

Pine Oaks - Sanitary Sewer Extension
Opinion of Probable Construction Costs
Matrix Design Group, Inc.
March 11, 2015

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<u>Mobile Home Park Connection</u>				
Development Charges for Mobile Homes (Connection Fees)*	236	ea	\$ 1,900	\$ 448,400
Development Charges for Single Family Unit (Connection Fees)*	1	ea	\$ 2,882	\$ 2,882
Cost Recovery for JL Ranch Pump Station	42.77	ac	\$ 161	\$ 6,900
* Requires City Council approval for outside user				<u>\$ 458,182</u>

Extension Costs from Mobile Home Park to New Lift Station

Mobilization	1	ls	\$ 7,500	\$ 7,500
Grading within Easement	1	ls	\$ 25,000	\$ 25,000
Erosion Control	1	ls	\$ 7,500	\$ 7,500
Reseeding/Stabilization	1	ls	\$ 5,000	\$ 5,000
Connection from Existing MHP System to New System	1	ls	\$ 10,000	\$ 10,000
8" Sanitary Sewer Main	1,675	lf	\$ 45.00	\$ 75,375
4' Manhole	7	ea	\$ 4,500.00	\$ 31,500
Subtotal - Hard Costs				<u>\$ 161,875</u>

Design Survey	1	ls	\$ 3,500	\$ 3,500
Easement Documentation	1	ls	\$ 2,000	\$ 2,000
Engineering	1	ls	\$ 12,500	\$ 12,500
Construction Surveying	1	ls	\$ 2,500	\$ 2,500
Construction Management	1	ls	\$ 5,000	\$ 5,000
Subtotal - Soft Costs				<u>\$ 25,500</u>

Subtotal Project Costs				\$ 187,375
Contingency (20%)				\$ 37,475
Total Estimated Cost				<u>\$ 224,850</u>

Extension Costs from New Lift Station to JL Ranch Height Road

Mobilization	1	ls	\$ 15,000	\$ 15,000
Grading within Easement	1	ls	\$ 50,000	\$ 50,000
Erosion Control	1	ls	\$ 20,000	\$ 20,000
Reseeding/Stabilization	1	ls	\$ 15,000	\$ 15,000
Lift Station	1	ls	\$ 450,000	\$ 450,000
Electric Service for Lift Station	1	ls	\$ 15,000	\$ 15,000
4" Sanitary Sewer Force Main	5,700	lf	\$ 40.00	\$ 228,000
4' Manhole	1	ea	\$ 4,500.00	\$ 4,500
Check Valves	10	ea	\$ 1,000.00	\$ 10,000
Air Release Station	1	ea	\$ 12,500.00	\$ 12,500
5' Manhole with Sewer Tie-in to Gravity Main (includes bypass pumping)	1	ls	\$ 10,000	\$ 10,000
Upgrades to JL Ranch Pump Station	1	ls	\$ 80,000	\$ 80,000
Cost Recovery for JL Ranch Pump Station	16.04	ac	\$ 161	\$ 2,588
Subtotal - Hard Costs				<u>\$ 912,588</u>

208 Permitting/Permitting Fees/Preliminary Engineering Design	1	ls	\$ 50,000	\$ 50,000
Design Survey	1	ls	\$ 3,500	\$ 3,500
Easement Documentation	1	ls	\$ 2,500	\$ 2,500
Final Engineering	1	ls	\$ 45,000	\$ 45,000
Construction Surveying	1	ls	\$ 3,500	\$ 3,500
Construction Management	1	ls	\$ 10,000	\$ 10,000
Subtotal - Soft Costs				<u>\$ 114,500</u>

Subtotal Project Costs				\$ 1,027,088
Contingency (20%)				\$ 205,418
Total Estimated Cost				<u>\$ 1,232,505</u>

