

**APPENDIX PD-3**  
**DOMESTIC WATER STUDY**

DRAFT

# North Watt Specific Plan Domestic Water Study

April 16, 2026

*Prepared for*



*Prepared by*



**WOOD RODGERS**

**BUILDING RELATIONSHIPS ONE PROJECT AT A TIME**

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## 1.0 Introduction

The North Watt Specific Plan area (NWSP) is in the North Highlands area of Sacramento County. The NWSP extends along Watt Avenue from Antelope Road south to Interstate 80. The plan area is within the Sacramento Suburban Water District (SSWD) service area. The NWSP is located within SSWD's North Service Area. The NWSP will identify parcels within the plan area for future redevelopment. The NWSP goal is to revitalize the North Watt corridor and facilitate public-private development.

The purpose of this water study is to identify existing water infrastructure upgrades required to provide service to the North Watt Specific Plan parcels once they are redeveloped. This study will determine new water demand factors, evaluate system capacity constraints and propose water system upgrades.

### 1.1 Land Use

The NWSP area is primarily a commercial corridor. The plan area is comprised of 384 parcels over 638.68 acres, with retail/commercial, residential, office and industrial land uses. The existing land use summary is shown in Table 1. The existing land uses are shown on the Existing Land Use Plan.

**Table 1: Existing Project Land Use**

Source: AECOM

| Land Use Designation    | Acres         | % of Acres  |
|-------------------------|---------------|-------------|
| Retail/Commercial       | 135.94        | 21%         |
| <i>Restaurant</i>       | 14.99         | 2%          |
| <i>Retail</i>           | 101.28        | 16%         |
| <i>Vehicle-Oriented</i> | 19.67         | 3%          |
| Residential             | 40.54         | 6%          |
| <i>Multi-Family</i>     | 32.81         | 5%          |
| <i>Single-Family</i>    | 6.66          | 1%          |
| <i>Hotel</i>            | 1.07          | 0%          |
| Office                  | 28.07         | 4%          |
| Industrial              | 205.00        | 32%         |
| Church/Welfare          | 40.71         | 6%          |
| Public/Utilities        | 2.31          | 0%          |
| Recreational            | 3.40          | 1%          |
| Miscellaneous           | 42.94         | 7%          |
| Vacant                  | 139.77        | 22%         |
| <b>Total</b>            | <b>638.68</b> | <b>100%</b> |

The Specific Plan's purpose is to encourage infill development. In order to identify the water system improvements required to serve development within the Specific Plan Area, the planning team identified 160 parcels for assumed development, and assumptions for land use types and development intensity and density to guide the water system analysis. The proposed land uses are small lot multi-family, medium lot mixed use and large lot mixed use. The medium lot and large lot mixed use are proposed to have commercial and multi-family components. The multi-family portion will be apartment style dwelling units. The proposed redevelopment parcels and their respective land uses are shown on the Proposed Land Use Plan. The residential unit densities vary depending on land use and parcel size. The densities range from 15 dwelling units per acre to 40 dwelling units per acre. The proposed redevelopment parcel, land use and densities are shown in Table 2.

**Table 2: Proposed Redevelopment Parcel Land Use**

Source: AECOM

| Land Use               | Area (acres)  | Number of Parcels | Target Density (DU/acre) | Estimated Dwelling Units (DU) | Estimate Gross Square Feet (SF) |
|------------------------|---------------|-------------------|--------------------------|-------------------------------|---------------------------------|
| Small Lot Multi-Family | 2.94          | 22                | 15                       | 45                            |                                 |
| Medium Lot Mixed-Use   | 47.65         | 81                | 25                       | 1,192                         | 518,906                         |
| Large Lot Mixed-Use    | 158.91        | 57                | 40                       | 5,986                         | 1,703,504                       |
| <b>Total</b>           | <b>209.50</b> | <b>160</b>        |                          | <b>7,223</b>                  | <b>2,249,409</b>                |

## 2.0 Existing Water System Description

The existing SSWD system includes water supply and infrastructure. This study will briefly discuss water supply however the focus of the study is infrastructure.

### 2.1 Water Supply

Both groundwater and surface water are conveyed to the NWSP area. Groundwater wells are the primary source of water for the area. The wells are supplemented by surface water from Placer County Water Agency (PCWA). Surface water supplies have usage conditions. Surface water flows are seasonal and dependent on water flows in the American River. Per SSWD's Water Forum Agreement, water flows must be above a certain quantity for SSWD to take and use surface water. Surface water flows are also contingent on available treatment shoulder capacity at San Juan Water District's Peterson Treatment Plant. If capacity is not available SSWD must decrease or stop usage. According to SSWD, sufficient water supply is available to provide service to the NWSP area.

### 2.2 Water Infrastructure

Existing water infrastructure within the plan area consists of 6-, 8-, 10-, 12- and 16-inch water mains. The plan area is broken into two separate distribution water systems: north of the Union Pacific Railroad and south of the railroad. The water system along Watt Avenue, north of the railroad, is comprised of predominantly 8-inch water mains. There is a 12-inch water main from Larry Way south to Karl Drive. SSWD requires minimum pipe sizes for water distribution mains to adequately deliver domestic and public fire protection to all new developments. The minimum water distribution main sizes are determined with reference to the Real Property Use Zones established by Sacramento County. Per SSWD Improvement Standards, Section D-2, a minimum 12-inch water main is required within a commercial corridor.

The existing water mains in the plan area south of the railroad vary in size from 6 to 16-inch. Some portions of this area have been redeveloped, and the water system has been upgraded to meet SSWD requirements. The water system within this area is looped throughout the properties to provide supporting facilities for fire protection.

## 3.0 Project Water Demands

The project water demands were determined by combining the residential demand and the commercial demand. The residential demands were determined by multiplying the daily demand factor by the number of dwelling units (DU). The commercial demand was determined by multiplying the daily demand factor by the acreage.

### 3.1 Water Demand Factors

SSWD maintains their own hydraulic model of their water system. For this study, we determined the proposed unit demand factors in collaboration with SSWD, and SSWD performed the necessary hydraulic modelling. The following resources were used to develop the unit water demand factors

- 2024 SSWD Water Supply Assessment (WSA) for Regional Housing Needs Allocation Rezone Project (2024WSA)
- 2020 SSWD Urban Water Management Plan (2020 UWMP)
- 2017 SSWD Water System Master Plan

The unit water demand factors represent average day demand (ADD) and are expressed in gallons per day per acre (gpd/ac) and gallons per day per dwelling unit (gpd/DU). The 2017 SSWD Water System Master Plan identified average day unit water demand factors at District buildout, which is projected in the year 2031.

The water demand factors include both indoor and outdoor demands. When calculating the mixed-use demand factors, the outdoor demand is accounted for in the non-residential portion. The unit water demand factors at buildout based on land use are shown in Table 3

**Table 3: Average Day Unit Water Demand Factors at Buildout by Land Use**

Source: 2017 SSWD Water System Master Plan

|                      |                                     | Non-Residential Demand<br>(gpd/ac) |         |       | Residential Demand<br>(gpd/DU) |         |       |
|----------------------|-------------------------------------|------------------------------------|---------|-------|--------------------------------|---------|-------|
| Land Use             | Residential<br>Density<br>(DU/acre) | Indoor                             | Outdoor | Total | Indoor                         | Outdoor | Total |
| Small Multi-Family   | 7-15                                | -                                  | -       | -     | 168                            | 41      | 209   |
| Medium Lot Mixed-Use | 25                                  | 1,251                              | 332     | 1,583 | 168                            | -       | 168   |
| Large Lot Mixed-Use  | 40                                  | 1,251                              | 332     | 1,583 | 168                            | -       | 168   |

### 3.2 Proposed Demands

The proposed water demands were determined by utilizing the average day demand factors shown in Table 2 and the number of dwelling units and commercial acreage shown in Table 1. For the model analysis performed by SSWD, the demand was converted from average day demand (ADD) to maximum day demand (MDD) using the following formula:

$$1.9 \times ADD = MDD^1$$

Proposed average day and maximum day demands are expressed in gallons per day (gpd) and gallons per minute (gpm). The proposed water demands are shown in Table 4.

<sup>1</sup> SSWD Water System Master Plan, prepared by Brown and Caldwell, 2017

**Table 4: Proposed Water Demands**

| Land Use             | Dwelling Units (DU) | Commercial (acres) | Water Demand             |                |                  |                    |              |
|----------------------|---------------------|--------------------|--------------------------|----------------|------------------|--------------------|--------------|
|                      |                     |                    | Average Day Demand (gpd) |                |                  | Maximum Day Demand |              |
|                      |                     |                    | Residential              | Commercial     | Total            | (gpd)              | (gpm)        |
| Small Multi-Family   | 45                  | -                  | 9,405                    | -              | 9,405            | 17,870             | 12           |
| Medium Lot Mixed-Use | 1,192               | 47.65              | 200,256                  | 75,430         | 275,686          | 523,803            | 364          |
| Large Lot Mixed-Use  | 5,986               | 158.91             | 1,005,648                | 251,551        | 1,257,199        | 2,388,678          | 1,659        |
| <b>Total</b>         | <b>7,223</b>        | <b>206.56</b>      | <b>1,215,309</b>         | <b>326,980</b> | <b>1,542,289</b> | <b>2,930,350</b>   | <b>2,035</b> |

A detailed average day demand breakdown by parcel is shown in Appendix E

### 3.3 Existing Demands

The NWSP area consists of 384 parcels while only 160 parcels are proposed for redevelopment. Of the 160 redevelopment parcels, seventy-nine (79) are existing SSWD customers and their respective demands were removed from the water system hydraulic model and replaced with the proposed demands. There are eighty-one (81) redevelopment parcels which are not current SSWD customers<sup>2</sup>. The existing water demands are shown in Table 5.

**Table 5: Existing Water Demands**

Source: SSWD 2025 Water System Hydraulic Model

| No. of Existing SSWD Parcels | Water Demand (gpm) |                    |
|------------------------------|--------------------|--------------------|
|                              | Average Day Demand | Maximum Day Demand |
| 79                           | 57                 | 108                |

The 224 parcels within the NWSP area, which are not proposed to be redeveloped will retain existing demands currently in the SSWD 2025 water system hydraulic model.

## 4.0 System Evaluation

SSWD regulations set parameters for water main sizes based on various land use. The land use establishes the minimum fire flows required, which then dictates the size of the water main. A residential parcel has a lower fire flow requirement than a commercial or industrial parcel. SSWD requires a minimum 12-inch water main for service to commercial properties. The proposed redevelopment parcels, with mixed-use land use, will require minimum 12-inch water mains.

SSWD maintains the water system hydraulic model. The hydraulic model uses InfoWater Pro software to run both dynamic and steady state simulations. The dynamic model simulates the water system over a 24-hour period using a diurnal curve to simulate the water system's fluctuating demand and supply changes, such as water tanks emptying and filling. The diurnal curve uses hourly multipliers applied to the average daily demand to represent real time fluctuations. The steady state model is used to run fire flow conditions.

<sup>2</sup> North Watt Specific Plan Technical Memorandum, prepared by Brown and Caldwell

The existing water system was evaluated utilizing the SSWD 2025 water system hydraulic model simulated under the following conditions:

- Demand: MDD conditions with the NWSP redevelopment demands listed in Table 3
- Supply: Groundwater only

SSWD simulated multiple scenarios to evaluate the existing water system including:

- Run 1: This is the baseline scenario simulating the proposed conditions outlined above with a diurnal pattern simulating hourly demands to evaluate the system under peak hour demands,
- Run 2: Fire flow condition of Run 1,
- Run 1a: Baseline scenario described in Run 1 with proposed pipeline improvements,
- Run 2a: Fire flow condition described in Run 2 with proposed pipeline improvements.

#### 4.1 Peak Hour Demand Evaluation Criteria

Based on the required evaluation criteria shown in Table 6, under peak hour demands, the SSWD system was evaluated with redevelopment demands.

**Table 6: Evaluation Criteria**

Source: SSWD Improvement Standards

| Component                                                         | Criteria  |
|-------------------------------------------------------------------|-----------|
| <b>Water Transmission Line Sizing (16-in diameter or greater)</b> |           |
| Minimum Pressure, (psi)                                           | 35 psi    |
| Maximum Head Loss, (ft/kft)                                       | 7 ft/kft  |
| Maximum Velocity, (fps)                                           | 7 fps     |
| <b>Water Distribution Line Sizing (Less than 16-in diameter)</b>  |           |
| Minimum Pressure, (psi)                                           | 35 psi    |
| Maximum Head Loss, (ft/kft)                                       | 10 ft/kft |
| Maximum Velocity, (fps)                                           | 5 fps     |

#### 4.2 Fire Flow Requirements

The SSWD system was evaluated to meet fire flow requirements during maximum day demand conditions, using the redevelopment demands and based on the requirements shown in Table 5. The fire flow requirements are based on Sacramento Metro Fire District and California Fire Code minimum standards. The final fire flow requirements are based building square footage, height and construction type. For the purposes of this study we are assuming Sacramento Metro Fire District minimum fire flow requirements for multi-family and commercial projects. Individual parcel fire flow requirements may be different and will be determined at time of development. SSWD's water system hydraulic model does not include laterals to specific fire hydrants; therefore, SSWD assumes only 80 percent of the modeled fire flow is available at the fire hydrant. Table 7 details the minimum fire flow requirements at the fire hydrant and corresponding nearest modeled junction.

**Table 7: Fire Flow Requirements**

Source: SSWD Regulations and Sacramento Metro Fire District

| NWSP Land Use Type                                   | Equivalent SSWD Master Plan Building Type | Criteria at Fire Hydrant | Criteria at Nearest Modeled Junction |
|------------------------------------------------------|-------------------------------------------|--------------------------|--------------------------------------|
| Small Multi-Family                                   | Multi-Family Residential                  | 2,500 gpm at 2 hrs.      | 3,125 gpm at 2 hrs.                  |
| Medium Lot Mixed-Use:<br>Commercial and Multi-Family | Commercial                                | 3,000 gpm at 3 hrs.      | 3,750 gpm at 3 hrs.                  |
| Large Lot Mixed-use:<br>Commercial and Multi-Family  | Commercial                                | 3,000 gpm at 3 hrs.      | 3,750 gpm at 3 hrs.                  |

### 4.3 Results

SSWD simulated multiple scenarios using the design criteria. The first scenario, Run 1, is the baseline scenario using maximum day demands and groundwater supply. This scenario uses a diurnal pattern simulating hourly demands to evaluate the system under peak hour demands. The modeling results indicate minimum pressures, maximum headloss, and maximum velocity criteria, listed in Table 5, are all met within the vicinity of NWSP area. The results are shown in the North Watt Specific Plan Modeling Technical Memorandum, by Brown and Caldwell, in Appendix D. Since no system deficiencies were found during Run 1, Run 1a was not needed.

The second scenario, Run 2, is the fire flow condition of Run 1. Multiple fire flow deficiencies were identified in localized areas. The results are shown in Appendix D. Since fire flow deficiencies were identified, Run 2a was necessary to identify and address potential system improvements.

## 5.0 Recommendations

The NWSP area is an existing commercial corridor that Sacramento County has identified as an area for redevelopment. The NWSP is intended to help facilitate public/private development opportunities to revitalize the North Watt Avenue corridor. The focus of this study is to evaluate the existing water distribution system, determine any system capacity constraints and propose any system upgrades necessary to meet SSWD requirements.

There are two criteria for the proposed system upgrades. The first, does the water system have the capacity to meet proposed demands, and the second, does the water system meet SSWD regulations based on the proposed redevelopment land uses. The water system hydraulic model results indicate the existing system meets peak hour demands, however there were capacity deficiencies identified when modelling fire flow demands. To meet fire flow requirements, parts of the existing water system require improvements. Those improvements and the affected parcels are listed in Table 8 and in the Proposed Water System Exhibit.

**Table 8: Proposed Water System Upgrades to Meet Fire Flow Requirements**

Source: North Watt Specific Plan Technical Memorandum, dated February 28, 2026, prepared by Brown and Caldwell

| Water System Upgrades                                                                                                                                                                                                                           | Parcels                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Upsize existing 8-inch water main to 12-inch water main                                                                                                                                                                                         | 27-30                               |
| Confirm existing water main is continuous. SSWD's GIS model indicates a water valve at this location, however there is a gap at this location. Fire flow requirements are met if this area is looped.                                           | 66                                  |
| Install new 12-inch water main and hydrants, along Dudley Boulevard and Freedom Park Drive, and connect to the existing North Service Area mains. The McClellan Business Park Service Area is adjacent, and a cross connection is not proposed. | 147, & 151-152                      |
| Install new 12-inch water main in Watt Avenue from A Street to Poplar Drive and make connections to existing system to provide a looped system.                                                                                                 | 192-195, 200-204, 207 & 384         |
| Upsize existing 6-inch water main to 12-inch water main in Myrtle Avenue from Palomino Lane to Watt Avenue, and in Watt Avenue from Myrtle Avenue to Oakdell Avenue.                                                                            | 266, 268, 271, 273, 275, 276, & 304 |

Note: These improvements will affect parcels not included in the redevelopment plan.

SSWD regulations state that commercial corridors be served by a minimum 12-inch water main. Per, Brown and Caldwell's Technical Memorandum, the additional improvements, listed in Table 9, are not required to meet water system hydraulic standards, however they are required to meet SSWD regulations. Those improvements and the affected parcels are listed in Table 9 and in the Proposed Water System Exhibit.

**Table 9: Proposed Water System Upgrades to Meet SSWD Regulations**

Source: North Watt Specific Plan Technical Memorandum, dated February 28, 2026, prepared by Brown and Caldwell

| Water System Upgrades                                                                                               | Parcels                                                          |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Upsize existing 8-inch water main to 12-inch water main in Watt Avenue from Antelope Road to Larry Way.             | 3, 9, 12-15, 17, 23, 26, 31-34, 37-38, 49-50, 67-68, 73, & 75-79 |
| Upsize existing 8-inch water main to 12-inch water main in Watt Avenue, from Karl Drive to just south of James Way. | 165-168, 170, 180, 185, 188, & 190-192                           |

Note: These improvements will affect parcels not included in the redevelopment plan.

These improvements will provide adequate fire flow and meet SSWD regulations for their water system in a commercial corridor

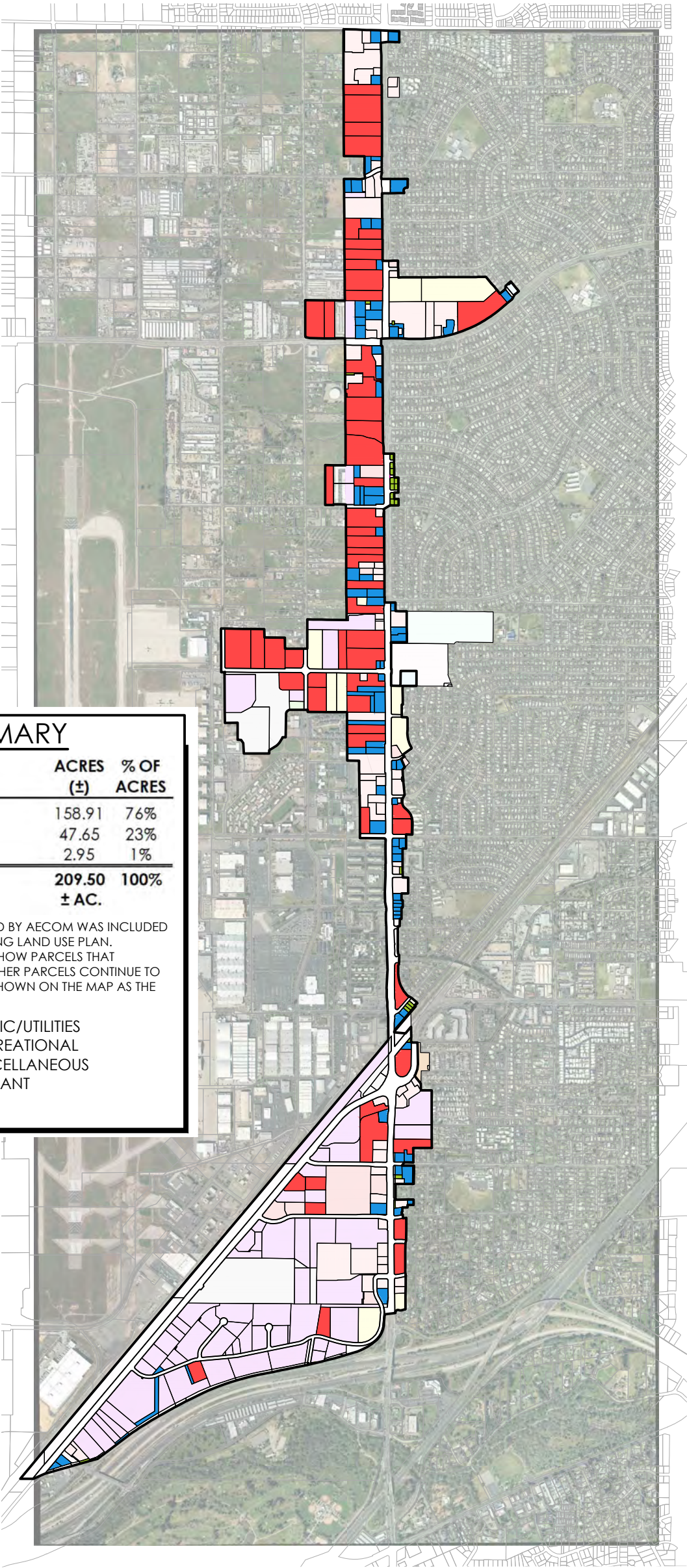
## APPENDIX A: Land Use Plan

PROPOSED LAND USE PLAN

NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CALIFORNIA

MARCH 18, 2026

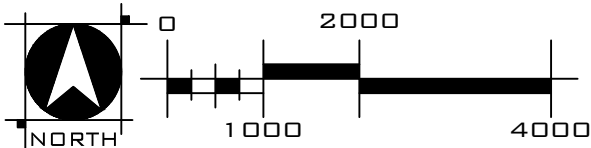


LAND USE SUMMARY

| LAND USE DESIGNATION | ACRES<br>(±)  | % OF<br>ACRES |
|----------------------|---------------|---------------|
| LARGE LOT MIXED-USE  | 158.91        | 76%           |
| MEDIUM LOT MIXED-USE | 47.65         | 23%           |
| SMALL MULTI-FAMILY   | 2.95          | 1%            |
| <b>Total</b>         | <b>209.50</b> | <b>100%</b>   |
|                      | <b>± AC.</b>  |               |

NOTE 1: ONLY PARCEL INFORMATION PROVIDED BY AECOM WAS INCLUDED IN THE ACREAGE CALCULATION FOR THE EXISTING LAND USE PLAN.  
NOTE 2: ALL LAND USE DESIGNATIONS ABOVE SHOW PARCELS THAT PROPOSED NEW DEVELOPMENT ONSITE. ALL OTHER PARCELS CONTINUE TO HAVE THE SAME EXISTING LAND USE AND ARE SHOWN ON THE MAP AS THE COLORS BELOW:

- RETAIL/COMMERCIAL
- PUBLIC/UTILITIES
- RESIDENTIAL
- RECREATIONAL
- OFFICE
- MISCELLANEOUS
- INDUSTRIAL
- VACANT
- CHURCH/WELFARE





