Attachment F

Monte Carlo Simulation Reports

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Yreka water supply Dam A modifications Most Probable	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - REV1 - 4-2011.xlsx]Dam A

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Remove & dispose steel frame with slide	86-68140	1	ea	$6,500.00	$6,500.00
		gates/weirs					
		14 ft wide x 9 ft tall, weight unknown					
		assume contains heavy metals					
	2	Remove & dispose by steel bulkhead panel	86-68140	1	ea	$1,000.00	$1,000.00
		3'-2" ft wide x 5'-6" tall					
		assume contains heavy metals					
	3	Remove & dispose fish screen panels	86-68140	6	ea	$1,000.00	$6,000.00
		3 ft wide x 5'-6" tall each					
		assume contains heavy metals					
	4	Cut, remove concrete deck	86-68140	2.4	cf	$150.00	$360.00
		3 ft x 1'-7" x 6 in					
	5	Remove & dipsose wood frame building	86-68140	1	ea	$25,000.00	$25,000.00
		16 ft x 12 ft with roll up door					
	6	Furnish, install wood frame building	86-68140	1	ea	$50,000.00	$50,000.00
		16 ft x 12 ft with two roll up doors					
		9 ft x 7 ft door, 12 ft x 7 ft door					
	7	Furnish & install steel slide gate with pedestal lift	86-68140	2	ea	$4,000.00	$8,000.00
		30" wide x 42", 500 lb ea.					
	7a	Furnish and place concrete walls		0	cy	$1,300.00	
		3 @ 5-6 h x 5 w x 1 ft thick					
		reinf. - 115 lb ea					
		27 #5 dowels, drill and grout					
	7b	Extend 220v power to the site		0	lf	$150.00	
		distance is about 350 ft, lots of clearing					
	7c	Diversion & care		0	ls	$100,000.00	
		assume 10 cfs for 40 days					
		Note: All work on this sheet takes place on existing					
		diversion dam with water flowing. Workers will					
		be above flowing water on diversion structure.					
		SUBTOTAL THIS SHEET					**$96,860.00**

QUANTITIES		PRICES	
BY Sayer	CHECKED	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/15/11	PEER REVIEW / DATE Dave Edwards 1/24/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE ACD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam A modifications

Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	8	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$100,000.00	$100,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Inclined track length = 10 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with internal propellar drives and 12 volt					
		DC winch					
		Furnish and install three bulkheads, welded	86-68410				
		structural steel construction, protective					
		coating.					
	9a	- 3 Bulkheads, 500 lbs. ea.		1,500	lbs	$7.50	$11,250.00
	9b	-30 - ½" dia. x 9" epoxy anchors		30	ea	$25.00	$750.00
		DAM A MODIFICATIONS SUBTOTAL					**$208,860.00**

QUANTITIES		PRICES	
BY R. Stephen	**CHECKED** R. Christensen	**BY** Craig A. Grush, P.E.	**CHECKED** Jug Alm 3/8/11
DATE PREPARED 01/20/11	**PEER REVIEW / DATE** T. Hummel P.E. 1/21/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Yreka water supply
Dam B modifications

Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Appraisal
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - REV1 - 4-2011.xlsx]Dam B

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	10	Excavation for structure	86-68140	40	cy	$80.00	$3,200.00
	11	Compacted backfill for structure	86-68140	30	cy	$60.00	$1,800.00
	12	Concrete removal, 2'x2' cut opening	86-68140	4	cf	$150.00	$600.00
	13	Furnish & place concrete in structure	86-68140	8	cy	$1,300.00	$10,400.00
	14	Remove & dipose existing trashrack	86-68140	1	ea	$2,500.00	$2,500.00
		5 ft x 9 ft					
		assume contains heavy metals					
	15	Furnish & install grating	86-68140	25	sf	$200.00	$5,000.00
	15a	Furnish and place concrete wall		0	cy	$2,200.00	
		size, 9.5 ft tall, 5 ft w, 1 ft thick					
		11 #5 dowels, drill and grout					
		reinf - 200 lb					
	15b	Extend 220v power to the site		0	lf	$150.00	
		distance is about 280 ft, lots of clearing					
	16	Diversion & care	86-68140	1	ls		$50,000.00
		assume 10 cfs for 10 days					
	17	Create access to dam	86-68140	1	ls		$30,000.00
		SUBTOTAL THIS SHEET					**$103,500.00**

QUANTITIES		PRICES	
BY Sayer	CHECKED	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/15/11	PEER REVIEW / DATE Dave Edwards 1/24/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE ACD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam B modifications

Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	18	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$100,000.00	$100,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Vertical track length = 12 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with internal propellar drives and 12 volt					
		DC winch					
		Furnish and install bulkhead to replace trashrack,	86-68410				
		welded structural steel construction,					
		protective coating.					
	19a	- 1 Bulkhead, 1,200 lbs.		1,200	lbs	$7.50	$9,000.00
	19b	-18 - ½" dia. x 9" epoxy anchors		18	ea	$25.00	$450.00
		DAM B MODIFICATIONS SUBTOTAL					**$212,950.00**

QUANTITIES		PRICES	
BY R. Stephen	**CHECKED** R. Christensen	**BY** Craig A. Grush, P.E.	**CHECKED** 3/8/11
DATE PREPARED 01/20/11	**PEER REVIEW / DATE** T. Hummel P.E. 1/21/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Yreka pipe crossing
Iron Gate Reservoir
Most Probable

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Appraisal
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	20	Three span, pre-engineered pipe support	86-68140	1	ea	$700,000.00	$700,000.00
		access bridge, with 7.5' box truss					
		Span lengths are 100', 200', 100'.					
		Support one 24" Dia. Welded steel pipe.					
		Steel pipe and supports, Wt.=150 lbs/linear ft					
		Water, Wt.=200 lbs/linear ft					
		Funish & place reinforced concrete caps for					
		abutment 1 and pier 1 (4' diameter column)					
	21	Concrete	86-68140	25	cy	$2,500.00	$62,500.00
	22	Reinforcement, epoxy coated	86-68140	10,000	lb	$2.00	$20,000.00
		Drilled shafts					
	23	5'-0" Diameter @ pier 1	86-68140	16	lf	$6,000.00	$96,000.00
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	24	3'-0" Diameter @ abutment 1	86-68140	52	lf	$1,500.00	$78,000.00
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
		SUBTOTAL THIS SHEET					**$956,500.00**

QUANTITIES		PRICES	
BY Sayer	**CHECKED** Clough 1/11/11	**BY** Craig A. Grush, P.E.	**CHECKED** Greg Allen 3/8/11
DATE PREPARED 01/10/11	**PEER REVIEW / DATE** Jesus Romero, PE 1/12/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Yreka pipe crossing
Iron Gate Reservoir
Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Furnish & place reinforced concrete caps for					
		abutment 2 and pier 2 (4' diameter column)					
	25	Concrete	86-68140	25	cy	$2,500.00	$62,500.00
	26	Reinforcement, epoxy coated	86-68140	10,000	lb	$2.00	$20,000.00
		Drilled shafts					
	27	5'-0" Diameter @ pier 2	86-68140	16	lf	$6,000.00	$96,000.00
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	28	3'-0" Diameter @ abutment 2	86-68140	52	lf	$1,500.00	$78,000.00
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
	29	Remove & dispose existing steel pipe,	86-68140	20	lf	$50.00	$1,000.00
		1/4 inch wall, 24" dia.					
		assume contains heavy metals					
	30	Welded steel pipe, 1/4 inch wall, 24 inch dia.	86-68140	490	lf	$200.00	$98,000.00
		epoxy primer, polyurethane top coat, exterior					
		coal-tar epoxy lined					
	31	Install/Remove 2 access ramps for piers,	86-68140	270	cy	$100.00	$27,000.00
		dumped compacted gravel in river					
	32	Excavation for pipe trench	86-68140	70	cy	$15.00	$1,050.00
	33	CLSM pipe bedding	86-68140	8	cy	$300.00	$2,400.00
	34	Backfill in pipe trench	86-68140	55	cy	$30.00	$1,650.00
		PIPE CROSSING SUBTOTAL					**$1,344,100.00**

QUANTITIES		**PRICES**	
BY Sayer	**CHECKED**	**BY** Craig A. Grush, P.E.	**CHECKED** Greg Allen 3/9/11
DATE PREPARED 01/10/11	**PEER REVIEW / DATE**	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DGD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply	Klamath River Northern California/Southern Oregon
	WOID: AF484 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
Most Probable SUMMARY	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Dam A Modifications					$208,860.00
		Dam B Modifications					$212,950.00
		Pipe Crossing					$1,344,100.00
		Subtotal					**$1,765,910.00**
		Mobilization	5%	+/-			$88,000.00
		Subtotal 1 with Mobilization					**$1,853,910.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$637,590.00
		(assumes 3%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$2,491,500.00
		Design Contingencies	15%	+/-			$408,500.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$2,900,000.00**
		Construction Contingencies	25%	+/-			$700,000.00
		FIELD COST					**$3,600,000.00**
		Non-Contract Costs:	55%	+/-			$2,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 1%,					
		Engineering Design ~ 4%, Permitting ~ 3%,					
		Procurement ~ 1%, Construction Management					
		~ 10%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$5,600,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED 04-19-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 04/19/11	PEER REVIEW / DATE 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam A modifications

Most Probable High

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Remove & dispose steel frame with slide	86-68140	1	ea	$7,000.00	$7,000.00
		gates/weirs					
		14 ft wide x 9 ft tall, weight unknown					
		assume contains heavy metals					
	2	Remove & dispose by steel bulkhead panel	86-68140	1	ea	$1,050.00	$1,050.00
		3'-2" ft wide x 5'-6" tall					
		assume contains heavy metals					
	3	Remove & dispose fish screen panels	86-68140	6	ea	$1,050.00	$6,300.00
		3 ft wide x 5'-6" tall each					
		assume contains heavy metals					
	4	Cut, remove concrete deck	86-68140	2.4	cf	$160.00	$384.00
		3 ft x 1'-7" x 6 in					
	5	Remove & dipsose wood frame building	86-68140	1	ea	$26,000.00	$26,000.00
		16 ft x 12 ft with roll up door					
	6	Furnish, install wood frame building	86-68140	1	ea	$52,500.00	$52,500.00
		16 ft x 12 ft with two roll up doors					
		9 ft x 7 ft door, 12 ft x 7 ft door					
	7	Furnish & install steel slide gate with pedestal lift	86-68140	2	ea	$4,200.00	$8,400.00
		30" wide x 42", 500 lb ea.					
	7a	Furnish and place concrete walls		3.1	cy	$1,350.00	$4,185.00
		3 @ 5-6 h x 5 w x 1 ft thick					
		reinf. - 115 lb ea					
		27 #5 dowels, drill and grout					
	7b	Extend 220v power to the site		350	lf	$160.00	$56,000.00
		distance is about 350 ft, lots of clearing					
	7c	Diversion & care		1	ls		$105,000.00
		assume 10 cfs for 40 days					
		SUBTOTAL THIS SHEET					**$266,819.00**

QUANTITIES		**PRICES**	
BY Sayer	**CHECKED**	**BY** Craig A. Grush, P.E.	**CHECKED** 03-08-11
DATE PREPARED 01/15/11	**PEER REVIEW / DATE** Dave Edwards 1/24/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply Dam A modifications Most Probable High	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 4-2011.xlsx]Dam B

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	8	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$150,000.00	$150,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Inclined track length = 10 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with electrical drives and 120 volt					
		AC winch					
		Furnish and install three bulkheads, welded	86-68410				
		structural steel construction, protective					
		coating.					
	9a	- 3 Bulkheads, 500 lbs. ea.		0	lbs	$8.00	
	9b	-30 - ½" dia. x 9" epoxy anchors		0	ea	$26.00	
		DAM A MODIFICATIONS SUBTOTAL					**$416,819.00**

QUANTITIES		PRICES	
BY R. Stephen	CHECKED R. Christensen	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/20/11	PEER REVIEW / DATE T. Hummel P.E. 1/21/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE DCD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam B modifications

Most Probable High

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	10	Excavation for structure	86-68140	40	cy	$120.00	$4,800.00
	11	Compacted backfill for structure	86-68140	30	cy	$65.00	$1,950.00
	12	Concrete removal, 2'x2' cut opening	86-68140	4	cf	$160.00	$640.00
	13	Furnish & place concrete in structure	86-68140	8	cy	$1,350.00	$10,800.00
	14	Remove & dipose existing trashrack	86-68140	1	ea	$2,600.00	$2,600.00
		5 ft x 9 ft					
		assume contains heavy metals					
	15	Furnish & install grating	86-68140	25	sf	$210.00	$5,250.00
	15a	Furnish and place concrete wall		1.8	cy	$2,325.00	$4,185.00
		size, 9.5 ft tall, 5 ft w, 1 ft thick					
		11 #5 dowels, drill and grout					
		reinf - 200 lb					
	15b	Extend 220v power to the site		280	lf	$160.00	$44,800.00
		distance is about 280 ft, lots of clearing					
	16	Diversion & care	86-68140	1	ls		$75,000.00
		assume 10 cfs for 10 days					
	17	Create access to dam	86-68140	1	ls		$50,000.00
		SUBTOTAL THIS SHEET					**$200,025.00**

QUANTITIES		**PRICES**	
BY Sayer	**CHECKED**	**BY** Craig A. Grush, P.E.	**CHECKED** 03-08-11
DATE PREPARED 01/15/11	**PEER REVIEW / DATE** Dave Edwards 1/24/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply Dam B modifications Most Probable High	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	18	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$150,000.00	$150,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Vertical track length = 12 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with electrical drives and 120 volt					
		AC winch					
		Furnish and install bulkhead to replace trashrack,	86-68410				
		welded structural steel construction,					
		protective coating.					
	19a	- 1 Bulkhead, 1,200 lbs.		0	lbs	$8.00	
	19b	-18 - ½" dia. x 9" epoxy anchors		0	ea	$26.00	
		DAM B MODIFICATIONS SUBTOTAL					**$350,025.00**

QUANTITIES		PRICES	
BY R. Stephen	CHECKED R. Christensen	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/20/11	PEER REVIEW / DATE T. Hummel P.E. 1/21/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE DCD 8/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Yreka pipe crossing
Iron Gate Reservoir
Most Probable High

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Appraisal
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	20	Furnish & install three span, pre-engineered	86-68140	1	ea	$1,365,000.00	$1,365,000.00
		pipe support/pedestrian access bridge, with 8'					
		clear width. Span lengths are 100', 200', 100'.					
		Support one 24" Dia. Welded steel pipe.					
		Steel pipe and supports, Wt.=150 lbs/linear ft					
		Water, Wt.=200 lbs/linear ft					
		4'-0" pedestrian walkway, with 85 psf live load					
		(Includes epoxy anchor bolts, and 8'-0" high					
		chain link fence (7'-0" fabric and 1'-0" high					
		3-strand barbed wire) on bridge (vinyl coated)					
		Funish & place reinforced concrete caps for					
		abutment 1 and pier 1 (4' diameter column)					
	21	Concrete	86-68140	25	cy	$2,600.00	$65,000.00
	22	Reinforcement, epoxy coated	86-68140	10,000	lb	$2.10	$21,000.00
		Drilled shafts					
	23	5'-0" Diameter @ pier 1	86-68140	16	lf	$10,000.00	$160,000.00
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	24	3'-0" Diameter @ abutment 1	86-68140	52	lf	$2,500.00	$130,000.00
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
		SUBTOTAL THIS SHEET					**$1,741,000.00**

QUANTITIES		PRICES	
BY Sayer	**CHECKED** Clough 11/05/10	**BY** Craig A. Grush, P.E.	**CHECKED** 03-08-11
DATE PREPARED 11/05/10	**PEER REVIEW / DATE** Jesus Romero, PE 11/05/10	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Yreka pipe crossing
Iron Gate Reservoir
Most Probable High

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 2-2011.xlsx]Pipe Crossing

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Furnish & place reinforced concrete caps for					
		abutment 2 and pier 2 (4' diameter column)					
	25	Concrete	86-68140	25	cy	$2,600.00	$65,000.00
	26	Reinforcement, epoxy coated	86-68140	10,000	lb	$2.10	$21,000.00
		Drilled shafts					
	27	5'-0" Diameter @ pier 2	86-68140	16	lf	$10,000.00	$160,000.00
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	28	3'-0" Diameter @ abutment 2	86-68140	52	lf	$2,500.00	$130,000.00
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
	29	Remove & dispose existing steel pipe,	86-68140	20	lf	$52.00	$1,040.00
		1/4 inch wall, 24" dia.					
		assume contains heavy metals					
	30	Welded steel pipe, 1/4 inch wall, 24 inch dia.	86-68140	490	lf	$210.00	$102,900.00
		epoxy primer, polyurethane top coat, exterior					
		coal-tar epoxy lined					
	31	Install/Remove 2 access ramps for piers,	86-68140	270	cy	$150.00	$40,500.00
		dumped compacted gravel in river					
	32	Excavation for pipe trench	86-68140	70	cy	$25.00	$1,750.00
	33	CLSM pipe bedding	86-68140	8	cy	$315.00	$2,520.00
	34	Backfill in pipe trench	86-68140	55	cy	$32.00	$1,760.00
		PIPE CROSSING SUBTOTAL					**$2,267,470.00**

QUANTITIES		PRICES	
BY Sayer	**CHECKED** Clough 11/05/10	**BY** Craig A. Grush, P.E.	**CHECKED** 03-10-11
DATE PREPARED 11/05/10	**PEER REVIEW / DATE**	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** DCD 3/10/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
Most Probable High SUMMARY	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPH - Appraisal Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Dam A Modifications					$416,819.00
		Dam B Modifications					$350,025.00
		Pipe Crossing					$2,267,470.00
		Subtotal					**$3,034,314.00**
		Mobilization	5%	+/-			$150,000.00
		Subtotal 1 with Mobilization					**$3,184,314.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$1,701,993.00
		(assumes 4.375%/yr compounding over 10 years) - Covered as a separate feature within the Project Summary of Costs					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$4,886,307.00
		Design Contingencies	20%	+/-			$996,422.00
		Allowance for Procurement Strategies (APS)	2%	+/-			$117,271.00
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$6,000,000.00**
		Construction Contingencies	30%	+/-			$1,800,000.00
		FIELD COST					**$7,800,000.00**
		Non-Contract Costs:	61%	+/-			$4,700,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 2%,					
		Engineering Design ~ 6%, Permitting ~ 4%,					
		Procurement ~ 2%, Construction Management					
		~ 11%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$12,500,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED 05-10-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 03/08/11	PEER REVIEW / DATE ACD 05-10-11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam A modifications

Most Probable Low

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Appraisal
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPL - Appraisal Est - 4-2011.xlsx]Pipe Crossing

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Remove & dispose steel frame with slide	86-68140	1	ea	$6,000.00	$6,000.00
		gates/weirs					
		14 ft wide x 9 ft tall, weight unknown					
		assume contains heavy metals					
	2	Remove & dispose by steel bulkhead panel	86-68140	1	ea	$950.00	$950.00
		3'-2" ft wide x 5'-6" tall					
		assume contains heavy metals					
	3	Remove & dispose fish screen panels	86-68140	6	ea	$950.00	$5,700.00
		3 ft wide x 5'-6" tall each					
		assume contains heavy metals					
	4	Cut, remove concrete deck	86-68140	2.4	cf	$140.00	$336.00
		3 ft x 1'-7" x 6 in					
	5	Remove & dipsose wood frame building	86-68140	1	ea	$24,000.00	$24,000.00
		16 ft x 12 ft with roll up door					
	6	Furnish, install wood frame building	86-68140	1	ea	$47,500.00	$47,500.00
		16 ft x 12 ft with two roll up doors					
		9 ft x 7 ft door, 12 ft x 7 ft door					
	7	Furnish & install steel slide gate with pedestal lift	86-68140	2	ea	$3,800.00	$7,600.00
		30" wide x 42", 500 lb ea.					
	7a	Furnish and place concrete walls		0	cy	$1,250.00	
		3 @ 5-6 h x 5 w x 1 ft thick					
		reinf. - 115 lb ea					
		27 #5 dowels, drill and grout					
	7b	Extend 220v power to the site		0	lf	$140.00	
		distance is about 350 ft, lots of clearing					
	7c	Diversion & care		0	ls	$95,000.00	
		assume 10 cfs for 40 days					
		Note: All work on this sheet takes place on existing					
		diversion dam with water flowing. Workers will					
		be above flowing water on diversion structure.					
		SUBTOTAL THIS SHEET					**$92,086.00**

QUANTITIES		PRICES	
BY Sayer	**CHECKED**	**BY** Craig A. Grush, P.E.	**CHECKED** DW 05-23-11
DATE PREPARED 01/15/11	**PEER REVIEW / DATE** Dave Edwards 1/24/11	**DATE PREPARED** 05/23/11	**PEER REVIEW / DATE** DCD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam A modifications

Most Probable Low

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	8	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$95,000.00	$95,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Inclined track length = 10 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with internal propellar drives and 12 volt					
		DC winch					
		Furnish and install three bulkheads, welded	86-68410				
		structural steel construction, protective					
		coating.					
	9a	- 3 Bulkheads, 500 lbs. ea.		1,500	lbs	$7.00	$10,500.00
	9b	-30 - ½" dia. x 9" epoxy anchors		30	ea	$24.00	$720.00
		DAM A MODIFICATIONS SUBTOTAL					**$198,306.00**

QUANTITIES		PRICES	
BY R. Stephen	**CHECKED** R. Christensen	**BY** Craig A. Grush, P.E.	**CHECKED** 3/8/11
DATE PREPARED 01/20/11	**PEER REVIEW / DATE** T. Hummel P.E. 1/21/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply Dam B modifications	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
Most Probable Low	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPL - Appraisal Est - 4-2011.xlsx]Pipe Crossing

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	10	Excavation for structure	86-68140	40	cy	$75.00	$3,000.00
	11	Compacted backfill for structure	86-68140	30	cy	$55.00	$1,650.00
	12	Concrete removal, 2'x2' cut opening	86-68140	4	cf	$140.00	$560.00
	13	Furnish & place concrete in structure	86-68140	8	cy	$1,250.00	$10,000.00
	14	Remove & dipose existing trashrack	86-68140	1	ea	$2,400.00	$2,400.00
		5 ft x 9 ft					
		assume contains heavy metals					
	15	Furnish & install grating	86-68140	25	sf	$190.00	$4,750.00
	15a	Furnish and place concrete wall		0	cy	$2,100.00	
		size, 9.5 ft tall, 5 ft w, 1 ft thick					
		11 #5 dowels, drill and grout					
		reinf - 200 lb					
	15b	Extend 220v power to the site		0	lf	$140.00	
		distance is about 280 ft, lots of clearing					
	16	Diversion & care	86-68140	1	ls		$47,500.00
		assume 10 cfs for 10 days					
	17	Create access to dam	86-68140	1	ls		$28,500.00
		SUBTOTAL THIS SHEET					**$98,360.00**

QUANTITIES		PRICES	
BY Sayer	CHECKED	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/15/11	PEER REVIEW / DATE Dave Edwards 1/24/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE DCD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka water supply
Dam B modifications

Most Probable Low

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MP - Appraisal Est - 2-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	18	Furnish and install cylindrical tee fish screen	86-68410	1	ea	$95,000.00	$95,000.00
		(Q= 15 cfs)					
		Assumes approach velocity = 0.33 ft/s					
		Screen diameter = 30 inches					
		Overall unit length = 128"					
		Vertical track length = 12 ft					
		All stainless steel 304 or 316					
		Assume: ISI screen model T30-42					
		with internal propellar drives and 12 volt					
		DC winch					
		Furnish and install bulkhead to replace trashrack,	86-68410				
		welded structural steel construction,					
		protective coating.					
	19a	- 1 Bulkhead, 1,200 lbs.		1,200	lbs	$7.00	$8,400.00
	19b	-18 - ½" dia. x 9" epoxy anchors		18	ea	$24.00	$432.00
		DAM B MODIFICATIONS SUBTOTAL					**$202,192.00**

QUANTITIES		PRICES	
BY R. Stephen	**CHECKED** R. Christensen	**BY** Craig A. Grush, P.E.	**CHECKED** 3/8/11
DATE PREPARED 01/20/11	**PEER REVIEW / DATE** T. Hummel P.E. 1/21/11	**DATE PREPARED** 03/08/11	**PEER REVIEW / DATE** 3/9/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply Yreka pipe crossing - mount pipe on haul bridge Iron Gate Reservoir Most Probable Low	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPL - Appraisal Est - 4-2011.xlsx]Pipe Crossing

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	20	Three span, pre-engineered pipe support	86-68140	0	ea	$650,000.00	
		access bridge, with 7.5' box truss					
		Span lengths are 100', 200', 100'.					
		Support one 24" Dia. Welded steel pipe.					
		Steel pipe and supports, Wt.=150 lbs/linear ft					
		Water, Wt.=200 lbs/linear ft					
		Funish & place reinforced concrete caps for					
		abutment 1 and pier 1 (4' diameter column)					
	21	Concrete	86-68140	0	cy	$2,400.00	
	22	Reinforcement, epoxy coated	86-68140	0	lb	$1.90	
		Drilled shafts					
	23	5'-0" Diameter @ pier 1	86-68140	0	lf	$5,500.00	
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	24	3'-0" Diameter @ abutment 1	86-68140	0	lf	$1,400.00	
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY Sayer	CHECKED Clough 1/11/11	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/10/11	PEER REVIEW / DATE Jesus Romero, PE 1/12/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply Yreka pipe crossing - mount pipe on haul bridge Iron Gate Reservoir Most Probable Low	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Klamath Dams Removal - Yreka Water Supply Line - MPL - Appraisal Est - 4-2011.xlsx]Pipe Crossing

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Furnish & place reinforced concrete caps for					
		abutment 2 and pier 2 (4' diameter column)					
	25	Concrete	86-68140	0	cy	$2,400.00	
	26	Reinforcement, epoxy coated	86-68140	0	lb	$1.90	
		Drilled shafts					
	27	5'-0" Diameter @ pier 2	86-68140	0	lf	$5,500.00	
		(Pier drilled shaft requires 12 CY of concrete					
		and 5,000 lbs of reinforcement)					
	28	3'-0" Diameter @ abutment 2	86-68140	0	lf	$1,400.00	
		(Abutment drilled shafts require 14 CY of					
		concrete and 8,000 lbs of reinforcement)					
	29	Remove & dispose existing steel pipe,	86-68140	0	lf	$45.00	
		1/4 inch wall, 24" dia.					
		assume contains heavy metals					
	30	Welded steel pipe, 1/4 inch wall, 24 inch dia.	86-68140	2,100	lf	$190.00	$399,000.00
		epoxy primer, polyurethane top coat, exterior					
		coal-tar epoxy lined					
	31	Install/Remove 2 access ramps for piers,	86-68140	0	cy	$95.00	
		dumped compacted gravel in river					
	32	Excavation for pipe trench	86-68140	1,800	cy	$14.00	$25,200.00
	33	CLSM pipe bedding	86-68140	200	cy	$285.00	$57,000.00
	34	Backfill in pipe trench	86-68140	1,400	cy	$28.00	$39,200.00
		PIPE CROSSING SUBTOTAL					**$520,400.00**