Pine Oaks - Water Main Extension
Opinion of Probable Construction Costs

Matrix Design Group, Inc.
 March 11, 2015

<u>Extension Costs from Northern Property Boundary to JL Ranch Heights Road</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Mobilization	1	ls	\$ 15,000	\$ 15,000
Grading within Easement	1	ls	\$ 50,000	\$ 50,000
Erosion Control	1	ls	\$ 20,000	\$ 20,000
Reseeding/Stabilization	1	ls	\$ 15,000	\$ 15,000
8" Water Main with Bends and Valves	10,950	lf	\$ 50.00	\$ 547,500
Air Release Station	1	ea	\$ 12,500.00	\$ 12,500
Cost Recovery ?????		ac		\$ -
Subtotal - Hard Costs				\$ 660,000
Design Survey	1	ls	\$ 3,500	\$ 3,500
Easement Documentation	1	ls	\$ 2,500	\$ 2,500
Final Engineering	1	ls	\$ 25,000	\$ 25,000
Construction Surveying	1	ls	\$ 3,500	\$ 3,500
Construction Management	1	ls	\$ 10,000	\$ 10,000
Subtotal - Soft Costs				\$ 44,500
 Subtotal Project Costs				 \$ 704,500
Contingency (20%)				\$ 140,900
Total Estimated Cost				\$ 845,400



TECHNICAL MEMORANDUM

TO: Mr. Dany Mientka, The Equity Group, LLC

FROM: Nathan Martinson, P.E.

REVIEWED BY: Bob Frchetti, P.E.

DATE: June 9, 2017

SUBJECT: Pine Oaks Lift Station, Alternative Service Area Cost Comparison

PN/File No.: EQTY-17-0235 5.0

The purpose of this technical memorandum (TM) is to evaluate alternatives and costs to potentially connect two additional service areas into the planned Pine Oaks lift station (Project) for the Sundance at Rock Creek Apartments Development (Sundance). Adding service areas to this Project will increase capital and long term operation and maintenance (O&M) costs. However, the present worth of O&M costs may be less than the capital.

1. BACKGROUND

The Equity Group (Owner) is currently in planning phases for the Sundance development which will reside in El Paso County, Colorado. The planned lift station will be located in the south or southeastern portion of the Sundance development site, with the exact location to be determined. The lift station will convey municipal wastewater through a 5,500-linear foot of force main to a terminal gravity sewer which is owned, operated, and maintained by Colorado Springs Utilities (CSU). The force main will run along north portion of State Highway 115 (Vietnam Veterans Memorial Highway) until it reaches the terminal manhole. At a minimum, the primary service area will consist of wastewater from the Sundance development, and the Project's lift station and force main will be sized to convey this wastewater generated from the planned 240 apartment units. See Attachment A for the Sundance development site plan provided from the Owner.

With the assistance of this TM's findings, the Owner may decide to negotiate two other adjacent service area land owners to use the Sundance's lift station. The two adjacent service areas evaluated for potential tie in are: (1) The Pinions at Rock Creek Mesa (Pinions) located west of Sundance, and (2) Cheyenne Mountain Estates Mobile Home Park (Cheyenne Estates) located to the northwest of Sundance. The Pinions is an adjacent development that is also currently in the planning stages while the Cheyenne Estates is existing and currently using individual septic systems for wastewater disposal and treatment.

This TM will determine sewer flows from these potential service areas and provide a conceptual level Engineer's Opinion of Probable Construction Cost (OPCC) for each. FEI notes potential service area tap fees, user fees, or similar for each additional service area were not evaluated within the scope of this TM. Additionally, easement costs and/or land use acquisition costs from one service area to another are excluded.

2. PROBABLE COST APPROACH & METHODOLOGY

FEI used a lump sum price approach to estimate the conceptual capital cost for the lift station for the three alternatives. Each portion of work is divided into one of the Construction Specification Institute (CSI) Divisions - 1 through 16. Each CSI Division is further subdivided into specific portions of work (i.e., line item for each product/material) – where a lump sum price is given for each line item.

