Prepared for:
The City of Albuquerque
December 2021

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN

Infrastructure Needs Assessment Report

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Volcano Heights
Preliminary Infrastructure Needs Assessment Report

Prepared for:

The City of Albuquerque

WCI Project: 21-600-143-00

Prepared by:

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December 2021

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A. INTRODUCTION

The purpose of this report is to provide an approximate estimate of the infrastructure needs and costs for planning purposes of the area described in the **Volcano Heights Sector Development Plan**. The Sector Plan area is located on the West Mesa of Albuquerque and is bounded on the east by the *Petroglyph National Monument lands***,** on the south by the extended southern alignment of Paseo Del Norte Boulevard, on the west by Universe Boulevard, and on the north by the existing Paradise Hills development. See **Exhibit I-Sector Plan Location Map** for orientation to the area, and the boundary of the sector plan. **This Needs Assessment is designed on the best available information at the time. Deviations from these assumptions will require additional design effort on the part of the land developer**. This report is intended to give property owners a better understanding of the costs associated with developing the major backbone infrastructure and to present funding alternatives and is not intended to be used for a detailed infrastructure plan, as the current land usage and road layout may change as the area develops. Costs associated with the improvements and zoning used for the report are subject to change and will need to be adjusted should parcel specific planning by developers change impacts on land usage.

Possible Additional Development:

It is likely that additional development beyond the scope of this report will be required, as the infrastructure outside of this area will need improvement to accommodate the development of the Volcano Heights area. Water Treatment, such as Arsenic Removal, and additional tank capacity are likely to be required. Specifically, a second 4W Corrales reservoir will be required for the developments located within Pressure Zone 4w and 3w of the Volcano Heights area. Developers in the Volcano Heights area will be required to pay Water Resource Charges to fund these required infrastructure improvements.

Volcano Heights Sector Development Plan (VHSDP) (Amended 2014, Repealed in 2017)

The study prepared by the City of Albuquerque provides the guidelines and zoning for the development of this area. The VHSDP was originally adopted by the City of Albuquerque's City Council and signed by the Mayor in August 2013 (Ref: File No. R-13-132 / City Enactment No. 2013-068). The plan was amended as of November 5, 2014 and was rescinded as a standalone document in 2017 per Resolution 17-213. Policies from the Sector Development Plans were incorporated into the 2017 updates of the Albuquerque/Bernalillo County Comprehensive Plan in 2017 and the Sector Plans became Appendix D. Regulations from the Sector Development Plans were incorporated into the City's Integrated Development Ordinance in 2017. The VHSDP is the plan being utilized for the infrastructure analysis, various infrastructure developments, and costs. This infrastructure report is intended to provide conceptual water, sanitary sewer, stormwater, roadway, and dry utility infrastructure plans and cost estimates for the Volcano Heights area.

The VHSDP area is largely undeveloped, except for the intersecting arterial roadways, and is surrounded by largely developed areas. All or most of the area to the north, west, and south is currently developed, and the impacts to the east for the Petroglyphs monument are required to be minimal. The land requirement for open space is intended to be satisfied by the monument open-space. Major school complexes currently existing are located along the northern border and just to the southwest of the sector. The Volcano Heights Planning Area includes the location of two main arterial roads, Unser Boulevard (N-S) and Paseo Del Norte Boulevard (E-W); both are intended to be limited-access and intersect on the site.

This Preliminary Infrastructure Needs Assessment Report is intended to accomplish the following:

1. Provide for reasonable overall development density of the 568.6 development acres to develop the water and sanitary sewer inputs and account for the deduction of the roadway Rights-of-Way (ROW) and the storm water pond areas.

2. Provide preliminary water analysis by utilizing ABCWUA-supplied methodology, with modeling for water flow system elements, including pipe sizing, lengths, and other appurtenances.

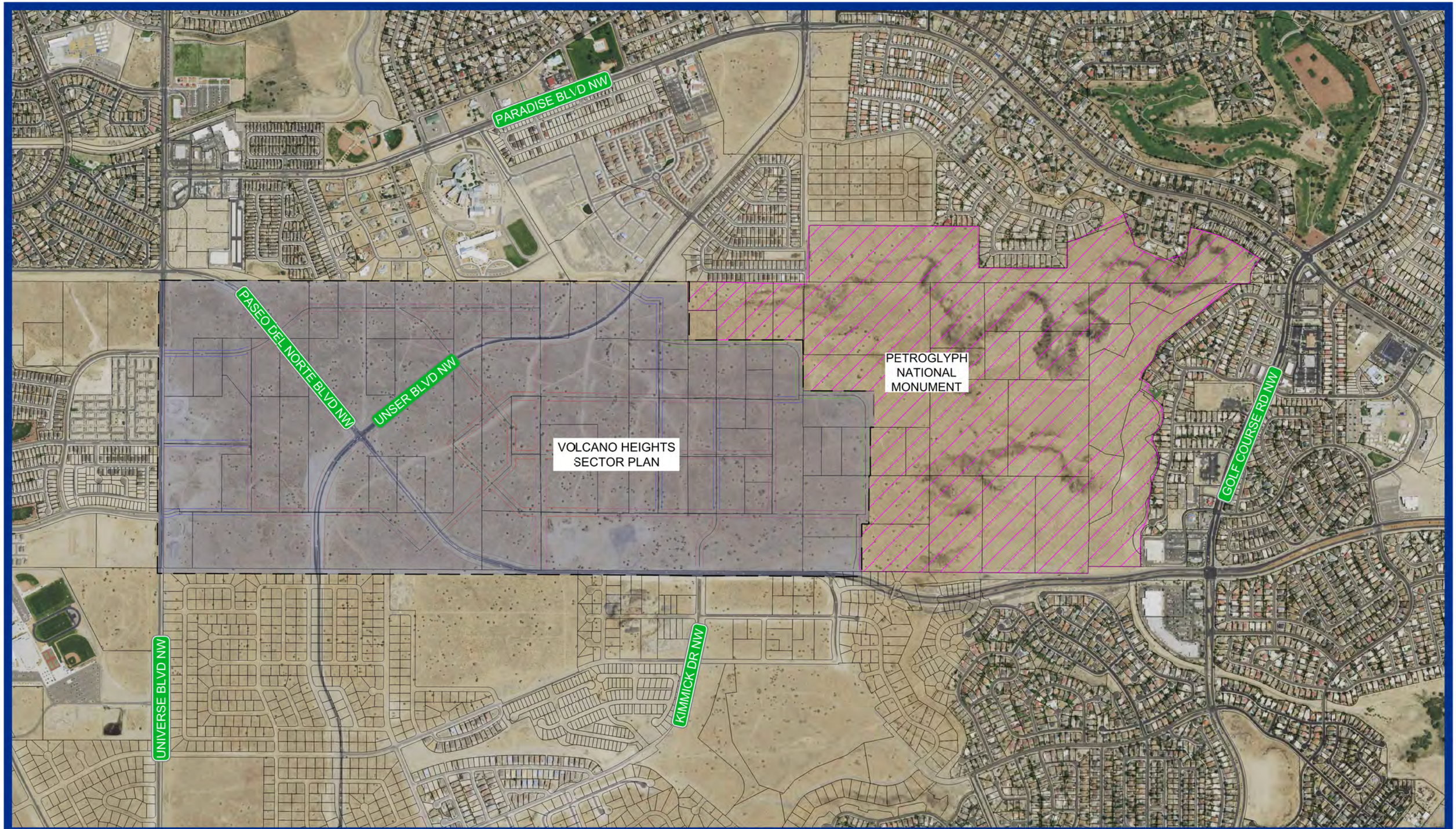
3. Provide preliminary sanitary sewer analysis, also utilizing ABCWUA-supplied methodology, by spreadsheet-developed sewer flow system elements, including pipe sizing, manholes, and other appurtenances.

4. Provide preliminary analysis, roadway layout, and street cross-sections for roadway infrastructure based on the VHSDP.

5. Summarize the Storm Drainage Plan, based upon the "**Upper Piedras Marcadas Watershed Drainage and Water Quality Management Plan" (UPMDMP)** completed by Wilson & Company for the Albuquerque Metropolitan Area Flood Control Authority (AMAFCA), dated April 2017.

6. Provide conceptual layout plans for the water, sanitary sewer, streets, storm sewer, and dry utilities alignments within the context of this Infrastructure Development Plan.

7. Provide preliminary cost estimates for the public infrastructure improvements, including for water, sanitary sewer, stormwater, and roadways within the context of this Infrastructure Development Plan.



GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
NEEDS ASSESSMENT REPORT

SECTOR PLAN LOCATION MAP
EXHIBIT I

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B. EXISTING CONDITIONS

Description of the Land

The proposed Volcano Heights Sector Development Plan area is in the "Established Urban In-Fill" area of the City. The area is vacant land with the following paved streets:

- Universe Blvd. (Compass Ave.) – Asphalt 2-lane roadway with rural roadway section, or half-street curbs along developments.
- Unser Blvd – from southern border at Avenida De Jamito to northern connection with existing Unser near Cold Creek Avenue- variable sections- 2-lane divided to 3-lanes total at Paseo Del Norte.
- Paseo del Norte –from southeastern border to northwestern border– variable sections- 4-lane divided to 3-lanes total at Unser to two-lanes divided

Except for the described paved streets, the existing sector land consists of a mesa-type vacant land, containing numerous volcanic (basaltic) rock outcroppings. The land generally slopes approximately one to two percent running from west to east, and is bordered on the east by the Petroglyph National Monument, which falls off more steeply within the monument, the drastic elevation change can more accurately be defined as an escarpment.

Extensive rock excavation, possible blasting, and significant fill are all anticipated in order to develop the infrastructure for this plan. See the "Possible Additional Development" section of the introduction for a more detailed breakdown of the anticipated requirements.

Northwest Mesa Escarpment Plan

This sector plan is within the limits of the Northwest Mesa Escarpment Plan (NWMEP). *The lots within the impact area (eastern boundary) of the NWMEP (200+/- feet from the Petroglyph National Monument boundary) have the following restrictions:*

1. No wall or fence along the monument boundary.
2. Height of buildings restricted to 15 feet.
3. Street lighting restrictions on height and required shielding.
4. Architectural restrictions to prevent glare and distractions from the escarpment.

These restrictions are repeated in the Volcano Heights Sector Plan, Amended November 5, 2014. ***(None of these restrictions affect the Infrastructure analysis, development, or costs.)***

Northwest Service Area Infrastructure Plan

The Northwest Services Area Infrastructure Plan, Integrated Infrastructure Plan, Project Task Memorandum No. 1, July 2012 (IIP), provides long-range plans for the water and sewer backbone to serve Northwest Albuquerque.The IIP does not get into the specific needs for the Volcano Heights area, but does include recommendations for major trunk lines through the area. Specifically, the IIP calls for the following:

1. 16-inch waterline along Unser Blvd.
2. 12-inch waterline along Paseo Del Norte Blvd.
3. 15-inch sewer interceptor from the existing Lift Station 380 east along Paseo Del Norte to the southeast corner of Volcano Heights.

This infrastructure was considered in the development of the infrastructure presented herein for Volcano Heights.

Since the authoring of this report, there have been advancements to the IIP, and additional infrastructure outside of the Volcano Heights zone will likely be required

Adjacent Development

The proposed sector plan improvements are adjacent to the following developments:

1. SOUTH of the Sector Plan – Existing SAD 228, Volcano Cliffs Subdivision vacant lots and Legacy Development (La Cuentista) are located along the western portion of the south side of the Sector Plan – drainage and sanitary sewer from these developments generally drain southward. A large vacant area to the south, midway of the sector boundary, is currently being operated as a rock excavation area, which may be developed in the future. Several mixed-use areas bound the sector along the southeastern border, and parallel to the south side of Paseo Del Norte Right-of-Way (ROW). Development of these areas is uncertain, as access to the roadway will be limited through this alignment.

    - Water connections from Unser Boulevard northward and along with the Universe Boulevard extension also provide possible future water system extensions for the western edge and southern edge upper-Pressure Zone (Zone 4W) water supply systems.

    - The sanitary sewer master plan lines via the Universe Boulevard extension along the western edge of the Volcano Heights Sector Area. Unser Boulevard, as extended, also provides the access and sanitary sewer infrastructure from the south. At the southeast corner of the sector, an existing 18-inch sanitary sewer in Paseo Del Norte is available for discharge of the Volcano Heights sanitary sewer system, thus running to the east, near Golf Course Road.

    - Stormwater runoff to the south of the VHSDP area and west of Unser Boulevard drains southward to the Boca Negra Dam, while the majority of the area east of Unser and south of the VHSDP area drains to the Mariposa Basin. Stormwater conveyance infrastructure to the Mariposa Basin and Boca Negra Dam are limited to downstream sections. A small basin south of the VHSDP area toward the east end of the area drains into the Piedras Marcadas Dam via a storm drain system along Paseo Del Norte and the Piedras Marcadas Channel.

2. WEST of the Sector Plan - A series of subdivisions entitled “The Trails” along the west boundary contain existing development in which infrastructure is fully developed or in the process of construction.

    - Multiple water system extensions may be made to this infrastructure to serve the 4W Pressure Zone within the Volcano Heights Area.

    - Stormwater runoff from the west is diverted south to the Boca Negra Dam via storm drain along Universe Boulevard. Storm drainage ponds, (located within the VHSDP area just east of, and parallel to, the alignment of Universe Boulevard) will provide stormwater detention for some areas within the sector, but also for several drainage areas located to the west of Universe Boulevard.

3. NORTH of the Sector Plan- Along the north boundary, there are multiple existing developed areas. These developments, named from east to west are: Commercial lots and storage facilities; the Vittoria Gated Community; Villa de Chamisa Subdivision; Chamisa Ridge Subdivision; James Monroe Middle School; The Boulder Subdivision; and Sundance Estates. The final two named subdivisions are located on opposite sides of Unser Boulevard.

    - Water system connection to the existing main line in Paradise Boulevard may be made for Pressure Zone 4W water supply through Calle Chamisa, and extension south of the existing main line in Unser Boulevard may be utilized for lower-zone water system pressures.

    - Sanitary sewer systems adjacent to the Volcano Heights boundary to the north predominantly drain to the Paradise Boulevard Interceptor. Lift Station #381 and #382 are planned to be abandoned, with the sanity sewer flows routed south through Volcano Heights. These flows will impact the system flow rate but will not be significant enough to increase any pipe sizes. These flows will be included in the sewer calculations.

    - Stormwater runoff from the north of the VHSDP area is diverted to the north via a storm drain along Unser Boulevard to the Calabacillas Arroyo. This diversion is known as the Chamisa/Lyon Storm Drain, which is routed through a detention pond before draining into the Calabacillas Arroyo. This system is discussed in detail in the UPMDMP.

4. EAST of the Sector Plan - To the east, the boundary of the **Petroglyph National Monument** abuts the Volcano Heights Sector. Development is limited above-ground in several respects within 200 feet of the monument (See the “**Northwest Mesa Escarpment Plan”** found on page 3 of this report for descriptions). No utilities, streets, or any type of development is allowed within the monument. Stormwater discharge is limited to 120 cubic feet per second (cfs) to the monument from the VHSDP area.

C. PROPOSED CONDITIONS

The infrastructure analysis, development and sizing of facilities required proceeding with a number of assumptions, primarily developing densities of the various mixed development areas, based upon the Volcano Heights Sector Plan description of acceptable uses within the number of mixed use zones.

Primarily only 1. Water Infrastructure sizing and 2. Sanitary Sewer Infrastructure sizing is dependent upon the development densities. Roadway development and dry utilities development depend upon other elements.

1. Water system infrastructure sizing is calculated utilizing the development densities and the sizing procedure is detailed in the following sections.
2. Sanitary Sewer System Infrastructure sizing is calculated utilizing the development densities, the sizing procedure is detailed in the subsequent sections
3. Stormwater infrastructure analysis presented in the UPMDMP utilized the VHSDP Zoning to calculate the land treatment types for hydrologic calculations. Alternatives identified in the UPMDMP are included in Appendix A of this report.
4. Roadway development sizing, street widths, and related infrastructure are based on the VHSDP street layout.
5. Specific dry utility improvements have not been identified in this report, as the plan is too conceptual for the dry utility companies to determine required infrastructure. In general, developers would be responsible for funding PNM infrastructure improvements in the area, while other dry utility companies are responsible for their respective improvements necessary for development. For the purposes of this report, we have included costs for PNM facilities in the detailed estimates included in Appendix B.

C-1. Development Densities and Flow Characteristics for Water & Sanitary Sewer Infrastructure

The Volcano Heights Sector Development Plan provided relatively undefined areas concerning exact definitions of development densities, choosing instead to define areas as mixed use type zones.This approach is intended to provide maximum flexibility in development but does not solidify any development densities for determining water and sanitary sewer infrastructure. This infrastructure report has been revised to incorporate the most recent design flows and peaking factors as provided by the Water Authority (As of December, 2021). See table below for the baseline flows used to develop the demands for the Volcano Heights area evaluation.

TABLE 1 - WATER/SEWER UNIT FLOW TABLE (PER ABCWUA)

Land Use Type	*2020 Revised Water MDD (GPAD)*	*Water Peak Hour Factor*	*2020 Revised Avg Day Wastewater Flow (GPAD)*	*Wastewater Peak Hour Factor*
Rural Residential	400	1.6	100	1.6
Light Residential	1400	1.6	600	1.6
Medium Residential	2900	1.4	1200	1.3
Heavy Residential	14400	1.7	5800	1.6
Light Commercial	1800	1.4	900	1.6
Heavy Commercial	3000	2.1	1500	1.6
Light Industrial	1500	1.4	750	1.3
Heavy Industrial	5000	1.1	2500	1.1
Light Institutional	1000	2.3	500	1.6
Heavy Institutional	3000	2.2	1500	1.8

As the Volcano Heights area is a mixed-use area, customized demands and peaking factors are necessary for each land use type. Working with developers and based upon institutional knowledge of the area, each Volcano Heights specific Sector Development Plan land use type was assigned a ratio based on a mix of the land use types defined in the table above. As an example, a "mixed" land use type may be assigned as 50% Medium Residential and 50% commercial, and a new base demand/acre and peaking factor for this land use type will be developed based on the peaking factors for the constituent land use types. For a breakdown of how these land use types are defined, see **Table II-W: Mixed-Use Zones – Calculated Water Demands.**

Development of Non-Residential Densities:

The total ID area has been divided into several smaller segments (called "parcels" in this report) to better describe the development areas within each land use type district presented by the sector plan. Dividing these land use type areas into parcels allows for a more granular development of demands, which can be better applied to the water model.

Approximately 61.23% of the land use in the Volcano Heights Sector Development Plan is presented as non-residential areas. The intent of this infrastructure report is to develop reasonable determinations as to the densities of development, but also provide flexibility to the eventual developers of the land so that the preliminary infrastructure may be anticipated (given the assumptions outlined in this report). All the following descriptions of non-residential areas, and the various area densities, may be viewed on **Exhibit II – Development Density-Water & Sewer**. For a summary of the acreage of each land use type, see **Table VI – Land Use Types** in the appendix of this report. The exhibit also identifies the net area of all developed areas as 441.5 Acres total (per volcano heights sector development plan Amended 2014, Repealed in 2017), and deducts the areas that are not to be included in the demand calculations, such as Roadway ROW (totaling 108.1 acres), and stormwater drainage ponds (totaling 19.0 acres), for a total estimated sector area of 568.6 acres. For a Summary of the Total Demands for the Volcano Heights area, See **Table VII – Water Demand Summary** and **Table VIII – Wastewater Demand Summary** in the appendix of this report.

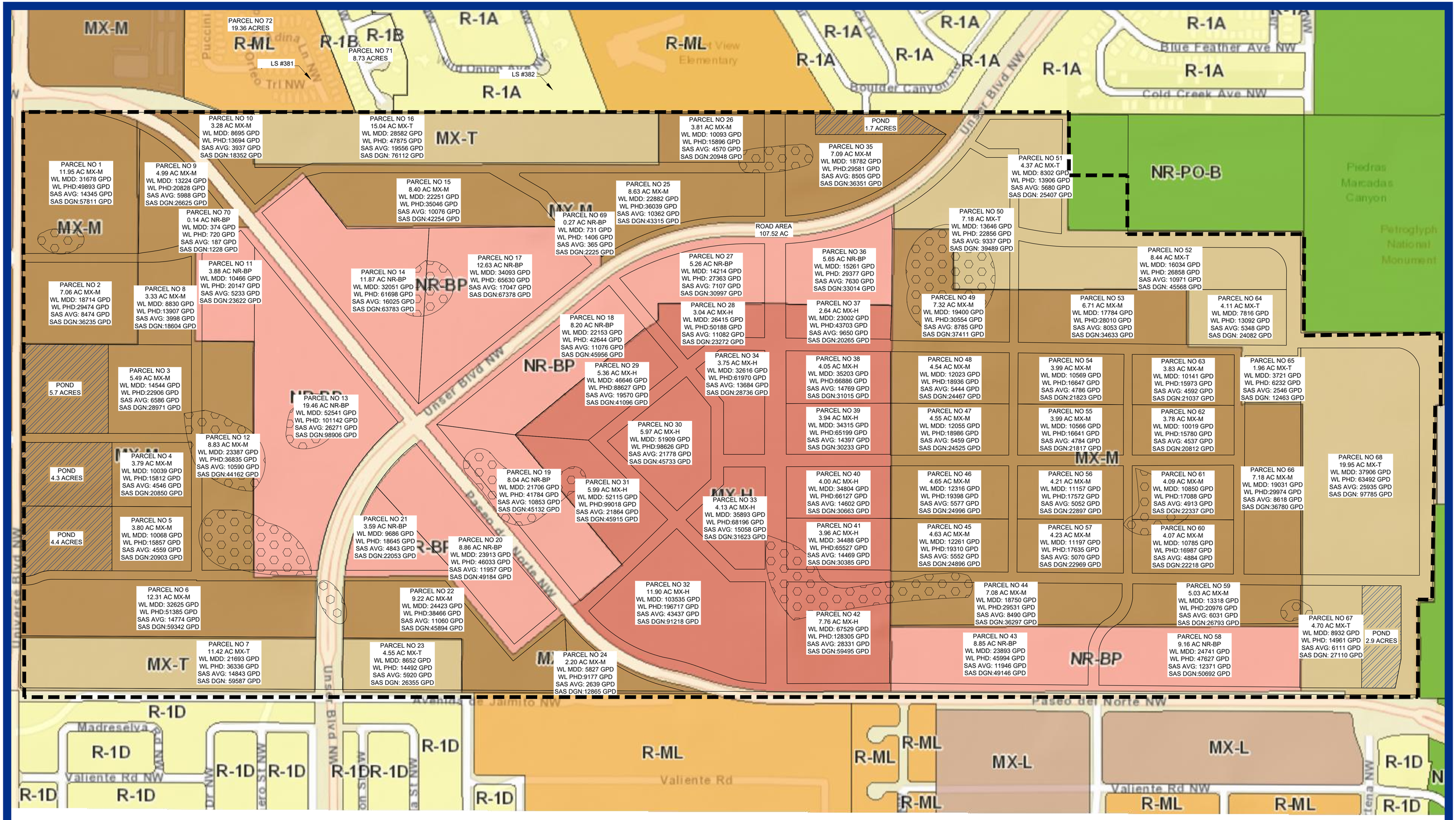
All land use types within the volcano heights are are as described below:

MX-T : The purpose of the MX-T zone district is to provide a transition between residential neighborhoods and more intense commercial areas. Primary land uses include a range of low-density residential, small-scale multi-family, office, institutional, and pedestrian-oriented commercial uses.

