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**Evaluation Study of
Options for MSW Landfill
W Alsdorf Rd and S Toltec Rd
Eloy, AZ**

April 12, 2019

Project No.: 182778

Prepared exclusively for:

**City of Eloy
1137 W Houser Rd
Eloy, AZ 85131**

Prepared by:

**Alta Arizona
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Figure 1: Site Map



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Client: City of Eloy
1137 W Houser Rd
Eloy, AZ 85131
Attention: **Keith Brown**

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It's our pleasure to provide you with our engineering services for this project. As requested, Wright Geotechnical of Arizona, LLC dba Alta Arizona (Alta) has completed our evaluation of landfill options in general accordance with our proposal. This report will present our findings, conclusions and recommendations.

If you have any questions or concerns, please contact me personally.

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Background

The City of Eloy has owned and operated a solid waste landfill (the site) since the late 1940s. The site has not conducted any significant expansions for modifications since initial operation, and all necessary documents for the site indicate that the site is currently in compliance with all EPA and Arizona Department of Environmental Quality (ADEQ) regulations. The site has all necessary documents on file with ADEQ including, but not limited to: Operating Plan, Monitoring Reports, and Closure Plan. Due to the length of operation, as this is one of the oldest operating landfills in Arizona, the file is large and has considerable correspondence on compliance, operational issues, and issues with tires from the early 1990s and early 2010. These issues have all been addressed to the satisfaction of ADEQ, and is considered in compliance with all Federal, State and Local regulations.

The site is considered “grandfathered” to EPA Subtitle D regulations, and does not have synthetic liners, leachate collection, or gas collection systems. The gas and groundwater monitoring wells have not shown any high levels of contaminate and methane gas. The site can continue to operate indefinitely under the grandfather clause, but any expansion or significant permit modification would require any new areas to be designed and constructed in compliance with the Subtitle D regulations. According to ADEQ files the site is located in the 100-year flood plain, but the files did not address the new requirement of not being located within 0.5 mile from a stream with over 25,000 cfm.

The volumes are relatively low, with about 4,000 tons of Municipal Solid Waste (MSW) per year, or 20 tons per day. This low volume makes daily operation economically difficult, as small sites have closed in preference for large regional landfills, managing up to thousands of tons per day. The costs of equipment necessary to open, compact and cover the relatively low volume is uneconomical. The additional costs of installing and maintaining the 18 inches of intermediate cover for all areas that will not be disturbed for more than 30 days also increases the operation costs. The site operating plan, approved by ADEQ, requires a compactor, dozer, scraper and loader, which currently are not being utilized each day because the site currently has only three operators. This site is one of the few remaining municipally owned unlined landfills still in operation

The site charges residents a subsidized rate of \$25 per ton of MSW for Eloy residents and \$45 per ton for non-Eloy residents.

Geology

The Eloy Landfill is located in the Eloy sub-basin, which contains over 2,000 feet of alluvium. In the Eloy sub-basin, the groundwater exists mostly under unconfined conditions. Semi-confined groundwater is found in areas underlying the fine-grained sediments in the basin. The sub-basins in this area of Arizona are generally ringed and underlain by impermeable rock.

The Eloy sub-basin is isolated from the Maricopa-Stanfield sub-basin by the underlying geologic structure, which consists of a subsurface anticlinal ridge composed of a conglomerate unit, underlain by granitic and volcanic bedrock. This structure blocks most groundwater exchange between the basins. The sub-basins formed late in the Tertiary period due to Basin and Range structural activity. The depth of basin fill exceeds 2,000 feet in the center of the basin. The lower basin fill consists largely of fine-grained sediments with interspersed evaporite deposits from ancient lakebeds. Upper basin fill consists of coarser grained soils, with finer grained soils dispersed closer to the center of the sub-basin. Unconsolidated sands and gravels cover the upper 100 feet of the basin. These soils serve as a pathway for water moving from the surface to the underlying basin fill.

Solid Waste Volumes generated by Eloy residents

Eloy generates around 8,000 tons of solid waste per year, inclusive of the volumes generated by the nearby prisons. The residential volume is estimated at 5,000 tons per year, while the prisons generate an



additional 3,000 tons. The self-haul, and small contractors generate 4,000 tons of the waste currently managed at the landfill. A portion of the landfill volume, roughly 1,000 tons, is generated outside the City.