WOOD RODGERS

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Sacramento, CA 95816

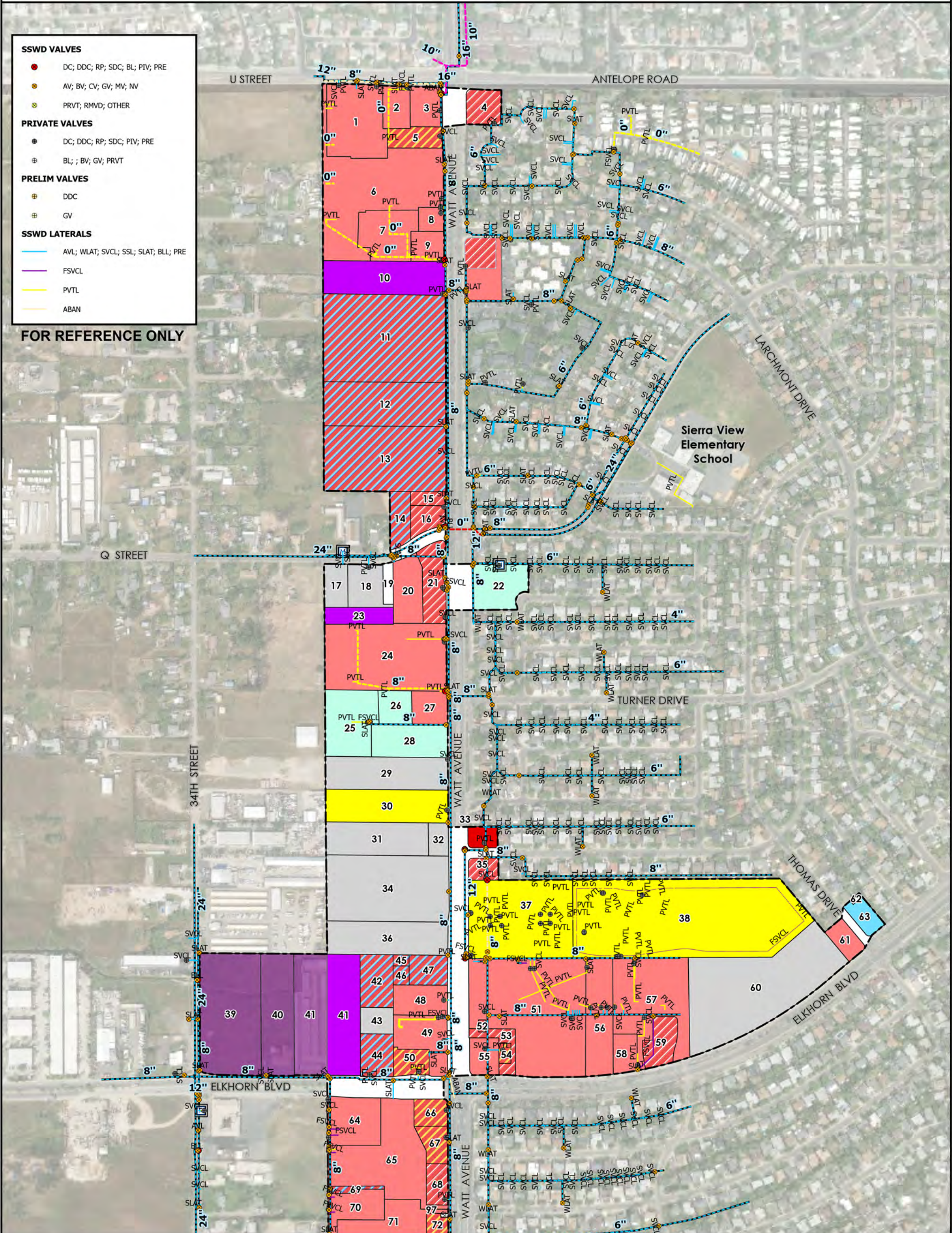
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## APPENDIX B: Existing Conditions

# WATER STUDY PLAN - EXISTING CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



**SSWD VALVES**

- DC; DDC; RP; SDC; BL; PIV; PRE
- AV; BV; CV; GV; MV; NV
- PRVT; RMVD; OTHER

**PRIVATE VALVES**

- DC; DDC; RP; SDC; PIV; PRE
- BL; ; BV; GV; PRVT

**PRELIM VALVES**

- DDC
- GV

**SSWD LATERALS**

- AVL; WLAT; SVCL; SSL; SLAT; BLL; PRE
- FSVCL
- PVTL
- ABAN

FOR REFERENCE ONLY

**WATER MAIN TYPE:**

- WATER MAIN
- DIAMETER = 0-INCH
- CAL-AM
- PRIVATE
- ABANDONED

- Church / Welfare
- Industrial
- Miscellaneous
- Office
- Public / Utilities

- Recreational
- Residential
- Retail / Commercial
- Vacant
- Restaurant

- Retail / Commercial
- Vehicle Oriented
- NORTH WATT SPECIFIC PLAN
- WATER METER (PUBLIC)
- SAMPLING STATION

SOURCES:  
\* EXISTING WATER FACILITIES PROVIDED BY SACRAMENTO SUBURBAN WATER DISTRICT GIS.  
\* NORTH WATT SPECIFIC PLAN BOUNDARY PROVIDED BY AECOM

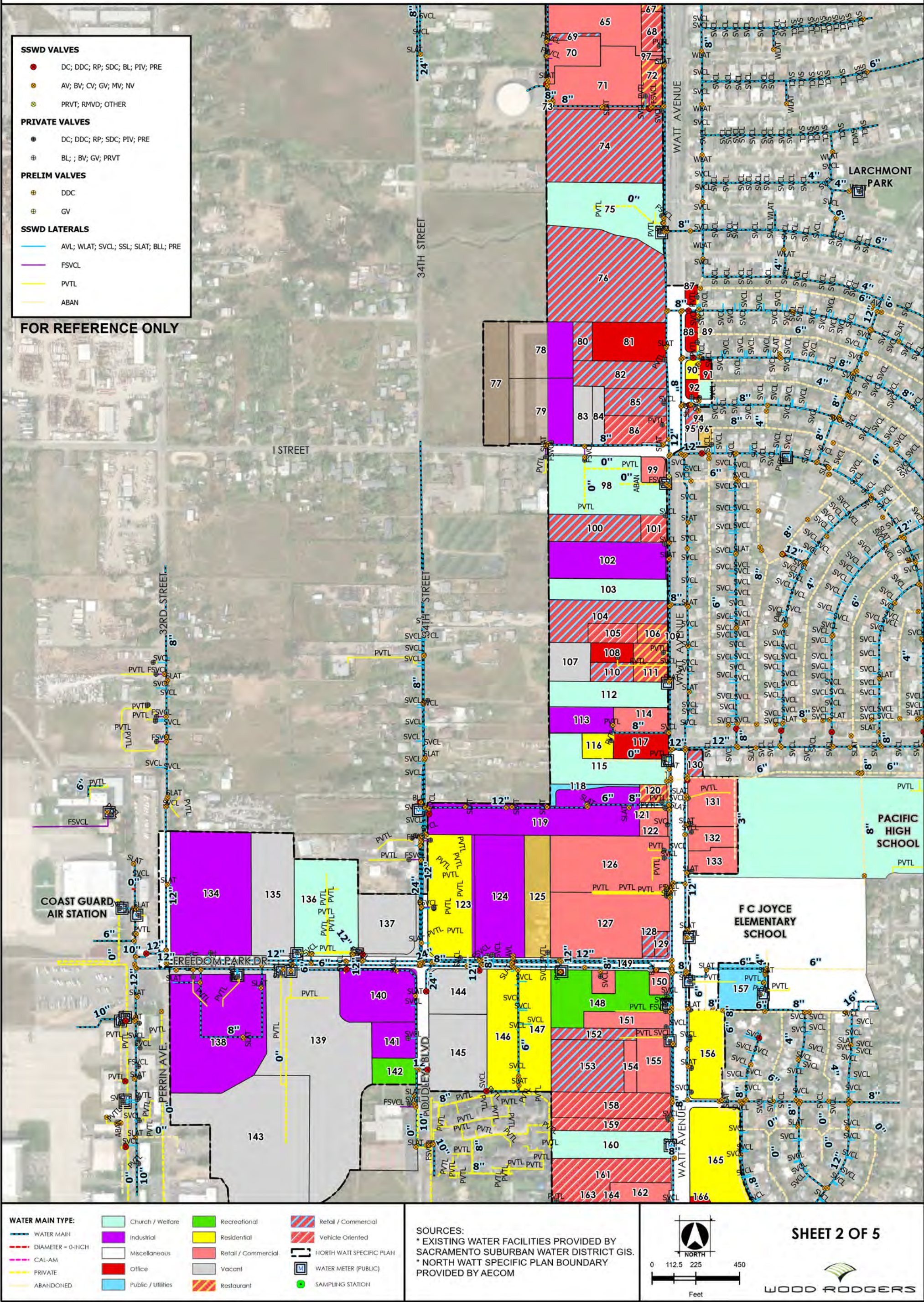
0 112.5 225 450  
Feet

SHEET 1 OF 5

# WATER STUDY PLAN - EXISTING CONDITIONS

## NORTH WATT SPECIFIC PLAN

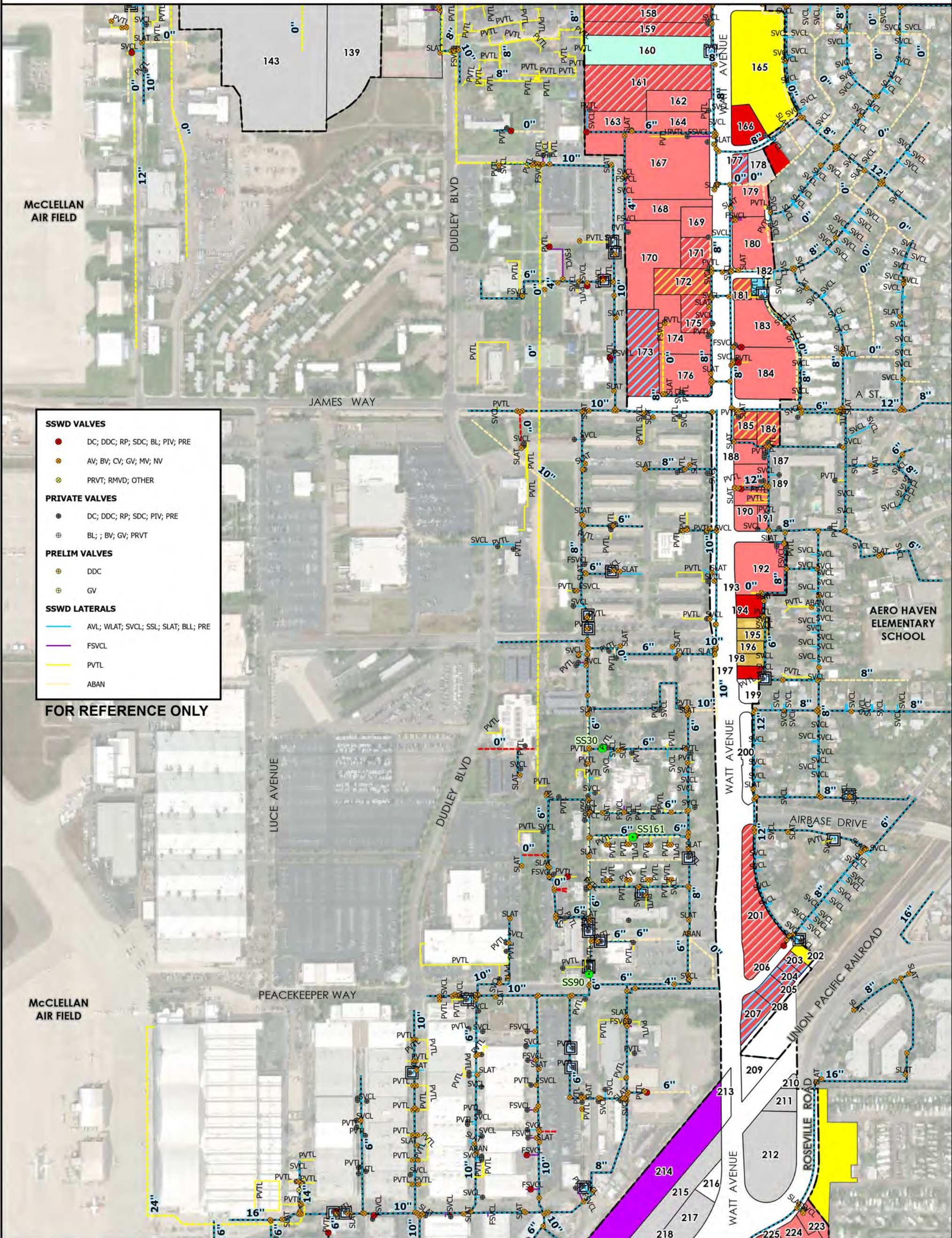
COUNTY OF SACRAMENTO, CA  
MARCH 2026



# WATER STUDY PLAN - EXISTING CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



| WATER MAIN TYPE: |                   |  |                          |
|------------------|-------------------|--|--------------------------|
|                  | WATER MAIN        |  | Church / Welfare         |
|                  | DIAMETER = 0-INCH |  | Recreational             |
|                  | CAL-AM            |  | Residential              |
|                  | PRIVATE           |  | Retail / Commercial      |
|                  | ABANDONED         |  | Miscellaneous            |
|                  |                   |  | Office                   |
|                  |                   |  | Vacant                   |
|                  |                   |  | Public / Utilities       |
|                  |                   |  | Restaurant               |
|                  |                   |  | Retail / Commercial      |
|                  |                   |  | Vehicle Oriented         |
|                  |                   |  | NORTH WATT SPECIFIC PLAN |
|                  |                   |  | WATER METER (PUBLIC)     |
|                  |                   |  | SAMPLING STATION         |

SOURCES:  
\* EXISTING WATER FACILITIES PROVIDED BY  
SACRAMENTO SUBURBAN WATER DISTRICT GIS.  
\* NORTH WATT SPECIFIC PLAN BOUNDARY  
PROVIDED BY AECOM



SHEET 3 OF 5

WOOD RODGERS

COUNTY OF SACRAMENTO, CA  
MARCH 2026

## SSWD VALVES

- ## PRIVATE VALVES

- ## PRELIM VALVES

- ## SSWD LATERALS

- FOR REFERENCE ONLY**

**SSWD VALVES**

- DC; DDC; RP; SDC; BL; PIV; PRE
- AV; BV; CV; GV; MV; NV
- PRVT; RMVD; OTHER

**PRIVATE VALVES**

- DC; DDC; RP; SDC; PIV; PRE
- BL; BV; GV; PRVT

**PRELIM VALVES**

- DDC
- GV

**SSWD LATERALS**

- AVL; WLAT; SVCL; SSL; SLAT; BLL; PRE
- FSVCL
- PVTL
- ABAN

**FOR REFERENCE ONLY**

The map displays a residential area with numerous property lots, each identified by a unique number. The lots are color-coded: red for lots 220-250, 260-280, 290-300, 310-320, 330-340, and 350-360; purple for lots 251-260, 261-270, 271-280, 281-290, 291-300, 301-310, 311-320, 321-330, 331-340, and 341-350; and yellow for lots 351-360. The map shows a network of water service lines, including SSWD laterals (AVL, WLAT, SVCL, SSL, SLAT, BLL, PRE) and private laterals (FSVCL, PVTL, ABAN). The lines are color-coded and labeled with their respective sizes (e.g., 6", 8", 10", 12", 16", 20", 24") and types. The map also shows various valves (DC, DDC, RP, SDC, BL, PIV, PRE, AV, BV, CV, GV, MV, NV, PRVT, RMVD, OTHER) and their locations. The map is overlaid on an aerial photograph and shows various streets including Dudley Blvd, Roseville Road, Myrtle Ave, Winona Way, Orange Grove Ave, and Interstate 80. The map is a technical drawing for engineering purposes, showing the layout of water service infrastructure for a specific residential area.

**WATER MAIN TYPE:**

- |                                                                                     |                   |                                                                                     |                    |                                                                                     |                     |                                                                                     |                          |
|-------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|--------------------------|
|  | WATER MAIN        |  | Industrial         |  | Residential         |  | Vehicle Oriented         |
|  | DIAMETER = 0-INCH |  | Miscellaneous      |  | Retail / Commercial |  | NORTH WATT SPECIFIC PLAN |
|  | CAL-AM            |  | Office             |  | Vacant              |  | WATER METER (PUBLIC)     |
|  | PRIVATE           |  | Public / Utilities |  | Restaurant          |  | SAMPLING STATION         |
|  | ABANDONED         |                                                                                     |                    |                                                                                     |                     |                                                                                     |                          |

**SOURCES:**

**SOURCES:**  
 \* EXISTING WATER FACILITIES PROVIDED BY  
 SACRAMENTO SUBURBAN WATER DISTRICT GIS.  
 \* NORTH WATT SPECIFIC PLAN BOUNDARY  
 PROVIDED BY AECOM



A horizontal graphic scale bar with four vertical tick marks. Above the bar, the numbers 0, 112.5, 225, and 450 are printed. Below the bar, the word "Feet" is centered.

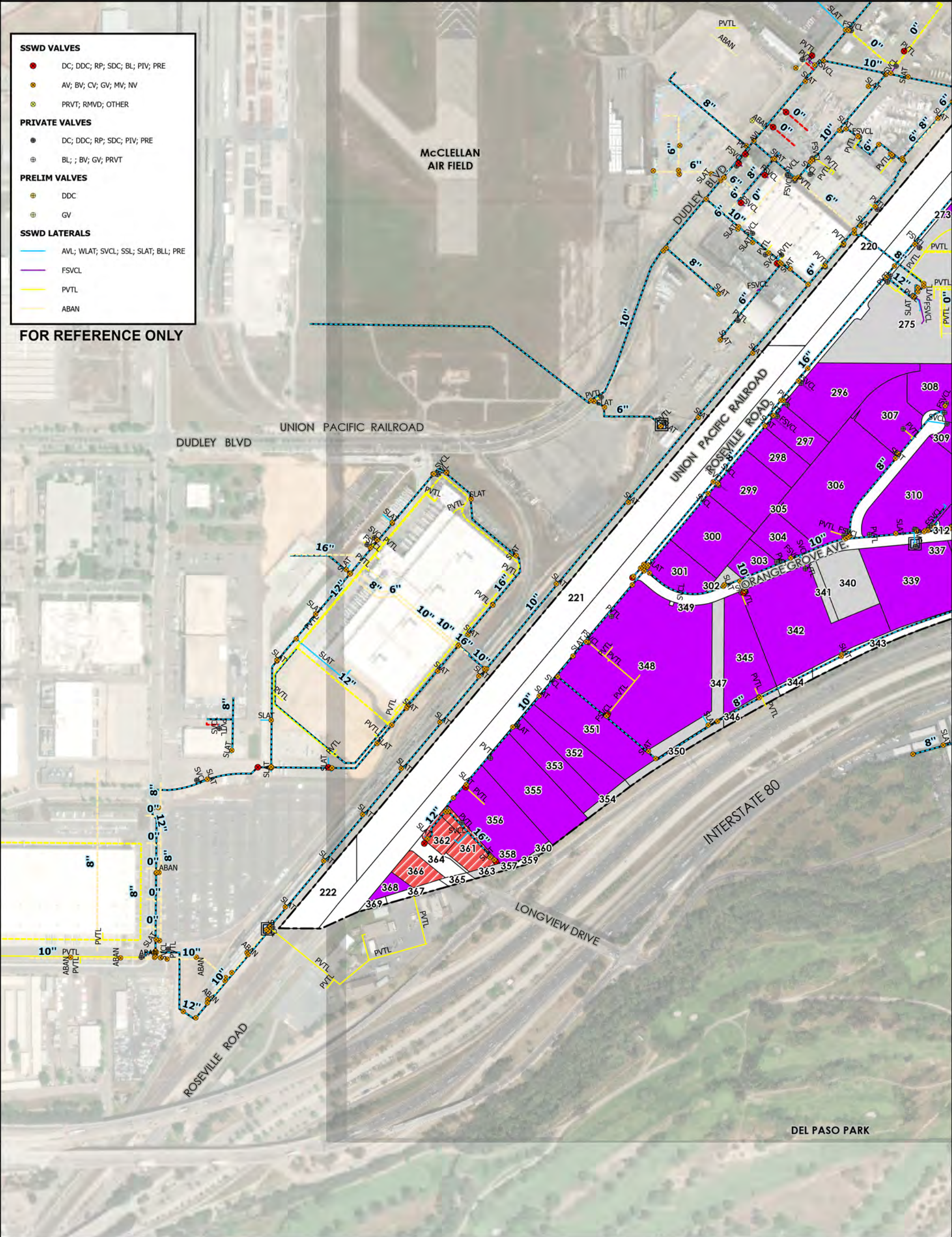
**SHEET 4 OF 5**



# WATER STUDY PLAN - EXISTING CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



**WATER MAIN TYPE:**

- WATER MAIN
- DIAMETER = 0-INCH
- CAL-AM
- PRIVATE
- ABANDONED

- Church / Welfare
- Industrial
- Miscellaneous
- Office
- Public / Utilities
- Recreational
- Residential
- Retail / Commercial
- Vacant
- Restaurant

- Retail / Commercial
- Vehicle Oriented
- NORTH WATT SPECIFIC PLAN
- WATER METER (PUBLIC)
- SAMPLING STATION

**SOURCES:**

- \* EXISTING WATER FACILITIES PROVIDED BY SACRAMENTO SUBURBAN WATER DISTRICT GIS.
- \* NORTH WATT SPECIFIC PLAN BOUNDARY PROVIDED BY AECOM