MX-M: The purpose of the MX-M zone district is to provide for a wide array of moderate-intensity retail, commercial, institutional and moderate-density residential uses, with taller, multi-story buildings encouraged in Centers and Corridors.

MX-H: The purpose of the MX-H zone district is to provide for large-scale destination retail and high-intensity commercial, residential, light industrial, and institutional uses, as well as high-density residential uses, particularly along Transit Corridors and in Urban Centers. The MX-H zone district is intended to allow higher-density infill development in appropriate locations.

NR-BP: The purpose of the NR-BP zone district is to accommodate a wide range of nonresidential uses in campus-like settings to buffer potential impacts on surrounding uses and adjacent areas. Allowable uses include a wide variety of office, commercial, research, light industrial, distribution, showroom, processing, and institutional uses.



LEGEND

- NR-BP
- MX-T
- MX-H
- MX-L
- MX-M
- BOUNDARY

GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)
1 inch = 250 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN INFRASTRUCTURE NEEDS ASSESSMENT REPORT

DEMAND CLASSIFICATIONS

EXHIBIT - II

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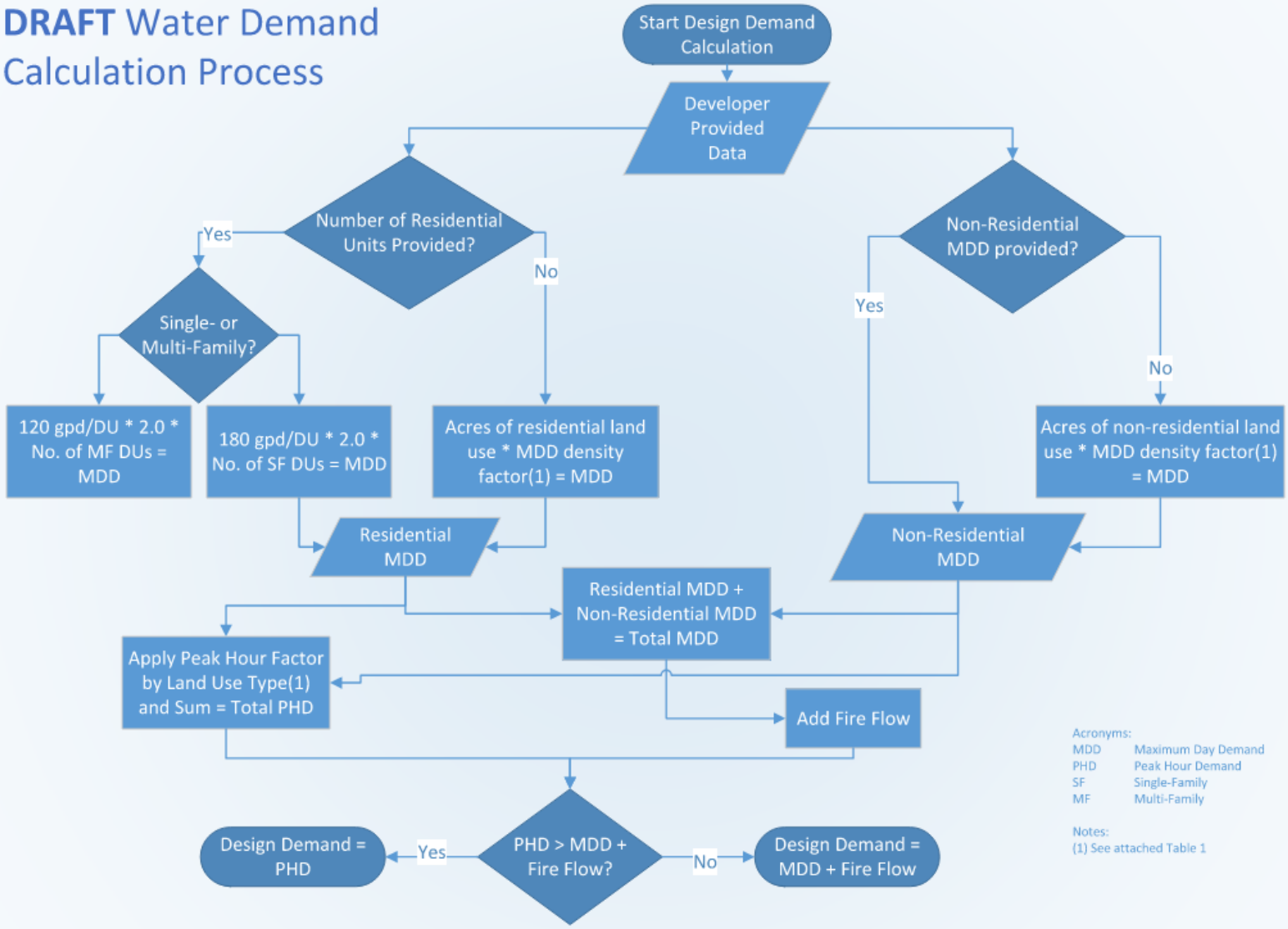
DRAFT Water Demand Calculation Process



C-2. Development of Water System Infrastructure Methodology:

Using the Water Demand Calculation process flowchart on the previous page (Current as-of December 2021) the residential and non-residential Maximum Day Demand (MDD) were both calculated using the MDD density factor for the volcano heights area. Non-Residential and Residential MDDs were summed together. Following the Water Demand Calculations process flowchart, Peak Hour Demand (PHD) and MDD plus fire flow were compared within the hydraulic model to determine the governing water demand condition. Since the MDD plus fire flow is greater than the PHD, the MDD plus fire flow is the applied demand condition for sizing the Volcano Heights area water system.

Additional development outside of the Volcano Heights area may be required, See the "Possible Additional Development" section of the introduction to this report

Using the MDD plus fire flow demand for each parcel applied to the hydraulic model at the nearest node, water system layout and water line sizing was completed to satisfy the demands. The demand at each parcel was applied to the nearest node in the water model. The water system generally follows the planned roadway alignments as provided at the start of this study from previous planning efforts.

The non-residential (i.e., commercial, institutional, and industrial) water demands as developed utilizing the densities presented in "Table I -Non-Residential Water Usage" are summarized in **Table II-W: Mixed-Use Zones Calculated Water Demands**, which assigns development densities to the various sector areas.

The residential water demands as developed utilizing the flows presented and described in the paragraphs preceding, are summarized in **Table III-W: Individual Area Water Demands**, which assigns development demand rates to the various sector areas.

Each individual parcel was matched with the corresponding zoning area, and assigned a demand based on the area of the parcel and zoning mix as described in **Table II-W** and. This is summarized in **Table III-W: Individual Area Water Demands**, which is then input into the water model and used to evaluate the pipe sizing at the MDD+Fire Flow and PHD Condition for the Volcano Heights area.

The Volcano Heights area requires water system connections to existing developments from the west, north, and south to provide sufficient system looping and redundancy. Due to the elevation differences within the volcano heights area, the volcano heights area must be separated into two separate water pressure zones. Approximately 50% to 60% of the Sector Plan Area occurs in the **Water Pressure Zone 4W**, which is defined as elevation 5485' to 5370' AMSL NGVD 27/29. The remaining 40% to 50% of the Zone lies within **Zone 3W,** Elevation 5370' to 5255' AMSL NGVD 27/29.

The Water CAD model was connected to the Existing Water Authority model, at seven inter-connection locations to the existing system. Four interconnections are located within Pressure Zone 4W at the following locations:

- 12-inch Zone 4W Connection to the north to Paradise Boulevard, achieved by connecting at the end of Calle Chamisa
- 12-inch water line Zone 4W connection from the west at the northwest corner of the sector at Paseo Del Norte Boulevard and Universe Boulevard;
- 12-inch Zone 4W connection from the west at the southwest corner of the sector at Universe Boulevard and Avenue De Jamito.

- 12-inch water line connecting at Paradise Blvd and Calle Chamisa

The delineation between **Water Pressure Zone 4W,** and the reduced **Water Pressure Zone 3W** is best aligned along the proposed "Transit Boulevard" which runs north-south approximately midway through the sector. The fifth sixth and seventh interconnections with the existing surrounding development occurs within the lower **Water Pressure Zone 3W-R and 3W.** A 12-inch water line from an existing 12-inch line in Unser Boulevard to the north, extends across the Volcano Heights Sector area to the sixth interconnection on the south side of the development area. The Zone 3W-R/3W connection points are at the following locations:

- Unser Blvd, along the North border of the sector area, connecting to an existing 12" water line (Zone 3w)
- Kimmick Dr (Zone 3W-R)
- Calle Norteña (Zone 3W-R).

The Volcano Heights system was developed by connecting the area to the existing water system at the connection points listed above within the water modelling software. The software used for the calculations was: **"Bentley WaterCAD, Connect Edition, Update 2."** Four separate scenarios were run within the model to evaluate several alternatives. The modelling has been updated to include the connection to the adjacent existing water system demand inputs were derived using table **IV-W, Appendix B, and Exhibit II.** A fire flow analysis was run to determine the maximum fire flows available within the modelling area, results for this fire flow test can be viewed at selected locations in the model(s) within **Exhibit III (A, B, and C)**. Minimum Fire Flows of 1500 GPM for residential areas, and 3000 GPM for heavy commercial areas are the desired thresholds for an alternative to be considered viable. Note that fire flows numbers are for **evaluation purposes only, each development will require a detailed fire analysis and fire-one plan to demonstrate that the infrastructure can meet the specific demand and fire flow needs**. All fire flows are evaluated with the reservoirs at 50% full. The system interconnects to the north and the west of the Volcano Heights area can be connected to current infrastructure; Connections to the east and south are fed from the PRV at the top of zone 3W-R.

The IIP was compared with the hydraulic system model provided by the Albuquerque Bernalillo County Water Utility Authority and the Volcano Heights infrastructure presented in this report. The IIP calls for a 16-inch waterline to be constructed along Unser Blvd. across the entirety of the Volcano Heights Zone and connect to future infrastructure in Zone 3W and 4W south of Volcano Heights. Based upon the internal Volcano Heights demands, a 16-inch waterline is not needed in this area. However, to provide sufficient infrastructure to the Westside as a whole, the Volcano Heights Infrastructure plans requires a 16-inch Waterline that connects to the existing water system at Unser Blvd. north of the Volcano Heights area and crosses along Transit Blvd to be closest to the 3W/4W zone boundary. The 16-inch waterline is then run west and connected to infrastructure in Unser Blvd between Zones 4W and 3W/3W-R. This alternate route was developed to minimize additional piping (any lines upgraded to 16" would require a parallel line for the adjacent lots to tap off since it is not allowable to tap on a transmission line) and meet the needs of the IIP simultaneously.

Three alternates were developed for the water system layout to better understand the needs of the area. See below for a summary of each layout, and a discussion on the pros and cons of each option

Waterline Alternates:

Alternative 1:

This alternative consists of installing ~12 miles of water line (of varying size), with a zone break between Pressure Zones 3W and 4W located near Kimmick St. See **Exhibit III-A** for layout and modeling results. This zone break is close to the ideal zone break elevation at 5370 ft. In order to promote better flows, this alternate includes a PRV at the zone break to provide additional flow paths from Zone 4W to Zone 3W, so Zone 3W is not completely relying on cross trunk flows for the sole source of water supply. Due to the Petroglyphs, only two interconnections to the existing system are available at this location at full build out. Currently, only one interconnection beyond the PRV is available.

Pros:

- Provides zone break at ideal location
- Interconnections provide fire flows well in excess of the minimum flow requirements (MDD+Fire Flow demands)
- Pressure requirements are met at all locations in the system

Cons:

- Additional PRV requires maintenance
- Additional PRV requires more installation cost

Alternative 2:

This alternate is the same as Alternate 1, with an additional PRV to provide more flow. See **Exhibit III-B** for layout and modeling results. This alternate provides additional flow from Pressure Zone 4w, and better interconnectivity. As the flows in Alternate 1 were already in excess of the requirements (MDD+Fire Flow demands), and the area to the east of the Pressure Zone boundary is majority low density development, this alternate is likely excessive for the needs of this area and is not recommended.

Pros:

- Provides Pressure Zone break at ideal location
- Interconnections provide fire flows well in excess of the minimum flow requirements (MDD+Fire Flow demands), this is the best alternate for fire flows
- Pressure requirements are met at all locations in the system

Cons:

- Additional PRVs requires maintenance
- Additional PRVs requires more installation cost
- This is the most expensive alternate

Alternative 3:

Note: this is a legacy alternative and is no longer recommended for consideration.

This alternative moves the Pressure Zone break to better match the existing road infrastructure and install the Pressure Zone break along Paseo Del Norte and Unser Blvd. See **Exhibit III-C** for layout and modeling results. Due to the elevations along these roads, this was found to not be an ideal location for a Pressure Zone break. This alternate includes no PRVs. Due to the location of the Pressure Zone break, low fire flows are observed throughout Pressure Zone 3w, and pressures below the minimum pressure requirements. Moving the Pressure Zone break westward also moves high demand users from Pressure Zone 4w to Pressure Zone 3w, further reducing pressure in this zone. This alternate is not recommended.

Pros:

- Provides Pressure Zone break at easy to access location along main road
- No PRV installation
- No PRV maintenance

Cons:

- Fire flows are inadequate
- Pressure is inadequate
- No cross feeding from Pressure Zone 4w, limited to pulling from adjacent trunks
- Moves high demand users to a lower pressure Pressure Zone

Alternative 4:

This alternate is the same layout as Alternate I and II but does not include any PRVs. See **Exhibit III-D** for layout and modeling results. This alternate provides generally adequate fire flows and pressures at full build out, with marginally low pressures at the southwest corner of the Pressure Zone once the area to the south is developed (near Parcel 41). Without this development, there is insufficient pressure in this area, and this alternate is not recommended. Due to the lacking infrastructure to the south, it is recommended that this be installed only if the Pressure Zone to the south can be interconnected. Alternatively, this alternate can be used in the future, and the PRV from Alternate 1 decommissioned to help with operational simplicity.

Pros:

- Provides Pressure Zone break at ideal location
- Interconnections provide fire flows in excess of the minimum flow requirements (MDD+Fire Flow demands)
- No PRV Maintenance
- No PRV Operations

Cons:

- No interconnections from Pressure Zone 4w
- Marginal pressures in southwest corner of Pressure Zone
- Requires development to south to complete prior to viability

Alternative Recommendations:

It is the opinion of the engineer that Alternate I and Alternate IV are both viable alternates for this area.

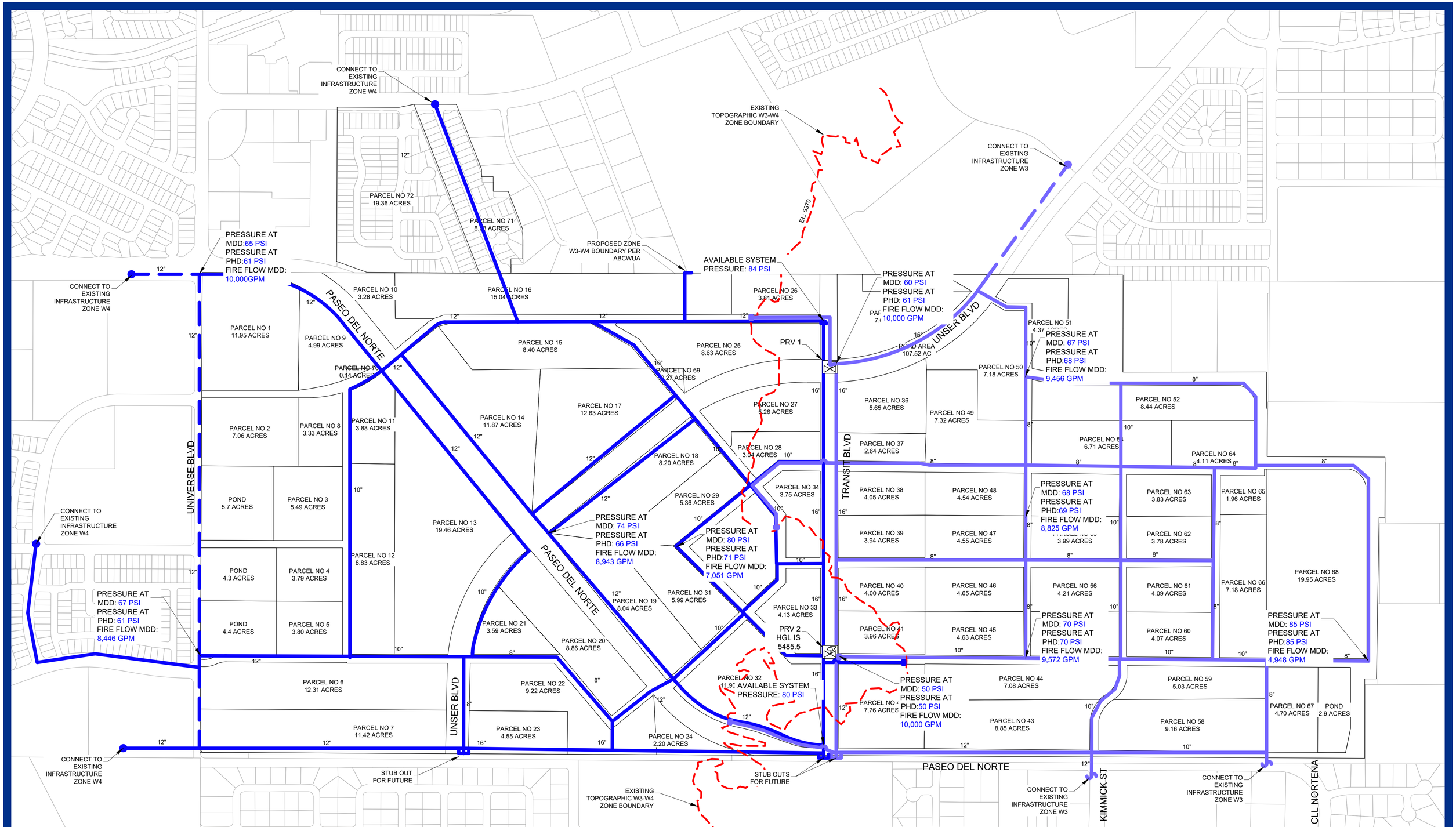
Alternate I provides the most Pressure Zone interconnectivity, without providing excessive infrastructure for the Volcano Heights area. Additionally, this alternative is not reliant on the development of the area immediately to the south of the Volcano Heights area.

If more operational simplicity is desired Alternate IV will provide lower performance to Alternate I, while still meeting the minimum pressures and fire flows for the area. This alternate lacks the ability to feed water from the upper zone 4W for redundancy and improved pressure/fire flow but makes up for this with operational simplicity.

See below **Table VII** for a full summary of the flows within the area:

Table VII - Water Demand Sumary

ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	**Total Estimated Acres**	***Max Day Demand Equation**	**Total Max Day Demand (MGD)**
HVY-RES			
HVY-COMM	70.49	8700	0.613263
LT-COMM			
HVY-COMM	124.92	2700	0.337284
LT-COMM			
HVY-COMM			
MED-RES	178.84	2650	0.473926
LT-RES			
HVY-COMM			
LT-COMM	79.76	1900	0.151544
TOTAL ACRES	454.01	**TOTAL DEMAND**	1.576017



LEGEND:

- PRESSURE ZONE 4W
- PRESSURE ZONE 3W
- PRESSURE ZONE 4W EXISTING
- PRESSURE ZONE 3W EXISTING
- PRESSURE REDUCING VALVE

NOTE:
SYSTEM PRESSURES ARE STATIC PRESSURES WITH NO LOADING TO BETTER DEMONSTRATE PRESSURE ZONE LOCATIONS.
ALL FIRE FLOWS ARE APPLIED ON 6" HYDRANT LEGS AT PEAK ZONE DEMANDS WITH 20 PSI RESIDUAL.