Current Eloy MSW volume management

Eloy currently is contracted with Right Away Disposal (RAD) through 2021, for weekly residential collection. The contractor is responsible for all disposal costs and retains all recycle rebates. The current provider was recently acquired by a national firm, and the City should look at all options for residential collection when the current agreement expires. Approximately 50% of Eloy's 15,000 residents are inmates at one of the four local private prisons.

Current landfill volumes management

Eloy landfill is used solely for self-haul and small contractors, for residential and self-haul disposal. The City currently partners with the County to offer seasonal "free dump days" for local residents, which helps to reduce "wildcat", or desert dumping. The site manages about 4,000 tons per year.

RAD manages the majority of the residential collection agreement, with an estimated volume of 5,000 tons per year. The volumes are collected curbside and then transported to the RAD landfill in southern Pinal County. The prison volumes are handled by companies contracted for, and paid by, the prisons. The prison volume is then sent to the disposal location selected by the provider.

Estimated costs per ton for current operating model

Cost per ton to Operate landfill:

	Compactor	Scraper	Loader	Water truck
Capital Cost	\$500,000	\$450,000	\$300,00	\$170,000
Depreciation (\$/HR)	\$25.00	\$22.50	\$15.00	\$25.00
Fuel, Oil Grease (\$/HR)	\$18.00	\$18.00	\$18.00	\$12.00
Tips/Tires (\$/HR)	\$3.50	\$4.80	Included	Included
Maintenance (\$/HR)	\$37.00	\$25.00	\$25.00	\$15.00
Hours per day	5	3	2	2
Equipment Cost per Day	\$417.50	\$210.90	\$116.00	\$88.00



Cost Summary	
Scale House Labor Cost per day	\$200.00
Operators (2) Labor Cost per day	\$400.00
Total Average Cost per day (includes equipment, labor and fuel)	\$1432.40
Average tons per day	19.5 ton
Cost per ton	\$73.46

Ways to reduce the costs in the short term

One area of consideration is the current drop off area, where waste is dropped directly into roll off boxes, and when the boxes are full, are transported offsite via the RAD agreement. The site could be improved to provide better service and economics. The table below details the current and estimated capital costs for a transfer station:

Estimated Costs				
	Current Method (Single Roll Off)	Use Double Roll Off to Reduce Costs	Convert to Walking Floor	Convert to Tipper Trailers
Capacity (Tons)	4.4	8.8	18	24
Total cost per trip	\$150.00	\$200.00	\$400.00	\$300.00
Trip Cost (\$/ton)	\$34.09	\$22.73	\$22.22	\$12.50
Disposal Cost (\$/ton)	\$20.00	\$20.00	\$20.00	\$20.00
Total Cost (\$/ton)	\$54.09	\$42.73	\$42.22	\$32.50
Current Cost (\$/ton)	\$73.46	\$73.46	\$73.46	\$73.46
Improvements required	TBD	TBD	Increase wall height and possible access improvement	Increase wall height and possible access improvement

In the interim, considerable cost savings can be realized by shifting the site to a transfer station model, and by preparing a Request for Proposal (RFP) to ask for a per ton, all-inclusive, rate for the current transfer volumes. The 4,000 tons per year will generate interest from all waste companies that currently operate in the area.



Options when the RAD agreement expires.

Other communities of similar size in the area currently pay around \$20 per home for a similar level of service, so the current agreement of paying \$12.50 per home is an attractive rate. With the change in ownership of the company, the City should not expect the current rate structure to remain, and the rates could increase significantly without modifications to scope of work, including how to manage the disposal volumes.

The attached sketch outline (Figure 2) shows an example of an interim design that will allow residents to dump on a pad, and then use the loader to compact and load the trucks.

Alternatives for the landfill – assuming transfer station conversion

Landfill remaining life.

The estimates of remaining life of the landfill is approximately 750,000 cubic yards. The exact volumes remaining are difficult to determine without a detailed calculation and are impacted by settlement and compaction effort. The volume is adequate to meet the City's needs for decades, but as previously discussed, the effort to operate the site, in compliance, makes continued operation uneconomical.