0 112.5 225 450

Feet

**SHEET 5 OF 5**

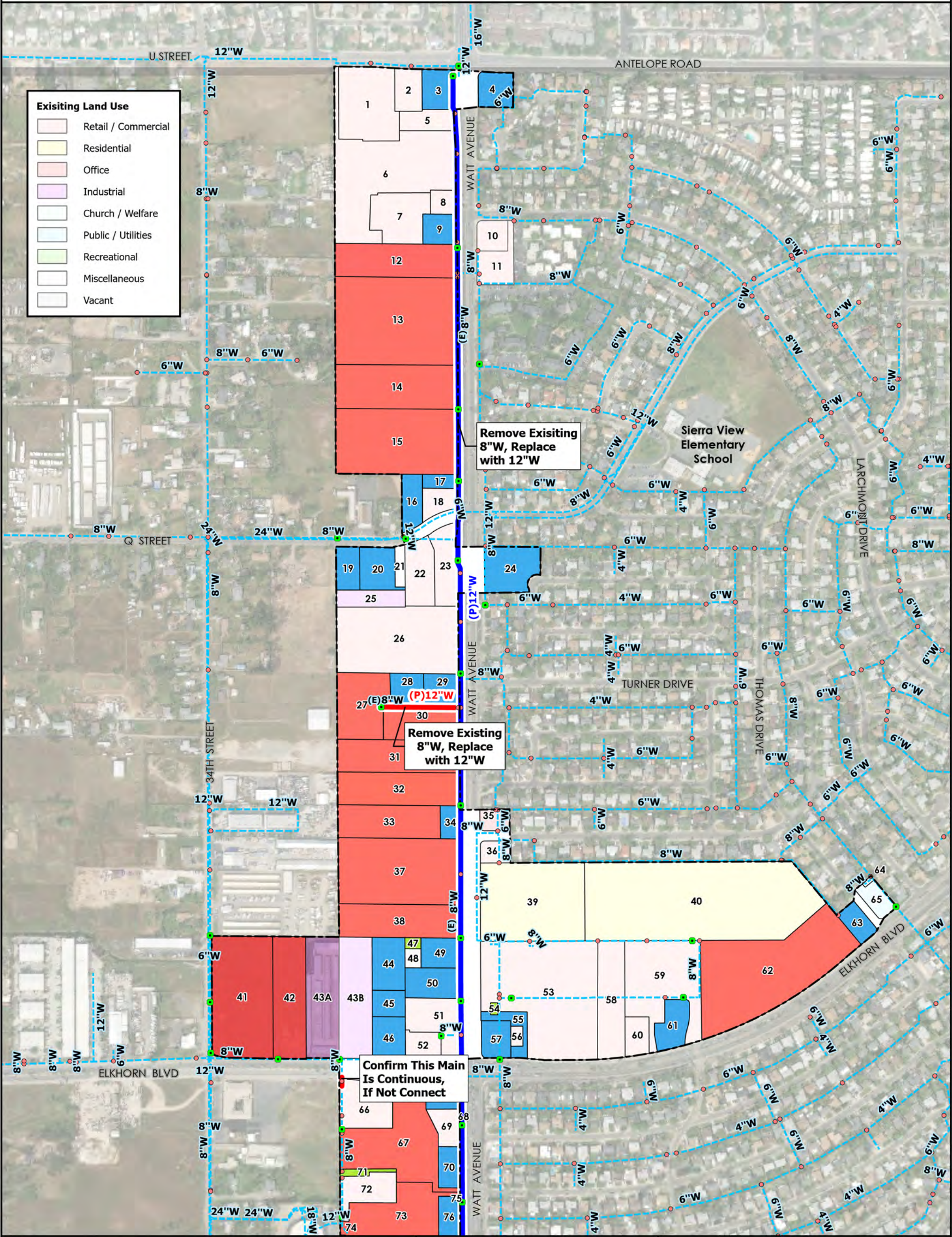
WOOD RODGERS

## APPENDIX C: Proposed Conditions

# WATER STUDY PLAN - PROPOSED CONDITIONS

## NORTH WATT SPECIFIC PLAN

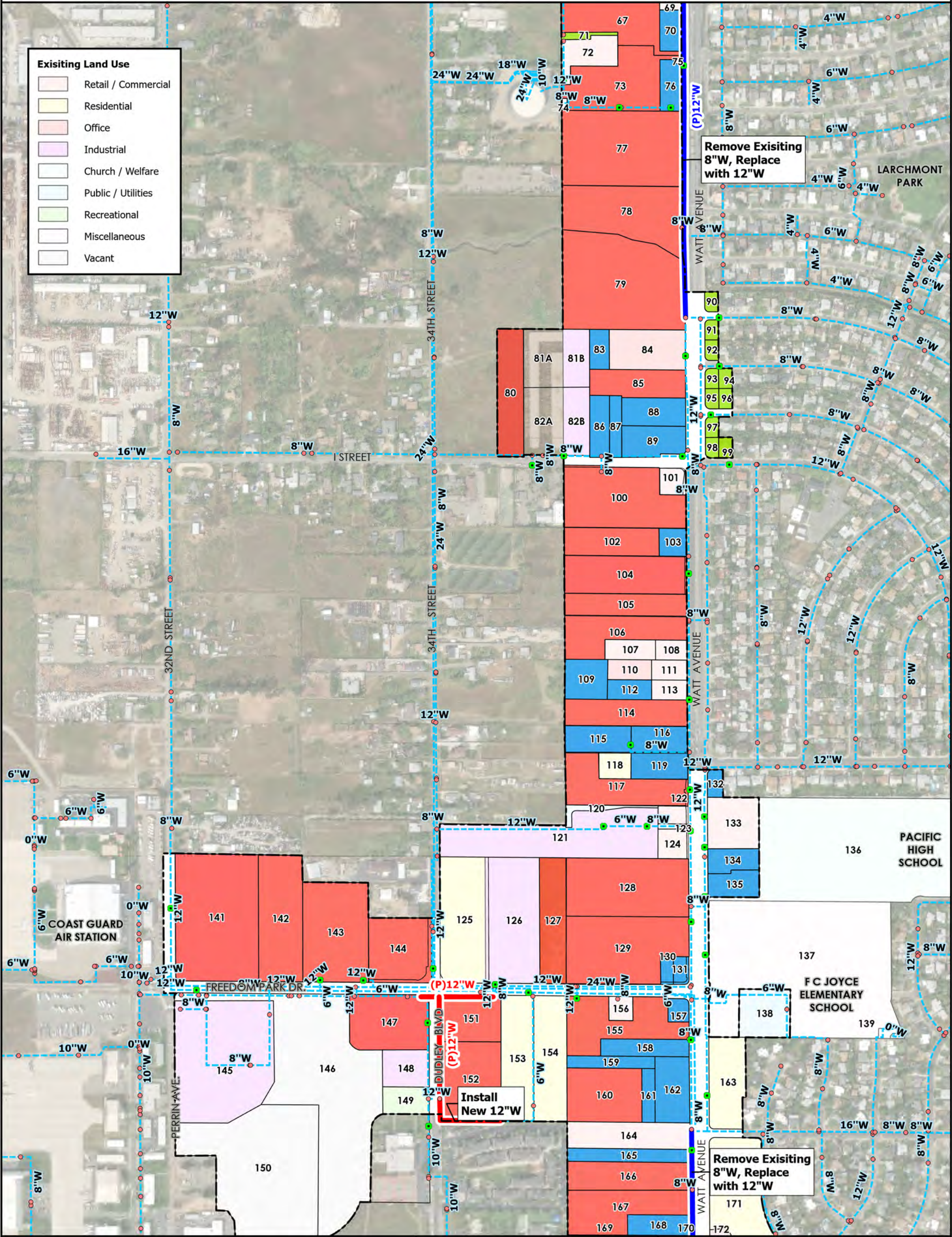
COUNTY OF SACRAMENTO, CA  
MARCH 2026



# WATER STUDY PLAN - PROPOSED CONDITIONS

## NORTH WATT SPECIFIC PLAN

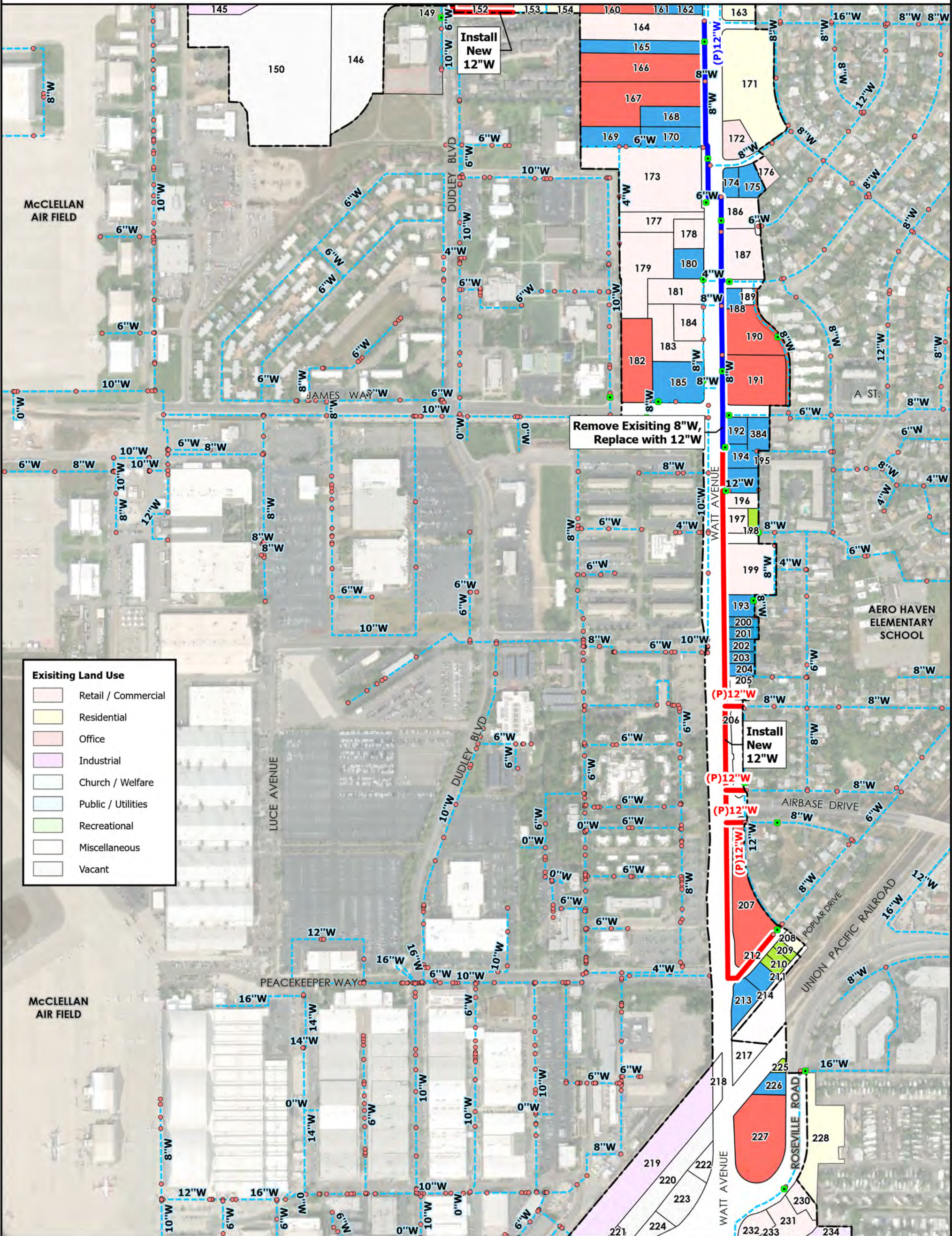
COUNTY OF SACRAMENTO, CA  
MARCH 2026



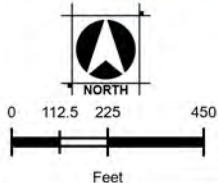
# WATER STUDY PLAN - PROPOSED CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



SOURCES:  
\* WATER FACILITIES PROVIDED BY  
SACRAMENTO SUBURBAN WATER DISTRICT GIS.  
\* NORTH WATT SPECIFIC PLAN BOUNDARY  
PROVIDED BY AECOM



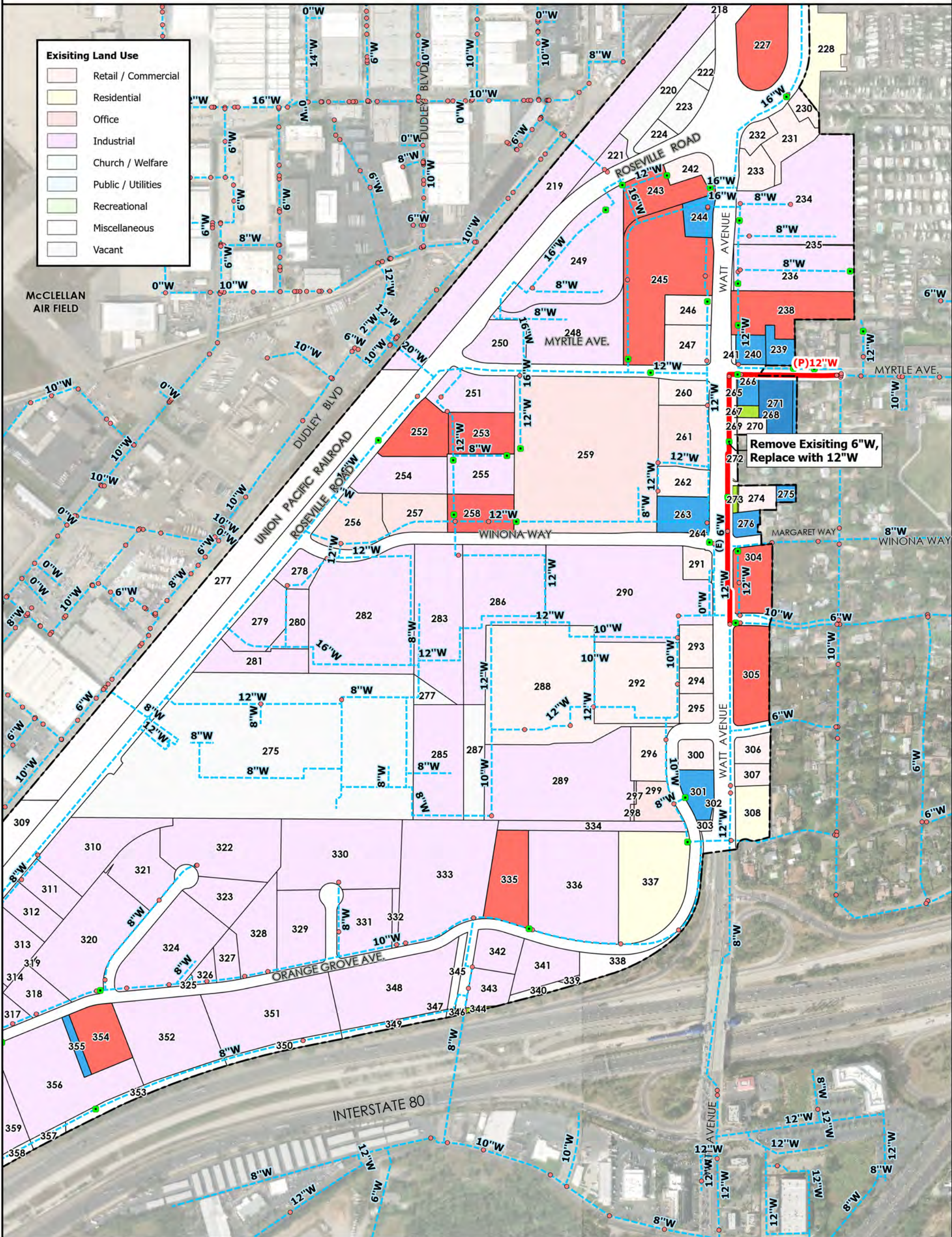
SHEET 3 OF 5



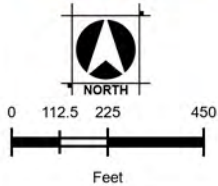
# WATER STUDY PLAN - PROPOSED CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



SOURCES:  
\* WATER FACILITIES PROVIDED BY  
SACRAMENTO SUBURBAN WATER DISTRICT GIS.  
\* NORTH WATT SPECIFIC PLAN BOUNDARY  
PROVIDED BY AECOM



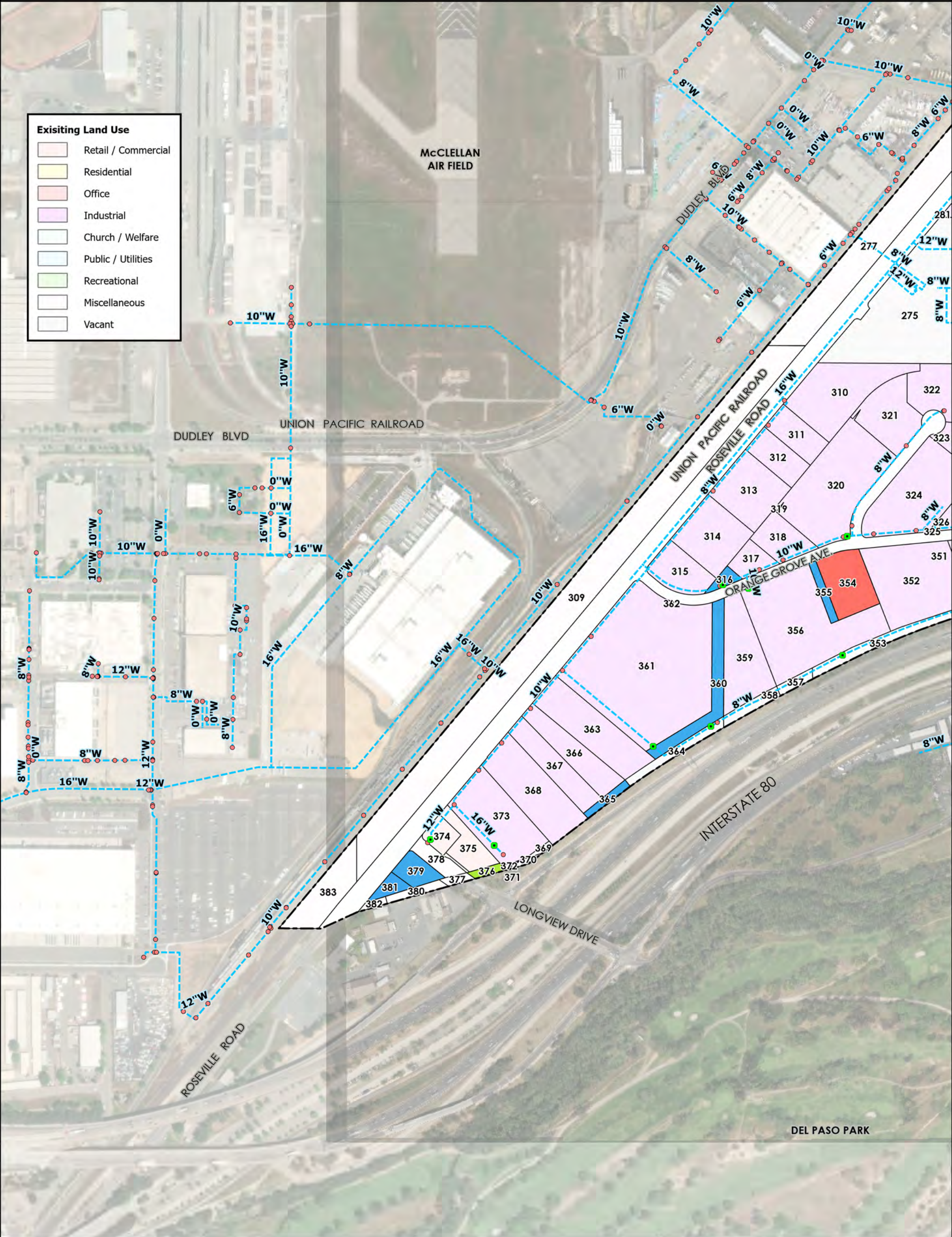
SHEET 4 OF 5

WOOD RODGERS

# WATER STUDY PLAN - PROPOSED CONDITIONS

## NORTH WATT SPECIFIC PLAN

COUNTY OF SACRAMENTO, CA  
MARCH 2026



|                                                                       |                                                                                                                                                                                                                                 |                                                                                                                                                                                       |                                                                                                                                                                                                      |                            |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <ul style="list-style-type: none"><li>HYDRANT</li><li>VALVE</li></ul> | <b>WATER MAIN</b> <ul style="list-style-type: none"><li>EXISTING</li><li><b>PROPOSED WATER MAIN</b><ul style="list-style-type: none"><li>REQUIRED TO MEET FIRE FLOW</li><li>REQUIRED TO MEET SSWD STANDARDS</li></ul></li></ul> | <b>PROPOSED LAND USE</b> <ul style="list-style-type: none"><li>LARGE LOT MIXED-USE</li><li>MEDIUM LOT MIXED-USE</li><li>SMALL MULTI-FAMILY</li><li>NORTH WATT SPECIFIC PLAN</li></ul> | <b>SOURCES:</b> <ul style="list-style-type: none"><li>* WATER FACILITIES PROVIDED BY SACRAMENTO SUBURBAN WATER DISTRICT GIS.</li><li>* NORTH WATT SPECIFIC PLAN BOUNDARY PROVIDED BY AECOM</li></ul> | <p><b>SHEET 5 OF 5</b></p> |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|

## APPENDIX D: Modelling Results



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# Technical Memorandum

## DRAFT

Prepared for: Sacramento Suburban Water District

Project No.: 152854

### Technical Memorandum

Subject: North Watt Specific Plan Modeling

Date: February 28, 2026

To: Karen Holcombe, Senior Project Manager

From: Melanie Holton

Prepared by: \_\_\_\_\_  
Lauren Starosta, P.E., TX License No. 106329  
Project Engineer

Reviewed by: \_\_\_\_\_  
Melanie Holton, P.E., CA License No. 64983

Reviewed by: \_\_\_\_\_  
Colin Ricks, P.E., UT License No. 9339073-2202

### Limitations:

*This is a draft memorandum and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.*

*This document was prepared solely for Sacramento Suburban Water District in accordance with professional standards at the time the services were performed and in accordance with the contract between Sacramento Suburban Water District and Brown and Caldwell dated **Date**. This document is governed by the specific scope of work authorized by Sacramento Suburban Water District; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Sacramento Suburban Water District and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.*

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## Section 1: Introduction

Sacramento County is redeveloping the north Watt Avenue commercial corridor and needs to identify the water system infrastructure improvements to serve this redevelopment. Sacramento County has developed the North Watt Specific Plan (NWSP). The NWSP identifies parcels planned for redevelopment as shown in Attachment A. These parcels are all within the Sacramento Suburban Water District (SSWD) service area. Brown and Caldwell (BC) was tasked to confirm the NWSP water demands estimated by Sacramento County and run the SSWD hydraulic model with those demands so that Sacramento County could propose improvements to address SSWD deficiencies identified given the change in demand. This technical memorandum (TM) documents the confirmation of the NWSP demand review and water system hydraulic modeling of the NWSP redevelopment added to the SSWD water distribution system. The TM also informs SSWD of improvements that would address the deficiencies; however, the final improvements are to be proposed by Sacramento County through discussions with SSWD.

## Section 2: Water Demand

Sacramento County developed estimates of future water demand based on the redevelopment plan for the NWSP. BC reviewed the NWSP demand and estimated the SSWD existing customers demands currently being served in the NWSP area.

### 2.1 NWSP Water Demand

Table 1 summarizes the land use types as shown in the NWSP redevelopment plan shown in Attachment A and the selected unit water demand factors used to estimate water demand for the NWSP redevelopment parcels. The following resources were used for the unit water demand factors for the NWSP land uses:

- 2024 SSWD Water Supply Assessment (WSA) for Regional Housing Needs Allocation Rezone Project (2024 WSA)
- 2020 SSWD Urban Water Management Plan (2020 UWMP)
- 2017 SSWD Water System Master Plan

The unit water demand factors represent average day demand (ADD). Unit water demand factors are expressed in gallons per day per acre (gpd/ac) and gpd per dwelling unit (gpd/DU).



**Table 1. Average Day Unit Water Demand Factors by Land Use**

| Land Use or Customer Sectors in NWSP              | Residential density (dwelling units (DU) per acre) | Non-Residential Demand (gpd/ac) |                      |       | Residential Demand (gpd/DU) |                      |       |
|---------------------------------------------------|----------------------------------------------------|---------------------------------|----------------------|-------|-----------------------------|----------------------|-------|
|                                                   |                                                    | Indoor <sup>a</sup>             | Outdoor <sup>b</sup> | Total | Indoor <sup>a</sup>         | Outdoor <sup>b</sup> | Total |
| Small Multi-Family                                | 7-15                                               | --                              | --                   | --    | 168                         | 41                   | 209   |
| Medium Lot Mixed Use: Commercial and Multi Family | 25                                                 | 1,251                           | 332                  | 1,583 | 168                         | -- <sup>c</sup>      | 168   |
| Large Lot Mixed Use: Commercial and Multi Family  | 40                                                 | 1,251                           | 332                  | 1,583 | 168                         | -- <sup>c</sup>      | 168   |

a. Commercial outdoor estimate based on the SSWD 2020 UWMP (21% outdoor usage).

b. Multi-family outdoor water use estimate based on assumptions in 2024 WSA for the SSWD portion of the Sac County RHNA Rezone project. Assumed 15% irrigated landscape area per acre, based on net evapotranspiration (ET<sub>o</sub>) of 58-in/year, with a 70% ET<sub>o</sub> factor. The net ET<sub>o</sub> is from SSWD's 2024 Urban Water Use Objective Report to DWR. Unit water used in gpd per DU is assumed to be proportional to gpd/acre for outdoor usage (20%). This is close to the 29% outdoor usage for multi-family customers in the 2020 UWMP but likely lower because 20% is based on Urban Water Use Objectives defined since the 2020 UWMP.

c. Outdoor use is already accounted for in the non-residential (i.e., commercial) portion of the unit demand.

Sacramento County provided acres of each type of land use and the expected number of dwelling units for each parcel as a GIS shapefile. The resulting redevelopment and water demands are summarized in Table 2. For the model analysis the demand was converted from ADD to maximum day demand (MDD) based on a ratio of 1.9 MDD to ADD per the SSWD Water System Master Plan (Brown and Caldwell, 2017). Demands are expressed in gallons per day (gpd) and gallons per minute (gpm).

**Table 2. NWSP Redevelopment Dwelling Units, Commercial Acreage, and Water Demand**

| Land Use or Customer Sectors                      | Dwelling Units | Commercial Area (acres) | Water Demand <sup>a</sup> |                |                  |                    |              |
|---------------------------------------------------|----------------|-------------------------|---------------------------|----------------|------------------|--------------------|--------------|
|                                                   |                |                         | Average Day Demand (gpd)  |                |                  | Maximum Day Demand |              |
|                                                   |                |                         | Residential               | Commercial     | Total            | (gpd)              | (gpm)        |
| Small Multi-Family                                | 45             | --                      | 9,405                     | --             | 9,405            | 17,870             | 12           |
| Medium Lot Mixed Use: Commercial and Multi Family | 1,192          | 47.7                    | 200,256                   | 75,430         | 275,686          | 523,803            | 364          |
| Large Lot Mixed Use: Commercial and Multi Family  | 5,986          | 158.9                   | 1,005,648                 | 251,551        | 1,257,199        | 2,388,678          | 1,659        |
| <b>TOTAL</b>                                      | <b>7,223</b>   | <b>206.6</b>            | <b>1,215,309</b>          | <b>326,980</b> | <b>1,542,289</b> | <b>2,930,350</b>   | <b>2,035</b> |

a. Resulting demands are consistent with the Maddaus projections.

