



APPENDIX C

Hydraulic Modeling (Akel Engineering)



COACHELLA VALLEY WATER DISTRICT

DOMESTIC WATER SYSTEM HYDRAULIC ANALYSIS FOR SUPPLY TREATMENT ALTERNATIVES

Supply Treatment Analysis Scenarios

Submitted June 2014 – February 2015

PRELIMINARY

AKEL
ENGINEERING GROUP, INC.

Table 1 Hydraulic Analysis Summary
 Hydraulic Analysis for Supply Treatment Alternatives
 Coachella Valley Water District

PRELIMINARY

Analysis Scenario No.							
Pressure Zone	1	1A	2	3	4	5	6
	La Quinta	La Quinta	Lake Cahuilla	Lake Cahuilla	Sun City	Sun City/Valley	Valley
New Supply Location	A	Jefferson Street	B	C	D	D	G
Parameters and Assumptions	Impacted wells (Cr-6 at 8 ppb) in Lower La Quinta to be turned off	Wells 5701-2, 5708-1, 5709-1, 5713-1, 5714-1, 5715-1, 5725-1 to be active	Impacted wells (Cr-6 at 8 ppb) in Lake Cahuilla to be turned off	Impacted wells (Cr-6 at 8 ppb) in Lake Cahuilla to be turned off	Impacted wells (Cr-6 at 8 ppb) in Sun City to be turned off	Impacted wells (Cr-6 at 8 ppb) in Sun City to be turned off.	Impacted wells (Cr-6 at 8 ppb) in Valley to be turned off
	SWTP at point A set to supply the resulting water deficit amount	Impacted wells (Cr-6 > 10.4 ppb) in La Quinta to be turned off.	SWTP at point B set to supply the resulting water deficit amount	SWTP at point C set to supply the resulting water deficit amount	SWTP at point D set to supply the resulting water deficit amount	Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated).	SWTP at point G set to supply the resulting water deficit amount
	Zone interconnections to Lake Cahuilla and Valley closed (PRVs and/or Pumps)	SWTP at Jefferson Street to supply remaining La Quinta Zone water deficit amount. Zone interconnections to the surrounding Zones assumed closed (PRVs and/or Pumps)	Zone interconnections to La Quinta and Middleton closed (PRVs and/or Pumps)	Zone interconnections to La Quinta and Middleton closed (PRVs and/or Pumps)	Zone interconnections to Valley closed (PRVs and/or Pumps)	SWTP at point D set to supply the resulting water deficit amount in Sun City and the existing water deficient in Valley Pump Station located at point F, pumping to the Valley Zone to supply the existing water deficit of Valley through the existing 24-inch crossing under the Freeway Zone interconnections to Sky Mountain, Lower 1000 Palms, and La Quinta closed (PRVs and/or Pumps)	Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Quinta closed (PRVs and/or Pumps)
New SWTP Production	20,819 gpm	8,500 gpm	5,686 gpm	5,686 gpm	5,975 gpm	14,767 gpm	20,347 gpm
Existing Well Production	995 gpm	12,900 gpm	2,259 gpm	2,272 gpm	n/a	n/a	22,496 gpm
New Pump Station Flow	n/a		n/a	n/a	n/a	8,780 gpm	n/a
Analysis Summary	This Scenario results with headlosses up to 14 ft/kft and velocities up to 11 fps near the new SWTP	La Quinta deficiency: 8,466 gpm (Cr-6 >10.4 ppb)	Minimal impact to system headlosses and velocities	Minimal impact to system headlosses and velocities	Minimal impact to system headlosses and velocities	This Scenario results with headlosses up to 9 ft/kft and velocities up to 7 fps near the SWTP, with headlosses up to 47ft/kft and velocities up to 13 fps near the new Valley Pump Station	This Scenario results with headlosses up to 105 ft/kft and velocities up to 25 fps near the new SWTP
	Low pressures (>20psi) are experienced on the northern portion of the La Quinta Pressure Zone	High Velocities and Headlosses in the existing 12 and 18-inch mains near the SWTP	Pressure increase at the SWTP discharge is approximately 5 psi	Pressure increase at the SWTP discharge is approximately 3 psi	Pressure increase at the SWTP discharge is approximately 2 psi	Pressure increase at the SWTP discharge is approximately 3 psi	Pressure increase at the SWTP discharge is approximately 120 psi. (Avg Pressure is approx. 216 psi)
	Pressure increase at the SWTP discharge is approximately 2 psi	Pressure increases approximately 5 psi near the SWTP and decreases approximately 6 psi in the northern portion on the pressure zone. Transmission Main Improvements: <ul style="list-style-type: none"> • 5,250 ft of 30" in Jefferson St from SWTP to 52nd Ave • 5,350 ft of 24" in 52nd Ave from Jefferson St to Cetrino SWTP Pump Station: 8,500 gpm at 274 ft				This scenario results in pressures up to 117 psi in the Valley Pressure Zone near the new pump station.	
Figures	Figures 1-1, 1-2, 1-3, 1-4	Figures 1A-1, 1A-3, 1A-3, 1A-4	Figures 2-1, 2-2, 2-3, 2-4	Figures 3-1, 3-2, 3-3, 3-4	Figures 4-1, 4-2, 4-3, 4-4	Figures 5-1, 5-2, 5-3, 5-4	Figures 6-1, 6-2, 6-3, 6-4

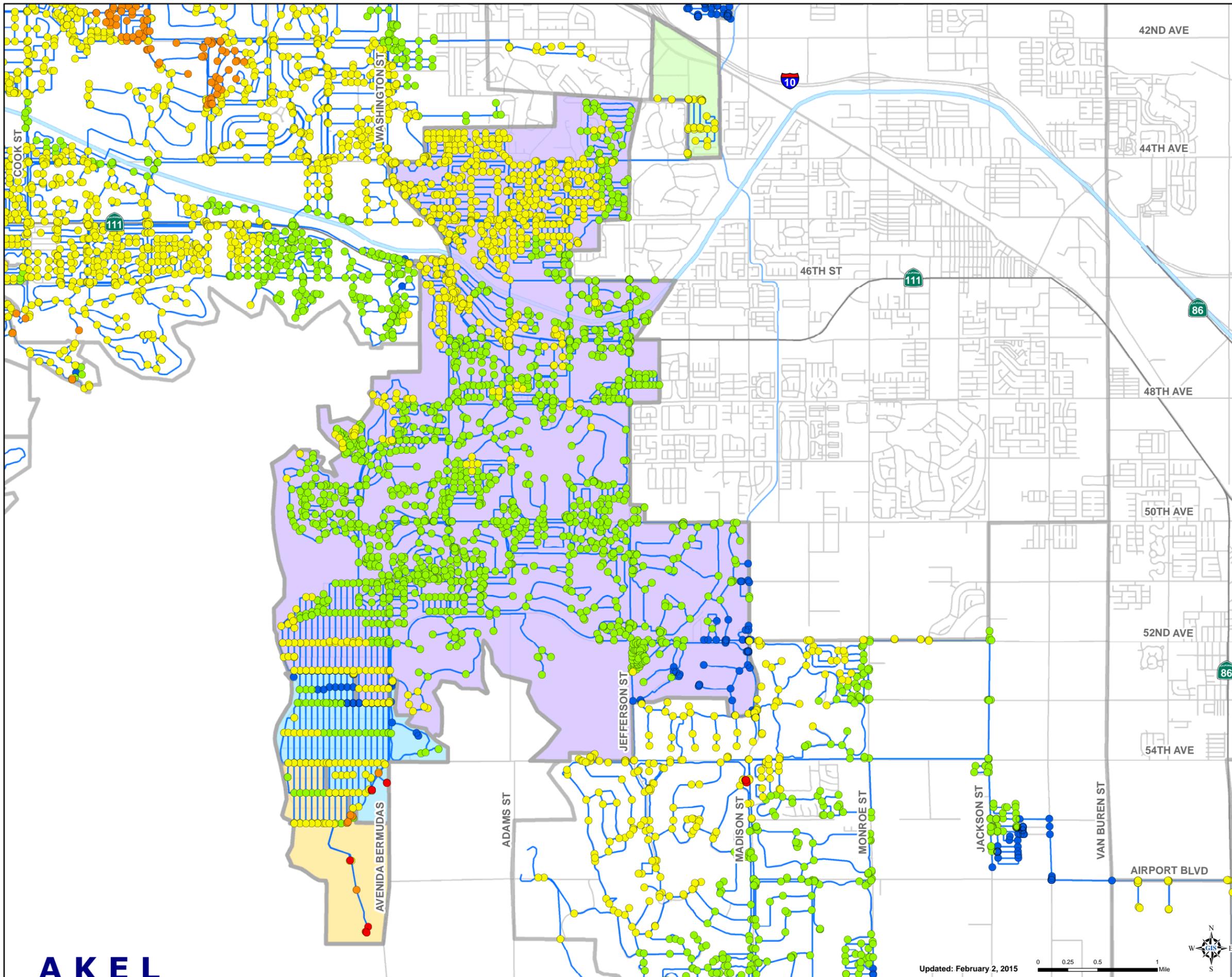
Table 1 Hydraulic Analysis Summary (cont'd)
 Hydraulic Analysis for Supply Treatment Alternatives
 Coachella Valley Water District

