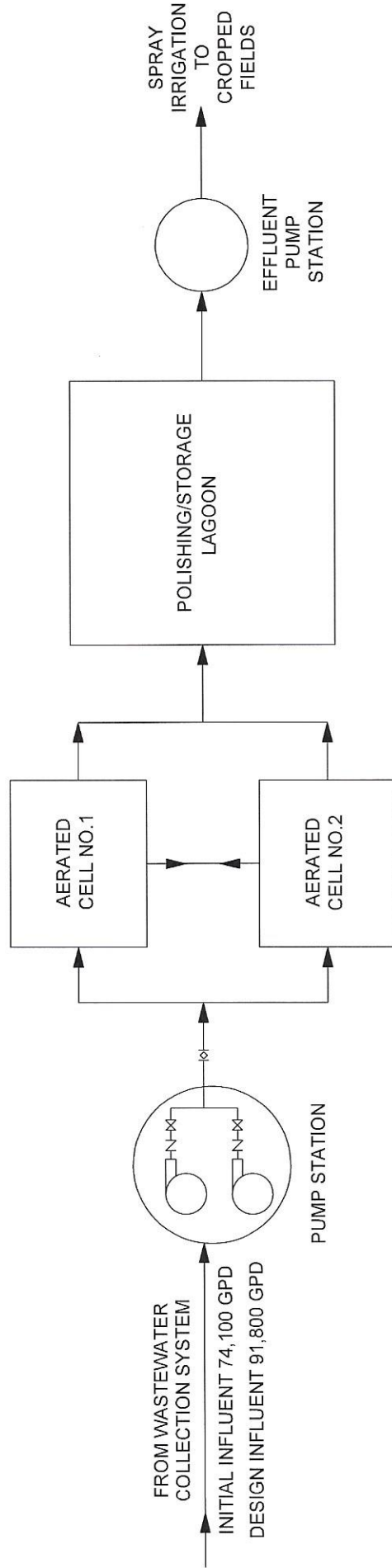
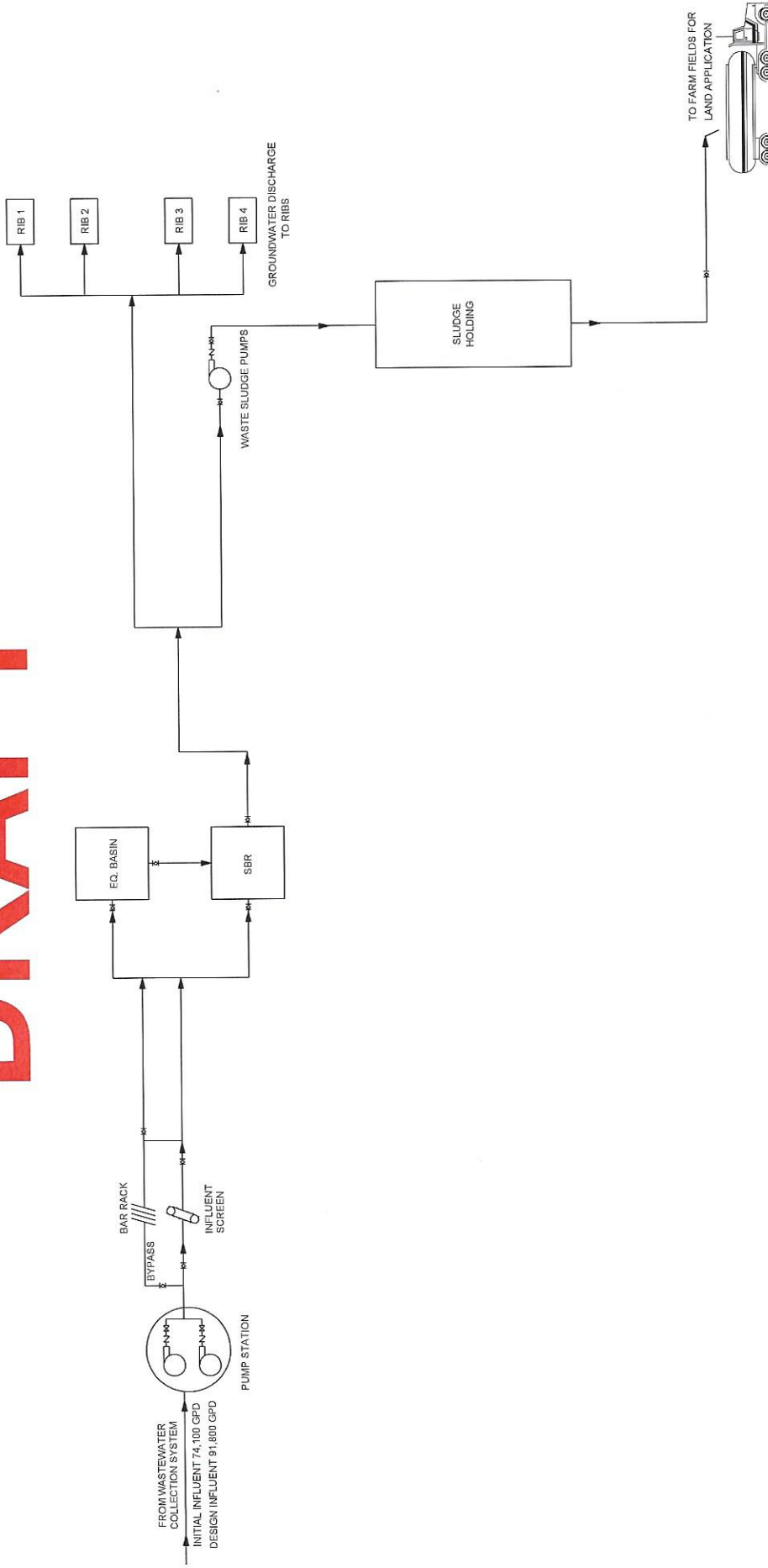