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

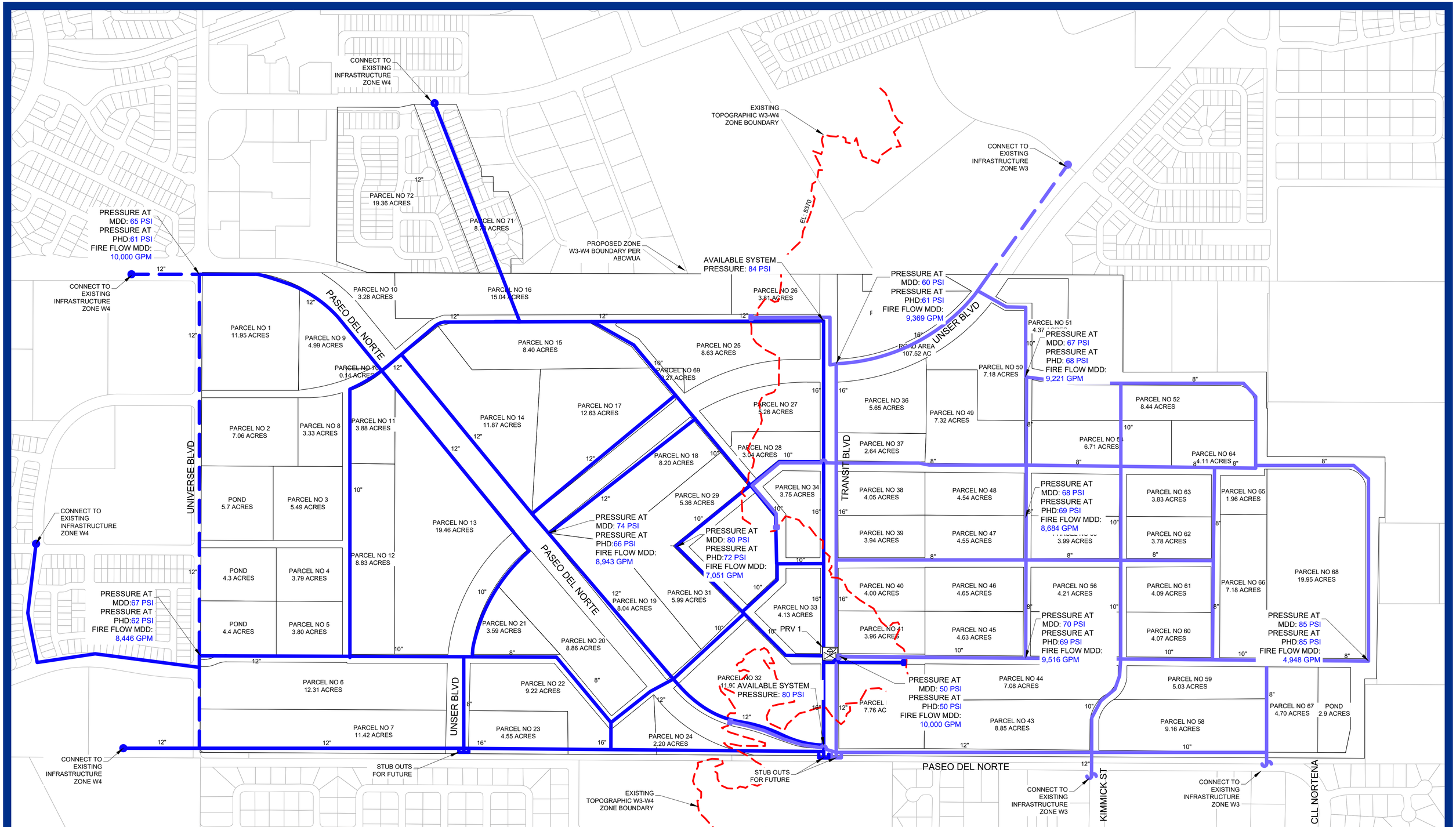
N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
INFRASTRUCTURE NEEDS ASSESSMENT REPORT

WATER LINE ALTERNATIVE 2
EXHIBIT - III B

CITY OF ALBUQUERQUE NEW MEXICO 1706

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
FAX: 505-348-4055 FIRST FLOOR
FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com



LEGEND:

- PRESSURE ZONE 4W
- PRESSURE ZONE 3W
- PRESSURE ZONE 4W EXISTING
- PRESSURE ZONE 3W EXISTING
- PRESSURE REDUCING VALVE

NOTE:
SYSTEM PRESSURES ARE STATIC PRESSURES WITH NO LOADING TO BETTER DEMONSTRATE PRESSURE ZONE LOCATIONS.
ALL FIRE FLOWS ARE APPLIED ON 6" HYDRANT LEGS AT PEAK ZONE DEMANDS WITH 20 PSI RESIDUAL.

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
INFRASTRUCTURE NEEDS ASSESSMENT REPORT

WATER LINE ALTERNATIVE 1
EXHIBIT - IIIA

WILSON & COMPANY
4900 LANG AVE. NE
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PHONE: 505-348-4000
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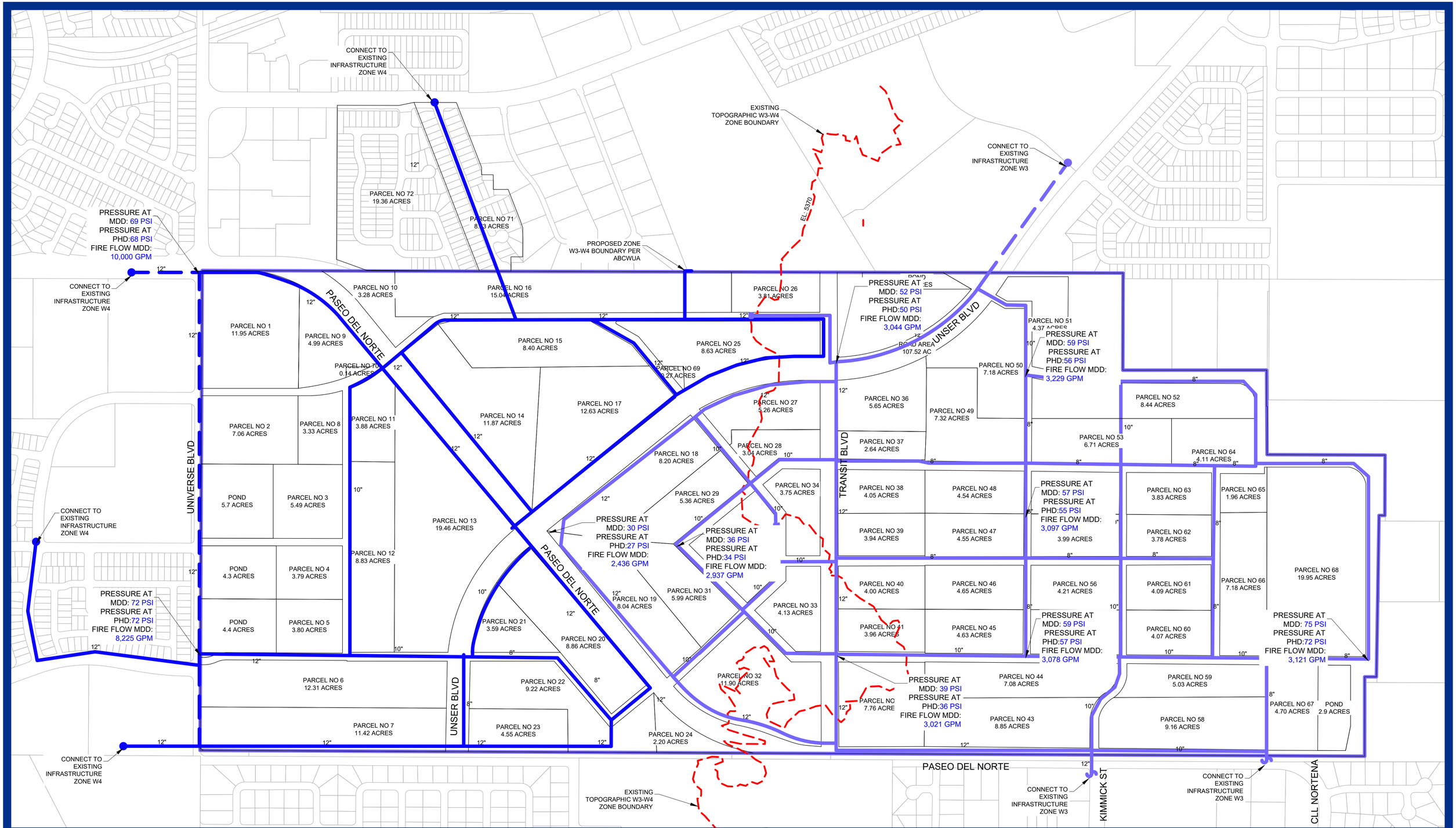
FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com



LEGEND:

- PRESSURE ZONE 4W
- PRESSURE ZONE 3W
- PRESSURE ZONE 4W EXISTING
- PRESSURE ZONE 3W EXISTING
- PRESSURE REDUCING VALVE

NOTE:
SYSTEM PRESSURES ARE STATIC PRESSURES WITH NO LOADING TO BETTER DEMONSTRATE PRESSURE ZONE LOCATIONS.
ALL FIRE FLOWS ARE APPLIED ON 6" HYDRANT LEGS AT PEAK ZONE DEMANDS WITH 20 PSI RESIDUAL.

GRAPHIC SCALE
300 0 150 300 600 1200
(IN FEET)
1 inch = 300 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN INFRASTRUCTURE NEEDS ASSESSMENT REPORT

WATER LINE ALTERNATIVE 3

EXHIBIT - III-C

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FAX: 505-348-4155 SECOND FLOOR
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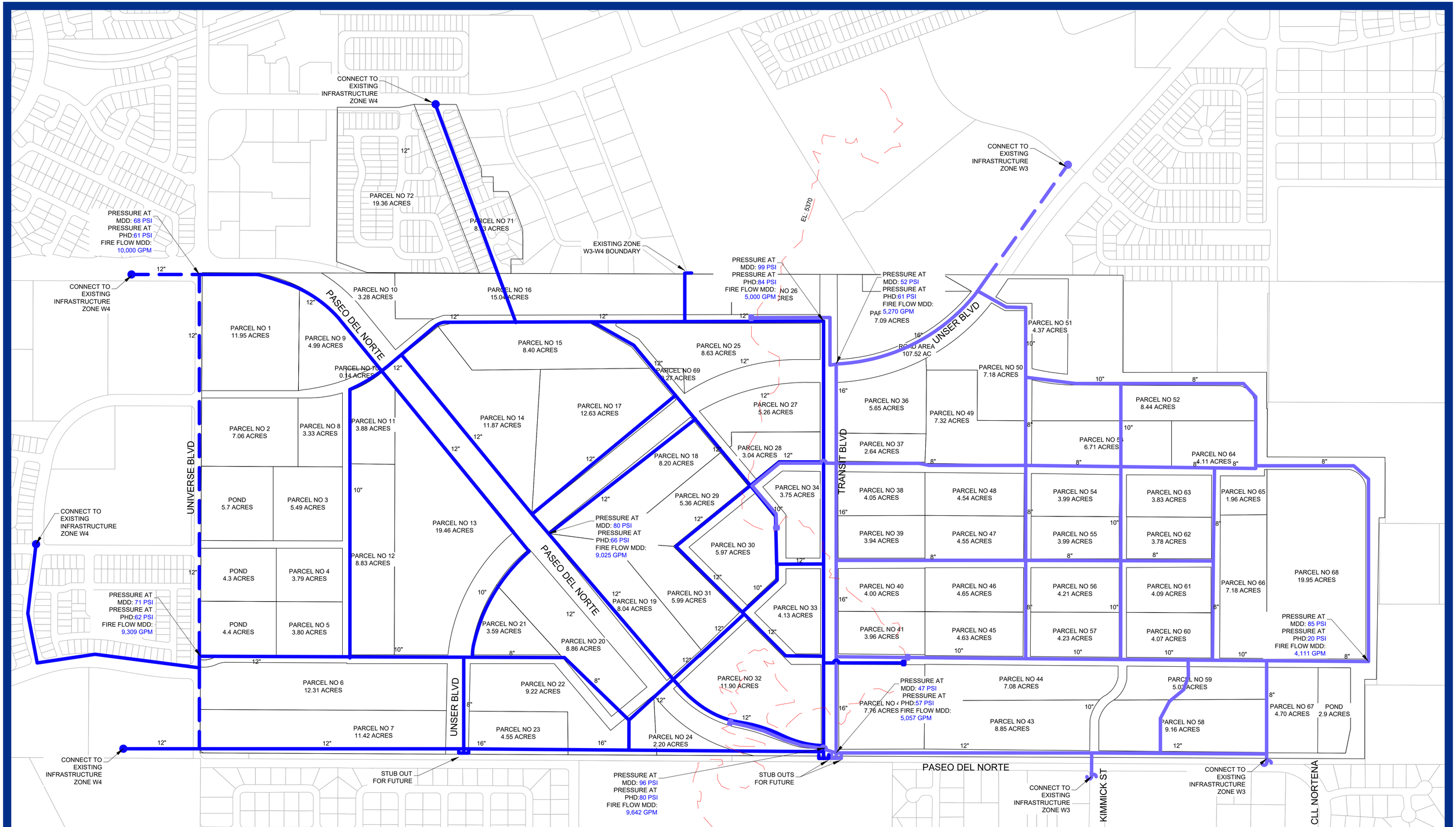

LEGEND:

- PRESSURE ZONE 4W
- PRESSURE ZONE 3W
- PRESSURE ZONE 4W EXISTING
- PRESSURE ZONE 3W EXISTING
- PRESSURE REDUCING VALVE

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
INFRASTRUCTURE NEEDS ASSESSMENT REPORT
WATER LINE ALTERNATIVE 4
EXHIBIT - III-D

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FAX: 505-348-4155 SECOND FLOOR
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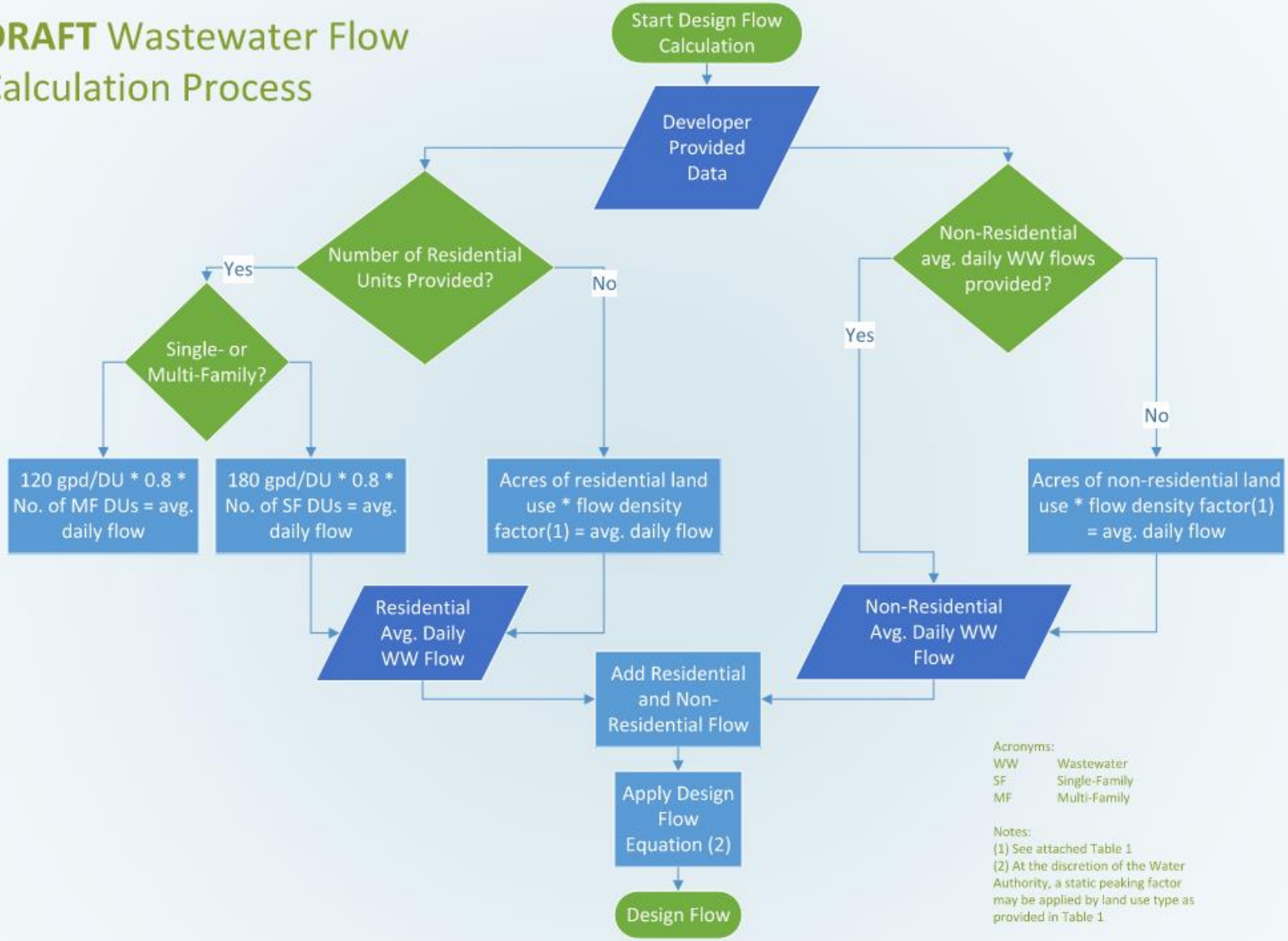
DRAFT Wastewater Flow Calculation Process



C-3. Development of Sanitary Sewer System Infrastructure Methodology:

Using the Wastewater Fow Calculation process flowchart on the previous page (Current as-of December 2021) the residential and non-residential average daily flow were both calculated using the density factors developed in **Table III-S** for the volcano heights area. Non-Residential and Residential sewer flows were added to the sewer line on a tabular basis (see **Table IV-S**). the Peak Flow Design Equation (below) and 1.2x Design Factor (Provided by the Water Authority December 2021) are applied at analysis points where sewer branches merge.

$$Peak\ Flow\ (MGD) = 2.5 * Average\ Flow\ (MGD)^{0.8875}$$

The businesses and residents in the area will be serviced by sanitary sewer lines installed in the nearest roadway where possible, with easements provided as necessary where conditions or slopes do not allow for routing along the roadways. As previously described in the "Adjacent Development" Subsection of "B. Existing Conditions", sanitary sewers for the existing developed areas to the north, south, and west have been routed to avoid or bypass the Volcano Heights Sector, except for a portion of the southern area to the southeast, which has been connected to the existing 18-inch sanitary sewer located in the Paseo Del Norte Boulevard ROW, and which then connects with a 33-inch sanitary sewer interceptor located near the intersection of Paseo Del Norte Boulevard and Golf Course Road. This existing 18-inch sanitary sewer will handle the entire output of the Volcano Heights area, as there are no other logical outlets for splitting the flow. The IIP proposes a 15-inch interceptor extension along the southern boundary of Volcano Heights to the intersection of Universe Blvd. and Ave. De Jaimito where Lift Station 380 is presently located. The Sewer routing divides Volcano Heights area into 3 sewer branches generally described as follows:

1. Branch A – Area west of Paseo Del Norte
2. Branch B – Bound on the west by Paseo Del Norte, and on the east by the extension of Kimmick Street.
3. Branch C – bound on the west by the extension of Kimick Street, and on the East by the Volcano Heights area boundary.

All three branches flow to the east and south, tying into the 15-inch proposed Paseo Interceptor. See **Exhibit IV – Sanitary Sewer System Layout**.

The residential and non-residential (i.e., commercial, institutional, and industrial) sanitary sewer demands were developed utilizing the densities presented in **Table III-S -Mixed-Use Zones – Calculated Sewer Demands.** These demands were then assigned to the various sector areas which are used to calculate the sewer flows in the following sections of this report.

Each individual parcel is paired with a flow demand (in GPD/AC), which is used to calculate the lot demand in GPD. This is summarized in **Table IV-S: Individual Area Sewer Demands**, and **Exhibit II,** which is then utilized to determine sizing of the sanitary sewer system elements.

Currently, the Volcano Heights area has no sewer lines within its borders. Due to the fact that there are no sewer lines crossing through this border and the neighboring areas are already serviced by existing sewer lines, the sewer lines proposed in this report are designed only considering the capacity needs for the Volcano Heights area itself, and do not consider the needs of the surrounding area, with the exceptions being the flows incoming from LS 382 & 381 (applied as peak flows in analysis @ 15.5 GPM & 28.7 GPM, respectively), which will be re-routed into the Volcano Heights system to eliminate these lift stations.