To reach a total estimated conceptual level, capital project cost, the subtotal cost must also be adjusted to account for construction prorates, contractor's overhead and profit, a construction contingency, and an estimate for engineering services. It is FEI's experience that construction prorates typically account for 18 percent of the subtotal; 10 percent for overhead and profit; and for typical cost estimations at this conceptual level, a 30 percent design/construction contingency; and 15 percent estimate for engineering services. Contingency can be adjusted based on projected changes from the conceptual planning stages to final design plans and specifications. A detailed breakout of the subtotals and adjustments is included in the OPCCs provided as an attachment to this TM.

To determine the lump sum prices for each line item, FEI used the following sources to assist in the development of each OPCC:

- Historic bid tabulations from FEI's archived lift station projects within Colorado (adjusted for inflation, 2017 dollars)
- Historic bid tabulations from various other sources within Colorado (adjusted for inflation, 2017 dollars)
- Historic contractor cost estimates for previously completed FEI projects (adjusted for inflation, 2017 dollars)
- Unit price cost data from published sources (e.g., RS Means)
- When multiple sources provided cost estimates for specific line items, FEI used the most reliable source, which was typically local contractor cost estimates for projects completed within the last calendar year.

2.1. DESIGN ASSUMPTIONS FOR BASE COST OF LIFT STATION AND FORCE MAIN

A base cost will be determined for the lift station and force main as these facilities will be required, at a minimum, to serve the Sundance development service area. This base cost evaluation is also considered "Alternative 1". The costs for tying in the alternative service areas are considered "adder costs", and are in addition to the base cost generated for Alternative 1.

By evaluating and incorporating feedback from the Owner; Matrix Design Services (the Owner's Representative); and CSU, FEI has made the following assumptions to assist in the preparation of each the Alternative 1 base cost and additional alternative costs:

- Lift station wetwell will be a buried, below grade structure not exceeding 25 feet in depth and utilizing submersible non-clog sewage pumps.
- Lift station and its components will include submersible solids handling pumps, accessories, valves, and discharge piping to the force main. Accessories include but are not limited to: motors, motor starters, guide rails for removal, electrical, packaged controls, level sensors, flow metering devices, and other instrumentation.
- A masonry block building with a control room and backup generator room will be provided. The masonry building will meet all code requirements, including a fully automated HVAC system. Access to the wetwell and pumps will be provided exterior of the building. Interior

access of the wetwell and pumps within the building is considerably more expensive and not a typical design practice.

- Electrical components include a backup generator, service disconnects, lighting panels, lights, receptacles, interior transformer(s), and other electrical gear. Electrical service requirements prior to the main service disconnect are the responsibility of the electrical utility and are not included.
- Native soils that are easily excavated, backfilled, and compacted, and do not consist of bedrock.
- Ground water table is greater than 25 feet below ground surface. Groundwater dewatering for construction is not included.
- Bedrock would not be encountered within the vicinity of the excavation for the lift station.

All OPCC's made available within this TM are preliminary, conceptual, and are subject to change as the design progresses. The relative accuracy of the OPCC is costs provided with a 30 percent contingency due to the current preliminary and conceptual state of the project.

3. SERVICE AREA ALTERNATIVES

Each service area alternative added to Alternative 1, or the base alternative, will increase the cost and would ultimately be passed onto the users via tap fees and/or monthly user fees. As mentioned, the Owner may negotiate with the adjacent service area landowners provided there is cost benefit to do so.

The receiving treatment facility for all potential service areas for this lift station is owned and operated by CSU. El Paso County and CSU provide guidelines for sewer generation estimates on a gallon per person per day basis. Both El Paso County and CDPHE On-site Wastewater Treatment Systems regulations (Regulation 43) recommend a design wastewater generation rate of 75 gallons per day (gpd) per person. FEI used historic census data to determine the persons per household for each dwelling unit (DU). This TM will analyze expected sewer flow from these service areas by categorizing them into three alternatives.

1. Alternative 1 (Base Cost): Sundance at Rock Creek Apartments.
2. Alternative 2: Sundance at Rock Creek Apartments combined with Pinions at Rock Creek Mesa.
3. Alternative 3: Sundance at Rock Creek Apartments combined with Pinions at Rock Creek Mesa and the existing Cheyenne Estates.