## 2.2 Existing Demands

SSWD existing water system customers were correlated to 79 of the 160 parcels in the NWSP redevelopment area as shown in Table 3. These SSWD existing customer water demands were removed from the water system hydraulic model before applying the NWSP redevelopment water demands. As shown in Table 3 existing average day demand in the NWSP is 57 gpm, approximately 5 percent of the proposed redevelopment demand.



| <b>Table 3. Existing SSWD Water Demands in NWSP Parcels</b> |                |                                 |                    |
|-------------------------------------------------------------|----------------|---------------------------------|--------------------|
| Method to Correlate SSWD Customers with NWSP Parcel         | No. of Parcels | Water Demand <sup>a</sup> (gpm) |                    |
|                                                             |                | Average Day Demand              | Maximum Day Demand |
| Using SSWD customer address                                 | 70             | --                              | --                 |
| Using Google Earth aerial image                             | 9              | --                              | --                 |
| <b>TOTAL</b>                                                | <b>79</b>      | <b>57</b>                       | <b>108</b>         |

a. Existing water demands in the NWSP are based on water demands in the SSWD 2025 water system hydraulic model.

NWSP parcels with no SSWD existing customers identified are as follows:

- A. 67 parcels are vacant or used for parking based on Google Earth aerial imagery review
- B. Five parcels do not have an SSWD service account but there is a demand at a junction near the parcel in the water system hydraulic model that could not be matched to an SSWD service accounts. Total demand for these junctions was 6 gpm average day demand.
- C. Nine parcels do not have an SSWD service account and there is no modeled demand for them

For parcels identified in category A and C, there is no existing demand that needs to be removed before adding the NWSP redevelopment demand. For category B, it is uncertain if the demands relate to the redevelopment parcels are another demand; therefore, the demands at those junctions were kept in the model to be conservative.

## 2.3 Demand Summary

The process for updating the demand in the model for the NWSP redevelopment analysis is summarized in Table 4.

| <b>Table 4. SSWD Hydraulic Model Demand Summary</b>      |                    |               |
|----------------------------------------------------------|--------------------|---------------|
| Demand Update Process                                    | Water Demand (gpm) |               |
|                                                          | Average Day        | Maximum Day   |
| Total existing conditions model demand                   | 19,641             | 37,318        |
| Existing demand removed from NWSP redevelopment area (-) | (57)               | (108)         |
| Redevelopment demand added for NWSP                      | 1,071              | 2,035         |
| <b>Total model demand with NWSP redevelopment</b>        | <b>20,655</b>      | <b>39,245</b> |

## Section 3: Model Evaluation

The SSWD 2025 water system hydraulic model was simulated under the following conditions:

- Demand: MDD conditions with the NWSP redevelopment demands
- Supply: Groundwater only



The system was evaluated during peak hour demand during MDD conditions and for fire flow during MDD conditions. Improvements were identified to address deficiencies. The specific scenarios simulated that represent this evaluation process are described as follows:

- Run 1: This is the baseline scenario simulating the conditions outlined above with a diurnal pattern simulating hourly demands to evaluate the system under MDD conditions with peak hour demands. The results showed no deficiencies that needed improvement; therefore, no additional runs were needed under these conditions.
- Run 2: Fire flow condition (MDD plus fire flow) of Run 1. Deficiencies were identified.
- Run 2a: Run 2 with recommended pipeline improvements

The SSWD system in the vicinity of the NWSP redevelopment was evaluated under these scenarios according to the criteria outlined below.

### 3.1 Evaluation Criteria for Peak Hour Demand

For Run 1, the SSWD system was evaluated with the redevelopment demands based on the criteria shown in Table . These criteria are from the SSWD Water System Master Plan.

| Table 5. Evaluation Criteria for Peak Hour Demands         |           |
|------------------------------------------------------------|-----------|
| Component                                                  | Criteria  |
| Water Transmission Line Sizing (16-in diameter or greater) |           |
| Minimum Pressure, psi                                      | 35 psi    |
| Maximum Head Loss, ft/kft                                  | 7 ft/kft  |
| Maximum Velocity, fps                                      | 7 fps     |
| Water Distribution Line Sizing (Less than 16-in diameter)  |           |
| Minimum Pressure, psi                                      | 35 psi    |
| Maximum Head Loss, ft/kft                                  | 10 ft/kft |
| Maximum Velocity, fps                                      | 5 fps     |

*psi: pounds per square inch*

*ft/kft: feet per thousand feet of pipe*

*fps: feet per second*

### 3.2 Fire Flow Requirements

For Run 2, the SSWD system was evaluated to meet fire flow requirements during MDD conditions with the NWSP redevelopment demands based on the criteria shown in Table 5. These criteria are from the SSWD Water System Master Plan. The water system hydraulic model does not include laterals to specific hydrants; therefore, SSWD assumes only 80 percent of the modeled fire flow is available at the hydrant. The required modeled fire flows to meet the criteria at the hydrant are also shown in Table 5.



**Table 6. Evaluation Criteria for Fire Flow**

| Land Use Type                                     | Equivalent SSWD Master Plan Building Type | Criteria at Hydrant <sup>a</sup> | Criteria at Nearest Modeled Junction <sup>b</sup> |
|---------------------------------------------------|-------------------------------------------|----------------------------------|---------------------------------------------------|
| Small Multi-Family                                | Multi-Family Residential                  | 2,500 gpm @ 2 hrs.               | 3,125 gpm @ 2 hrs.                                |
| Medium Lot Mixed Use: Commercial and Multi Family | Commercial                                | 3,000 gpm @ 3 hrs.               | 3,750 gpm @ 3 hrs.                                |
| Large Lot Mixed Use: Commercial and Multi Family  | Commercial                                | 3,000 gpm @ 3 hrs.               | 3,750 gpm @ 3 hrs.                                |

a. Residual pressure requirement: 20 psi

b. SSWD assumes only 80 percent of the modeled fire flow is available at the hydrant; therefore, these values at the modeled junction would meet the criteria at the hydrant

### 3.3 Results

The results and potential improvements are shown in exhibits as part of Attachment B.

The SSWD system in the vicinity of the NWSP redevelopment meets the evaluation criteria for peak hour demand during MDD (Run 1). Minimum pressures, maximum headloss, and maximum velocity criteria are all met within the vicinity of the NWSP redevelopment area. This excludes connections at pumps and wells.

Fire flow deficiencies were identified in localized areas (Run 2). Potential improvements were identified to address the fire flow deficiencies, and these improvements were included in Run 2a to confirm that the improvements resolve the deficiencies .

The final set of exhibits in Attachment B show additional improvements needed to meet the SSWD requirement that a minimum 12-in diameter pipeline is needed to serve mixed use development. These additional improvements were not included in Run 2a because they were not needed to meet the hydraulic requirements.

## References

Brown and Caldwell. 2020 Urban Water Management Plan. June 2021.

Brown and Caldwell. 2024 SSWD Water Supply Assessment for Regional Housing Needs Allocation Rezone Project. 2024.

Brown and Caldwell, Water System Master Plan, Section 11, "Hydraulic Modeling", Prepared for Sacramento Suburban Water District, 2017.



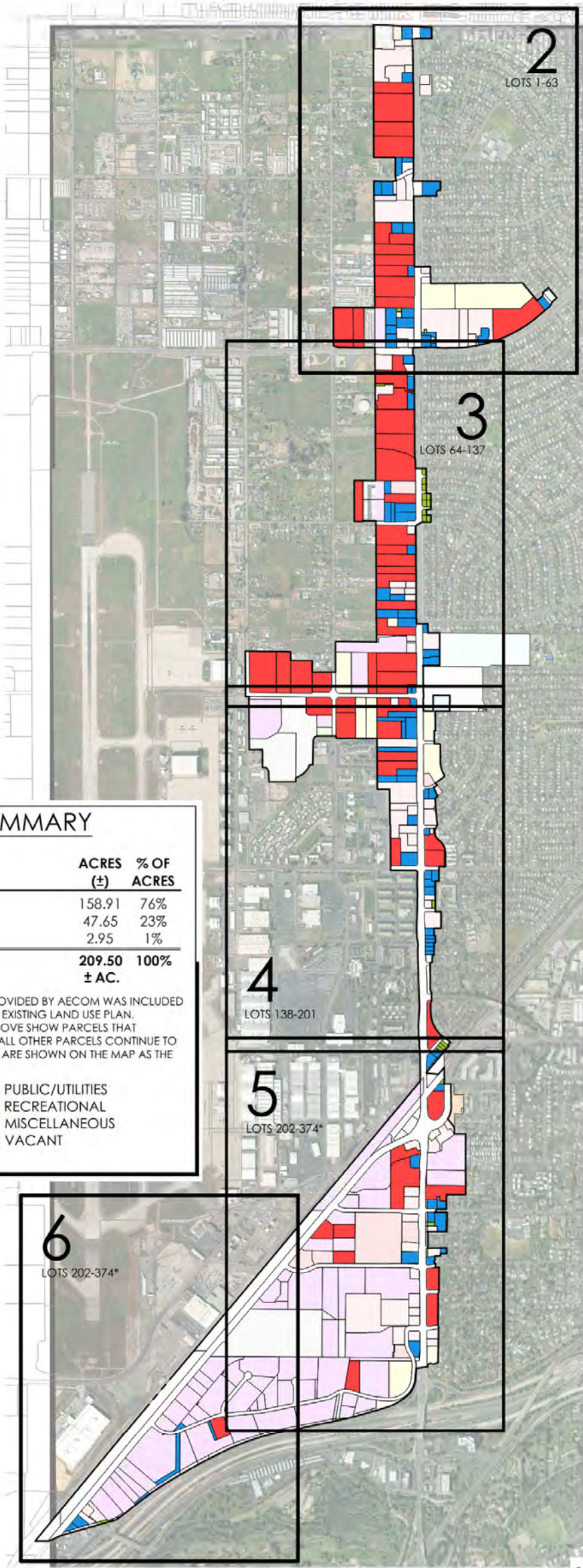
## Attachment A: Proposed Land Use Plan

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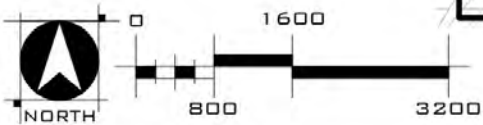
North Watt Specific Plan exhibit prepared by Wood Rodgers



PROPOSED LAND USE PLAN  
NORTH WATT SPECIFIC PLAN  
COUNTY OF SACRAMENTO, CALIFORNIA  
NOVEMBER 13, 2025



| LAND USE SUMMARY                                                                                                                                                                                                                                                                                                                    |                                                            |               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------|
| LAND USE DESIGNATION                                                                                                                                                                                                                                                                                                                | ACRES<br>(±)                                               | % OF<br>ACRES |
| <span style="color: red;">■</span> LARGE LOT MIXED-USE                                                                                                                                                                                                                                                                              | 158.91                                                     | 76%           |
| <span style="color: blue;">■</span> MEDIUM LOT MIXED-USE                                                                                                                                                                                                                                                                            | 47.65                                                      | 23%           |
| <span style="color: green;">■</span> SMALL MULTI-FAMILY                                                                                                                                                                                                                                                                             | 2.95                                                       | 1%            |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                        | <b>209.50<br/>± AC.</b>                                    | <b>100%</b>   |
| NOTE 1: ONLY PARCEL INFORMATION PROVIDED BY AECOM WAS INCLUDED IN THE ACREAGE CALCULATION FOR THE EXISTING LAND USE PLAN.<br>NOTE 2: ALL LAND USE DESIGNATIONS ABOVE SHOW PARCELS THAT PROPOSED NEW DEVELOPMENT ONSITE. ALL OTHER PARCELS CONTINUE TO HAVE THE SAME EXISTING LAND USE AND ARE SHOWN ON THE MAP AS THE COLORS BELOW: |                                                            |               |
| <span style="color: pink;">■</span> RETAIL/COMMERCIAL                                                                                                                                                                                                                                                                               | <span style="color: lightgreen;">■</span> PUBLIC/UTILITIES |               |
| <span style="color: yellow;">■</span> RESIDENTIAL                                                                                                                                                                                                                                                                                   | <span style="color: lightblue;">■</span> RECREATIONAL      |               |
| <span style="color: orange;">■</span> OFFICE                                                                                                                                                                                                                                                                                        | <span style="color: lightgreen;">■</span> MISCELLANEOUS    |               |
| <span style="color: purple;">■</span> INDUSTRIAL                                                                                                                                                                                                                                                                                    | <span style="color: white;">■</span> VACANT                |               |
| <span style="color: lightblue;">■</span> CHURCH/WELFARE                                                                                                                                                                                                                                                                             |                                                            |               |





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Sacramento, CA 95816  
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Fax 916.341.7767

SHEET 1 OF 6

PROPOSED LAND USE PLAN - NORTH WATT SPECIFIC PLAN

## Attachment B: Modeling Results and Proposed Improvements

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Exhibits outlining the results and proposed projects



# Attachment B

North Watt Specific Plan (NWSP) Modeling

# Modeling Results

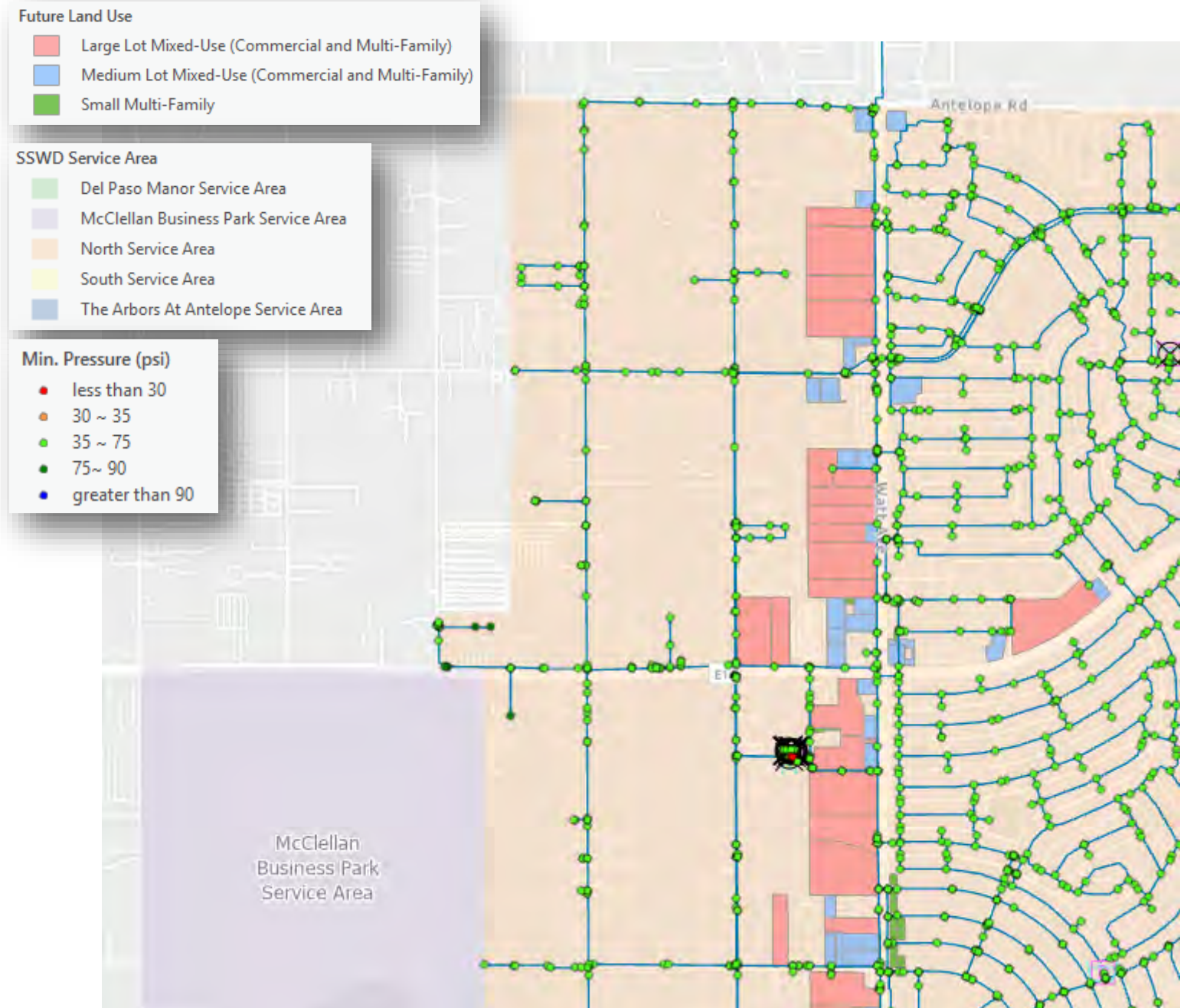
Run 1: This is the baseline scenario simulating the conditions outlined above with a diurnal pattern simulating hourly demands to evaluate the system under peak hour demands during maximum day demand (MDD)

Run 2: Fire flow condition of Run 1 (MDD + fire flow)

# Run 1. Peak Hour Demand Results (pressures)

Results: No deficiencies identified for pressure (all > 35 psi)

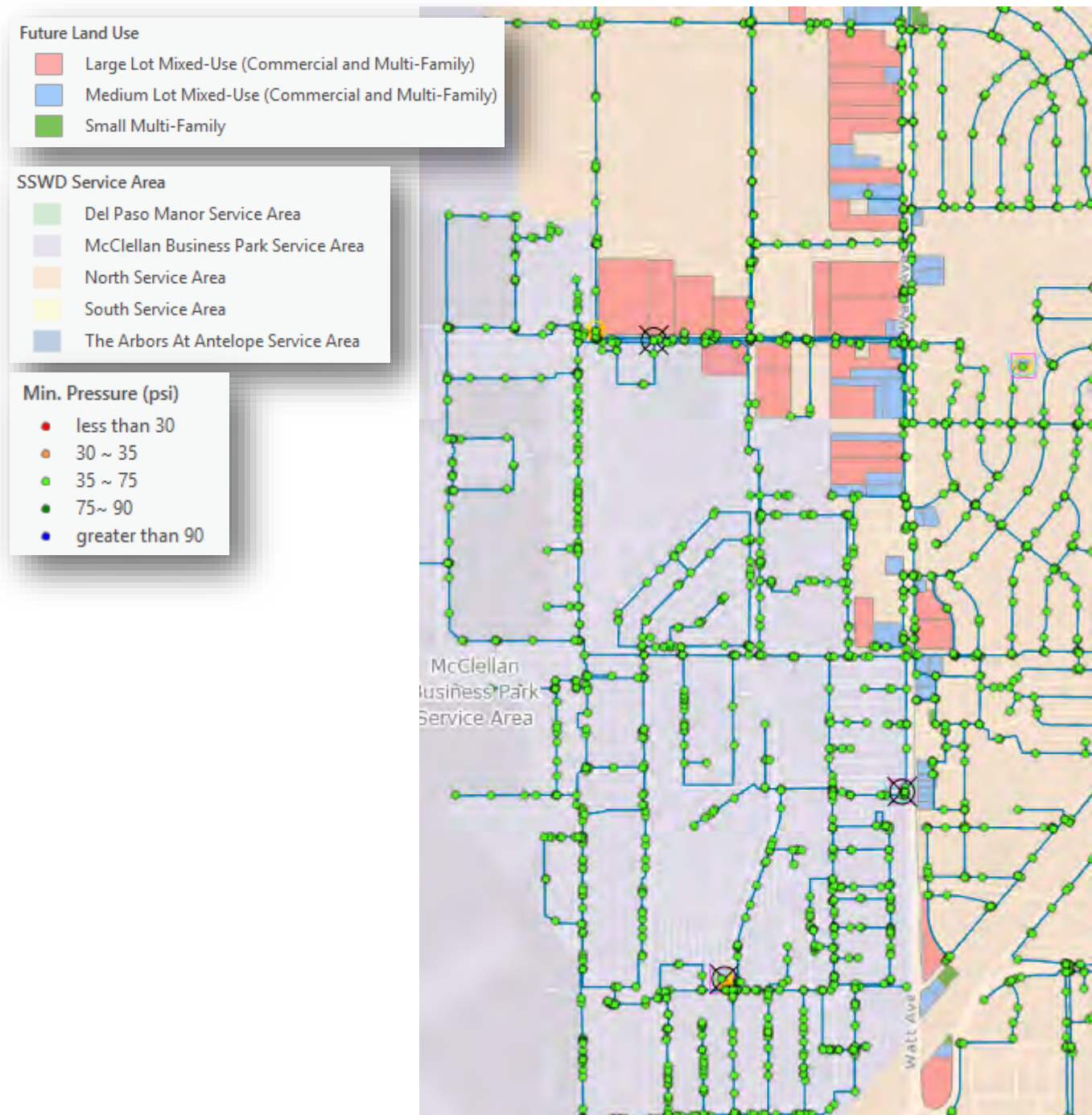
A. Antelope Rd to I St



# Run 1. Peak Hour Demand Results (pressures)

Results: No deficiencies identified for pressure (all > 35 psi)

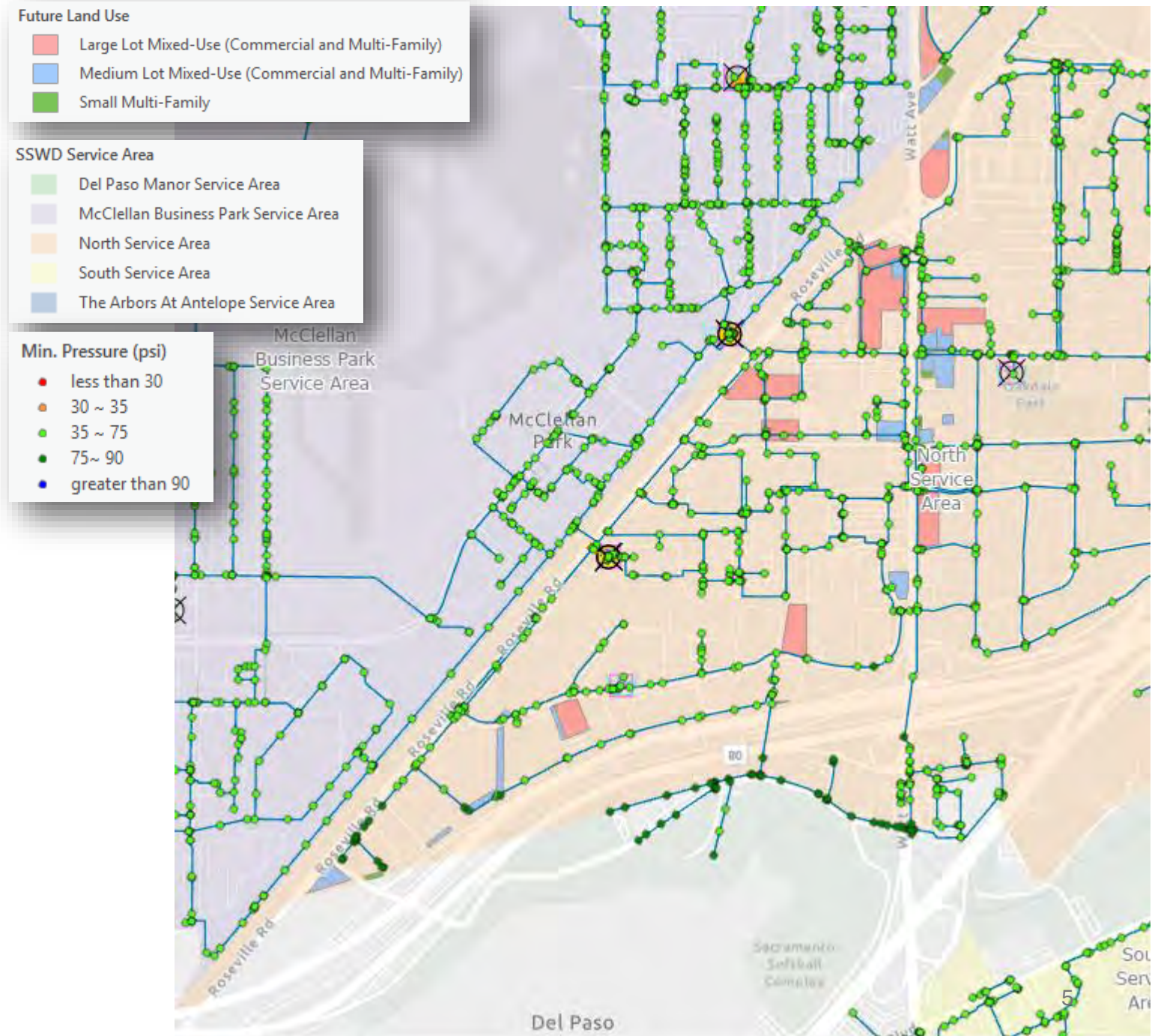
B. I St to Railroad



# Run 1. Peak Hour Demand Results (pressures)

Results: No deficiencies identified for pressure (all > 35 psi)