For the Volcano Heights Sector Development Plan, the sanitary sewer system network is limited to considering only internal development for sewer flow capacity, all sewer flows for the surrounding area are already captured by the existing sewer system. The sanitary sewer system sizing is guided by the individual sewer system elements, the individual contributing areas, and the available local ground slopes. The planning/design team developed a sanitary system contributory area spreadsheet to assist in (1) minimizing the average depth of sewer lines (i.e., minimize rock excavation), minimize sizes of sewer lines, and provide a coverage of all expected development areas. The spreadsheet is detailed as **Table V-S: Sewer System Sizing Elements**, was used to calculate the size of each individual branch in the volcano heights area. All flows are added at each individual lot, peaking factor and design factor are added at the bottom of each sewer branch. The spreadsheet selected sanitary sewer alignments, sizes, and layout are provided on **Exhibit IV- Sanitary Sewer System Layout.** For a Summary of All SAS flows within the Volcano Heights area, see **Table IX – Peak Wastewater Flow by Sewer Branch** to see total flows for each branch and basin of the sewer. See **Table VII** below for a summary of wastewater flows

`

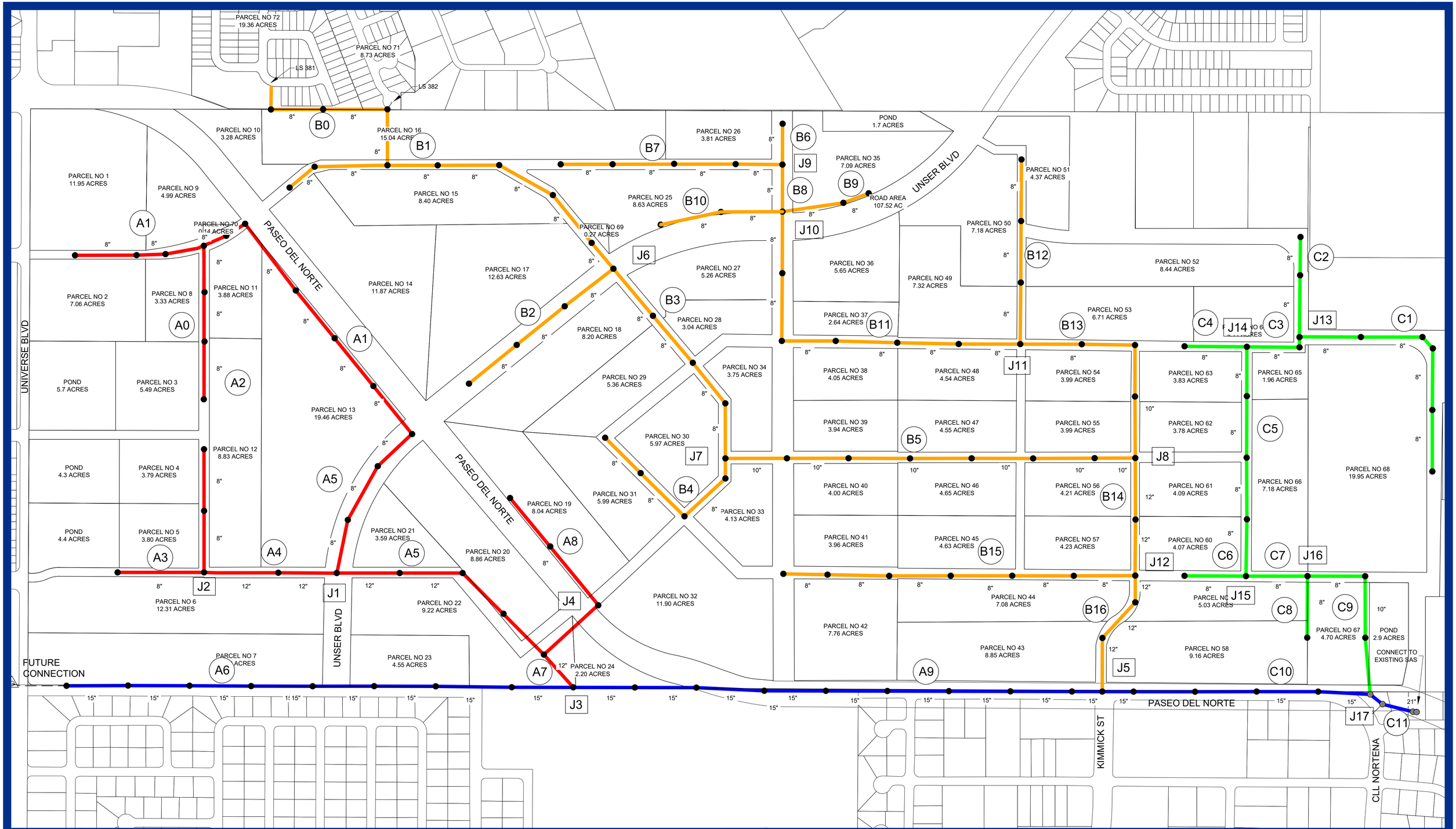
Table VIII - Wastewater Demand Summary

ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	Total Estimated Acres	Avg Day (GPAD)	Avg Day (MG)
HVY-RES			
HVY-COMM	70.49	3650	0.257289
LT-COMM			
HVY-COMM	124.92	1350	0.168642
LT-COMM			
HVY-COMM			
MED-RES	178.84	1200	0.214608
LT-RES			
HVY-COMM			
LT-COMM	79.76	1300	0.103688
TOTAL	454.01		0.744227

C-4. Development of Stormwater System Infrastructure

Stormwater infrastructure for the VHSDP area has been evaluated as part of the UPMDMP, completed for AMAFCA by Wilson & Company dated April, 2107. The objective of the UPMDMP was to:

- Address Limited Downstream Capacity
- Optimize Diversions to Adjacent Watersheds
- Propose Storm Drain, Detention, and Water Quality Features
- Develop Funding/Reimbursement Mechanism
- Assess Piedras Marcadas Dam with Gate Removed



LEGEND:

- BRANCH A
- BRANCH B
- BRANCH C
- FUTURE PASEO INTERCEPTOR ALIGNMENT PER CDMSITH REPORT
- FUTURE PASEO INTERCEPTOR PER RECENT CDMSITH REPORT
- J1 JUNCTION NO.
- A1 SEGMENT NO.
- NEW MH
- EXISTING MH

GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)

1 inch = 250 ft.

N

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN INFRASTRUCTURE NEEDS ASSESSMENT REPORT

SANITARY SEWER SYSTEM LAYOUT

EXHIBIT - IV

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4900 LANG AVE. NE
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FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com

Three alternatives were evaluated with the Piedras Marcadas Dam intake structure gate closed and one alternative with the gate removed. Addressing limited downstream capacity, optimizing diversions, and water quality features were the primary goals in developing the alternatives. All three gated alternatives included diversions to the Calabacillas and Boca Negra watersheds, while alternatives one and two also included a diversion to the Mariposa watershed. The 4th alternative utilized alternative three as a base model since it resulted in the highest peak flow and volume discharge to the Piedras Marcadas Dam. The alternatives are presented in Appendix A, including cost estimates for each alternative.

Stormwater within the watershed will be conveyed to regional ponds through public storm drain systems. Debris can be removed from the stormwater through the use of water quality manholes, water quality inlets, ported risers, and filter/fence screens. Larger scale screens, grates, and traps can be constructed within regional ponds or channels to help reduce "floatable" pollutant loads.

Each alternative included various ponds and storm systems. The results of the analyses showed that calculated runoff volume to the Piedras Marcadas Dam for all three alternatives, assuming the gate remains closed, is over the allowable storage for the fully developed conditions. The Dam has a gated principal spillway with capacity of 307 ac-feet without freeboard and 280 ac-feet with one foot of freeboard. Based on the findings of this study the dam can accommodate 81 ac-feet from the Upper Piedras Marcadas with the gate closed.

If the gate remains closed we have identified two options for AMAFCA to ensure the dam is operating as intended during the low frequency events. Option one is to increase the storage capacity by one of two ways:

1. Excavating additional capacity in the Dam pool area
2. Providing retention ponds in the upper watershed

Both of these options would need to capture the additional volume of runoff generated by the preferred alternative for diversions out of the watershed. Option two is to restrict runoff from future developments draining into the dam by required low impact development practices to meet the reduced volume required per the preferred alternative.

If the Piedras Marcadas Dam principle spillway gate is removed and the Dam can free discharge per the principle spillway rating curve, it can accommodate the runoff peak flow and volume from each of the Upper Piedras Marcadas Watershed alternatives.

C-5. Development of Roadway Infrastructure

As part of the VHSDP, primary streets were identified throughout the area and were designated Type "A" or "B". Type "A" streets are pedestrian oriented while Type "B: streets are auto oriented. For example, Unser Boulevard and Paseo Del Norte are Type "B" streets, which are designed primarily for vehicles to travel quickly through the area, while Transit Boulevard will be a Type "A" street to create a pedestrian friendly character zone. Typical sections were developed for each primary street in the VHSDP and utilized for estimating costs as part of this report. Standard City of Albuquerque pavement sections were used for collector roads, while recent designs for Unser Boulevard and Paseo Del Norte were utilized for arterial pavement sections.

A Traffic Forecast and Circulation Assessment was completed as part of the VHSDP. With 2035 traffic forecast of about 60,000 trips per day, Paseo Del Norte will be the busiest and most travelled roadway in the area. The intersection of Paseo Del Norte and Unser Boulevard is currently signalized and is designated to be a grade separated intersection at full build-out, while the intersection of Transit Boulevard and Paseo Del Norte is designated as a High-T intersection in the future. For the purposes of estimating costs, these intersections are treated as standard at grade intersections. The VHSDP designates the following Signalized Full Access intersections:

1. Paseo Del Norte and Unser Boulevard (currently signalized)
2. Paseo Del Norte and Universe Boulevard (currently signalized)
3. Paseo Del Norte and Kimmick Road (currently partially signalized)
4. Paseo Del Norte and Loop Road (future signals at 2 locations)
5. Paseo Del Norte and Transit Boulevard (future signal)
6. Unser Boulevard and Transit Boulevard (future signal)

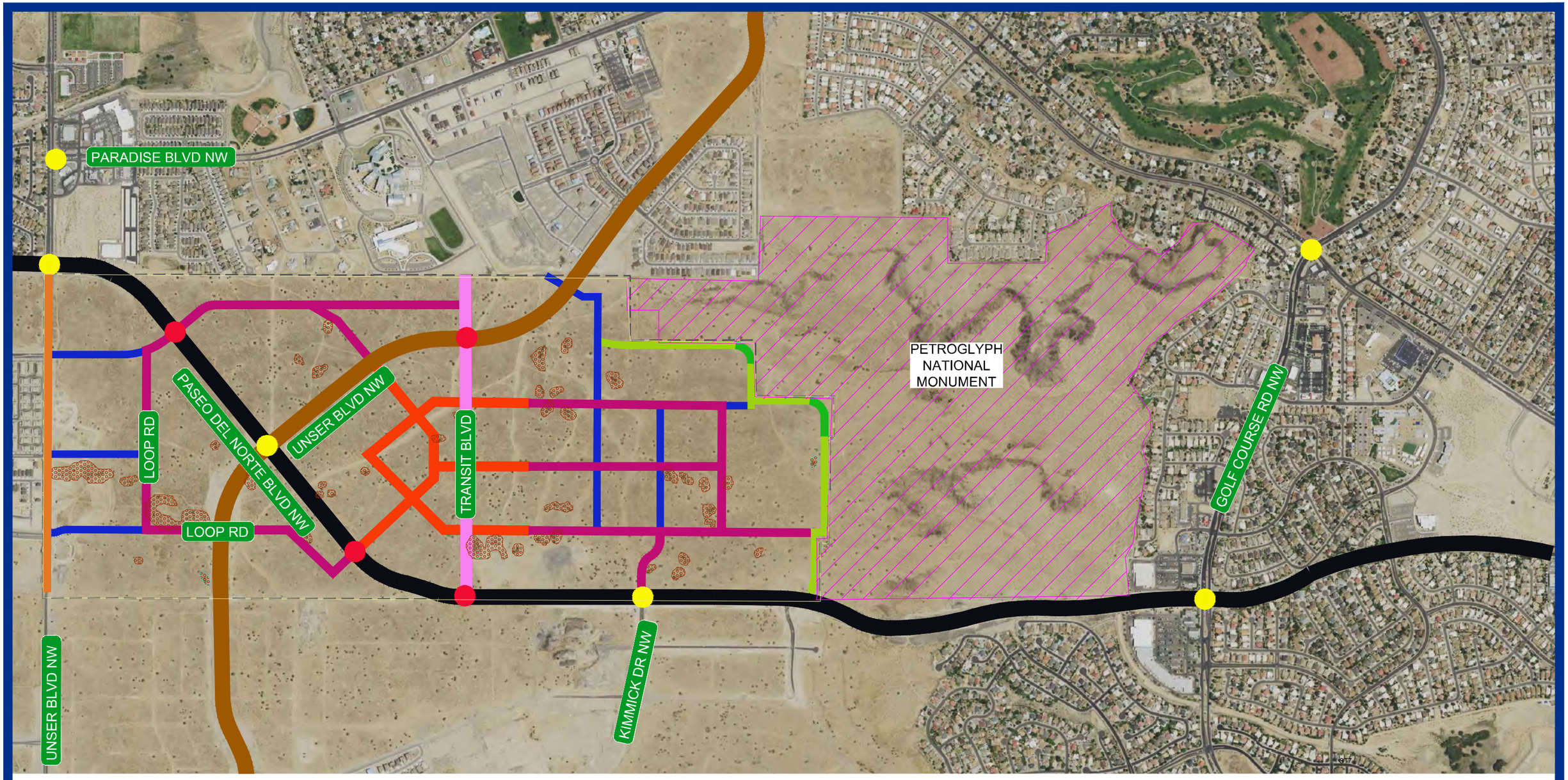
The primary purpose of this needs assessment is to provide conceptual costs for development of the primary streets in the VHSDP area. The paving improvements will include curb and gutter, asphalt paving, drainage infrastructure, sidewalk, wheel chair ramps, streetlights, and traffic signals per the City's DPM standards. Cost estimates also include design/engineering, inspection, testing, dry utility costs, and landscaping. Even though costs were prepared as part of the UPMDMP, drainage infrastructure was included in the roadway cost to cover local storm drain inlets, manholes, and small-scale storm drain pipes. Costs for Paseo Del Norte, Unser Boulevard, and Universe Boulevard are based on expanding upon the existing roadway sections, so the cost is not for a full roadway section. The Primary Street layout is shown on Exhibit V, while the typical roadway sections are shown on Exhibit VI.

The City of Albuquerque's (City's) Department of Municipal Development has started a project to widen Paseo del Norte from two lanes to four lanes from Rainbow Boulevard to Calle Norteña. The City's project number is 7050.06 and as of August 2021 approximately $17.8 million of City and state funding has been programmed for project development including design, right-of-way acquisition, and construction. The project will include the design and construction of four high capacity traffic lanes, supporting turn lanes, traffic signals, lighting, sidewalks, and drainage facilities. The Paseo del Norte roadway widening improvements are being designed to support future transit service. Water and sanitary sewer facilities are not expected to be included in the project, although a corridor for future development may be accommodated within the roadway right-of-way. Phased construction is anticipated since the expected cost exceeds currently programmed funding.

Similarly, in 2020 the City started a project to widen Unser Boulevard from two lanes to four lanes from Kimmick Drive to Paradise Boulevard. The City's project number is 7050.07 and as of August 2021, approximately $13.3 million of City, state, and federal funds have been programmed for project development including the design, right-of-way acquisition, and construction of roadway and stormwater improvements. The project includes the design and construction of four high-capacity traffic lanes, supporting turn lanes, traffic signals, a median, on-street bike lanes, sidewalks, lighting, drainage facilities, and an off-road, paved, multiuse trail. The Unser roadway widening improvements are being designed to support future transit service. Water and sanitary sewer facilities are not expected to be included in the project, although a corridor for future development may be accommodated within the roadway right-of-way. Phased construction is anticipated since the expected cost exceeds currently programmed funding.

C-6. Development of Dry Utilities Infrastructure

Specific dry utility improvements have not been identified in this report, as the plan is too conceptual for the dry utility companies to determine required infrastructure. In general, developers would be responsible for funding PNM infrastructure improvements in the area, while other dry utility companies are responsible for their respective improvements necessary for development. For the purposes of this report, we have included costs for PNM facilities in the detailed estimates included in Appendix B.



LEGEND

- ST1 - TOWN CENTER STREET
- ST2 - CONNECTOR STREET
- ST3 - NEIGHBORHOOD STREET
- ST4.1 - PARK EDGE STREET (ONE SIDE)
- ST4.2 - PARK EDGE STREET (TWO SIDES)
- ST5 - TRANSIT BLVD
- ST6 - UNSER BLVD
- ST7 - PASEO DEL NORTE BLVD
- ST8 - UNIVERSE BLVD

- VHSDP BOUNDARY
- ROCK OUTCROPPINGS
- FUTURE SIGNALIZATION FULL ACCESS INTERSECTION
- EXISTING SIGNALIZATION FULL ACCESS INTERSECTION

GRAPHIC SCALE

500 0 250 500 1000 2000

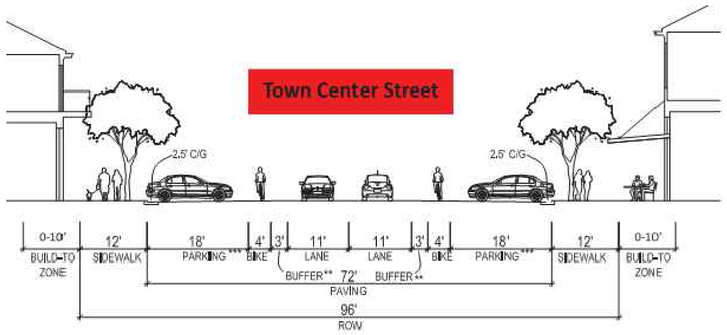
(IN FEET)
1 inch = 500 ft.

N

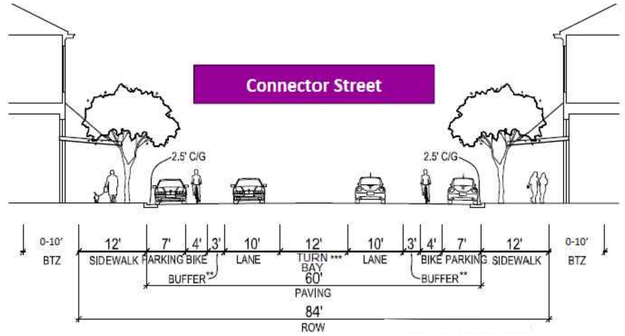
VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
NEEDS ASSESSMENT REPORT

ROADWAY PLAN
EXHIBIT V

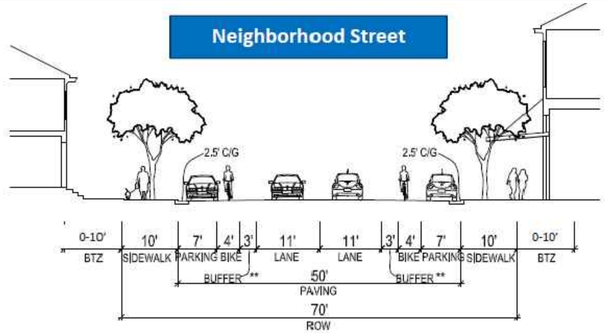
WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
www.wilsonco.com



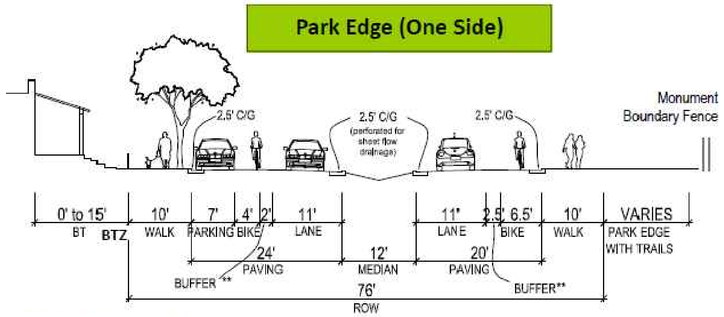
Street Type 1



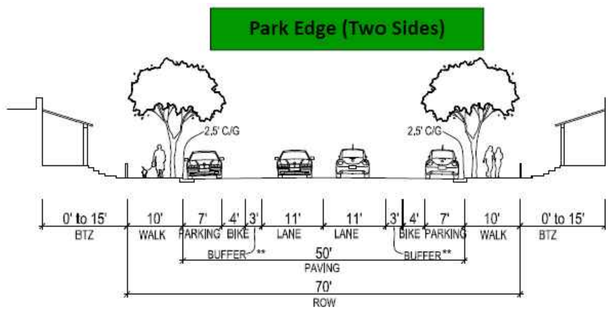
Street Type 2



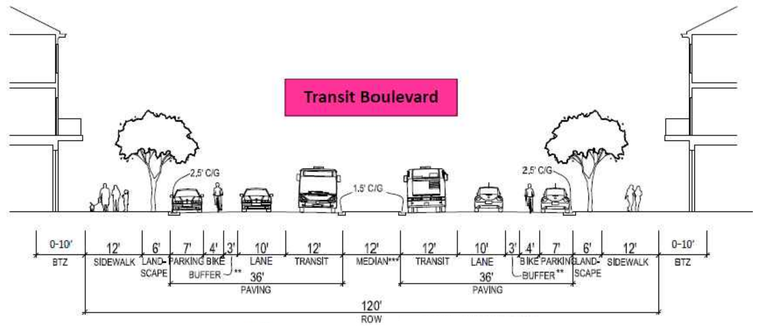
Street Type 3



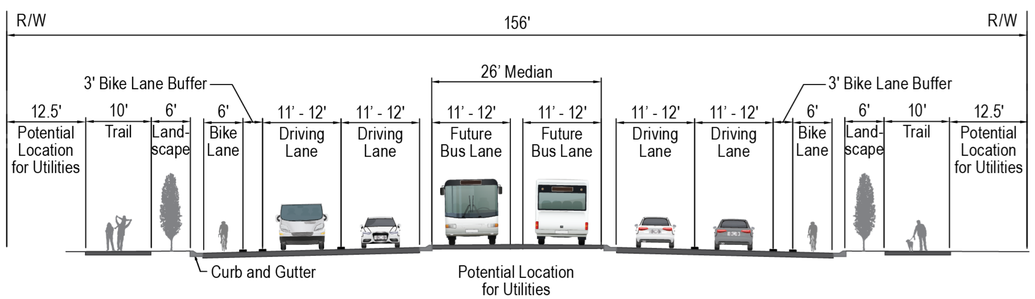
Street Type 4.1



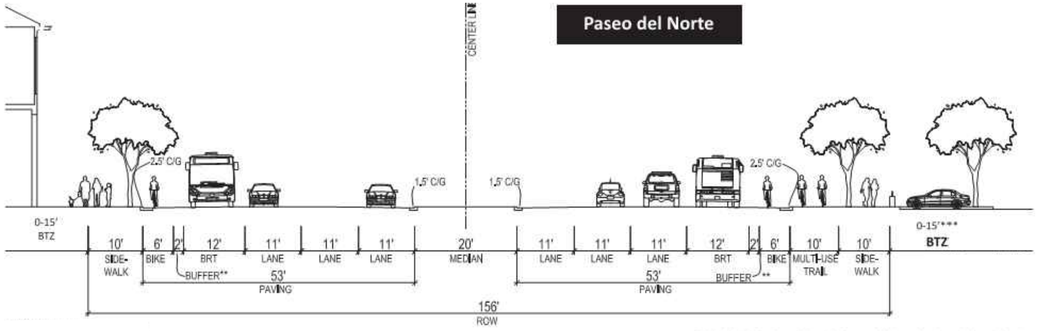
Street Type 4.2



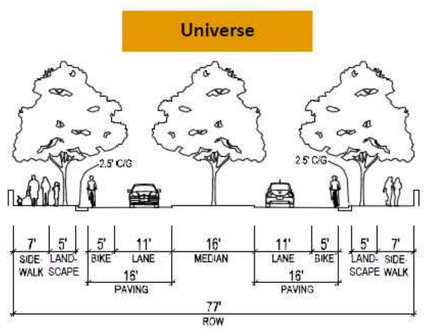
Street Type 5



Street Type 6



Street Type 7



Street Type 8

VOLCANO HEIGHTS SECTOR DEVELOPMENT PLAN
NEEDS ASSESSMENT REPORT

ROADWAY TYPICAL SECTIONS

EXHIBIT VI

WILSON & COMPANY
4900 LANG AVE. NE
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D. ESTIMATED INFRASTRUCTURE COSTS

Estimated Infrastructure cost estimates for the water, sanitary sewers, stormwater, dry utilities, and roadways/streets are provided in Appendix B. Costs are estimated higher than other locations throughout Albuquerque; however, the higher costs are due primarily to the difficulties in rock excavation. The Volcano Heights infrastructure, similar to the Volcano Cliffs developments to the south, is uniquely affected by the high surface level and solidity of the existing volcanic rock (which is evident throughout the sector), and adversely affects the development costs, due to the requirement of blasting for utilities, and the need for soil to be imported in order to provide for managed surface development.

