MERRELL JOHNSON

PRELIMINARY SEWER SERVICE FEASIBILITY STUDY

TO EVALUATE SEWER CONNECTION FOR PROPOSED WAREHOUSE AT DACHSHUND AVE AND CORDOVA RD

For:

TOWN OF APPLE VALLEY

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Prepared by:

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Town of Apple Valley

Approved by
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2/7/2024

Scope

The site for the proposed warehouse development is bounded by Dachshund Ave. on the west, Cordova Rd. on the south, and Quarry Rd. on the north. This property is located within the North Apple Valley Industrial Specific Plan boundary. This report will evaluate the existing and required sewer infrastructure needed to provide sewer services to this property. Both a gravity flow option and a shorter lift station option will be evaluated.

Existing Sewer System Description

The Town of Apple Valley is part of a regional wastewater treatment agency, Victor Valley Wastewater Reclamation Authority (VVWRA). VVWRA was originally formed by the Mojave Water Agency to help meet the requirements of the federal Clean Water Act and provide wastewater treatment for the growing area. The VVWRA is now a joint powers authority and public agency of the state of California. There are currently two treatment plants serving Apple Valley. The main treatment plant is on Shay Road near Southern California Logistics Airport and the second plant is a subregional plant located on Otoe Road just east of Dale Evans Parkway next to Brewster Park. The subregional plant in Apple Valley is a scalping facility which treats a portion of the wastewater from the locale area and reuses the treated recycled water in beneficial locations within the town and returns the solids to the sewer for treatment at the main VVWRA plant.

There are two main sewer transmission lines in the north area of Apple Valley, the North Apple Valley Interceptor and a piping network for the Northeastern Portion of Assessment District 2B. The North AV Interceptor begins in Dale Evans Parkway near the High Desert Juvenile Detention Center and then west along and near Stoddard Wells Rd. and in general to the southwest and terminates at the VVWRA plant in Victorville. The Northeastern Portion of Assessment District 2B piping begins in Navajo Road at Johnson Road and runs south to Altadena St. then west to Dakota Rd. then south to Corwin Rd. then SW to Comanche Rd. then west on Waalew Rd. then South on Dale Evans Parkway, then east on Otoe to the Subregional Treatment Plant.

Project Demands and Requirements

The proposed development of the subject warehouse is anticipated to have less than 300 Drainage Fixture Units (DFU). Using 300 DFU's the calculated flow rate derived from Chart A-2 of the uniform plumbing code is 113 gpm.

For the remaining tributary areas we are using 1,500 gallons per day per acre of building as is used in the Town's Sewer System Master Plan Update dated Aug 2013 by: URS Corp. The ratio we used in an earlier report for a similar project in this area was 50% of the gross land area to establish the building area. (Job. No. 3675.007 Dated Feb. 14, 2023). As a comparison this project building to site area ratio is 31ac building / 94ac site = 33%. Recognizing that not all industrial projects will be the same we believe a ratio of 50% would be a conservative estimate.

The demand calculation will be total acreage of tributary area to the pipeline X 50% X 1,500 GPD/ac = total average GPD. This would be the average day demand (ADD). The peak flow rates measured and reported in the Master Plan were 1.46 times the average flow rates. This may or may not be indicative of this development area. For this study we will use a peaking factor of 2.0 to size the sewer mains. Therefore, the design flow rate will be calculated using the ADD x 2.0.

Tributary Area and Main Sewer Alignment

The gravity flow sewer alignment option and the lift station option alignment are shown in Fig 1. For the gravity flow option, the 113gpm from the project warehouse and flow from Tributary Area #1 will contribute to the flow within segment #1, Tributary Area #2 will add to Segment #2, and Tributary Area #3 will add to segment #3.

This alignment would collect sewer from the properties north of Johnson Rd. and South of Quarry Rd. Also, west of Navajo Rd. The alignment would pick up flow from the warehouse at midpoint of the building with a lateral coming off of Dachshund Ave. then run south down Dachshund Ave. to Shepherd Rd. then west to Dale Evans Parkway, then south to Johnson Rd., then west along Johnson Rd. to the point of connection in the VVWRA North Apple Valley Interceptor. There is an existing right of way along most of this alignment, however along Johnson Rd. there are five properties in-which sewer easement or street right of way would need to be acquired. These properties are: APN 0472-302-21, APN 0472-302-13, APN 0472-302-09, APN 0472-302-08, and APN 0472-302-03.