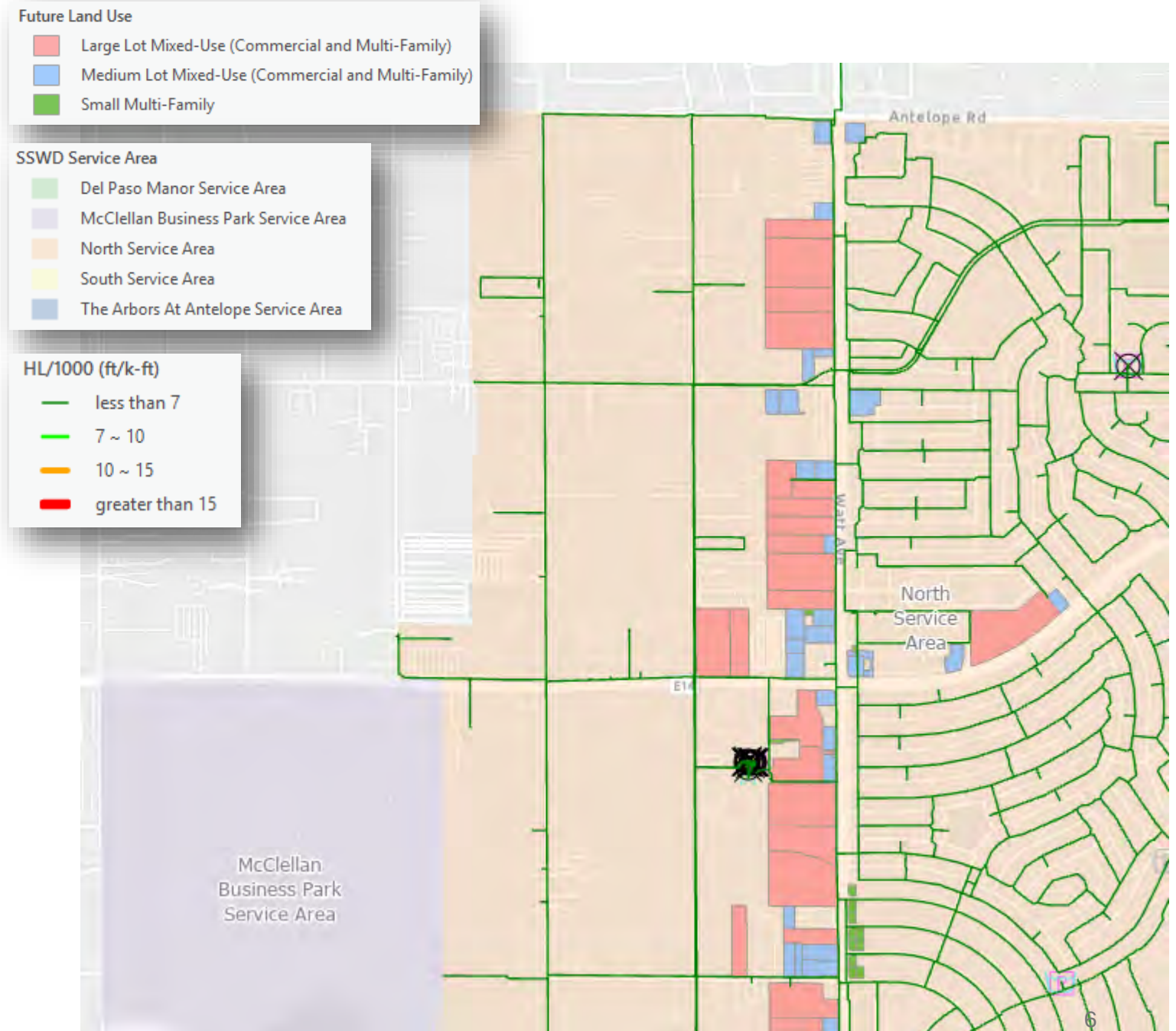
C. Railroad to I-80



# Run 1. Peak Hour Demand Results (unit headloss)

Result: No deficiencies identified for unit headloss (all < 7 ft/k-ft)

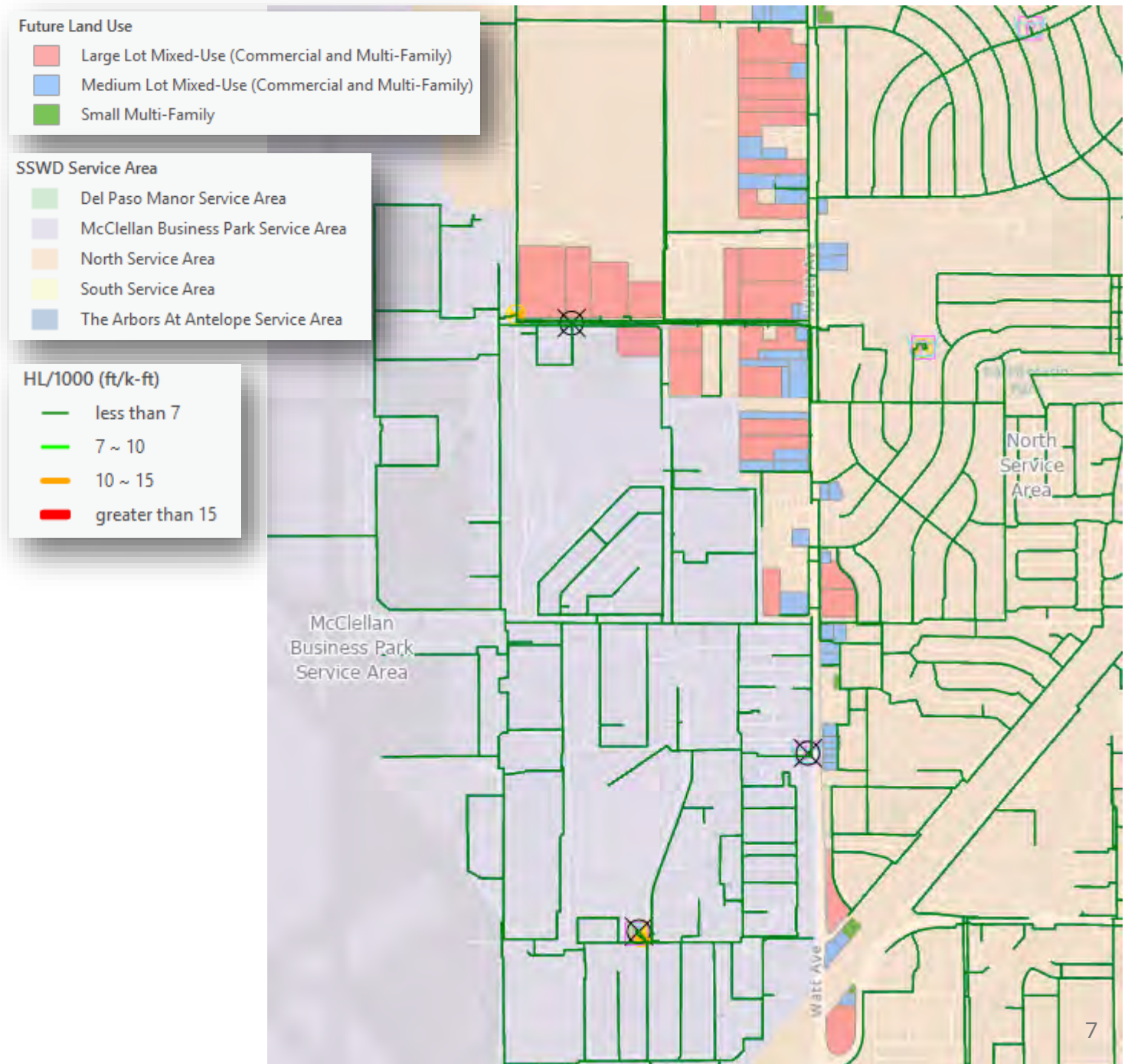
A. Antelope Rd to I St



# Run 1. Peak Hour Demand Results (unit headloss)

Result: No deficiencies identified  
for unit headloss (all < 7 ft/k-ft)

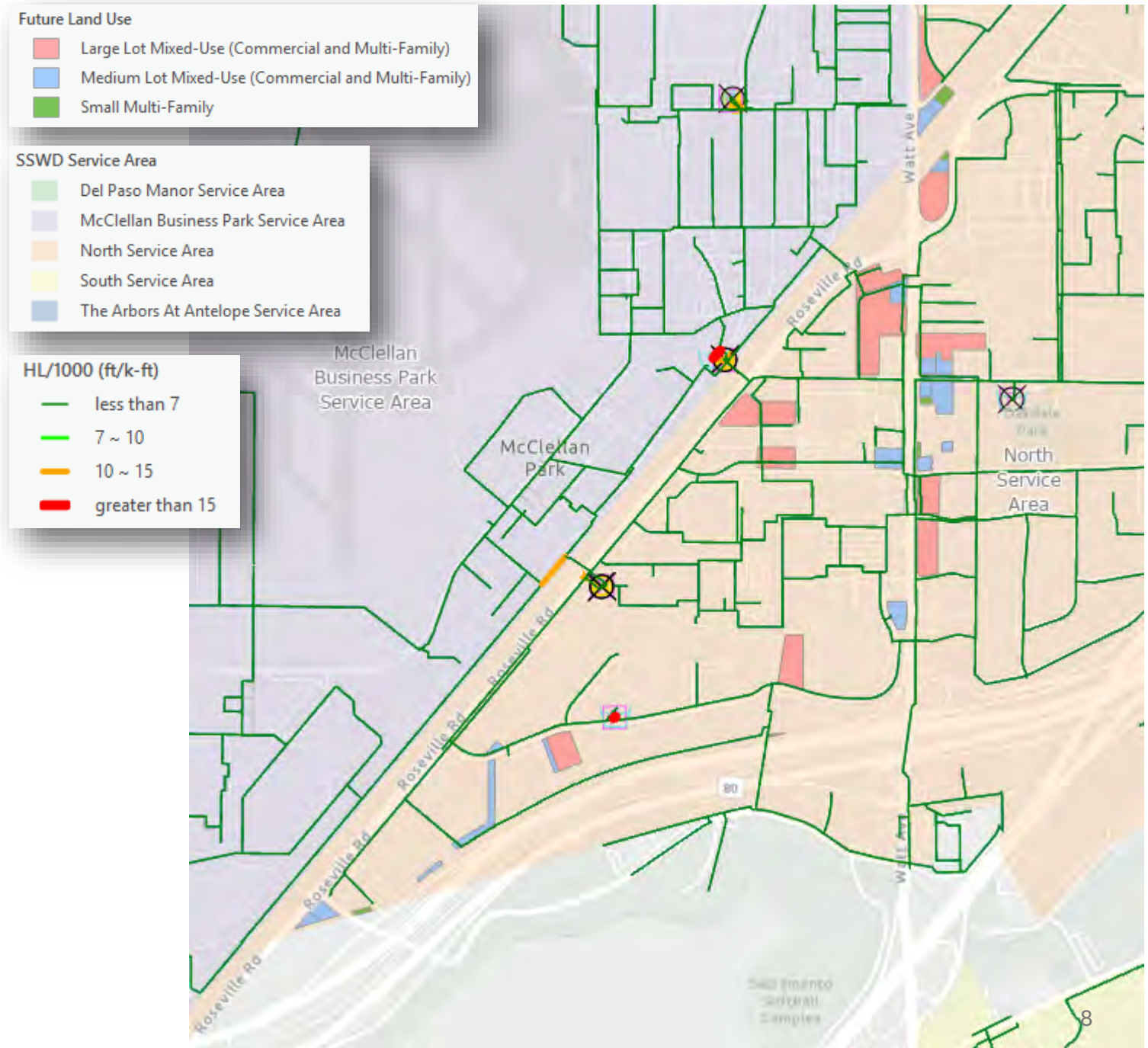
B. I St to Railroad



# Run 1. Peak Hour Demand Results (unit headloss)

Result: No deficiencies identified for Headloss (all < 7 ft/k-ft)

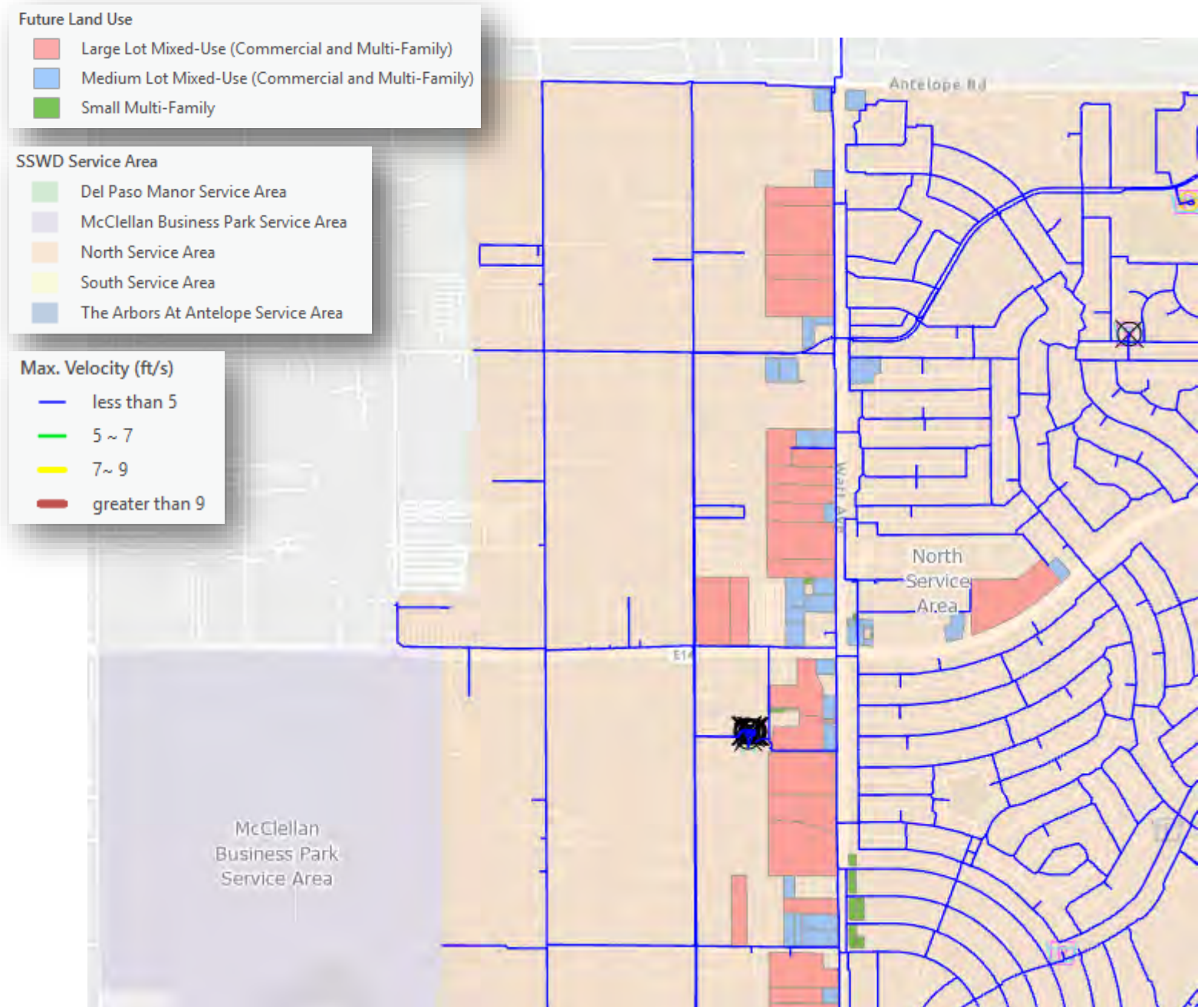
C. Railroad to I-80



# Run 1. Peak Hour Demand Results (velocity)

Results: No deficiencies identified for Velocity (all < 5 fps)

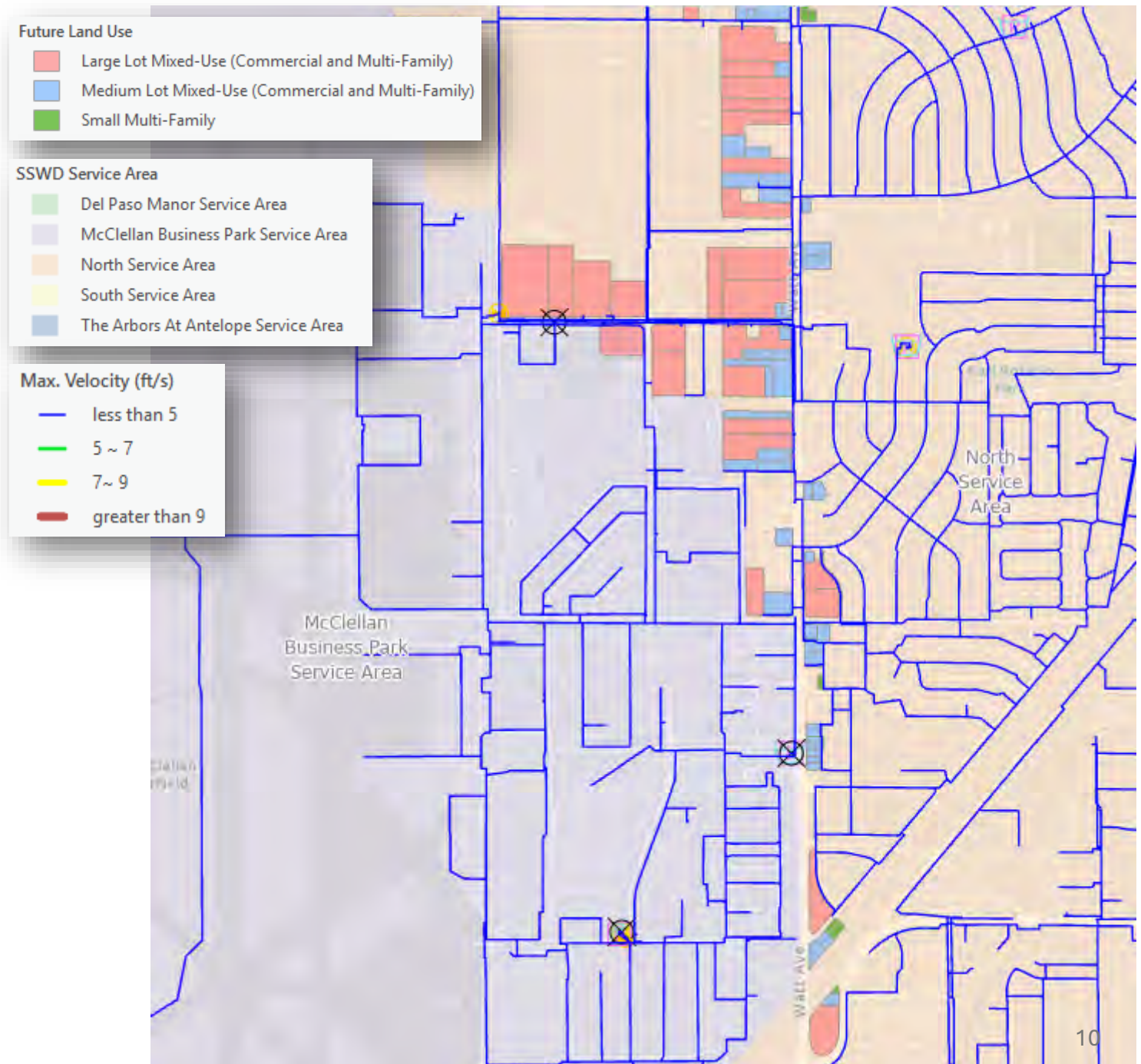
A. Antelope Rd to I St



# Run 1. Peak Hour Demand Results (velocity)

Results: No deficiencies identified for Velocity (all < 5 fps)

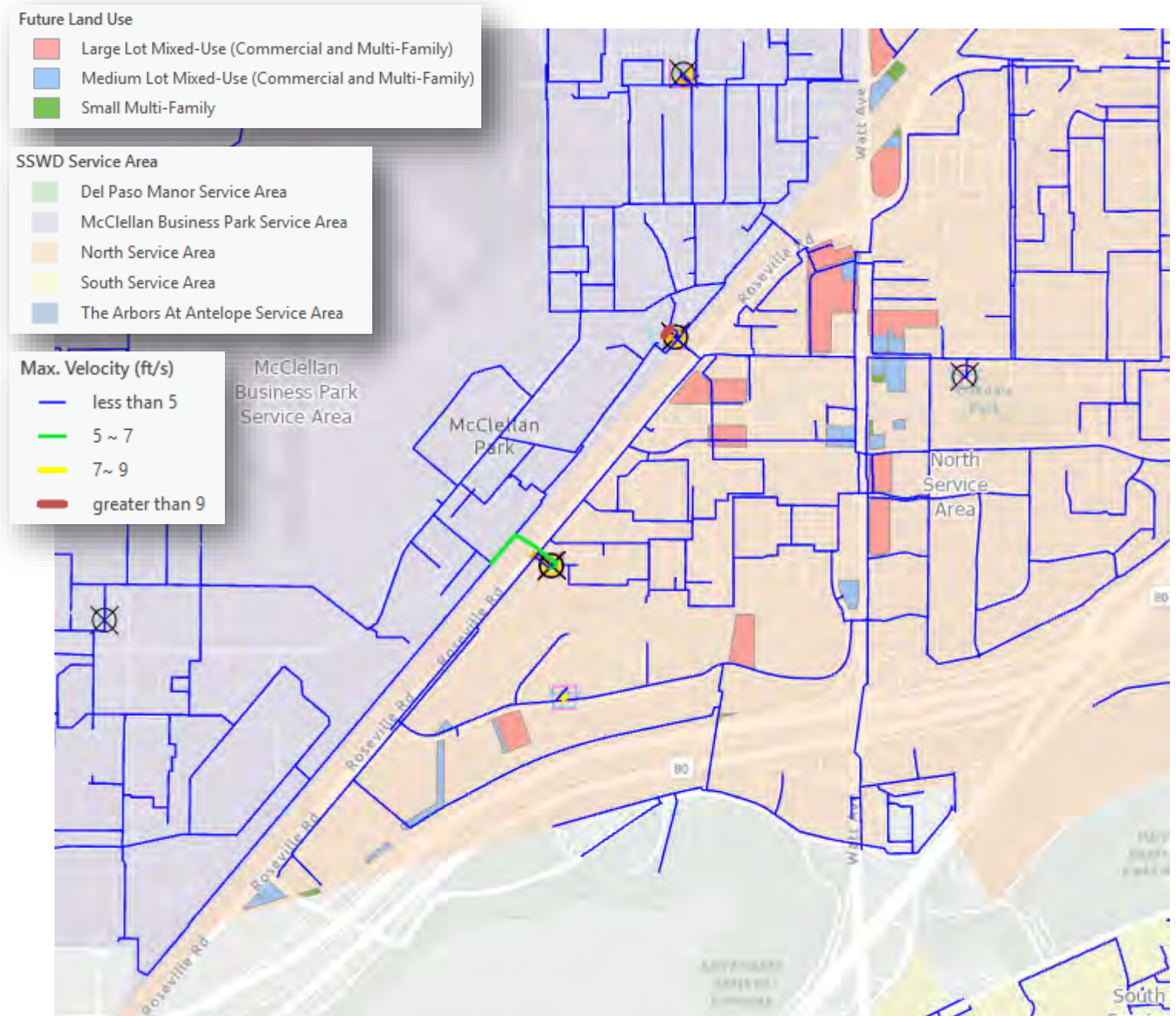
B. I St to Railroad



# Run 1. Peak Hour Demand Results (velocity)

No deficiencies identified for Velocity (all < 5 fps)

