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

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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

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	RCD 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

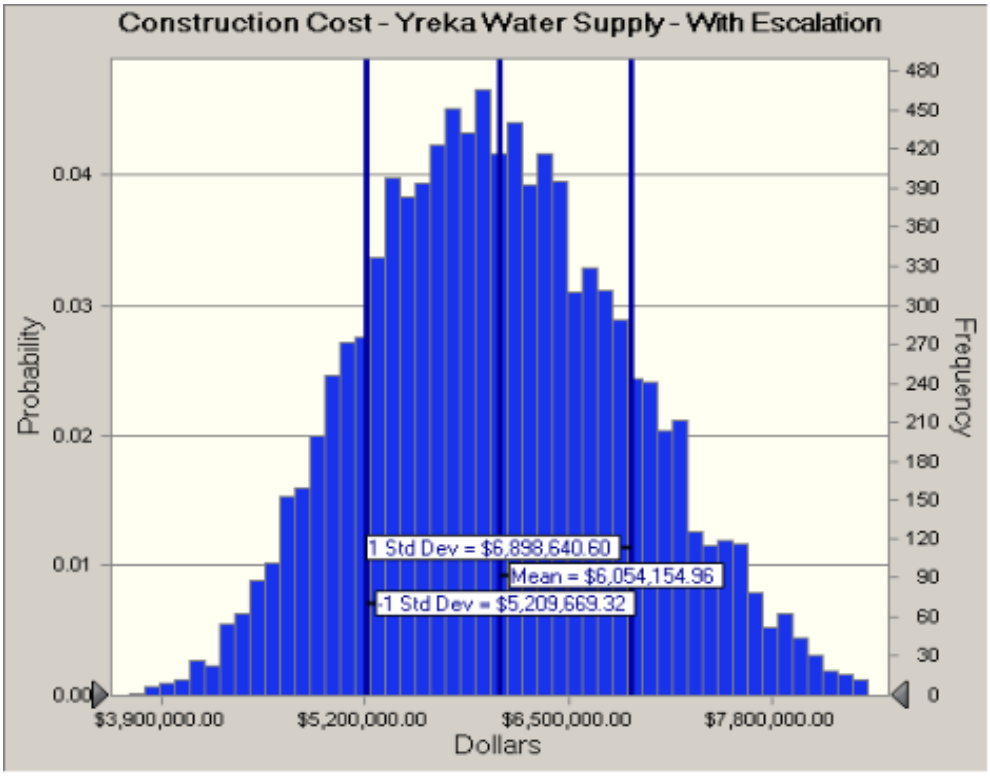
DATE	PEER REVIEWER(S)	CODE
6/1/11	Signature DAN MAK Printed Name	8126
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

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



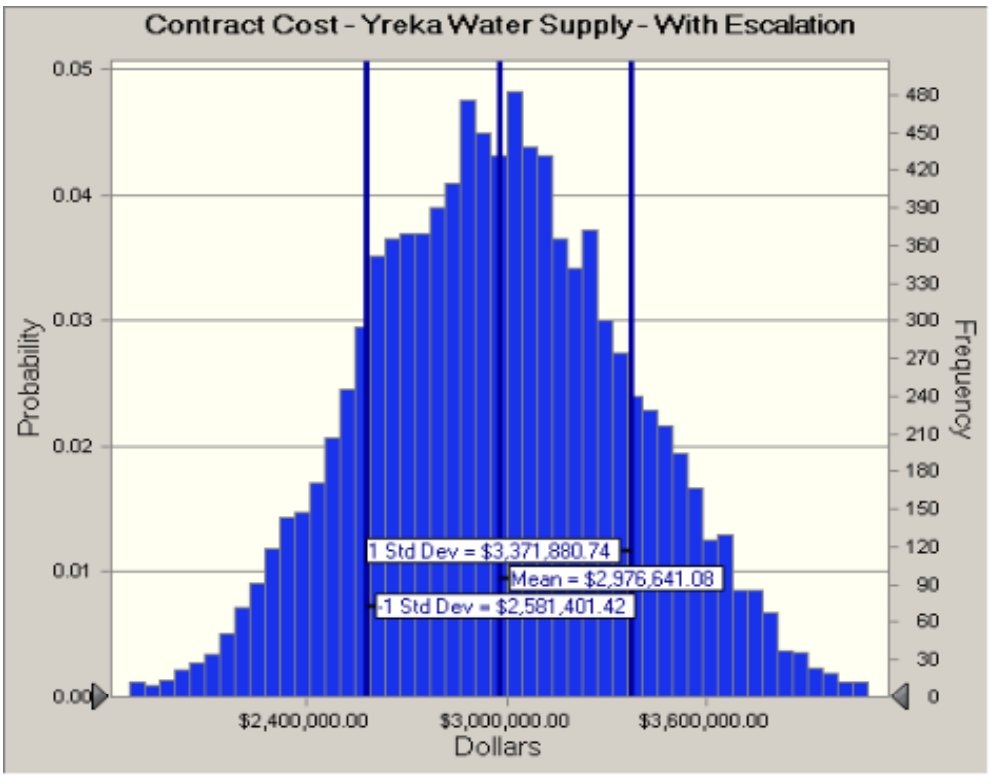
Forecast: Construction Cost - Yreka Water Supply - With Escalation (cont'd) **Cell: U72**

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



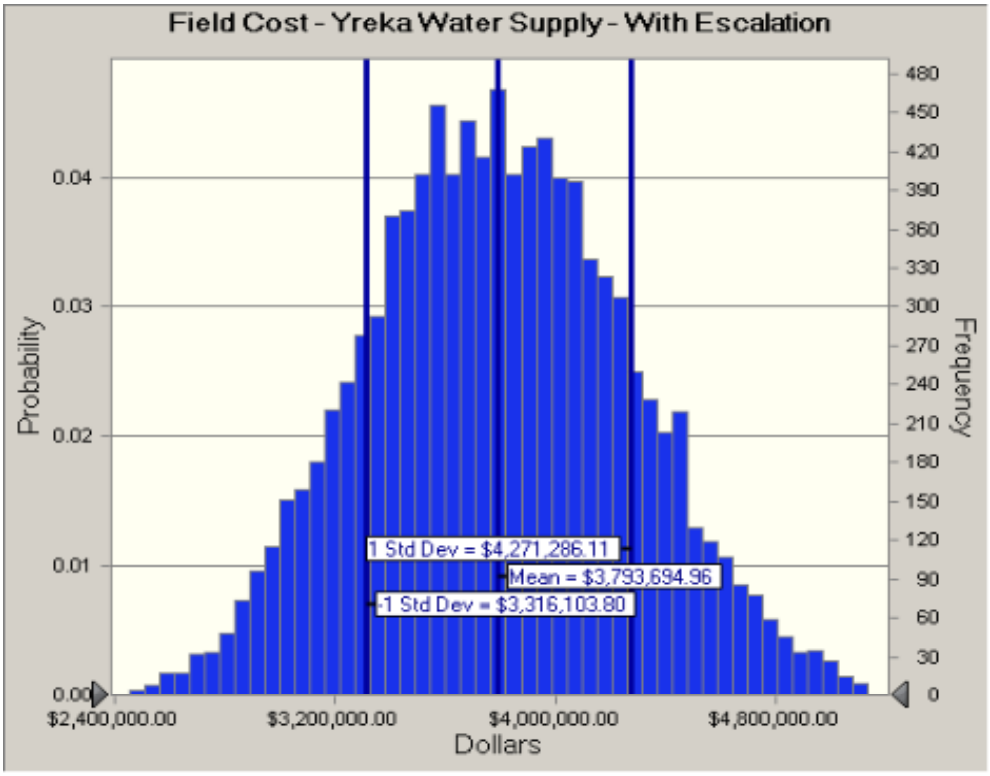
Forecast: Contract Cost - Yreka Water Supply - With Escalation (cont'd) **Cell: U68**

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

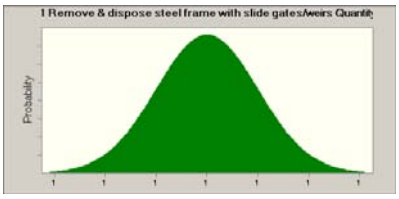
Assumptions

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:

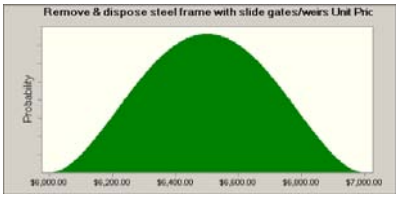
Mean	1	(=L15)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