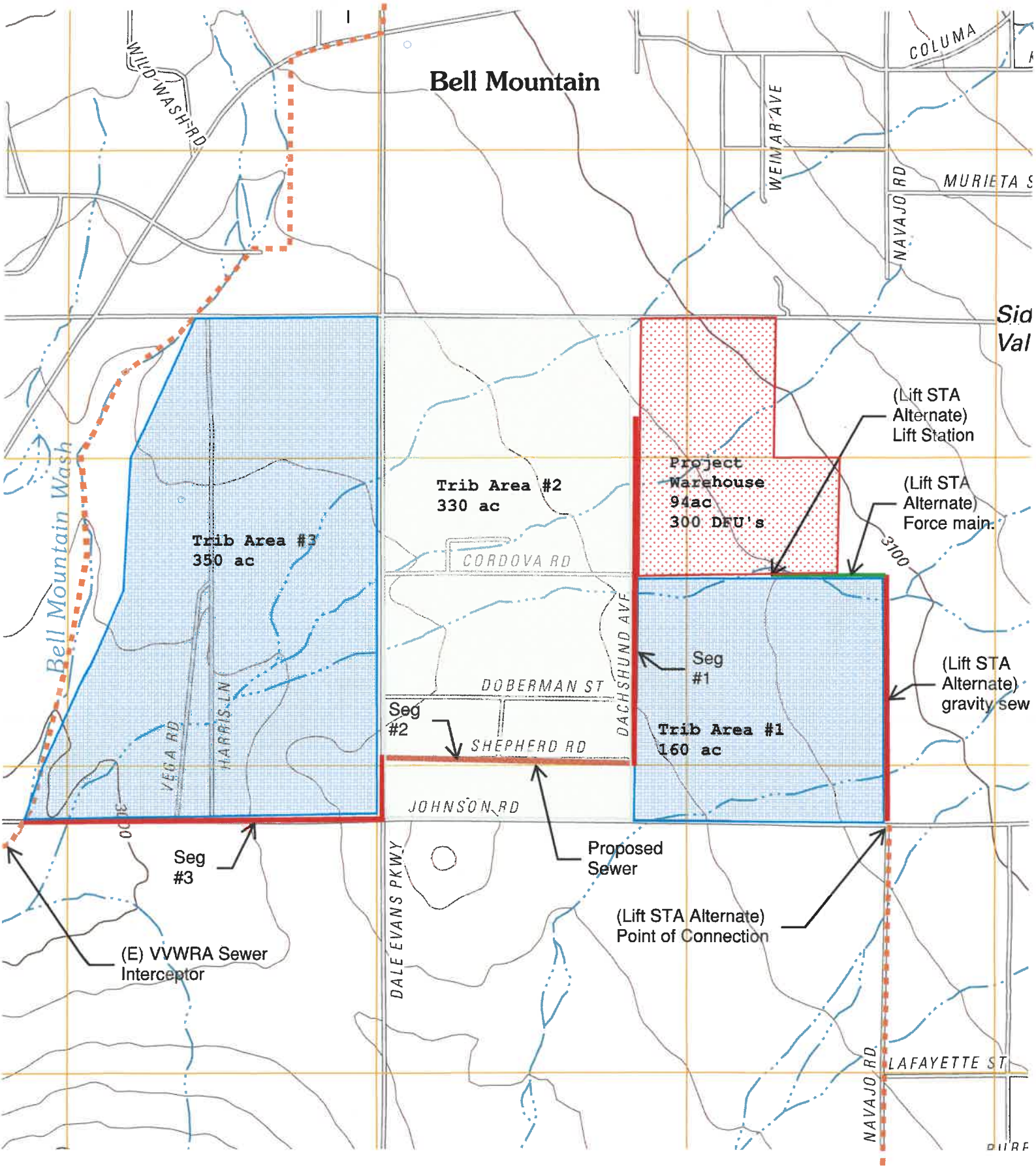
Using this alignment would direct the sewer tributary flows to the main piping for the VVWRA North Apple Valley interceptor.