QUANTITIES		PRICES	
BY	CHECKED Sayer	BY Craig A. Grush, P.E.	CHECKED 05-23-11
DATE PREPARED 01/05/11	PEER REVIEW / DATE Jesus Romero, PE 1/09/11	DATE PREPARED 05/23/11	PEER REVIEW / DATE RCD 5/24/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Yreka water supply	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
Most Probable Low SUMMARY	FILE: C:\Craig Stuff @ Work\[2011 PP.xlsx]PP1110

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Dam A Modifications					$198,306.00
		Dam B Modifications					$202,192.00
		Pipe Crossing					$520,400.00
		Subtotal					**$920,898.00**
		Mobilization	5%	+/-			$46,000.00
		Subtotal 1 with Mobilization					**$966,898.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$155,227.00
		(assumes 1.5%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$1,122,125.00
		Design Contingencies	13%	+/-			$127,875.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$1,250,000.00**
		Construction Contingencies	23%	+/-			$300,000.00
		FIELD COST					**$1,550,000.00**
		Non-Contract Costs:	52%	+/-			$850,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 1%,					
		Engineering Design ~ 3%, Permitting ~ 2%,					
		Procurement ~ 1%, Construction Management					
		~ 9%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$2,400,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED 05-10-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 05/10/11	PEER REVIEW / DATE DCD 05-10-11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka Water Supply
Escalation Included

SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Appraisal
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Yreka Crystal Ball - with Escalation - 2011-04.xls]Yreka Water Supply - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
		Dam A Modifications											
	1	Remove & dispose steel frame with slide gates/weirs		1	1	1	ea	$6,000.00	$6,500.00	$7,000.00	$6,000.00	$6,500.00	$7,000.00
	2	Remove & dispose by steel bulkhead panel		1	1	1	ea	$950.00	$1,000.00	$1,050.00	$950.00	$1,000.00	$1,050.00
	3	Remove & dispose fish screen panels		6	6	6	ea	$950.00	$1,000.00	$1,050.00	$5,700.00	$6,000.00	$6,300.00
	4	Cut, remove concrete deck		2.4	2.4	2.4	cf	$140.00	$150.00	$160.00	$336.00	$360.00	$384.00
	5	Remove & dipsose wood frame building		1	1	1	ea	$24,000.00	$25,000.00	$26,000.00	$24,000.00	$25,000.00	$26,000.00
	6	Furnish, install wood frame building		1	1	1	ea	$47,500.00	$50,000.00	$52,500.00	$47,500.00	$50,000.00	$52,500.00
	7	Furnish & install steel slide gate with pedestal lift		2	2	2	ea	$3,800.00	$4,000.00	$4,200.00	$7,600.00	$8,000.00	$8,400.00
	7a	Furnish and place concrete walls		0	0	3.1	cy	$1,250.00	$1,300.00	$1,350.00	$0.00	$0.00	$4,185.00
	7b	Extend 220v power to the site		0	0	350	lf	$140.00	$150.00	$160.00	$0.00	$0.00	$56,000.00
	7c	Diversion & care		0	0	1	ls	$95,000.00	$100,000.00	$105,000.00	$0.00	$0.00	$105,000.00
	8	Furnish and install cylindrical tee fish screen		1	1	1	ea	$95,000.00	$100,000.00	$150,000.00	$95,000.00	$100,000.00	$150,000.00
	9a	Furnish and install three bulkheads		1,500	1,500	0	lbs	$7.00	$7.50	$8.00	$10,500.00	$11,250.00	$0.00
	9b	Furnish and install epoxy anchors for bulkheads		30	30	0	ea	$24.00	$25.00	$26.00	$720.00	$750.00	$0.00
		Dam B Modifications											
	10	Excavation for structure		40	40	40	cy	$75.00	$80.00	$120.00	$3,000.00	$3,200.00	$4,800.00
	11	Compacted backfill for structure		30	30	30	cy	$55.00	$60.00	$65.00	$1,650.00	$1,800.00	$1,950.00
	12	Concrete removal, 2'x2' cut opening		4	4	4	cf	$140.00	$150.00	$160.00	$560.00	$600.00	$640.00
	13	Furnish & place concrete in structure		8	8	8	cy	$1,250.00	$1,300.00	$1,350.00	$10,000.00	$10,400.00	$10,800.00
	14	Remove & dipose existing trashrack		1	1	1	ea	$2,400.00	$2,500.00	$2,600.00	$2,400.00	$2,500.00	$2,600.00
	15	Furnish & install grating		25	25	25	sf	$190.00	$200.00	$210.00	$4,750.00	$5,000.00	$5,250.00
	15a	Furnish and place concrete wall		0	0	1.8	cy	$2,100.00	$2,200.00	$2,325.00	$0.00	$0.00	$4,185.00
	15b	Extend 220v power to the site		0	0	280	lf	$140.00	$150.00	$160.00	$0.00	$0.00	$44,800.00
	16	Diversion & care		1	1	1	ls	$47,500.00	$50,000.00	$75,000.00	$47,500.00	$50,000.00	$75,000.00
	17	Create access to dam		1	1	1	ls	$28,500.00	$30,000.00	$50,000.00	$28,500.00	$30,000.00	$50,000.00
	18	Furnish and install cylindrical tee fish screen		1	1	1	ea	$95,000.00	$100,000.00	$150,000.00	$95,000.00	$100,000.00	$150,000.00
	19a	Furnish and install bulkhead to replace trashrack,		1,200	1,200	0	lbs	$7.00	$7.50	$8.00	$8,400.00	$9,000.00	$0.00
	19b	Furnish and install epoxy anchors for bulkheads		18	18	0	ea	$24.00	$25.00	$26.00	$432.00	$450.00	$0.00
		Yreka Pipe Crossing											
	20	F & I 3-span, pre-engineered pipe support bridge		0	1	1	ea	$650,000.00	$700,000.00	$1,365,000.00	$0.00	$700,000.00	$1,365,000.00
	21	Furnish & place abutment 1 concrete cap		0	25	25	cy	$2,400.00	$2,500.00	$2,600.00	$0.00	$62,500.00	$65,000.00
	22	Furnish & place abutment 1 reinforcement, epoxy coated		0	10,000	10,000	lb	$1.90	$2.00	$2.10	$0.00	$20,000.00	$21,000.00
	23	5'- dia reinforced concrete drilled shaft for pier 1		0	16	16	lf	$5,500.00	$6,000.00	$10,000.00	$0.00	$96,000.00	$160,000.00
	24	3'- dia reinforced concrete drilled shaft for pier 1		0	52	52	lf	$1,400.00	$1,500.00	$2,500.00	$0.00	$78,000.00	$130,000.00
	25	Furnish & place abutment 2 concrete cap		0	25	25	cy	$2,400.00	$2,500.00	$2,600.00	$0.00	$62,500.00	$65,000.00
	26	Furnish & place abutment 2 reinforcement, epoxy coated		0	10,000	10,000	lb	$1.90	$2.00	$2.10	$0.00	$20,000.00	$21,000.00
	27	5'- dia reinforced concrete drilled shaft for pier 2		0	16	16	lf	$5,500.00	$6,000.00	$10,000.00	$0.00	$96,000.00	$160,000.00
	28	3'- dia reinforced concrete drilled shaft for pier 2		0	52	52	lf	$1,400.00	$1,500.00	$2,500.00	$0.00	$78,000.00	$130,000.00
	29	Remove & dispose existing steel pipe,		0	20	20	lf	$45.00	$50.00	$52.00	$0.00	$1,000.00	$1,040.00
	30	Welded steel pipe, 1/4 inch wall, 24 inch dia.		2,100	490	490	lf	$190.00	$200.00	$210.00	$399,000.00	$98,000.00	$102,900.00
	31	Install/Remove 2 access ramps for piers,		0	270	270	cy	$95.00	$100.00	$150.00	$0.00	$27,000.00	$40,500.00
	32	Excavation for pipe trench		1,800	70	70	cy	$14.00	$15.00	$25.00	$25,200.00	$1,050.00	$1,750.00
	33	CLSM pipe bedding		200	8	8	cy	$285.00	$300.00	$315.00	$57,000.00	$2,400.00	$2,520.00
	34	Backfill in pipe trench		1,400	55	55	cy	$28.00	$30.00	$32.00	$39,200.00	$1,650.00	$1,760.00
		Subtotal 1									$920,898.00	$1,765,910.00	$3,034,314.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$46,000.00	$88,000.00	$150,000.00	$46,000.00	$88,000.00	$150,000.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka Water Supply
Escalation Included

SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Appraisal
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Yreka Crystal Ball - with Escalation - 2011-04.xls]Yreka Water Supply - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)		1	1	1	ls	$155,227.00	$637,590.00	$1,701,993.00	$155,227.00	$637,590.00	$1,701,993.00
		from Unit Price Level (July 2010) to NTP (Jan. 2020)											
		MPL - 1.5% / year for 10 yr.; MP - 3.0% /year for 10 yr.; MPH - 4.375% / year for 10 yr.											
		Design Contingencies (MPL ~ 13%; MP ~ 15%; MPH ~ 20%)		1	1	1	ls	$127,875.00	$408,500.00	$996,422.00	$127,875.00	$408,500.00	$996,422.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$117,271.00	$0.00	$0.00	$117,271.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$1,250,000.00**	**$2,900,000.00**	**$6,000,000.00**
		Construction Contingencies (MPL ~ 23%; MP ~ 25%; MPH ~ 30%)		1	1	1	ls	$300,000.00	$700,000.00	$1,800,000.00	$300,000.00	$700,000.00	$1,800,000.00
		FIELD COST									**$1,550,000.00**	**$3,600,000.00**	**$7,800,000.00**
		Non-Contract Cost (MPL ~ 52%; MP ~ 55%; MPH ~ 61%)		1	1	1	ls	$850,000.00	$2,000,000.00	$4,700,000.00	$850,000.00	$2,000,000.00	$4,700,000.00
		CONSTRUCTION COST									**$2,400,000.00**	**$5,600,000.00**	**$12,500,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES		
BY	See Group Worksheets	CHECKED: See Group Worksheets	BY	Craig Grush, P.E.	CHECKED
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	05/24/11	PEER REVIEW

05-24-11
AKD 5/24/11

Crystal Ball Report - Full
Simulation started on 5/26/2011 at 9:54:13
Simulation stopped on 5/26/2011 at 9:57:42

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	36.68
Trials/second (average)	273
Random numbers per sec	25,629
Crystal Ball data:	
Assumptions	94
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP

UNIT PRICES BY Craig A. Grush

DATE 5/26/2011

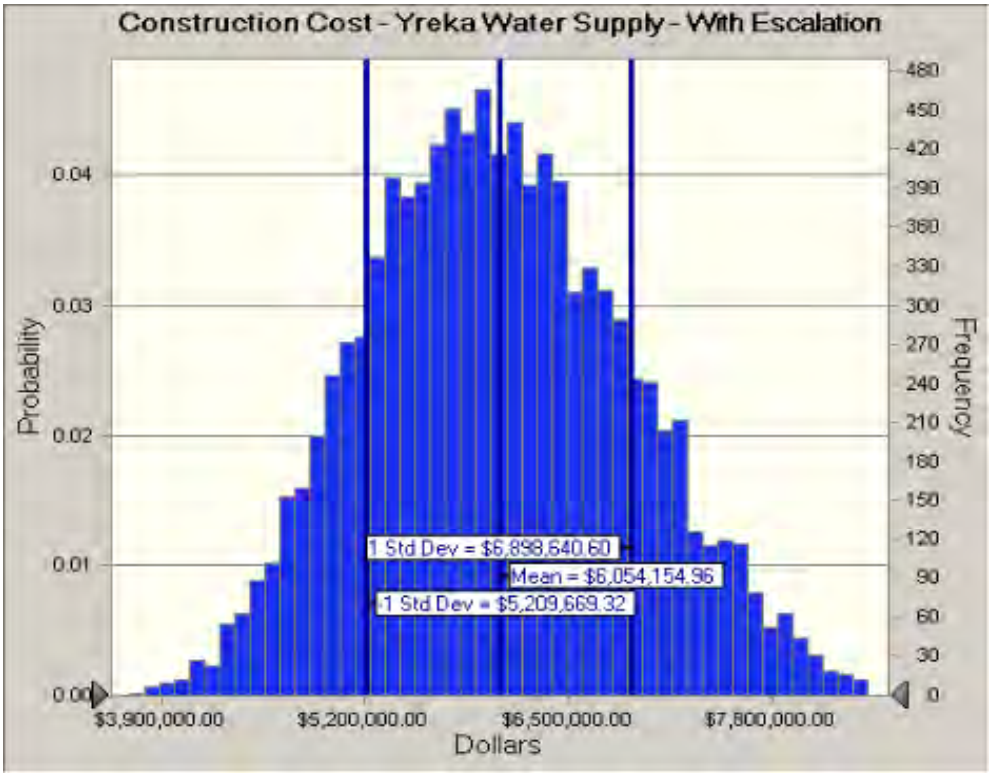
DATE	PEER REVIEWER(S)	CODE
6/1/11	Signature DAN MAK Printed Name	8126
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [Yreka Crystal Ball - with Escalation - 2011-04.xls]Yreka Water Supply - with Esc

Forecast: Construction Cost - Yreka Water Supply - With Escalation **Cell: U72**

Summary:
Entire range is from $3,457,244.18 to $9,546,517.64
Base case is $5,600,000.00
After 10,000 trials, the std. error of the mean is $8,444.86



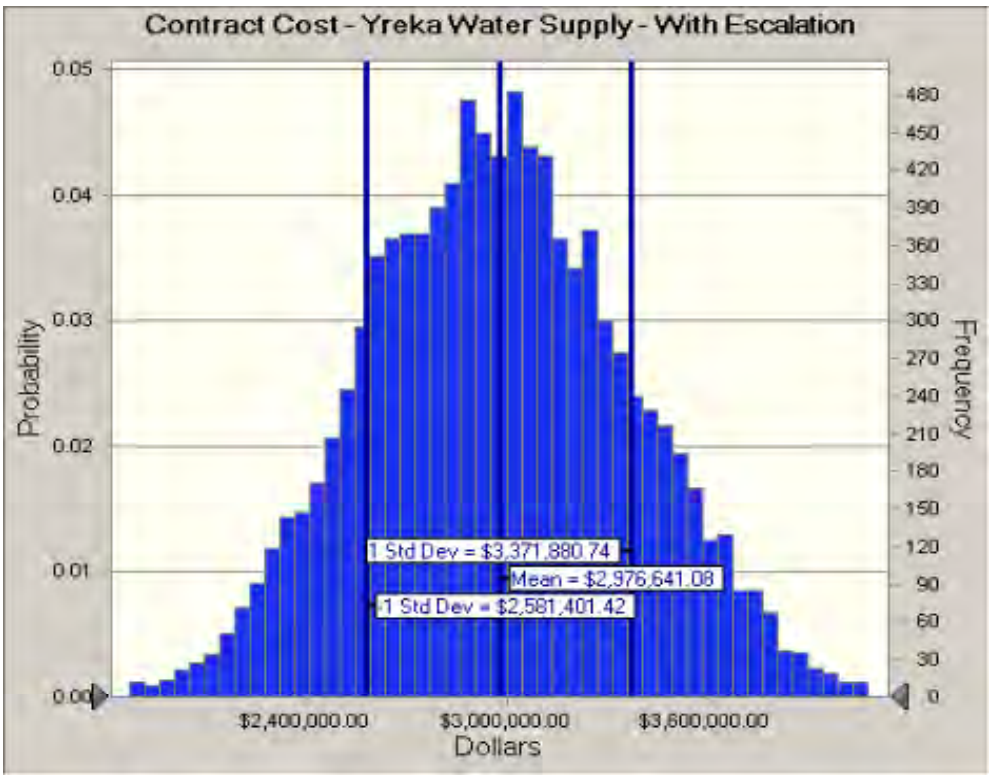
Forecast: Construction Cost - Yreka Water Supply - With Escalation (cont'd) **Cell: U72**

Statistics:	Forecast values
Trials	10,000
Mean	$6,054,154.96
Median	$6,012,477.88
Mode	---
Standard Deviation	$844,485.64
Variance	$713,155,989,820.45
Skewness	0.2219
Kurtosis	2.81
Coeff. of Variability	0.1395
Minimum	$3,457,244.18
Maximum	$9,546,517.64
Range Width	$6,089,273.47
Mean Std. Error	$8,444.86

Percentiles:	Forecast values
0%	$3,457,244.18
10%	$4,986,215.27
20%	$5,320,334.79
30%	$5,571,665.13
40%	$5,796,248.26
50%	$6,012,244.06
60%	$6,238,714.68
70%	$6,477,250.01
80%	$6,783,151.73
90%	$7,176,677.91
100%	$9,546,517.64

Forecast: Contract Cost - Yreka Water Supply - With Escalation **Cell: U68**

Summary:
Entire range is from $1,573,796.32 to $4,393,918.53
Base case is $2,900,000.00
After 10,000 trials, the std. error of the mean is $3,952.40



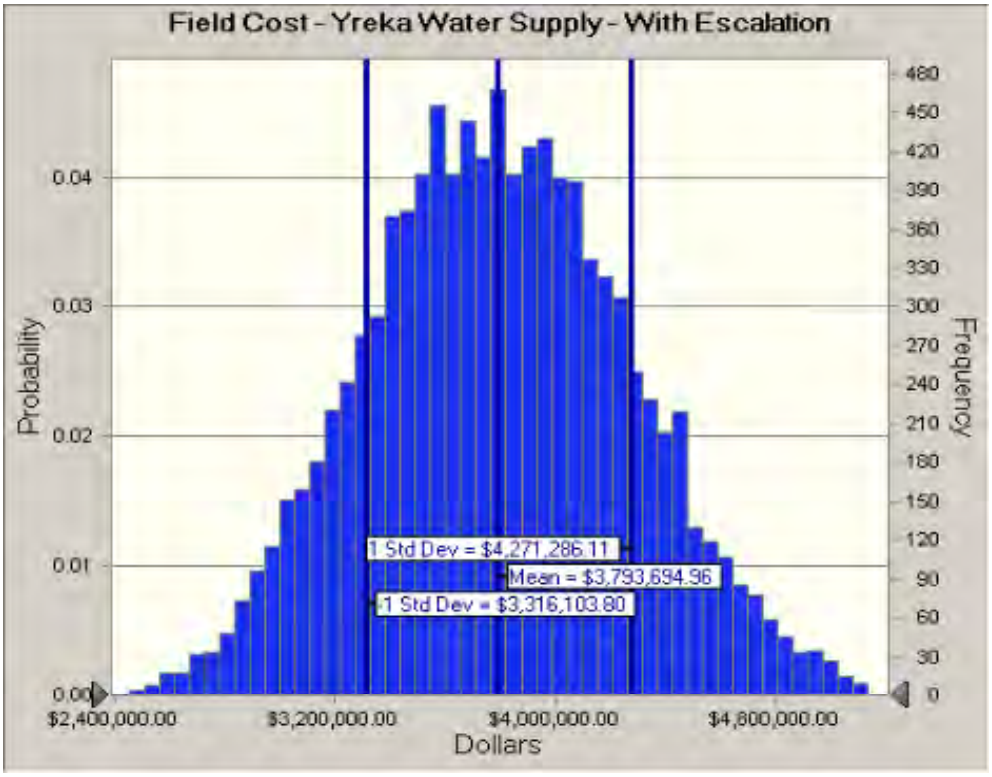
Forecast: Contract Cost - Yreka Water Supply - With Escalation (cont'd) **Cell: U68**

Statistics:	Forecast values
Trials	10,000
Mean	$2,976,641.08
Median	$2,968,584.03
Mode	---
Standard Deviation	$395,239.66
Variance	$156,214,389,648.94
Skewness	0.1030
Kurtosis	2.84
Coeff. of Variability	0.1328
Minimum	$1,573,796.32
Maximum	$4,393,918.53
Range Width	$2,820,122.21
Mean Std. Error	$3,952.40

Percentiles:	Forecast values
0%	$1,573,796.32
10%	$2,477,563.14
20%	$2,634,630.72
30%	$2,755,453.48
40%	$2,871,227.59
50%	$2,968,555.21
60%	$3,066,165.58
70%	$3,179,809.97
80%	$3,312,634.50
90%	$3,501,087.92
100%	$4,393,918.53

Forecast: Field Cost - Yreka Water Supply - With Escalation **Cell: U70**

Summary:
Entire range is from $2,018,075.68 to $5,559,615.95
Base case is $3,600,000.00
After 10,000 trials, the std. error of the mean is $4,775.91



Forecast: Field Cost - Yreka Water Supply - With Escalation (cont'd) **Cell: U70**

Statistics:	Forecast values
Trials	10,000
Mean	$3,793,694.96
Median	$3,783,030.36
Mode	---
Standard Deviation	$477,591.16
Variance	$228,093,311,559.82
Skewness	0.1139
Kurtosis	2.87
Coeff. of Variability	0.1259
Minimum	$2,018,075.68
Maximum	$5,559,615.95
Range Width	$3,541,540.27
Mean Std. Error	$4,775.91

Percentiles:	Forecast values
0%	$2,018,075.68
10%	$3,178,499.68
20%	$3,387,801.00
30%	$3,532,307.50
40%	$3,659,555.95
50%	$3,782,906.06
60%	$3,912,644.15
70%	$4,043,263.12
80%	$4,198,255.04
90%	$4,418,999.64
100%	$5,559,615.95

End of Forecasts

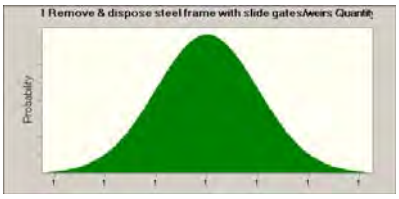
Assumptions

Worksheet: [Yreka Crystal Ball - with Escalation - 2011-04.xls]Yreka Water Supply - with Esc

Assumption: 1 Remove & dispose steel frame with slide gates/weirs Quantity **Cell: L15**

Normal distribution with parameters:

Mean	1	(=L15)
Std. Dev.	0	(=0.000001)



Assumption: 1 Remove & dispose steel frame with slide gates/weirs Unit Price **Cell: R15**

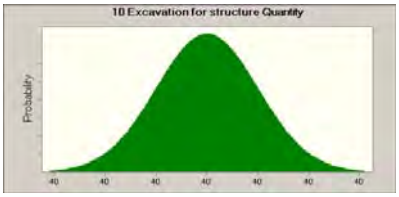
BetaPERT distribution with parameters:

Minimum	$6,000.00	(=Q15)
Likeliest	$6,500.00	(=R15)
Maximum	$7,000.00	(=S15)

Assumption: 10 Excavation for structure Quantity **Cell: L29**

Normal distribution with parameters:

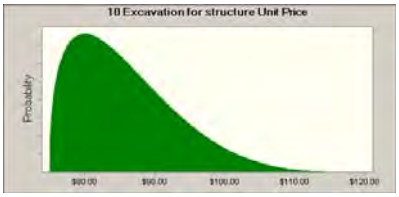
Mean	40	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 10 Excavation for structure Unit Price **Cell: R29**

BetaPERT distribution with parameters:

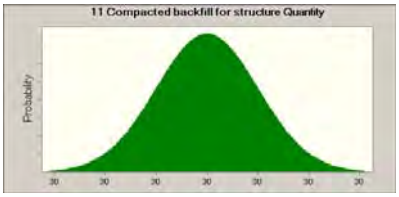
Minimum	$75.00	(=Q29)
Likeliest	$80.00	(=R29)
Maximum	$120.00	(=S29)



Assumption: 11 Compacted backfill for structure Quantity **Cell: L30**

Normal distribution with parameters:

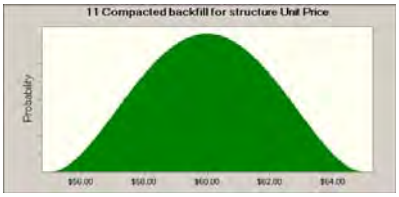
Mean	30	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 11 Compacted backfill for structure Unit Price **Cell: R30**

BetaPERT distribution with parameters:

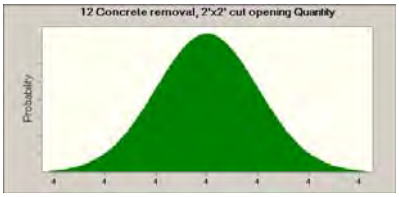
Minimum	$55.00	(=Q30)
Likeliest	$60.00	(=R30)
Maximum	$65.00	(=S30)



Assumption: 12 Concrete removal, 2'x2' cut opening Quantity **Cell: L31**

Normal distribution with parameters:

Mean	4	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 12 Concrete removal, 2'x2' cut opening Unit Price **Cell: R31**

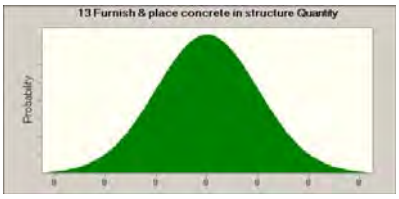
BetaPERT distribution with parameters:

Minimum	$140.00	(=Q31)
Likeliest	$150.00	(=R31)
Maximum	$160.00	(=S31)

Assumption: 13 Furnish & place concrete in structure Quantity **Cell: L32**

Normal distribution with parameters:

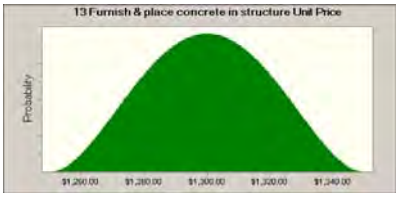
Mean	8	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 13 Furnish & place concrete in structure Unit Price **Cell: R32**

BetaPERT distribution with parameters:

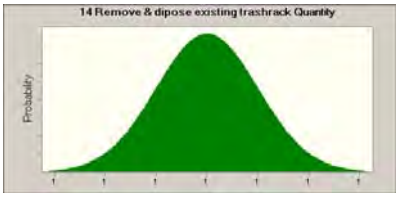
Minimum	$1,250.00	(=Q32)
Likeliest	$1,300.00	(=R32)
Maximum	$1,350.00	(=S32)



Assumption: 14 Remove & dipose existing trashrack Quantity **Cell: L33**

Normal distribution with parameters:

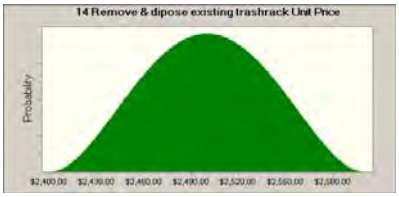
Mean	1	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove & dipose existing trashrack Unit Price **Cell: R33**

BetaPERT distribution with parameters:

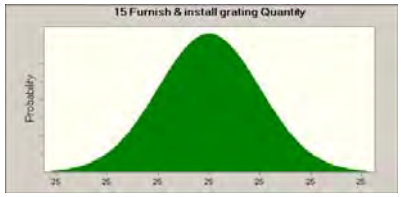
Minimum	$2,400.00	(=Q33)
Likeliest	$2,500.00	(=R33)
Maximum	$2,600.00	(=S33)