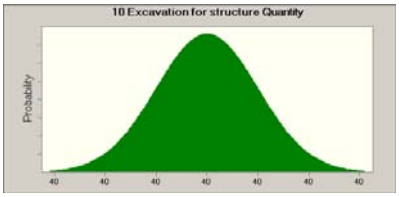
Minimum	$6,000.00	(=Q15)
Likeliest	$6,500.00	(=R15)
Maximum	$7,000.00	(=S15)



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

Normal distribution with parameters:

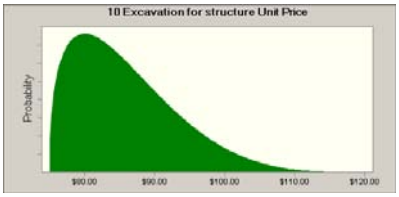
Mean	40	(=L29)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

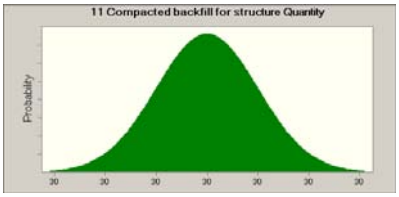
Minimum	$75.00	(=Q29)
Likeliest	$80.00	(=R29)
Maximum	$120.00	(=S29)



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

Normal distribution with parameters:

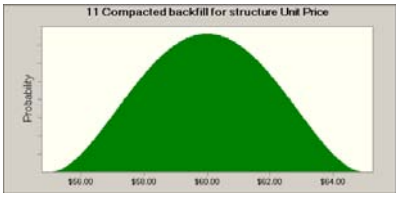
Mean	30	(=L30)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

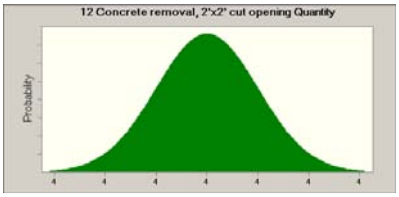
Minimum	$55.00	(=Q30)
Likeliest	$60.00	(=R30)
Maximum	$65.00	(=S30)



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**

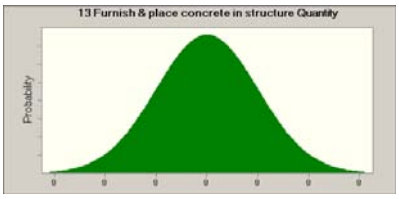
BetaPERT distribution with parameters:

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:

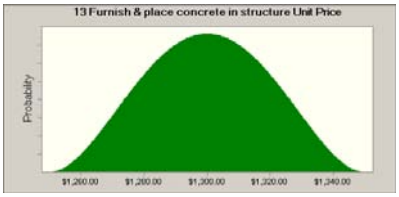
Mean	8	(=L32)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

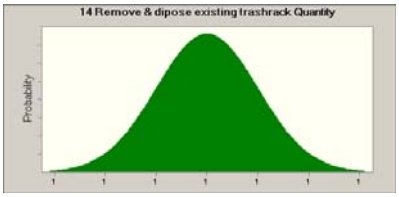
Minimum	$1,250.00	(=Q32)
Likeliest	$1,300.00	(=R32)
Maximum	$1,350.00	(=S32)



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

Normal distribution with parameters:

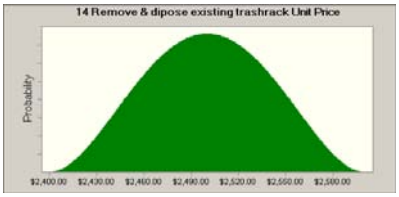
Mean	1	(=L33)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

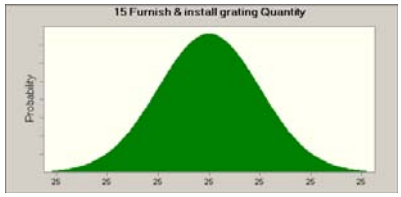
Minimum	$2,400.00	(=Q33)
Likeliest	$2,500.00	(=R33)
Maximum	$2,600.00	(=S33)



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

Normal distribution with parameters:

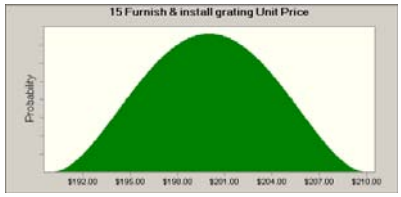
Mean	25	(=L34)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

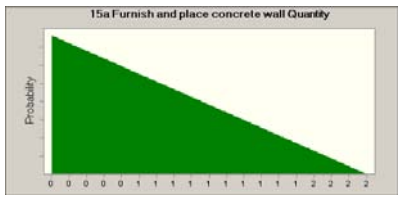
Minimum	$190.00	(=Q34)
Likeliest	$200.00	(=R34)
Maximum	$210.00	(=S34)



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**

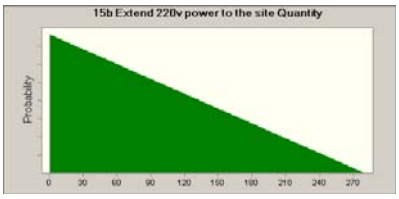
BetaPERT distribution with parameters:

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:

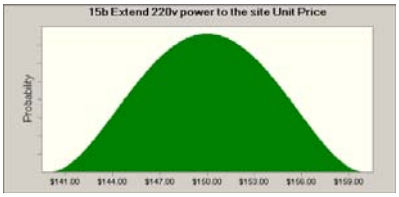
Minimum	0	(=K36)
Likeliest	0	(=L36)
Maximum	280	(=M36)



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

BetaPERT distribution with parameters:

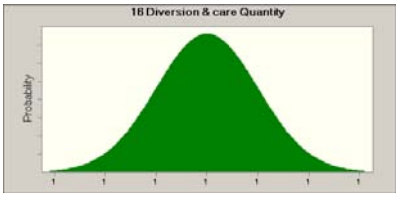
Minimum	$140.00	(=Q36)
Likeliest	$150.00	(=R36)
Maximum	$160.00	(=S36)



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**

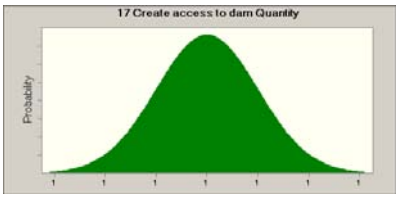
BetaPERT distribution with parameters:

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:

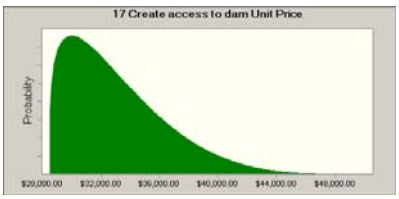
Mean	1	(=L38)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

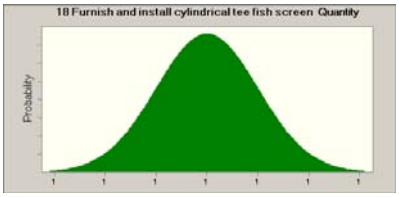
Minimum	$28,500.00	(=Q38)
Likeliest	$30,000.00	(=R38)
Maximum	$50,000.00	(=S38)



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

Normal distribution with parameters:

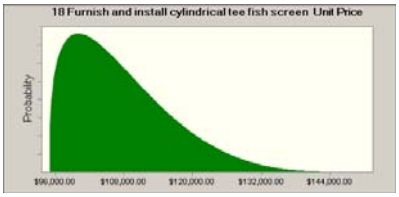
Mean	1	(=L39)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

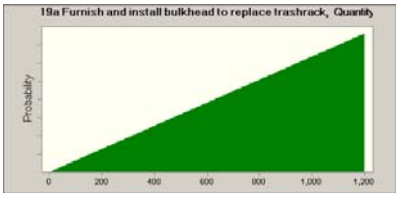
Minimum	$95,000.00	(=Q39)
Likeliest	$100,000.00	(=R39)
Maximum	$150,000.00	(=S39)



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

Triangular distribution with parameters:

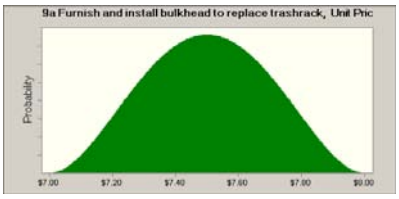
Minimum	0	(=M40)
Likeliest	1,200	(=L40)
Maximum	1,200	(=K40)



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

BetaPERT distribution with parameters:

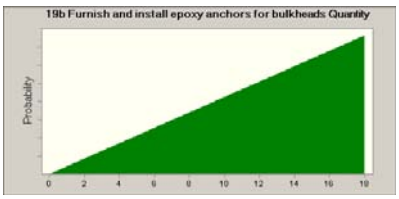
Minimum	$7.00	(=Q40)
Likeliest	$7.50	(=R40)
Maximum	$8.00	(=S40)



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

Triangular distribution with parameters:

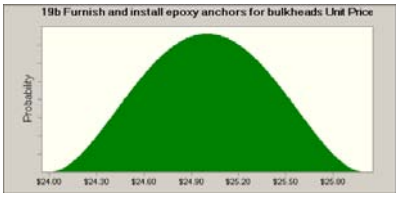
Minimum	0	(=M41)
Likeliest	18	(=L41)
Maximum	18	(=K41)



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

BetaPERT distribution with parameters:

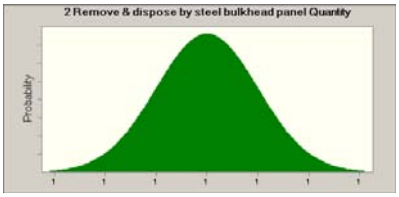
Minimum	$24.00	(=Q41)
Likeliest	$25.00	(=R41)
Maximum	$26.00	(=S41)



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

Normal distribution with parameters:

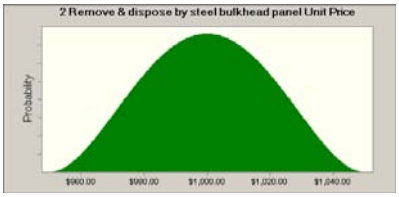
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

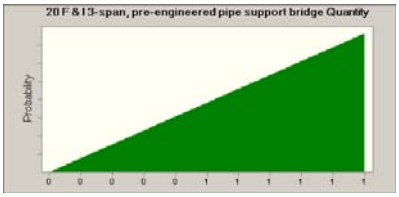
Minimum	$950.00	(=Q16)
Likeliest	$1,000.00	(=R16)
Maximum	$1,050.00	(=S16)



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

Triangular distribution with parameters:

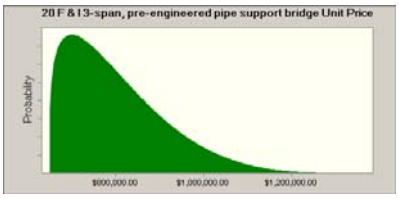
Minimum	0	(=K43)
Likeliest	1	(=L43)
Maximum	1	(=M43)



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**

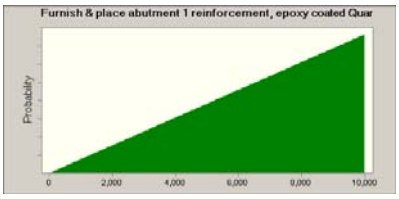
BetaPERT distribution with parameters:

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:

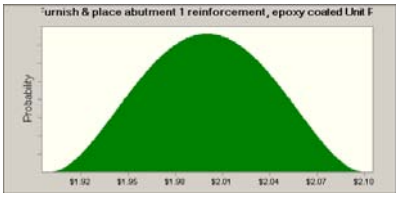
Minimum	0	(=K45)
Likeliest	10,000	(=L45)
Maximum	10,000	(=M45)



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

BetaPERT distribution with parameters:

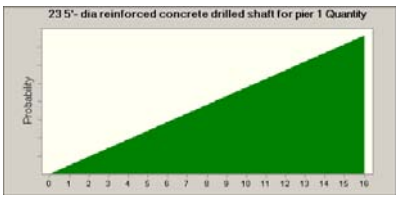
Minimum	$1.90	(=Q45)
Likeliest	$2.00	(=R45)
Maximum	$2.10	(=S45)



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

Triangular distribution with parameters:

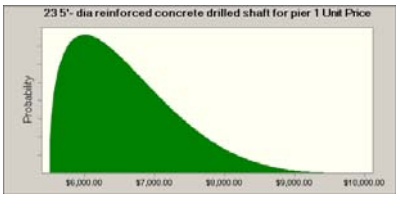
Minimum	0	(=K46)
Likeliest	16	(=L46)
Maximum	16	(=M46)



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**

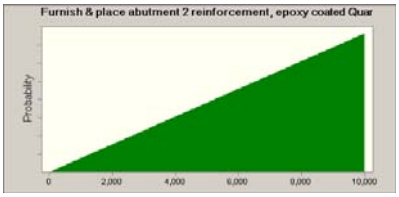
BetaPERT distribution with parameters:

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:

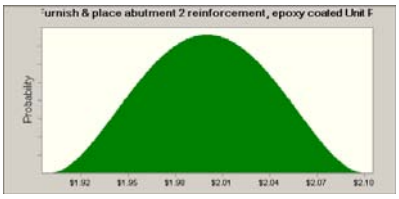
Minimum	0	(=K49)
Likeliest	10,000	(=L49)
Maximum	10,000	(=M49)



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**

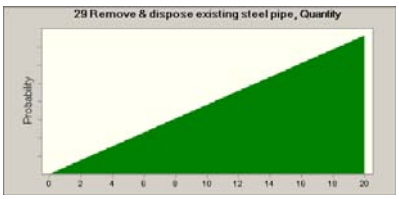
BetaPERT distribution with parameters:

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:

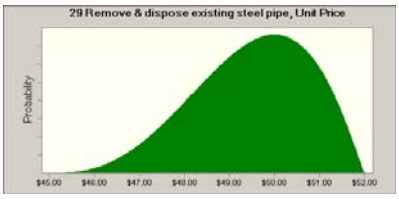
Minimum	0	(=K52)
Likeliest	20	(=L52)
Maximum	20	(=M52)



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

BetaPERT distribution with parameters:

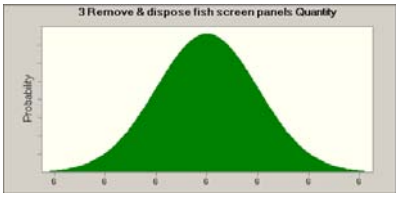
Minimum	$45.00	(=Q52)
Likeliest	$50.00	(=R52)
Maximum	$52.00	(=S52)



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

Normal distribution with parameters:

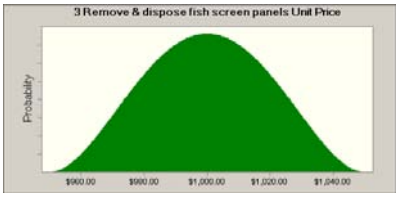
Mean	6	(=L17)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

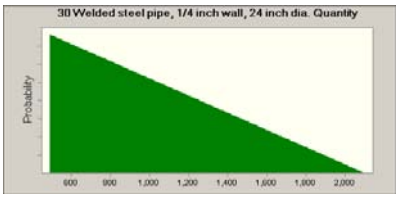
Minimum	$950.00	(=Q17)
Likeliest	$1,000.00	(=R17)
Maximum	$1,050.00	(=S17)



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

Triangular distribution with parameters:

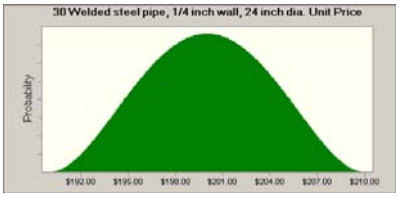
Minimum	490	(=M53)
Likeliest	490	(=L53)
Maximum	2,100	(=K53)



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

BetaPERT distribution with parameters:

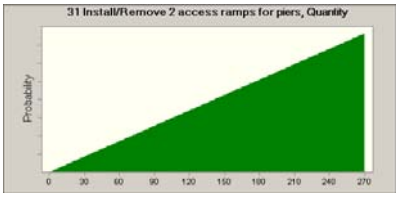
Minimum	$190.00	(=Q53)
Likeliest	$200.00	(=R53)
Maximum	$210.00	(=S53)



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

Triangular distribution with parameters:

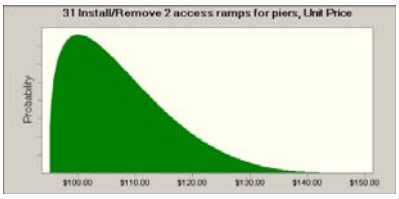
Minimum	0	(=K54)
Likeliest	270	(=L54)
Maximum	270	(=M54)



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

BetaPERT distribution with parameters:

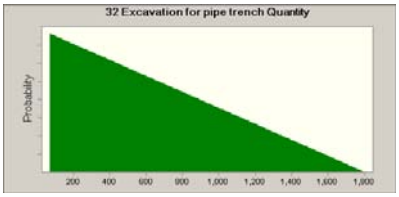
Minimum	$95.00	(=Q54)
Likeliest	$100.00	(=R54)
Maximum	$150.00	(=S54)