D-1. Water System Infrastructure Costs

The water system cost estimates are based upon the sizing and layout **(See Exhibit III Water System Layout).** Costs have been inflated by 5.576% to account for inflation since the last time the report was issued, per the BLS inflation rate since this report was last published. Total Estimated Waterline Improvement Costs, including contingencies, is **$12,271,023.** See Appendix B for Conceptual Cost Estimates.

D-2. Sanitary Sewer System Infrastructure Costs

The sanitary sewer system cost estimate is provided in Appendix B and is based upon the sizing and layout **(See Exhibit IV Sanitary Sewer System Layout).** Costs have been inflated by 5.576% to account for inflation since the last time the report was issued, per the BLS inflation rate since this report was last published. Total Estimated Sanitary Sewer Costs, including contingencies, is **$10,161,692.**

D-3. Stormwater System Infrastructure Costs

Stormwater infrastructure cost estimates were completed as part of the UPMDMP and are included in Appendix A. The total estimated costs range from **$18.7M to $20.5M** depending on the alternative, including major ponding areas and storm drain trunk lines along primary streets.

D-4. Roadways Infrastructure Costs

Roadway infrastructure cost estimates are based on the typical sections presented in the VHSDP and are included in Appendix A. The total estimated cost for all primary streets in the area, including contingencies, is approximately **$69M**. Each individual roadway estimated cost is listed below:

ST1 (Town Center) –	$6,708,304
ST2 (Connector Street) –	$14,664,441
ST3 (Neighborhood Street) -	$5,420,043
ST4.1 (Park Edge – 1 Side) -	$3,253,119
ST4.2 (Park Edge – 2 Sides) -	$512,645
ST5 (Transit Blvd) -	$5,058,333

ST6 (Unser Blvd) - $11,096,610

ST7 (Paseo Del Norte) - $19,677,000

ST8 (Universe Blvd) - $2,599,959

D-5. Dry Utilities Infrastructure Costs

The dry utility cost estimates are based upon the SAD 228 Project. It is anticipated that developers of the area would pay for trenching and backfill, as well as casings for crossing roadways. This cost also includes trenching through rock for a total of $25 per linear foot of roadway. It is assumed that the dry utility trench would be on one side of the roadway along each primary street. Total dry utility cost is estimated at **$1,696,563 excluding contingencies and NMGRT.** See Appendix B for detailed cost estimates.

E. Funding Alternatives

One of the primary goals of the Plan is to develop funding/reimbursement mechanism for development of the watershed area. The following funding sources are being considered:

- Easement
- Special Assessment District - SAD
- Infrastructure Development Zone – IDZ
- Public Improvement District – PID
- Tax Increment Financing – TIF

E-1. Easement

The idea behind this funding mechanism is for the City to obtain an easement over all of the properties within the area. As the properties are developed, the City would be reimbursed a predetermined amount in order to vacate the easement and allow for development of the property. The advantage is that the process would be simplified compared to other alternatives. The primary disadvantage is that it would be difficult to obtain 100% concurrence from all property owners.

E-2. Special Assessment District

SAD's are created to provide infrastructure improvements funded by General Obligation Bonds or Special Assessment Bonds and reimbursed by the property owners by assessment. The process consists of 5 resolutions, 2 hearings, and 2 ordinances and typically takes 2-3 years to complete. For this particular project, an SAD would be led by the City of Albuquerque, as AMAFCA does not have the authority. The advantages of an SAD is that it would provide an appraised property value benefit to the property owners and it is a proven process with adjustable assessments to fit benefits. The primary disadvantages of an SAD are that they are not popular politically and are viewed as time consuming and confusing. In general, property owners in the area that were interviewed preferred an SAD the least out of all alternatives.

E-3. Infrastructure Development Zone

IDZ's are quasi-municipal political subdivisions created to provide and finance "services", which are infrastructure and facilities. The primary financing tool is the issuance of general obligation bonds, special assessment bonds, revenue bonds or refunding bonds. An IDZ must adopt a "Service Plan" which governs the scope of its activities, which must be approved by the City of Albuquerque by resolution. A five director board is elected to govern the IDZ. The advantage of an IDZ is that it is a modernized and streamlined process compared to the SAD process and the lesser of 30% or 400 of the taxpaying electors need to sign an initial petition. The primary disadvantage of an IDZ is that one has never been completed in the State of New Mexico.

E-4. Public Improvement District

A PID is a modernized and streamlined SAD process that was introduced to New Mexico in 2001 and creates districts for public improvements through a petition and hearing process. A "General Plan" is filed with the clerk at the time the governing body adopts a resolution indicating its intention to form a PID. The General Plan includes the district boundary, description of improvements, cost estimates, financing methods and possible alternatives. The disadvantage of a PID is that they have experienced economic difficulties since the onset of the recent economic downturn. This led to legislative initiatives to reform the PID process which limited the amount of general obligation bonds that may be issues, provides that a detailed application be filed in connection with proposed PID formations, requires that notices be given to purchasers of property within a PID, and allows for the governing body forming a PID to resume governance of the PID after the end of the terms of appointed PID members.

E-5. Tax Increment Financing

A TIF is a financial tool widely used by municipalities to promote economic development and redevelopment. A TIF District is formed, which is a separate political subdivision of the state with the powers that the statutes and municipality allow. There is no liability of the municipality and no pledge of any other revenues of the municipality. A TIF differs from other financing tools in that no new taxes are created, they are self-financed (no reliance on guarantees or pledges of existing revenues), they are not dependent on federal or state funding, and they allow flexibility in project activities. One disadvantage is that TIF's are limited by a revenue bond with a pledge of up to 75% of new property taxes and gross receipts taxes from the TIF District only.

APPENDIX A

WILSON & COMPANY

discipline | intensity | collaboration | shared ownership | solutions

Pond Summary (100 yr - 24 hr)				
Pond	Inflow	Outflow	Volume Prv'd	Peak Volume
	(cfs)	(cfs)	(ac-ft)	(ac-ft)
Pond 202B	302.20	133.50	13.40	12.06
Pond 202C	231.00	117.20	8.00	6.03
Pond 204	299.80	62.70	9.50	9.27
Pond 209	63.90	40.50	2.00	1.39
Pond 206A	258.10	194.10	4.00	3.46
Pond 206B	383.90	250.00	8.00	7.57
Sundance Ponc	101.70	32.60	2.80	2.76
Unser Pond	102.00	102.30	3.00	2.94
Pond 2	424.00	355.60	7.00	4.33

Proposed Basin Summary Data (100 yr - 24 hr)			
Basin ID	Area	Peak Flow	Volume
	(ac)	(cfs)	(ac-ft)
B202A	44.3	130	7.9
B202B	37.1	132	6.5
B202C	32.3	116	6.0
B203A	46.5	133	8.5
B203B	37.4	120	6.5
B204	81.3	276	14.8
B205A	20.6	76	3.7
B205B	21.9	79	3.9
B206A	87.0	258	16.3
B206B	73.2	241	13.0
B206C	46.2	130	8.2
B206D	26.4	97	4.8
B206E	24.3	80	4.0
B207	249.0	72	6.9
B208	111.9	67	5.1
B209	32.9	64	3.5
B210	22.0	66	3.6
Sundance	40.3	102	5.5

LEGEND

- FLOW DIRECTION
- AP3 ANALYSIS POINT DESIGNATION
- EXISTING INDEX CONTOUR (25')
- EXISTING INTERMEDIATE CONTOUR (5')
- 1 PIEDRAS MARCADAS DAM
- 2 JAMES MONROE MIDDLE SCHOOL
- 3 THE BOULDERS
- 4 THE TRAILS
- 5 VENTANA SQUARE
- 6 VILLA DE LA CHAMISA SUBDIVISION
- 7 CHAMISA RIDGE SUBUDIVISION
- 8 SUNDANCE ESTATES
- PROPOSED POND
- EXISTING POND
- PROPOSED BASINS
- PETROGLYPH NATIONAL MONUMENT
- PLANNED LOTS
- PLANNED STORM DRAIN
- EXISTING STORM DRAIN
- ROCK OUTCROP
- BOCA NEGRA DAM WATERSHED
- CALABACILLAS WATERSHED
- MARIPOSA WATERSHED
- PIEDRAS MARCADAS WATERSHED
- THE TRAILS WATERSHED

Analysis Point Summary (100 yr - 24 hr)			
Analysis Point	Area	Peak Flow	Volume
	(ac)	(cfs)	(ac-ft)
AP-1	275.3	426	49.3
AP-2	387.2	486	54.4
AP-3	506.6	192	37.5
AP-4	915.8	611	95.5
AP-5	37.4	120	6.5
AP-6	-	45	9.3
AP-7	44.3	127	7.9
AP-8	160.2	134	28.0
AP-9	160.2	306	28.8
AP-10	78.8	236	14.5
AP-11	184.4	102	21.8
AP-12	160.2	250	28.9
AP-13	186.6	300	33.7
AP-14	232.8	424	41.9
AP-15	81.3	276	14.8
AP-16	20.6	76	3.7
AP-17	32.9	41	3.4

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)

1 inch = 600 ft.

UPPER PIEDRAS MARCADAS WATERSHED DRAINAGE AND WATER QUALITY MANAGEMENT PLAN
PLATE 1 - ALTERNATIVE 1

AMAFCA

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
www.wilsonco.com

Pond Summary (100 yr - 24 hr)				
Pond	Inflow	Outflow	Volume Prv'd	Peak Volume
	(cfs)	(cfs)	(ac-ft)	(ac-ft)
Pond 202B	349.8	133.8	11.00	9.57
Pond 203.B	237.0	167.1	4.50	4.38
Pond 204	299.8	62.7	9.50	9.27
Pond 209	63.9	19.2	3.00	1.95
Sundance Pond	101.7	32.6	2.80	2.76
Unser Pond	131.7	106.8	3.70	3.64
Pond 2	617.8	294.3	20.00	19.76

Proposed Basin Summary Data (100 yr - 24 hr)			
Basin ID	Area	Peak Flow	Volume
	(ac)	(cfs)	(ac-ft)
B202A	44.3	130	7.9
B202B	37.1	132	6.5
B202C	32.3	116	6.0
B203A	46.5	133	8.5
B203B	37.4	120	6.5
B204	81.3	276	14.8
B205A	20.6	76	3.7
B205B	21.9	79	3.9
B206A	87.0	258	16.3
B206B	73.2	241	13.0
B206C	46.2	130	8.2
B206D	26.4	97	4.8
B206E	24.3	80	4.0
B207	249.0	72	6.9
B208	111.9	67	5.1
B209	32.9	64	3.5
B210	22.0	66	3.6
Sundance	40.3	102	5.5

LEGEND

- FLOW DIRECTION
- AP3 ANALYSIS POINT DESIGNATION
- EXISTING INDEX CONTOUR (25')
- EXISTING INTERMEDIATE CONTOUR (5')
- 1 PIEDRAS MARCADAS DAM
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- 7 CHAMISA RIDGE SUBDIVISION
- 8 SUNDANCE ESTATES
- PROPOSED POND
- EXISTING POND
- PROPOSED BASINS
- PETROGLYPH NATIONAL MONUMENT
- PLANNED LOTS
- PLANNED STORM DRAIN
- EXISTING STORM DRAIN
- CHAMISA BASINS
- ROCK OUTCROP
- BOCA NEGRA DAM WATERSHED
- CALABACILLAS WATERSHED
- MARIPOSA WATERSHED
- PIEDRAS MARCADAS WATERSHED
- THE TRAILS WATERSHED

Analysis Point Summary (100 yr - 24 hr)			
Analysis Point	Area	Peak Flow	Volume
	(ac)	(cfs)	(ac-ft)
AP-1	275.3	328	48.5
AP-2	387.2	363	53.6
AP-3	460.2	184	32.8
AP-4	869.3	528	89.9
AP-5	83.9	167	14.8
AP-6	0.0	44	6.7
AP-7	44.3	130	7.9
AP-8	113.7	134	20.3
AP-9	113.7	354	20.5
AP-10	76.6	241	13.9
AP-11	138.0	107	17.1
AP-12	160.2	495	29.2
AP-13	206.4	556	36.6
AP-14	232.8	618	41.4
AP-15	81.3	276	14.8
AP-16	20.6	76	3.7
AP-17	32.9	19	3.4
AP-18	83.9	237	15.0

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)

1 inch = 600 ft.

UPPER PIEDRAS MARCADAS WATERSHED DRAINAGE AND WATER QUALITY MANAGEMENT PLAN
PLATE 2 - ALTERNATIVE 2

AMAFCA

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
www.wilsonco.com

Pond Summary				
Pond	Inflow (cfs)	Outflow (cfs)	Volume Prv'd (ac-ft)	Peak Volume (ac-ft)
Ponc 202B	400.7	197.8	13.40	13.28
Pond 209	63.9	19.2	3.00	1.95
Pond 10	196.3	19.9	7.00	6.9
Sundarce Pond	101.7	32.6	2.80	2.76
Unser Pond	166.1	119.3	7.70	7.68
Pond 2	652.6	446.3	16.00	15.9

Proposed Basin Summary Data (100 yr - 24 hr)			
Basin ID	Area (ac)	Peak Flow (cfs)	Volume (ac-ft)
B202A	44.3	130	7.9
B202B	37.1	132	8.5
B202C	32.3	116	6.0
B203A	46.5	133	8.5
B203B	37.4	119	6.4
B204A	53.6	196	9.7
B204B	27.7	104	5.1
B205A	20.6	76	3.7
B205B	21.9	79	3.9
B206A	87.0	258	16.3
B206B	73.2	241	13.0
B206C	46.2	130	8.2
B206D	26.4	97	4.8
B206E	24.3	80	4.0
B207	249.0	72	6.9
B208	111.9	67	5.1
B209	32.9	64	3.5
B210	22.0	66	3.6
Sundance	40.3	102	5.5

LEGEND
- FLOW DIRECTION
- AP3 ANALYSIS POINT DESIGNATION
- EXISTING INDEX CONTOUR (25')
- EXISTING INTERMEDIATE CONTOUR (5')
- (1) PIEDRAS MARCADAS DAM
- (2) JAMES MONROE MIDDLE SCHOOL
- (3) THE BOULDERS
- (4) THE TRAILS
- (5) VENTANA SQUARE
- (6) VILLA DE LA CHAMISA SUBDIVISION
- (7) CHAMISA RIDGE SUBDIVISION
- (8) SUNDANCE ESTATES
- PROPOSED POND
- EXISTING POND
- PROPOSED BASINS
- PETROGLYPH NATIONAL MONUMENT
- PLANNED LOTS
- PLANNED STORM DRAIN
- EXISTING STORM DRAIN
- ROCK OUTCROP
- BOCA NEGRA DAM WATERSHED
- CALABACILLAS WATERSHED
- MARIPOSA WATERSHED
- PIEDRAS MARCADAS WATERSHED
- THE TRAILS WATERSHED

Analysis Point Summary (100-yr, 24- hr)			
Analysis Point	Area	Peak Flow	Volume
	ac	cfs	ac-ft
AP-1	356.6	570	63.4
AP-2	468.5	612	68.5
AP-3	506.6	157	40.2
AP-4	997.1	730	112.2
AP-5	37.4	119	6.4
AP-6	0.0	47	6.6
AP-7	44.3	130	7.9
AP-8	160.2	198	27.9
AP-9	160.2	402	28.5
AP-10	78.8	226	14.5
AP-11	184.4	119	24.5
AP-12	160.2	473	29.2
AP-13	186.6	537	34.0
AP-14	232.8	653	42.2
AP-15	53.6	196	9.7
AP-16	101.9	177	17.8
AP-17	32.9	19	3.4
AP-18	81.3	110	14.1

GRAPHIC SCALE
600 0 300 600 1200 2400
(IN FEET)
1 inch = 600 ft.

UPPER PIEDRAS MARCADAS WATERSHED DRAINAGE AND WATER QUALITY MANAGEMENT PLAN
PLATE 3 - ALTERNATIVE 3

AMAFCA

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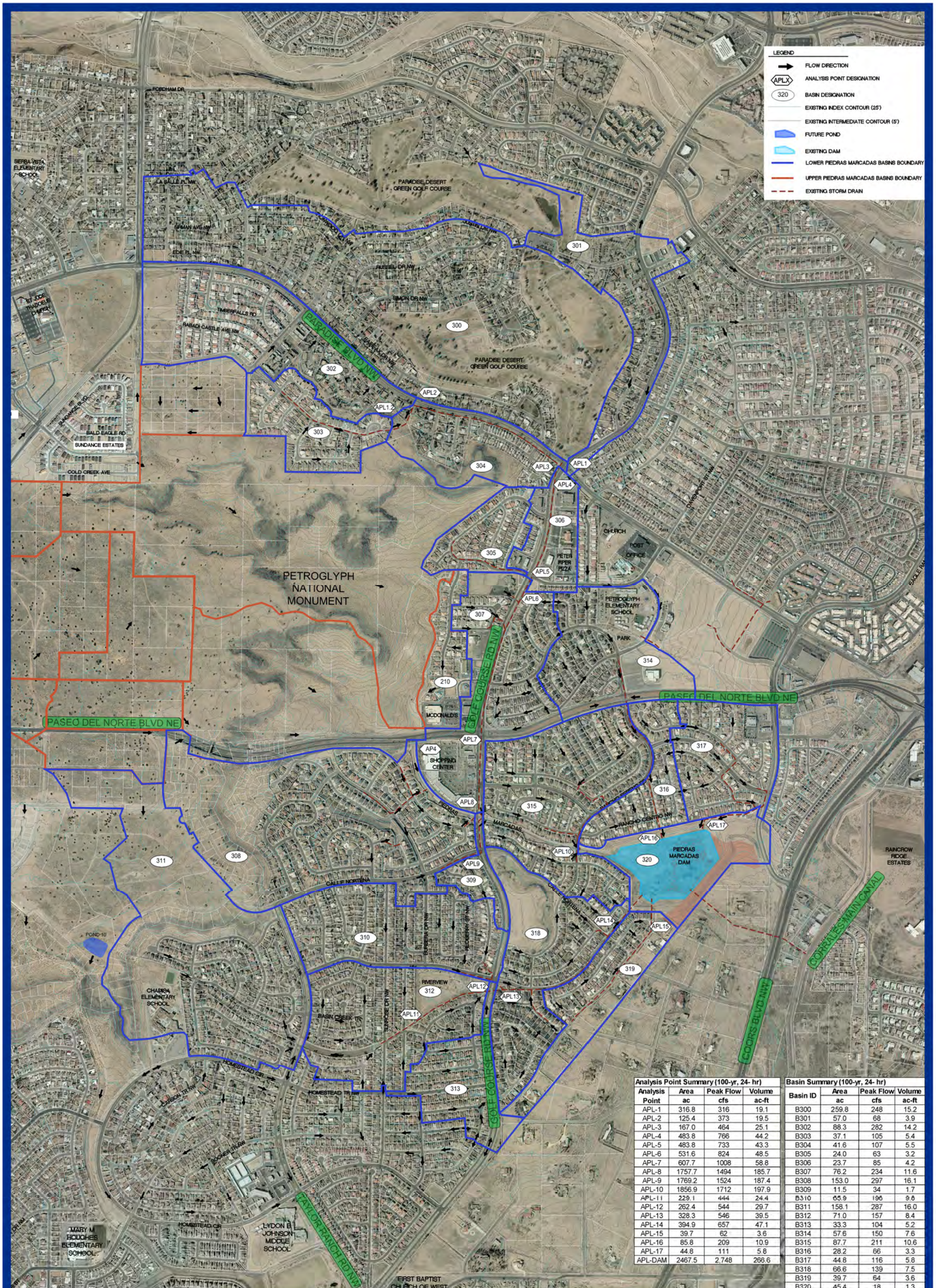
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
www.wilsonco.com



Analysis Point Summary (100-yr, 24- hr)			
Analysis Point	Area ac	Peak Flow cfs	Volume ac-ft
APL-1	316.8	316	19.1
APL-2	125.4	373	19.5
APL-3	167.0	464	25.1
APL-4	483.8	766	44.2
APL-5	483.8	733	43.3
APL-6	531.6	824	48.5
APL-7	607.7	1008	58.8
APL-8	1757.7	1494	185.7
APL-9	1769.2	1524	187.4
APL-10	1856.9	1712	197.9
APL-11	229.1	444	24.4
APL-12	262.4	544	29.7
APL-13	328.3	546	39.5
APL-14	394.9	657	47.1
APL-15	39.7	62	3.6
APL-16	85.8	209	10.9
APL-17	44.8	111	5.8
APL-DAM	2467.5	2,748	266.6

Basin Summary (100-yr, 24- hr)			
Basin ID	Area ac	Peak Flow cfs	Volume ac-ft
B300	259.8	248	15.2
B301	57.0	68	3.9
B302	88.3	282	14.2
B303	37.1	105	5.4
B304	41.6	107	5.5
B305	24.0	63	3.2
B306	23.7	85	4.2
B307	76.2	234	11.6
B308	153.0	297	16.1
B309	11.5	34	1.7
B310	65.9	196	9.8
B311	158.1	287	16.0
B312	71.0	157	8.4
B313	33.3	104	5.2
B314	57.6	150	7.6
B315	87.7	211	10.6
B316	28.2	66	3.3
B317	44.8	116	5.8
B318	66.6	139	7.5
B319	39.7	64	3.6
B320	45.4	18	1.3

PLATE 4
LOWER PIEDRAS MARCADAS BASIN MAP

GRAPHIC SCALE
(IN FEET)
1 inch = 600 ft.