Option 1

Fill and Close:

The landfill can be continued in operation for many decades. The access to site makes it attractive for volumes from Pima, Maricopa and Pinal county. At \$20 per ton, there is volume available to complete the closure after filling to permitted grades. When the capacity is eventually reached, use the gate receipts to fund the closure costs and sell the equipment. After closure, create a transfer station to maintain service continuity for the local residents.

Option II

Mothball and Transfer Station:

Continue minimal operation with current regulatory requirements to maintain compliance and keep permit active. The site has a valid permit from ADEQ, and ADEQ's interpretation of "active" has historically meant a minimum of one load per year. All waste must be covered with a minimum of 18 inches of cover material and this cover will have to be maintained until the site is permanently closed. If the site remains in operation the operating plan should be reviewed in detail, with site management, to assure all requirements are met.

The site can be mothballed indefinitely, but Eloy will be required to submit reports and continue with the financial assurance mechanisms currently in place for closure and post-closure of the landfill. The available airspace could be considered an option in the event of a significant natural disaster, or as a negotiating tool with private haulers to hold residential rates down low.

The site can then be converted to a transfer station to transport current volume to regional landfills. There are multiple regional landfill options available with competitive rates, which would lower operating costs. The transfer and disposal costs will be far lower than operating the landfill with low volumes.

Option III

City expands the landfill and offers disposal services in the community:

The City could enter the disposal market, by competing with private companies, partnering with another city (Casa Grande for example). The current landfill area can be redesigned to create more volume deeper and higher over the entire area. The major challenge will be public acceptance of a regional landfill and capital costs relatively high, relatively similar to the below cost estimate in Option IV.



Option IV

Create a public/private partnership and offer the facility to potential companies for commercial operation:
The site has excellent location, good geology, and low population density in the surrounding area.

The City of Buckeye created a Pollution Control Corporation, in which Buckeye owns the landfill, and Republic Services is responsible for construction and operation of the facility.

This option would require a new design, operating plan, Storm Water Protection Plan (SWPP) Air permit, and others. There would also be public hearings conducted by ADEQ before they would issue any additional permits. The costs to prepare the design and permit applications is dependent on requirements for additional site investigations and geotechnical investigation but is anticipated to be approximately \$1.6M.

Eloy Landfill - Expansion Cost Estimate			
Engineering			
	Groundwater Verifications	\$	45,000
	Ground Water Modeling	\$	54,000
	Geotechnical borings	\$	93,750
	Geotechnical engineering	\$	19,500
SWPP	Storm water and drainage engineering	\$	130,000
Planning	Update Operations Plan with ADEQ	\$	100,000
Air Permits			
	Air Permits applications and submittals to ADEQ and EPA	\$	250,000
Aquifer Protection Permit (APP)			
	Permit Application	\$	400,000
Negotiations			
	Negotiate Air Permit	\$	75,000
	Negotiate APP	\$	75,000
	Negotiate Operations Plan	\$	75,000
Public Relations			
	Public outreach assistance	\$	50,000
Contingency @20%		\$	273,450
TOTAL ESTIMATE		\$	1,640,700



	Option I	Option II	Option III	Option IV
Description	Fill and Close	Mothball	Expand	Partner
Goal	Sell the remaining airspace and close the landfill	Mothball landfill for future use (expansion) and convert to transfer station	Expand the landfill and utilize for city needs, and market airspace to third parties or other municipalities	Create Pollution Control Corporation or other legal mechanism to create public/private partnership
Benefits	Create short term cash flow by decreasing operating costs and selling equipment	Retain airspace for future needs, avoid closure costs, recognize economic benefit and maintain permits active	Provide long-term disposal capacity for Eloy, as well as provide consistent cash for long term	Provide long term disposal for the City, as well long-term consistent cash flow for the City
Disadvantages	<ul style="list-style-type: none"> The City would have to negotiate with third party for disposal of MSW The City would have to fund the closure and post-closure monitoring 	The City would have to continue to provide financial assurance, as well as maintain cover on the site.	<ul style="list-style-type: none"> The cash required to expand the site are unknown, but will be costly The residents may dislike the negative impacts on the neighborhood. 	<ul style="list-style-type: none"> The City would hand over operations to a third party Must provide community acceptance of the project
Short-Term Cash Flow Impact	Depending on market price for disposal positive cash flow to be used for closure costs	Possibility to sell used equipment	High capital costs to finance Engineering and permitting for ADEQ permit application	None
Long-Term Cash Flow Potential	None	Closure costs remain responsibility of the City	High: The City could realize full economic benefit of a strategically located landfill in a high growth area.	Medium: the partner would share in profits of the facility.