PRELIMINARY

Pressure Zone	Analysis Scenario No.						
	7	8	8A	8B	9	9A	10
Valley	Valley	Valley	Valley	Valley	La Quinta/Valley	La Quinta/Valley	Valley
New Supply Location	G	G	G	Burr Street	A	A	H & I
Parameters and Assumptions	<p>Impacted wells (Cr-6 at 8 ppb) in Valley to be turned off</p> <p>SWTP at point G set to supply the resulting water deficit amount</p> <p>Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed (PRVs and/or Pumps)</p> <p>18-inch main in 42nd Avenue extended from Washington St to Oasis Club Dr</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated)</p> <p>SWTP at point G set to supply only the existing Valley zone water deficit amount</p> <p>Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed (PRVs and/or Pumps)</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated)</p> <p>SWTP at point G set to supply only the existing Valley zone water deficit amount</p> <p>Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed (PRVs and/or Pumps)</p> <p>18-inch main in 42nd Avenue extended from Washington St to Oasis Club Dr</p>	<p>Impacted wells (Cr-6 > 10.4 ppb) in Valley are active (assumed to be locally treated)</p> <p>Pressure drop of 30 psi assumed through on-site facilities at impacted wells: 5632-2, 5657-2, 5664-1, 5679-1, and 4628-2.</p> <p>SWTP at Burr St to supply remaining Valley Zone water deficit amount.</p> <p>Zone interconnections to the surrounding Zones assumed closed (PRVs and/or Pumps)</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Lower La Quinta to be turned off</p> <p>Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated)</p> <p>SWTP at point A set to supply the existing Valley zone water deficit amount, and the resulting La Qunita water deficit</p> <p>Zone interconnections to Lake Cahuilla, Sky Mountain, Lower 1000 Palms, and Sun City closed (PRVs and/or Pumps)</p> <p>The capacity of Pump Station 5636 (Near Fred Warning Dr and Washington St) was increased to 8,800 gpm to transfer water to the Valley Zone</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Lower La Quinta to be turned off</p> <p>Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated)</p> <p>SWTP at point A set to supply the existing Valley zone water deficit amount, and the resulting La Qunita water deficit</p> <p>Zone interconnections to Lake Cahuilla, Sky Mountain, Lower 1000 Palms, and Sun City closed (PRVs and/or Pumps)</p> <p>The capacity of Pump Station 5636 (Near Fred Warning Dr and Washington St) was increased to 8,800 gpm to transfer water to the Valley Zone</p> <p>Extend the 18 inch main (Replace existing 12-inch) in Washington from 47th Ave north to connect to the segment north of Highway 111</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Valley are active (assumed to be locally treated)</p> <p>SWTP at point H & I set to supply only the existing Valley zone water deficit amount</p> <p>Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed (PRVs and/or Pumps)</p>
New SWTP Production	20,347 gpm	8,792 gpm	8,792 gpm	7,525 gpm	29,611 gpm	29,611 gpm	8,792 gpm
Existing Well Production	23,276 gpm	35,793 gpm	22,496 gpm	42,250 gpm			35,793 gpm
New Pump Station Flow	n/a	n/a	n/a		8,800 gpm	8,800 gpm	n/a
Transfer from other zones							
Analysis Summary	<p>This Scenario results with headlosses up to 105 ft/kft and velocities up to 25 fps near the new SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 105 psi. (Avg Pressure is approx. 201 psi)</p>	<p>This Scenario results with headlosses up to 21 ft/kft and velocities up to 11 fps near the new SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 30 psi. (Avg Pressure is approx. 126 psi)</p>	<p>This Scenario results with headlosses up to 21 ft/kft near the SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 27 psi. (Avg Pressure is approx. 123 psi)</p>	<p>Head increase at wells with on-site treatment is approximately 70ft and capacity is reduced by approximately 450 gpm. (Total Capacity lost: 2,250 gpm)</p> <p>Valley deficiency: 5,275 gpm (Existing) + 2,250 gpm (well capacity lost due to on-site treatment) = SWTP production of 7,525 gpm</p> <p>High Velocities and Headlosses in the existing transmission mains around the SWTP.</p> <p>Transmission Main Improvements:</p> <ul style="list-style-type: none"> • 5,600ft of 30" in 42nd Ave from the SWTP to Washington St • 4,750ft of 24" in Washington Ave from 42nd Ave to Calle Las Brisas <p>Pressure increases approximately 8 psi near the SWTP.</p> <p>SWTP: 7,525 gpm at 295 ft</p>	<p>This Scenario results with headlosses up to 22 ft/kft near the SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 1 psi. (Avg Pressure is approx. 82 psi)</p> <p>Negative pressure predicted in the northern portion of the La Qunita PZ</p>	<p>This Scenario results with headlosses up to 22 ft/kft near the SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 1 psi. (Avg Pressure is approx. 82 psi)</p> <p>Negative pressure predicted in the northern portion of the La Qunita PZ</p>	<p>This Scenario results with headlosses up to 6 ft/kft near the SWTP</p> <p>Pressure increase at the SWTP discharge is approximately 17 psi. (Avg Pressure is approx. 58 psi)</p>
Figures	Figures 7-1, 7-2, 7-3, 7-4	Figures 8-1, 8-2, 8-3, 8-4	Figures 8-5, 8-6, 8-7	Figures 8B-1, 8B-2, 8B-3, 8B-4	Figures 9-1, 9-2, 9-3	Figures 9-4, 9-5, 9-6	Figures 10-1, 10-2, 10-3

Table 1 Hydraulic Analysis Summary (cont'd)
 Hydraulic Analysis for Supply Treatment Alternatives
 Coachella Valley Water District

