlled Low Strength Mate	\$90.00 cy			\$97.43	7,969	\$776,383
xg	Grout Admixtures	\$10.00 cy			\$10.83	12,964	\$140,339
<b>Formwork</b>							
lumb	Lumber for lagging/blocking	\$1.31 bf			\$1.42	1,121	\$1,589
ply1	Plywood MDO 1"	\$1.50 sf			\$1.62	280	\$455
<b>Permanent Materials</b>							
swppp	Silt Fence / Straw Waddles	\$5.00 lf	plug		\$5.41	2,000	\$10,825
h20	Water	\$100.00 kgal			\$108.25	392	\$42,483
xmisc	Miscellaneous material	\$1,000 lot		N	\$1,000	40	\$40,000
	Mobilization Freight and Materials						\$150,847
	Demobilization Freight and Materials						\$59,925
	General Plant Operation/Maintenance Materials						\$53,900
	Overhead Maintenance/Service Materials						\$70,724
	Bonds, Insurance, and Taxes not in General N (unclassified)						\$238,389
	Contractor Markup (unclassified)						\$490,309
	Financing Charges (unclassified)						\$14,593
	Contractor Contingency (unclassified)						\$98,382
	Material Escalation						\$14,449
						<b>Total Material</b>	<b>\$2,521,924</b>

**SUBCONTRACTS**

Code	Resource/Group Description	Unit Cost/Measure	Notes	Total Quantity	Total Cost	
<b>Sitework</b>						
cg	Clearing and grubbing	\$10,000.00 acre		4	\$35,000	
sr	Site restoration	\$10,000.00 acre	Plug Price	4	\$35,000	
tfnc	Temporary Construction Fenc	\$25.00 lf		2,000	\$50,000	
<b>Specialty Subcontracts</b>						
Drill	Drilling Subcontractor	\$98.00 lf		2,592	\$254,016	
	General Plant Operation/Maintenance Subcontracts				\$19,250	
	Overhead Maintenance/Service Subcontracts				\$296,268	
					<b>Total Subcontract</b>	<b>\$689,534</b>
					<b>Escalated Construction Bid</b>	<b>\$4,508,762</b>

**McMILLEN JACOBS ASSOCIATES**

Project	Client	Job No.	Estimator	Rev	Computed on
<b>Alto Tunnel</b>	<b>Marin County</b>	<b>5581.0</b>	<b>TLP</b>	<b>0</b>	<b>6/20/2017</b>
<b>Tunnel Abandonment Study</b>					<b>4:05 PM</b>

**RESOURCE RATE AND USAGE DETAIL**

**SUMMARY BY RESOURCE TYPE**

Cost Type	Labor	Equipment	Material	Subcontract	Total
Direct* Cost	\$525,316	\$232,803	\$1,327,414	\$374,016	\$2,459,549
Indirect* Cost	\$442,460	\$92,234	\$338,389	\$315,518	\$2,030,274
Indirect Cost (unclassified)	-	-	\$841,672	-	-
Owner Allowances	-	-	-	-	-
Escalation from NTP	\$4,490	\$0	\$14,449	\$0	\$18,939
<b>Escalated Construction Bid</b>	<b>\$972,266</b>	<b>\$325,037</b>	<b>\$2,521,924</b>	<b>\$689,534</b>	<b>\$4,508,762</b>
Relative Direct* + Indirect* Costs	27%	9%	46%	19%	100% on \$3,648,151

**SUMMARY BY COST TYPE**

Cost Type	Total	% Total Estimate	% Direct, Equipment and Plant Cost	Applicable Cost Items
Mobilization/Demobilization	\$255,127	5.7%	9.6%	019 - 020
Directs, Equipment, and Plant	\$2,645,794	58.9%	100.0%	001 - 018, 021 -
Overhead/Profit	\$1,588,902	35.4%	60.1%	022 - 027
Owner Allowances	-			
<b>Unescalated Construction Bid</b>	<b>\$4,489,823</b>		<b>169.7%</b>	

**UNESCALATED TIME-RELATED INDIRECT COST BREAKDOWN**

Cost Type	Average Cost/month	Exclude?	
Lineal/Other Plant Equipment CFC	\$0 /mo		Monthly costs include adjustments totalling 5.6% for: - bonds, insurance, and taxes - financing charges but exclude contractor contingency
GP operation/maintenance	\$19,926 /mo		
Weekend maintenance			
Field supervision	\$47,254 /mo		
OH maintenance/service	\$45,608 /mo		
<b>Total</b>	<b>\$112,788 /mo (excluding markup)</b>		<b>\$134,100 /mo (including markup)</b>

**DISTRIBUTION OF PROJECT NON-WORKDAYS**

Type of non-workday	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar Year	Total Project	
Holiday		1	1	0	0	1	0	1	0	1	0	2	2	9	4
Inclement Weather Day		2	2	1	0	0	0	0	0	0	2	2	9	3	
<b>Total</b>		<b>3</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>18</b>	<b>7</b>