C. Railroad to I-80

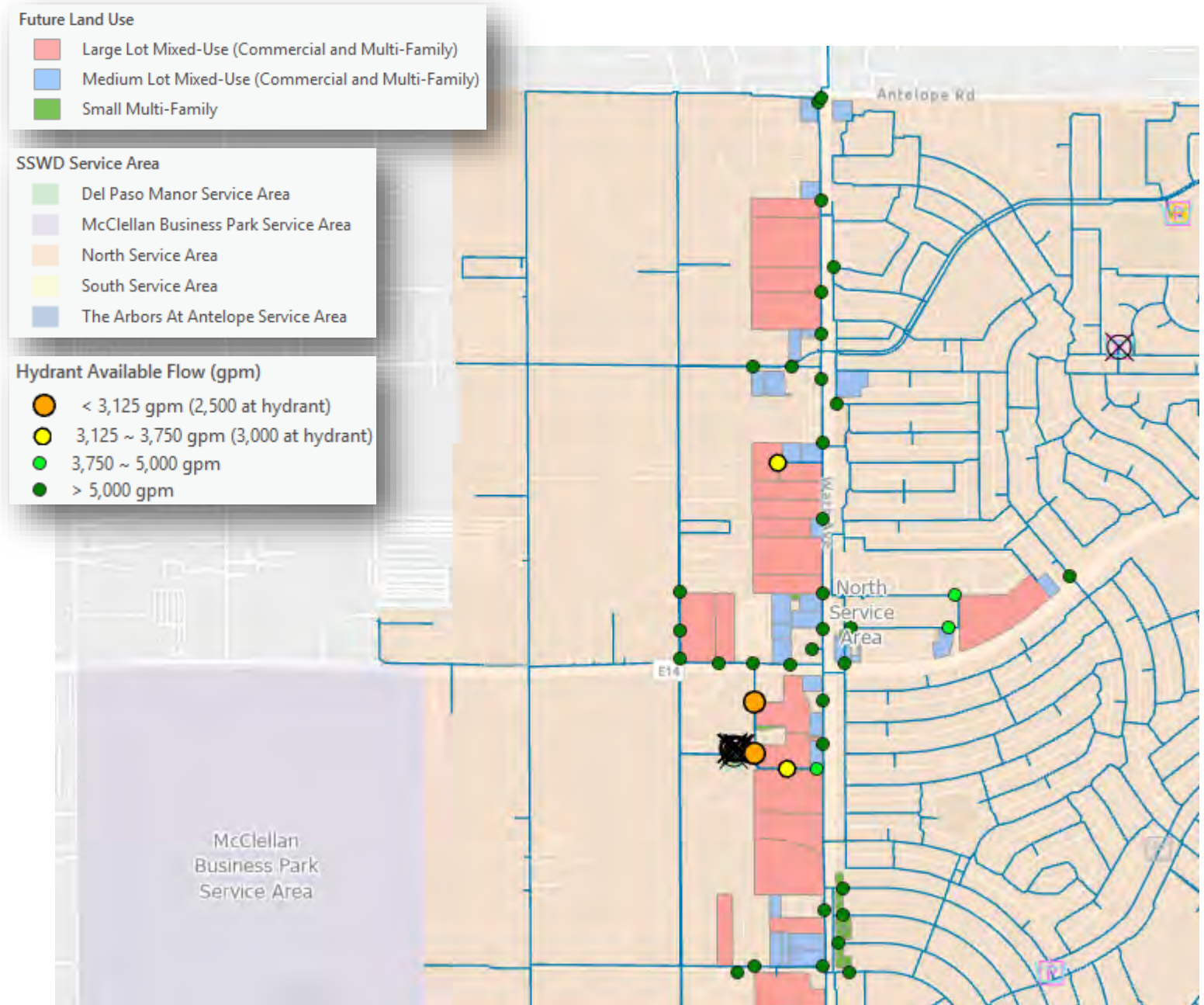


# Run 2. Fire Flow Results

Results: Results shown at nearest modeled junction to a hydrant

Deficiencies identified as shown

A. Antelope Rd to I St

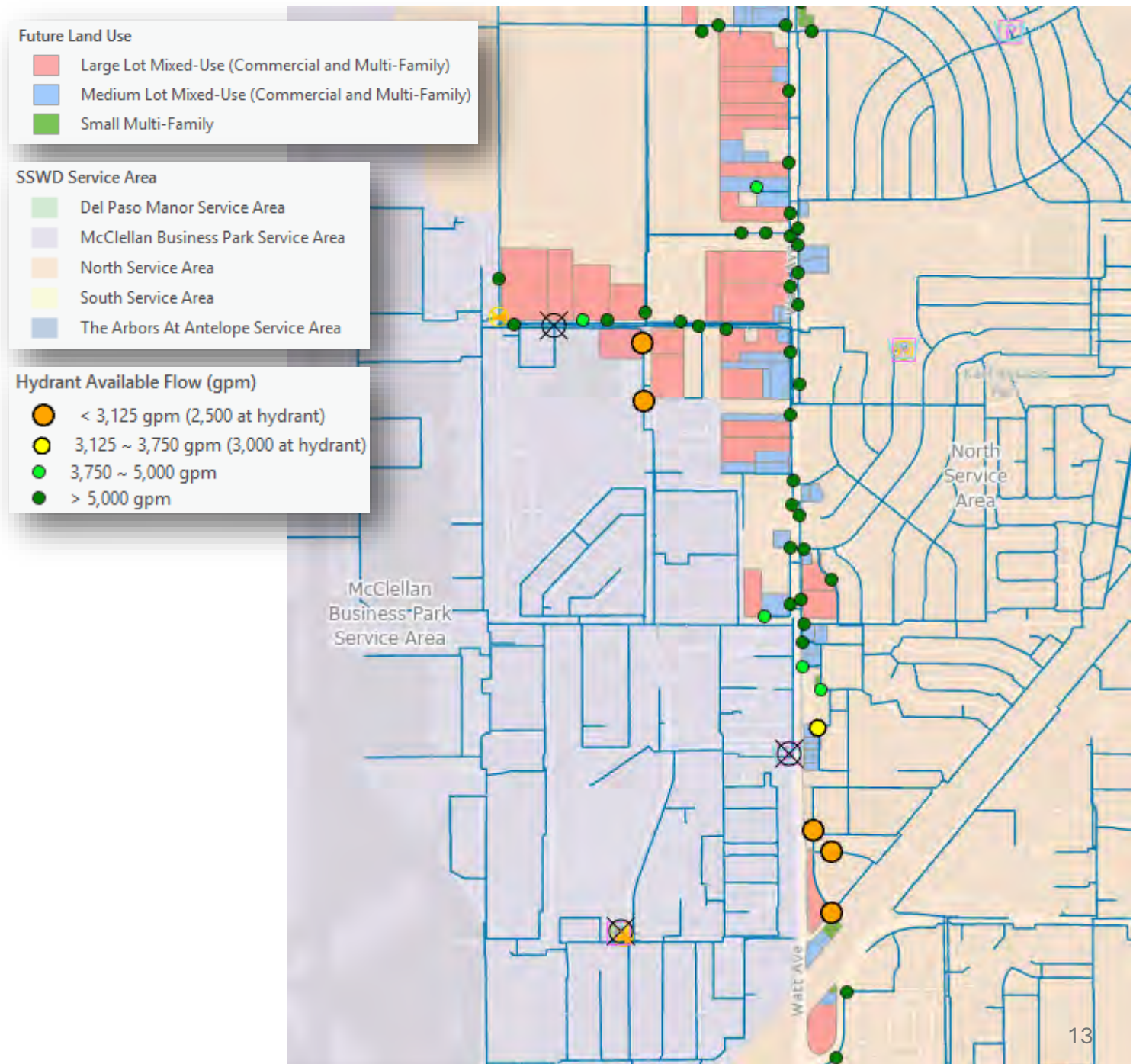


# Run 2. Fire Flow Results

Results: Results shown at nearest modeled junction to a hydrant

Deficiencies identified as shown

B. I St to Railroad

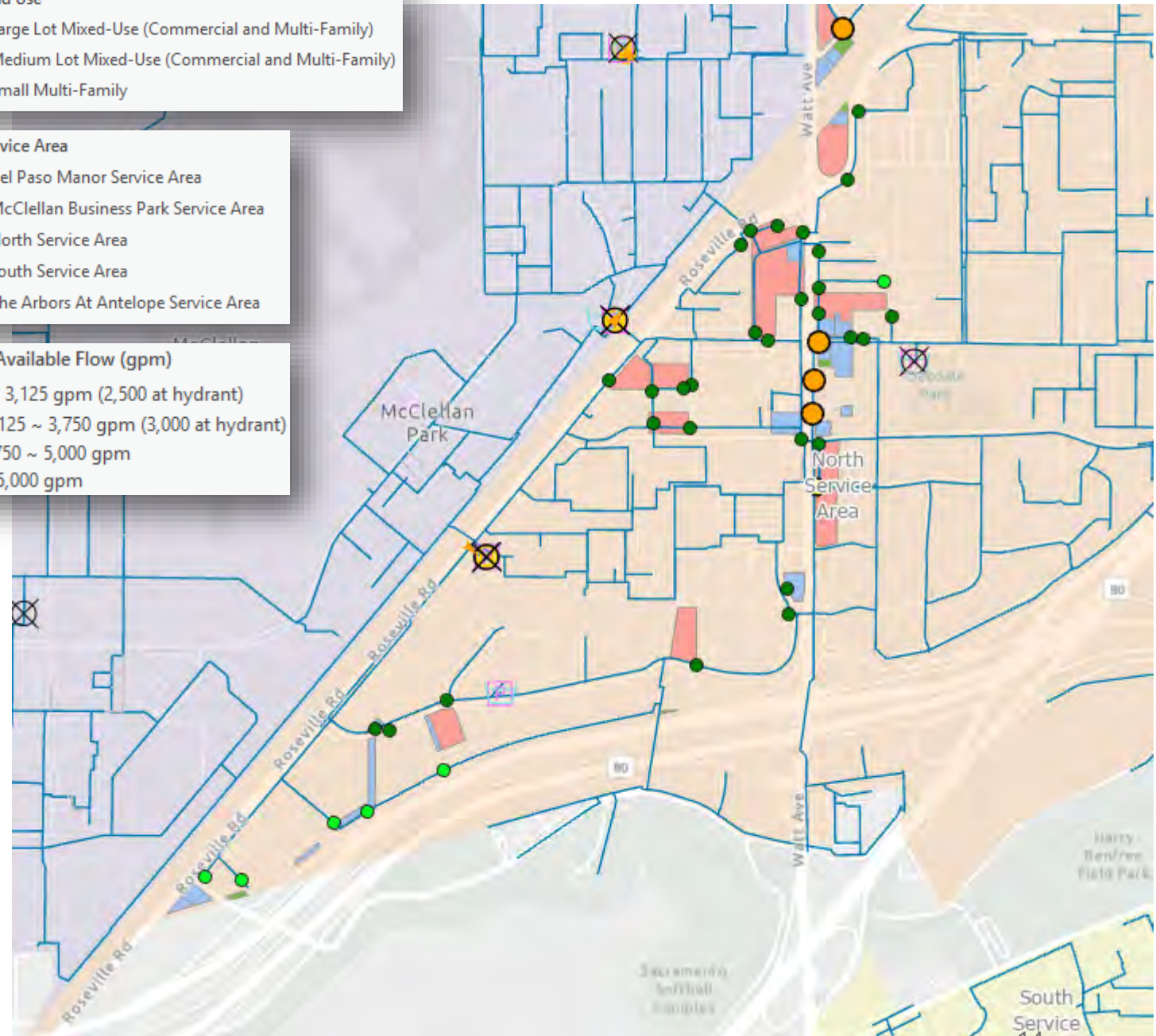
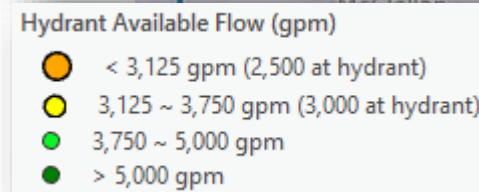
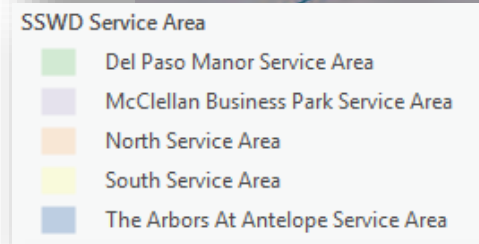
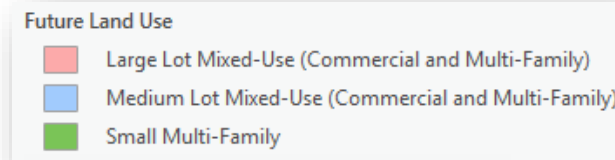


# Run 2. Fire Flow Results

Results: Results shown at nearest modeled junction to a hydrant

Deficiencies identified as shown

C. Railroad to I-80



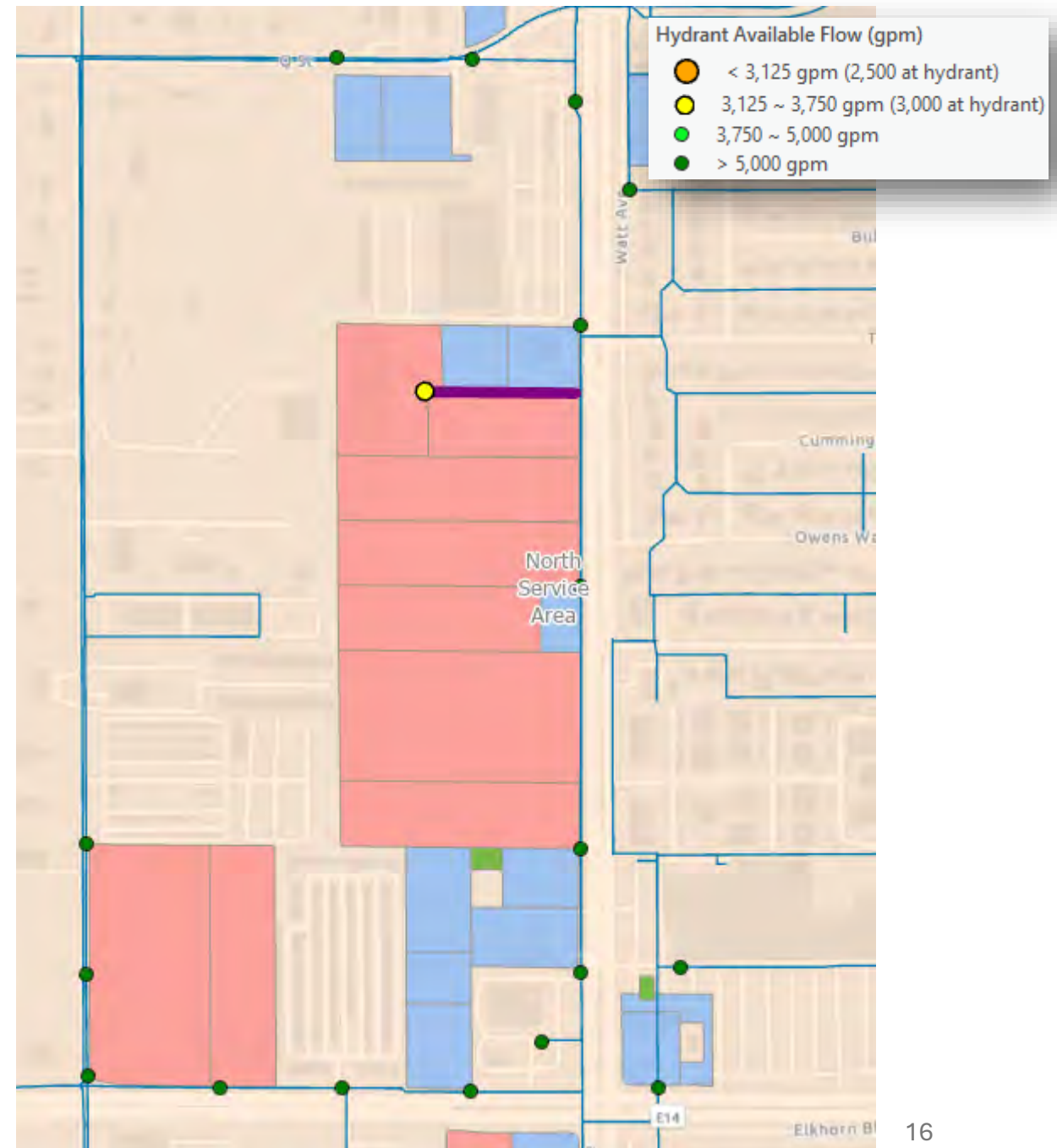
# Suggested Improvements to Meet Hydraulic Requirements

Run 2a: Run 2 with pipeline improvements

Modeling from Run 2a confirmed that proposed improvements resolve fire flow deficiencies identified from Run 2

# Run 2a. Potential Improvements to Meet Fire Flow

- Deficient fire flow south of Q St as shown. 8-in diameter pipelines limit the fire flow.
- Proposed improvements: Upsize 8-in pipe to 12-in diameter as shown (purple line).



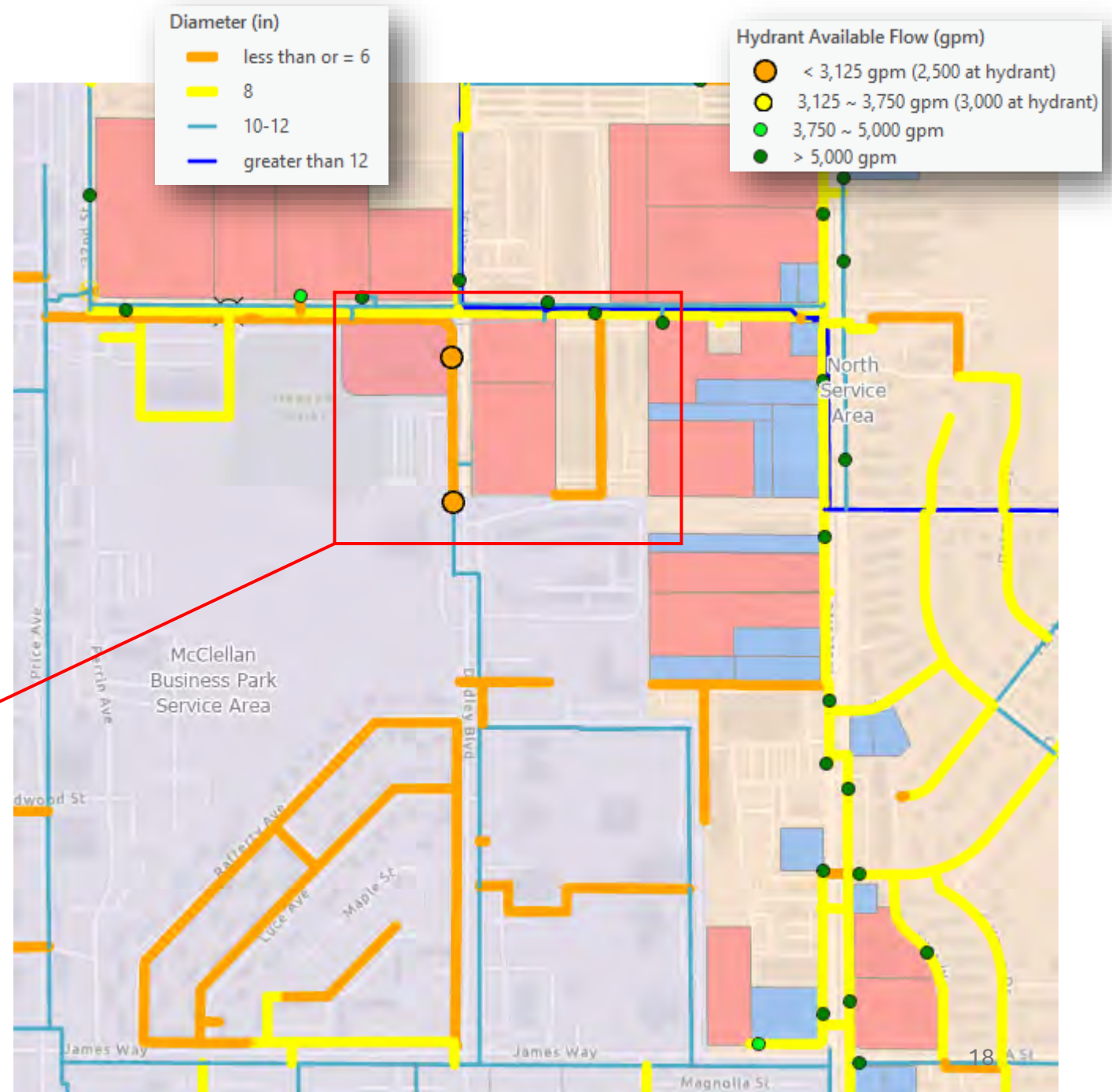
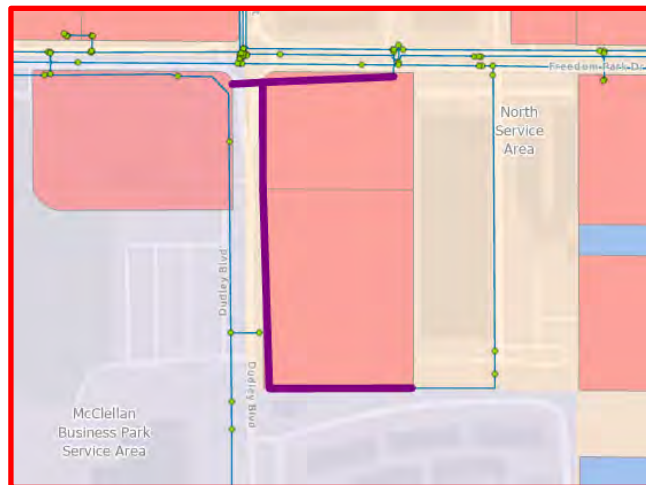
# Run 2a. Potential Improvements to Meet Fire Flow

- Limited fire flow at southwest corner of Watt Ave and Elkhorn Blvd (E14)
- Issue due to a gap in the pipe system at **red** box (in GIS and model)
  - Gap is in the GIS data (8/16/21) and the model
  - GIS data indicates there is a valve at this location
- Fire flow criteria is met in this area if the gap is eliminated creating a looped system



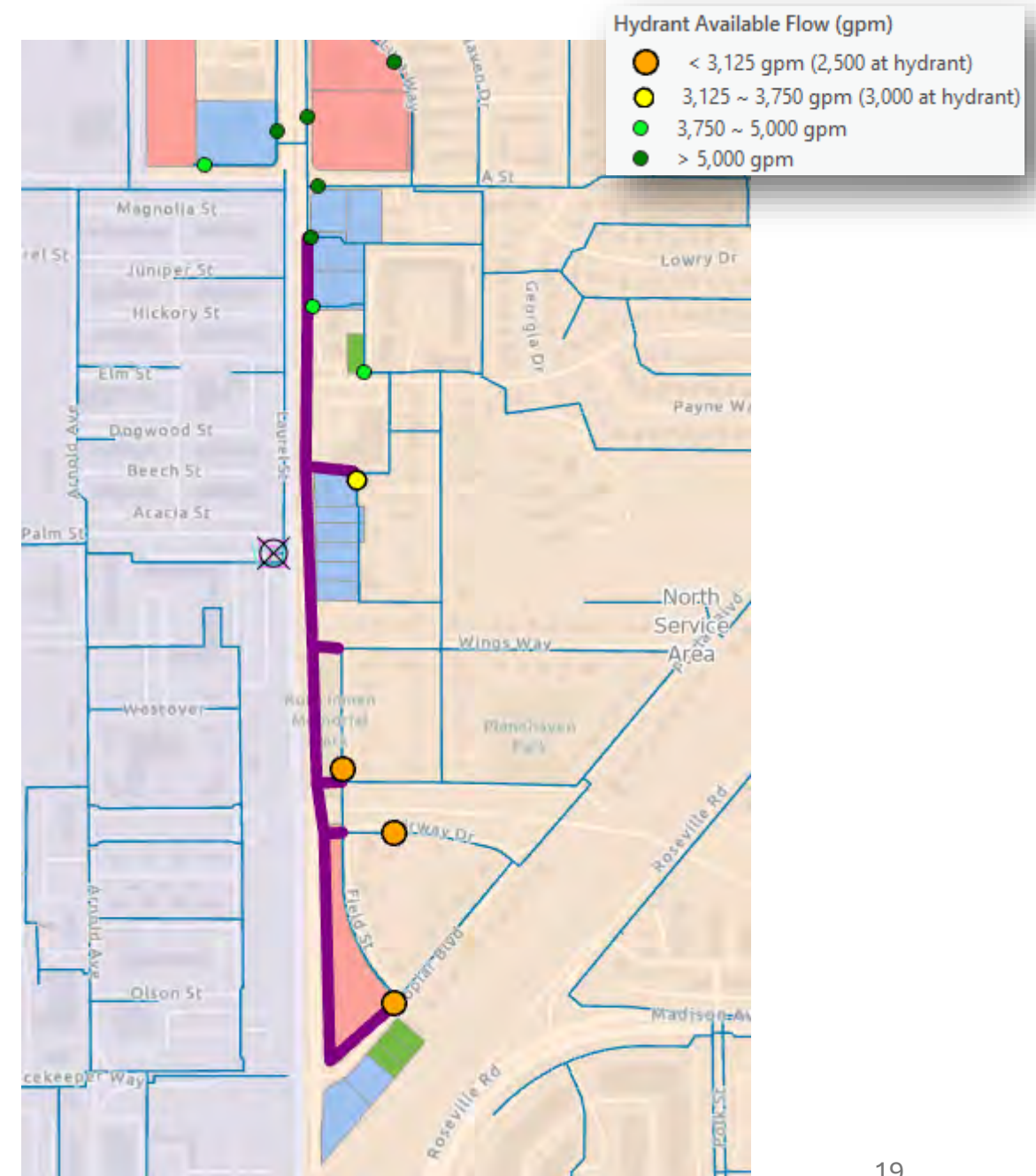
# Run 2a. Potential Improvements to Meet Fire Flow

- Limited fire flow along Dudley Blvd along 6-in diameter pipes and connected to the McClellan Business Park Service Area (mostly 10-in diameter pipelines) cannot be improved without upsizing the entire loop to 12-in diameter
- Proposed Improvements: Install new 12-in diameter mains and hydrants connected to North Service Area mains as shown below (purple lines). Do not cross connect with McClellan.