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ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
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Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 1

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
1	Site Clearing & Grubbing, Complete	AC	$1,150.00	15	$17,250.00
2	Unclassified Excavation	CY	$5.00	110,300	$551,500.00
3	Import	CY	$8.50	27,575	$234,387.50
4	Rock Excavation, Utility Trench, Remove & Dispose, Compl	CY	$29.00	65,000	$1,885,000.00
5	Surface Rock Excavation, Remove & Dispose, Compl	CY	$83.17	23,270	$1,935,365.90
6	24" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$80.00	250	$20,000.00
7	30" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$100.00	696	$69,600.00
8	36" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$140.00	2,009	$281,260.00
9	42" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$160.00	8,919	$1,427,040.00
10	48" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$195.00	9,146	$1,783,470.00
11	54" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$260.00	6,208	$1,614,080.00
12	60" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$285.00	5,481	$1,562,085.00
13	66" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$380.00	2,393	$909,340.00
14	72" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$470.00	2,385	$1,120,950.00
15	78" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$510.00	446	$227,460.00
16	Manhole, 4' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$3,100.00	17	$52,700.00
17	Manhole, 4' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$4,500.00	11	$49,500.00
18	Manhole, 6' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$5,200.00	71	$369,200.00

Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 1

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
19	Manhole, 6' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$5,500.00	26	$143,000.00
20	Manhole, 8' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$11,000.00	4	$44,000.00
21	Catch Basin	EA	$4,500.00	253	$1,137,990.00
22	Pond Inlet Structure	EA	$7,000.00	1	$7,000.00
23	Pond Water Quality Structure	EA	$20,000.00	10	$200,000.00
	Sub-Total Bid Items				**$15,642,178.40**
Miscellaneous Items					
24	Construction Staking	LS	$219,000.00	1	$219,000.00
25	Construction Project Sign, per Contract Special Provisions, CIP	EA	$750.00	4	$3,000.00
26	Mobilization, Complete	LS	$746,200.00	1	$746,200.00
27	Demobilization, Complete	LS	$47,000.00	1	$47,000.00
28	Construction Traffic Control & Barricading, Complete	LS	$328,500.00	1	$328,500.00
29	NPDES Permitting, Complete	LS	$98,600.00	1	$98,600.00
	Sub-Total Miscellaneous Items				**$1,442,300.00**
	Total Bid Items				**$17,084,478.40**
	Contingency @ 10%				**$1,708,447.84**
	New Mexico Gross Receipt Tax (NMGRT) @ 7.3125%				**$1,249,302.48**
	Total Cost Including NMGRT				**$20,042,228.72**

Note: CIP referes to complete in place

Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 2

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
1	Site Clearing & Grubbing, Complete	AC	$1,150.00	15	$17,250.00
2	Unclassified Excavation	CY	$5.00	110,300	$551,500.00
3	Import	CY	$8.50	27,575	$234,387.50
4	Rock Excavation, Utility Trench, Remove & Dispose, Compl	CY	$29.00	77,877	$2,258,433.00
5	Surface Rock Excavation, Remove & Dispose, Compl	CY	$83.17	22,000	$1,829,740.00
6	24" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$80.00	250	$20,000.00
7	30" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$100.00	696	$69,600.00
8	36" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$140.00	2,669	$373,660.00
9	42" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$160.00	8,919	$1,427,040.00
10	48" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$195.00	6,035	$1,176,825.00
11	54" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$260.00	4,760	$1,237,600.00
12	60" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$285.00	7,133	$2,032,905.00
13	66" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$380.00	2,547	$967,860.00
14	72" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$470.00	2,126	$999,220.00
15	78" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$510.00	1,108	$565,080.00
16	84" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$558.00	1,275	$711,450.00
17	90" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$620.00	690	$427,800.00
18	96" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$675.00	850	$573,750.00

Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 2

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
19	Manhole, 4' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$3,100.00	8	$24,800.00
20	Manhole, 4' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$4,500.00	11	$49,500.00
21	Manhole, 6' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$5,200.00	68	$353,600.00
22	Manhole, 6' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$5,500.00	35	$192,500.00
23	Manhole, 8' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$11,000.00	4	$44,000.00
24	Catch Basin	EA	$4,500.00	260	$1,171,740.00
25	Pond Inlet Structure	EA	$7,000.00	8	$56,000.00
26	Pond Water Quality Structure	EA	$20,000.00	8	$160,000.00
	Sub-Total Bid Items				**$17,526,240.50**
Miscellaneous Items					
27	Construction Staking	LS	$245,400.00	1	$245,400.00
28	Construction Project Sign, per Contract Special Provisions, CIP	EA	$750.00	4	$3,000.00
29	Mobilization, Complete	LS	$836,100.00	1	$836,100.00
30	Demobilization, Complete	LS	$52,600.00	1	$52,600.00
31	Construction Traffic Control & Barricading, Complete	LS	$368,100.00	1	$368,100.00
32	NPDES Permitting, Complete	LS	$110,500.00	1	$110,500.00
	Sub-Total Miscellaneous Items				**$1,615,700.00**
	Total Bid Items				**$19,141,940.50**
	Contingency @ 10%				**$1,914,194.05**
	New Mexico Gross Receipt Tax (NMGRT) @ 7.3125%				**$1,399,754.40**
	Total Cost Including NMGRT				**$22,455,888.95**

Note: CIP referes to complete in place

Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 3

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
1	Site Clearing & Grubbing, Complete	AC	$1,150.00	15	$17,250.00
2	Unclassified Excavation	CY	$5.00	118,000	$590,000.00
3	Import	CY	$8.50	29,500	$250,750.00
4	Rock Excavation, Utility Trench, Remove & Dispose, Compl	CY	$29.00	79,100	$2,293,900.00
5	Surface Rock Excavation, Remove & Dispose, Compl	CY	$83.17	20,100	$1,671,717.00
6	24" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$80.00	1,115	$89,200.00
7	30" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$100.00	696	$69,600.00
8	36" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$140.00	1,238	$173,320.00
9	42" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$160.00	8,906	$1,424,960.00
10	48" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$195.00	9,391	$1,831,245.00
11	54" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$260.00	4,356	$1,132,560.00
12	60" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$285.00	3,123	$890,055.00
13	66" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$380.00	939	$356,820.00
14	72" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$470.00	3,407	$1,601,290.00
15	78" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$510.00	446	$227,460.00
16	84" RCP, CL III, Incl Trenching, Backfill & Compaction, CIP	LF	$558.00	468	$261,144.00
17	Manhole, 4' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$3,100.00	15	$46,500.00
18	Manhole, 4' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$4,500.00	11	$49,500.00

Upper Piedras Mercadas
Drainage and Water Quality Management Plan
Conceptual Cost Estimate - Alternative 3

WILSON & COMPANY

April 3, 2017

No	Description	Unit	Unit Cost	Quantity	Total
19	Manhole, 6' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$5,200.00	53	$275,600.00
20	Manhole, 6' DIA, Type "C" OR "E", 10' to 14' deep, CIP	EA	$5,500.00	26	$143,000.00
21	Manhole, 8' DIA, Type "C" OR "E", 6' to 10' deep, CIP	EA	$11,000.00	6	$66,000.00
22	Catch Basin	EA	$4,500.00	227	$1,022,550.00
23	Pond Inlet Structure	EA	$7,000.00	5	$35,000.00
24	Pond Water Quality Structure	EA	$20,000.00	5	$100,000.00
	Sub-Total Bid Items				**$14,619,421.00**
Miscellaneous Items					
25	Construction Staking	LS	$204,700.00	1	$204,700.00
26	Construction Project Sign, per Contract Special Provisions, CIP	EA	$750.00	4	$3,000.00
27	Mobilization, Complete	LS	$697,400.00	1	$697,400.00
28	Demobilization, Complete	LS	$43,900.00	1	$43,900.00
29	Construction Traffic Control & Barricading, Complete	LS	$307,100.00	1	$307,100.00
30	NPDES Permitting, Complete	LS	$92,200.00	1	$92,200.00
	Sub-Total Miscellaneous Items				**$1,348,300.00**
	Total Bid Items				**$15,967,721.00**
	Contingency @ 10%				**$1,596,772.10**
	New Mexico Gross Receipt Tax (NMGRT) @ 7.3125%				**$1,167,639.60**
	Total Cost Including NMGRT				**$18,732,132.70**

Note: CIP referes to complete in place

APPENDIX B

WILSON & COMPANY

discipline | intensity | collaboration | shared ownership | solutions

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE SUMMATION

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	407,500	1,049,312.50
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	183,900	2,083,587.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	150,240	739,691.62
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	925,540	495,719.22
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	815,000	12,225,000.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	183,900	3,678,000.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBGRADE PREP	$15.00	SY	16,120	241,800.00
8	340.010	SDWK, 4", PCC	$41.20	SY	134,060	5,523,272.00
9	340.050	C & G STD, PCC	$30.00	LF	135,725	4,071,750.00
10	340.060	C & G MDN, PCC	$20.00	LF	50,050	1,001,000.00
		SUBTOTAL PAVING				31,109,132.34
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		2,177,639.26
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		1,555,456.62
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		3,110,913.23
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		777,728.31
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		1,555,456.62
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		867,668.81
17		DRY UTILITIES (PNM)	$30.00	LF	67863	2,035,875.00
18	422.XXX	LIGHTING @ 2%		%		677,050.73
		SUBTOTAL MISCELLANEOUS				12,757,788.58
		SUBTOTAL CONSTRUCTION				**43,866,920.92**
		CONTINGENCIES @ 25%				10,966,730.23
		SUBTOTAL				**54,833,651.15**
		NMGRT @ 7.5%				4,112,523.84
		TOTAL CONSTRUCTION				**58,946,174.98**
		STAKING @ 3%				1,768,385.25
		DESIGN/ENGINEERING @ 8%				4,715,694.00
		INSPECTION @ 8%				4,715,694.00
		TESTING @ 2%				1,178,923.50
		GRAND TOTAL				**71,324,871.73**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST1

TOWN CENTER

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	54975	141,560.63
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	0	0.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	0	0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	54975	29,444.61
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	109950	1,649,250.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	0	0.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	19400	799,280.00
9	340.050	C & G STD, PCC	$30.00	LF	14550	436,500.00
10	340.060	C & G MDN, PCC	$20.00	LF	0	0.00
		SUBTOTAL PAVING				3,056,035.24
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		213,922.47
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		152,801.76
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		305,603.52
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		76,400.88
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		152,801.76
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		0.00
17		DRY UTILITIES (PNM)	$30.00	LF	7275	218,250.00
18	422.XXX	LIGHTING @ 2%		%		61,120.70
		SUBTOTAL MISCELLANEOUS				1,180,901.10
		SUBTOTAL CONSTRUCTION				**4,236,936.33**
		CONTINGENCIES @ 25%				1,059,234.08
		SUBTOTAL				**5,296,170.42**
		NMGRT @ 7.5%				397,212.78
		TOTAL CONSTRUCTION				**5,693,383.20**
		STAKING @ 3%				170,801.50
		DESIGN/ENGINEERING @ 8%				455,470.66
		INSPECTION @ 8%				455,470.66
		TESTING @ 2%				113,867.66
		GRAND TOTAL				**6,888,993.67**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST2

CONNECTOR ST

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	110015	283,288.63
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	0	0.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	0	0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	110015	58,924.03
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	220030	3,300,450.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	0	0.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	47150	1,942,580.00
9	340.050	C & G STD, PCC	$30.00	LF	35365	1,060,950.00
10	340.060	C & G MDN, PCC	$20.00	LF	0	0.00
		SUBTOTAL PAVING				6,646,192.66
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		465,233.49
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		332,309.63
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		664,619.27
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		166,154.82
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		332,309.63
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		0.00
17		DRY UTILITIES (PNM)	$30.00	LF	17682.5	530,475.00
18	422.XXX	LIGHTING @ 2%		%		132,923.85
		SUBTOTAL MISCELLANEOUS				2,624,025.69
		SUBTOTAL CONSTRUCTION				**9,270,218.35**
		CONTINGENCIES @ 25%				2,317,554.59
		SUBTOTAL				**11,587,772.93**
		NMGRT @ 7.5%				869,082.97
		TOTAL CONSTRUCTION				**12,456,855.90**
		STAKING @ 3%				373,705.68
		DESIGN/ENGINEERING @ 8%				996,548.47
		INSPECTION @ 8%				996,548.47
		TESTING @ 2%				249,137.12
		GRAND TOTAL				**15,072,795.64**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST3

NEIGHBORHOOD ST

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	38790	99,884.25
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	0	0.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	0	0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	38790	20,775.92
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	77580	1,163,700.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	0	0.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	16865	694,838.00
9	340.050	C & G STD, PCC	$30.00	LF	15180	455,400.00
10	340.060	C & G MDN, PCC	$20.00	LF	0	0.00
		SUBTOTAL PAVING				2,434,598.17
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		170,421.87
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		121,729.91
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		243,459.82
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		60,864.95
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		121,729.91
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		0.00
17		DRY UTILITIES (PNM)	$30.00	LF	7590	227,700.00
18	422.XXX	LIGHTING @ 2%		%		48,691.96
		SUBTOTAL MISCELLANEOUS				994,598.42
		SUBTOTAL CONSTRUCTION				**3,429,196.60**
		CONTINGENCIES @ 25%				857,299.15
		SUBTOTAL				**4,286,495.75**
		NMGRT @ 7.5%				321,487.18
		TOTAL CONSTRUCTION				**4,607,982.93**
		STAKING @ 3%				138,239.49
		DESIGN/ENGINEERING @ 8%				368,638.63
		INSPECTION @ 8%				368,638.63
		TESTING @ 2%				92,159.66
		GRAND TOTAL				**5,575,659.34**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST4.1

PARK EDGE - 1 SIDE

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	16150	41,586.25
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	0	0.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	0	0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	16150	8,649.94
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	32300	484,500.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	0	0.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	8970	369,564.00
9	340.050	C & G STD, PCC	$30.00	LF	16145	484,350.00
10	340.060	C & G MDN, PCC	$20.00	LF	0	0.00
		SUBTOTAL PAVING				1,388,650.19
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		97,205.51
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		69,432.51
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		138,865.02
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		34,716.25
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		69,432.51
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		0.00
17		DRY UTILITIES (PNM)	$30.00	LF	8072.5	242,175.00
18	422.XXX	LIGHTING @ 2%		%		27,773.00
		SUBTOTAL MISCELLANEOUS				679,599.81
		SUBTOTAL CONSTRUCTION				**2,068,250.00**
		CONTINGENCIES @ 25%				517,062.50
		SUBTOTAL				**2,585,312.50**
		NMGRT @ 7.5%				193,898.44
		TOTAL CONSTRUCTION				**2,779,210.94**
		STAKING @ 3%				83,376.33
		DESIGN/ENGINEERING @ 8%				222,336.87
		INSPECTION @ 8%				222,336.87
		TESTING @ 2%				55,584.22
		GRAND TOTAL				**3,362,845.23**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST4.2

PARK EDGE - 2 SIDES

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	3670	9,450.25
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	0	0.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	0	0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	3670	1,965.65
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	7340	110,100.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	0	0.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	1595	65,714.00
9	340.050	C & G STD, PCC	$30.00	LF	1435	43,050.00
10	340.060	C & G MDN, PCC	$20.00	LF	0	0.00
		SUBTOTAL PAVING				230,279.90
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		16,119.59
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		11,514.00
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		23,027.99
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		5,757.00
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		11,514.00
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		0.00
17		DRY UTILITIES (PNM)	$30.00	LF	717.5	21,525.00
18	422.XXX	LIGHTING @ 2%		%		4,605.60
						94,063.17
		SUBTOTAL CONSTRUCTION				**324,343.07**
		CONTINGENCIES @ 25%				81,085.77
		SUBTOTAL				**405,428.84**
		NMGRT @ 7.5%				30,407.16
		TOTAL CONSTRUCTION				**435,836.00**
		STAKING @ 3%				13,075.08
		DESIGN/ENGINEERING @ 8%				34,866.88
		INSPECTION @ 8%				34,866.88
		TESTING @ 2%				8,716.72
		GRAND TOTAL				**527,361.56**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST5

TRANSIT BLVD

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	24200	62,315.00
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	24200	274,186.00
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY		0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	72600	38,884.56
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	48400	726,000.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	24200	484,000.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	8800	362,560.00
9	340.050	C & G STD, PCC	$30.00	LF	6600	198,000.00
10	340.060	C & G MDN, PCC	$20.00	LF	6600	132,000.00
		SUBTOTAL PAVING				2,277,945.56
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		159,456.19
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		113,897.28
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		227,794.56
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		56,948.64
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		113,897.28
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		113,897.28
17		DRY UTILITIES (PNM)	$30.00	LF	3300	99,000.00
18	422.XXX	LIGHTING @ 2%		%		45,558.91
		SUBTOTAL MISCELLANEOUS				930,450.13
		SUBTOTAL CONSTRUCTION				**3,208,395.69**
		CONTINGENCIES @ 25%				802,098.92
		SUBTOTAL				**4,010,494.61**
		NMGRT @ 7.5%				300,787.10
		TOTAL CONSTRUCTION				**4,311,281.71**
		STAKING @ 3%				129,338.45
		DESIGN/ENGINEERING @ 8%				344,902.54
		INSPECTION @ 8%				344,902.54
		TESTING @ 2%				86,225.63
		GRAND TOTAL				**5,216,650.87**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST6

UNSER BLVD

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	49660	127,874.50
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	49660	562,647.80
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	49660	244,496.04
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	198640	106,391.58
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	99320	1,489,800.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	49660	993,200.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	6060	90,900.00
8	340.010	SDWK, 4", PCC	$41.20	SY	6060	249,672.00
9	340.050	C & G STD, PCC	$30.00	LF	21800	654,000.00
10	340.060	C & G MDN, PCC	$20.00	LF	21800	436,000.00
		SUBTOTAL PAVING				4,954,981.93
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		346,848.73
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		247,749.10
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		495,498.19
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		123,874.55
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		247,749.10
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		247,749.10
17		DRY UTILITIES (PNM)	$30.00	LF	10900	327,000.00
18	422.XXX	LIGHTING @ 2%		%		99,099.64
		SUBTOTAL MISCELLANEOUS				2,135,568.40
		SUBTOTAL CONSTRUCTION				**7,090,550.33**
		CONTINGENCIES @ 25%				1,772,637.58
		SUBTOTAL				**8,863,187.91**
		NMGRT @ 7.5%				664,739.09
		TOTAL CONSTRUCTION				**9,527,927.01**
		STAKING @ 3%				285,837.81
		DESIGN/ENGINEERING @ 8%				762,234.16
		INSPECTION @ 8%				762,234.16
		TESTING @ 2%				190,558.54
		GRAND TOTAL				**11,528,791.68**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST7

PASEO DEL NORTE

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	100580	258,993.50
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	100580	1,139,571.40
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY	100580	495,195.57
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	402320	215,482.59
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	201160	3,017,400.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	100580	2,011,600.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	10060	150,900.00
8	340.010	SDWK, 4", PCC	$41.20	SY	20120	828,944.00
9	340.050	C & G STD, PCC	$30.00	LF	18100	543,000.00
10	340.060	C & G MDN, PCC	$20.00	LF	18100	362,000.00
		SUBTOTAL PAVING				9,023,087.06
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		631,616.09
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		451,154.35
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		902,308.71
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		225,577.18
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		451,154.35
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		451,154.35
17		DRY UTILITIES (PNM)	$30.00	LF	9050	271,500.00
18	422.XXX	LIGHTING @ 2%		%		180,461.74
		SUBTOTAL MISCELLANEOUS				3,564,926.78
		SUBTOTAL CONSTRUCTION				**12,588,013.84**
		CONTINGENCIES @ 25%				3,147,003.46
		SUBTOTAL				**15,735,017.30**
		NMGRT @ 7.5%				1,180,126.30
		TOTAL CONSTRUCTION				**16,915,143.60**
		STAKING @ 3%				507,454.31
		DESIGN/ENGINEERING @ 8%				1,353,211.49
		INSPECTION @ 8%				1,353,211.49
		TESTING @ 2%				338,302.87
		GRAND TOTAL				**20,467,323.76**

VHSDP
NEEDS ASSESSMENT
ROADWAY ESTIMATE

ST8

UNIVERSE BLVD

6 ITEM NO.	SPEC NO.	7 SHORT DESCRIPTION	8 EST. UNIT PRICE	UNIT	9 EST. QUANTITY	10 EST. AMOUNT
		PAVING				
1	301.020	SUBGRADE PREP, 12"	$2.58	SY	9460	24,359.50
2	302.02	AGGREGATE BASE COURSE, 8"	$11.33	SY	9460	107,181.80
3	329.01	SEAL COAT, PLAN MIX, 5/8"	$4.92	SY		0.00
4	336.01	PRIME COAT AND/OR TACK COAT	$0.54	SY	28380	15,200.33
5	336.022	ASP CONC, TYPE SPB, 1-2" LIFT	$15.00	SY	18920	283,800.00
6	336.024	ASP CONC, TYPE SPA, 1-3" LIFT	$20.00	SY	9460	189,200.00
7	336.05	BIKE ASP CONC, TRAIL, 2" SPC, 8" SUBG	$15.00	SY	0	0.00
8	340.010	SDWK, 4", PCC	$41.20	SY	5100	210,120.00
9	340.050	C & G STD, PCC	$30.00	LF	6550	196,500.00
10	340.060	C & G MDN, PCC	$20.00	LF	3550	71,000.00
		SUBTOTAL PAVING				1,097,361.63
		MISCELLANEOUS				
11	201/202	ROADWAY EXCAV & BORROW @ 7%		%		76,815.31
12	202.02	ROADWAY ROCK EXCAVATION @ 5%		%		54,868.08
13	9XX.XXX	ROADWAY DRAINAGE @ 10%		%		109,736.16
14	450.00X	SIGNAGE/STRIPING @ 2.5%		%		27,434.04
15	1005.01	LANDSCAPING @ 5% - IN SW 2 SIDES		%		54,868.08
16	1005.02	LANDSCAPING @ 5% - IN MEDIAN		%		54,868.08
17		DRY UTILITIES (PNM)	$30.00	LF	3275	98,250.00
18	422.XXX	LIGHTING @ 2%		%		76,815.31
		SUBTOTAL MISCELLANEOUS				553,655.08
		SUBTOTAL CONSTRUCTION				**1,651,016.70**
		CONTINGENCIES @ 25%				412,754.18
		SUBTOTAL				**2,063,770.88**
		NMGRT @ 7.5%				154,782.82
		TOTAL CONSTRUCTION				**2,218,553.70**
		STAKING @ 3%				66,556.61
		DESIGN/ENGINEERING @ 8%				177,484.30
		INSPECTION @ 8%				177,484.30
		TESTING @ 2%				44,371.07
		GRAND TOTAL				**2,684,449.97**