Assumption: 15 Furnish & install grating Quantity **Cell: L34**

Normal distribution with parameters:

Mean	25	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 15 Furnish & install grating Unit Price **Cell: R34**

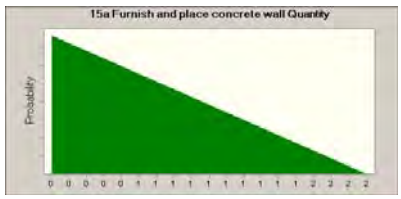
BetaPERT distribution with parameters:

Minimum	$190.00	(=Q34)
Likeliest	$200.00	(=R34)
Maximum	$210.00	(=S34)

Assumption: 15a Furnish and place concrete wall Quantity **Cell: L35**

Triangular distribution with parameters:

Minimum	0	(=K35)
Likeliest	0	(=L35)
Maximum	2	(=M35)



Assumption: 15a Furnish and place concrete wall Unit Price **Cell: R35**

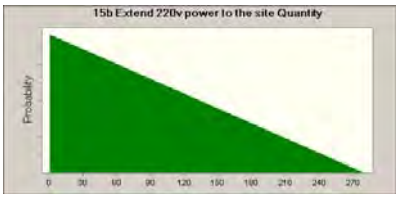
BetaPERT distribution with parameters:

Minimum	$2,100.00	(=Q35)
Likeliest	$2,200.00	(=R35)
Maximum	$2,325.00	(=S35)

Assumption: 15b Extend 220v power to the site Quantity **Cell: L36**

Triangular distribution with parameters:

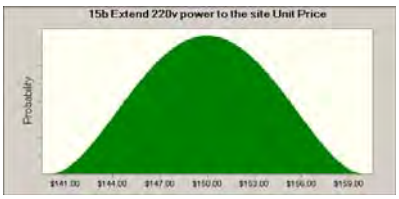
Minimum	0	(=K36)
Likeliest	0	(=L36)
Maximum	280	(=M36)



Assumption: 15b Extend 220v power to the site Unit Price **Cell: R36**

BetaPERT distribution with parameters:

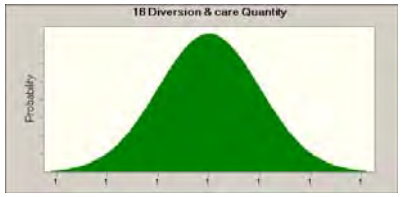
Minimum	$140.00	(=Q36)
Likeliest	$150.00	(=R36)
Maximum	$160.00	(=S36)



Assumption: 16 Diversion & care Quantity **Cell: L37**

Normal distribution with parameters:

Mean	1	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 16 Diversion & care Unit Price **Cell: R37**

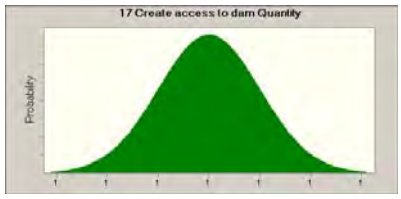
BetaPERT distribution with parameters:

Minimum	$47,500.00	(=Q37)
Likeliest	$50,000.00	(=R37)
Maximum	$75,000.00	(=S37)

Assumption: 17 Create access to dam Quantity **Cell: L38**

Normal distribution with parameters:

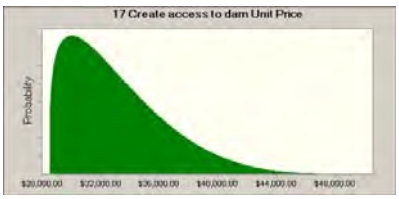
Mean	1	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 17 Create access to dam Unit Price **Cell: R38**

BetaPERT distribution with parameters:

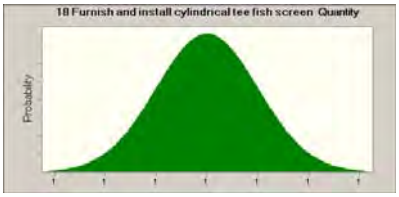
Minimum	$28,500.00	(=Q38)
Likeliest	$30,000.00	(=R38)
Maximum	$50,000.00	(=S38)



Assumption: 18 Furnish and install cylindrical tee fish screen Quantity **Cell: L39**

Normal distribution with parameters:

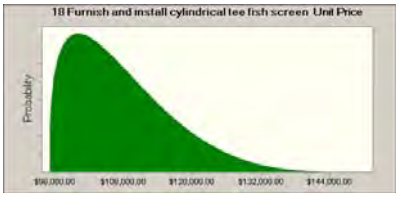
Mean	1	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 18 Furnish and install cylindrical tee fish screen Unit Price **Cell: R39**

BetaPERT distribution with parameters:

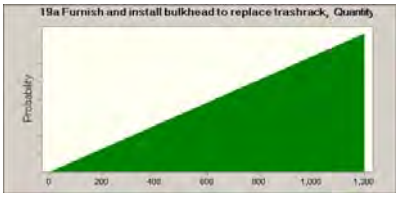
Minimum	$95,000.00	(=Q39)
Likeliest	$100,000.00	(=R39)
Maximum	$150,000.00	(=S39)



Assumption: 19a Furnish and install bulkhead to replace trashrack, Quantity **Cell: L40**

Triangular distribution with parameters:

Minimum	0	(=M40)
Likeliest	1,200	(=L40)
Maximum	1,200	(=K40)



Assumption: 19a Furnish and install bulkhead to replace trashrack, Unit Price **Cell: R40**

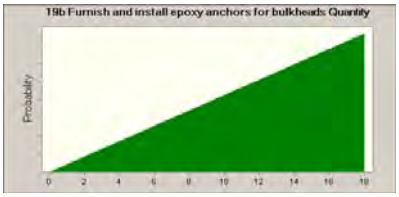
BetaPERT distribution with parameters:

Minimum	$7.00	(=Q40)
Likeliest	$7.50	(=R40)
Maximum	$8.00	(=S40)

Assumption: 19b Furnish and install epoxy anchors for bulkheads Quantity **Cell: L41**

Triangular distribution with parameters:

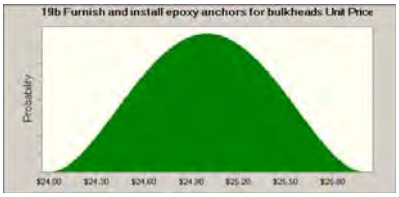
Minimum	0	(=M41)
Likeliest	18	(=L41)
Maximum	18	(=K41)



Assumption: 19b Furnish and install epoxy anchors for bulkheads Unit Price **Cell: R41**

BetaPERT distribution with parameters:

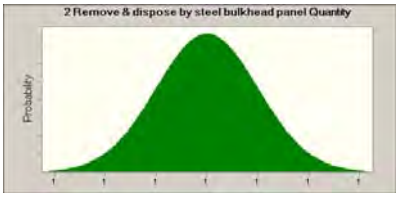
Minimum	$24.00	(=Q41)
Likeliest	$25.00	(=R41)
Maximum	$26.00	(=S41)



Assumption: 2 Remove & dispose by steel bulkhead panel Quantity **Cell: L16**

Normal distribution with parameters:

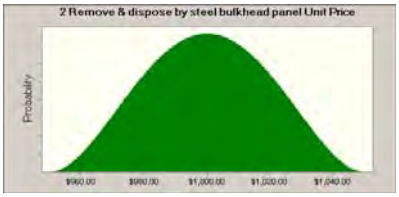
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



Assumption: 2 Remove & dispose by steel bulkhead panel Unit Price **Cell: R16**

BetaPERT distribution with parameters:

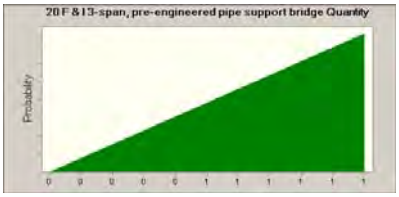
Minimum	$950.00	(=Q16)
Likeliest	$1,000.00	(=R16)
Maximum	$1,050.00	(=S16)



Assumption: 20 F & I 3-span, pre-engineered pipe support bridge Quantity **Cell: L43**

Triangular distribution with parameters:

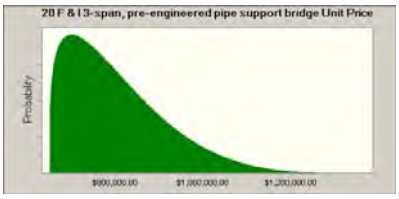
Minimum	0	(=K43)
Likeliest	1	(=L43)
Maximum	1	(=M43)



Assumption: 20 F & I 3-span, pre-engineered pipe support bridge Unit Price **Cell: R43**

BetaPERT distribution with parameters:

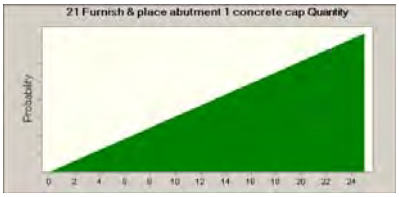
Minimum	$650,000.00	(=Q43)
Likeliest	$700,000.00	(=R43)
Maximum	$1,365,000.00	(=S43)



Assumption: 21 Furnish & place abutment 1 concrete cap Quantity **Cell: L44**

Triangular distribution with parameters:

Minimum	0	(=K44)
Likeliest	25	(=L44)
Maximum	25	(=M44)



Assumption: 21 Furnish & place abutment 1 concrete cap Unit Price **Cell: R44**

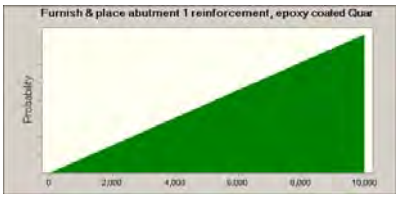
BetaPERT distribution with parameters:

Minimum	$2,400.00	(=Q44)
Likeliest	$2,500.00	(=R44)
Maximum	$2,600.00	(=S44)

Assumption: 22 Furnish & place abutment 1 reinforcement, epoxy coated Quantity **Cell: L45**

Triangular distribution with parameters:

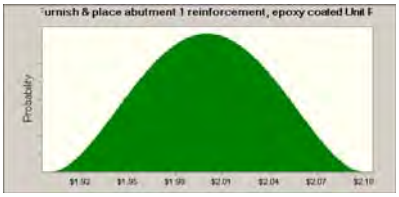
Minimum	0	(=K45)
Likeliest	10,000	(=L45)
Maximum	10,000	(=M45)



Assumption: 22 Furnish & place abutment 1 reinforcement, epoxy coated Unit Price **Cell: R45**

BetaPERT distribution with parameters:

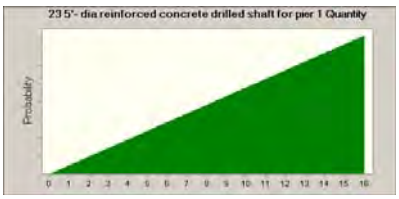
Minimum	$1.90	(=Q45)
Likeliest	$2.00	(=R45)
Maximum	$2.10	(=S45)



Assumption: 23 5'- dia reinforced concrete drilled shaft for pier 1 Quantity **Cell: L46**

Triangular distribution with parameters:

Minimum	0	(=K46)
Likeliest	16	(=L46)
Maximum	16	(=M46)



Assumption: 23 5'- dia reinforced concrete drilled shaft for pier 1 Unit Price **Cell: R46**

BetaPERT distribution with parameters:

Minimum	$5,500.00	(=Q46)
Likeliest	$6,000.00	(=R46)
Maximum	$10,000.00	(=S46)

Assumption: 24 3'- dia reinforced concrete drilled shaft for pier 1 Quantity **Cell: L47**

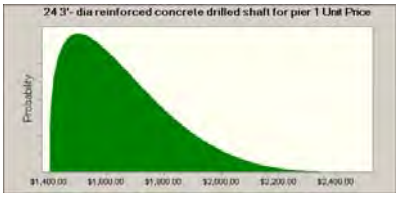
Triangular distribution with parameters:

Minimum	0	(=K47)
Likeliest	52	(=L47)
Maximum	52	(=M47)

Assumption: 24 3'- dia reinforced concrete drilled shaft for pier 1 Unit Price **Cell: R47**

BetaPERT distribution with parameters:

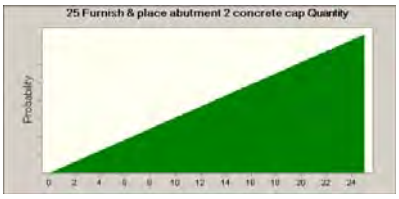
Minimum	$1,400.00	(=Q47)
Likeliest	$1,500.00	(=R47)
Maximum	$2,500.00	(=S47)



Assumption: 25 Furnish & place abutment 2 concrete cap Quantity **Cell: L48**

Triangular distribution with parameters:

Minimum	0	(=K48)
Likeliest	25	(=L48)
Maximum	25	(=M48)



Assumption: 25 Furnish & place abutment 2 concrete cap Unit Price **Cell: R48**

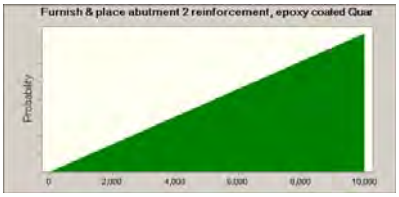
BetaPERT distribution with parameters:

Minimum	$2,400.00	(=Q48)
Likeliest	$2,500.00	(=R48)
Maximum	$2,600.00	(=S48)

Assumption: 26 Furnish & place abutment 2 reinforcement, epoxy coated Quantity **Cell: L49**

Triangular distribution with parameters:

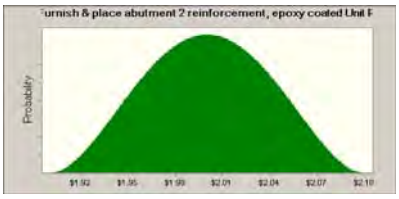
Minimum	0	(=K49)
Likeliest	10,000	(=L49)
Maximum	10,000	(=M49)



Assumption: 26 Furnish & place abutment 2 reinforcement, epoxy coated Unit Price **Cell: R49**

BetaPERT distribution with parameters:

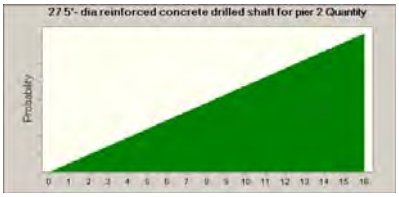
Minimum	$1.90	(=Q49)
Likeliest	$2.00	(=R49)
Maximum	$2.10	(=S49)



Assumption: 27 5'- dia reinforced concrete drilled shaft for pier 2 Quantity **Cell: L50**

Triangular distribution with parameters:

Minimum	0	(=K50)
Likeliest	16	(=L50)
Maximum	16	(=M50)



Assumption: 27 5'- dia reinforced concrete drilled shaft for pier 2 Unit Price **Cell: R50**

BetaPERT distribution with parameters:

Minimum	$5,500.00	(=Q50)
Likeliest	$6,000.00	(=R50)
Maximum	$10,000.00	(=S50)

Assumption: 28 3'- dia reinforced concrete drilled shaft for pier 2 Quantity **Cell: L51**

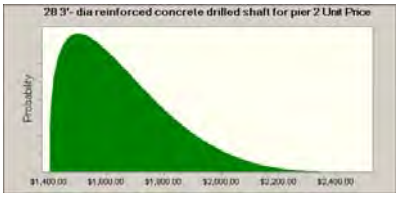
Triangular distribution with parameters:

Minimum	0	(=K51)
Likeliest	52	(=L51)
Maximum	52	(=M51)

Assumption: 28 3'- dia reinforced concrete drilled shaft for pier 2 Unit Price **Cell: R51**

BetaPERT distribution with parameters:

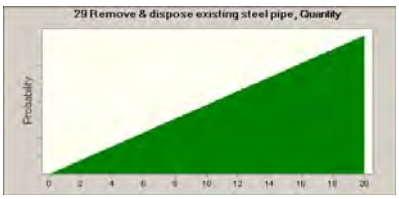
Minimum	$1,400.00	(=Q51)
Likeliest	$1,500.00	(=R51)
Maximum	$2,500.00	(=S51)



Assumption: 29 Remove & dispose existing steel pipe, Quantity **Cell: L52**

Triangular distribution with parameters:

Minimum	0	(=K52)
Likeliest	20	(=L52)
Maximum	20	(=M52)



Assumption: 29 Remove & dispose existing steel pipe, Unit Price **Cell: R52**

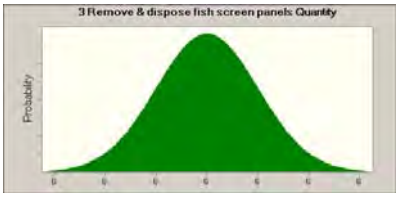
BetaPERT distribution with parameters:

Minimum	$45.00	(=Q52)
Likeliest	$50.00	(=R52)
Maximum	$52.00	(=S52)

Assumption: 3 Remove & dispose fish screen panels Quantity **Cell: L17**

Normal distribution with parameters:

Mean	6	(=L17)
Std. Dev.	0	(=0.000001)



Assumption: 3 Remove & dispose fish screen panels Unit Price **Cell: R17**

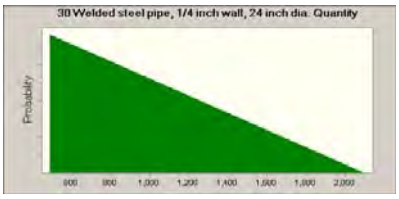
BetaPERT distribution with parameters:

Minimum	$950.00	(=Q17)
Likeliest	$1,000.00	(=R17)
Maximum	$1,050.00	(=S17)

Assumption: 30 Welded steel pipe, 1/4 inch wall, 24 inch dia. Quantity **Cell: L53**

Triangular distribution with parameters:

Minimum	490	(=M53)
Likeliest	490	(=L53)
Maximum	2,100	(=K53)



Assumption: 30 Welded steel pipe, 1/4 inch wall, 24 inch dia. Unit Price **Cell: R53**

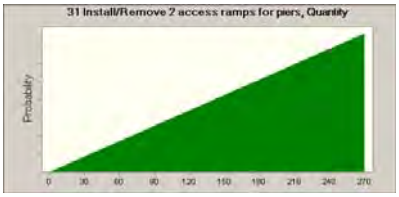
BetaPERT distribution with parameters:

Minimum	$190.00	(=Q53)
Likeliest	$200.00	(=R53)
Maximum	$210.00	(=S53)

Assumption: 31 Install/Remove 2 access ramps for piers, Quantity **Cell: L54**

Triangular distribution with parameters:

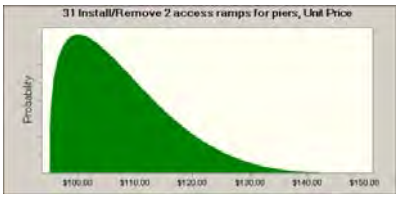
Minimum	0	(=K54)
Likeliest	270	(=L54)
Maximum	270	(=M54)



Assumption: 31 Install/Remove 2 access ramps for piers, Unit Price **Cell: R54**

BetaPERT distribution with parameters:

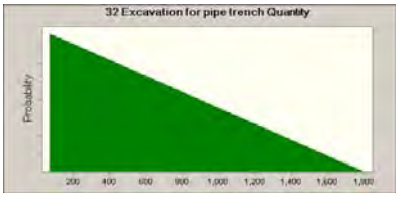
Minimum	$95.00	(=Q54)
Likeliest	$100.00	(=R54)
Maximum	$150.00	(=S54)



Assumption: 32 Excavation for pipe trench Quantity **Cell: L55**

Triangular distribution with parameters:

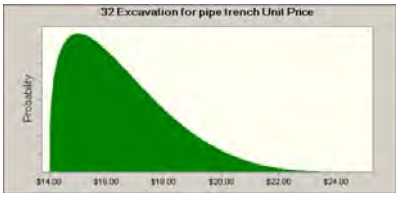
Minimum	70	(=M55)
Likeliest	70	(=L55)
Maximum	1,800	(=K55)



Assumption: 32 Excavation for pipe trench Unit Price **Cell: R55**

BetaPERT distribution with parameters:

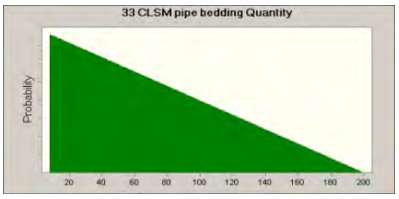
Minimum	$14.00	(=Q55)
Likeliest	$15.00	(=R55)
Maximum	$25.00	(=S55)



Assumption: 33 CLSM pipe bedding Quantity **Cell: L56**

Triangular distribution with parameters:

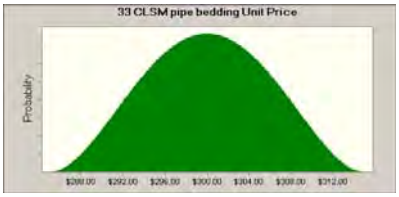
Minimum	8	(=M56)
Likeliest	8	(=L56)
Maximum	200	(=K56)



Assumption: 33 CLSM pipe bedding Unit Price **Cell: R56**

BetaPERT distribution with parameters:

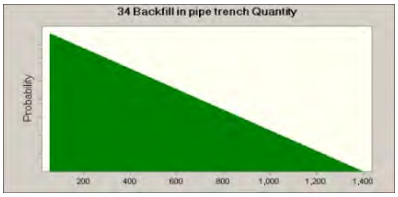
Minimum	$285.00	(=Q56)
Likeliest	$300.00	(=R56)
Maximum	$315.00	(=S56)



Assumption: 34 Backfill in pipe trench Quantity **Cell: L57**

Triangular distribution with parameters:

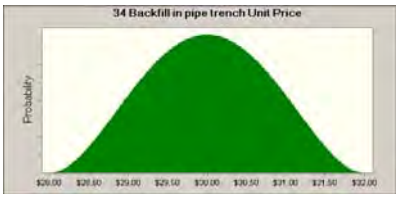
Minimum	55	(=M57)
Likeliest	55	(=L57)
Maximum	1,400	(=K57)



Assumption: 34 Backfill in pipe trench Unit Price **Cell: R57**

BetaPERT distribution with parameters:

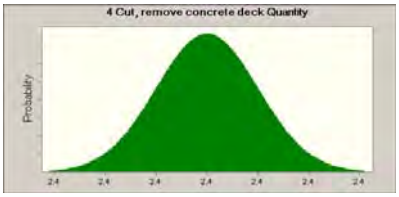
Minimum	$28.00	(=Q57)
Likeliest	$30.00	(=R57)
Maximum	$32.00	(=S57)



Assumption: 4 Cut, remove concrete deck Quantity **Cell: L18**

Normal distribution with parameters:

Mean	2.4	(=L18)
Std. Dev.	0.0	(=0.000001)



Assumption: 4 Cut, remove concrete deck Unit Price **Cell: R18**

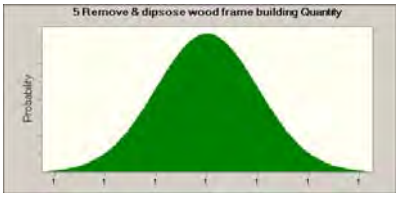
BetaPERT distribution with parameters:

Minimum	$140.00	(=Q18)
Likeliest	$150.00	(=R18)
Maximum	$160.00	(=S18)

Assumption: 5 Remove & dipsose wood frame building Quantity **Cell: L19**

Normal distribution with parameters:

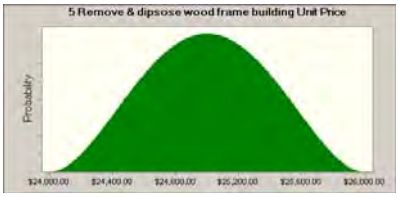
Mean	1	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove & dipsose wood frame building Unit Price **Cell: R19**

BetaPERT distribution with parameters:

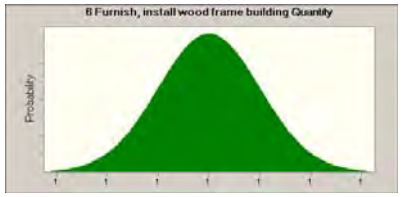
Minimum	$24,000.00	(=Q19)
Likeliest	$25,000.00	(=R19)
Maximum	$26,000.00	(=S19)



Assumption: 6 Furnish, install wood frame building Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 6 Furnish, install wood frame building Unit Price **Cell: R20**

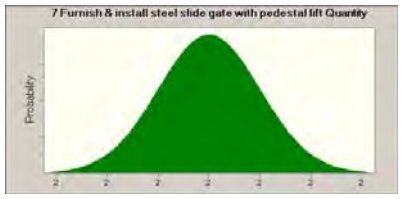
BetaPERT distribution with parameters:

Minimum	$47,500.00	(=Q20)
Likeliest	$50,000.00	(=R20)
Maximum	$52,500.00	(=S20)

Assumption: 7 Furnish & install steel slide gate with pedestal lift Quantity **Cell: L21**

Normal distribution with parameters:

Mean	2	(=L21)
Std. Dev.	0	(=0.000001)



Assumption: 7 Furnish & install steel slide gate with pedestal lift Unit Price **Cell: R21**

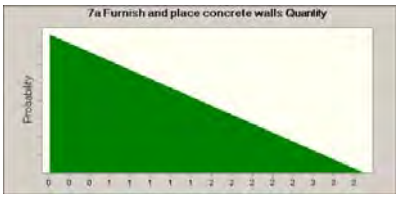
BetaPERT distribution with parameters:

Minimum	$3,800.00	(=Q21)
Likeliest	$4,000.00	(=R21)
Maximum	$4,200.00	(=S21)

Assumption: 7a Furnish and place concrete walls Quantity **Cell: L22**

Triangular distribution with parameters:

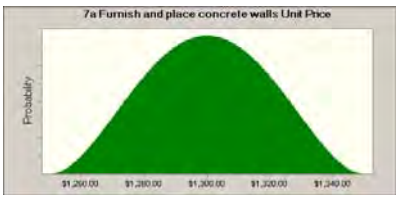
Minimum	0	(=K22)
Likeliest	0	(=L22)
Maximum	3	(=M22)



Assumption: 7a Furnish and place concrete walls Unit Price **Cell: R22**

BetaPERT distribution with parameters:

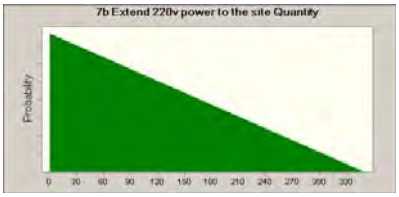
Minimum	$1,250.00	(=Q22)
Likeliest	$1,300.00	(=R22)
Maximum	$1,350.00	(=S22)



Assumption: 7b Extend 220v power to the site Quantity **Cell: L23**

Triangular distribution with parameters:

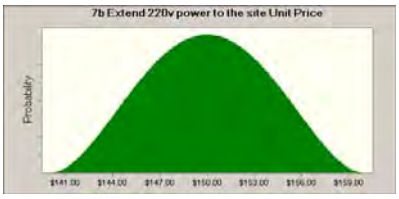
Minimum	0	(=K23)
Likeliest	0	(=L23)
Maximum	350	(=M23)