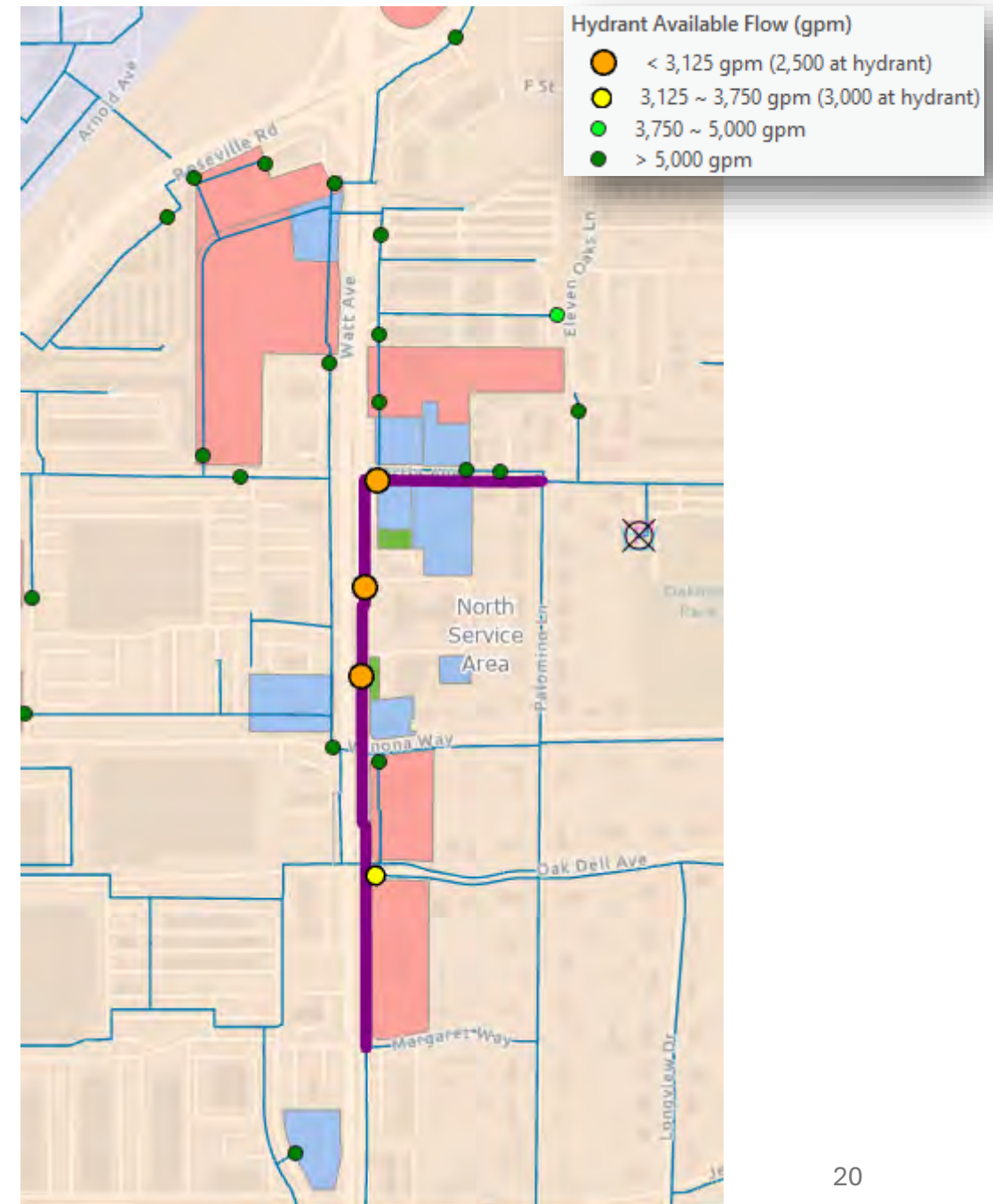
## Run 2a. Potential Improvements to Meet Fire Flow

- Limited fire flow along Watt Ave between A St and the Railroad. There is no existing pipe along Watt Ave in this area and the existing network is insufficient to provide enough fire flow.
- Proposed improvements: Install new 12-in diameter mains along Watt Ave (purple lines). Connect to existing network as shown.



## Run 2a. Potential Improvements to Meet Fire Flow

- Limited fire flow along Watt Ave south of the Railroad. The 6-in diameter pipes along Watt Ave are insufficient to provide fire flow.
- Proposed improvements: Upsize 6-in diameter pipes to 12-in along Watt Ave as shown (purple lines).



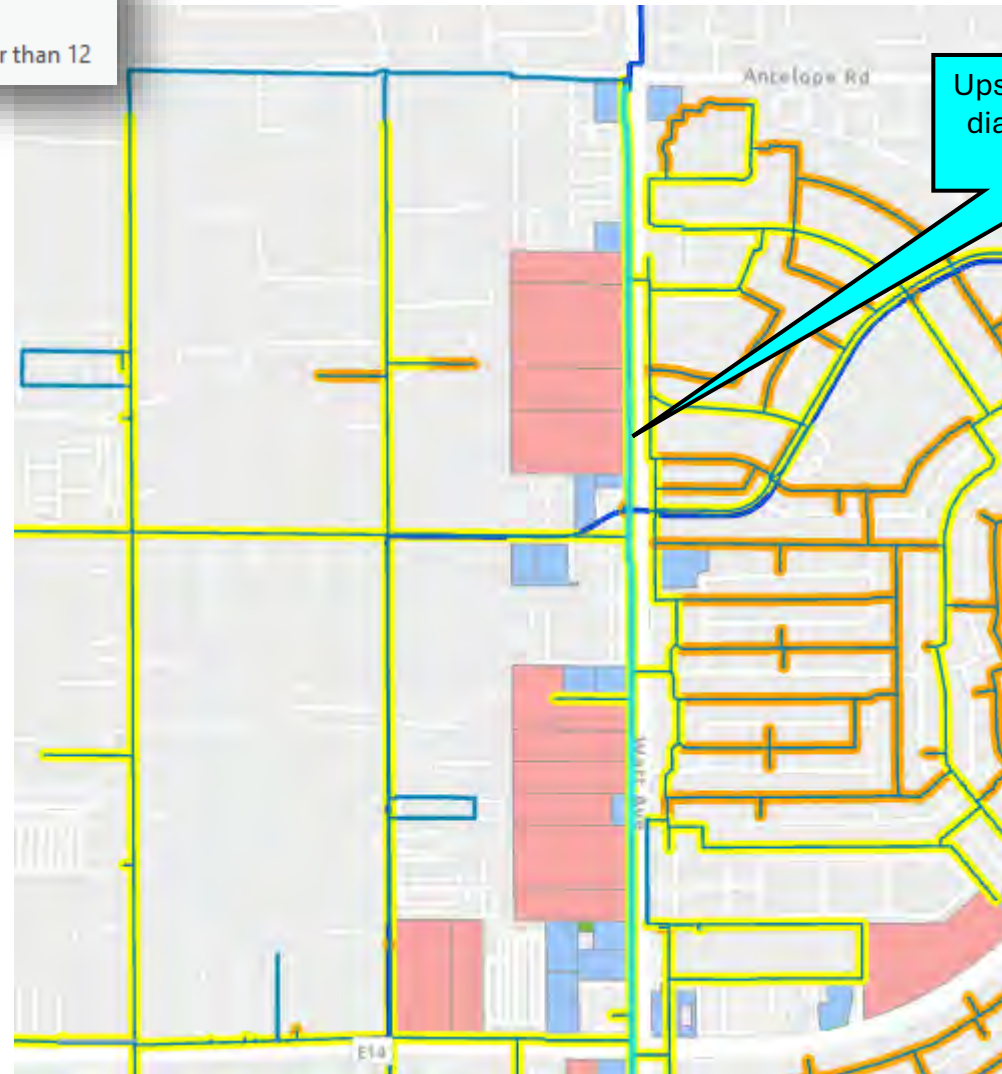
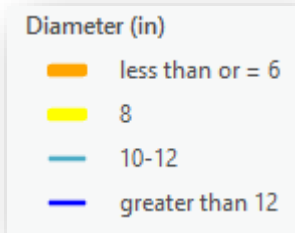
# Watt Avenue Required Improvements

Additional improvements along Watt Ave that may be needed to meet the SSWD requirement of a minimum 12-in diameter for mixed use development

Only the improvements needed to meet hydraulic requirements were included in Run 2a as shown in the previous section. This section shows the additional improvements needed to cover the SSWD requirement along the entire length of Watt Ave.

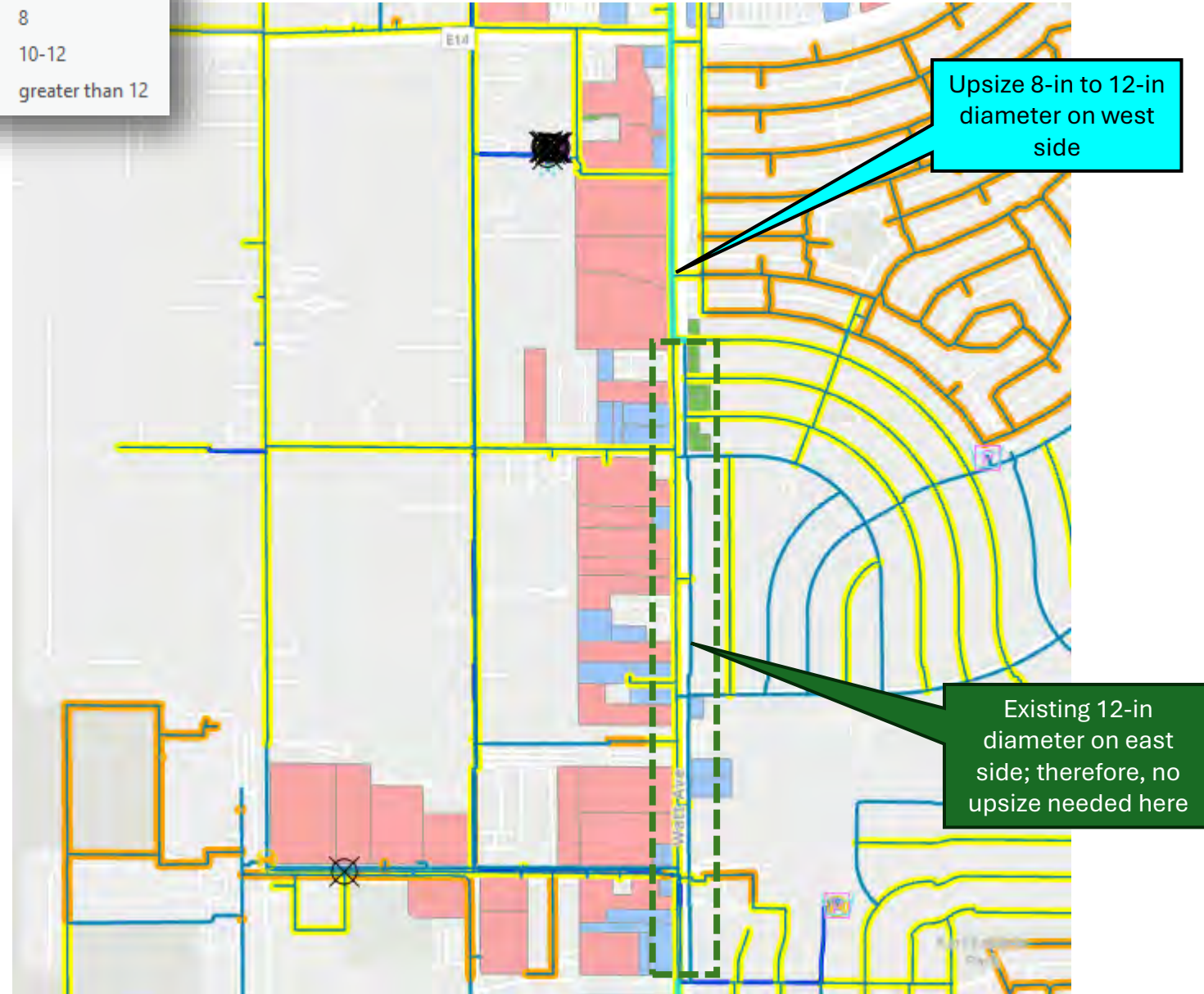
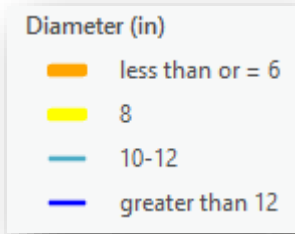
# SSWD Required Improvements for Watt Ave

- Pipelines highlighted in cyan would need to be upsized from 8-in to 12-in diameter



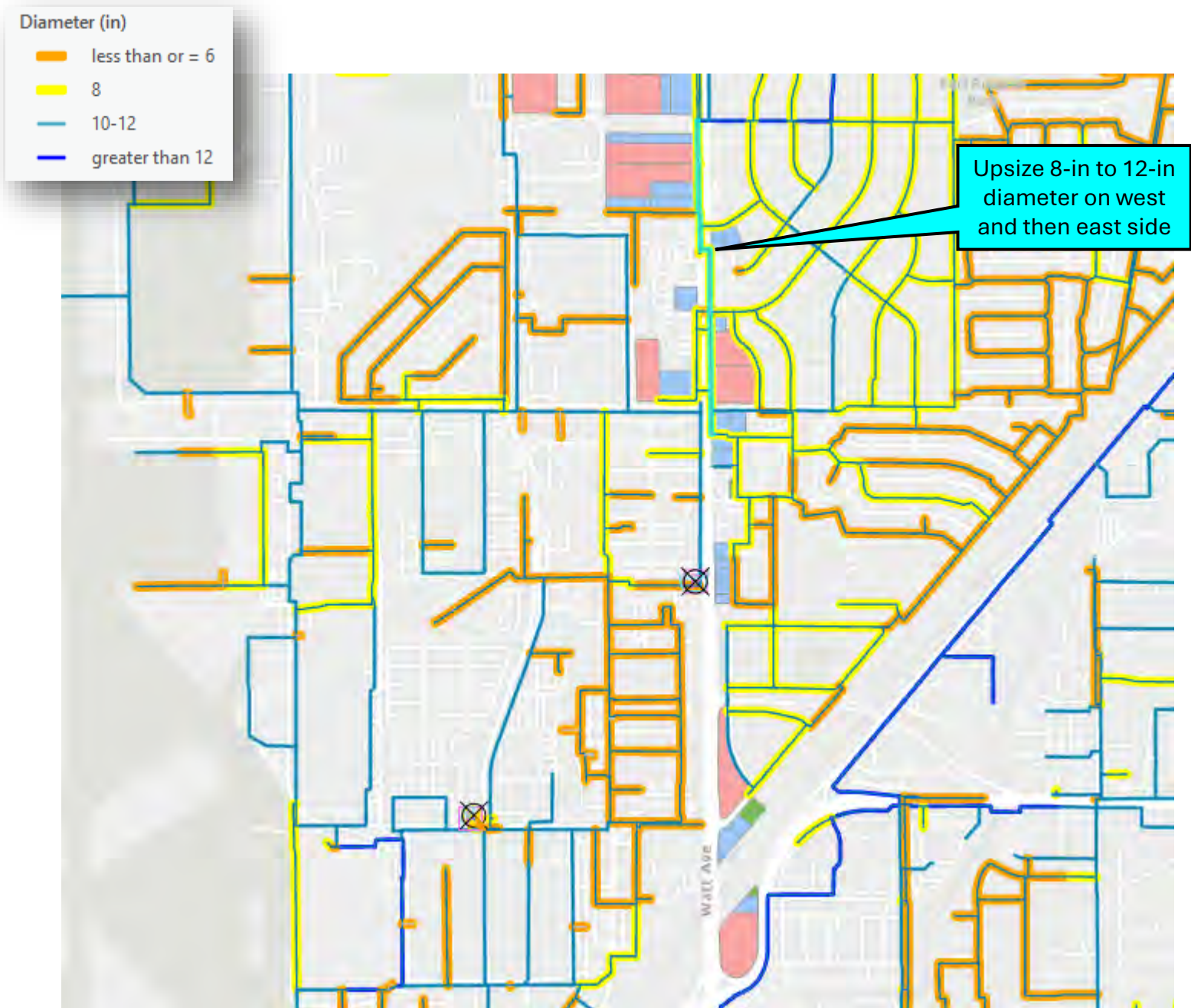
# SSWD Required Improvements

- Pipelines highlighted in cyan would need to be upsized from 8-in to 12-in diameter
- There is a portion of pipeline along the east side of Watt Ave that is already 12-in diameter



# SSWD Required Improvements

- Pipelines highlighted in cyan would need to be upsized from 8-in to 12-in diameter



## APPENDIX E: Average Day Demands

| Parcel<br>Number<br>Key | APN            | General<br>Land Use                                | Gross<br>Acres | Gross<br>Lot SF | Gross<br>Building<br>SF | Building<br>SF | Units | Residential<br>Demand<br>Factor (gpd) | Commercial<br>Demand<br>Factor (gpd) | Residential<br>Demand<br>(gpd) | Commercial<br>Demand<br>(gpd) | Total<br>Demand<br>(gpd) |
|-------------------------|----------------|----------------------------------------------------|----------------|-----------------|-------------------------|----------------|-------|---------------------------------------|--------------------------------------|--------------------------------|-------------------------------|--------------------------|
| 3                       | 20801220390000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.73           | 31,930          | 7,983                   | 6,785          | 18    | 168                                   | 1,583                                | 3,024                          | 1,160                         | 4,184                    |
| 4                       | 21902200540000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.70           | 30,363          | 7,591                   | 6,452          | 17    | 168                                   | 1,583                                | 2,856                          | 1,103                         | 3,959                    |
| 9                       | 20801220550000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.58           | 25,066          | 6,267                   | 5,327          | 14    | 168                                   | 1,583                                | 2,352                          | 911                           | 3,263                    |
| 12                      | 20801220090000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.34           | 101,999         | 25,500                  | 21,675         | 94    | 168                                   | 1,583                                | 15,792                         | 3,707                         | 19,499                   |
| 13                      | 20801220670000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 6.15           | 267,789         | 66,947                  | 56,905         | 246   | 168                                   | 1,583                                | 41,328                         | 9,732                         | 51,060                   |
| 14                      | 20801220660000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.09           | 134,587         | 33,647                  | 28,600         | 124   | 168                                   | 1,583                                | 20,832                         | 4,891                         | 25,723                   |
| 15                      | 20801320080000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 4.58           | 199,352         | 49,838                  | 42,362         | 183   | 168                                   | 1,583                                | 30,744                         | 7,245                         | 37,989                   |
| 16                      | 20801320290000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.64           | 27,932          | 6,983                   | 5,935          | 16    | 168                                   | 1,583                                | 2,688                          | 1,015                         | 3,703                    |
| 17                      | 20801320280000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.28           | 12,199          | 3,050                   | 2,592          | 7     | 168                                   | 1,583                                | 1,176                          | 443                           | 1,619                    |
| 19                      | 20801330110000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.58           | 25,482          | 6,371                   | 5,415          | 15    | 168                                   | 1,583                                | 2,520                          | 926                           | 3,446                    |
| 20                      | 20801330180000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.88           | 38,423          | 9,606                   | 8,165          | 22    | 168                                   | 1,583                                | 3,696                          | 1,396                         | 5,092                    |
| 24                      | 20000310140000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.35           | 58,772          | 14,693                  | 12,489         | 34    | 168                                   | 1,583                                | 5,712                          | 2,136                         | 7,848                    |
| 27                      | 20801420320000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.90           | 82,641          | 20,660                  | 17,561         | 47    | 168                                   | 1,583                                | 7,896                          | 3,003                         | 10,899                   |
| 28                      | 20801420340000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.64           | 27,917          | 6,979                   | 5,932          | 16    | 168                                   | 1,583                                | 2,688                          | 1,015                         | 3,703                    |
| 29                      | 20801420350000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.69           | 29,928          | 7,482                   | 6,360          | 17    | 168                                   | 1,583                                | 2,856                          | 1,088                         | 3,944                    |
| 30                      | 20801420330000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.44           | 62,920          | 15,730                  | 13,370         | 58    | 168                                   | 1,583                                | 9,744                          | 2,287                         | 12,031                   |
| 31                      | 20801420040000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.28           | 99,487          | 24,872                  | 21,141         | 91    | 168                                   | 1,583                                | 15,288                         | 3,615                         | 18,903                   |
| 32                      | 20801420050000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.31           | 100,432         | 25,108                  | 21,342         | 92    | 168                                   | 1,583                                | 15,456                         | 3,650                         | 19,106                   |
| 33                      | 20801420200000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.94           | 84,347          | 21,087                  | 17,924         | 77    | 168                                   | 1,583                                | 12,936                         | 3,065                         | 16,001                   |
| 34                      | 20801420220000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.38           | 16,492          | 4,123                   | 3,505          | 9     | 168                                   | 1,583                                | 1,512                          | 599                           | 2,111                    |
| 37                      | 20801420300000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 4.63           | 201,794         | 50,449                  | 42,881         | 185   | 168                                   | 1,583                                | 31,080                         | 7,333                         | 38,413                   |
| 38                      | 20801420360000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.30           | 100,202         | 25,050                  | 21,293         | 92    | 168                                   | 1,583                                | 15,456                         | 3,641                         | 19,097                   |
| 41                      | 20801520110000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 4.25           | 184,933         | 46,233                  | 39,298         | 170   | 168                                   | 1,583                                | 28,560                         | 6,721                         | 35,281                   |
| 42                      | 20801520100000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.31           | 100,667         | 25,167                  | 21,392         | 92    | 168                                   | 1,583                                | 15,456                         | 3,658                         | 19,114                   |
| 44                      | 20801520280000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.00           | 43,441          | 10,860                  | 9,231          | 25    | 168                                   | 1,583                                | 4,200                          | 1,579                         | 5,779                    |
| 45                      | 20801520300000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.50           | 21,736          | 5,434                   | 4,619          | 12    | 168                                   | 1,583                                | 2,016                          | 790                           | 2,806                    |
| 46                      | 20801520310000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.81           | 35,204          | 8,801                   | 7,481          | 20    | 168                                   | 1,583                                | 3,360                          | 1,279                         | 4,639                    |
| 47                      | 20801520360000 | Small Multi-Family                                 | 0.10           | 4,419           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 49                      | 20801520370000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.66           | 28,748          | 7,187                   | 6,109          | 16    | 168                                   | 1,583                                | 2,688                          | 1,045                         | 3,733                    |
| 50                      | 20801520150000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.94           | 40,944          | 10,236                  | 8,701          | 23    | 168                                   | 1,583                                | 3,864                          | 1,488                         | 5,352                    |
| 54                      | 20002200200000 | Small Multi-Family                                 | 0.05           | 2,160           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 55                      | 20002200160000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.44           | 19,193          | 4,798                   | 4,079          | 11    | 168                                   | 1,583                                | 1,848                          | 698                           | 2,546                    |
| 57                      | 20002200180000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.62           | 27,075          | 6,769                   | 5,753          | 16    | 168                                   | 1,583                                | 2,688                          | 984                           | 3,672                    |
| 61                      | 20002200240000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.78           | 34,174          | 8,544                   | 7,262          | 20    | 168                                   | 1,583                                | 3,360                          | 1,242                         | 4,602                    |
| 62                      | 20004000040000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 6.29           | 273,964         | 68,491                  | 58,217         | 252   | 168                                   | 1,583                                | 42,336                         | 9,956                         | 52,292                   |
| 63                      | 20004000050000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.49           | 21,304          | 5,326                   | 4,527          | 12    | 168                                   | 1,583                                | 2,016                          | 774                           | 2,790                    |
| 67                      | 20801530190000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.64           | 158,754         | 39,688                  | 33,735         | 91    | 168                                   | 1,583                                | 15,288                         | 5,769                         | 21,057                   |
| 68                      | 20801530220000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.52           | 22,779          | 5,695                   | 4,841          | 13    | 168                                   | 1,583                                | 2,184                          | 828                           | 3,012                    |
| 70                      | 20801530150000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.51           | 22,239          | 5,560                   | 4,726          | 13    | 168                                   | 1,583                                | 2,184                          | 808                           | 2,992                    |
| 71                      | 20801530250000 | Small Multi-Family                                 | 0.17           | 7,312           |                         |                | 3     | 209                                   |                                      | 627                            |                               | 627                      |
| 73                      | 20801530240000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.90           | 126,201         | 31,550                  | 26,818         | 116   | 168                                   | 1,583                                | 19,488                         | 4,586                         | 24,074                   |
| 76                      | 20801530200000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.62           | 27,041          | 6,760                   | 5,746          | 16    | 168                                   | 1,583                                | 2,688                          | 983                           | 3,671                    |
| 77                      | 20801620180000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 5.17           | 225,395         | 56,349                  | 47,896         | 207   | 168                                   | 1,583                                | 34,776                         | 8,191                         | 42,967                   |
| 78                      | 20801620240000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.65           | 159,126         | 39,782                  | 33,814         | 91    | 168                                   | 1,583                                | 15,288                         | 5,783                         | 21,071                   |
| 79                      | 20801620270000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 6.31           | 274,918         | 68,730                  | 58,420         | 252   | 168                                   | 1,583                                | 42,336                         | 9,991                         | 52,327                   |
| 80                      | 20801720020000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.94           | 84,291          | 21,073                  | 17,912         | 77    | 168                                   | 1,583                                | 12,936                         | 3,063                         | 15,999                   |
| 83                      | 20801720190000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.45           | 19,634          | 4,909                   | 4,172          | 11    | 168                                   | 1,583                                | 1,848                          | 714                           | 2,562                    |
| 85                      | 20801720200000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.50           | 65,476          | 16,369                  | 13,914         | 60    | 168                                   | 1,583                                | 10,080                         | 2,379                         | 12,459                   |
| 86                      | 20801720070000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.70           | 30,635          | 7,659                   | 6,510          | 18    | 168                                   | 1,583                                | 3,024                          | 1,113                         | 4,137                    |
| 87                      | 20801720080000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.43           | 18,808          | 4,702                   | 3,997          | 11    | 168                                   | 1,583                                | 1,848                          | 684                           | 2,532                    |
| 88                      | 20801720210000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.03           | 44,956          | 11,239                  | 9,553          | 26    | 168                                   | 1,583                                | 4,368                          | 1,634                         | 6,002                    |