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

Triangular distribution with parameters:

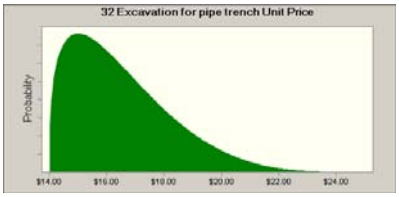
Minimum	70	(=M55)
Likeliest	70	(=L55)
Maximum	1,800	(=K55)



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

BetaPERT distribution with parameters:

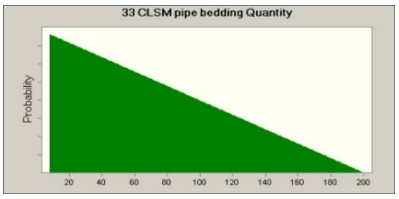
Minimum	$14.00	(=Q55)
Likeliest	$15.00	(=R55)
Maximum	$25.00	(=S55)



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**

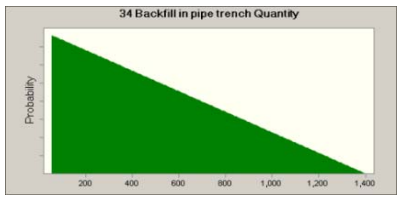
BetaPERT distribution with parameters:

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:

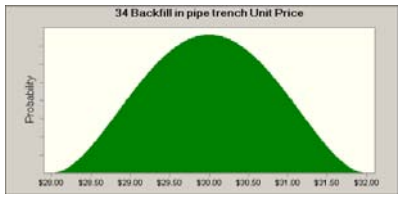
Minimum	55	(=M57)
Likeliest	55	(=L57)
Maximum	1,400	(=K57)



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

BetaPERT distribution with parameters:

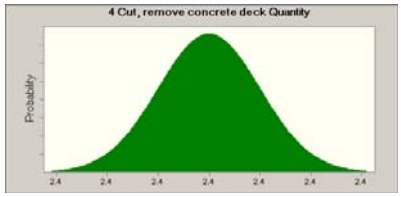
Minimum	$28.00	(=Q57)
Likeliest	$30.00	(=R57)
Maximum	$32.00	(=S57)



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**

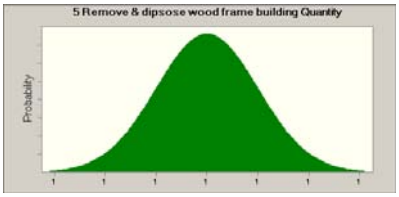
BetaPERT distribution with parameters:

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:

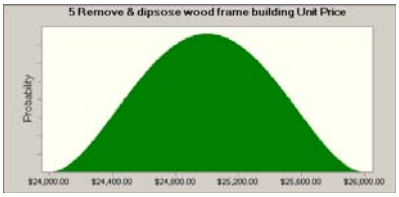
Mean	1	(=L19)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

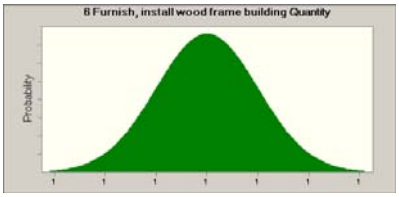
Minimum	$24,000.00	(=Q19)
Likeliest	$25,000.00	(=R19)
Maximum	$26,000.00	(=S19)



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**

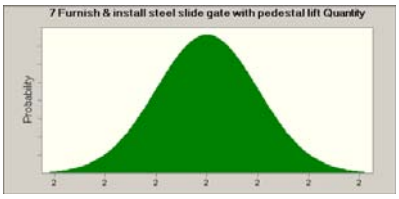
BetaPERT distribution with parameters:

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**

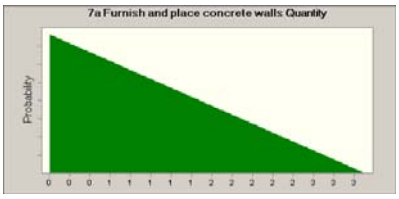
BetaPERT distribution with parameters:

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:

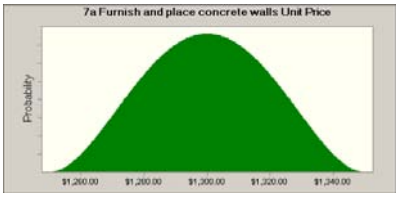
Minimum	0	(=K22)
Likeliest	0	(=L22)
Maximum	3	(=M22)



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

BetaPERT distribution with parameters:

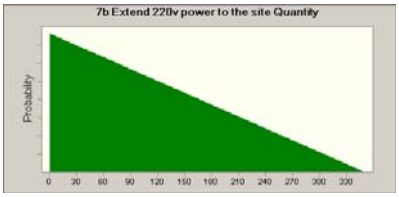
Minimum	$1,250.00	(=Q22)
Likeliest	$1,300.00	(=R22)
Maximum	$1,350.00	(=S22)



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

Triangular distribution with parameters:

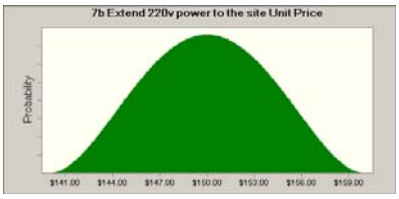
Minimum	0	(=K23)
Likeliest	0	(=L23)
Maximum	350	(=M23)



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

BetaPERT distribution with parameters:

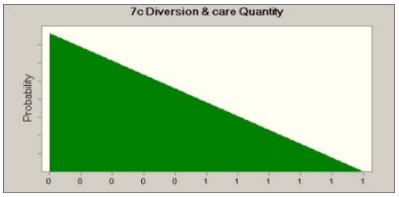
Minimum	$140.00	(=Q23)
Likeliest	$150.00	(=R23)
Maximum	$160.00	(=S23)



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**

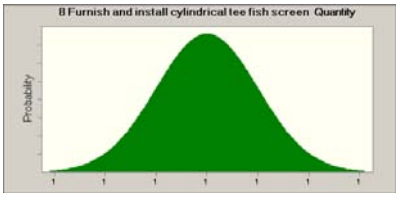
BetaPERT distribution with parameters:

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:

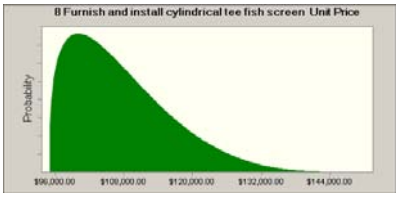
Mean	1	(=L25)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

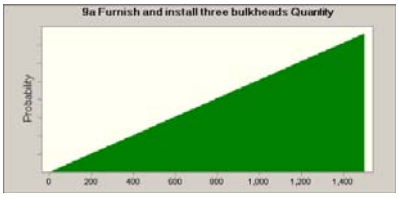
Minimum	$95,000.00	(=Q25)
Likeliest	$100,000.00	(=R25)
Maximum	$150,000.00	(=S25)



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

Triangular distribution with parameters:

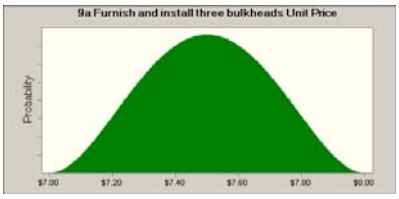
Minimum	0	(=M26)
Likeliest	1,500	(=L26)
Maximum	1,500	(=K26)



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

BetaPERT distribution with parameters:

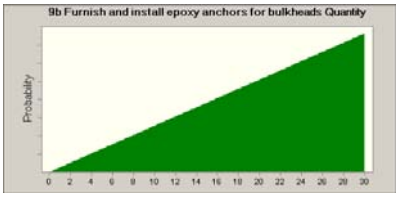
Minimum	$7.00	(=Q26)
Likeliest	$7.50	(=R26)
Maximum	$8.00	(=S26)



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

Triangular distribution with parameters:

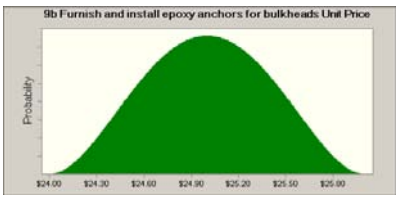
Minimum	0	(=M27)
Likeliest	30	(=L27)
Maximum	30	(=K27)



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

BetaPERT distribution with parameters:

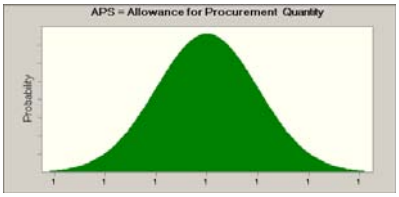
Minimum	$24.00	(=Q27)
Likeliest	$25.00	(=R27)
Maximum	$26.00	(=S27)



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

Normal distribution with parameters:

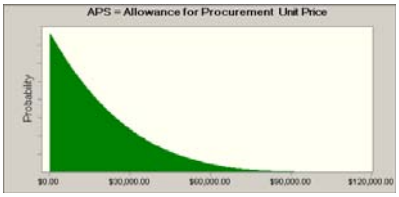
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

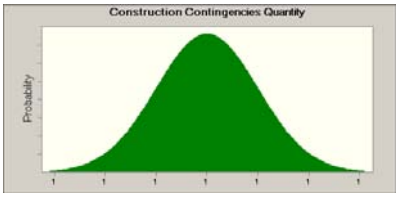
Minimum	$0.00	(=Q66)
Likeliest	$0.00	(=R66)
Maximum	$117,271.00	(=S66)



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

Normal distribution with parameters:

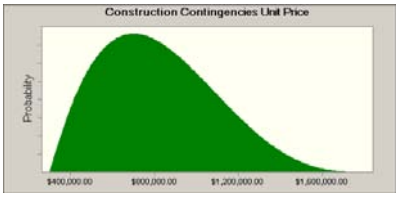
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

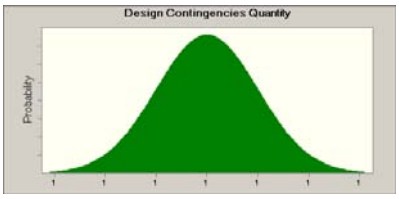
Minimum	$300,000.00	(=Q69)
Likeliest	$700,000.00	(=R69)
Maximum	$1,800,000.00	(=S69)



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**

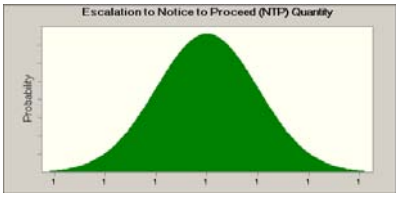
BetaPERT distribution with parameters:

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:

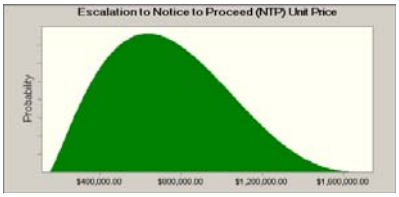
Mean	1	(=L62)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

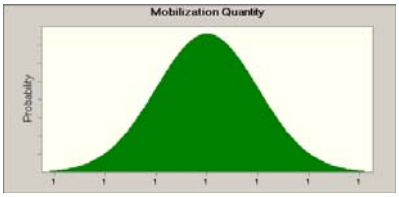
Minimum	$155,227.00	(=Q62)
Likeliest	$637,590.00	(=R62)
Maximum	$1,701,993.00	(=S62)



Assumption: Mobilization Quantity **Cell: L60**

Normal distribution with parameters:

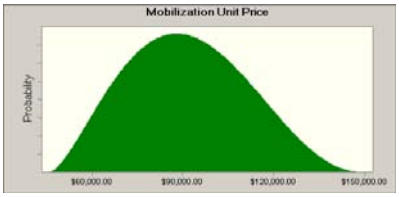
Mean	1	(=L60)
Std. Dev.	0	(=0.000001)



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)

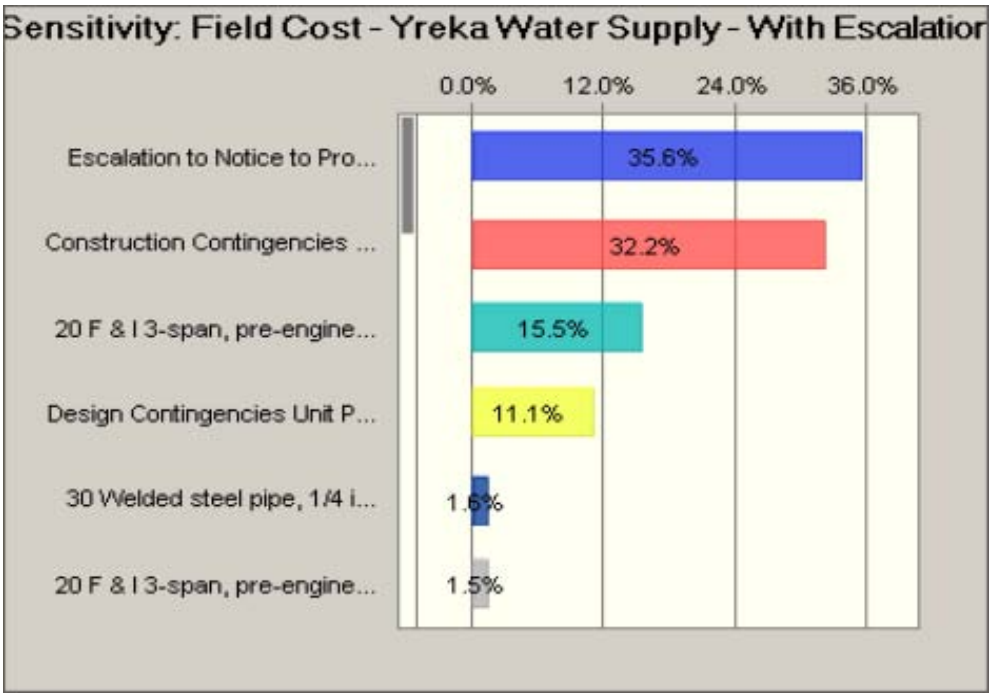
Assumption: Non-Contract Cost Unit Price **Cell: R71**

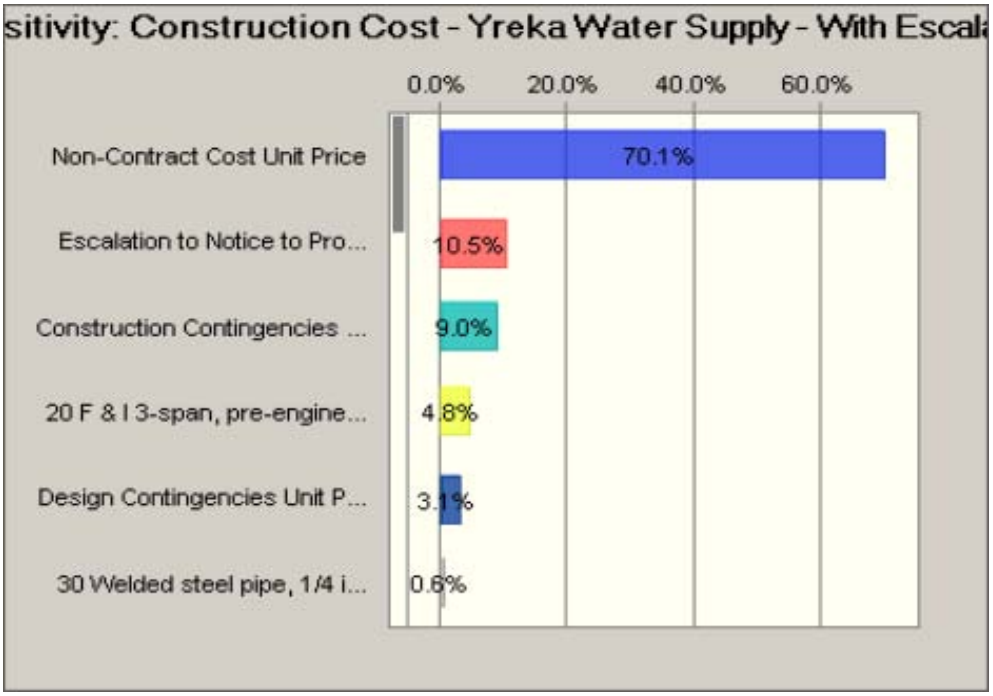
BetaPERT distribution with parameters:

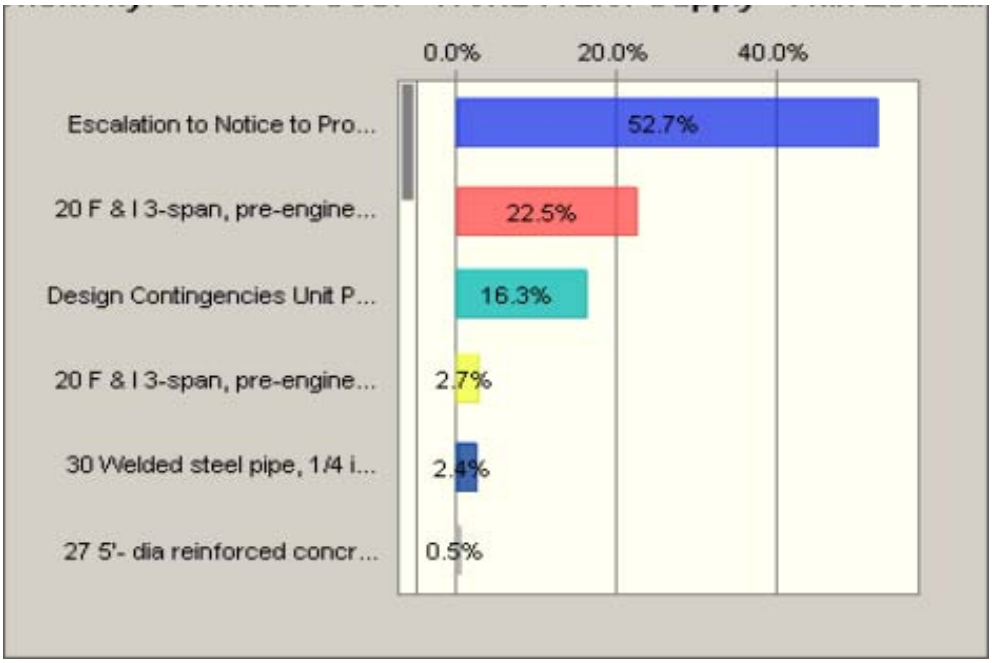
Minimum	$850,000.00	(=Q71)
Likeliest	$2,000,000.00	(=R71)
Maximum	$4,700,000.00	(=S71)