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**TABLE C1-b
NEW WASTEWATER COLLECTION - SYSTEM SERVICE AREA #2
PRE-DESIGN ESTIMATE OF PROBABLE CONSTRUCTION COSTS**

Client: Arcadia Township
Project: Preliminary Engineering Report

Project No: 817670
Date: December 2016

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	General Conditions / Mobilization / Bonds (5%)	Lsum	1	\$346,000	\$346,000
2	Sanitary Laterals - Tee & Valve	Ea	88	\$975	\$85,800
3	Low Pressure Force Main (2", 3", 4")	Lft	6,500	\$30	\$195,000
4	1 1/2" Low Pressure Lateral	Lft	6,600	\$22	\$145,200
5	4" Forcemain	Lft	4,900	\$45	\$220,500
6	6" Forcemain	Lft	4,610	\$55	\$253,550
7	Gravity Sewer and Manholes	Lft	40,860	\$57	\$2,329,020
8	Laterals	Lft	22,720	\$23	\$522,560
9	Sanitary Pump Station Medium	Ea	5	\$121,000	\$605,000
10	Pavement Removal and Restoration	Syd	72,020	\$28	\$2,016,560
11	Surface Restoration	Syd	56,990	\$4	\$227,960
12	Air Release Structure & Clean-outs	Ea	15	\$7,100	\$106,500
13	Erosion Control	Lsum	1	\$20,000	\$20,000
14	Dewatering	Lsum	1	\$100,000	\$100,000
15	Individual Grinder Pump Stations	Ea	88	\$7,500	\$660,000
16	Odor Control	Ea	1	\$50,000	\$50,000
				Construction Subtotal:	\$7,883,650
				Construction Contingency (10%):	\$788,370
				Construction Total:	\$8,672,020
				Engineering, Surveying, Legal	
				Financial, Administration	\$1,907,850
Total Wastewater Collection Project Cost: \$					10,580,000

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**TABLE C1-c
NEW WASTEWATER COLLECTION - SYSTEM SERVICE AREA #1
PRE-DESIGN ESTIMATE OF PROBABLE CONSTRUCTION COSTS**

Client: Arcadia Township
Project: Preliminary Engineering Report

Project No: 817670
Date: December 2016

Gravity and Low Pressure sewer serving 542 parcels and 538 acres

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	General Conditions / Modilization / Bonds (5%)	Lsum	1	\$228,220	\$228,220
2	Sanitary Laterals - Tee & Value	Ea	403	\$900	\$362,700
3	Low Pressure Force Main (2", 3", 4")	Lft	38,010	\$22	\$836,220
4	1 1/2" Low Pressure Lateral	Lft	30,225	\$15	\$453,375
5	4" Forcemain	Lft		\$25	\$0
6	6" Forcemain	Lft		\$35	\$0
7	Gravity Sewer and Manholes	Lft		\$40	\$0
8	Laterals	Lft		\$20	\$0
9	Sanitary Pump Station Medium	Ea		\$120,000	\$0
10	Pavement Removal and Restoration	Syd	32,650	\$16	\$522,400
11	Surface Restoration	Syd	21,120	\$4	\$84,480
12	Air Release Structure & Clean-outs	Ea	190	\$1,000	\$190,000
13	Erosion Control	Lsum	1	\$20,000	\$20,000
14	Dewatering	Lsum	1	\$20,000	\$20,000
15	Individual Grinder Pump Stations	Ea	403	\$5,500	\$2,216,500
				Construction Subtotal:	\$4,933,895
				Construction Contingency (10%):	\$493,390
				Construction Total:	\$5,427,285
				Engineering, Surveying, Legal	
				Financial, Administration	\$1,194,010
Total Wastewater Collection Project Cost: \$					6,621,000