City expands operation and actively markets the facility.

Another option could be to make the investment in the facility to expand and increase marketable volumes.

Competitive Landscape

Southern Pinal County has adequate disposal capacity with all three major, publicly traded, companies owning landfills in the region. The landfills primarily serve their own volumes. The sites are very remote, access is difficult, and volume is primarily transferred from Phoenix MSA and Tucson MSA.

The City has many options, short and long term, but by making operational changes, considerable decreases in annual operating costs could be realized.

Conclusion

- Landfills with small volumes are very expensive to operate, the high fixed costs of rolling stock drive up unit costs
- Eloy Landfill generates small volumes less than 20 tons per day of operation.
- The Capital Costs to modernize and expand the facility are high.
- County residents who choose to haul own waste get to use the City's landfill and the rates charged do not cover direct costs.
- The site has the basic infrastructure to shift to a transfer station model economically.
- The current rate structure does not cover the operation costs. And recommend the City revise to the recommended rates.

The City can realize cost savings by mothballing the landfill, preserving the permits, and delaying the closure costs. The current transfer station can be economically modified to serve the Eloy residents as well as the County.

The rate structure should be reviewed to match the costs of operation and reflect market conditions.

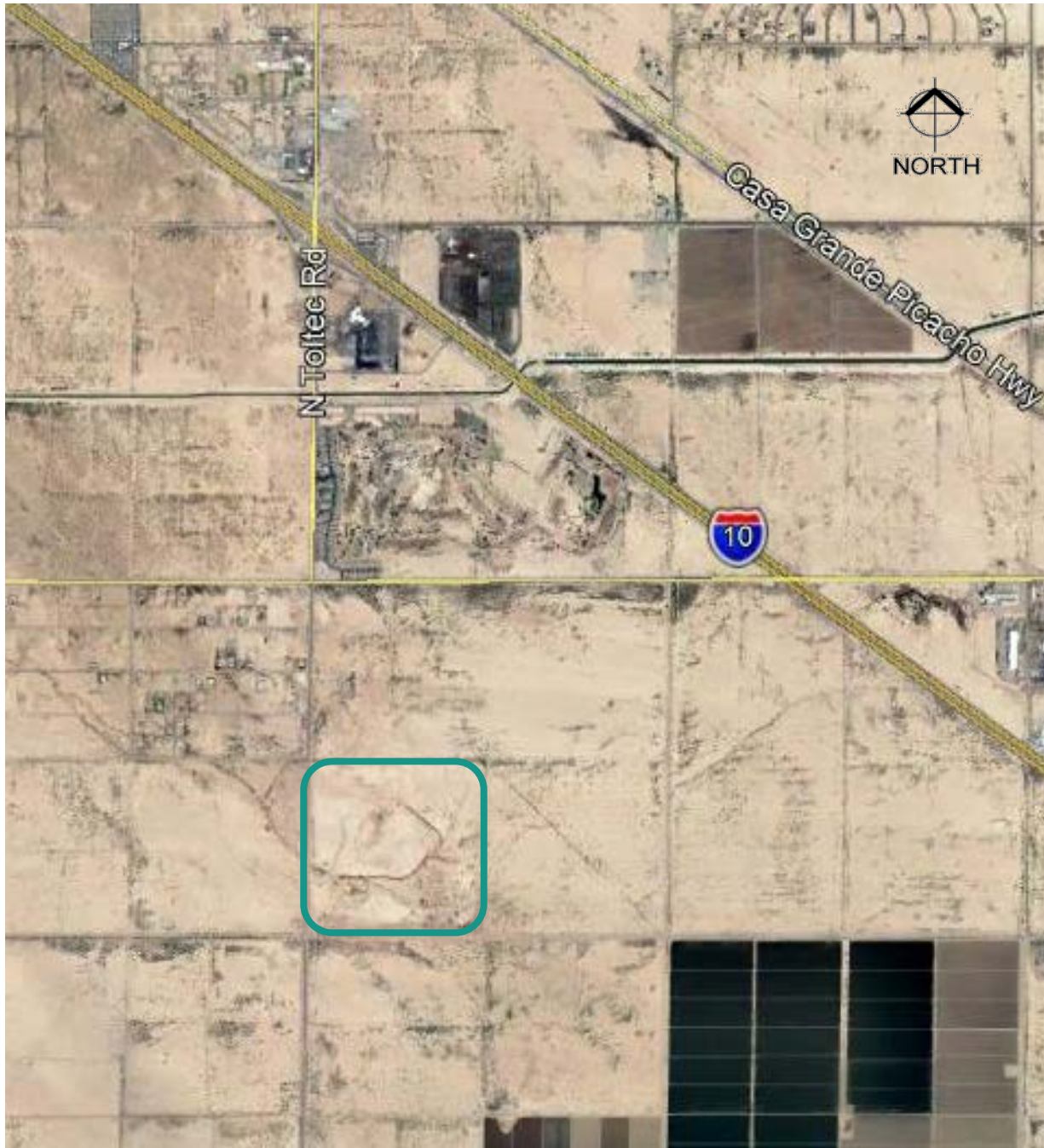