Assumption: 7b Extend 220v power to the site Unit Price **Cell: R23**

BetaPERT distribution with parameters:

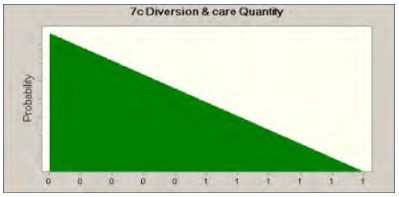
Minimum	$140.00	(=Q23)
Likeliest	$150.00	(=R23)
Maximum	$160.00	(=S23)



Assumption: 7c Diversion & care Quantity **Cell: L24**

Triangular distribution with parameters:

Minimum	0	(=K24)
Likeliest	0	(=L24)
Maximum	1	(=M24)



Assumption: 7c Diversion & care Unit Price **Cell: R24**

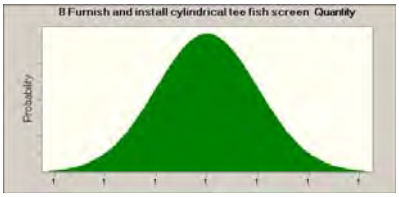
BetaPERT distribution with parameters:

Minimum	$95,000.00	(=Q24)
Likeliest	$100,000.00	(=R24)
Maximum	$105,000.00	(=S24)

Assumption: 8 Furnish and install cylindrical tee fish screen Quantity **Cell: L25**

Normal distribution with parameters:

Mean	1	(=L25)
Std. Dev.	0	(=0.000001)



Assumption: 8 Furnish and install cylindrical tee fish screen Unit Price **Cell: R25**

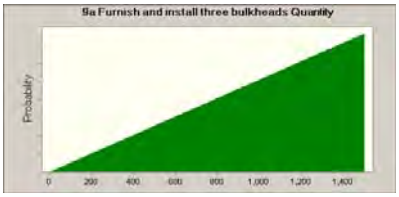
BetaPERT distribution with parameters:

Minimum	$95,000.00	(=Q25)
Likeliest	$100,000.00	(=R25)
Maximum	$150,000.00	(=S25)

Assumption: 9a Furnish and install three bulkheads Quantity **Cell: L26**

Triangular distribution with parameters:

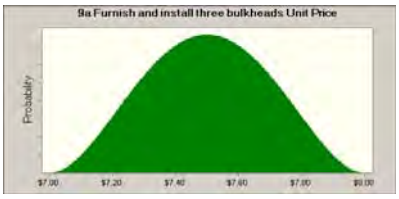
Minimum	0	(=M26)
Likeliest	1,500	(=L26)
Maximum	1,500	(=K26)



Assumption: 9a Furnish and install three bulkheads Unit Price **Cell: R26**

BetaPERT distribution with parameters:

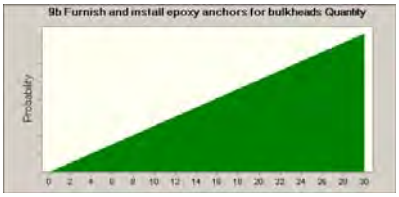
Minimum	$7.00	(=Q26)
Likeliest	$7.50	(=R26)
Maximum	$8.00	(=S26)



Assumption: 9b Furnish and install epoxy anchors for bulkheads Quantity **Cell: L27**

Triangular distribution with parameters:

Minimum	0	(=M27)
Likeliest	30	(=L27)
Maximum	30	(=K27)



Assumption: 9b Furnish and install epoxy anchors for bulkheads Unit Price **Cell: R27**

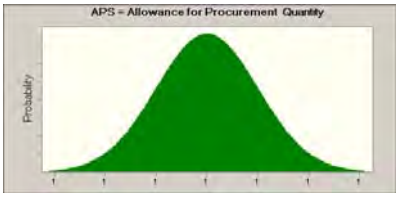
BetaPERT distribution with parameters:

Minimum	$24.00	(=Q27)
Likeliest	$25.00	(=R27)
Maximum	$26.00	(=S27)

Assumption: APS = Allowance for Procurement Quantity **Cell: L66**

Normal distribution with parameters:

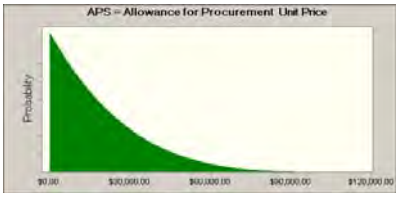
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R66**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q66)
Likeliest	$0.00	(=R66)
Maximum	$117,271.00	(=S66)



Assumption: Construction Contingencies Quantity **Cell: L69**

Normal distribution with parameters:

Mean	1	(=L69)
Std. Dev.	0	(=0.000001)

Assumption: Construction Contingencies Unit Price **Cell: R69**

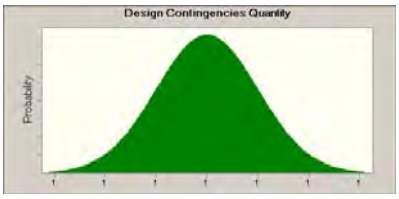
BetaPERT distribution with parameters:

Minimum	$300,000.00	(=Q69)
Likeliest	$700,000.00	(=R69)
Maximum	$1,800,000.00	(=S69)

Assumption: Design Contingencies Quantity **Cell: L65**

Normal distribution with parameters:

Mean	1	(=L65)
Std. Dev.	0	(=0.000001)



Assumption: Design Contingencies Unit Price **Cell: R65**

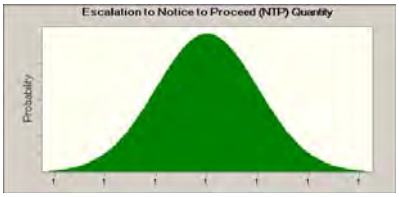
BetaPERT distribution with parameters:

Minimum	$127,875.00	(=Q65)
Likeliest	$408,500.00	(=R65)
Maximum	$996,422.00	(=S65)

Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L62**

Normal distribution with parameters:

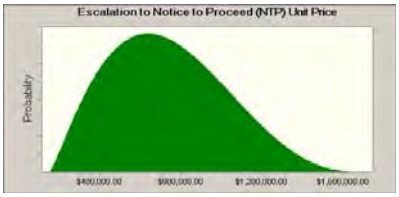
Mean	1	(=L62)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R62**

BetaPERT distribution with parameters:

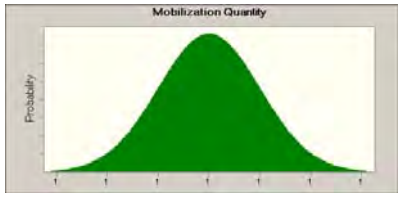
Minimum	$155,227.00	(=Q62)
Likeliest	$637,590.00	(=R62)
Maximum	$1,701,993.00	(=S62)



Assumption: Mobilization Quantity **Cell: L60**

Normal distribution with parameters:

Mean	1	(=L60)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R60**

BetaPERT distribution with parameters:

Minimum	$46,000.00	(=Q60)
Likeliest	$88,000.00	(=R60)
Maximum	$150,000.00	(=S60)

Assumption: Non-Contract Cost Quantity **Cell: L71**

Normal distribution with parameters:

Mean	1	(=L71)
Std. Dev.	0	(=0.000001)

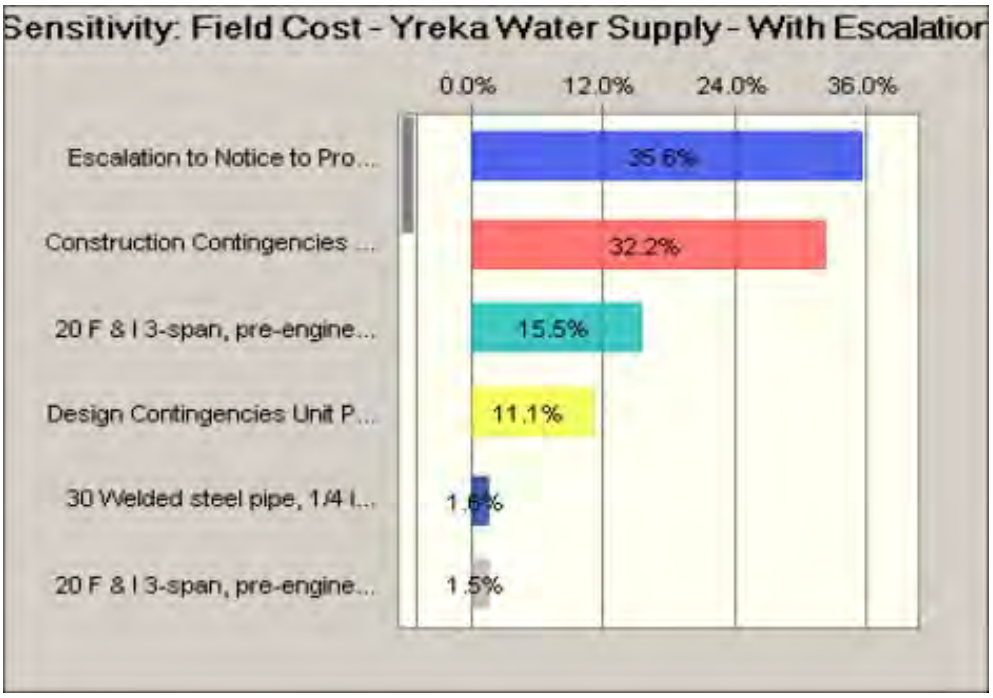
Assumption: Non-Contract Cost Unit Price **Cell: R71**

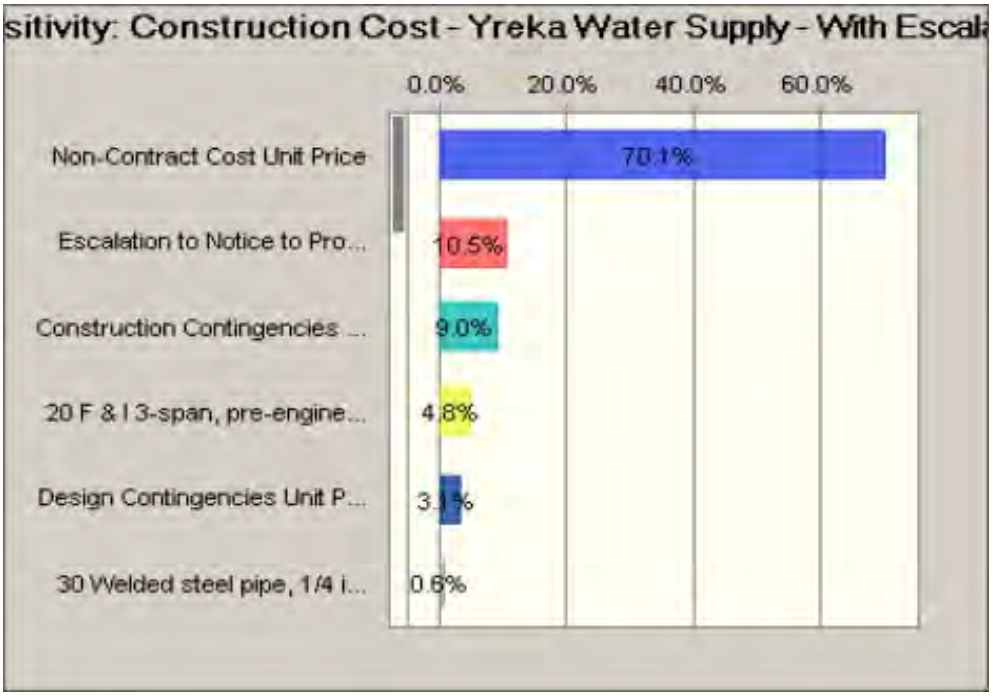
BetaPERT distribution with parameters:

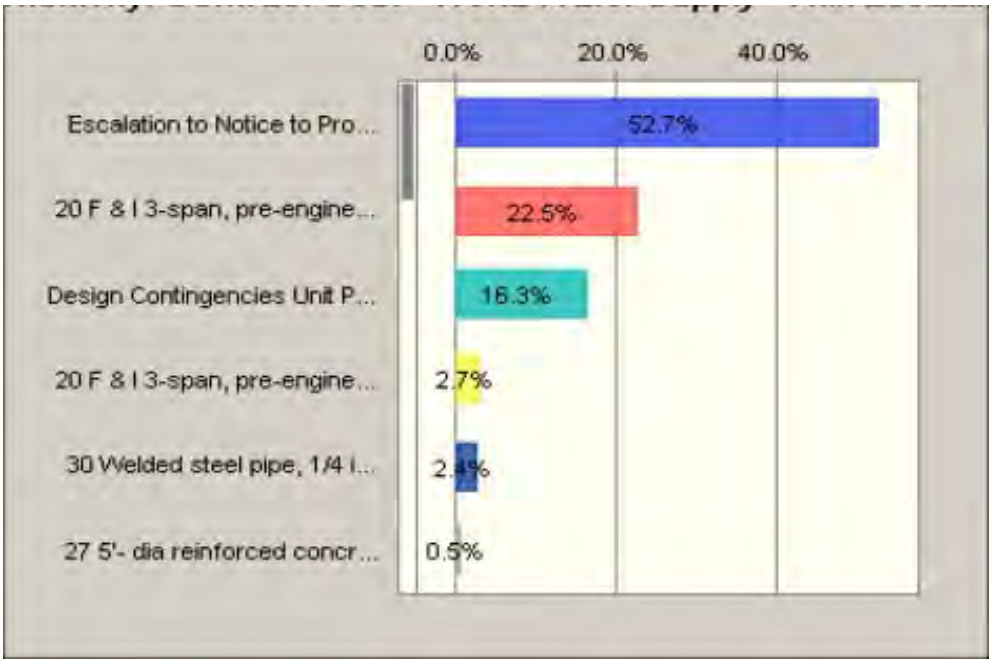
Minimum	$850,000.00	(=Q71)
Likeliest	$2,000,000.00	(=R71)
Maximum	$4,700,000.00	(=S71)

End of Assumptions

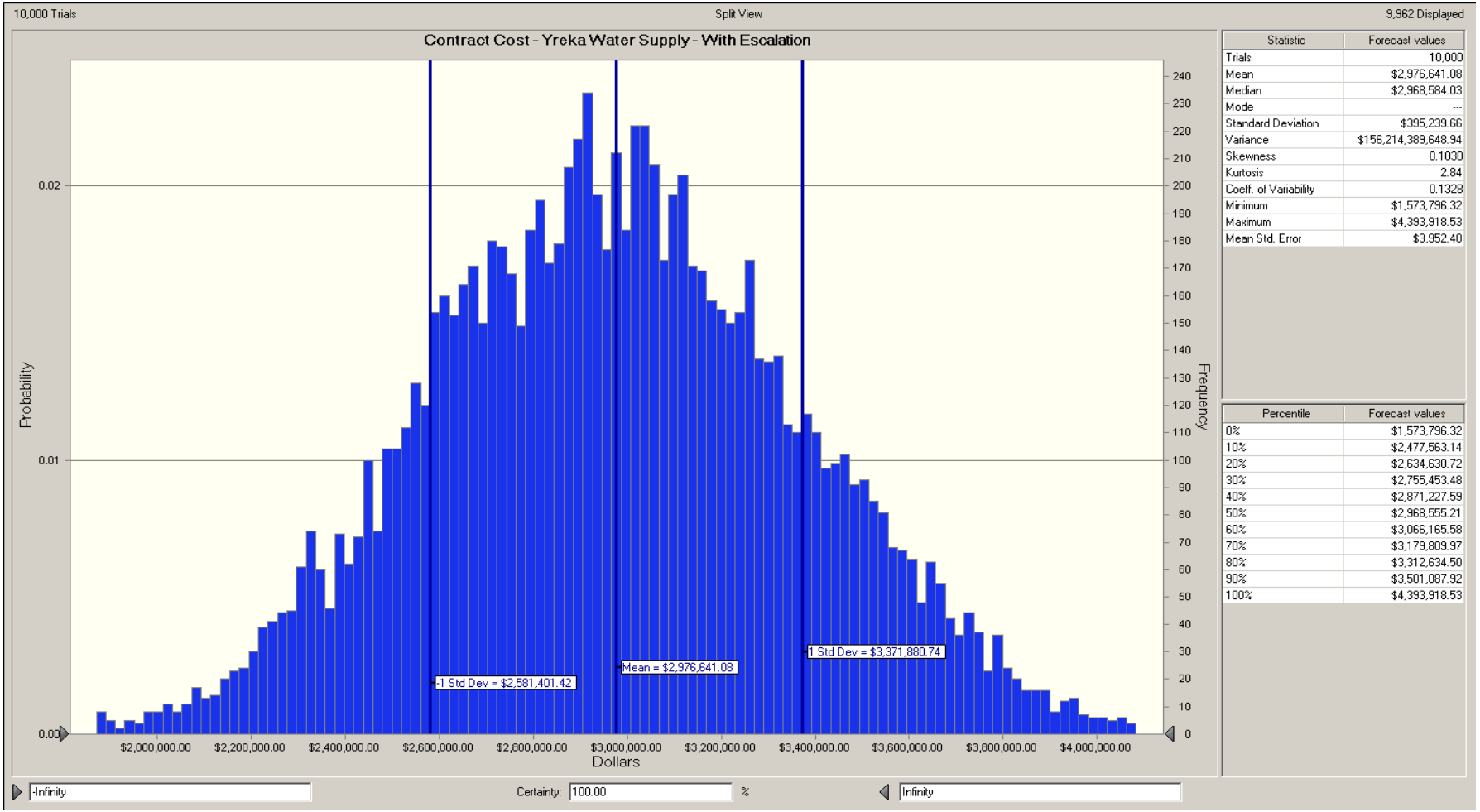
Sensitivity Charts





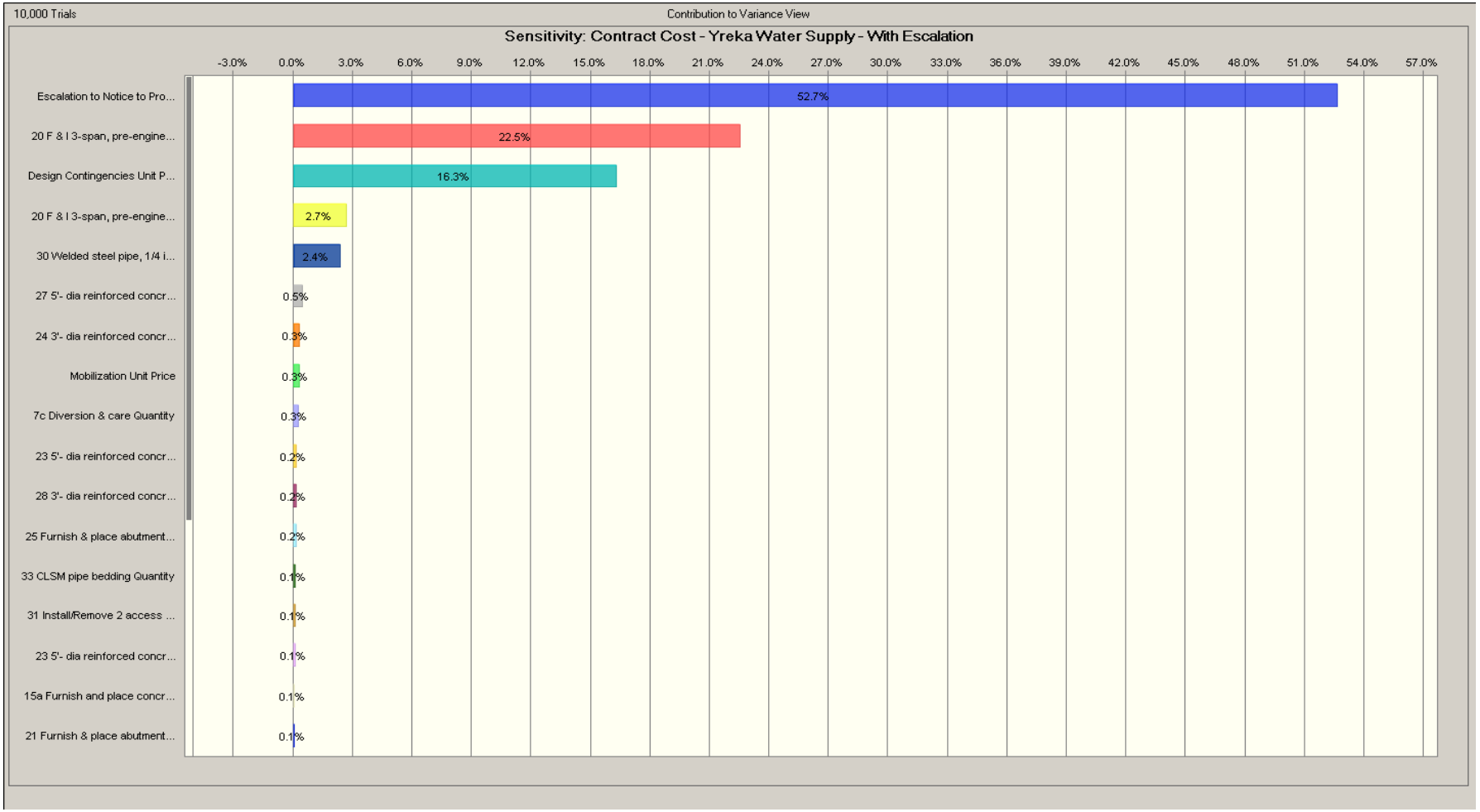


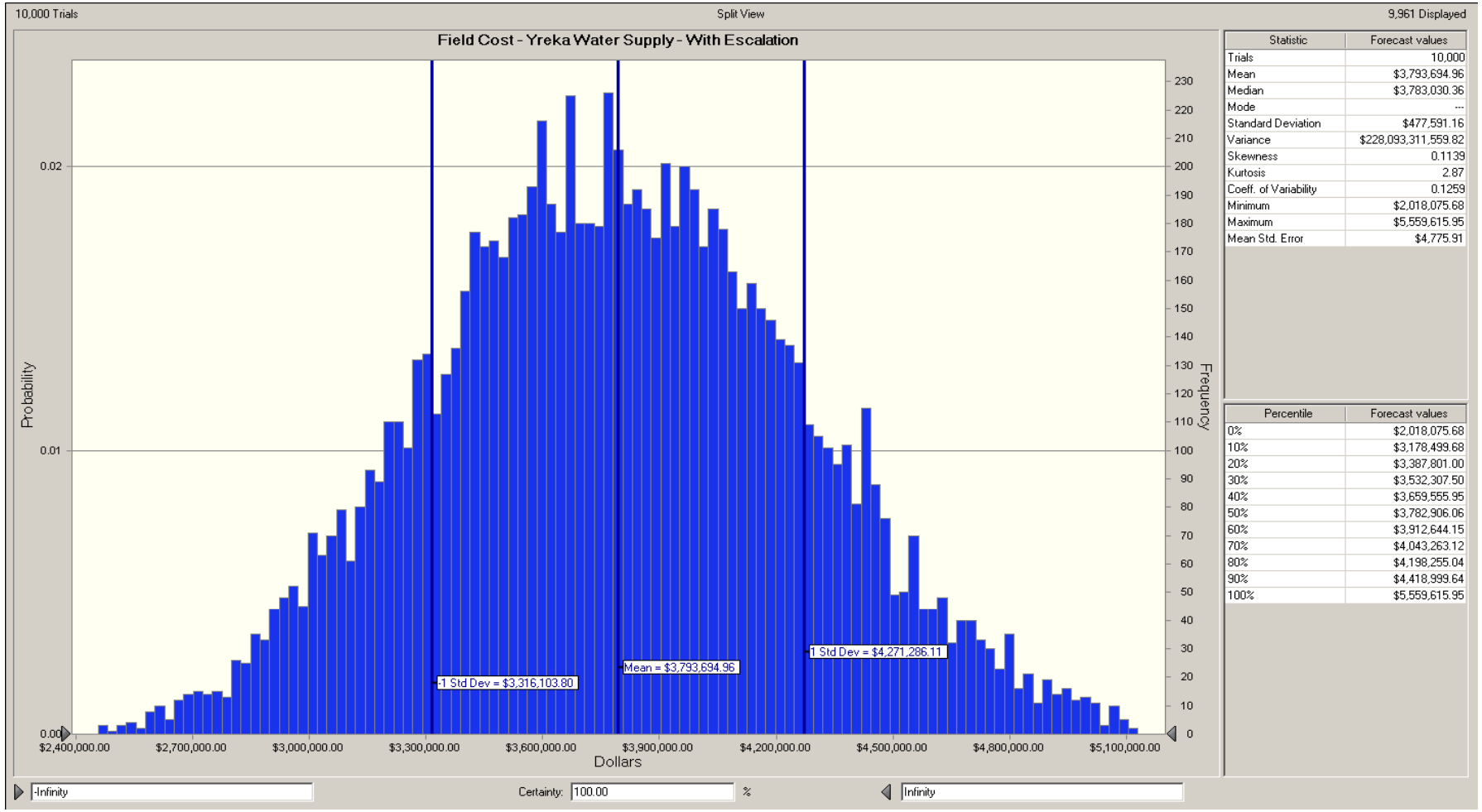
End of Sensitivity Charts



Statistic	Forecast values
Trials	10,000
Mean	$2,976,641.08
Median	$2,968,584.03
Mode	---
Standard Deviation	$395,239.66
Variance	$156,214,389,648.94
Skewness	0.1030
Kurtosis	2.84
Coeff. of Variability	0.1328
Minimum	$1,573,796.32
Maximum	$4,393,918.53
Mean Std. Error	$3,952.40