| Parcel<br>Number<br>Key | APN            | General<br>Land Use                                | Gross<br>Acres | Gross<br>Lot SF | Gross<br>Building<br>SF | Building<br>SF | Units | Residential<br>Demand<br>Factor (gpd) | Commercial<br>Demand<br>Factor (gpd) | Residential<br>Demand<br>(gpd) | Commercial<br>Demand<br>(gpd) | Total<br>Demand<br>(gpd) |
|-------------------------|----------------|----------------------------------------------------|----------------|-----------------|-------------------------|----------------|-------|---------------------------------------|--------------------------------------|--------------------------------|-------------------------------|--------------------------|
| 89                      | 20801720220000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.10           | 47,757          | 11,939                  | 10,148         | 27    | 168                                   | 1,583                                | 4,536                          | 1,736                         | 6,272                    |
| 90                      | 21700110330000 | Small Multi-Family                                 | 0.15           | 6,546           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 91                      | 21700120010000 | Small Multi-Family                                 | 0.15           | 6,685           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 92                      | 21700120290000 | Small Multi-Family                                 | 0.16           | 6,808           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 93                      | 21700210010000 | Small Multi-Family                                 | 0.15           | 6,670           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 94                      | 21700210020000 | Small Multi-Family                                 | 0.16           | 6,788           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 95                      | 21700210220000 | Small Multi-Family                                 | 0.16           | 6,782           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 96                      | 21700210210000 | Small Multi-Family                                 | 0.16           | 6,820           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 97                      | 21700220280000 | Small Multi-Family                                 | 0.15           | 6,739           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 98                      | 21700220270000 | Small Multi-Family                                 | 0.15           | 6,653           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 99                      | 21700220260000 | Small Multi-Family                                 | 0.16           | 7,109           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 100                     | 21500620540000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.88           | 169,130         | 42,283                  | 35,940         | 97    | 168                                   | 1,583                                | 16,296                         | 6,146                         | 22,442                   |
| 102                     | 21500620300000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.52           | 66,419          | 16,605                  | 14,114         | 61    | 168                                   | 1,583                                | 10,248                         | 2,414                         | 12,662                   |
| 103                     | 21500620250000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.44           | 19,209          | 4,802                   | 4,082          | 11    | 168                                   | 1,583                                | 1,848                          | 698                           | 2,546                    |
| 104                     | 21500620400000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.64           | 114,972         | 28,743                  | 24,432         | 106   | 168                                   | 1,583                                | 17,808                         | 4,178                         | 21,986                   |
| 105                     | 21500620560000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.57           | 68,331          | 17,083                  | 14,520         | 39    | 168                                   | 1,583                                | 6,552                          | 2,483                         | 9,035                    |
| 106                     | 21500620570000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.10           | 91,602          | 22,901                  | 19,465         | 84    | 168                                   | 1,583                                | 14,112                         | 3,329                         | 17,441                   |
| 109                     | 21500620110000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.97           | 42,453          | 10,613                  | 9,021          | 24    | 168                                   | 1,583                                | 4,032                          | 1,543                         | 5,575                    |
| 112                     | 21500620420000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.50           | 21,898          | 5,475                   | 4,653          | 13    | 168                                   | 1,583                                | 2,184                          | 796                           | 2,980                    |
| 114                     | 21500620100000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.87           | 81,393          | 20,348                  | 17,296         | 47    | 168                                   | 1,583                                | 7,896                          | 2,958                         | 10,854                   |
| 115                     | 21500720140000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.03           | 44,872          | 11,218                  | 9,535          | 26    | 168                                   | 1,583                                | 4,368                          | 1,631                         | 5,999                    |
| 116                     | 21500720150000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.87           | 37,753          | 9,438                   | 8,023          | 22    | 168                                   | 1,583                                | 3,696                          | 1,372                         | 5,068                    |
| 117                     | 21500720230000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.36           | 102,648         | 25,662                  | 21,813         | 59    | 168                                   | 1,583                                | 9,912                          | 3,730                         | 13,642                   |
| 119                     | 21500720220000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.85           | 37,030          | 9,257                   | 7,869          | 21    | 168                                   | 1,583                                | 3,528                          | 1,346                         | 4,874                    |
| 127                     | 21500720070000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.92           | 83,844          | 20,961                  | 17,817         | 77    | 168                                   | 1,583                                | 12,936                         | 3,047                         | 15,983                   |
| 128                     | 21500800010000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 4.08           | 177,686         | 44,421                  | 37,758         | 163   | 168                                   | 1,583                                | 27,384                         | 6,457                         | 33,841                   |
| 129                     | 21500800020000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 4.32           | 188,092         | 47,023                  | 39,969         | 173   | 168                                   | 1,583                                | 29,064                         | 6,835                         | 35,899                   |
| 130                     | 21500800050000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.21           | 8,965           | 2,241                   | 1,905          | 5     | 168                                   | 1,583                                | 840                            | 326                           | 1,166                    |
| 131                     | 21500800040000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.24           | 10,627          | 2,657                   | 2,258          | 6     | 168                                   | 1,583                                | 1,008                          | 386                           | 1,394                    |
| 132                     | 21700460010000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.24           | 10,659          | 2,665                   | 2,265          | 6     | 168                                   | 1,583                                | 1,008                          | 387                           | 1,395                    |
| 134                     | 21701100100000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.67           | 29,367          | 7,342                   | 6,241          | 17    | 168                                   | 1,583                                | 2,856                          | 1,067                         | 3,923                    |
| 135                     | 21701100090000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.75           | 32,679          | 8,170                   | 6,944          | 19    | 168                                   | 1,583                                | 3,192                          | 1,188                         | 4,380                    |
| 141                     | 21500920010000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 6.05           | 263,435         | 65,859                  | 55,980         | 242   | 168                                   | 1,583                                | 40,656                         | 9,573                         | 50,229                   |
| 142                     | 21500920020000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.20           | 139,409         | 34,852                  | 29,624         | 128   | 168                                   | 1,583                                | 21,504                         | 5,066                         | 26,570                   |
| 143                     | 21500920110000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 3.76           | 163,638         | 40,909                  | 34,773         | 94    | 168                                   | 1,583                                | 15,792                         | 5,947                         | 21,739                   |
| 144                     | 21500920080000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.33           | 101,464         | 25,366                  | 21,561         | 93    | 168                                   | 1,583                                | 15,624                         | 3,687                         | 19,311                   |
| 147                     | 21500930010000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.50           | 109,048         | 27,262                  | 23,173         | 100   | 168                                   | 1,583                                | 16,800                         | 3,963                         | 20,763                   |
| 151                     | 21501820010000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.60           | 69,648          | 17,412                  | 14,800         | 64    | 168                                   | 1,583                                | 10,752                         | 2,531                         | 13,283                   |
| 152                     | 21501820040000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.71           | 118,195         | 29,549                  | 25,116         | 109   | 168                                   | 1,583                                | 18,312                         | 4,295                         | 22,607                   |
| 155                     | 21501820170000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.67           | 116,490         | 29,122                  | 24,754         | 107   | 168                                   | 1,583                                | 17,976                         | 4,233                         | 22,209                   |
| 157                     | 21501820190000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.28           | 12,071          | 3,018                   | 2,565          | 7     | 168                                   | 1,583                                | 1,176                          | 439                           | 1,615                    |
| 158                     | 21501820160000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.87           | 38,103          | 9,526                   | 8,097          | 22    | 168                                   | 1,583                                | 3,696                          | 1,385                         | 5,081                    |
| 159                     | 21501820280000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.61           | 26,622          | 6,655                   | 5,657          | 15    | 168                                   | 1,583                                | 2,520                          | 967                           | 3,487                    |
| 160                     | 21501820320000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.31           | 100,564         | 25,141                  | 21,370         | 92    | 168                                   | 1,583                                | 15,456                         | 3,655                         | 19,111                   |
| 161                     | 21501820310000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.41           | 17,650          | 4,412                   | 3,751          | 10    | 168                                   | 1,583                                | 1,680                          | 641                           | 2,321                    |
| 162                     | 21501820220000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.30           | 56,799          | 14,200                  | 12,070         | 33    | 168                                   | 1,583                                | 5,544                          | 2,064                         | 7,608                    |
| 165                     | 21501820130000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.93           | 40,526          | 10,131                  | 8,612          | 23    | 168                                   | 1,583                                | 3,864                          | 1,473                         | 5,337                    |
| 166                     | 21501820120000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.99           | 86,566          | 21,642                  | 18,395         | 50    | 168                                   | 1,583                                | 8,400                          | 3,146                         | 11,546                   |
| 167                     | 21501820270000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.43           | 105,911         | 26,478                  | 22,506         | 97    | 168                                   | 1,583                                | 16,296                         | 3,849                         | 20,145                   |
| 168                     | 21501820110000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.72           | 31,434          | 7,858                   | 6,680          | 18    | 168                                   | 1,583                                | 3,024                          | 1,142                         | 4,166                    |
| 169                     | 21501820240000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.70           | 30,284          | 7,571                   | 6,435          | 17    | 168                                   | 1,583                                | 2,856                          | 1,101                         | 3,957                    |

| Parcel<br>Number<br>Key | APN            | General<br>Land Use                                | Gross<br>Acres | Gross<br>Lot SF | Gross<br>Building<br>SF | Building<br>SF | Units | Residential<br>Demand<br>Factor (gpd) | Commercial<br>Demand<br>Factor (gpd) | Residential<br>Demand<br>(gpd) | Commercial<br>Demand<br>(gpd) | Total<br>Demand<br>(gpd) |
|-------------------------|----------------|----------------------------------------------------|----------------|-----------------|-------------------------|----------------|-------|---------------------------------------|--------------------------------------|--------------------------------|-------------------------------|--------------------------|
| 170                     | 21501820100000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.69           | 30,268          | 7,567                   | 6,432          | 17    | 168                                   | 1,583                                | 2,856                          | 1,100                         | 3,956                    |
| 174                     | 21801510080000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.27           | 11,571          | 2,893                   | 2,459          | 7     | 168                                   | 1,583                                | 1,176                          | 421                           | 1,597                    |
| 175                     | 21801510090000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.41           | 17,719          | 4,430                   | 3,765          | 10    | 168                                   | 1,583                                | 1,680                          | 644                           | 2,324                    |
| 180                     | 21501900110000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.52           | 22,725          | 5,681                   | 4,829          | 13    | 168                                   | 1,583                                | 2,184                          | 826                           | 3,010                    |
| 182                     | 21501900510000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.50           | 65,309          | 16,327                  | 13,878         | 60    | 168                                   | 1,583                                | 10,080                         | 2,373                         | 12,453                   |
| 185                     | 21501900530000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.21           | 52,689          | 13,172                  | 11,196         | 30    | 168                                   | 1,583                                | 5,040                          | 1,915                         | 6,955                    |
| 188                     | 21801610010000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.21           | 9,081           | 2,270                   | 1,930          | 5     | 168                                   | 1,583                                | 840                            | 330                           | 1,170                    |
| 190                     | 21801610270000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.51           | 65,892          | 16,473                  | 14,002         | 61    | 168                                   | 1,583                                | 10,248                         | 2,395                         | 12,643                   |
| 191                     | 21801610260000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.73           | 75,398          | 18,850                  | 16,022         | 69    | 168                                   | 1,583                                | 11,592                         | 2,740                         | 14,332                   |
| 192                     | 21802310010000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.34           | 14,973          | 3,743                   | 3,182          | 9     | 168                                   | 1,583                                | 1,512                          | 544                           | 2,056                    |
| 193                     | 21802310080000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.42           | 18,463          | 4,616                   | 3,923          | 11    | 168                                   | 1,583                                | 1,848                          | 671                           | 2,519                    |
| 193                     | 21802330170000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.35           | 15,101          | 3,775                   | 3,209          | 9     | 168                                   | 1,583                                | 1,512                          | 549                           | 2,061                    |
| 194                     | 21802310020000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.42           | 18,235          | 4,559                   | 3,875          | 10    | 168                                   | 1,583                                | 1,680                          | 663                           | 2,343                    |
| 195                     | 21802310030000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.47           | 20,688          | 5,172                   | 4,396          | 12    | 168                                   | 1,583                                | 2,016                          | 752                           | 2,768                    |
| 198                     | 21802310060000 | Small Multi-Family                                 | 0.15           | 6,456           |                         |                | 2     | 168                                   |                                      | 336                            |                               | 336                      |
| 200                     | 21802330160000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.18           | 7,954           | 1,988                   | 1,690          | 5     | 168                                   | 1,583                                | 840                            | 289                           | 1,129                    |
| 201                     | 21802330150000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.21           | 9,343           | 2,336                   | 1,985          | 5     | 168                                   | 1,583                                | 840                            | 340                           | 1,180                    |
| 202                     | 21802330140000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.19           | 8,325           | 2,081                   | 1,769          | 5     | 168                                   | 1,583                                | 840                            | 303                           | 1,143                    |
| 203                     | 21802330130000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.18           | 7,977           | 1,994                   | 1,695          | 5     | 168                                   | 1,583                                | 840                            | 290                           | 1,130                    |
| 204                     | 21802330120000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.19           | 8,443           | 2,111                   | 1,794          | 5     | 168                                   | 1,583                                | 840                            | 307                           | 1,147                    |
| 207                     | 21802810010000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.81           | 78,938          | 19,734                  | 16,774         | 72    | 168                                   | 1,583                                | 12,096                         | 2,869                         | 14,965                   |
| 209                     | 21802830060000 | Small Multi-Family                                 | 0.13           | 5,777           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 210                     | 21802830050000 | Small Multi-Family                                 | 0.13           | 5,784           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 211                     | 21802830200000 | Small Multi-Family                                 | 0.13           | 5,791           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 212                     | 21802830190000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.30           | 12,876          | 3,219                   | 2,736          | 7     | 168                                   | 1,583                                | 1,176                          | 468                           | 1,644                    |
| 213                     | 21802830010000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.51           | 22,181          | 5,545                   | 4,714          | 13    | 168                                   | 1,583                                | 2,184                          | 806                           | 2,990                    |
| 225                     | 22801740010000 | Small Multi-Family                                 | 0.08           | 3,475           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 226                     | 22801740020000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.32           | 13,932          | 3,483                   | 2,961          | 8     | 168                                   | 1,583                                | 1,344                          | 506                           | 1,850                    |
| 227                     | 22801740030000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.27           | 99,007          | 24,752                  | 21,039         | 91    | 168                                   | 1,583                                | 15,288                         | 3,598                         | 18,886                   |
| 238                     | 22802510530000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.56           | 111,498         | 27,875                  | 23,693         | 102   | 168                                   | 1,583                                | 17,136                         | 4,052                         | 21,188                   |
| 239                     | 22802510540000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.52           | 22,451          | 5,613                   | 4,771          | 13    | 168                                   | 1,583                                | 2,184                          | 816                           | 3,000                    |
| 240                     | 22802510340000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.51           | 22,100          | 5,525                   | 4,696          | 13    | 168                                   | 1,583                                | 2,184                          | 803                           | 2,987                    |
| 243                     | 24006600140000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.64           | 71,620          | 17,905                  | 15,219         | 66    | 168                                   | 1,583                                | 11,088                         | 2,603                         | 13,691                   |
| 244                     | 24006600110000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.65           | 28,400          | 7,100                   | 6,035          | 16    | 168                                   | 1,583                                | 2,688                          | 1,032                         | 3,720                    |
| 245                     | 24006600100000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 5.42           | 235,978         | 58,994                  | 50,145         | 217   | 168                                   | 1,583                                | 36,456                         | 8,576                         | 45,032                   |
| 252                     | 24005500610000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.55           | 67,483          | 16,871                  | 14,340         | 62    | 168                                   | 1,583                                | 10,416                         | 2,452                         | 12,868                   |
| 253                     | 24005500630000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.57           | 68,386          | 17,097                  | 14,532         | 63    | 168                                   | 1,583                                | 10,584                         | 2,485                         | 13,069                   |
| 258                     | 24005500650000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.45           | 63,347          | 15,837                  | 13,461         | 58    | 168                                   | 1,583                                | 9,744                          | 2,302                         | 12,046                   |
| 263                     | 24005500530000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.08           | 46,999          | 11,750                  | 9,987          | 27    | 168                                   | 1,583                                | 4,536                          | 1,708                         | 6,244                    |
| 266                     | 24000110200000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.35           | 15,400          | 3,850                   | 3,272          | 9     | 168                                   | 1,583                                | 1,512                          | 560                           | 2,072                    |
| 268                     | 24000110280000 | Small Multi-Family                                 | 0.15           | 6,398           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 271                     | 24000110290000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.20           | 52,263          | 13,066                  | 11,106         | 30    | 168                                   | 1,583                                | 5,040                          | 1,899                         | 6,939                    |
| 273                     | 24000110320000 | Small Multi-Family                                 | 0.09           | 4,100           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 275                     | 24000110170000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.20           | 8,515           | 2,129                   | 1,809          | 5     | 168                                   | 1,583                                | 840                            | 309                           | 1,149                    |
| 276                     | 24000110370000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.38           | 16,387          | 4,097                   | 3,482          | 9     | 168                                   | 1,583                                | 1,512                          | 595                           | 2,107                    |
| 301                     | 24005500080000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.81           | 35,297          | 8,824                   | 7,501          | 20    | 168                                   | 1,583                                | 3,360                          | 1,283                         | 4,643                    |
| 304                     | 24000810120000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.51           | 65,567          | 16,392                  | 13,933         | 60    | 168                                   | 1,583                                | 10,080                         | 2,383                         | 12,463                   |
| 305                     | 24000840190000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.01           | 87,624          | 21,906                  | 18,620         | 80    | 168                                   | 1,583                                | 13,440                         | 3,184                         | 16,624                   |
| 316                     | 24004800130000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.22           | 9,611           | 2,403                   | 2,042          | 6     | 168                                   | 1,583                                | 1,008                          | 349                           | 1,357                    |
| 335                     | 24005400750000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 2.04           | 88,916          | 22,229                  | 18,895         | 82    | 168                                   | 1,583                                | 13,776                         | 3,231                         | 17,007                   |
| 344                     | 24005400990000 | Small Multi-Family                                 | 0.05           | 2,370           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |

| Parcel<br>Number<br>Key | APN            | General<br>Land Use                                | Gross<br>Acres | Gross<br>Lot SF | Gross<br>Building<br>SF | Building<br>SF | Units | Residential<br>Demand<br>Factor (gpd) | Commercial<br>Demand<br>Factor (gpd) | Residential<br>Demand<br>(gpd) | Commercial<br>Demand<br>(gpd) | Total<br>Demand<br>(gpd) |
|-------------------------|----------------|----------------------------------------------------|----------------|-----------------|-------------------------|----------------|-------|---------------------------------------|--------------------------------------|--------------------------------|-------------------------------|--------------------------|
| 354                     | 24005401020000 | Large Lot Mixed-Use (Commercial and Multi-Family)  | 1.59           | 69,291          | 17,323                  | 14,724         | 64    | 168                                   | 1,583                                | 10,752                         | 2,518                         | 13,270                   |
| 355                     | 24005401010000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.29           | 12,429          | 3,107                   | 2,641          | 7     | 168                                   | 1,583                                | 1,176                          | 452                           | 1,628                    |
| 360                     | 24005400710000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 1.27           | 55,252          | 13,813                  | 11,741         | 32    | 168                                   | 1,583                                | 5,376                          | 2,008                         | 7,384                    |
| 365                     | 24005400850000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.23           | 10,050          | 2,512                   | 2,136          | 6     | 168                                   | 1,583                                | 1,008                          | 365                           | 1,373                    |
| 376                     | 24005400900000 | Small Multi-Family                                 | 0.15           | 6,743           |                         |                | 2     | 209                                   |                                      | 418                            |                               | 418                      |
| 379                     | 24005400470000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.58           | 25,453          | 6,363                   | 5,409          | 15    | 168                                   | 1,583                                | 2,520                          | 925                           | 3,445                    |
| 381                     | 24005400460000 | Medium Lot Mixed-Use (Commercial and Multi-Family) | 0.31           | 13,298          | 3,324                   | 2,826          | 8     | 168                                   | 1,583                                | 1,344                          | 483                           | 1,827                    |