Analysis Scenario No.					
Pressure Zone	11	11A	11B	12	13
Valley	Valley	Valley	Valley	Sky Mountain	La Quinta
New Supply Location	H & I	Mid-Valley	n/a	n/a	Burr Street
Parameters and Assumptions	<p>Impacted wells (Cr-6 at 10 ppb) in Valley to be turned off</p> <p>SWTP to provide peak supply capacity of 14,000 gpm</p> <p>Remaining supply deficit to be provided by zone interconnections to Sky Mountain and La Quinta (PRVs and/or Pumps)</p>	<p>Assume impacted wells (Cr-6 > 10.4 ppb) 5632-2, 5657-2, 5664-1, 5669-1, and 5679-1 pump directly to SWTP for blending.</p> <p>Other impacted wells inactive (4628-2)</p> <p>SWTP at Mid-Valley to supply remaining Valley Zone water deficit amount.</p> <p>Zone interconnections to the surrounding Zones assumed closed (PRVs and/or Pumps)</p>	<p>Impacted wells (Cr-6 > 10.4 ppb) in Valley, La Quinta, and Sky Mountain are active (assumed to be locally treated)</p> <p>Pressure drop of 30 psi assumed through on-site facilities at impacted wells</p> <p>Zone interconnections from Sky Mountain, La Quinta, and Date Palm to supply water deficit amount</p>	<p>Impacted wells (Cr-6 at 8 ppb) in Sky Valley to be turned off</p> <p>Peak demand volume to be stored during off-peak hours and drawn down during peak demand period</p> <p>Peak demand volume to equal longest recorded historical peak period</p>	<p>Wells 5701-2, 5708-1, 5709-1, 5713-1, 5714-1, 5715-1, 5725-1 to be active</p> <p>Impacted wells (Cr-6 > 10.4 ppb) in La Quinta to be turned off.</p> <p>SWTP at Burr St to supply remaining La Quinta Zone water deficit amount.</p> <p>Zone interconnections to the surrounding Zones assumed closed (PRVs and/or Pumps)</p>
New SWTP Production	12,500 gpm Peak Day Average (14,000 gpm Peak Hour)	SWTP: 7,150 gpm, Blending Wells: 8,375 gpm SWTP Pump Station: 15,525 gpm (Blending wells + SWTP)	n/a	n/a	8,500 gpm
Existing Well Production	22,496 gpm	Wells: 34,275 gpm Blending Wells: 8,375 gpm	42,250 gpm		12,900 gpm
New Pump Station Flow	n/a			n/a	
Transfer from other zones					
California Waterworks Standards: Water sources sized to meet Peak Day Demands	Proposed supply improvements meet Peak Day Demand			Supply deficiency of 11.0 MGD not addressed in this scenario	
Analysis Summary	<p>Pressure increase at the SWTP discharge is approximately 19 psi. (Avg Pressure is approx. 62 psi)</p> <p>This Scenario results with headlosses up to 12 ft/kft near the SWTP.</p> <p>1.6 miles of 12 and 18 inch mains will need to be replaced with larger 18, 24 and 30-inch pipes to meet headloss and velocity criteria: 750' of 18" 6,250' of 24" 1,550' of 30"</p> <p>2,150 gpm is transferred from existing Sky Mountain PRVs and 850 gpm is pumped from La Quinta to make up the remaining supply deficit in Valley.</p> <p>Note: This scenario assumes the supply issues associated with Cr-6 implementations in Sky Mountain and La Quinta have been resolved. • Cr-6 Not Implemented Supply Totals: Sky Mountain: +5,654 gpm La Quinta: +3,531 gpm • With Cr-6 at 10ppb, supply for both Sky Mountain and La Quinta is deficient</p>	<p>Valley deficiency: 13,875 gpm (Cr-6 >10.4 ppb)</p> <p>Pressure increases approximately 5 psi near the SWTP at Hovley Ln and 10 psi at Via Toscana.</p> <p>Pressure decreases approximately 8 psi in the northern part of the Valley Zone (1000 Palms). This lower pressure is a result of the wells in the northern part of the zone feeding into the blending line instead of directly into the system.</p> <p>SWTP Pump Station: 15,525 gpm at 131 ft</p> <p>Transmission Main Improvements: • 2,950 ft of 30" in Via Toscana from SWTP to Club Villa Dr • 4,150 ft of 24" in Via Toscana from Club Villa Dr to Camino De Paco • 2,250 ft of 18" in Hovley Ln from SWTP to Beacon Hill • 1,650 ft of 30" in Hovley Ln from Carlotta Dr to El Dorado Dr • 450 ft of 30" in El Dorado Dr from Hovley Ln to 450 ft n/o Hovley Ln • 5,150 ft of 24" in El Dorado Dr from 450 ft n/o Hovley Ln to Honey Suckle Dr</p>	<p>Head increase at wells with on-site treatment is approximately 70ft and capacity is reduced by approximately 450 gpm each. (Total capacity lost: Valley: 2,250 gpm, La Quinta: 3,150 gpm, Sky Mountain: 2,700 gpm)</p> <p>Zone Supply Summary Valley Deficiency: 5,275 gpm (Existing) + 2,250 gpm (well capacity lost due to on-site treatment) = Total Deficiency of 7,525 gpm</p> <p>La Quinta Surplus: 4,300 gpm (Existing) - 3,150 gpm (well capacity lost due to on-site treatment) = Total Surplus of 1,150 gpm</p> <p>Sky Mountain Surplus: 2,525 gpm (Existing) - 2,700 gpm (well capacity lost due to on-site treatment) = Total Deficiency of 175 gpm</p> <p>Date Palm Surplus: 6,925 gpm (Existing) with no wells impacted by Cr-6 >10.4ppb = Total Surplus of 6,925 gpm</p> <p>Supply Summary Calculation: Valley: -7,525 gpm La Quinta: +1,150 gpm Sky Mountain: -175 gpm Date Palm: +6,925 gpm Remaining: +375 gpm</p> <p>Including the well treatment capacity losses in Sky Mountain and La Quinta, there is still a deficiency of 6,550 gpm in Valley. The remaining Valley deficiency could be supplied by Date Palm via Sky Mountain.</p> <p>Hydraulic modeling for this scenario has not been performed (awaiting confirmation of assumptions) but high velocities and headlosses are expected to occur near the upgraded pump station from La Quinta and new PRVs from Date Palm and Sky Mountain.</p>	<p>This Scenario results in an increase in storage deficiency for the Sky Mountain Zone, from -15.4 MGD to -34.6 MGD.</p> <p>Infrastructure requirements: • 34.6 MG of additional storage The preliminary location for the new storage in Sky Mountain is near 28th Avenue west of Sierra Del Sol.</p> <p>• Transmission main improvements for this new tank include: 14,100' of new 36" pipe from the new tank to Bob Hope Dr and Ramon Rd</p>	<p>La Quinta deficiency: 8,500 gpm (Cr-6 >10.4 ppb)</p> <p>High Velocities and Headlosses in the existing transmission mains around the SWTP connection.</p> <p>Pressure increases approximately 8 psi near the SWTP connection at Fred Warning Dr and Venice Dr</p> <p>SWTP: 8,500 gpm at 235 ft</p> <p>Transmission Main Improvements: • 5,600ft of 36" in 42nd Ave from the SWTP to Washington Ave • 3,025ft of 36" in Washington Ave from 42nd Ave to Palm Royale Dr • 3,200ft of 36" in Palm Royale Dr from Washington Dr to Fred Warning Dr • 1,150ft of 36" in Fred Warning Dr from Palm Royale Dr to Venice Dr • 1,150 ft of 30" in Fred Warning Dr from Venice Dr to Vistas Dr • 1,675ft of 24" in Fred Warning Dr from Vistas Dr to Adams St • 800 ft of 24" in Adams St from Fred Warning Dr to La Palma Dr • 475ft of 24" in Vistas Dr from Fred Warning Dr to Villetta Dr • 1,000 ft of 18" in Vistas Dr from Villetta Dr to Forbes Cir • 1,250ft of 24" in Washington St from Seeley Dr to 450ft n/o Hwy 111 • 5,375ft of 24" in Dune Palms Rd from Miles Ave to Hwy 111</p>
Figures	Figures 11-1, 11-2, 11-3, 11-4	Figures 11A-1, 11A-2, 11A-3, 11A-4	n/a	Table 12-1	Figures 13-1, 13-2, 13-3, 13-4



Legend

Existing Junctions
By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

Pressure Zones

- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Nairobi (190)
- Other

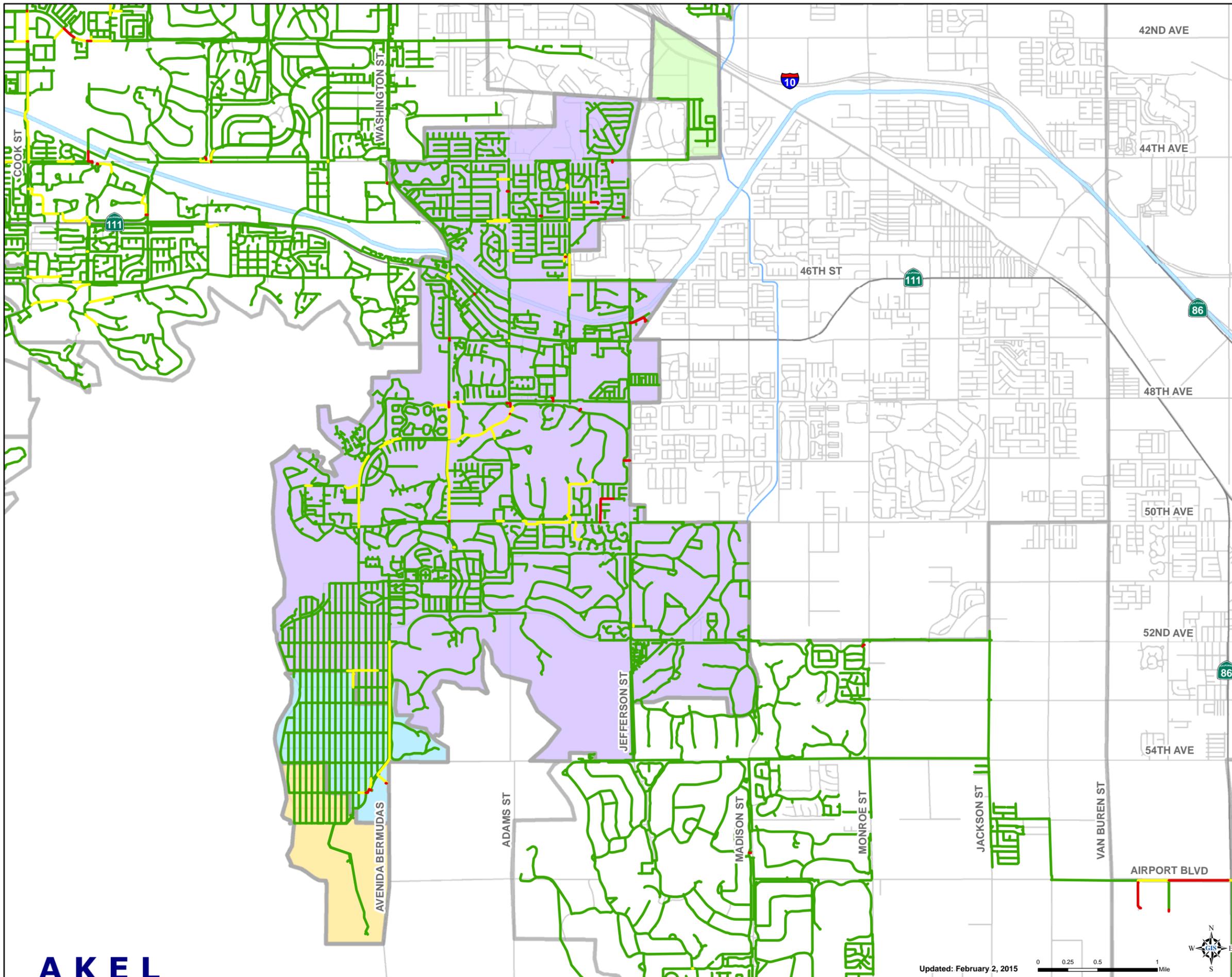
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Maximum Day Demands