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TABLE C2-a
REGIONAL ALTERNATIVE - LITTLE RIVER BAND OF OTTAWA INDIANS WASTEWATER TREATMENT FACILITY
PRE-DESIGN COST ESTIMATE

Client: Arcadia Township
Project: Preliminary Engineering Report

Project No: 817670
Date: April 2016

Regional Alternative - Pump Arcadia Service Area Wastewater to LRBOI WWTF

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	Conveyance System to Proposed Village of Onekama Lift Station				
	12-inch Gravity Sewer	LF	24,800	\$136	\$3,368,457
	6-inch Force Main	LF	46,500	\$70	\$3,266,393
	Intermediate Lift Stations	LS	3	\$280,000	\$840,000
2	Shared Conveyance System from Onekama to LRBOI WWTF				
	Proposed Transmission Sanitary Sewer and Stations	LS	1	\$1,166,000	\$1,166,000
3	Treatment Capacity at LRBOI WWTF				
	Purchase Treatment Capacity	GPD	91,800	\$20	\$1,836,000
				Construction Subtotal:	\$10,476,850
				Construction Contingency (10%):	\$1,048,000
				Construction Total:	\$11,524,850
				Engineering, Legal Counsel, Bond Counsel & Administration	\$2,305,000
Total Wastewater Treatment Project Cost: \$					13,830,000

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**TABLE C2-b
CENTRALIZED WASTEWATER TREATMENT AND DISPOSAL - FACULTATIVE LAGOON
PRE-DESIGN COST ESTIMATE**

Cleint: Arcadia Township
Project: Preliminary Engineering Report

Project No.: 817670
Date: April 2016

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	Contract General Conditions, Construction Reqs	LS	1	\$ 203,200	\$ 203,200
2	Pump Station and Forcemain to WWTF				
	Pump Station	LS	1	\$250,000	\$ 250,000
	6" HDPE Forcemain, HDD	LF	13,200	\$50.00	\$ 660,000
	Air Release Valve and Manhole	EA	4	\$10,000	\$ 40,000
	Erosion Control/Restoration	LS	1	\$4,000	\$ 4,000
	Traffic Control	LS	1	\$3,000	\$ 3,000
3	Site Work				
	Site Piping	LF	1,400	\$ 66	\$ 92,400
	Site Utilities Service - gas, phone, electric	LS	1	\$ 22,000	\$ 22,000
	Influent Control Structure	EA	1	\$ 33,000	\$ 33,000
	Transfer Structures	EA	3	\$ 19,300	\$ 57,900
	Site Fence	LF	5,616	\$ 4.61	\$ 25,900
	Site Clearing & Prep	AC	22	\$ 3,000	\$ 66,000
	SESC	LS	1	\$ 6,800	\$ 6,800
	Earthwork (excavation, fill)	LS	1	\$ 93,000	\$ 93,000
	Sand subbase	CYD	23,593	\$ 11.00	\$ 259,500
	Ballast	CYD	35,390	\$ 8.00	\$ 283,100
	Site Restoration	LS	1	\$ 54,300	\$ 54,300
	Flexible Membrane Liner	SF	1,009,452	\$ 0.70	\$ 706,600
	Geo-Composite Clay Liner	SF	1,009,452	\$ 0.75	\$ 757,100
	Geotextile Fabric	SYD	18,236	\$ 1.69	\$ 30,900
	6" Erosion Control Gravel	CYD	3,039	\$ 45	\$ 136,800
	Gas Venting System	LF	7,914	\$ 8.80	\$ 69,600
	Gravel Drives	SYD	6,590	\$ 5.50	\$ 36,200
4	Process Equipment				
	Ferric chloride storage and feed system	LS	1	\$ 66,000	\$ 66,000
	Flocculation Structure & Mixer	LS	1	\$ 16,500	\$ 16,500
5	Mechanical & Electrical				
	Electrical, Controls and Instrumentation	LS	1	\$ 35,000	\$ 35,000
	Back up Generator, portable, 15KW	LS	1	\$ 44,000	\$ 44,000
6	Treatment Building	LS	1	\$ 66,000	\$ 66,000
7	Discharge				
	Effluent Pump Station	LS	1	\$ 250,000	\$ 250,000
	Effluent Force Main	LF	1,400	\$ 45	\$ 63,000
	Air Release Valve and Manhole	EA	1	\$ 8,000	\$ 8,000
	Irrigation Pivots	EA	2	\$ 53,600	\$ 107,200
					<i>Construction Subtotal:</i>
					\$4,547,000
					<i>Construction Contingency (10%):</i>
					\$454,700
					Construction Total:
					\$5,001,700
					Engineering, Legal Counsel,
					Bond Counsel & Administration
					\$1,000,300
					WWTF Land Purchase
					\$217,500
					Total Wastewater Treatment Project Cost:
					\$6,220,000