3.1. ALTERNATIVE 1 (BASE ALTERNATIVE): SUNDANCE AT ROCK CREEK APARTMENTS

The Sundance development will be located near the intersection of Pine Oaks Road and State Highway 115. The development will be a 2-phased construction and the buildout service area will have 240 DU. Based on US Census Data for Colorado Springs, average occupancy for apartments is 2.27 persons per household (i.e., DU). Based on the County sewer flow design requirements of 75 gallons per person per day, the service area is expected to generate 40,900 gallons of wastewater per day (average day flow). See Figure 1 for the service area location and the proposed location of the lift station.

Table 1 presents the flow calculations for this base alternative.

Table 1. Alternative 1 Estimated Wastewater Generation (Sundance Apartments)

Item	Value	Unit
Number of Apartments	240	Dwelling Units
Number of persons per Apartment ⁽¹⁾	2.27	Persons/household
Sewer flow per person ⁽²⁾	75	Gallons per day
Total Estimated Average Daily Flow	40,900	Gallons per day
Total Estimated Peak Hour Flow⁽³⁾	204,500	Gallons per day
	142	Gallons per minute

(1) US Census Bureau for City of Colorado Springs.

(2) Per El Paso County and CDPHE On-Site Wastewater Treatment Systems Regulation.

(3) Peaking factor of 5.0.

Table 2 provides the OPCC for Alternative 1 which includes the wet well below grade structures, above grade structures, lift station equipment, and electrical/controls. The cost of the force main was not included, as preliminary flow data indicates the pipe size will not change, and likely will remain the minimum size of 4-inch for all alternatives. Additionally, the gravity sewer pipelines within the Sundance development were omitted as they will not directly impact the lift station or alternate service areas.

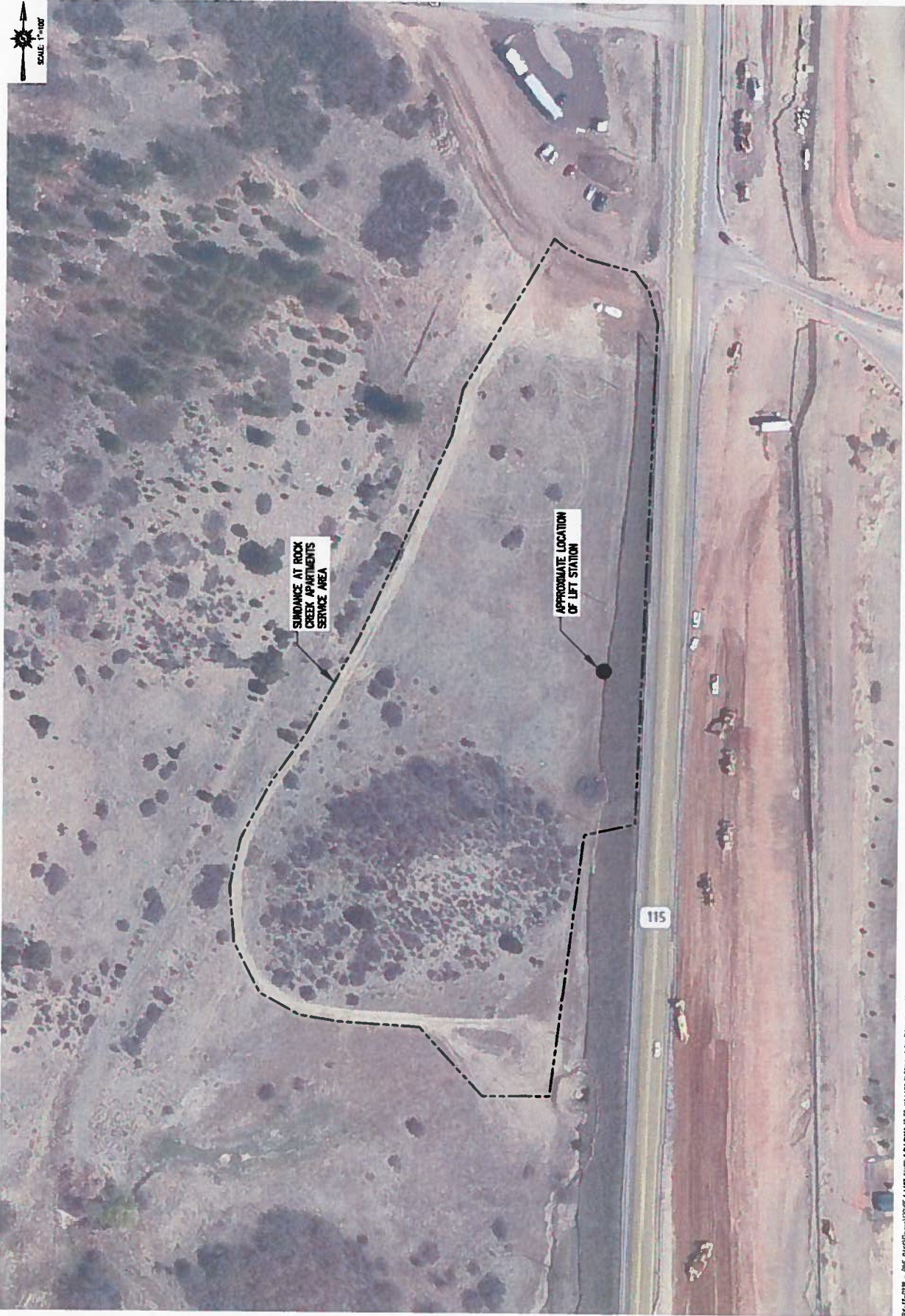
Table 2. Alternative 1 Opinion of Probably Construction Cost (Sundance Apartments)