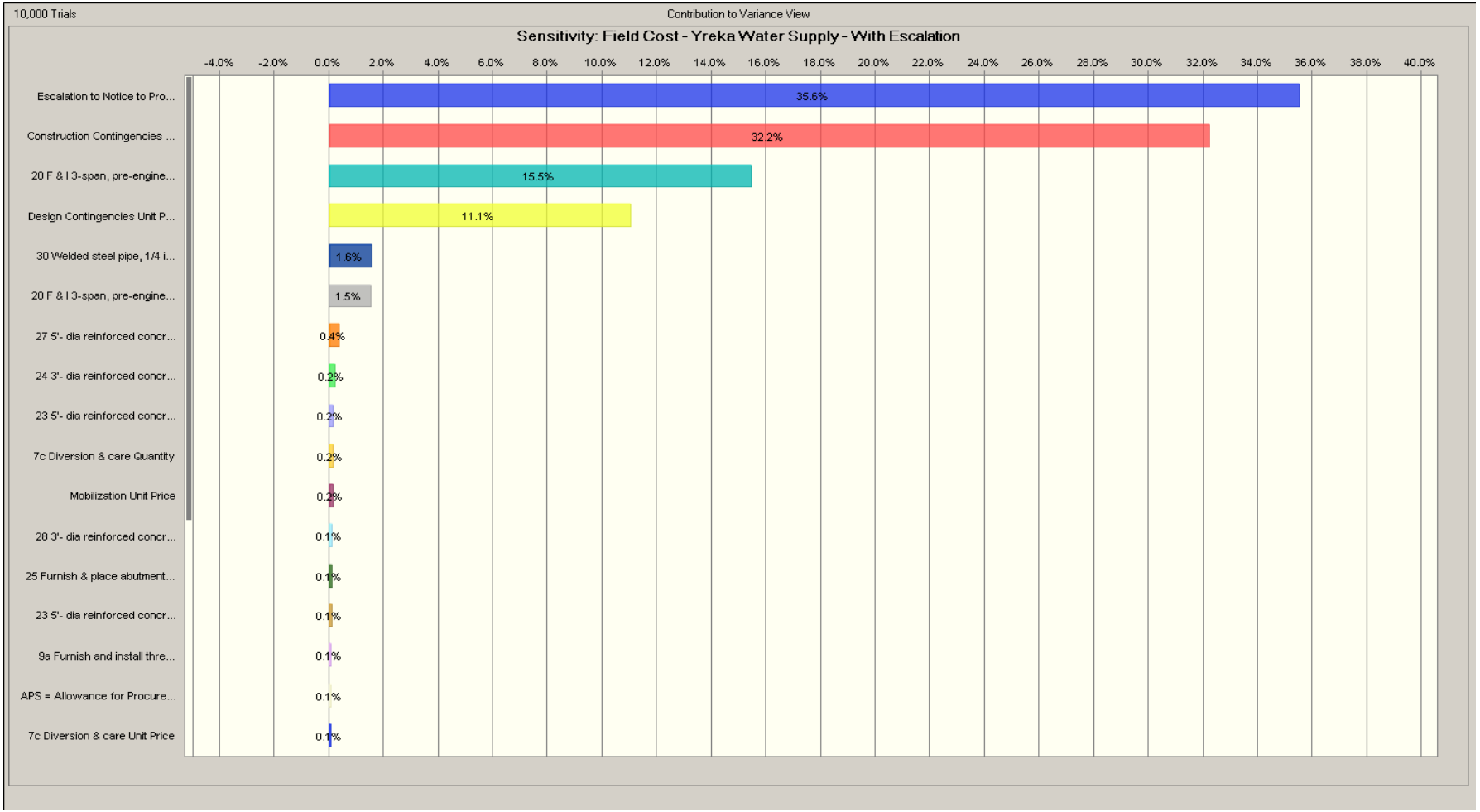
Percentile	Forecast values
0%	$1,573,796.32
10%	$2,477,563.14
20%	$2,634,630.72
30%	$2,755,453.48
40%	$2,871,227.59
50%	$2,968,555.21
60%	$3,066,165.58
70%	$3,179,809.97
80%	$3,312,634.50
90%	$3,501,087.92
100%	$4,393,918.53

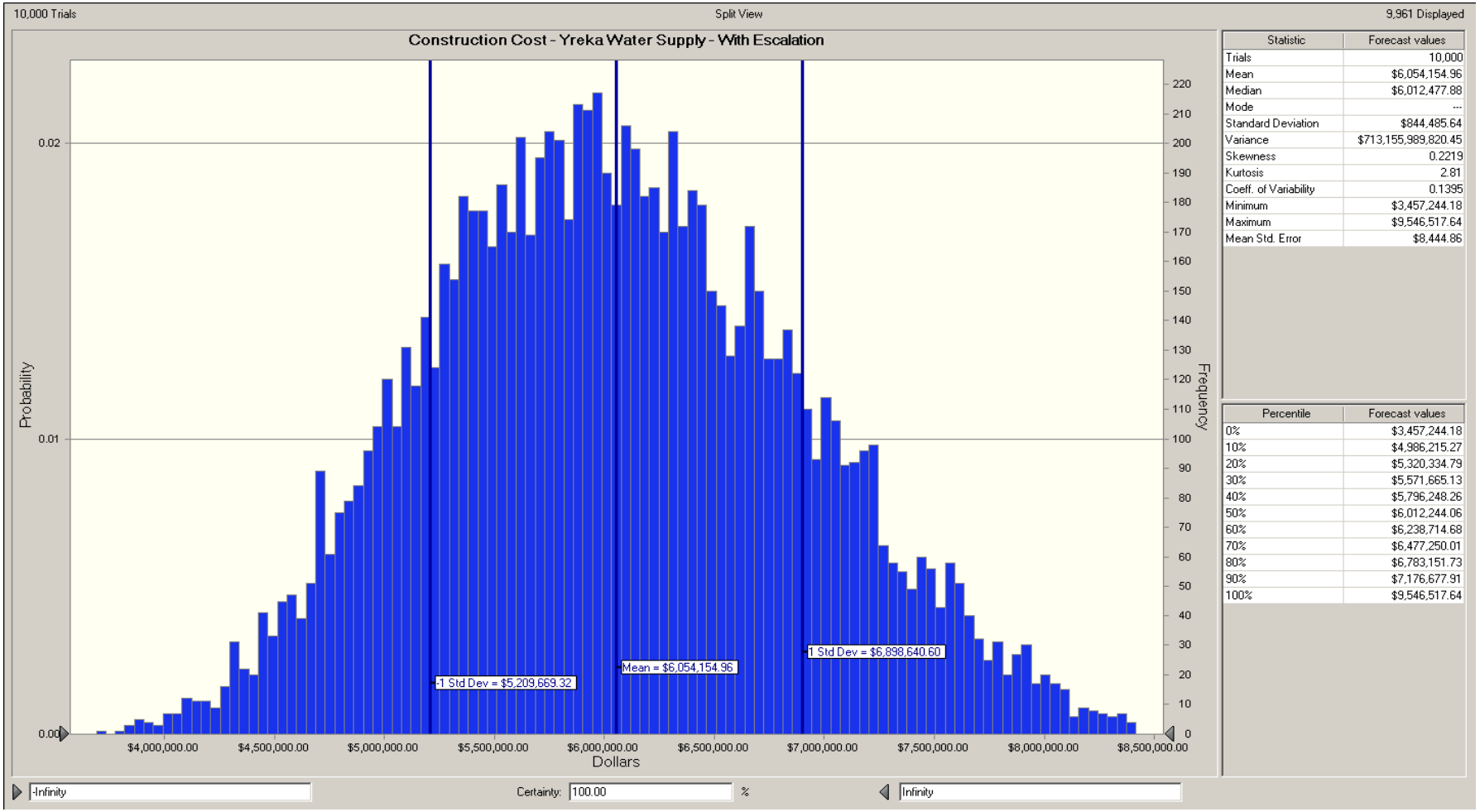

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Yreka Water Supply - With Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
48.0%
51.0%
54.0%
57.0%
Escalation to Notice to Pro...
52.7%
20 F & I 3-span, pre-engine...
22.5%
Design Contingencies Unit P...
16.3%
20 F & I 3-span, pre-engine...
2.7%
30 Welded steel pipe, 1/4 i...
2.4%
27 5'- dia reinforced concr...
0.5%
24 3'- dia reinforced concr...
0.3%
Mobilization Unit Price
0.3%
7c Diversion & care Quantity
0.3%
23 5'- dia reinforced concr...
0.2%
28 3'- dia reinforced concr...
0.2%
25 Furnish & place abutment...
0.2%
33 CLSM pipe bedding Quantity
0.1%
31 Install/Remove 2 access ...
0.1%
23 5'- dia reinforced concr...
0.1%
15a Furnish and place concr...
0.1%
21 Furnish & place abutment...
0.1%



Statistic	Forecast values
Trials	10,000
Mean	$3,793,694.96
Median	$3,783,030.36
Mode	---
Standard Deviation	$477,591.16
Variance	$228,093,311,559.82
Skewness	0.1139
Kurtosis	2.87
Coeff. of Variability	0.1259
Minimum	$2,018,075.68
Maximum	$5,559,615.95
Mean Std. Error	$4,775.91

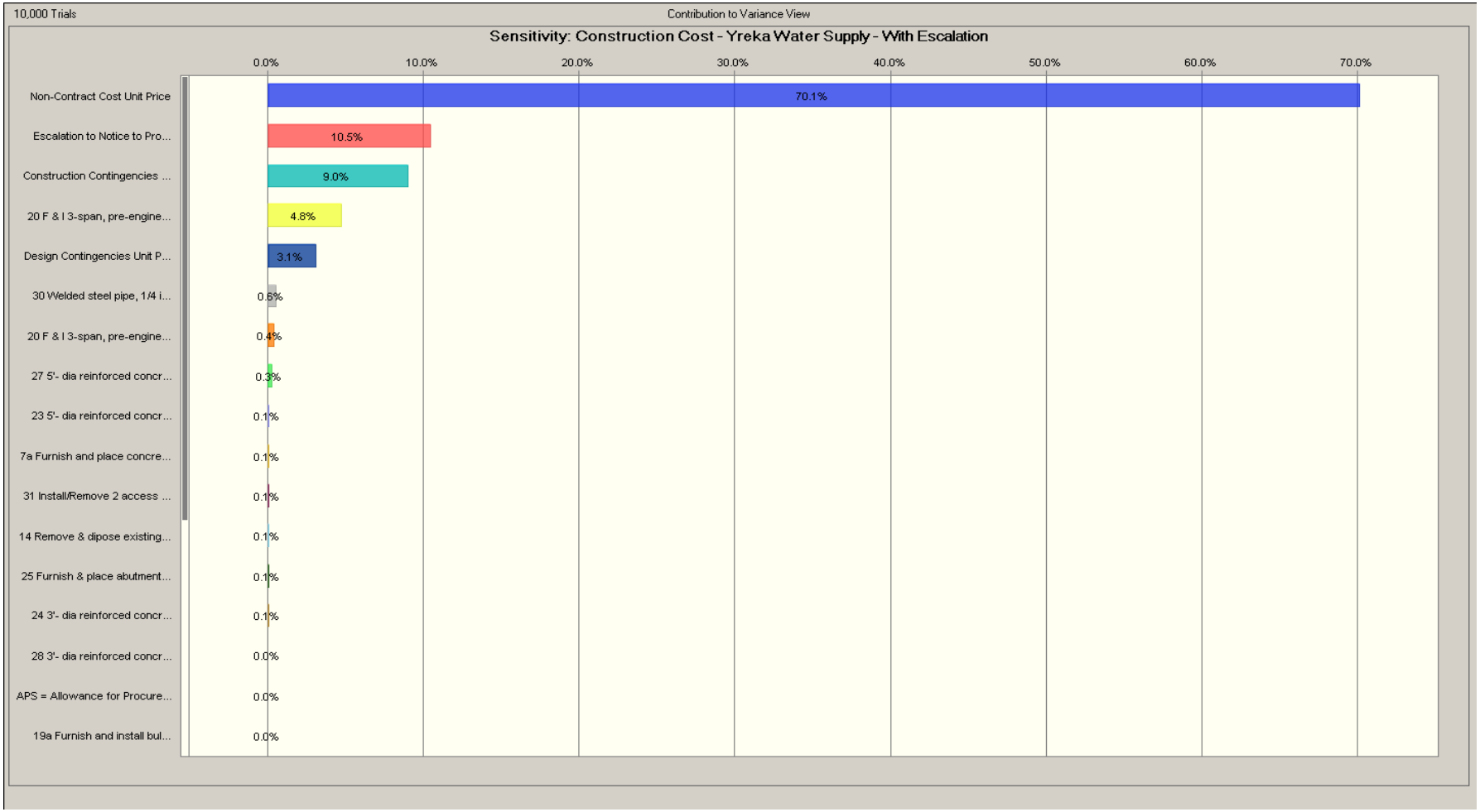
Percentile	Forecast values
0%	$2,018,075.68
10%	$3,178,499.68
20%	$3,387,801.00
30%	$3,532,307.50
40%	$3,659,555.95
50%	$3,782,906.06
60%	$3,912,644.15
70%	$4,043,263.12
80%	$4,198,255.04
90%	$4,418,999.64
100%	$5,559,615.95


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - Yreka Water Supply - With Escalation
-4.0% -2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0% 22.0% 24.0% 26.0% 28.0% 30.0% 32.0% 34.0% 36.0% 38.0% 40.0%
Escalation to Notice to Pro... 35.6%
Construction Contingencies ... 32.2%
20 F & I 3-span, pre-engine... 15.5%
Design Contingencies Unit P... 11.1%
30 Welded steel pipe, 1/4 i... 1.6%
20 F & I 3-span, pre-engine... 1.5%
27 5'- dia reinforced concr... 0.4%
24 3'- dia reinforced concr... 0.2%
23 5'- dia reinforced concr... 0.2%
7c Diversion & care Quantity 0.2%
Mobilization Unit Price 0.2%
28 3'- dia reinforced concr... 0.1%
25 Furnish & place abutment... 0.1%
23 5'- dia reinforced concr... 0.1%
9a Furnish and install thre... 0.1%
APS = Allowance for Procure... 0.1%
7c Diversion & care Unit Price 0.1%



Statistic	Forecast values
Trials	10,000
Mean	$6,054,154.96
Median	$6,012,477.88
Mode	---
Standard Deviation	$844,485.64
Variance	$713,155,989,820.45
Skewness	0.2219
Kurtosis	2.81
Coeff. of Variability	0.1395
Minimum	$3,457,244.18
Maximum	$9,546,517.64
Mean Std. Error	$8,444.86

Percentile	Forecast values
0%	$3,457,244.18
10%	$4,986,215.27
20%	$5,320,334.79
30%	$5,571,665.13
40%	$5,796,248.26
50%	$6,012,244.06
60%	$6,238,714.68
70%	$6,477,250.01
80%	$6,783,151.73
90%	$7,176,677.91
100%	$9,546,517.64


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Yreka Water Supply - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
70.1%
Escalation to Notice to Pro...
10.5%
Construction Contingencies ...
9.0%
20 F & I 3-span, pre-engine...
4.8%
Design Contingencies Unit P...
3.1%
30 Welded steel pipe, 1/4 i...
0.6%
20 F & I 3-span, pre-engine...
0.4%
27 5'- dia reinforced concr...
0.3%
23 5'- dia reinforced concr...
0.1%
7a Furnish and place concre...
0.1%
31 Install/Remove 2 access ...
0.1%
14 Remove & dipose existing...
0.1%
25 Furnish & place abutment...
0.1%
24 3'- dia reinforced concr...
0.1%
28 3'- dia reinforced concr...
0.0%
APS = Allowance for Procure...
0.0%
19a Furnish and install bul...
0.0%

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka Water Supply
Escalation NOT Included

SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Appraisal

REGION: MP | **PRICE LEVEL:** Jul-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Yreka Crystal Ball - without Escalation - 2011-04.xls]Yreka Water Supply-without Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
		Dam A Modifications											
	1	Remove & dispose steel frame with slide gates/weirs		1	1	1	ea	$6,000.00	$6,500.00	$7,000.00	$6,000.00	$6,500.00	$7,000.00
	2	Remove & dispose by steel bulkhead panel		1	1	1	ea	$950.00	$1,000.00	$1,050.00	$950.00	$1,000.00	$1,050.00
	3	Remove & dispose fish screen panels		6	6	6	ea	$950.00	$1,000.00	$1,050.00	$5,700.00	$6,000.00	$6,300.00
	4	Cut, remove concrete deck		2.4	2.4	2.4	cf	$140.00	$150.00	$160.00	$336.00	$360.00	$384.00
	5	Remove & dipsose wood frame building		1	1	1	ea	$24,000.00	$25,000.00	$26,000.00	$24,000.00	$25,000.00	$26,000.00
	6	Furnish, install wood frame building		1	1	1	ea	$47,500.00	$50,000.00	$52,500.00	$47,500.00	$50,000.00	$52,500.00
	7	Furnish & install steel slide gate with pedestal lift		2	2	2	ea	$3,800.00	$4,000.00	$4,200.00	$7,600.00	$8,000.00	$8,400.00
	7a	Furnish and place concrete walls		0	0	3.1	cy	$1,250.00	$1,300.00	$1,350.00	$0.00	$0.00	$4,185.00
	7b	Extend 220v power to the site		0	0	350	lf	$140.00	$150.00	$160.00	$0.00	$0.00	$56,000.00
	7c	Diversion & care		0	0	1	ls	$95,000.00	$100,000.00	$105,000.00	$0.00	$0.00	$105,000.00
	8	Furnish and install cylindrical tee fish screen		1	1	1	ea	$95,000.00	$100,000.00	$150,000.00	$95,000.00	$100,000.00	$150,000.00
	9a	Furnish and install three bulkheads		1,500	1,500	0	lbs	$7.00	$7.50	$8.00	$10,500.00	$11,250.00	$0.00
	9b	Furnish and install epoxy anchors for bulkheads		30	30	0	ea	$24.00	$25.00	$26.00	$720.00	$750.00	$0.00
		Dam B Modifications											
	10	Excavation for structure		40	40	40	cy	$75.00	$80.00	$120.00	$3,000.00	$3,200.00	$4,800.00
	11	Compacted backfill for structure		30	30	30	cy	$55.00	$60.00	$65.00	$1,650.00	$1,800.00	$1,950.00
	12	Concrete removal, 2'x2' cut opening		4	4	4	cf	$140.00	$150.00	$160.00	$560.00	$600.00	$640.00
	13	Furnish & place concrete in structure		8	8	8	cy	$1,250.00	$1,300.00	$1,350.00	$10,000.00	$10,400.00	$10,800.00
	14	Remove & dipose existing trashrack		1	1	1	ea	$2,400.00	$2,500.00	$2,600.00	$2,400.00	$2,500.00	$2,600.00
	15	Furnish & install grating		25	25	25	sf	$190.00	$200.00	$210.00	$4,750.00	$5,000.00	$5,250.00
	15a	Furnish and place concrete wall		0	0	1.8	cy	$2,100.00	$2,200.00	$2,325.00	$0.00	$0.00	$4,185.00
	15b	Extend 220v power to the site		0	0	280	lf	$140.00	$150.00	$160.00	$0.00	$0.00	$44,800.00
	16	Diversion & care		1	1	1	ls	$47,500.00	$50,000.00	$75,000.00	$47,500.00	$50,000.00	$75,000.00
	17	Create access to dam		1	1	1	ls	$28,500.00	$30,000.00	$50,000.00	$28,500.00	$30,000.00	$50,000.00
	18	Furnish and install cylindrical tee fish screen		1	1	1	ea	$95,000.00	$100,000.00	$150,000.00	$95,000.00	$100,000.00	$150,000.00
	19a	Furnish and install bulkhead to replace trashrack,		1,200	1,200	0	lbs	$7.00	$7.50	$8.00	$8,400.00	$9,000.00	$0.00
	19b	Furnish and install epoxy anchors for bulkheads		18	18	0	ea	$24.00	$25.00	$26.00	$432.00	$450.00	$0.00
		Yreka Pipe Crossing											
	20	F & I 3-span, pre-engineered pipe support bridge		0	1	1	ea	$650,000.00	$700,000.00	$1,365,000.00	$0.00	$700,000.00	$1,365,000.00
	21	Furnish & place abutment 1 concrete cap		0	25	25	cy	$2,400.00	$2,500.00	$2,600.00	$0.00	$62,500.00	$65,000.00
	22	Furnish & place abutment 1 reinforcement, epoxy coated		0	10,000	10,000	lb	$1.90	$2.00	$2.10	$0.00	$20,000.00	$21,000.00
	23	5'- dia reinforced concrete drilled shaft for pier 1		0	16	16	lf	$5,500.00	$6,000.00	$10,000.00	$0.00	$96,000.00	$160,000.00
	24	3'- dia reinforced concrete drilled shaft for pier 1		0	52	52	lf	$1,400.00	$1,500.00	$2,500.00	$0.00	$78,000.00	$130,000.00
	25	Furnish & place abutment 2 concrete cap		0	25	25	cy	$2,400.00	$2,500.00	$2,600.00	$0.00	$62,500.00	$65,000.00
	26	Furnish & place abutment 2 reinforcement, epoxy coated		0	10,000	10,000	lb	$1.90	$2.00	$2.10	$0.00	$20,000.00	$21,000.00
	27	5'- dia reinforced concrete drilled shaft for pier 2		0	16	16	lf	$5,500.00	$6,000.00	$10,000.00	$0.00	$96,000.00	$160,000.00
	28	3'- dia reinforced concrete drilled shaft for pier 2		0	52	52	lf	$1,400.00	$1,500.00	$2,500.00	$0.00	$78,000.00	$130,000.00
	29	Remove & dispose existing steel pipe,		0	20	20	lf	$45.00	$50.00	$52.00	$0.00	$1,000.00	$1,040.00
	30	Welded steel pipe, 1/4 inch wall, 24 inch dia.		2,100	490	490	lf	$190.00	$200.00	$210.00	$399,000.00	$98,000.00	$102,900.00
	31	Install/Remove 2 access ramps for piers,		0	270	270	cy	$95.00	$100.00	$150.00	$0.00	$27,000.00	$40,500.00
	32	Excavation for pipe trench		1,800	70	70	cy	$14.00	$15.00	$25.00	$25,200.00	$1,050.00	$1,750.00
	33	CLSM pipe bedding		200	8	8	cy	$285.00	$300.00	$315.00	$57,000.00	$2,400.00	$2,520.00
	34	Backfill in pipe trench		1,400	55	55	cy	$28.00	$30.00	$32.00	$39,200.00	$1,650.00	$1,760.00
		Subtotal 1									$920,898.00	$1,765,910.00	$3,034,314.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$46,000.00	$88,000.00	$150,000.00	$46,000.00	$88,000.00	$150,000.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Yreka Water Supply
Escalation NOT Included

SUMMARY ESTIMATE

PROJECT: **Klamath River, Northern California/Southern Oregon**

WOID: AF652 **ESTIMATE LEVEL:** Appraisal

REGION: MP **PRICE LEVEL:** Jul-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Yreka Supply Line\MPL, MP, MPH\[Yreka Crystal Ball - without Escalation - 2011-04.xls]Yreka Water Supply-without Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)											
		NOT INCLUDED											
		Design Contingencies (MPL ~ 13%; MP ~ 15%; MPH ~ 20%)		1	1	1	ls	$133,102.00	$246,090.00	$639,262.00	$133,102.00	$246,090.00	$639,262.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$76,424.00	$0.00	$0.00	$76,424.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$1,100,000.00**	**$2,100,000.00**	**$3,900,000.00**
		Construction Contingencies (MPL ~ 23%; MP ~ 25%; MPH ~ 30%)		1	1	1	ls	$250,000.00	$600,000.00	$1,200,000.00	$250,000.00	$600,000.00	$1,200,000.00
		FIELD COST									**$1,350,000.00**	**$2,700,000.00**	**$5,100,000.00**
		Non-Contract Cost (MPL ~ 52%; MP ~ 55%; MPH ~ 61%)		1	1	1	ls	$750,000.00	$1,500,000.00	$3,100,000.00	$750,000.00	$1,500,000.00	$3,100,000.00
		CONSTRUCTION COST									**$2,100,000.00**	**$4,200,000.00**	**$8,200,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES

BY	See Group Worksheets	CHECKED: See Group Worksheets	
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	

PRICES

BY	Craig Grush, P.E.	CHECKED	05-24-11
DATE PREPARED	05/24/11	PEER REVIEW	5/24/11

Crystal Ball Report - Full
Simulation started on 5/26/2011 at 10:48:30
Simulation stopped on 5/26/2011 at 10:51:56

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	32.57
Trials/second (average)	307
Random numbers per sec	28,250
Crystal Ball data:	
Assumptions	92
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP

UNIT PRICES BY Craig A. Grush

DATE 5/26/2011

DATE	PEER REVIEWER(S)	CODE
6/1/11	Signature / Printed Name DAN MAGGI	8174
	Signature / Printed Name	

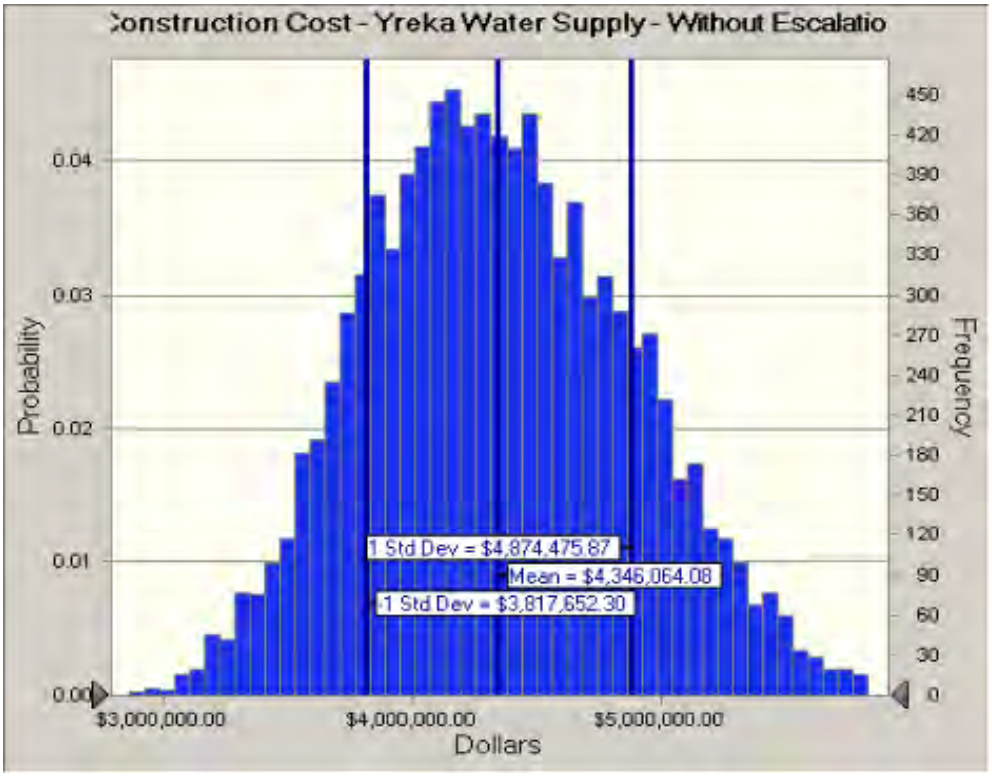
Author Initials PEER REVIEW N

Forecasts

Worksheet: [Yreka Crystal Ball - without Escalation - 2011-04.xls]Yreka Water Supply-without I

Forecast: Construction Cost - Yreka Water Supply - Without Escalation **Cell: U72**

Summary:
Entire range is from $2,471,247.40 to $6,210,942.08
Base case is $4,200,000.00
After 10,000 trials, the std. error of the mean is $5,284.12