Figure E-1
La Quinta PZ Existing System
Minimum Pressure (psi)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

Modeled Pipes
By Maximum Velocity (ft/s)

- 0 - 3
- 3.01 - 5
- > 5

Pressure Zones

- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Nairobi (190)
- Other

- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

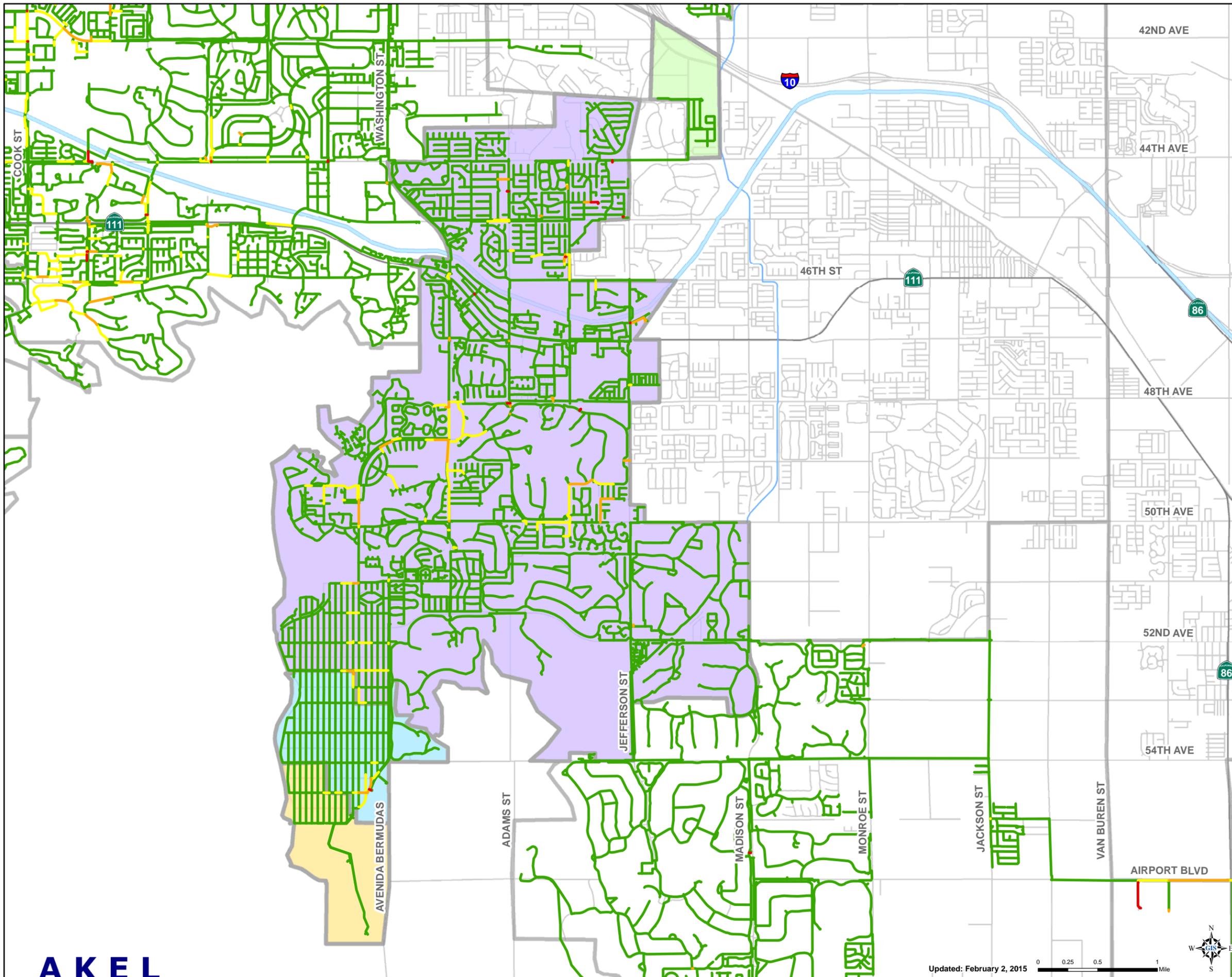
PRELIMINARY

Maximum Day Demands

Figure E-2
La Quinta PZ Existing System
Maximum Velocity (ft/s)

Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

Modeled Pipes
By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Nairobi (190)
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

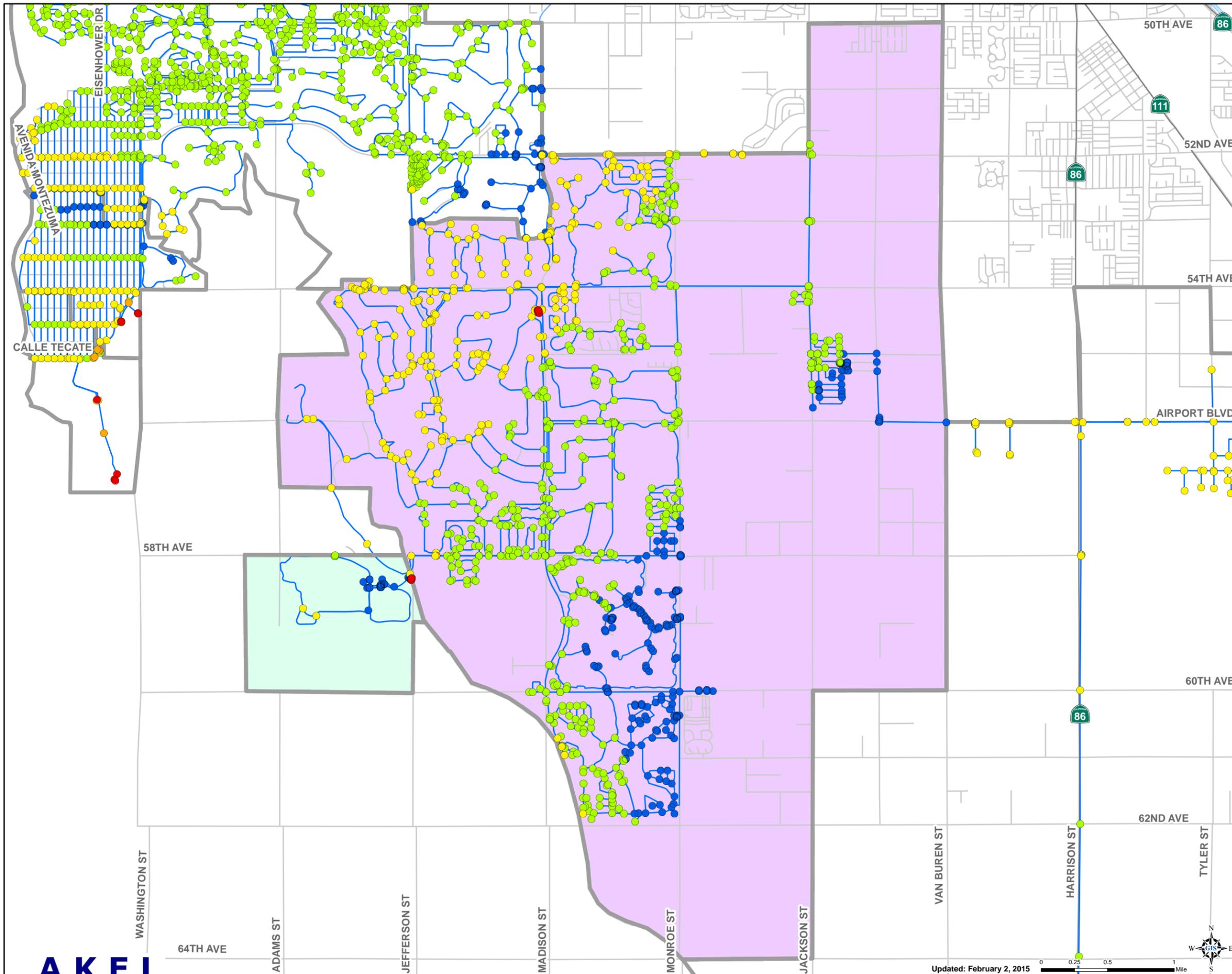
PRELIMINARY

Maximum Day Demands

Figure E-3
La Quinta PZ Existing System
Maximum Headloss (ft/kft)

Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

Existing Junctions
By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

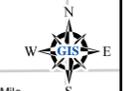
Pressure Zones

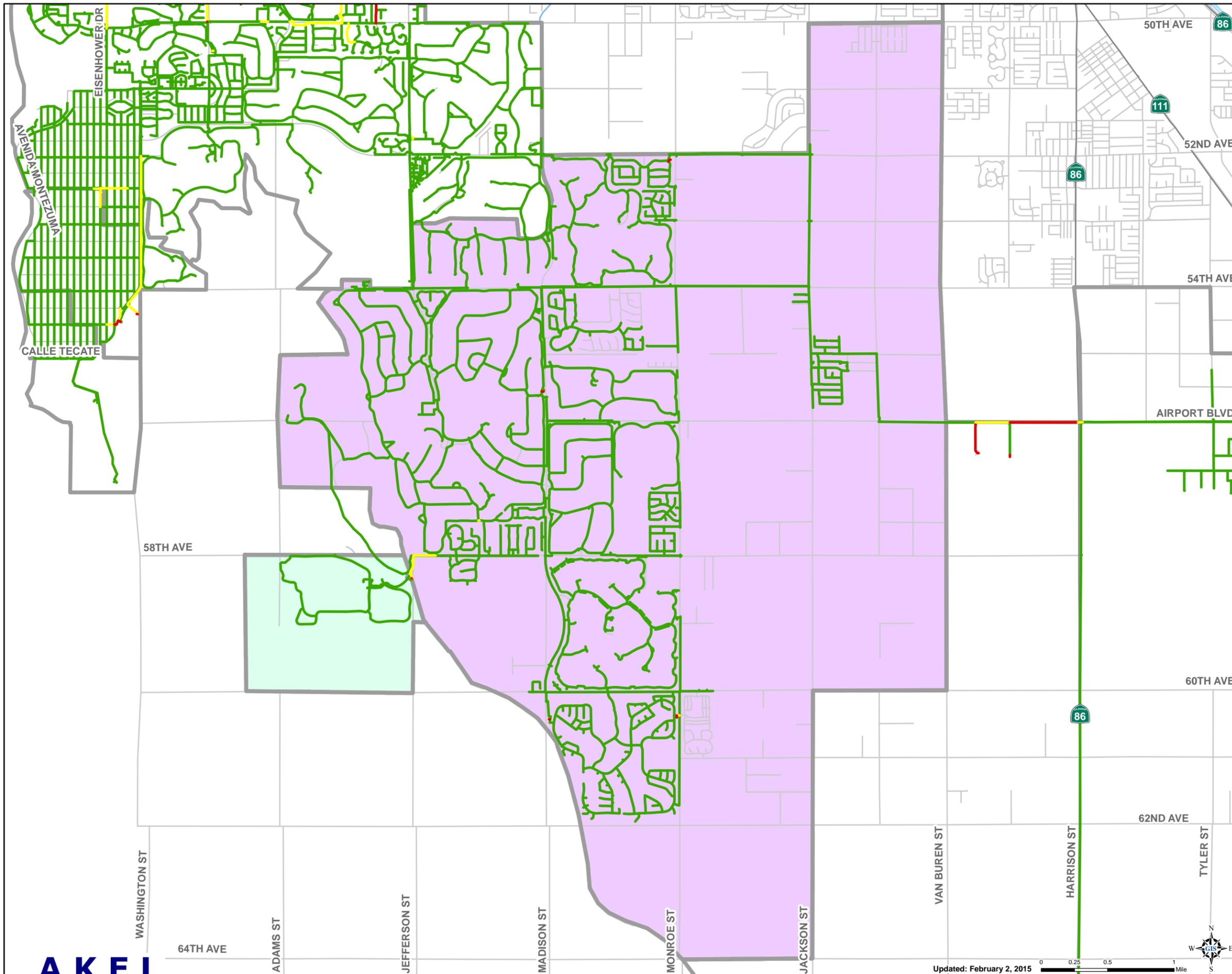
- Lake Cahuilla
- Quarry
- Other
- Street Centerlines
- Highways
- ~ Canals/Creeks/Rivers
- ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure E-4
Lake Cahuilla PZ Existing System
Minimum Pressure (psi)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





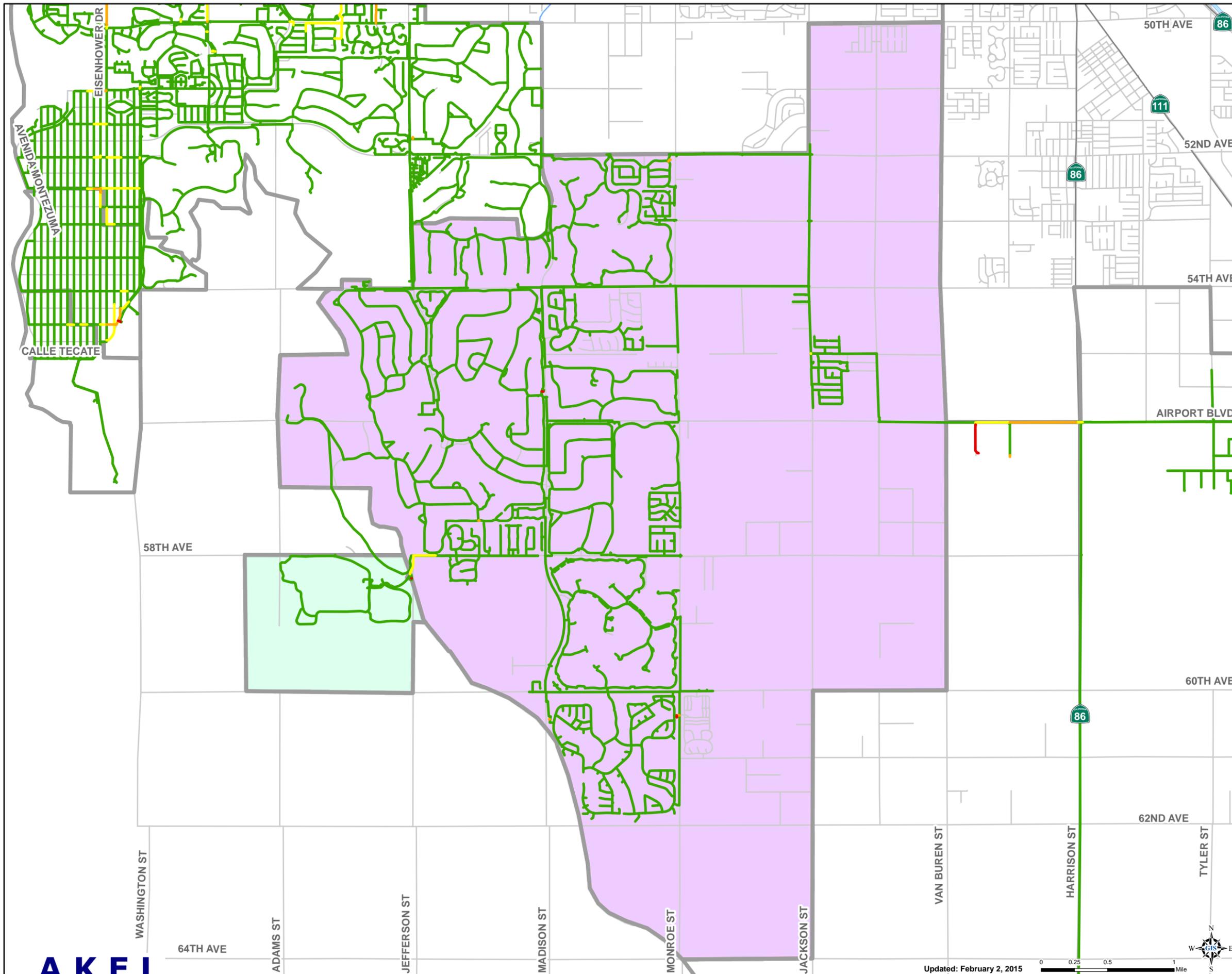
- ### Legend
- Modeled Pipes
 - By Maximum Velocity (ft/s)
 - 0 - 3
 - 3.01 - 5
 - > 5
 - Pressure Zones
 - Lake Cahuilla
 - Quarry
 - Other
 - Street Centerlines
 - Highways
 - ~ Canals/Creeks/Rivers
 - ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure E-5
Lake Cahuilla PZ Existing System
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