Division	Item	Alternative 1 (Base Cost)
2	Civil / Site Work ⁽¹⁾	\$ 25,000
3	Concrete (precast)	\$ 100,000
4	Masonry ⁽²⁾	\$ 50,000
5	Metals	\$ 15,000
9	Finishes	\$ 15,000
11	Equipment	\$ 100,000
15	Mechanical/HVAC	\$ 5,000
16	Electrical, Instrumentation & Controls	\$ 250,000
	Raw Subtotal 1	\$ 560,000
	Construction Prorates (18%)	\$ 100,800
	Contractor's Overhead & Profit (10%)	\$ 56,000
	Subtotal 2	\$ 716,800
	Engineering (15%)	\$ 107,500
	Contingency (30%)	\$ 215,000
	TOTAL CONSTRUCTION COST	\$ 1,039,400

(1) Does not include cost of force main construction or sanitary sewer within Sundance.

(2) Assumes above grade masonry block building.

Alternative 1 is used as base cost for the additions of Alternative 2 and Alternative 3. Subtotal 1 cost is the bare cost for construction. Construction prorates and contractor overhead & profit (OH&P) costs are added to construction subtotal 1 to calculate subtotal 2 cost. Engineering and contingency costs are added to subtotal 2 cost to calculate the total construction cost. The 30 percent contingency is considered a conservative, industry standard value used for conceptual cost estimates.



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3.2. ALTERNATIVE 2: SUNDANCE AND THE PINONS AT ROCK CREEK MESA

The Pinons at Rock Creek Mesa (Pinons) development will be located near the intersection of Pawnee Road and State Highway 115, and will be to the south of the Apartments. The Pinons is projected to have 211 single family DU. Based on US Census Data for Colorado Springs, average occupancy for single family DU is 3.04 persons per household. Based on 75 gallons per person per day, the Pinons service area will generate 48,100 gallons of wastewater per day (average day flow). The Pinons and Sundance service areas will result in a combined sewer flow of 89,000 gallons per day. Table 3 provides the breakdown of sewer flow from the Sundance and the Pinons. Figure 2 shows the service area locations and additional sanitary facilities required.