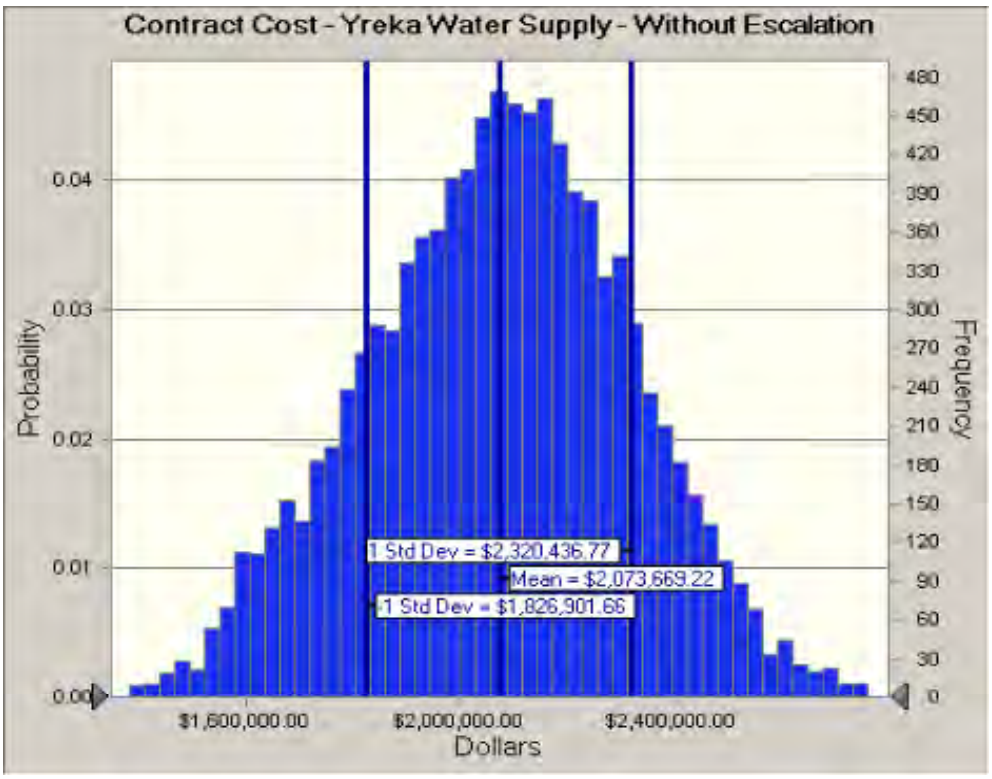
Forecast: Construction Cost - Yreka Water Supply - Without Escalation (cont'd) **Cell: U72**

Statistics:	Forecast values
Trials	10,000
Mean	$4,346,064.08
Median	$4,318,221.63
Mode	---
Standard Deviation	$528,411.78
Variance	$279,219,013,820.12
Skewness	0.1957
Kurtosis	2.74
Coeff. of Variability	0.1216
Minimum	$2,471,247.40
Maximum	$6,210,942.08
Range Width	$3,739,694.69
Mean Std. Error	$5,284.12

Percentiles:	Forecast values
0%	$2,471,247.40
10%	$3,683,202.98
20%	$3,881,282.51
30%	$4,038,153.76
40%	$4,180,306.35
50%	$4,318,197.32
60%	$4,460,654.39
70%	$4,623,691.00
80%	$4,813,329.88
90%	$5,045,677.63
100%	$6,210,942.08

Forecast: Contract Cost - Yreka Water Supply - Without Escalation **Cell: U68**

Summary:
Entire range is from $1,287,732.53 to $3,034,560.81
Base case is $2,100,000.00
After 10,000 trials, the std. error of the mean is $2,467.68



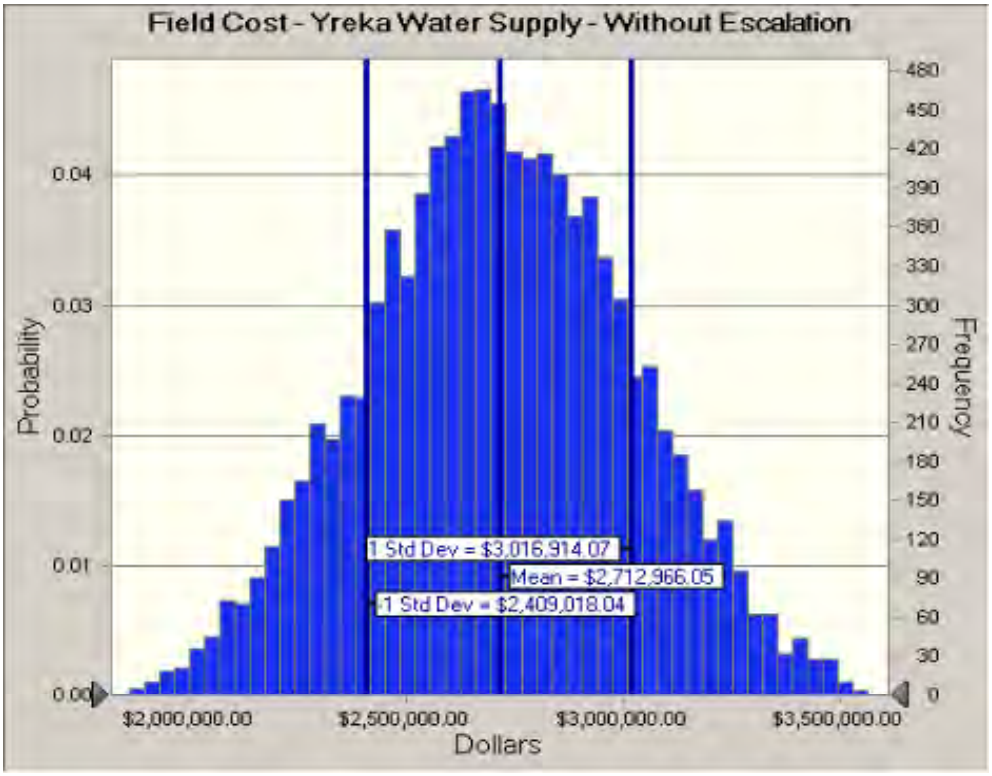
Forecast: Contract Cost - Yreka Water Supply - Without Escalation (cont'd) **Cell: U68**

Statistics:	Forecast values
Trials	10,000
Mean	$2,073,669.22
Median	$2,081,824.25
Mode	---
Standard Deviation	$246,767.56
Variance	$60,894,226,647.34
Skewness	-0.0575
Kurtosis	2.77
Coeff. of Variability	0.1190
Minimum	$1,287,732.53
Maximum	$3,034,560.81
Range Width	$1,746,828.28
Mean Std. Error	$2,467.68

Percentiles:	Forecast values
0%	$1,287,732.53
10%	$1,740,950.91
20%	$1,858,472.49
30%	$1,945,586.80
40%	$2,019,983.06
50%	$2,081,822.28
60%	$2,143,275.76
70%	$2,208,393.18
80%	$2,284,801.66
90%	$2,386,737.29
100%	$3,034,560.81

Forecast: Field Cost - Yreka Water Supply - Without Escalation **Cell: U70**

Summary:
Entire range is from $1,612,744.35 to $3,684,509.27
Base case is $2,700,000.00
After 10,000 trials, the std. error of the mean is $3,039.48



Forecast: Field Cost - Yreka Water Supply - Without Escalation (cont'd) **Cell: U70**

Statistics:	Forecast values
Trials	10,000
Mean	$2,712,966.05
Median	$2,710,271.79
Mode	---
Standard Deviation	$303,948.01
Variance	$92,384,394,158.67
Skewness	0.0182
Kurtosis	2.77
Coeff. of Variability	0.1120
Minimum	$1,612,744.35
Maximum	$3,684,509.27
Range Width	$2,071,764.91
Mean Std. Error	$3,039.48

Percentiles:	Forecast values
0%	$1,612,744.35
10%	$2,310,150.52
20%	$2,454,740.63
30%	$2,552,777.39
40%	$2,632,723.28
50%	$2,710,198.53
60%	$2,789,321.17
70%	$2,876,643.65
80%	$2,972,279.49
90%	$3,107,544.75
100%	$3,684,509.27

End of Forecasts

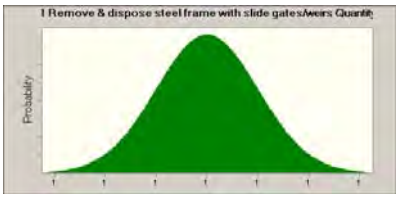
Assumptions

Worksheet: [Yreka Crystal Ball - without Escalation - 2011-04.xls]Yreka Water Supply-without I

Assumption: 1 Remove & dispose steel frame with slide gates/weirs Quantity **Cell: L15**

Normal distribution with parameters:

Mean	1	(=L15)
Std. Dev.	0	(=0.000001)



Assumption: 1 Remove & dispose steel frame with slide gates/weirs Unit Price **Cell: R15**

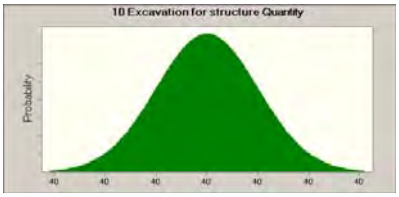
BetaPERT distribution with parameters:

Minimum	$6,000.00	(=Q15)
Likeliest	$6,500.00	(=R15)
Maximum	$7,000.00	(=S15)

Assumption: 10 Excavation for structure Quantity **Cell: L29**

Normal distribution with parameters:

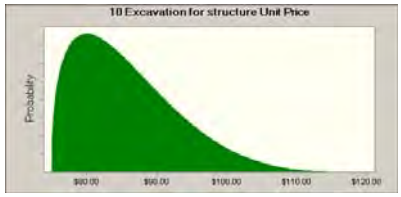
Mean	40	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 10 Excavation for structure Unit Price **Cell: R29**

BetaPERT distribution with parameters:

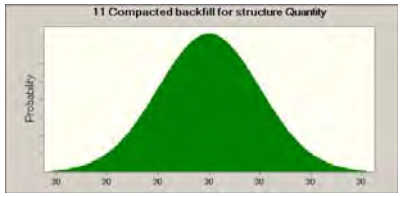
Minimum	$75.00	(=Q29)
Likeliest	$80.00	(=R29)
Maximum	$120.00	(=S29)



Assumption: 11 Compacted backfill for structure Quantity **Cell: L30**

Normal distribution with parameters:

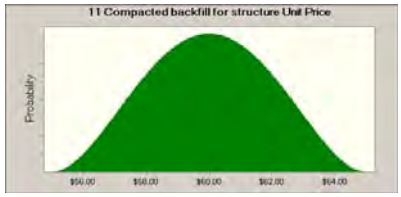
Mean	30	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 11 Compacted backfill for structure Unit Price **Cell: R30**

BetaPERT distribution with parameters:

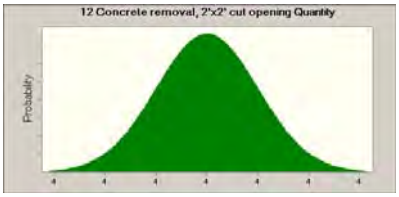
Minimum	$55.00	(=Q30)
Likeliest	$60.00	(=R30)
Maximum	$65.00	(=S30)



Assumption: 12 Concrete removal, 2'x2' cut opening Quantity **Cell: L31**

Normal distribution with parameters:

Mean	4	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 12 Concrete removal, 2'x2' cut opening Unit Price **Cell: R31**

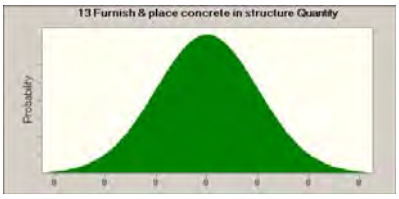
BetaPERT distribution with parameters:

Minimum	$140.00	(=Q31)
Likeliest	$150.00	(=R31)
Maximum	$160.00	(=S31)

Assumption: 13 Furnish & place concrete in structure Quantity **Cell: L32**

Normal distribution with parameters:

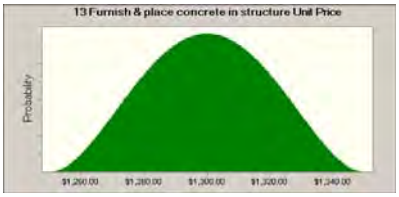
Mean	8	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 13 Furnish & place concrete in structure Unit Price **Cell: R32**

BetaPERT distribution with parameters:

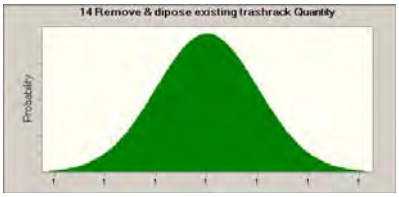
Minimum	$1,250.00	(=Q32)
Likeliest	$1,300.00	(=R32)
Maximum	$1,350.00	(=S32)



Assumption: 14 Remove & dipose existing trashrack Quantity **Cell: L33**

Normal distribution with parameters:

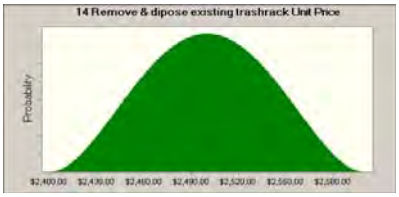
Mean	1	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove & dipose existing trashrack Unit Price **Cell: R33**

BetaPERT distribution with parameters:

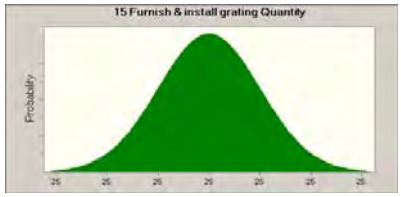
Minimum	$2,400.00	(=Q33)
Likeliest	$2,500.00	(=R33)
Maximum	$2,600.00	(=S33)



Assumption: 15 Furnish & install grating Quantity **Cell: L34**

Normal distribution with parameters:

Mean	25	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 15 Furnish & install grating Unit Price **Cell: R34**

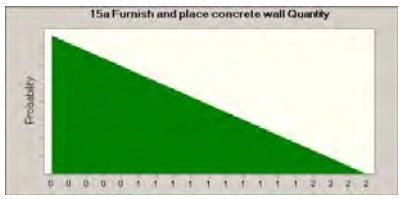
BetaPERT distribution with parameters:

Minimum	$190.00	(=Q34)
Likeliest	$200.00	(=R34)
Maximum	$210.00	(=S34)

Assumption: 15a Furnish and place concrete wall Quantity **Cell: L35**

Triangular distribution with parameters:

Minimum	0	(=K35)
Likeliest	0	(=L35)
Maximum	2	(=M35)



Assumption: 15a Furnish and place concrete wall Unit Price **Cell: R35**

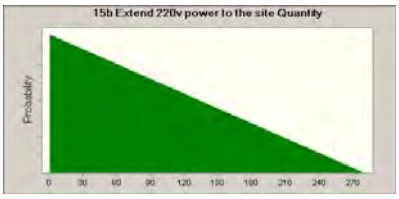
BetaPERT distribution with parameters:

Minimum	$2,100.00	(=Q35)
Likeliest	$2,200.00	(=R35)
Maximum	$2,325.00	(=S35)

Assumption: 15b Extend 220v power to the site Quantity **Cell: L36**

Triangular distribution with parameters:

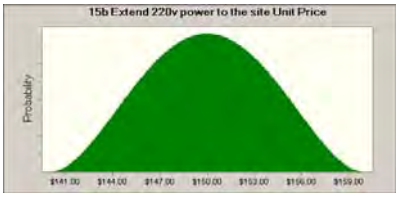
Minimum	0	(=K36)
Likeliest	0	(=L36)
Maximum	280	(=M36)



Assumption: 15b Extend 220v power to the site Unit Price **Cell: R36**

BetaPERT distribution with parameters:

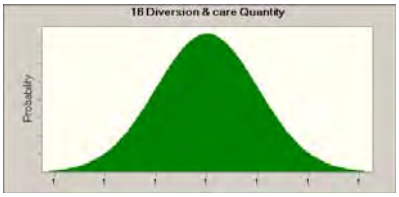
Minimum	$140.00	(=Q36)
Likeliest	$150.00	(=R36)
Maximum	$160.00	(=S36)



Assumption: 16 Diversion & care Quantity **Cell: L37**

Normal distribution with parameters:

Mean	1	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 16 Diversion & care Unit Price **Cell: R37**

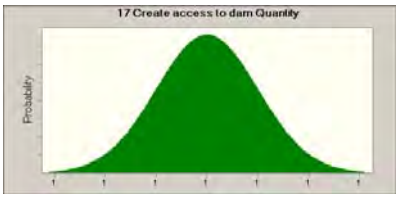
BetaPERT distribution with parameters:

Minimum	$47,500.00	(=Q37)
Likeliest	$50,000.00	(=R37)
Maximum	$75,000.00	(=S37)

Assumption: 17 Create access to dam Quantity **Cell: L38**

Normal distribution with parameters:

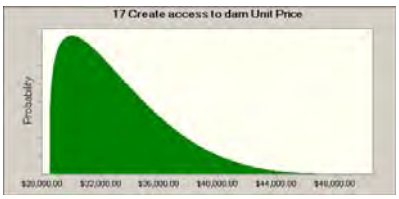
Mean	1	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 17 Create access to dam Unit Price **Cell: R38**

BetaPERT distribution with parameters:

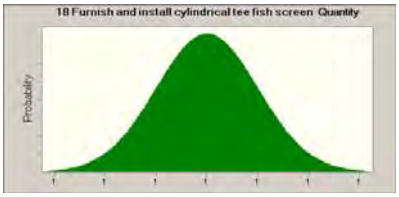
Minimum	$28,500.00	(=Q38)
Likeliest	$30,000.00	(=R38)
Maximum	$50,000.00	(=S38)



Assumption: 18 Furnish and install cylindrical tee fish screen Quantity **Cell: L39**

Normal distribution with parameters:

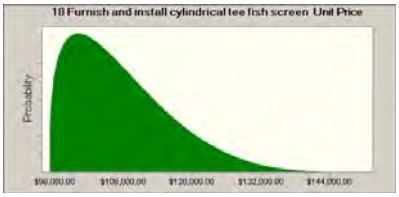
Mean	1	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 18 Furnish and install cylindrical tee fish screen Unit Price **Cell: R39**

BetaPERT distribution with parameters:

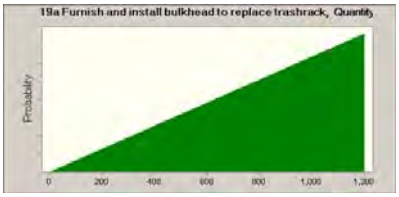
Minimum	$95,000.00	(=Q39)
Likeliest	$100,000.00	(=R39)
Maximum	$150,000.00	(=S39)



Assumption: 19a Furnish and install bulkhead to replace trashrack, Quantity **Cell: L40**

Triangular distribution with parameters:

Minimum	0	(=M40)
Likeliest	1,200	(=L40)
Maximum	1,200	(=K40)



Assumption: 19a Furnish and install bulkhead to replace trashrack, Unit Price **Cell: R40**

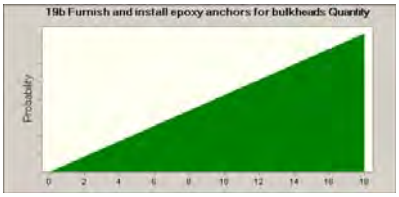
BetaPERT distribution with parameters:

Minimum	$7.00	(=Q40)
Likeliest	$7.50	(=R40)
Maximum	$8.00	(=S40)

Assumption: 19b Furnish and install epoxy anchors for bulkheads Quantity **Cell: L41**

Triangular distribution with parameters:

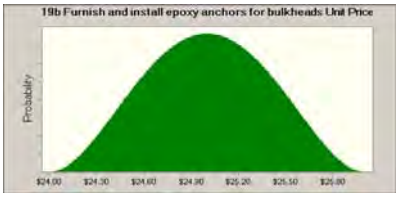
Minimum	0	(=M41)
Likeliest	18	(=L41)
Maximum	18	(=K41)



Assumption: 19b Furnish and install epoxy anchors for bulkheads Unit Price **Cell: R41**

BetaPERT distribution with parameters:

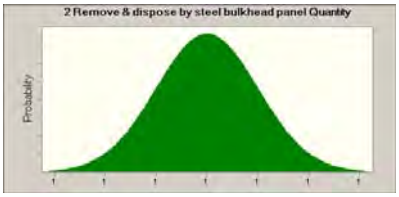
Minimum	$24.00	(=Q41)
Likeliest	$25.00	(=R41)
Maximum	$26.00	(=S41)



Assumption: 2 Remove & dispose by steel bulkhead panel Quantity **Cell: L16**

Normal distribution with parameters:

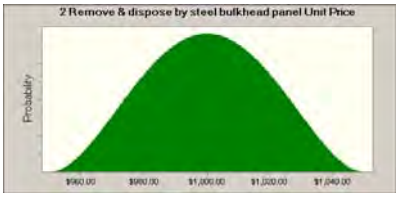
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



Assumption: 2 Remove & dispose by steel bulkhead panel Unit Price **Cell: R16**

BetaPERT distribution with parameters:

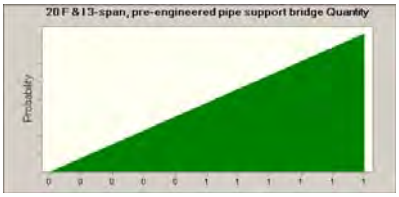
Minimum	$950.00	(=Q16)
Likeliest	$1,000.00	(=R16)
Maximum	$1,050.00	(=S16)



Assumption: 20 F & I 3-span, pre-engineered pipe support bridge Quantity **Cell: L43**

Triangular distribution with parameters:

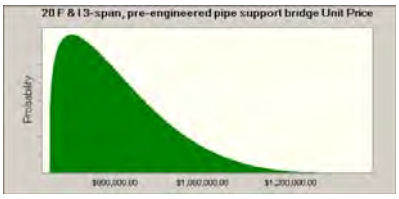
Minimum	0	(=K43)
Likeliest	1	(=L43)
Maximum	1	(=M43)



Assumption: 20 F & I 3-span, pre-engineered pipe support bridge Unit Price **Cell: R43**

BetaPERT distribution with parameters:

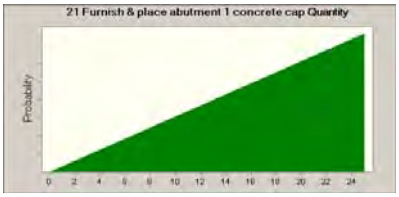
Minimum	$650,000.00	(=Q43)
Likeliest	$700,000.00	(=R43)
Maximum	$1,365,000.00	(=S43)



Assumption: 21 Furnish & place abutment 1 concrete cap Quantity **Cell: L44**

Triangular distribution with parameters:

Minimum	0	(=K44)
Likeliest	25	(=L44)
Maximum	25	(=M44)



Assumption: 21 Furnish & place abutment 1 concrete cap Unit Price **Cell: R44**

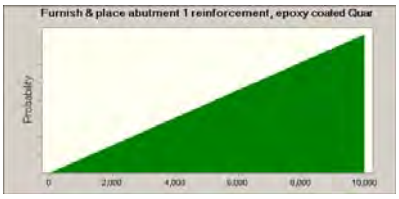
BetaPERT distribution with parameters:

Minimum	$2,400.00	(=Q44)
Likeliest	$2,500.00	(=R44)
Maximum	$2,600.00	(=S44)

Assumption: 22 Furnish & place abutment 1 reinforcement, epoxy coated Quantity **Cell: L45**

Triangular distribution with parameters:

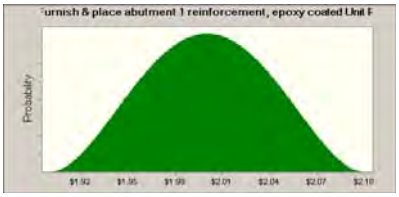
Minimum	0	(=K45)
Likeliest	10,000	(=L45)
Maximum	10,000	(=M45)



Assumption: 22 Furnish & place abutment 1 reinforcement, epoxy coated Unit Price **Cell: R45**

BetaPERT distribution with parameters:

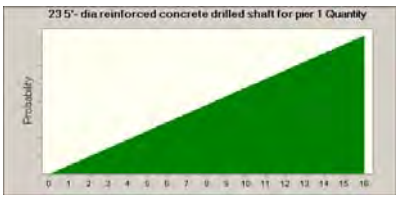
Minimum	$1.90	(=Q45)
Likeliest	$2.00	(=R45)
Maximum	$2.10	(=S45)



Assumption: 23 5'- dia reinforced concrete drilled shaft for pier 1 Quantity **Cell: L46**

Triangular distribution with parameters:

Minimum	0	(=K46)
Likeliest	16	(=L46)
Maximum	16	(=M46)



Assumption: 23 5'- dia reinforced concrete drilled shaft for pier 1 Unit Price **Cell: R46**

BetaPERT distribution with parameters:

Minimum	$5,500.00	(=Q46)
Likeliest	$6,000.00	(=R46)
Maximum	$10,000.00	(=S46)

Assumption: 24 3'- dia reinforced concrete drilled shaft for pier 1 Quantity **Cell: L47**

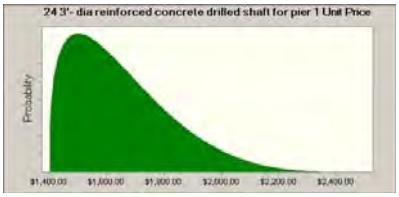
Triangular distribution with parameters:

Minimum	0	(=K47)
Likeliest	52	(=L47)
Maximum	52	(=M47)

Assumption: 24 3'- dia reinforced concrete drilled shaft for pier 1 Unit Price **Cell: R47**

BetaPERT distribution with parameters:

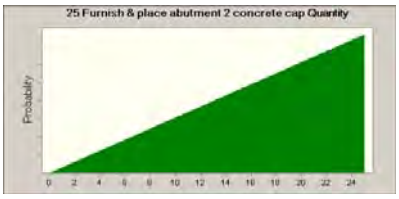
Minimum	$1,400.00	(=Q47)
Likeliest	$1,500.00	(=R47)
Maximum	$2,500.00	(=S47)



Assumption: 25 Furnish & place abutment 2 concrete cap Quantity **Cell: L48**

Triangular distribution with parameters:

Minimum	0	(=K48)
Likeliest	25	(=L48)
Maximum	25	(=M48)



Assumption: 25 Furnish & place abutment 2 concrete cap Unit Price **Cell: R48**

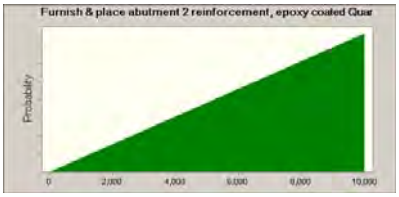
BetaPERT distribution with parameters:

Minimum	$2,400.00	(=Q48)
Likeliest	$2,500.00	(=R48)
Maximum	$2,600.00	(=S48)

Assumption: 26 Furnish & place abutment 2 reinforcement, epoxy coated Quantity **Cell: L49**

Triangular distribution with parameters:

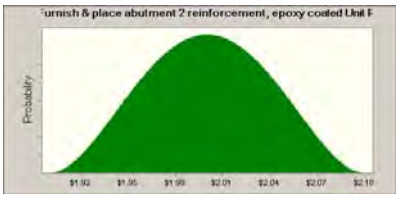
Minimum	0	(=K49)
Likeliest	10,000	(=L49)
Maximum	10,000	(=M49)



Assumption: 26 Furnish & place abutment 2 reinforcement, epoxy coated Unit Price **Cell: R49**

BetaPERT distribution with parameters:

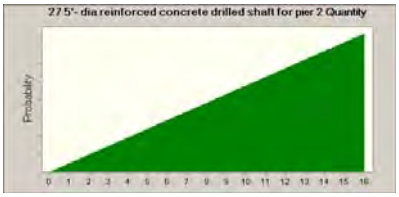
Minimum	$1.90	(=Q49)
Likeliest	$2.00	(=R49)
Maximum	$2.10	(=S49)



Assumption: 27 5'- dia reinforced concrete drilled shaft for pier 2 Quantity **Cell: L50**

Triangular distribution with parameters:

Minimum	0	(=K50)
Likeliest	16	(=L50)
Maximum	16	(=M50)



Assumption: 27 5'- dia reinforced concrete drilled shaft for pier 2 Unit Price **Cell: R50**

BetaPERT distribution with parameters:

Minimum	$5,500.00	(=Q50)
Likeliest	$6,000.00	(=R50)
Maximum	$10,000.00	(=S50)

Assumption: 28 3'- dia reinforced concrete drilled shaft for pier 2 Quantity **Cell: L51**

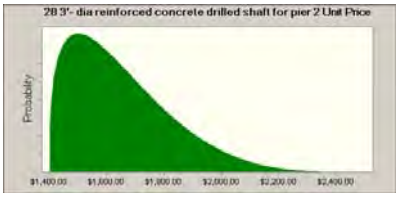
Triangular distribution with parameters:

Minimum	0	(=K51)
Likeliest	52	(=L51)
Maximum	52	(=M51)

Assumption: 28 3'- dia reinforced concrete drilled shaft for pier 2 Unit Price **Cell: R51**

BetaPERT distribution with parameters:

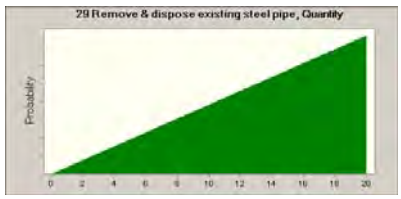
Minimum	$1,400.00	(=Q51)
Likeliest	$1,500.00	(=R51)
Maximum	$2,500.00	(=S51)



Assumption: 29 Remove & dispose existing steel pipe, Quantity **Cell: L52**

Triangular distribution with parameters:

Minimum	0	(=K52)
Likeliest	20	(=L52)
Maximum	20	(=M52)



Assumption: 29 Remove & dispose existing steel pipe, Unit Price **Cell: R52**

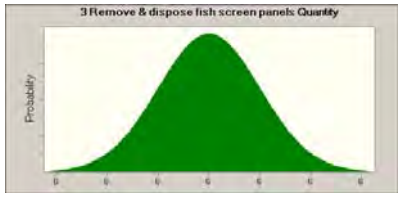
BetaPERT distribution with parameters:

Minimum	$45.00	(=Q52)
Likeliest	$50.00	(=R52)
Maximum	$52.00	(=S52)

Assumption: 3 Remove & dispose fish screen panels Quantity **Cell: L17**

Normal distribution with parameters:

Mean	6	(=L17)
Std. Dev.	0	(=0.000001)



Assumption: 3 Remove & dispose fish screen panels Unit Price **Cell: R17**

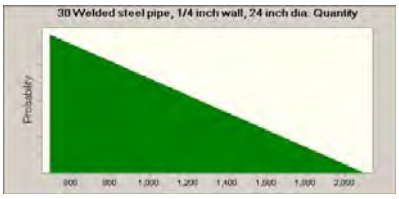
BetaPERT distribution with parameters:

Minimum	$950.00	(=Q17)
Likeliest	$1,000.00	(=R17)
Maximum	$1,050.00	(=S17)

Assumption: 30 Welded steel pipe, 1/4 inch wall, 24 inch dia. Quantity **Cell: L53**

Triangular distribution with parameters:

Minimum	490	(=M53)
Likeliest	490	(=L53)
Maximum	2,100	(=K53)



Assumption: 30 Welded steel pipe, 1/4 inch wall, 24 inch dia. Unit Price **Cell: R53**

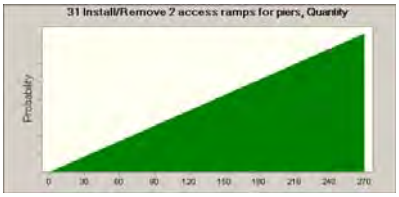
BetaPERT distribution with parameters:

Minimum	$190.00	(=Q53)
Likeliest	$200.00	(=R53)
Maximum	$210.00	(=S53)

Assumption: 31 Install/Remove 2 access ramps for piers, Quantity **Cell: L54**

Triangular distribution with parameters:

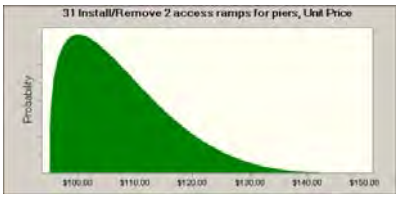
Minimum	0	(=K54)
Likeliest	270	(=L54)
Maximum	270	(=M54)



Assumption: 31 Install/Remove 2 access ramps for piers, Unit Price **Cell: R54**

BetaPERT distribution with parameters:

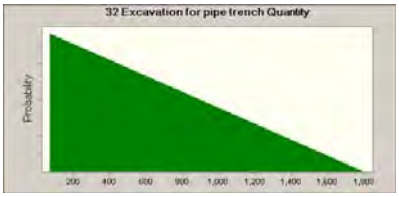
Minimum	$95.00	(=Q54)
Likeliest	$100.00	(=R54)
Maximum	$150.00	(=S54)



Assumption: 32 Excavation for pipe trench Quantity **Cell: L55**

Triangular distribution with parameters:

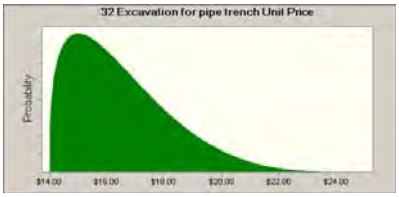
Minimum	70	(=M55)
Likeliest	70	(=L55)
Maximum	1,800	(=K55)



Assumption: 32 Excavation for pipe trench Unit Price **Cell: R55**

BetaPERT distribution with parameters:

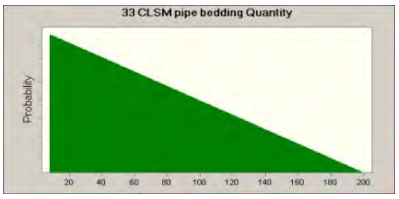
Minimum	$14.00	(=Q55)
Likeliest	$15.00	(=R55)
Maximum	$25.00	(=S55)



Assumption: 33 CLSM pipe bedding Quantity **Cell: L56**

Triangular distribution with parameters:

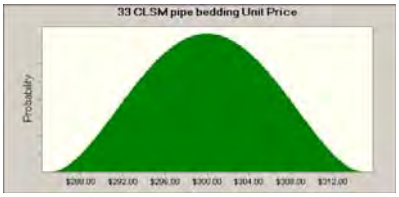
Minimum	8	(=M56)
Likeliest	8	(=L56)
Maximum	200	(=K56)



Assumption: 33 CLSM pipe bedding Unit Price **Cell: R56**

BetaPERT distribution with parameters:

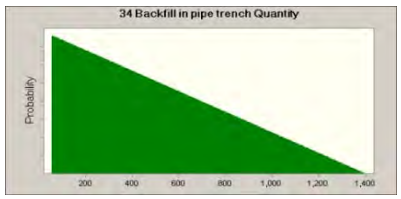
Minimum	$285.00	(=Q56)
Likeliest	$300.00	(=R56)
Maximum	$315.00	(=S56)



Assumption: 34 Backfill in pipe trench Quantity **Cell: L57**

Triangular distribution with parameters:

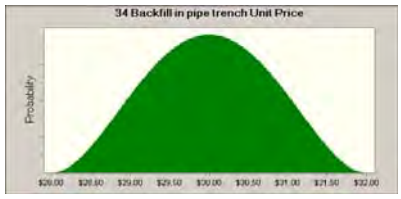
Minimum	55	(=M57)
Likeliest	55	(=L57)
Maximum	1,400	(=K57)



Assumption: 34 Backfill in pipe trench Unit Price **Cell: R57**

BetaPERT distribution with parameters:

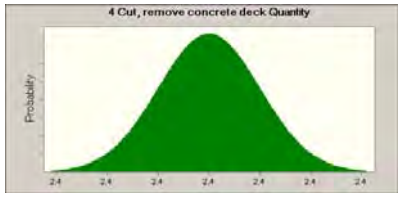
Minimum	$28.00	(=Q57)
Likeliest	$30.00	(=R57)
Maximum	$32.00	(=S57)



Assumption: 4 Cut, remove concrete deck Quantity **Cell: L18**

Normal distribution with parameters:

Mean	2.4	(=L18)
Std. Dev.	0.0	(=0.000001)



Assumption: 4 Cut, remove concrete deck Unit Price **Cell: R18**

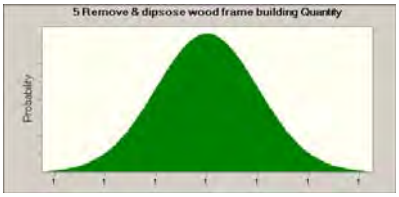
BetaPERT distribution with parameters:

Minimum	$140.00	(=Q18)
Likeliest	$150.00	(=R18)
Maximum	$160.00	(=S18)

Assumption: 5 Remove & dipsose wood frame building Quantity **Cell: L19**

Normal distribution with parameters:

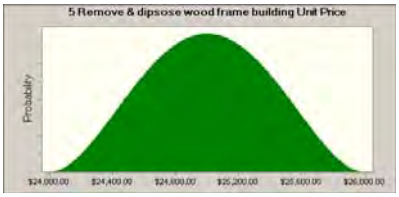
Mean	1	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove & dipsose wood frame building Unit Price **Cell: R19**

BetaPERT distribution with parameters:

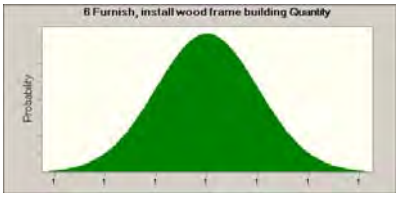
Minimum	$24,000.00	(=Q19)
Likeliest	$25,000.00	(=R19)
Maximum	$26,000.00	(=S19)



Assumption: 6 Furnish, install wood frame building Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 6 Furnish, install wood frame building Unit Price **Cell: R20**

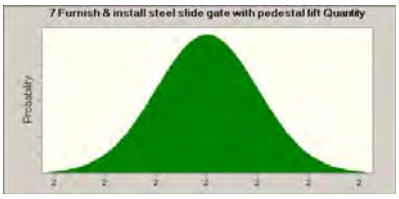
BetaPERT distribution with parameters:

Minimum	$47,500.00	(=Q20)
Likeliest	$50,000.00	(=R20)
Maximum	$52,500.00	(=S20)

Assumption: 7 Furnish & install steel slide gate with pedestal lift Quantity **Cell: L21**

Normal distribution with parameters:

Mean	2	(=L21)
Std. Dev.	0	(=0.000001)



Assumption: 7 Furnish & install steel slide gate with pedestal lift Unit Price **Cell: R21**

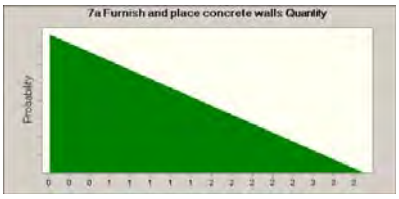
BetaPERT distribution with parameters:

Minimum	$3,800.00	(=Q21)
Likeliest	$4,000.00	(=R21)
Maximum	$4,200.00	(=S21)

Assumption: 7a Furnish and place concrete walls Quantity **Cell: L22**

Triangular distribution with parameters:

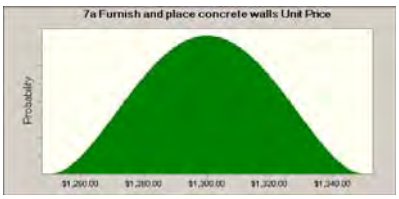
Minimum	0	(=K22)
Likeliest	0	(=L22)
Maximum	3	(=M22)



Assumption: 7a Furnish and place concrete walls Unit Price **Cell: R22**

BetaPERT distribution with parameters:

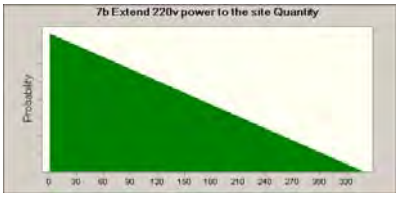
Minimum	$1,250.00	(=Q22)
Likeliest	$1,300.00	(=R22)
Maximum	$1,350.00	(=S22)



Assumption: 7b Extend 220v power to the site Quantity **Cell: L23**

Triangular distribution with parameters:

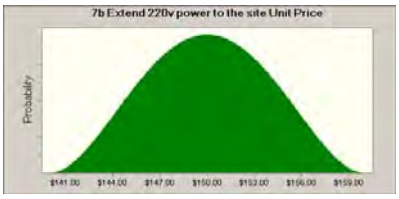
Minimum	0	(=K23)
Likeliest	0	(=L23)
Maximum	350	(=M23)



Assumption: 7b Extend 220v power to the site Unit Price **Cell: R23**

BetaPERT distribution with parameters:

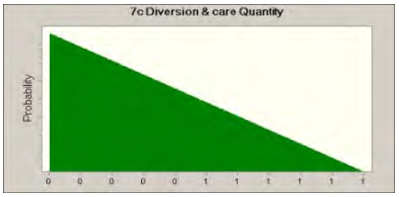
Minimum	$140.00	(=Q23)
Likeliest	$150.00	(=R23)
Maximum	$160.00	(=S23)



Assumption: 7c Diversion & care Quantity **Cell: L24**

Triangular distribution with parameters:

Minimum	0	(=K24)
Likeliest	0	(=L24)
Maximum	1	(=M24)



Assumption: 7c Diversion & care Unit Price **Cell: R24**

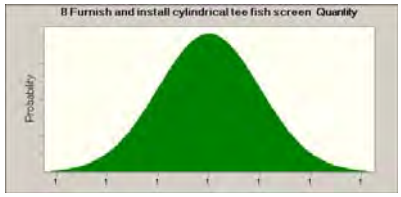
BetaPERT distribution with parameters:

Minimum	$95,000.00	(=Q24)
Likeliest	$100,000.00	(=R24)
Maximum	$105,000.00	(=S24)

Assumption: 8 Furnish and install cylindrical tee fish screen Quantity **Cell: L25**

Normal distribution with parameters:

Mean	1	(=L25)
Std. Dev.	0	(=0.000001)



Assumption: 8 Furnish and install cylindrical tee fish screen Unit Price **Cell: R25**

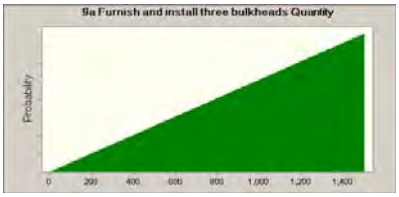
BetaPERT distribution with parameters:

Minimum	$95,000.00	(=Q25)
Likeliest	$100,000.00	(=R25)
Maximum	$150,000.00	(=S25)

Assumption: 9a Furnish and install three bulkheads Quantity **Cell: L26**

Triangular distribution with parameters:

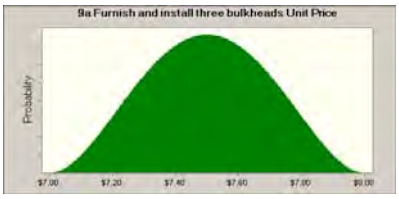
Minimum	0	(=M26)
Likeliest	1,500	(=L26)
Maximum	1,500	(=K26)



Assumption: 9a Furnish and install three bulkheads Unit Price **Cell: R26**

BetaPERT distribution with parameters:

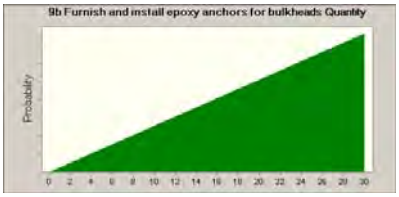
Minimum	$7.00	(=Q26)
Likeliest	$7.50	(=R26)
Maximum	$8.00	(=S26)



Assumption: 9b Furnish and install epoxy anchors for bulkheads Quantity **Cell: L27**

Triangular distribution with parameters:

Minimum	0	(=M27)
Likeliest	30	(=L27)
Maximum	30	(=K27)



Assumption: 9b Furnish and install epoxy anchors for bulkheads Unit Price **Cell: R27**

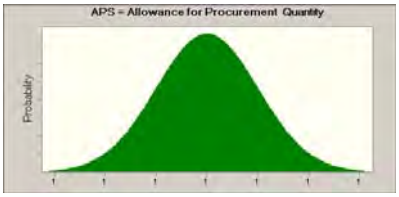
BetaPERT distribution with parameters:

Minimum	$24.00	(=Q27)
Likeliest	$25.00	(=R27)
Maximum	$26.00	(=S27)

Assumption: APS = Allowance for Procurement Quantity **Cell: L66**

Normal distribution with parameters:

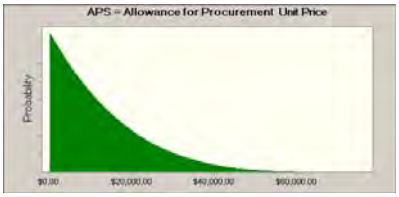
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R66**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q66)
Likeliest	$0.00	(=R66)
Maximum	$76,424.00	(=S66)



Assumption: Construction Contingencies Quantity **Cell: L69**

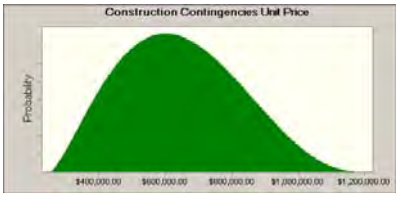
Normal distribution with parameters:

Mean	1	(=L69)
Std. Dev.	0	(=0.000001)

Assumption: Construction Contingencies Unit Price **Cell: R69**

BetaPERT distribution with parameters:

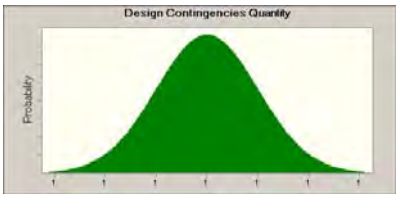
Minimum	$250,000.00	(=Q69)
Likeliest	$600,000.00	(=R69)
Maximum	$1,200,000.00	(=S69)



Assumption: Design Contingencies Quantity **Cell: L65**

Normal distribution with parameters:

Mean	1	(=L65)
Std. Dev.	0	(=0.000001)



Assumption: Design Contingencies Unit Price **Cell: R65**

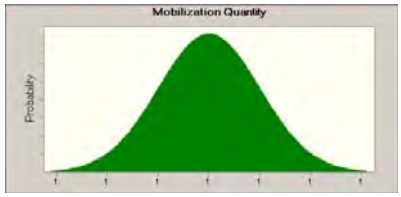
BetaPERT distribution with parameters:

Minimum	$133,102.00	(=Q65)
Likeliest	$246,090.00	(=R65)
Maximum	$639,262.00	(=S65)

Assumption: Mobilization Quantity **Cell: L60**

Normal distribution with parameters:

Mean	1	(=L60)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R60**

BetaPERT distribution with parameters:

Minimum	$46,000.00	(=Q60)
Likeliest	$88,000.00	(=R60)
Maximum	$150,000.00	(=S60)

Assumption: Non-Contract Cost Quantity **Cell: L71**

Normal distribution with parameters:

Mean	1	(=L71)
Std. Dev.	0	(=0.000001)

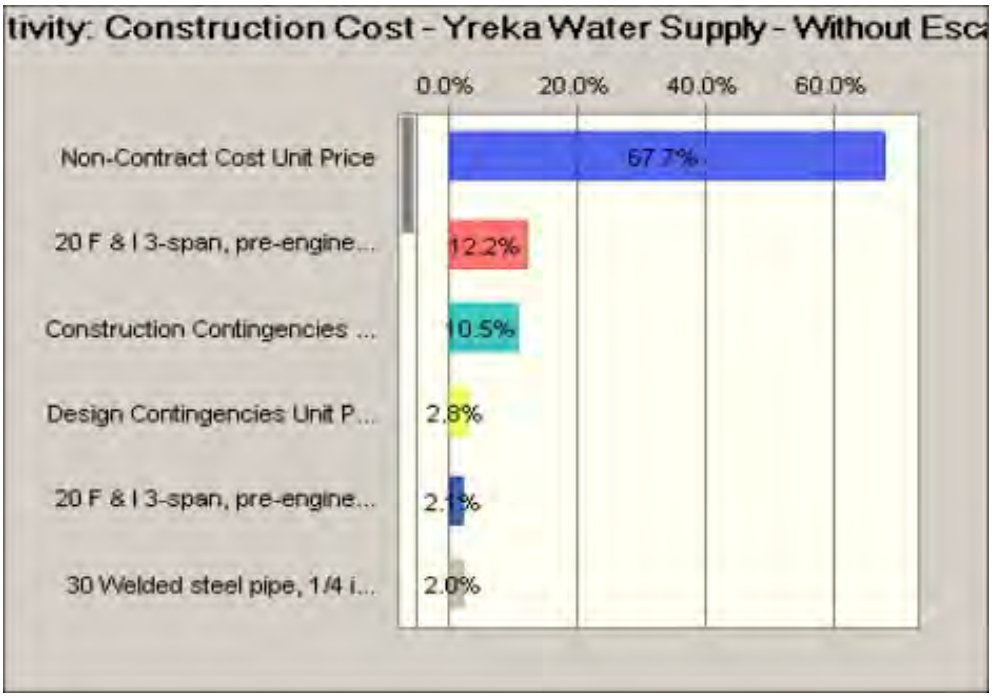
Assumption: Non-Contract Cost Unit Price **Cell: R71**

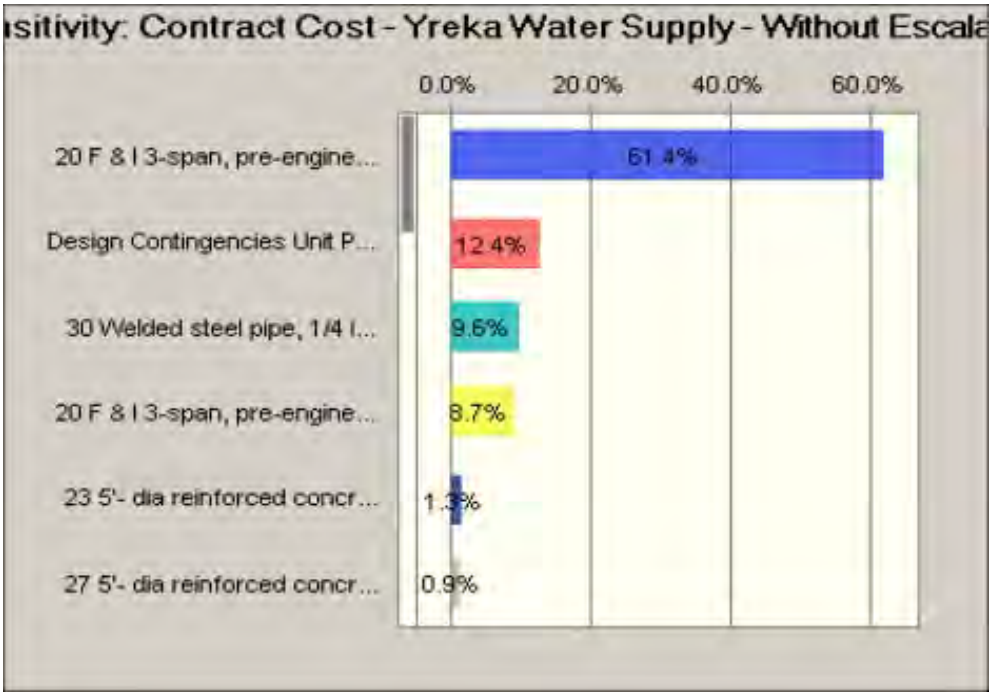
BetaPERT distribution with parameters:

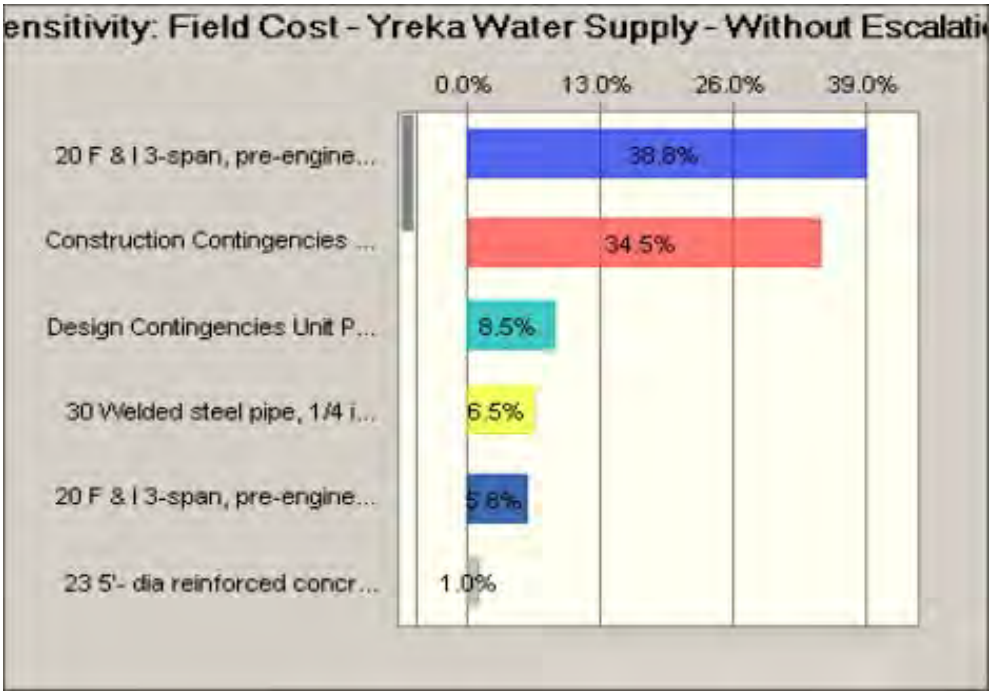
Minimum	$750,000.00	(=Q71)
Likeliest	$1,500,000.00	(=R71)
Maximum	$3,100,000.00	(=S71)