FIGURE 1

SITE MAP



Figure 1 – Site Map



Site Location

Not to Scale



FIGURE 2

EXHIBIT DRAWING

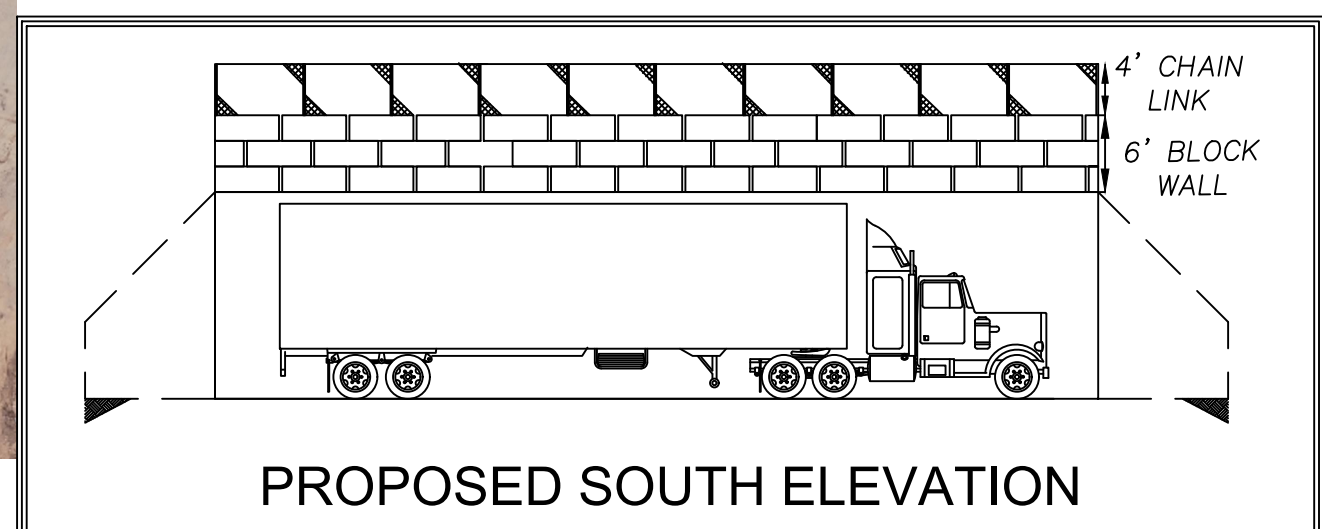
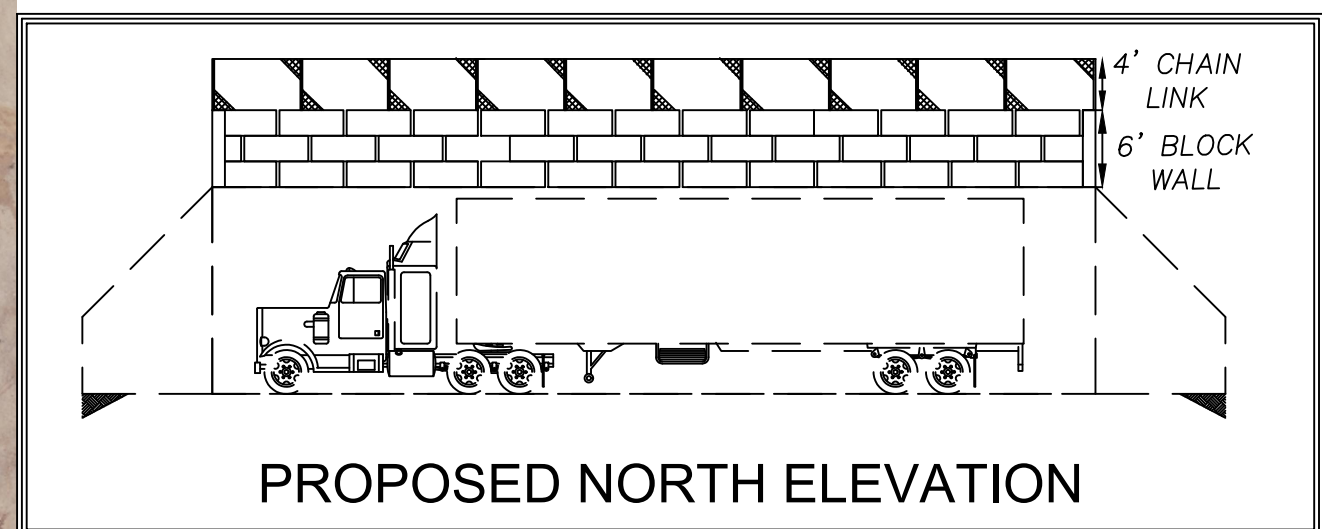
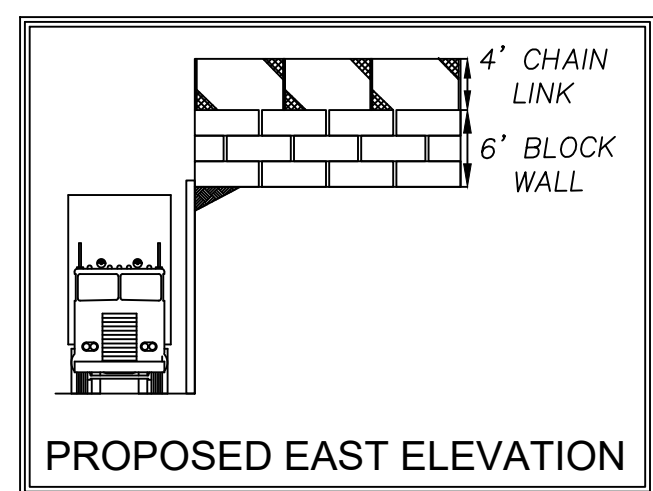
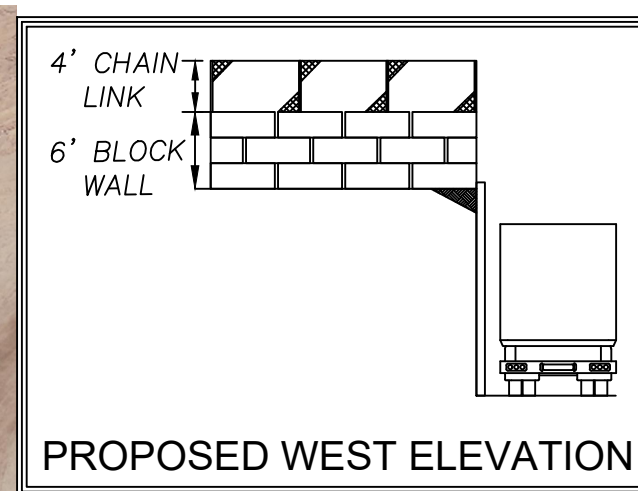
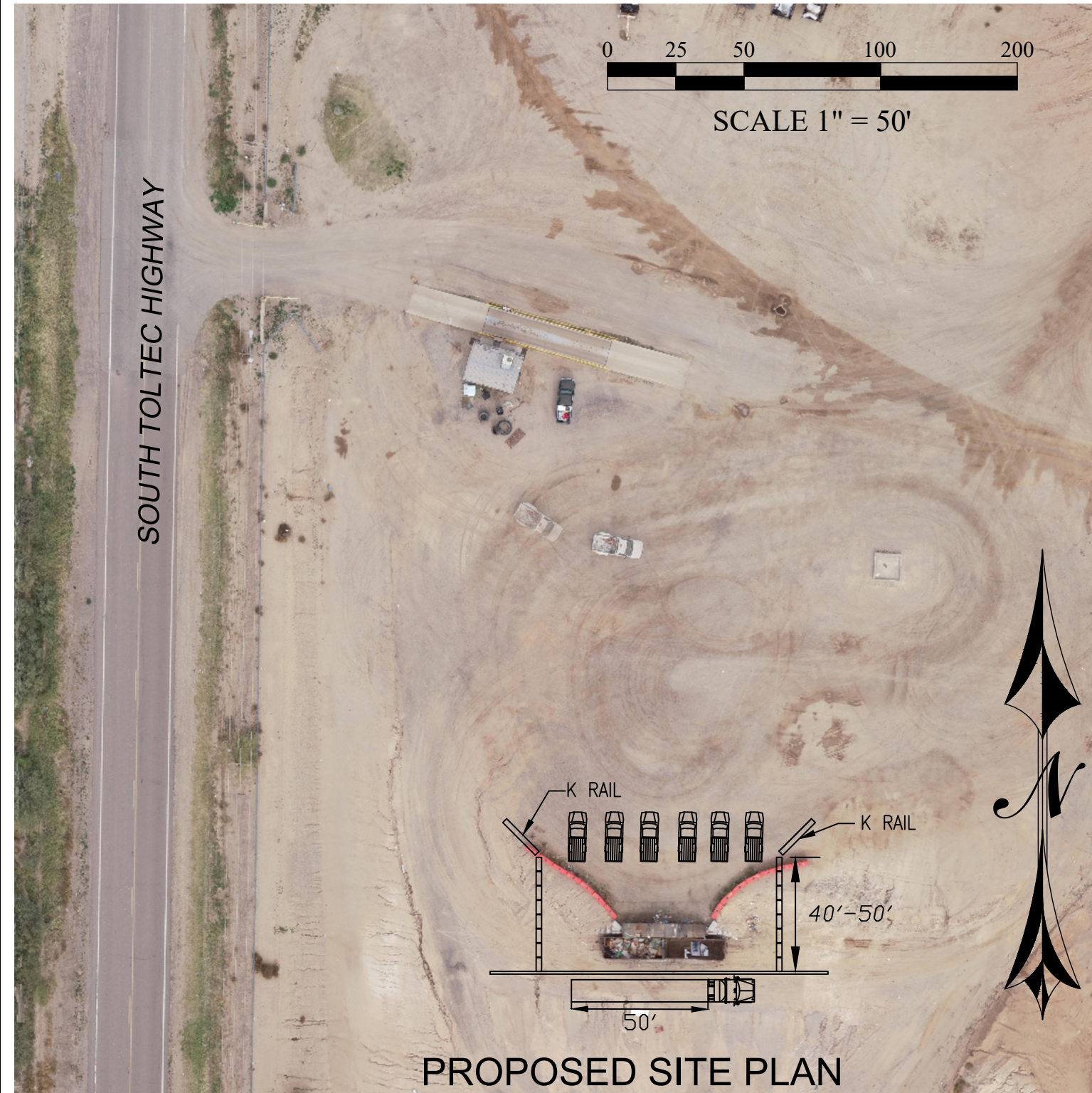


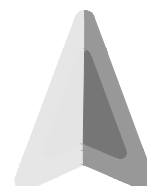
EXHIBIT DRAWING

TOLTEC LANDFILL – CITY OF ELOY
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PINAL COUNTY, ARIZONA

Project No.
18-519

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