Notes:

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**TABLE C2-c
CENTRALIZED WASTEWATER TREATMENT AND DISPOSAL - AERATED LAGOON TREATMENT
PRE-DESIGN COST ESTIMATE**

Client: Arcadia Township
Project: Preliminary Engineering Report

Project No: 817670
Date: April 2016

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	Contract General Conditions, Construction Reqs	LS	1	\$ 145,400	\$ 145,400
2	Pump Station and Forcemain to WWTF				
	Pump Station	LS	1	\$250,000	\$ 250,000
	6" HDPE Forcemain, HDD	LF	13,200	\$50.00	\$ 660,000
	Air Release Valve and Manhole	EA	4	\$10,000	\$ 40,000
	Erosion Control/Restoration	LS	1	\$4,000	\$ 4,000
	Traffic Control	LS	1	\$3,000	\$ 3,000
3	Site Work				
	Site Piping	LF	600	\$ 66	\$ 39,600
	Site Utilities Service (gas, phone, electric)	LS	1	\$ 26,400	\$ 26,400
	Influent Control Structure	LS	1	\$ 33,000	\$ 33,000
	Transfer Structures	EA	2	\$ 19,300	\$ 38,600
	Site Fence	LF	2,800	\$ 4.61	\$ 12,900
	Site Clearing & Prep	AC	10	\$ 3,000	\$ 30,000
	SESC	LS	1	\$ 3,400	\$ 3,400
	Earthwork (excavation, fill)	LS	1	\$ 107,000	\$ 107,000
	Sand subbase	CYD	13,541	\$ 11.00	\$ 149,000
	Ballast	CYD	20,312	\$ 8.00	\$ 162,500
	Site Restoration	LS	1	\$ 31,200	\$ 31,200
	Flexible Membrane Liner	SF	582,381	\$ 0.70	\$ 407,700
	Geo-Composite Clay Liner	SF	582,381	\$ 0.75	\$ 436,800
	Geotextile Fabric	SYD	15,597	\$ 1.69	\$ 26,400
	6" Erosion Control Gravel	CYD	2,599	\$ 45	\$ 117,000
	Gas Venting System	LF	4,080	\$ 8.80	\$ 35,900
	Gravel Drives	SYD	3,734	\$ 5.50	\$ 20,500
4	Process Equipment				
	Surface Aerators	Ea	4	\$ 22,000	\$ 88,000
	Ferric chloride storage and feed system	LS	1	\$ 66,000	\$ 66,000
	Effluent Composite Sampler	LS	1	\$ 8,800	\$ 8,800
	Flocculation Structure & Mixer	LS	1	\$ 15,400	\$ 15,400
5	Mechanical & Electrical				
	Electrical, Controls and Instrumentation	LS	1	\$ 50,000	\$ 50,000
	Back up Generator	LS	1	\$ 66,000	\$ 66,000
6	Treatment Building	LS	1	\$ 66,000	\$ 66,000
7	Rapid Infiltration Basins				
	Effluent Pump Station	LS	1	\$ 250,000	\$ 250,000
	Effluent Force Main	LF	1,400	\$ 45	\$ 63,000
	Air Release Valve and Manhole	EA	1	\$ 8,000	\$ 8,000
	Irrigation Pivot	EA	1	\$ 64,600	\$ 64,600
				<i>Construction Subtotal:</i>	<i>\$3,526,100</i>
				<i>Construction Contingency (10%):</i>	<i>\$352,600</i>
				Construction Total:	\$3,878,700
				Engineering, Legal Counsel, Bond Counsel & Administration	\$775,700
				WWTF Land Purchase	\$140,000
				Total Wastewater Treatment Project Cost:	\$4,794,000

Notes:

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**TABLE C2-d
MECHANICAL TREATMENT - SEQUENCING BATCH REACTOR GROUNDWATER
PRE-DESIGN COST ESTIMATE**