End of Assumptions

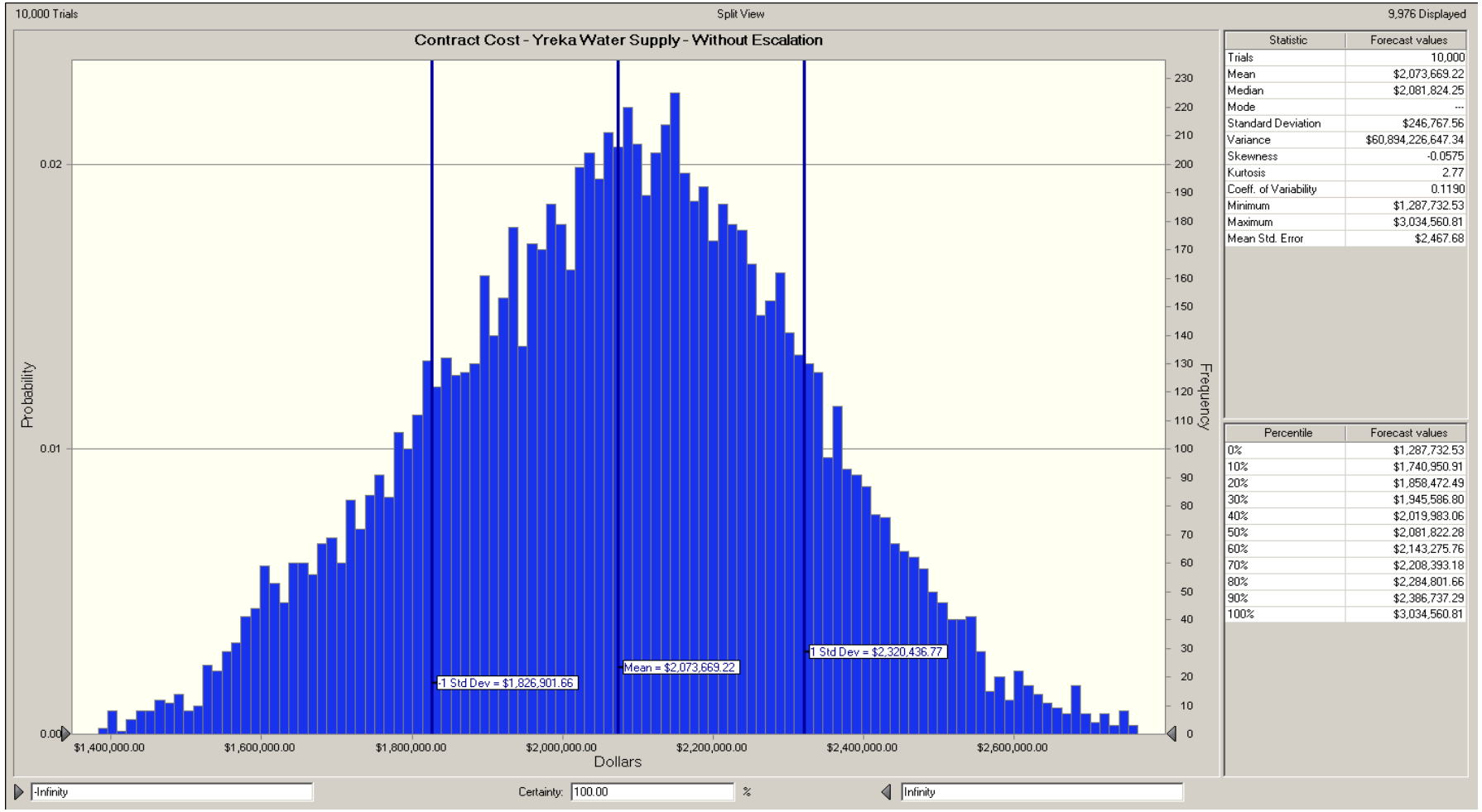
Sensitivity Charts





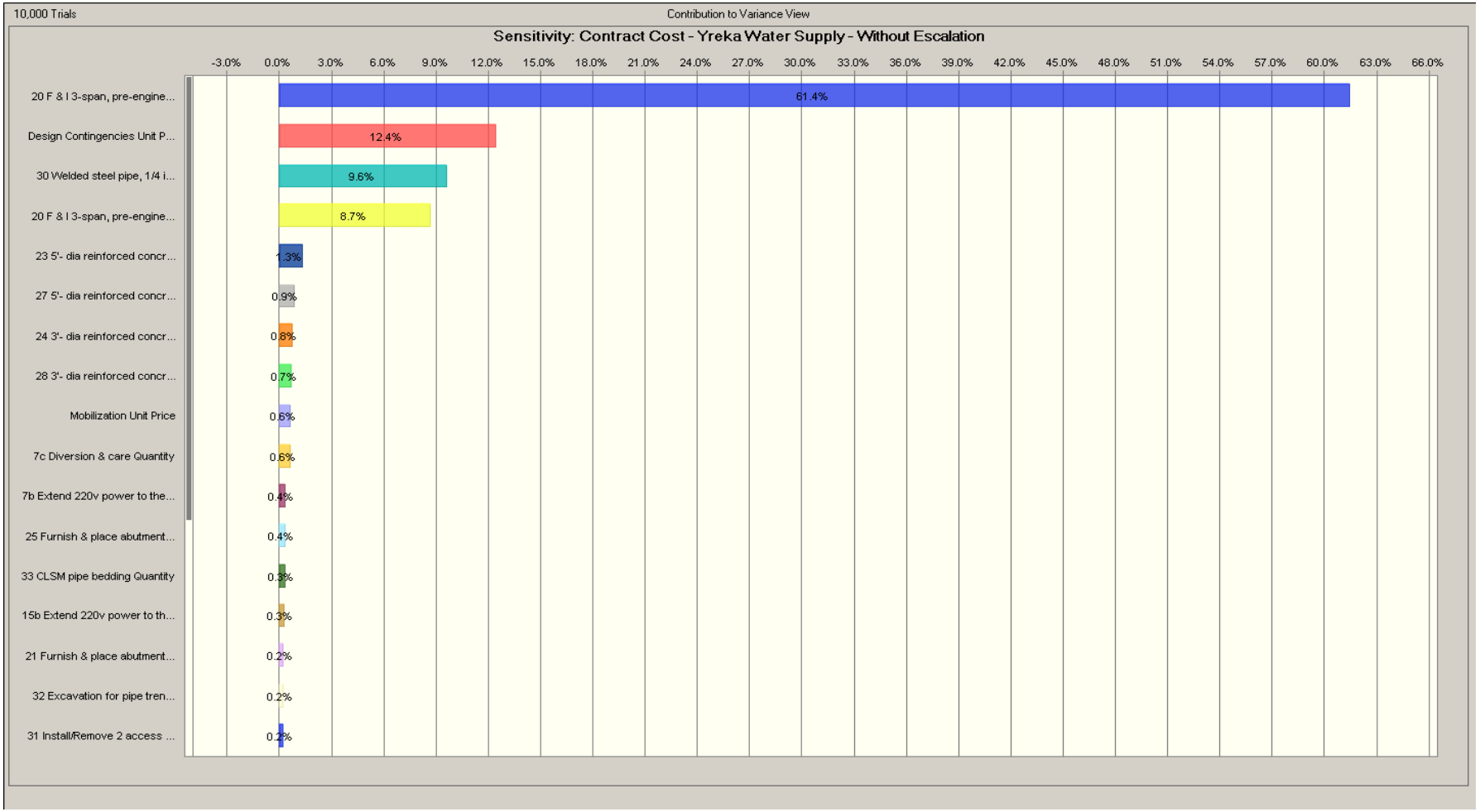


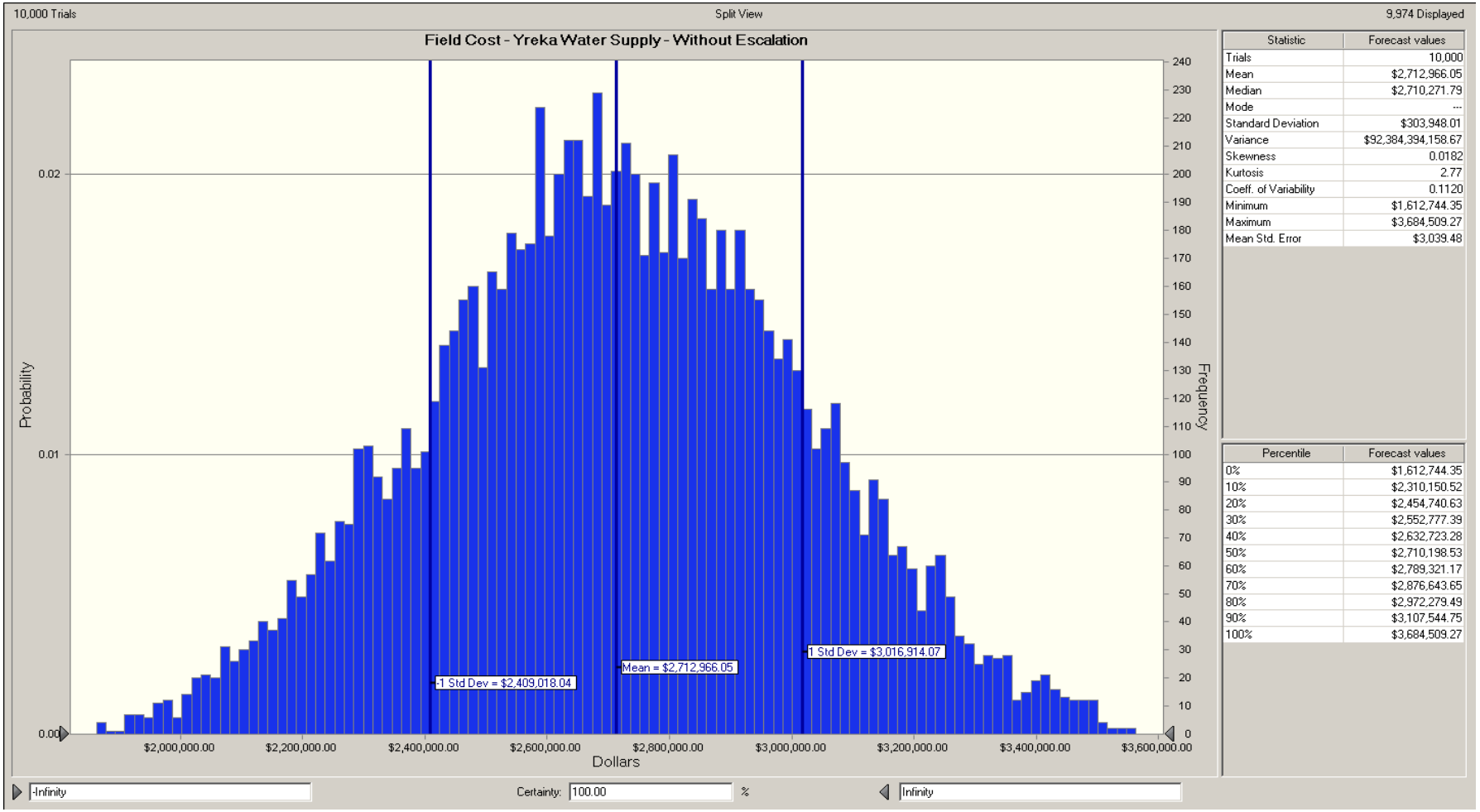
End of Sensitivity Charts



Statistic	Forecast values
Trials	10,000
Mean	$2,073,669.22
Median	$2,081,824.25
Mode	---
Standard Deviation	$246,767.56
Variance	$60,894,226,647.34
Skewness	-0.0575
Kurtosis	2.77
Coeff. of Variability	0.1190
Minimum	$1,287,732.53
Maximum	$3,034,560.81
Mean Std. Error	$2,467.68

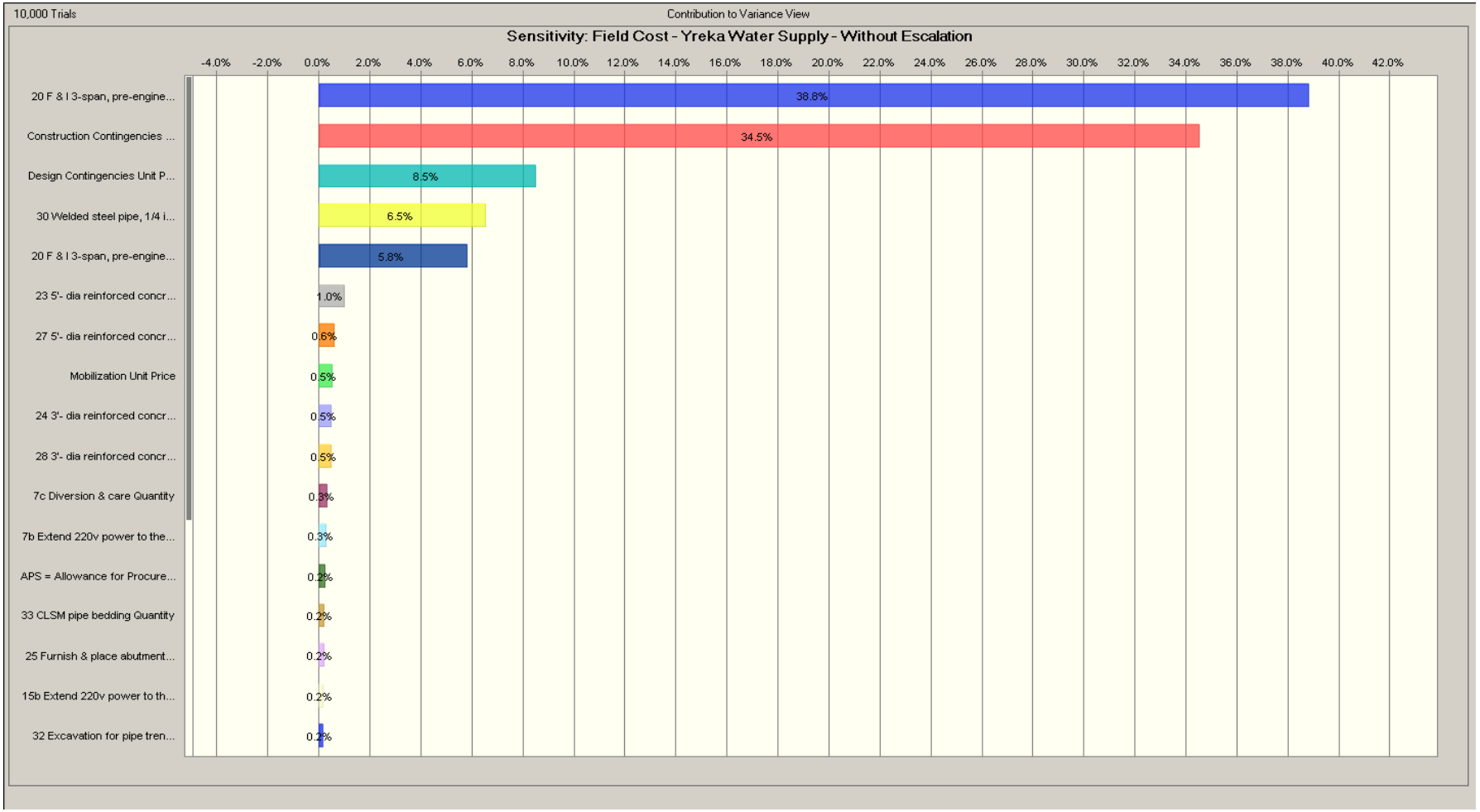
Percentile	Forecast values
0%	$1,287,732.53
10%	$1,740,950.91
20%	$1,858,472.49
30%	$1,945,586.80
40%	$2,019,983.06
50%	$2,081,822.28
60%	$2,143,275.76
70%	$2,208,393.18
80%	$2,284,801.66
90%	$2,386,737.29
100%	$3,034,560.81

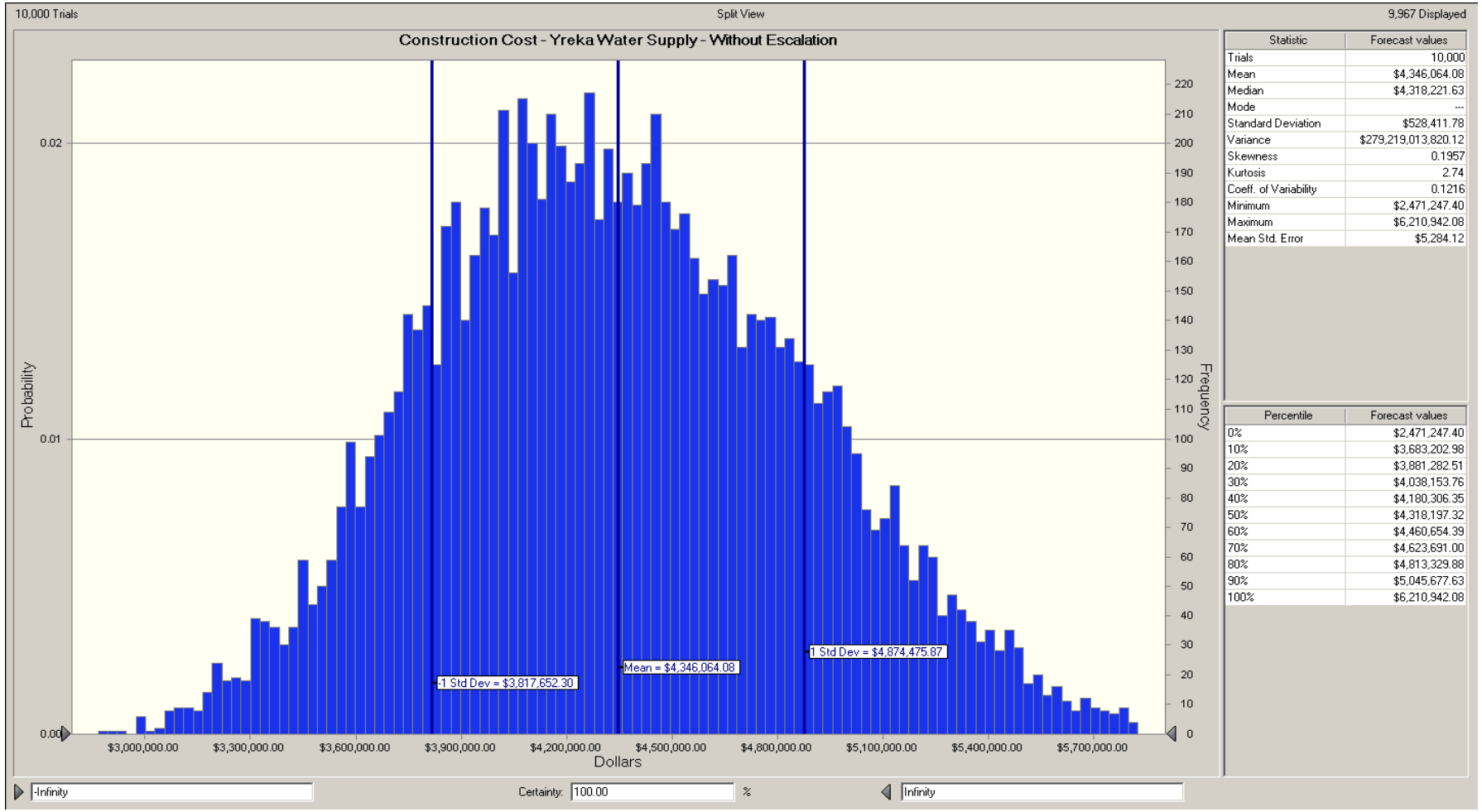

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Yreka Water Supply - Without Escalation
-3.0% 0.0% 3.0% 6.0% 9.0% 12.0% 15.0% 18.0% 21.0% 24.0% 27.0% 30.0% 33.0% 36.0% 39.0% 42.0% 45.0% 48.0% 51.0% 54.0% 57.0% 60.0% 63.0% 66.0%
20 F & I 3-span, pre-engine... 61.4%
Design Contingencies Unit P... 12.4%
30 Welded steel pipe, 1/4 i... 9.6%
20 F & I 3-span, pre-engine... 8.7%
23 5'- dia reinforced concr... 1.3%
27 5'- dia reinforced concr... 0.9%
24 3'- dia reinforced concr... 0.8%
28 3'- dia reinforced concr... 0.7%
Mobilization Unit Price 0.6%
7c Diversion & care Quantity 0.6%
7b Extend 220v power to the... 0.4%
25 Furnish & place abutment... 0.4%
33 CLSM pipe bedding Quantity 0.3%
15b Extend 220v power to th... 0.3%
21 Furnish & place abutment... 0.2%
32 Excavation for pipe tren... 0.2%
31 Install/Remove 2 access ... 0.2%



Statistic	Forecast values
Trials	10,000
Mean	$2,712,966.05
Median	$2,710,271.79
Mode	---
Standard Deviation	$303,948.01
Variance	$92,384,394,158.67
Skewness	0.0182
Kurtosis	2.77
Coeff. of Variability	0.1120
Minimum	$1,612,744.35
Maximum	$3,684,509.27
Mean Std. Error	$3,039.48

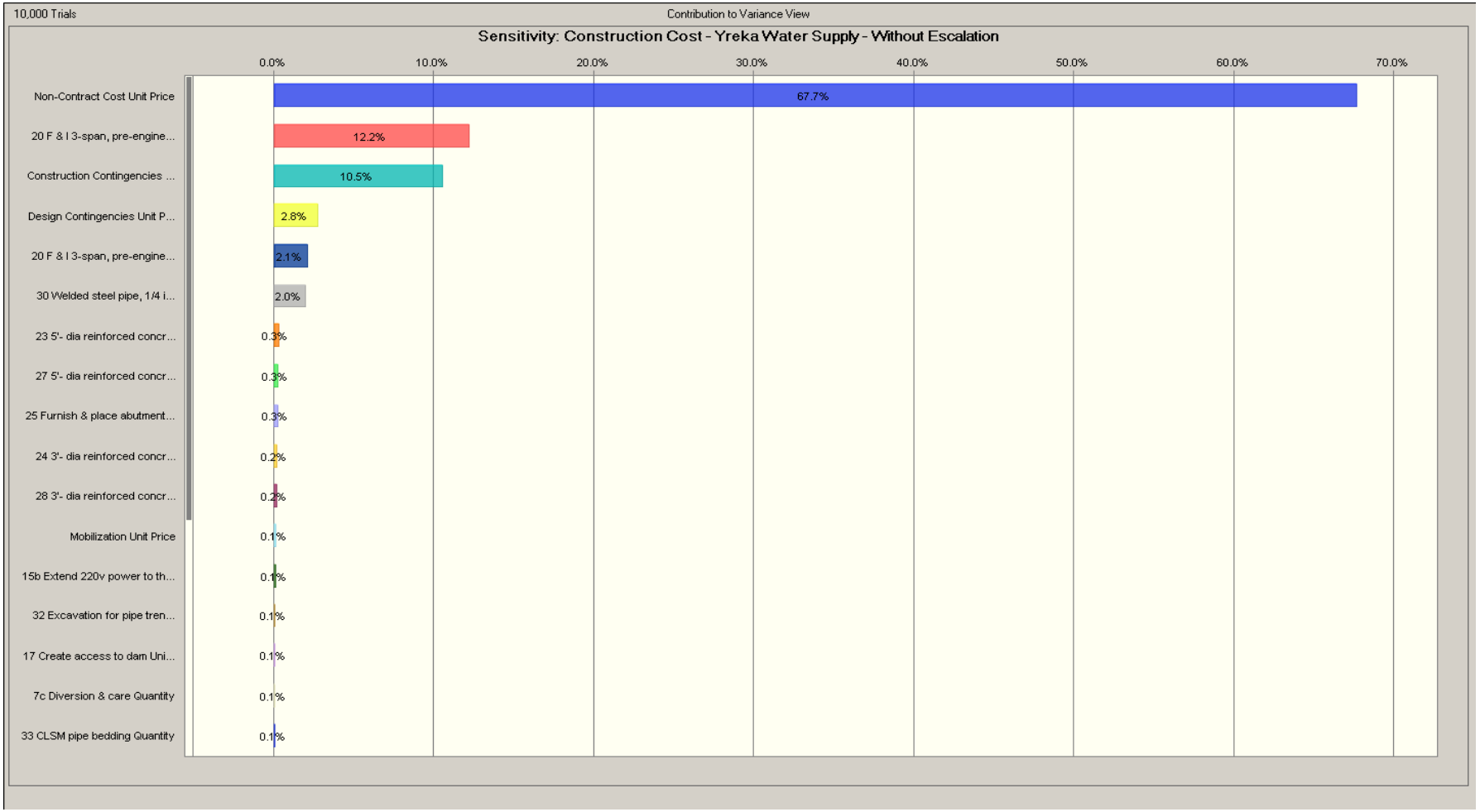
Percentile	Forecast values
0%	$1,612,744.35
10%	$2,310,150.52
20%	$2,454,740.63
30%	$2,552,777.39
40%	$2,632,723.28
50%	$2,710,198.53
60%	$2,789,321.17
70%	$2,876,643.65
80%	$2,972,279.49
90%	$3,107,544.75
100%	$3,684,509.27


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - Yreka Water Supply - Without Escalation
-4.0% -2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0% 22.0% 24.0% 26.0% 28.0% 30.0% 32.0% 34.0% 36.0% 38.0% 40.0% 42.0%
20 F & I 3-span, pre-engine...
38.8%
Construction Contingencies ...
34.5%
Design Contingencies Unit P...
8.5%
30 Welded steel pipe, 1/4 i...
6.5%
20 F & I 3-span, pre-engine...
5.8%
23 5'- dia reinforced concr...
1.0%
27 5'- dia reinforced concr...
0.6%
Mobilization Unit Price
0.5%
24 3'- dia reinforced concr...
0.5%
28 3'- dia reinforced concr...
0.5%
7c Diversion & care Quantity
0.3%
7b Extend 220v power to the...
0.3%
APS = Allowance for Procure...
0.2%
33 CLSM pipe bedding Quantity
0.2%
25 Furnish & place abutment...
0.2%
15b Extend 220v power to th...
0.2%
32 Excavation for pipe tren...
0.2%



Statistic	Forecast values
Trials	10,000
Mean	$4,346,064.08
Median	$4,318,221.63
Mode	---
Standard Deviation	$528,411.78
Variance	$279,219,013,820.12
Skewness	0.1957
Kurtosis	2.74
Coeff. of Variability	0.1216
Minimum	$2,471,247.40
Maximum	$6,210,942.08
Mean Std. Error	$5,284.12

Percentile	Forecast values
0%	$2,471,247.40
10%	$3,683,202.98
20%	$3,881,282.51
30%	$4,038,153.76
40%	$4,180,306.35
50%	$4,318,197.32
60%	$4,460,654.39
70%	$4,623,691.00
80%	$4,813,329.88
90%	$5,045,677.63
100%	$6,210,942.08


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Yreka Water Supply - Without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
67.7%
20 F & I 3-span, pre-engine...
12.2%
Construction Contingencies ...
10.5%
Design Contingencies Unit P...
2.8%
20 F & I 3-span, pre-engine...
2.1%
30 Welded steel pipe, 1/4 i...
2.0%
23 5'- dia reinforced concr...
0.3%
27 5'- dia reinforced concr...
0.3%
25 Furnish & place abutment...
0.3%
24 3'- dia reinforced concr...
0.2%
28 3'- dia reinforced concr...
0.2%
Mobilization Unit Price
0.1%
15b Extend 220v power to th...
0.1%
32 Excavation for pipe tren...
0.1%
17 Create access to dam Uni...
0.1%
7c Diversion & care Quantity
0.1%
33 CLSM pipe bedding Quantity
0.1%