VHSDP
NEEDS ASSESSMENT

WATER ESTIMATE ALTERNATIVE I
12/29/2021
CONCEPTUAL DESIGN

ITEM NO.	SHORT DESCRIPTION	EST. UNIT PRICE	UNIT	EST. QUANTITY	EST. AMOUNT
	CONSTRUCTION				
1	EXCAV & DISP, ROCK	$ 104.67	CY	27338	$2,861,534.07
2	FILL, BORROW, HAUL & COMP	$ 12.31	CY	33414	$411,473.36
3	ART PVMT, R&R, W/M	$ 61.57	SY	4000	$246,288.00
4	DIRECTIONAL DRILL, CARRIER PIPE NOT INCL	$ 461.79	LF	640	$295,545.60
5	6" WL PIPE	$ 27.71	LF	0	$0.00
6	8" WL PIPE	$ 36.94	LF	14575	$538,447.14
7	10" WL PIPE	$ 40.02	LF	16798	$672,286.20
8	12" WL PIPE	$ 46.18	LF	32704	$1,510,238.02
9	6" GATE VLV	$ 2,052.40	EA	134	$275,021.60
10	8" GATE VLV	$ 2,462.88	EA	24	$59,109.12
11	10" GATE VLV	$ 2,975.98	EA	39	$116,063.22
12	12" GATE VLV	$ 4,617.90	EA	25	$115,447.50
13	FITTINGS	$ 4.62	LB	53138	$245,385.97
14	PRESSURE REDUCING VALVE VAULT	$ 96,462.80	EA	1	$96,462.80
15	FIRE HYDRANTS	$ 3,899.56	EA	134	$522,541.04
	SUBTOTAL CONSTRUCTION				**$7,965,843.64**
	CONTINGENCIES @ 20%				$1,593,168.73
	SUBTOTAL				**$9,559,012.36**
	NMGRT @ 7.875%				$752,772.22
	TOTAL CONSTRUCTION				**10,311,784.59**
	STAKING @ 3%				309,353.54
	DESIGN/ENGINEERING @ 10%				1,031,178.46
	INSPECTION @ 4%				412,471.38
	TESTING @ 2%				206,235.69
	GRAND TOTAL				**12,271,023.66**

VHSDP
NEEDS ASSESSMENT

WATER ESTIMATE ALTERNATIVE IV
12/29/2021
CONCEPTUAL DESIGN

ITEM NO.	SHORT DESCRIPTION	EST. UNIT PRICE	UNIT	EST. QUANTITY	EST. AMOUNT
	CONSTRUCTION				
1	EXCAV & DISP, ROCK	$ 104.67	CY	27338	$2,861,534.07
2	FILL, BORROW, HAUL & COMP	$ 12.31	CY	33414	$411,473.36
3	ART PVMT, R&R, W/M	$ 61.57	SY	4000	$246,288.00
4	DIRECTIONAL DRILL, CARRIER PIPE NOT INCL	$ 461.79	LF	640	$295,545.60
5	6" WL PIPE	$ 27.71	LF	0	$0.00
6	8" WL PIPE	$ 36.94	LF	14575	$538,447.14
7	10" WL PIPE	$ 40.02	LF	16798	$672,286.20
8	12" WL PIPE	$ 46.18	LF	32704	$1,510,238.02
9	6" GATE VLV	$ 2,052.40	EA	134	$275,021.60
10	8" GATE VLV	$ 2,462.88	EA	24	$59,109.12
11	10" GATE VLV	$ 2,975.98	EA	39	$116,063.22
12	12" GATE VLV	$ 4,617.90	EA	25	$115,447.50
13	FITTINGS	$ 4.62	LB	53138	$245,385.97
15	FIRE HYDRANTS	$ 3,899.56	EA	134	$522,541.04
	SUBTOTAL CONSTRUCTION				**$7,869,380.84**
	CONTINGENCIES @ 20%				$1,573,876.17
	SUBTOTAL				**$9,443,257.00**
	NMGRT @ 7.875%				$743,656.49
	TOTAL CONSTRUCTION				**10,186,913.49**
	STAKING @ 3%				305,607.40
	DESIGN/ENGINEERING @ 10%				1,018,691.35
	INSPECTION @ 4%				407,476.54
	TESTING @ 2%				203,738.27
	GRAND TOTAL				**12,122,427.05**

VHSDP
NEEDS ASSESSMENT

SANITARY SEWER ESTIMATE
8/16/2021
CONCEPTUAL DESIGN

ITEM NO.	SHORT DESCRIPTION	EST. UNIT PRICE	UNIT	EST. QUANTITY	EST. AMOUNT
	CONSTRUCTION				
1	TRCH, 4-15" SAS, <12'	$21.21	LF	42172	$894,673.23
2	EXCAV & DISP, ROCK	$113.89	CY	27457	$3,127,086.55
3	FILL, BORROW, HAUL & COMP	$13.40	CY	32026	$429,111.93
4	ART PVMT, R&R, W/M	$66.99	SY	3600	$241,179.50
5	DIRECTIONAL DRILL, CARRIER PIPE NOT INCL	$502.46	LF	940	$472,309.86
6	8" SAS PIPE	$20.66	LF	26353	$544,362.80
7	10" SAS PIPE	$23.45	LF	4626	$108,470.48
8	12" SAS PIPE	$26.80	LF	3778	$101,241.80
9	15" SAS PIPE	$35.73	LF	7415	$264,940.15
10	MH, 4' DIA, C OR E 6-10' D	$3,126.40	EA	101	$315,766.50
11	MH, 6' DIA, C OR E, 6-10' D	$4,577.94	EA	34	$155,650.11
	SUBTOTAL CONSTRUCTION				**$6,654,792.91**
	CONTINGENCIES @ 20%				$1,330,958.58
	SUBTOTAL				**$7,985,751.49**
	NMGRT @ 7.875%				$628,877.93
	TOTAL CONSTRUCTION				**$8,614,629.42**
	STAKING @ 3%				$258,438.88
	DESIGN/ENGINEERING @ 10%				$861,462.94
	INSPECTION @ 4%				$344,585.18
	TESTING @ 2%				$172,292.59
	GRAND TOTAL				**$10,251,409.01**

APPENDIX C

WILSON & COMPANY

discipline | intensity | collaboration | shared ownership | solutions

TABLE 1 - WATER/SEWER UNIT FLOW TABLE (PER ABCWUA)

NO.	DESCRIPTION	ABBREVIATION	AVG. DAY UNIT WASTEWATER FLOW (GPAD)	WW PEAKING FACTOR	AVG DAY UNIT WATER (GPAD)	WATER PEAKING FACTOR
1	LIGHT RESIDENTIAL	LT-RES	1400	1.6	1400	1.6
1.6	RURAL RESIDENTIAL	RURAL-RES	100	1.6	400	1.6
2	MEDIUM RESIDENTIAL	MED-RES	1200	1.4	2900	1.4
3	HEAVY RESIDENTIAL	HVY-RES	5800	1.7	14400	1.7
4	LIGHT COMMERCIAL	LT-COMM	900	1.4	1800	1.4
5	HEAVY COMMERCIAL	HVY-COMM	1500	2.1	3000	2.1
6	LIGHT INDUSTRIAL	LT-IND	750	1.4	1500	1.4
8	HEAVY INDUSTRIAL	HVY-IND	2500	1.1	5000	1.1
9	LIGHT INSTITUTIONAL	LT-INST	500	2.3	1000	2.3
10	HEAVY INSTITUTIONAL	HVY-INST	1500	2.2	3000	2.2

NOTE: Flows and peaking factors are as reproduced from a chart provided by the Water Authority

(1) - Development Uses present within the Volcano Heights sector development plan

TABLE II-W - MIXED-USE ZONES-CALCULATED WATER DEMANDS

Mixed Zone Designation:	MX Zone Makeup					MX Zone Demands	
	ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	Weight	Water Demand MDD (GPAD)	Water Peaking Factor (Per Water Authority Table 1.)	Weighted Avg. Peaking Factor	Calculated MX Water Demand* MDD (GPAD)	Calculated MX Water Peak Demand** PHD (GPAD)
MX-H	HVY-RES	50%	14400	1.70	1.90	**8700**	**16530.00**
	HVY-COMM	50%	3000	2.10			
NR-BP	LT-COMM	25%	1800	1.40	1.93	**2700**	**5197.50**
	HVY-COMM	75%	3000	2.10			
MX-M	LT-COMM	25%	1800	1.40	1.58	**2650**	**4173.75**
	HVY-COMM	25%	3000	2.10			
	MED-RES	50%	2900	1.40			
MX-T	LT-RES	50%	1400	1.60	1.68	**1900**	**3182.50**
	HVY-COMM	25%	3000	2.10			
	LT-COMM	25%	1800	1.40			

* Maximum Day Demands(MDD) are calculated by using the weighted average of the constituent zones. For
** Peak Demands are calculated by multiplying the MDD by the Weighted Peaking Factor

TABLE III-S - MIXED-USE ZONES-CALCULATED SEWER DEMANDS

Mixed Zone Designation:	MX Zone Makeup				MX Zone
	Component Zones	Weight	SAS Demand (GPAD)	SAS Peaking Factor	Calculated MX SAS Demand (GPAD)
MX-H	HVY-RES	50%	5800	1.60	**3650**
	HVY-COMM	50%	1500	1.60	
NR-BP	LT-COMM	25%	900	1.60	**1350**
	HVY-COMM	75%	1500	1.60	
MX-M	LT-COMM	25%	900	1.60	**1200**
	HVY-COMM	25%	1500	1.60	
	MED-RES	50%	1200	1.30	
MX-T	LT-RES	50%	1400	1.60	**1300**
	HVY-COMM	25%	1500	1.60	
	LT-COMM	25%	900	1.60	
R-ML **	LT-RES	100%	1400	1.60	**1400**
R-1B **	LT-RES	100%	1400	1.60	**1400**

* To calculate a Peak Hour Flow to use for design, the DPM equation is used:
$Peak\ Flow\ (mgd) = 2.5 Average\ Flow\ (mgd)^{0.8875}$

** Existing areas outside the sector development plan which the ABBCWUA has requested to be included in the sewer demand calculations within the sector.

TABLE III-W: INDIVIDUAL AREA WATER DEMANDS

PARCEL NO	DEMAND CLASS	MDD (GPAD)	PHD (GPAD)	AREA (AC)	MDD (GPD)	PHD (GPD)
1	MX-M	2650	4173.750	11.95	31678	49893
2	MX-M	2650	4173.750	7.06	18714	29475
3	MX-M	2650	4173.750	5.49	14543	22906
4	MX-M	2650	4173.750	3.79	10038	15810
5	MX-M	2650	4173.750	3.80	10067	15856
6	MX-M	2650	4173.750	12.31	32624	51383
7	MX-T	1900	3182.500	11.42	21692	36335
8	MX-M	2650	4173.750	3.33	8830	13907
9	MX-M	2650	4173.750	4.99	13224	20827
10	MX-M	2650	4173.750	3.28	8695	13694
11	NR-BP	2700	5197.500	3.88	10465	20146
12	MX-M	2650	4173.750	8.83	23386	36833
13	NR-BP	2700	5197.500	19.46	52542	101143
14	NR-BP	2700	5197.500	11.87	32052	61700
15	MX-M	2650	4173.750	8.40	22252	35047
16	MX-T	1900	3182.500	15.04	28582	47874
17	NR-BP	2700	5197.500	12.63	34093	65629
18	NR-BP	2700	5197.500	8.21	22154	42645
19	NR-BP	2700	5197.500	8.04	21705	41783
20	NR-BP	2700	5197.500	8.86	23914	46034
21	NR-BP	2700	5197.500	3.59	9685	18643
22	MX-M	2650	4173.750	9.22	24422	38465
23	MX-T	1900	3182.500	4.55	8653	14493
24	MX-M	2650	4173.750	2.20	5827	9178
25	MX-M	2650	4173.750	8.64	22883	36040
26	MX-M	2650	4173.750	3.81	10094	15898
27	NR-BP	2700	5197.500	5.27	14216	27365
28	MX-H	8700	16530.000	3.04	26413	50185
29	MX-H	8700	16530.000	5.36	46649	88634
30	MX-H	8700	16530.000	5.97	51904	98618
31	MX-H	8700	16530.000	6	52113	99015
32	MX-H	8700	16530.000	11.90	103539	196724
33	MX-H	8700	16530.000	4.13	35896	68203
34	MX-H	8700	16530.000	3.75	32616	61971
35	MX-M	2650	4173.750	7.09	18781	29579
36	NR-BP	2700	5197.500	5.65	15260	29376
37	MX-H	8700	16530.000	2.64	23003	43705
38	MX-H	8700	16530.000	4.05	35200	66880
39	MX-H	8700	16530.000	3.94	34313	65194
40	MX-H	8700	16530.000	4.00	34800	66120
41	MX-H	8700	16530.000	3.96	34487	65525

TABLE III-W: INDIVIDUAL AREA WATER DEMANDS

PARCEL NO	DEMAND CLASS	MDD (GPAD)	PHD (GPAD)	AREA (AC)	MDD (GPD)	PHD (GPD)
42	MX-H	8700	16530.000	7.76	67529	128306
43	NR-BP	2700	5197.500	8.85	23892	45993
44	MX-M	2650	4173.750	7.08	18749	29529
45	MX-M	2650	4173.750	4.63	12262	19312
46	MX-M	2650	4173.750	4.65	12317	19400
47	MX-M	2650	4173.750	4.55	12055	18986
48	MX-M	2650	4173.750	4.54	12023	18936
49	MX-M	2650	4173.750	7.32	19401	30556
50	MX-T	1900	3182.500	7.18	13646	22857
51	MX-T	1900	3182.500	4.37	8303	13908
52	MX-T	1900	3182.500	8.44	16034	26857
53	MX-M	2650	4173.750	6.71	17784	28010
54	MX-M	2650	4173.750	3.99	10568	16645
55	MX-M	2650	4173.750	3.99	10566	16641
56	MX-M	2650	4173.750	4.21	11157	17571
57	MX-M	2650	4173.750	4.23	11196	17634
58	NR-BP	2700	5197.500	9.16	24740	47625
59	MX-M	2650	4173.750	5.03	13319	20977
60	MX-M	2650	4173.750	4.07	10786	16987
61	MX-M	2650	4173.750	4.09	10849	17087
62	MX-M	2650	4173.750	3.78	10020	15781
63	MX-M	2650	4173.750	3.83	10142	15973
64	MX-T	1900	3182.500	4.11	7817	13093
65	MX-T	1900	3182.500	1.96	3720	6231
66	MX-M	2650	4173.750	7.18	19032	29976
67	MX-T	1900	3182.500	4.70	8932	14961
68	MX-T	1900	3182.500	19.95	37905	63491
69	NR-BP	2700	5197.500	19.36	52283	100644
70	NR-BP	2700	5197.500	0.14	373	717
			TOTAL:	**441.70**	**1516746.05**	**2692055.02**

TABLE IV-S: INDIVIDUAL AREA SEWER DEMANDS

PARCEL NO	DEMAND CLASS	AVERGE DAILY FLOW (GPAD)	AREA (AC)	AVERGE DAILY FLOW (GPD)
1	MX-M	1200	11.95	14345
2	MX-M	1200	7.06	8474
3	MX-M	1200	5.49	6586
4	MX-M	1200	3.79	4546
5	MX-M	1200	3.80	4559
6	MX-M	1200	12.31	14773
7	MX-T	1300	11.42	14842
8	MX-M	1200	3.33	3998
9	MX-M	1200	4.99	5988
10	MX-M	1200	3.28	3937
11	NR-BP	1350	3.88	5233
12	MX-M	1200	8.83	10590
13	NR-BP	1350	19.46	26271
14	NR-BP	1350	11.87	16026
15	MX-M	1200	8.40	10076
16	MX-T	1300	15.04	19556
17	NR-BP	1350	12.63	17046
18	NR-BP	1350	8.21	11077
19	NR-BP	1350	8.04	10853
20	NR-BP	1350	8.86	11957
21	NR-BP	1350	3.59	4842
22	MX-M	1200	9.22	11059
23	MX-T	1300	4.55	5920
24	MX-M	1200	2.20	2639
25	MX-M	1200	8.64	10362
26	MX-M	1200	3.81	4571
27	NR-BP	1350	5.27	7108
28	MX-H	3650	3.04	11081
29	MX-H	3650	5.36	19571
30	MX-H	3650	5.97	21776
31	MX-H	3650	5.99	21864
32	MX-H	3650	11.90	43439
33	MX-H	3650	4.13	15060
34	MX-H	3650	3.75	13684
35	MX-M	1200	7.09	8504
36	NR-BP	1350	5.65	7630
37	MX-H	3650	2.64	9651
38	MX-H	3650	4.05	14768
39	MX-H	3650	3.94	14396
40	MX-H	3650	4.00	14600
41	MX-H	3650	3.96	14469

TABLE IV-S: INDIVIDUAL AREA SEWER DEMANDS

PARCEL NO	DEMAND CLASS	AVERGE DAILY FLOW (GPAD)	AREA (AC)	AVERGE DAILY FLOW (GPD)
42	MX-H	3650	7.76	28331
43	NR-BP	1350	8.85	11946
44	MX-M	1200	7.08	8490
45	MX-M	1200	4.63	5552
46	MX-M	1200	4.65	5578
47	MX-M	1200	4.55	5459
48	MX-M	1200	4.54	5444
49	MX-M	1200	7.32	8785
50	MX-T	1300	7.18	9337
51	MX-T	1300	4.37	5681
52	MX-T	1300	8.44	10971
53	MX-M	1200	6.71	8053
54	MX-M	1200	3.99	4786
55	MX-M	1200	3.99	4784
56	MX-M	1200	4.21	5052
57	MX-M	1200	4.23	5070
58	NR-BP	1350	9.16	12370
59	MX-M	1200	5.03	6031
60	MX-M	1200	4.07	4884
61	MX-M	1200	4.09	4913
62	MX-M	1200	3.78	4537
63	MX-M	1200	3.83	4592
64	MX-T	1300	4.11	5348
65	MX-T	1300	1.96	2545
66	MX-M	1200	7.18	8618
67	MX-T	1300	4.70	6111
68	MX-T	1300	19.95	25935
69	NR-BP	1350	0.27	365
70	NR-BP	1350	0.14	186
			441.70	**716930.95**

TABLE IV - WATER/SEWER UNIT FLOW TABLE (PER ABCWUA)

Land Use Type	*2020 Revised Water MDD (GPAD)*	*Water Peak Hour Factor*	*2020 Revised Avg Day Wastewater Flow (GPAD)*	*Wastewater Peak Hour Factor*
Rural Residential	400	1.6	100	1.6
Light Residential	1400	1.6	600	1.6
Medium Residential	2900	1.4	1200	1.3
Heavy Residential	14400	1.7	5800	1.6
Light Commercial	1800	1.4	900	1.6
Heavy Commercial	3000	2.1	1500	1.6
Light Industrial	1500	1.4	750	1.3
Heavy Industrial	5000	1.1	2500	1.1
Light Institutional	1000	2.3	500	1.6
Heavy Institutional	3000	2.2	1500	1.8

TABLE V-S - SEWER SYSTEM SIZING ELEMENTS

CUMULATIVE FLOWS FOR BRANCH A

PIPE SEG	INFLOWS	INFLOW PERCENT	ADTL FLOW (GPM)	TOTAL FLOW (GPM)	DIA.	PIPE SLOPE	FULL PIPE FLOW (GPM)	PERCENT FULL (Q/Q)
				0				
A0	PARCEL NO 8	50.00%	3.18	3.18	8 in	2.00%	769.09	0.41%
A0	PARCEL NO 11	50.00%	6.25	9.43	8 in	2.07%	782.44	1.21%
PEAKING FACTOR ANALISIS				45.89				
SUBTOTAL	**SAS PIPE A0**	**100.00%**	**0.00**	**45.89**	15 in	0.48%	2014.14	2.28%
A1	PARCEL NO 1	100.00%	9.96	13.14	8 in	2.00%	769.09	1.71%
A1	PARCEL NO 2	100.00%	5.89	19.03	8 in	2.00%	769.09	2.47%
A1	PARCEL NO 8	50.00%	1.39	20.42	8 in	2.00%	769.09	2.65%
A1	PARCEL NO 9	100.00%	4.16	24.58	8 in	2.00%	769.09	3.20%
A1	SAS PIPE AO	100.00%	9.43	34.01	8 in	2.00%	769.09	4.42%
A1	PARCEL NO 70	100.00%	6.25	40.26	8 in	2.00%	769.09	5.23%
A1	PARCEL NO 11	50.00%	9.96	50.22	8 in	0.48%	376.78	13.33%
A1	PARCEL NO 13	50.00%	15.85	66.07	8 in	0.48%	376.78	17.53%
A1	PARCEL NO 14	50.00%	7.27	73.34	8 in	0.48%	376.78	19.47%
A1	PARCEL NO 13	50.00%	5.55	78.89	8 in	0.40%	343.95	22.94%
A1	PARCEL NO 20	50.00%	13.59	92.48	8 in	0.40%	343.95	26.89%
PEAKING FACTOR ANALISIS				347.85				
SUBTOTAL	**SAS PIPE A1**	**N/A**	**0.00**	**347.85**	**8 in**	**0.40%**	**343.95**	**101.13%**
A2	PARCEL NO 6	50.00%	5.13	5.13	8 in	2.07%	782.44	0.66%
A2	PARCEL NO 11	50.00%	1.82	6.95	8 in	2.07%	782.44	0.89%
A2	PARCEL NO 3	100.00%	4.57	11.52	8 in	0.50%	384.55	3.00%
A2	PARCEL NO 12	100.00%	7.35	18.87	8 in	0.50%	384.55	4.91%
A2	PARCEL NO 4	100.00%	3.16	22.03	8 in	0.50%	384.55	5.73%
A2	PARCEL NO 5	100.00%	3.17	25.20	8 in	0.50%	384.55	6.55%
PEAKING FACTOR ANALISIS				109.70				
SUBTOTAL	**SAS PIPE A2**	**N/A**	**0.00**	**25.20**	**8 in**	**1.45%**	**654.86**	**3.85%**
A3	PARCEL NO 6	50.00%	5.13	5.13	8 in	0.48%	376.78	1.36%
PEAKING FACTOR ANALISIS				26.71				
SUBTOTAL	**SAS PIPE A3**	**N/A**	**0.00**	**5.13**	**8 in**	**1.45%**	**654.86**	**0.78%**
A4	SAS PIPE A2	100.00%	25.20	25.20	12 in	0.48%	1110.87	2.27%
A4	SAS PIPE A3	100.00%	5.13	30.33	12 in	0.48%	1110.87	2.73%
A4	PARCEL NO 6	50.00%	5.13	35.46	12 in	0.48%	1110.87	3.19%
PEAKING FACTOR ANALISIS				148.55				
SUBTOTAL	**SAS PIPE A4**	**100.00%**	**0.00**	**35.46**	12 in	0.48%	1110.87	3.19%
A5	SAS PIPE A1	100.00%	347.85	347.85	12 in	0.48%	1110.87	31.31%
A5	SAS PIPE A4	100.00%	35.46	383.30	12 in	0.48%	1110.87	34.50%
A5	PARCEL NO 21	100.00%	3.36	386.66	12 in	0.48%	1110.87	34.81%
A5	PARCEL NO 22	50.00%	3.84	390.50	12 in	0.48%	1110.87	35.15%
A5	PARCEL NO 20	50.00%	4.15	394.66	12 in	0.48%	1110.87	35.53%