The tributary areas and calculated flow rates are listed in Table 1.

Table 1 (Design Flow Rates)

ID	Tributary Area (ac)	Building Area (ac)	ADD flow rate (gpm)	PDD flow rate (gpm)	Cumulative flow rate (gpm)	EDU's 1 EDU = 180 GPD
#0	Bldg	N/A	N/A	113	113	904
#1	160	80	83	167	280	1,120
#2	330	165	172	344	624	2,496
#3	350	175	182	364	988	3,952

FIG 1 Proposed Sewer Main alignment and Tributary Areas



Existing Sewer Pipe Capacity

From an email correspondence with Darron Paulsen, the General Manager of Victor Valley Wastewater Reclamation Authority we understand that the existing VVWRA interceptor has the capacity to accept the flow from this proposed sewer. We were informed that the proposed pipeline would be owned and operated by the Town of Apple Valley.

Proposed Sewer Pipe Size

This report is only looking at the pipe size required in the proposed sewer alignment and as shown in Fig. 1.The minimum slope and capacity for each segment is illustrated in Table 2. The capacity is calculated using the Manning Equation with a Manning Coefficient of 0.009.

Table 2 (Proposed Pipe Size

Segment ID	Minimum Slope Ft/Ft	Capacity of 8" pipe at 75% full (gpm)	Capacity of 12" pipe at 75% full (gpm)	Capacity of 15" pipe at 75% full (gpm)	Demand (gpm)	Pipe size to Use (inch)
#1	.004	452	1,332	2,415	280	8
#1	.0022		988	1,791	280	12
#1	.0016			1,527	280	N/A
#2	.004	452	1,150	2,090	624	12
#2	.0022		988	1,791	624	12
#3	.009		1,998	3,623	988	12
#3	.0026		1,074	1,947	988	12
#3	.0016			1,527	988	15

From the results above, it is proposed that the sewer size will start with 8 inch North of Cordova Rd. along the western project boundary in Dachshund Ave. and transition to 12 inch when the slope limitation drops to 0.0022. and as the slope needs to reduce more to 0.0016 the size will increase to 15 inch at the end just before the point of connection. The sewer pipe main will be installed in the project alignment with slopes as needed to minimize depth of bury and maintain a minimum cover of 8 feet.

Depth of Cover

Most of the pipeline will be placed between 8 feet to 12 feet of cover. There is a section near the point of connection where the pipe depth will need to be 19 feet deep to go under a small elevation rise on Johnson Rd.

Optional Alignment

The above discussion utilizes a pipeline alignment that will allow gravity flow for the whole alignment. As an alternative, a sewer lift station could be installed on the warehouse project property along the south edge along Cordova Rd. and pump the sewer effluent to the east along Cordova Rd. in a pressure main to a new manway at the intersection of Cordova Rd. and Navajo Rd. From there a gravity line could be built going south on Navajo Rd. to the point of connection at the intersection of Navajo Rd. and Johnson Rd. The sewer force main would be about 40 feet in elevation and run about 1,800 feet in distance. This option would direct flow to the sub regional sewer treatment plant.

Conclusion

The Town of Apple Valley prefers a gravity sewer, but the onsite lift station option is an acceptable alternative provided a maintenance agreement is recorded with the property that details the regular maintenance of the facilities, and the annual reporting with the Town. The lift station and force main improvements would be owned and operated by the property owner. The gravity sewer option would be owned and operated by the Town of Apple Valley.

The anticipated construction costs of each option are listed below.

Gravity Sewer

The estimated cost of construction is as follows:

2,000 LF of 8" Sewer Main	($200 / LF)	$400,000
8,600 LF of 12" Sewer Main	($225 / LF)	$1,935,000
500 LF of 15" Sewer Main	($400 / LF)	$200,000
35 Manways	($8,000 ea)	$280,000
Misc.		$500,000
Total		$3,315,000

Alternate (Using Sewer Lift Station)

The estimated cost of construction is as follows:

1,800 LF of 4" Force Main	($150 / LF)	$270,000
2,750 LF of 12" Sewer Main	($225 / LF)	$619,000
Sewer Lift Station		$500,000
10 Manways	($8,000 ea)	$80,000
Misc.		$300,000
Total		$1,769,000