Table 3. Alternative 2 Estimated Wastewater Generation

Total Wastewater Generation Rates	Value	Unit
Number of Homes at Pinons	211	Dwelling Unit
Number of persons per Single Family Home ⁽¹⁾	3.04	Persons per Household
Sewer flow per person ⁽²⁾	75	Gallons per day
Flow from Pinons	48,100	Gallons per day
Flow from Apartments (Sundance)	40,900	Gallons per day
Total Estimated Average Daily Flow	89,000	Gallons per day
Total Estimated Peak Hour Flow⁽³⁾	445,000	Gallons per day
	309	Gallons per minute

(1) US Census Bureau for City of Colorado Springs

(2) Per El Paso County and CDPHE

(3) Peaking factor of 5.0.

The main additional cost for Alternative 2 includes additional installation of approximately 1,400 linear feet of gravity sewer required to convey wastewater from the Pinons development to the Sundance development.



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Cost estimate for Alternative 2 is split into an added cost included with the Alternative 1 base cost. The adder cost will include the additional gravity sewer pipe from Pinons to Sundance, increased concrete requirement for additional wet well emergency storage capacity, increased equipment cost for larger pumps and motors, and increased electrical and instrumentation cost. Table 4 provides the OPCC for Alternative 2.

Table 4. Alternative 2 Opinion of Probable Construction Cost (Apartments + Pinions)

Division	Item	Alternative 2 (Adder Cost)
	Alternative 1, Base Cost Construction Subtotal 1	\$ 560,000
2	Civil / Site Work ⁽¹⁾	\$ 105,000
3	Concrete ⁽²⁾	\$ 50,000
11	Equipment ⁽³⁾	\$ 25,000
16	Electrical, Instrumentation & Controls	\$ 25,000
	Raw Alternative 2 Additional Cost	\$ 205,000
	Raw Alternative 2 - Construction Subtotal 1	\$ 765,000
	Construction Prorates (18%)	\$ 137,700
	Contractor's Overhead & Profit (10%)	\$ 76,500
	Subtotal 2	\$ 979,200
	Engineering (15%)	\$ 146,900
	Contingency (30%)	\$ 293,800
	TOTAL CONSTRUCTION COST	\$ 1,419,900

(1) 1,400 linear feet of 8-inch gravity sanitary sewer.

(2) Additional concrete for additional emergency wetwell storage capacity.

(3) Increased equipment size to accommodate additional flow

3.3. ALTERNATIVE 3: SUNDANCE, PINIONS, AND CHEYENNE ESTATES

Alternative 3 includes Sundance, Pinons, and adds the neighboring Cheyenne Estates to the lift station service area. The Cheyenne Estates is currently located to the southwest of the Apartments development and uses individual septic systems for their current method of waste disposal. The Park's buildout currently has 240 mobile homes and does not plan on additional spaces in the future.

At this time, flow data from the existing Cheyenne Estates is not available. El Paso County Board of Health and CDPHE On-site Wastewater Treatment Systems regulations (Regulation 43) recommends design sewer flow of 300 gallons per day per Cheyenne Estates space, which results in approximately 4 persons per mobile home. Table 5 provides the breakdown of generated sewer flow from all three service areas.

Table 5. Alternative 3 Estimated Wastewater Generation

Total Wastewater Generation Rates	Value	Unit
Number of Mobile Homes	240	Dwelling Units
Flow per Mobile Home Space	300	Gallons per day per space
Flow from Sundance	40,900	Gallons per day
Flow from Pinons	48,100	Gallons per day
Flow from Mobile Homes	72,000	Gallons per day
Total Estimated Average Daily Flow	161,000	Gallons per day
Total Estimated Peak Hour Flow⁽³⁾	805,000	Gallons per day
	559	Gallons per minute

(1) 1,400 linear feet of 8-inch gravity sanitary sewer.

(2) Additional concrete for additional emergency wetwell storage capacity.

(3) Peaking factor of 5.0.