Client: Arcadia Township
Project: Preliminary Engineering Report

Project No: 817670
Date: April 2016

Item	Item Description	Unit	Qty.	Unit Price	Amount
1	Contract General Conditions, Construction Reqs	LS	1	\$ 133,200	\$ 133,200
2	Pump Station and Forcemain to WWTF				
	Pump Station	LS	1	\$250,000	\$ 250,000
	6" HDPE Forcemain, HDD	LF	13,200	\$50.00	\$ 660,000
	Air Release Valve and Manhole	EA	4	\$10,000	\$ 40,000
	Erosion Control/Restoration	LS	1	\$4,000	\$ 4,000
	Traffic Control	LS	1	\$3,000	\$ 3,000
3	Site Work				
	Site Piping	LF	400	\$ 66	\$ 26,400
	Site Utilities Service (gas, phone, data, electric)	LS	1	\$ 26,400	\$ 26,400
	Site Fence	LF	800	\$ 4.61	\$ 3,700
	Site Clearing & Prep	AC	1.0	\$ 3,000	\$ 3,000
	SESC	LS	1	\$ 2,900	\$ 2,900
	Earthwork (excavation, fill)	LS	1	\$ 52,300	\$ 52,300
	Concrete Tanks (EQ, SBR, Sludge Storage)	LS	1	\$ 705,700	\$ 705,700
	Site Restoration	LS	1	\$ 3,000	\$ 3,000
4	Process Equipment				
	Influent Screen	LS	1	\$ 89,400	\$ 89,400
	SBR Equipment (aerators, valves, transfer pump, decanter, controls)	LS	1	\$ 350,000	\$ 350,000
	SBR Equipment Installation	LS	1	\$ 105,000	\$ 105,000
	Ferric Chloride Storage and Feed System	LS	1	\$ 66,000	\$ 66,000
	Effluent Composite Sampler	LS	1	\$ 13,200	\$ 13,200
5	Mechanical & Electrical				
	Process Piping	LS	1	\$ 88,000	\$ 88,000
	Electrical, Controls and Instrumentation	LS	1	\$ 140,000	\$ 140,000
	Back up Generator	LS	1	\$ 71,500	\$ 71,500
6	Treatment Building	LS	1	\$ 220,000	\$ 220,000
7	Discharge				
	Excavation	CYD	10,000	\$ 5.00	\$ 50,000
	Sand (RIB fill)	CYD	10,000	\$ 11.00	\$ 110,000
	Discharge Piping	LS	1	\$ 44,000	\$ 44,000
	Control Structure	LS	1	\$ 49,500	\$ 49,500
					<i>Construction Subtotal:</i>
					\$3,310,200
					Construction Contingency (10%):
					\$331,000
					Construction Total:
					\$3,641,200
					Engineering, Legal Counsel, Bond Counsel & Administration
					\$728,200
					WWTF Land Purchase
					\$17,500
Total Wastewater Treatment Project Cost:					\$4,387,000

Notes:

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ARCADIA TOWNSHIP
PRELIMINARY ENGINEERING REPORT

**TABLE C3
PRESENT WORTH ANALYSIS - SERVICE AREA #1**

<u>Item</u>	WASTEWATER COLLECTION & TREATMENT FACILITY ALTERNATIVES			
	Alt. WWTF-1 Regional LRBOI WWTF	Alt. WWTF-2 Facultative Lagoon	Alt. WWTF-3 Aerated Lagoon	Alt. WWTF-4 Mechanical SBR
2016 Treatment Facility Project Cost:	\$13,830,000	\$6,220,000	\$4,794,000	\$4,387,000
2016 Collection System Project Cost	\$8,163,000	\$8,163,000	\$8,163,000	\$8,163,000
Annual OM&R Costs (2016):	\$65,000	\$108,900	\$128,900	\$275,900
Present Worth of 20 Yrs of OM&R Costs ⁽¹⁾	\$1,149,700	\$2,178,000	\$2,279,900	\$4,879,900
Total Present Worth:	\$23,142,700	\$16,561,000	\$15,236,900	\$17,429,900
Salvage Value @ 20 Years	\$9,718,100	\$5,977,800	\$5,935,900	\$6,073,200
Present Worth of Salvage Value ⁽¹⁾	\$7,655,500	\$4,709,000	\$4,676,000	\$4,784,200
<u>Net Present Worth:</u>	<u>\$15,490,000</u>	<u>\$11,850,000</u>	<u>\$10,560,000</u>	<u>\$12,650,000</u>

(1) Discount Rate of 1.2%, taken from Appendix C of OMB circular A-94 (Effective for 2016)

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