Modeled Pipes
By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

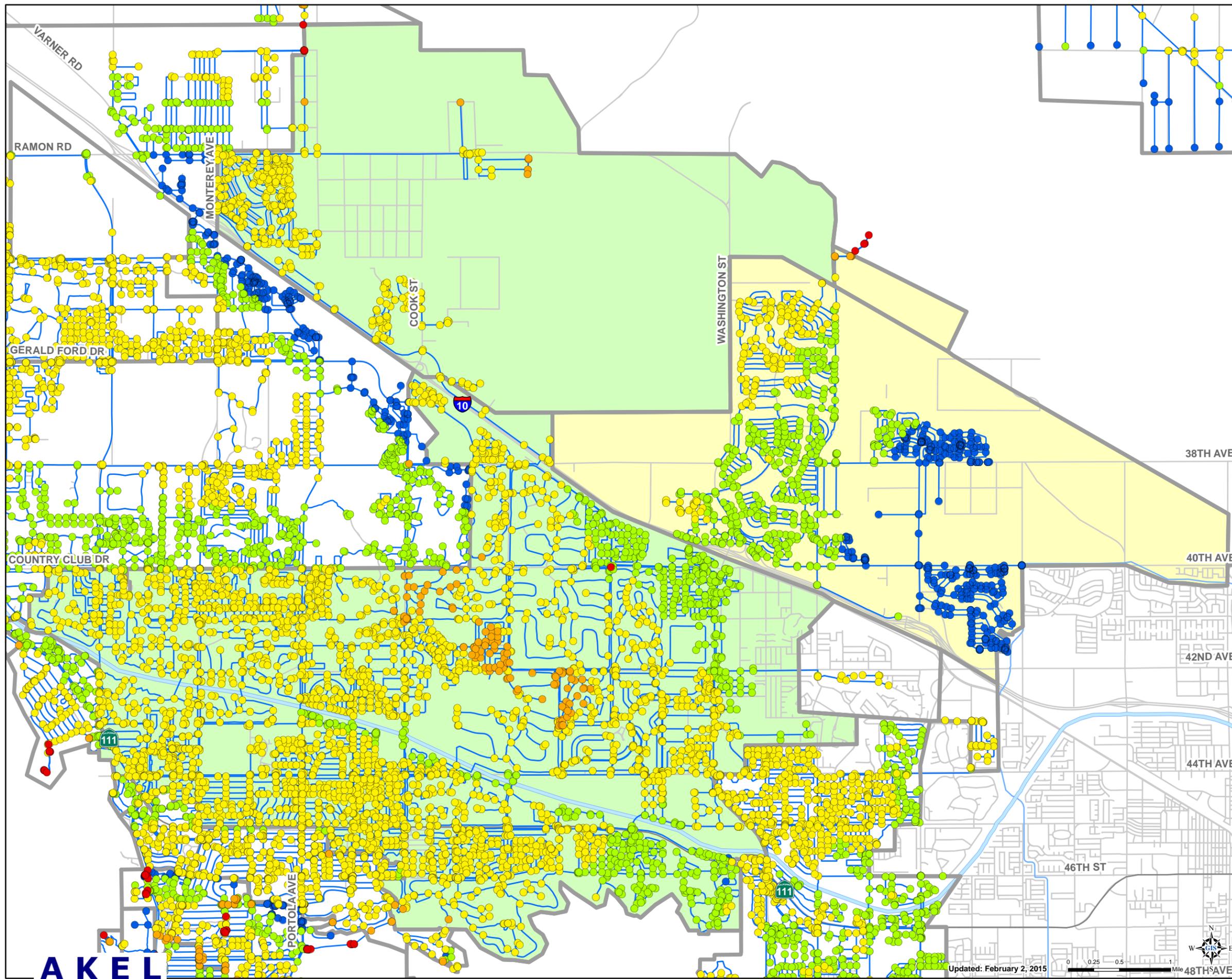
- Lake Cahuilla
- Quarry
- Other
- Street Centerlines
- Highways
- ~ Canals/Creeks/Rivers
- ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure E-6
Lake Cahuilla PZ Existing System
Maximum Headloss (ft/kft)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

Existing Junctions
By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

— Modeled Pipes

Pressure Zones

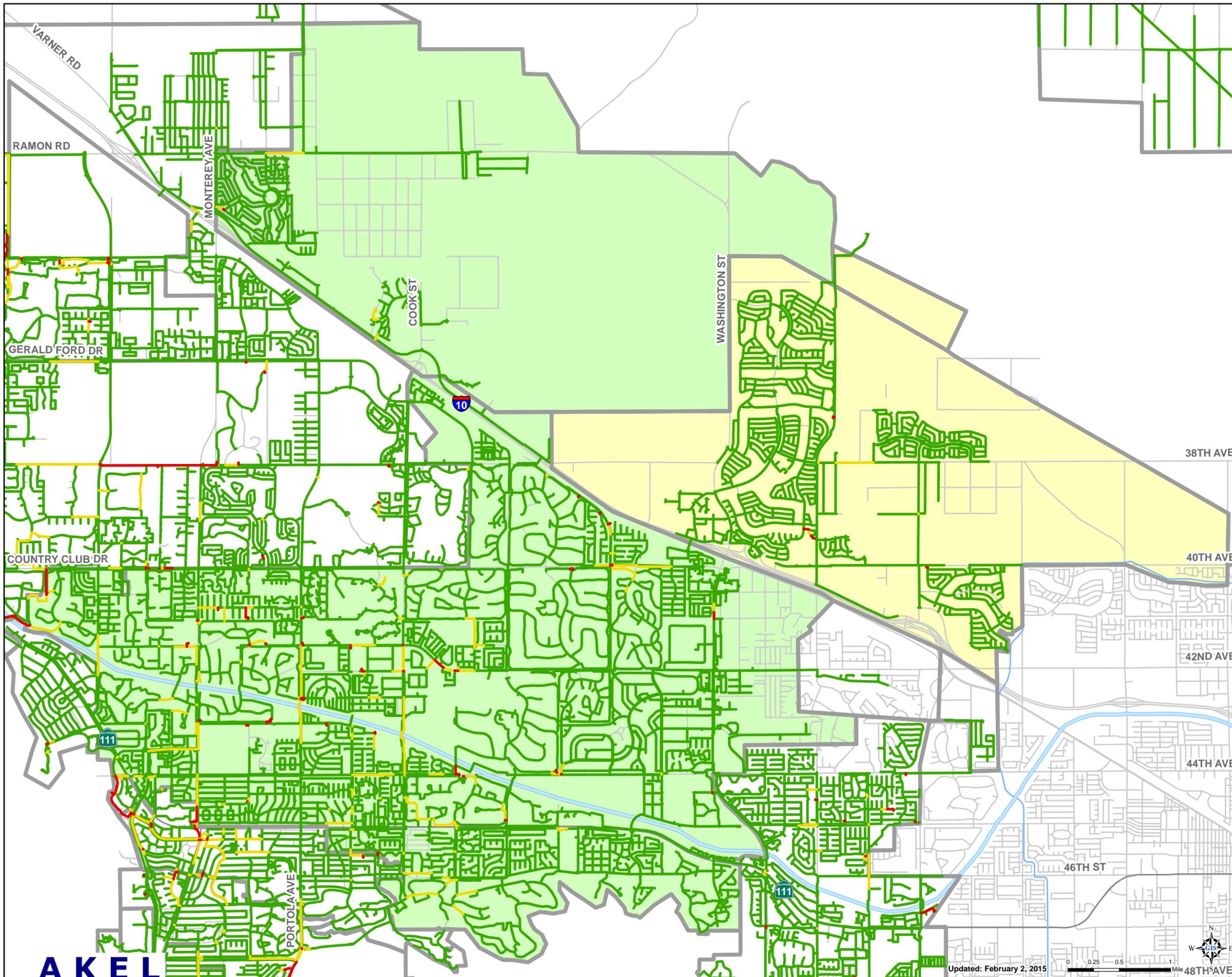
- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- ~ Canals/Creeks/Rivers
- ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure E-7
Sun City/Valley PZ
Existing System
Minimum Pressure (psi)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

Modeled Pipes
By Maximum Velocity (ft/s)

- 0 - 3
- 3.01 - 5
- >5

Pressure Zones

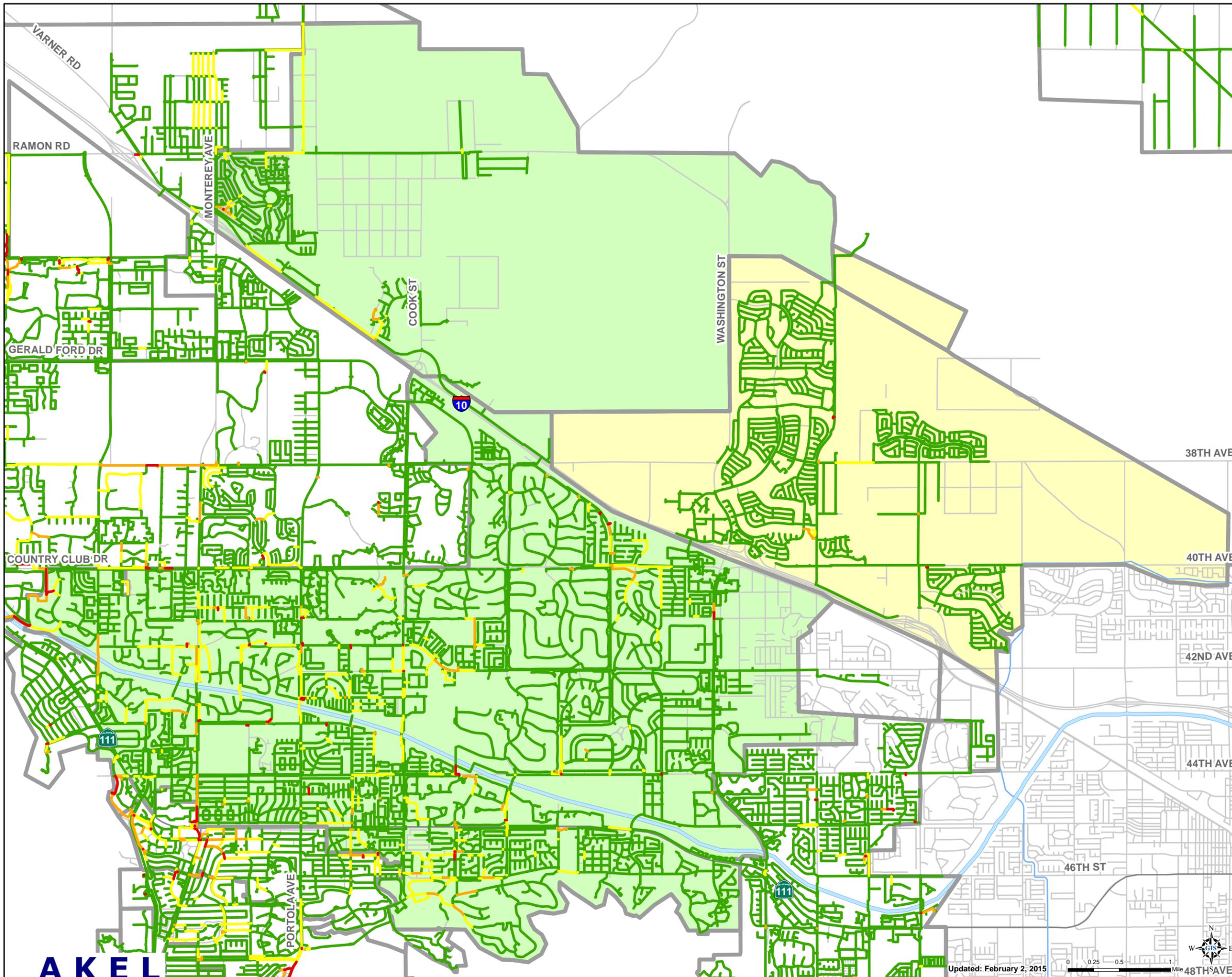
- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Maximum Day Demands