The main additive cost for Alternative 3 is approximately 1,150 linear feet of gravity sewer line from the mobile homes, which can connect to the proposed gravity sewer line from the Pinions, then continue as a combined gravity sewer to the lift station. FEI notes that due to the individual onsite sewer treatment systems at the Cheyenne Estates, it is likely that an interior gravity sewer collection system does not exist – this cost is not included in the scope of this TM, and assumes any interior collection improvements would not be provided by the Equity Group. Figure 3 shows the service areas and proposed gravity sewer line facilities for this alternative.

Like Alternative 2, the cost estimate for Alternative 3 is split into adder cost and base cost. The adder cost will include the cost for gravity sewer pipe from Pinons to lift station, increased concrete requirement, increased equipment cost and increased electrical and instrumentation cost. The adder cost will then be added to the Alternative 1 cost to calculate Alternative 3 OPC. Table 6 provides the OPC for Alternative 3. Adder cost is added to construction subtotal 1 cost from Table 2 to calculate Construction Subtotal 1 cost for Alternative 3.

**Table 6. Alternative 3 Opinion of Probable Construction Costs
(Apartments + Pinions + Park)**

Division	Item	Alternative 3 (Adder Cost)
	Raw Alternative 1, Base Cost Construction Subtotal 1	\$ 560,000
	Raw Alternative 2, Construction Subtotal 1	\$ 205,000
2	Civil / Site Work ⁽¹⁾	\$ 87,000
3	Concrete	\$ 50,000
11	Equipment	\$ 25,000
16	Electrical, Instrumentation & Controls	\$ 25,000
	Raw Alternative 3 Additional Cost	\$ 187,000
	Raw Alternative 3 - Construction Subtotal 1	\$ 952,000
	Construction Prorates (18%)	\$ 171,400
	Contractor's Overhead & Profit (10%)	\$ 95,200
	Subtotal 2	\$ 1,218,600
	Engineering (15%)	\$ 182,800
	Contingency (30%)	\$ 365,600
	TOTAL CONSTRUCTION COST	\$ 1,767,000

(1) 1,150 linear feet of 8-inch gravity sanitary sewer.



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4. PROBABLE COST SUMMARY

Capital construction costs are summarized and compared below for each alternative in Table 7.

Table 7. Conceptual Probable Construction Costs

Item	Alternative 1 (Base Cost)	Alternative 2	Alternative 3
Raw Base Cost	\$ 560,000	--	--
Alternative Adder Cost ⁽¹⁾	--	\$ 205,000	\$ 187,000
Raw Construction Subtotal 1	\$ 560,000	\$ 765,000	\$ 1,352,000
Adjusted Subtotal 2 ⁽²⁾	\$ 716,800	\$ 979,200	\$ 1,218,600
TOTAL CONSTRUCTION COST ⁽³⁾	\$ 1,039,400	\$ 1,419,900	\$ 1,767,000

(1) Additional cost for collection sewer from one service area to another, plus costs for lift station to handle additional flow.

(2) Includes Contractor Overhead and Profit and Construction Prorates.

(3) Includes Engineering and 30 percent Contingency.

(4) Costs do not include gravity sewer systems interior of any service area, only from one service area to another. Additionally, for conceptual purposes, the shortest alignment routes from one service area to another were assumed. Alternate routes will increase costs.

(5) Costs do not include cost of force main.

(6) Costs do not include easement or land acquisition costs.

5. ATTACHMENTS

Attachment A Sundance At Rock Creek Apartments Site Plan
Attachment B Pinons at Rock Creek Mesa Site Plan

END OF MEMORANDUM



Pool + Amenity Area



Clubhouse



Pool Amenity Area



Attachment A

Elevation Imagery

Summary:	
Project Acreage	14.6 Ac
Number of Units	240 Du
Density	16.4 Du/Ac
Sp/Du	2.1 Sp/Du
Bdr/Du	1.2 Sp/Bdr/Du