End of Assumptions

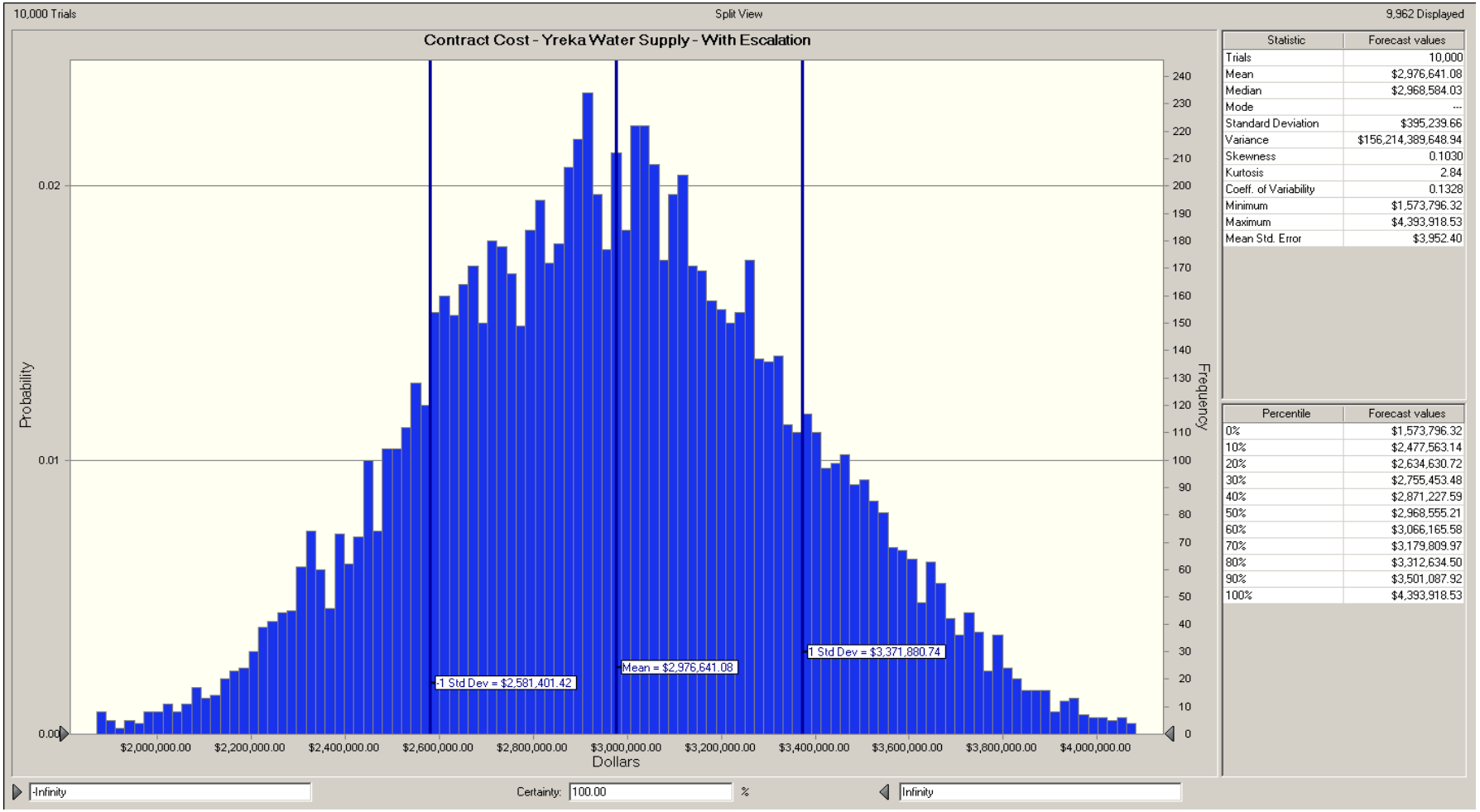
Sensitivity Charts





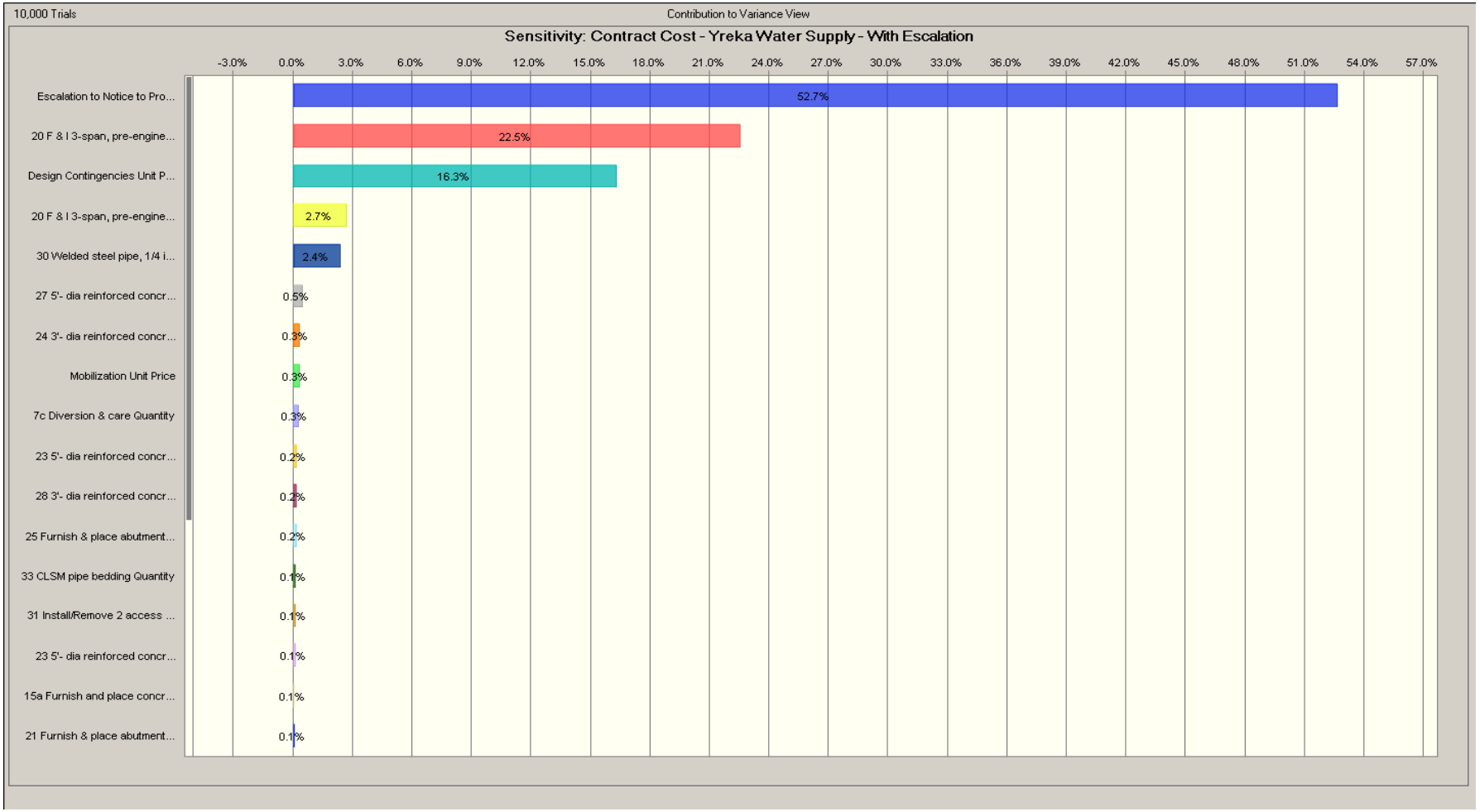


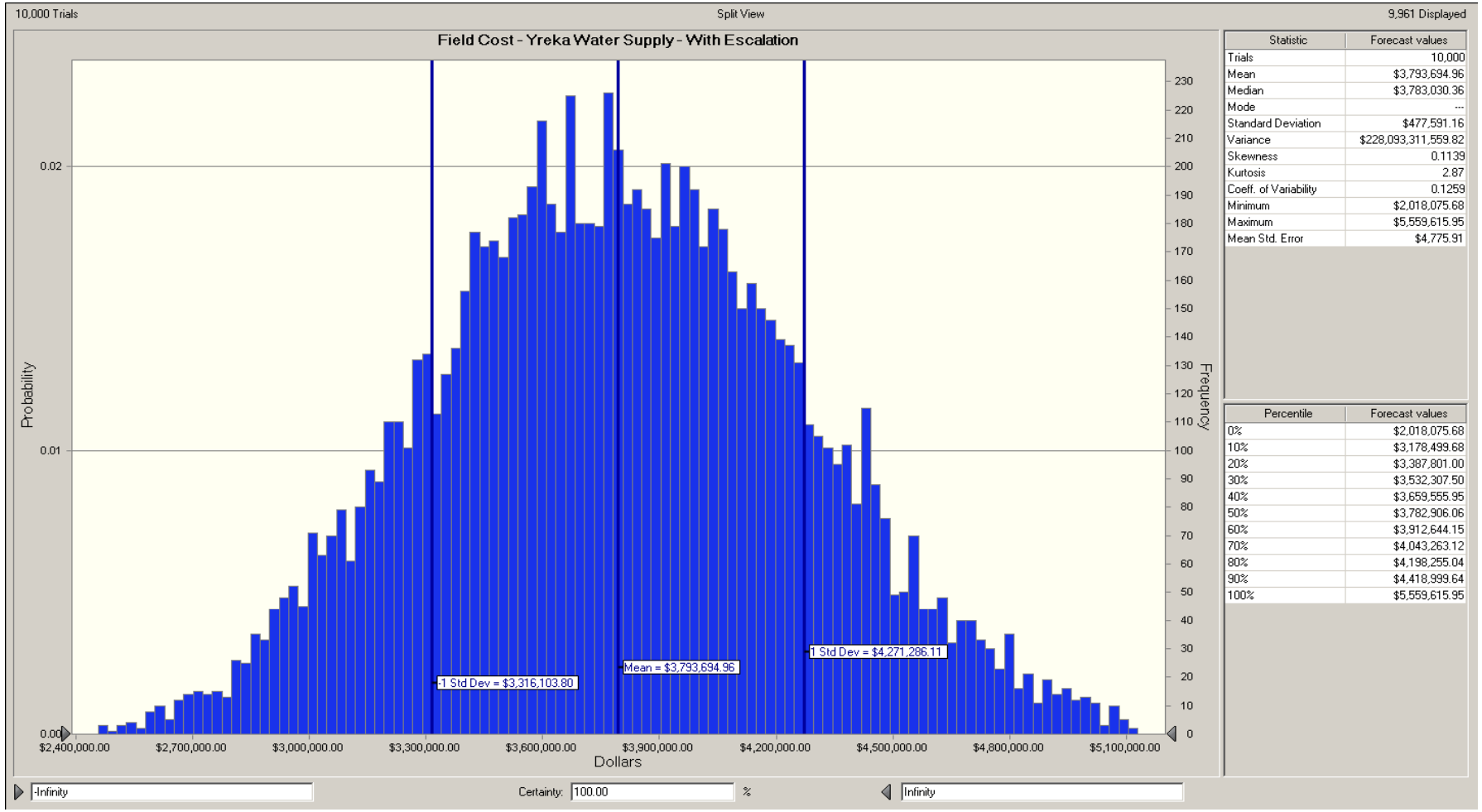
End of Sensitivity Charts



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

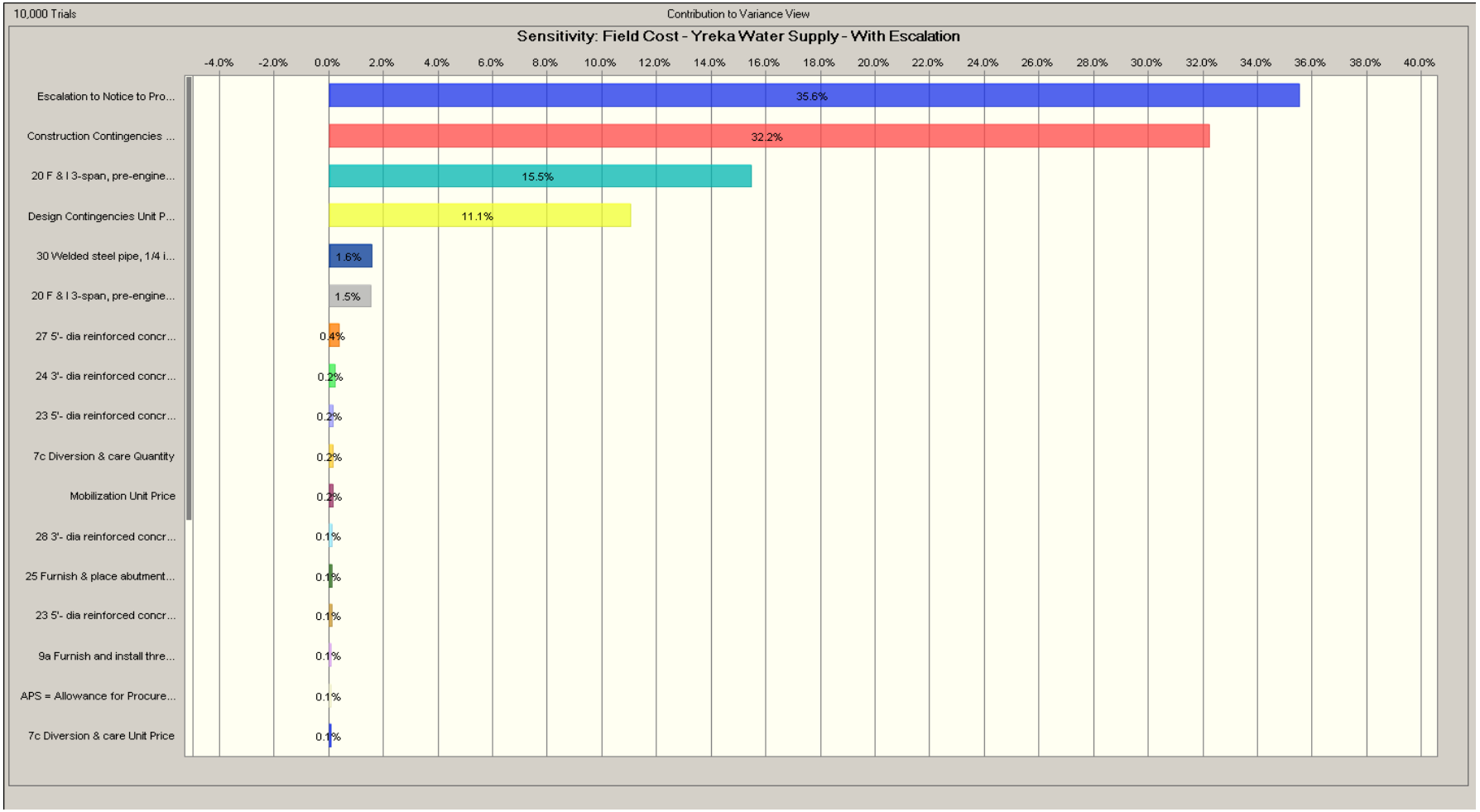
Percentile	Forecast values
0%	$1,573,796.32
10%	$2,477,563.14
20%	$2,634,630.72
30%	$2,755,453.48
40%	$2,871,227.59
50%	$2,968,555.21
60%	$3,066,165.58
70%	$3,179,809.97
80%	$3,312,634.50
90%	$3,501,087.92
100%	$4,393,918.53