Figure E-8
Sun City/Valley PZ
Existing System
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

Modeled Pipes
By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.31 - 5
- 5.01 - 10
- > 10

Pressure Zones

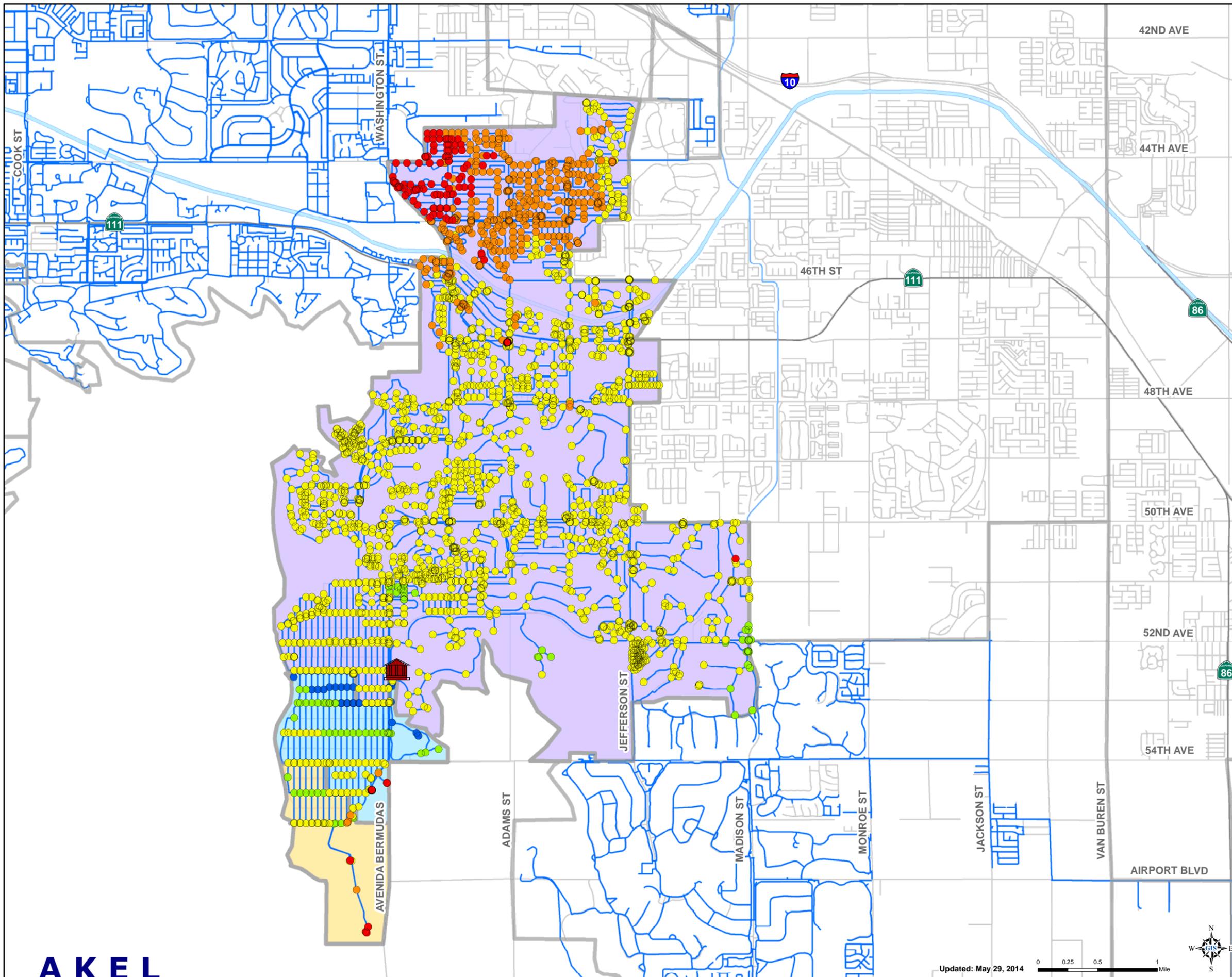
- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- ~ Canals/Creeks/Rivers
- ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure E-9
Sun City/Valley PZ
Existing System
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





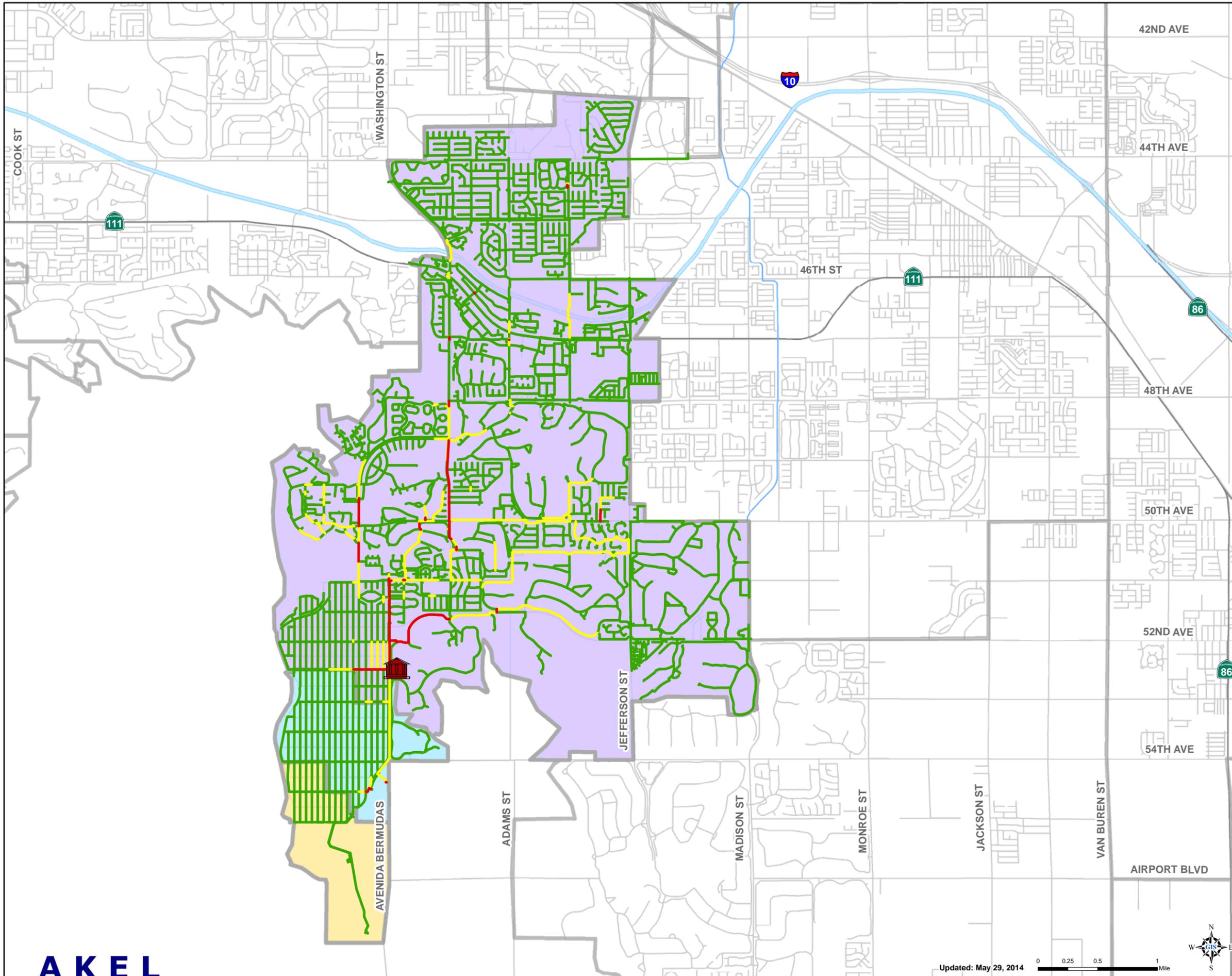
Legend

-  New Supply Location
- Scenario 1 Junctions**
- By Minimum Pressure (psi)**
-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100
-  Modeled Pipes
- Pressure Zones**
-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 1-1
Scenario 1
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