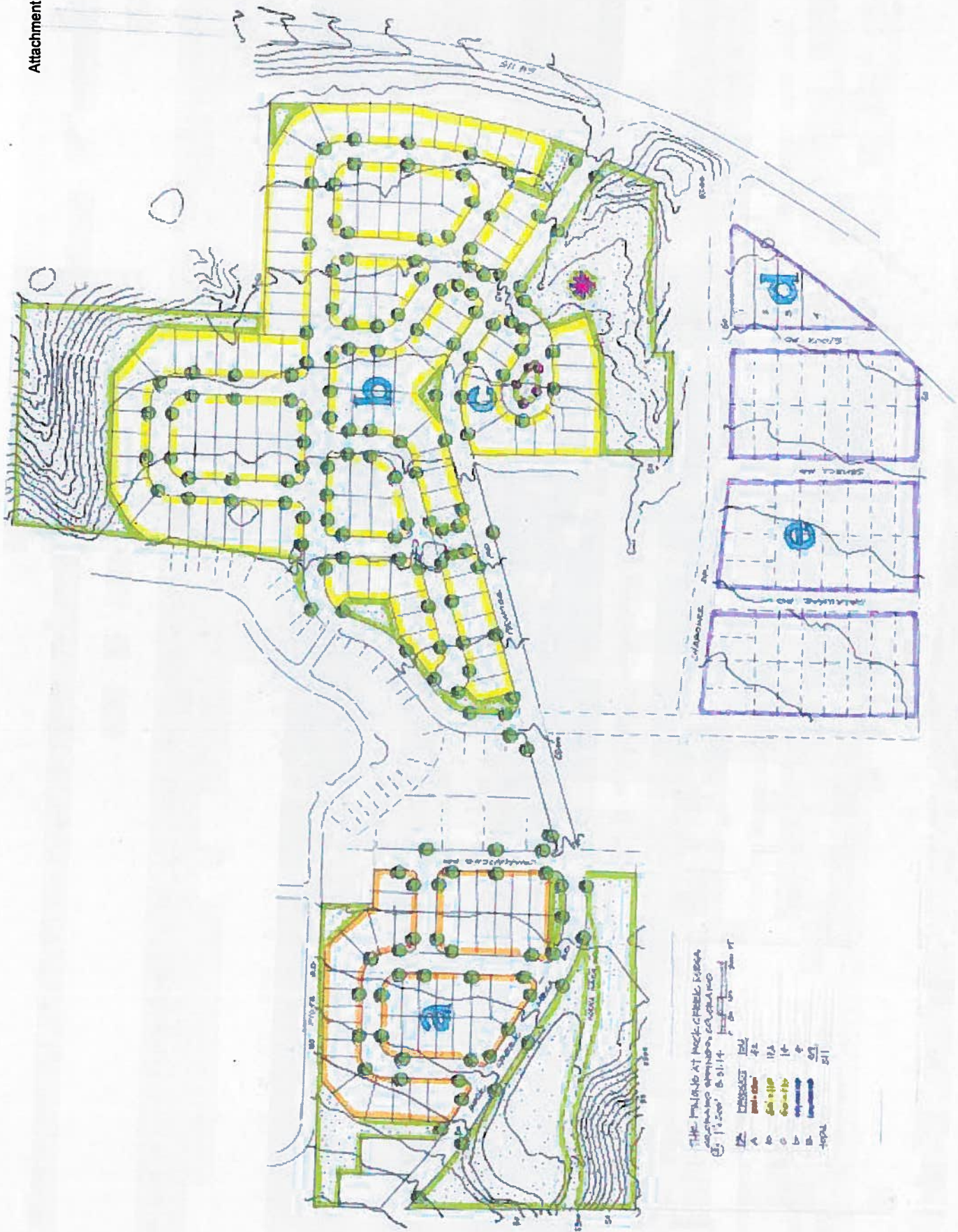


Vietnam Veterans Memorial Hwy.

Final Site Plan

WINDANCE AT ROCK CREEK APIS

Colorado Springs, CO



The plans at mechanical issue
 showing utilities, contours
 @ 1"=20' 8.11.14

NO.	DESCRIPTION	12/1	12/2
A	24' x 24'	42	42
B	24' x 24'	12A	12A
C	24' x 24'	14	14
D	24' x 24'	14	14
E	24' x 24'	14	14
F	24' x 24'	14	14
TOTAL		121	121