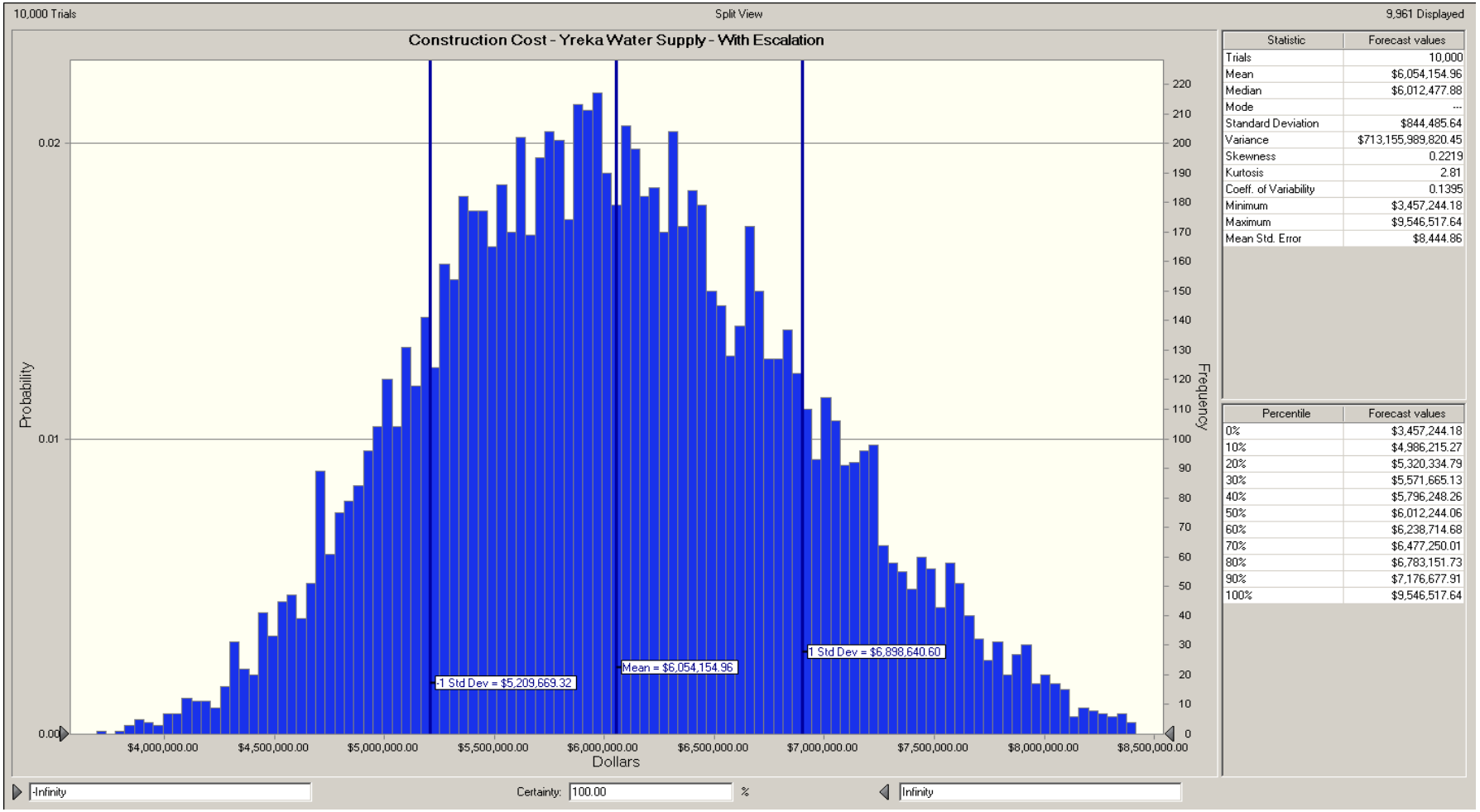

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Yreka Water Supply - With Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
48.0%
51.0%
54.0%
57.0%
Escalation to Notice to Pro...
52.7%
20 F & I 3-span, pre-engine...
22.5%
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

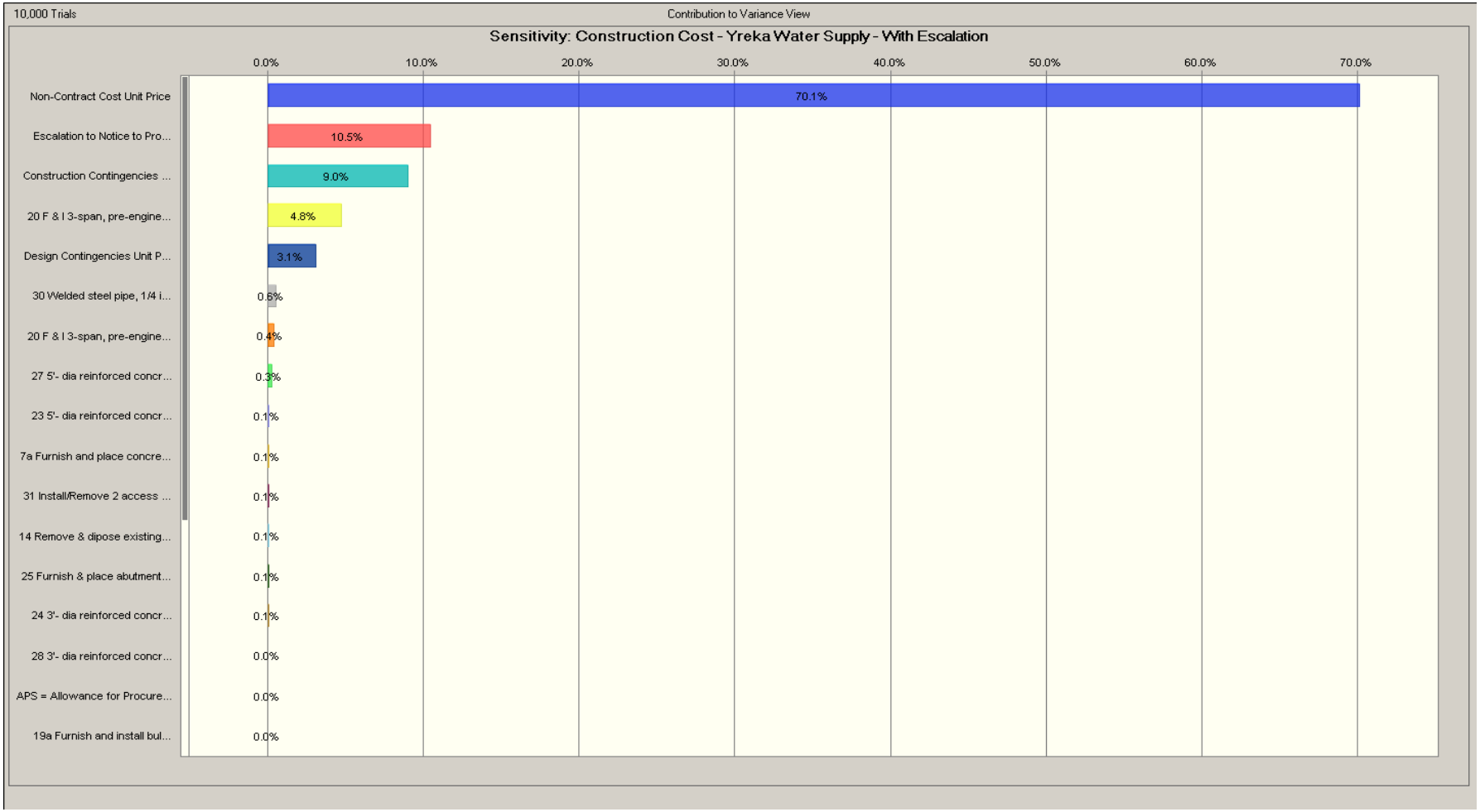
Percentile	Forecast values
0%	$2,018,075.68
10%	$3,178,499.68
20%	$3,387,801.00
30%	$3,532,307.50
40%	$3,659,555.95
50%	$3,782,906.06
60%	$3,912,644.15
70%	$4,043,263.12
80%	$4,198,255.04
90%	$4,418,999.64
100%	$5,559,615.95


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%