PEAKING FACTOR ANALISIS				1260.87				
SUBTOTAL	**SAS PIPE A5**	**N/A**	**0.00**	**394.66**	**15 in**	**0.30%**	**1592.31**	**24.79%**
A6	PARCEL NO 7	100.00%	10.31	10.31	15 in	0.48%	2014.14	0.51%
A6	PARCEL NO 23	100.00%	4.11	14.42	15 in	0.48%	2014.14	0.72%
A6	PARCEL NO 22	50.00%	3.84	18.26	15 in	0.48%	2014.14	0.91%
PEAKING FACTOR ANALISIS				82.43				
SUBTOTAL	**SAS PIPE A6**	**100.00%**	**0.00**	**18.26**	15 in	0.48%	2014.14	0.91%
A7	PARCEL NO 19	100.00%	7.54	7.54	12 in	0.48%	1110.87	0.68%
PEAKING FACTOR ANALISIS				37.59				
SUBTOTAL	**SAS PIPE A7**	**100.00%**	**0.00**	**7.54**	8 in	0.48%	376.78	2.00%
A8	SAS PIPE A5	100.00%	394.66	394.66	8 in	0.48%	376.78	104.75%
A8	SAS PIPE A7	100.00%	7.54	402.19	8 in	0.48%	376.78	106.75%
PEAKING FACTOR ANALISIS				1282.22				
SUBTOTAL	**SAS PIPE A8**	**100.00%**	**0.00**	**402.19**	8 in	2.12%	791.83	50.79%
A9	SAS PIPE A7	100.00%	402.19	402.19	15 in	0.48%	2014.14	19.97%
A9	SAS PIPE A6	100.00%	18.26	420.45	15 in	0.48%	2014.14	20.88%
A9	PARCEL NO 24	100.00%	1.83	422.28	15 in	0.48%	2014.14	20.97%
A9	PARCEL NO 32	100.00%	30.17	452.45	15 in	2.12%	4232.88	10.69%
A9	PARCEL NO 42	66.00%	12.99	465.43	15 in	0.48%	2014.14	23.11%
A9	PARCEL NO 43	100.00%	8.30	473.73	15 in	0.48%	2014.14	23.52%
PEAKING FACTOR ANALISIS				1482.73				
SUBTOTAL	**SAS PIPE A9**	**100.00%**	**0.00**	**473.73**	15 in	0.48%	2014.14	23.52%
END OF SECTION A				**473.73**				

CUMULATIVE FLOWS FOR BRANCH B

PIPE SEG	INFLOWS	INFLOW	ADTL	TOTAL FLOW	DIA.	PIPE	FULL	PERCENT
B0	LS 382	100.00%	15.51	15.51	8 in	2.00%	769.09	2.02%
B0	LS 381	100.00%	28.69	44.20	8 in	2.00%	769.09	5.75%
PEAKING FACTOR ANALISIS				180.65				
SUBTOTAL	**SAS PIPE B0**	**100.00%**	**0.00**	**44.20**	**8 in**	**2.00%**	**769.09**	**5.75%**
B1	PARCEL NO 10	100.00%	7.35	7.35	8 in	2.00%	769.09	0.96%
B1	PARCEL NO 14	50.00%	1.58	8.93	8 in	2.00%	769.09	1.16%
B1	SAS PIPE B0	100.00%	44.20	53.13	8 in	2.00%	769.09	6.91%
B1	PARCEL NO 15	100.00%	7.00	60.13	8 in	2.00%	769.09	7.82%
B1	PARCEL NO 16	66.67%	9.05	69.18	8 in	2.00%	769.09	9.00%
B1	PARCEL NO 25	33.30%	2.40	71.58	8 in	0.48%	376.78	19.00%
B1	PARCEL NO 17	33.30%	3.94	75.52	8 in	0.48%	376.78	20.04%
B1	PARCEL NO 69	100.00%	0.25	75.78	8 in	0.48%	376.78	20.11%

PEAKING FACTOR ANALISIS				291.48				
SUBTOTAL	**SAS PIPE B1**	**100.00%**	**0.00**	**75.52**	**8 in**	**0.48%**	**376.78**	**20.04%**
B2	PARCEL NO 17	66.67%	7.89	7.89	8 in	0.48%	376.78	2.09%
B2	PARCEL NO 18	50.00%	3.85	11.74	8 in	0.48%	376.78	3.12%
PEAKING FACTOR ANALISIS				55.69				
SUBTOTAL	**SAS PIPE B2**	**100.00%**	**0.00**	**11.74**	**8 in**	**0.48%**	**376.78**	**3.12%**
B3	SAS PIPE B1	100.00%	75.52	75.52	8 in	0.48%	376.78	20.04%
B3	SAS PIPE B2	100.00%	11.74	87.26	8 in	0.48%	376.78	23.16%
B3	PARCEL NO 18	50.00%	3.85	91.11	8 in	0.48%	376.78	24.18%
B3	PARCEL NO 27	50.00%	2.47	93.57	8 in	0.48%	376.78	24.84%
B3	PARCEL NO 28	50.00%	3.85	97.42	8 in	0.48%	376.78	25.86%
B3	PARCEL NO 29	100.00%	13.59	111.01	8 in	0.48%	376.78	29.46%
B3	PARCEL NO 34	100.00%	9.50	120.52	8 in	0.48%	376.78	31.99%
B3	PARCEL NO 30	50.00%	7.56	128.08	8 in	0.48%	376.78	33.99%
PEAKING FACTOR ANALISIS				464.42				
SUBTOTAL	**SAS PIPE B3**	**100.00%**	**0.00**	**128.08**	**8 in**	**1.45%**	**654.86**	**19.56%**
B4	PARCEL NO 31	100.00%	15.18	15.18	8 in	0.48%	376.78	4.03%
B4	PARCEL NO 30	50.00%	7.56	22.74	8 in	0.48%	376.78	6.04%
B4	PARCEL NO 33	66.67%	6.97	29.72	8 in	0.48%	376.78	7.89%
PEAKING FACTOR ANALISIS				127.00				
SUBTOTAL	**SAS PIPE B4**	**100.00%**	**0.00**	**29.72**	**8 in**	**1.45%**	**654.86**	**4.54%**
B5	SAS PIPE B3	100.00%	128.08	128.08	10 in	0.48%	683.14	18.75%
B5	SAS PIPE B4	100.00%	29.72	157.79	10 in	0.48%	683.14	23.10%
B5	PARCEL NO 33	33.33%	3.49	161.28	10 in	0.48%	683.14	23.61%
B5	PARCEL NO 39	100.00%	10.00	171.28	10 in	0.48%	683.14	25.07%
B5	PARCEL NO 40	100.00%	10.14	181.42	10 in	0.48%	683.14	26.56%
B5	PARCEL NO 47	100.00%	3.79	185.21	10 in	0.48%	683.14	27.11%
B5	PARCEL NO 46	100.00%	3.87	189.08	10 in	0.48%	683.14	27.68%
B5	PARCEL NO 55	50.00%	1.66	190.74	10 in	0.48%	683.14	27.92%
B5	PARCEL NO 56	50.00%	1.75	192.50	10 in	0.48%	683.14	28.18%
PEAKING FACTOR ANALISIS				666.73				
SUBTOTAL	**SAS PIPE B5**	**100.00%**	**0.00**	**192.50**	**10 in**	**0.48%**	**683.14**	**28.18%**
B6	PARCEL NO 26	50.00%	1.59	1.59	8 in	0.48%	376.78	0.42%
B6	PARCEL NO 35	50.00%	2.95	4.54	8 in	0.48%	376.78	1.20%
PEAKING FACTOR ANALISIS				23.97			#DIV/0!	#DIV/0!
SUBTOTAL	**SAS PIPE B6**	**100.00%**	**0.00**	**4.54**	**8 in**	**0.48%**	**376.78**	**1.20%**
B7	PARCEL NO 16	33.30%	4.52	4.52	8 in	0.48%	376.78	1.20%
B7	PARCEL NO 25	33.30%	2.40	6.92	8 in	0.48%	376.78	1.84%
B7	PARCEL NO 26	50.00%	1.59	8.51	8 in	0.48%	376.78	2.26%
PEAKING FACTOR ANALISIS				41.84				
SUBTOTAL	**SAS PIPE B7**	**100.00%**	**0.00**	**8.51**	**8 in**	**0.48%**	**376.78**	**2.26%**
B8	SAS PIPE B6	100.00%	4.54	4.54	8 in	0.48%	376.78	1.20%
B8	SAS PIPE B7	100.00%	8.51	13.05	8 in	0.48%	376.78	3.46%
PEAKING FACTOR ANALISIS				61.16				
SUBTOTAL	**SAS PIPE B8**	**100.00%**	**0.00**	**13.05**	**8 in**	**0.48%**	**376.78**	**3.46%**
B9	PARCEL NO 35	50.00%	2.95	2.95	8 in	0.48%	376.78	0.78%

PEAKING FACTOR ANALISIS				16.36				
SUBTOTAL	**SAS PIPE B9**	**100.00%**	**0.00**	**2.95**	**8 in**	**0.48%**	**376.78**	**0.78%**
B10	PARCEL NO 25	33.30%	2.40	2.40	8 in	0.48%	376.78	0.64%
PEAKING FACTOR ANALISIS				13.59				
SUBTOTAL	**SAS PIPE B10**	**100.00%**	**0.00**	**2.40**	**8 in**	**0.48%**	**376.78**	**0.64%**
B11	SAS PIPE B8	100.00%	13.05	13.05	8 in	0.48%	376.78	3.46%
B11	SAS PIPE B9	100.00%	2.95	16.00	8 in	0.48%	376.78	4.25%
B11	SAS PIPE B10	100.00%	2.40	18.39	8 in	0.48%	376.78	4.88%
B11	PARCEL NO 27	50.00%	2.47	20.86	8 in	0.48%	376.78	5.54%
B11	PARCEL NO 28	50.00%	3.85	24.71	8 in	0.48%	376.78	6.56%
B11	PARCEL NO 36	100.00%	5.30	30.01	8 in	0.48%	376.78	7.96%
B11	PARCEL NO 37	100.00%	6.70	36.71	8 in	0.48%	376.78	9.74%
B11	PARCEL NO 38	100.00%	10.26	46.97	8 in	0.48%	376.78	12.47%
B11	PARCEL NO 48	100.00%	3.78	50.75	8 in	0.48%	376.78	13.47%
B11	PARCEL NO 49	100.00%	6.10	56.85	8 in	0.48%	376.78	15.09%
PEAKING FACTOR ANALISIS				225.86				
SUBTOTAL	**SAS PIPE B11**	**100.00%**	**0.00**	**56.85**	**8 in**	**0.48%**	**376.78**	**15.09%**
B12	PARCEL NO 50	100.00%	6.48	6.48	8 in	0.48%	376.78	1.72%
B12	PARCEL NO 51	100.00%	3.95	10.43	8 in	0.48%	376.78	2.77%
B12	PARCEL NO 52	50.00%	3.81	14.24	8 in	0.48%	376.78	3.78%
PEAKING FACTOR ANALISIS				66.10				
SUBTOTAL	**SAS PIPE B12**	**100.00%**	**0.00**	**14.24**	**8 in**	**0.48%**	**376.78**	**3.78%**
B13	SAS PIPE B11	100.00%	56.85	56.85	8 in	0.48%	376.78	15.09%
B13	SAS PIPE B12	100.00%	14.24	71.09	8 in	0.48%	376.78	18.87%
B13	PARCEL NO 54	100.00%	3.32	74.41	8 in	0.48%	376.78	19.75%
B13	PARCEL NO 53	100.00%	5.59	80.00	8 in	0.48%	376.78	21.23%
B13	PARCEL NO 55	50.00%	1.66	81.66	8 in	0.48%	376.78	21.67%
PEAKING FACTOR ANALISIS				311.50				
SUBTOTAL	**SAS PIPE B13**	**100.00%**	**0.00**	**81.66**	**8 in**	**0.48%**	**376.78**	**21.67%**
B14	SAS PIPE B5	100.00%	192.50	192.50	12 in	0.48%	1110.87	17.33%
B14	SAS PIPE B13	100.00%	81.66	274.16	12 in	0.48%	1110.87	24.68%
B14	PARCEL NO 56	50.00%	1.75	275.91	12 in	0.48%	1110.87	24.84%
PEAKING FACTOR ANALISIS				917.72				
SUBTOTAL	**SAS PIPE B14**	**100.00%**	**0.00**	**275.91**	**12 in**	**0.48%**	**1110.87**	**24.84%**
B15	PARCEL NO 41	100.00%	10.05	10.05	8 in	0.48%	376.78	2.67%
B15	PARCEL NO 45	100.00%	3.86	13.90	8 in	0.48%	376.78	3.69%
B15	PARCEL NO 57	100.00%	3.52	17.42	8 in	0.48%	376.78	4.62%
B15	PARCEL NO 44	100.00%	5.90	23.32	8 in	0.48%	376.78	6.19%
PEAKING FACTOR ANALISIS				102.42				
SUBTOTAL	**SAS PIPE B15**	**100.00%**	**0.00**	**23.32**	**12 in**	**0.48%**	**1110.87**	**2.10%**
B16	SAS PIPE 14	100.00%	275.91	275.91	12 in	0.48%	1110.87	24.84%
B16	SAS PIPE 15	100.00%	23.32	299.23	12 in	0.48%	1110.87	26.94%
PEAKING FACTOR ANALISIS				986.25				
SUBTOTAL	**SAS PIPE B16**	**100.00%**	**0.00**	**299.23**	**12 in**	**0.48%**	**1110.87**	**26.94%**
END OF SECTION B				**299.23**				

CUMULATIVE FLOWS FOR BRANCH C

PIPE SEG	INFLOWS	INFLOW PERCENT	ADTL FLOW (GPM)	TOTAL FLOW (GPM)	DIA.	PIPE SLOPE	FULL PIPE FLOW (GPM)	PERCENT FULL
C1	PARCEL NO 68	50.00%	9.01	9.01	8 in	0.48%	376.78	2.39%
PEAKING FACTOR ANALISIS				44.02				
SUBTOTAL	**SAS PIPE C1**	**100.00%**	**0.00**	**9.01**	**8 in**	**0.48%**	**376.78**	**2.39%**
C2	PARCEL NO 52	50.00%	3.81	3.81	8 in	0.48%	376.78	1.01%
C2	PARCEL NO 64	50.00%	1.86	5.67	8 in	0.48%	376.78	1.50%
PEAKING FACTOR ANALISIS				29.18				
SUBTOTAL	**SAS PIPE C2**	**100.00%**	**0.00**	**5.67**	**8 in**	**0.48%**	**376.78**	**1.50%**
C3	SAS PIPE C1	100.00%	9.01	9.01	8 in	0.48%	376.78	2.39%
C3	SAS PIPE C2	100.00%	5.67	14.67	8 in	0.48%	376.78	3.89%
PEAKING FACTOR ANALISIS				67.88				
SUBTOTAL	**SAS PIPE C3**	**100.00%**	**0.00**	**14.67**	**8 in**	**0.48%**	**376.78**	**3.89%**
C4	PARCEL NO 64	50.00%	1.86	10.86	8 in	0.48%	376.78	2.88%
PEAKING FACTOR ANALISIS				51.99				
SUBTOTAL	**SAS PIPE C4**	**100.00%**	**0.00**	**10.86**	**8 in**	**0.48%**	**376.78**	**2.88%**
C5	SAS PIPE C4	100.00%	10.86	10.86	8 in	0.48%	376.78	2.88%
C5	SAS PIPE C3	100.00%	14.67	25.53	8 in	0.48%	376.78	6.78%
C5	PARCEL NO 63	100.00%	3.19	28.72	8 in	0.48%	376.78	7.62%
C5	PARCEL NO 65	100.00%	1.77	30.49	8 in	0.48%	376.78	8.09%
C5	PARCEL NO 62	100.00%	3.15	33.64	8 in	0.48%	376.78	8.93%
C5	PARCEL NO 66	100.00%	5.99	39.63	8 in	0.48%	376.78	10.52%
C5	PARCEL NO 61	100.00%	3.41	43.04	8 in	0.48%	376.78	11.42%
C5	PARCEL NO 60	66.70%	2.26	45.30	8 in	0.48%	376.78	12.02%
PEAKING FACTOR ANALISIS				184.64				
SUBTOTAL	**SAS PIPE C5**	**100.00%**	**0.00**	**45.30**	**8 in**	**0.48%**	**376.78**	**12.02%**
C6	PARCEL NO 60	33.30%	1.13	1.13	8 in	0.48%	376.78	0.30%
C6	PARCEL NO 59	100.00%	4.19	5.32	8 in	0.48%	376.78	1.41%
PEAKING FACTOR ANALISIS				27.58				
SUBTOTAL	**SAS PIPE C6**	**100.00%**	**0.00**	**5.32**	**8 in**	**0.48%**	**376.78**	**1.41%**
C7	SAS PIPE C5	100.00%	45.30	45.30	8 in	0.48%	376.78	12.02%
C7	SAS PIPE C6	100.00%	5.32	50.62	8 in	0.48%	376.78	13.43%
PEAKING FACTOR ANALISIS				203.75				
SUBTOTAL	**SAS PIPE C7**	**100.00%**	**0.00**	**50.62**	**8 in**	**0.48%**	**376.78**	**13.43%**
C8	PARCEL NO 58	33.30%	2.86	2.86	8 in	0.48%	376.78	0.76%
PEAKING FACTOR ANALISIS				15.91				
SUBTOTAL	**SAS PIPE C8**	**100.00%**	**0.00**	**2.86**	**8 in**	**0.48%**	**376.78**	**0.76%**
C9	SAS PIPE C7	100.00%	50.62	50.62	10 in	0.48%	683.14	7.41%
C9	SAS PIPE C8	100.00%	2.86	53.48	10 in	0.48%	683.14	7.83%

C9	PARCEL NO 58	33.30%	2.86	56.34	10 in	0.48%	683.14	8.25%
C9	PARCEL NO 67	100.00%	4.24	60.58	10 in	0.48%	683.14	8.87%
PEAKING FACTOR ANALISIS				238.98	10 in	0.48%	683.14	32.35%
SUBTOTAL	**SAS PIPE C9**	**100.00%**	**0.00**	**60.58**	**10 in**	**0.48%**	**683.14**	**8.87%**
C10	SAS PIPE A9	100.00%	473.73	473.73	15 in	0.48%	2014.14	23.52%
C10	SAS PIPE B16	100.00%	299.23	772.96	15 in	0.48%	2014.14	38.38%
C10	PARCEL NO 58	66.70%	5.73	778.69	15 in	0.48%	2014.14	38.66%
C10	PARCEL NO 67	100.00%	4.24	782.94	15 in	0.48%	2014.14	38.87%
PEAKING FACTOR ANALISIS				2315.85	15 in	0.48%	2014.14	139.43%
SUBTOTAL	**SAS PIPE C10**	**100.00%**	**0.00**	**782.94**	**15 in**	**0.48%**	**2014.14**	**38.87%**
C11	SAS PIPE C9	100.00%	60.58	60.58	15 in	0.48%	2014.14	3.01%
C11	SAS PIPE C10	100.00%	782.94	843.52	15 in	0.48%	2014.14	41.88%
PEAKING FACTOR ANALISIS				2474.21	15 in	0.48%	2014.14	44.89%
SUBTOTAL	**SAS PIPE C11**	**100.00%**	**0.00**	**843.52**	**15 in**	**0.48%**	**2014.14**	**41.88%**

Table VI- Land Use Types

Mixed Zone Designation:	ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	Estimated Acres
MX-H	HVY-RES	70.49
	HVY-COMM	
NR-BP	LT-COMM	124.92
	HVY-COMM	
MX-M	LT-COMM	178.84
	HVY-COMM	
	MED-RES	
MX-T	LT-RES	79.76
	HVY-COMM	
	LT-COMM	

Table VII - Water Demand Sumary

ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	Total Estimated Acres	*Max Day Demand Equation	Total Max Day Demand (MGD)
HVY-RES			
HVY-COMM	70.49	8700	0.613263
LT-COMM			
HVY-COMM	124.92	2700	0.337284
LT-COMM			
HVY-COMM			
MED-RES	178.84	2650	0.473926
LT-RES			
HVY-COMM			
LT-COMM	79.76	1900	0.151544
TOTAL	454.01	**TOTAL DEMAND**	1.576017

*From table 2

Table VIII - Wastewater Demand Summary

ABCWUA Integrated Infrastructure Plan (IIP) Land Use Type	Total Estimated Acres	Avg Day (GPAD)	Avg Day (MG)
HVY-RES			
HVY-COMM	70.49	3650	0.257289
LT-COMM			
HVY-COMM	124.92	1350	0.168642
LT-COMM			
HVY-COMM			
MED-RES	178.84	1200	0.214608
LT-RES			
HVY-COMM			
LT-COMM	79.76	1300	0.103688
TOTAL	454.01		0.744227

Table IX - Peak Wastewater Flow by Sewer Branch

Sewer Branches	Q (GPM)
A0	9.43
A1	104.08
A2	44.17
A3	8.93
A4	62.02
A5	190.39
A6	34.36
A7	14.47
A8	204.86
A9	341.19
Basin A Total (MGD)	1.46

B0	10.20
B1	75.46
B2	22.54
B3	175.88
B4	57.06
B5	297.57
B6	7.90
B7	15.61
B8	23.51
B9	5.14
B10	4.17
B11	104.87
B12	27.34
B13	150.61
B14	451.24
B15	42.39
B16	493.62
Basin B Total (MGD)	2.83

C1	17.29
C2	10.88
C3	28.17
C4	3.57
C5	83.74
C6	9.25
C7	92.99
C8	5.49
C9	112.12
C10	853.96
C11	966.08
Basin C Total (MGD)	3.14