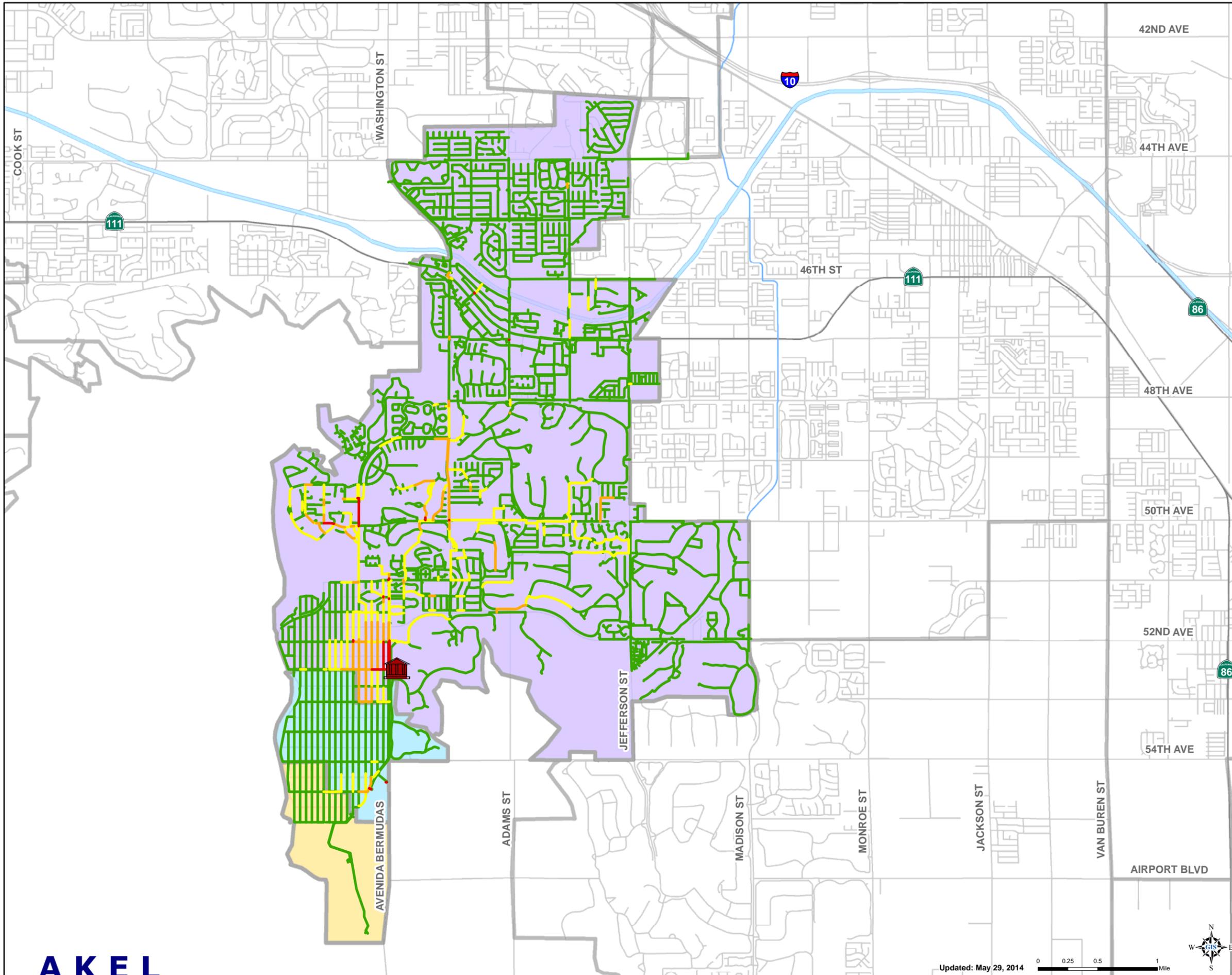
Legend

-  New Supply Location
- Scenario 1 Pipes
- By Maximum Velocity (ft/s)
 -  0 - 3
 -  3.01 - 5
 -  > 5
- Pressure Zones
 -  Lower La Quinta
 -  Middle La Quinta
 -  Upper La Quinta
 -  Other
 -  Street Centerlines
 -  Highways
 -  Canals/Creeks/Rivers
 -  White Water River

PRELIMINARY

Figure 1-2
Scenario 1
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 1 Pipes
By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Other

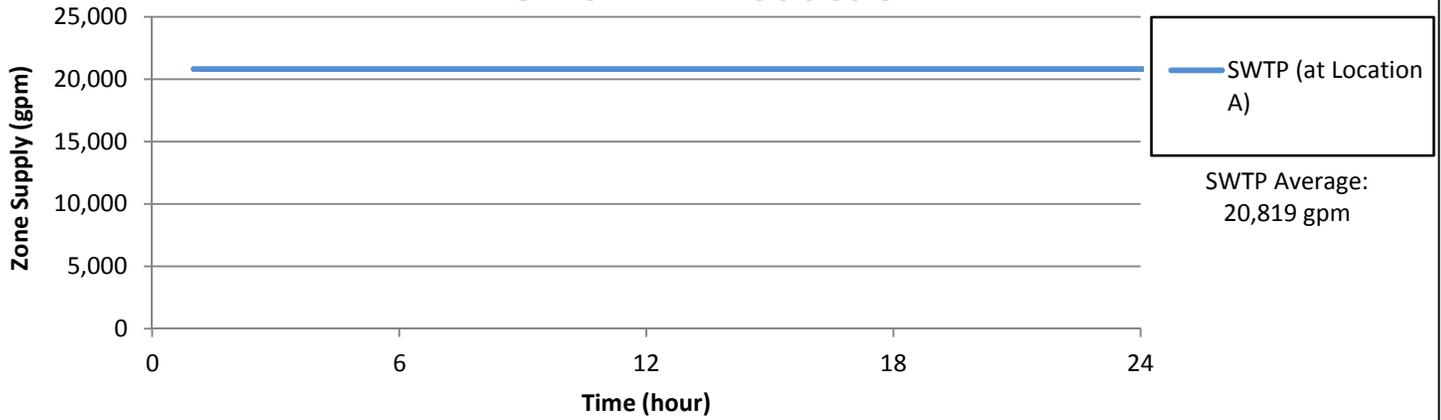
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

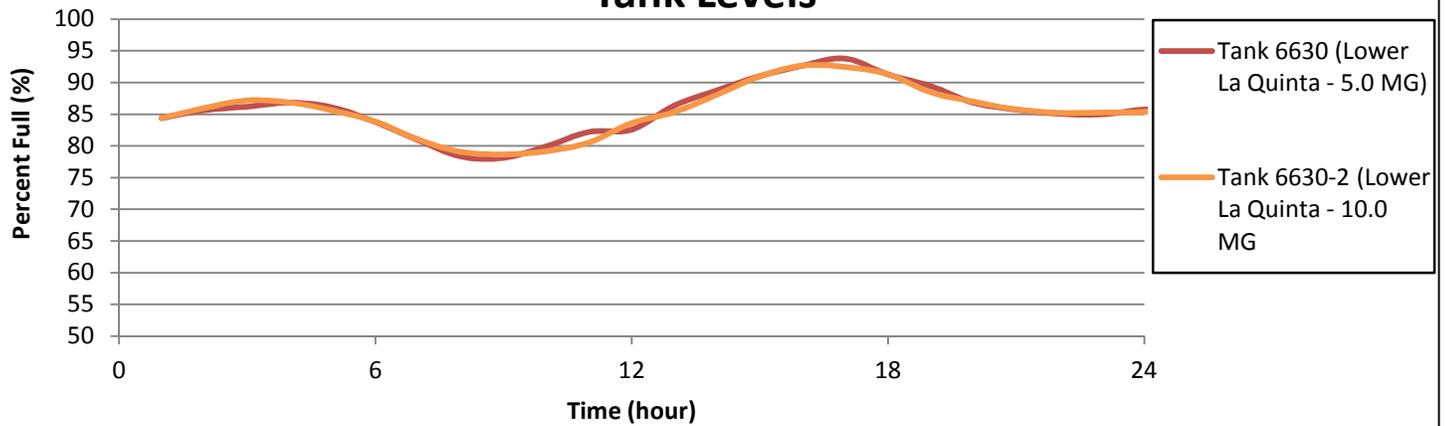
**Figure 1-3
Scenario 1
Maximum Headloss (ft/kft)**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



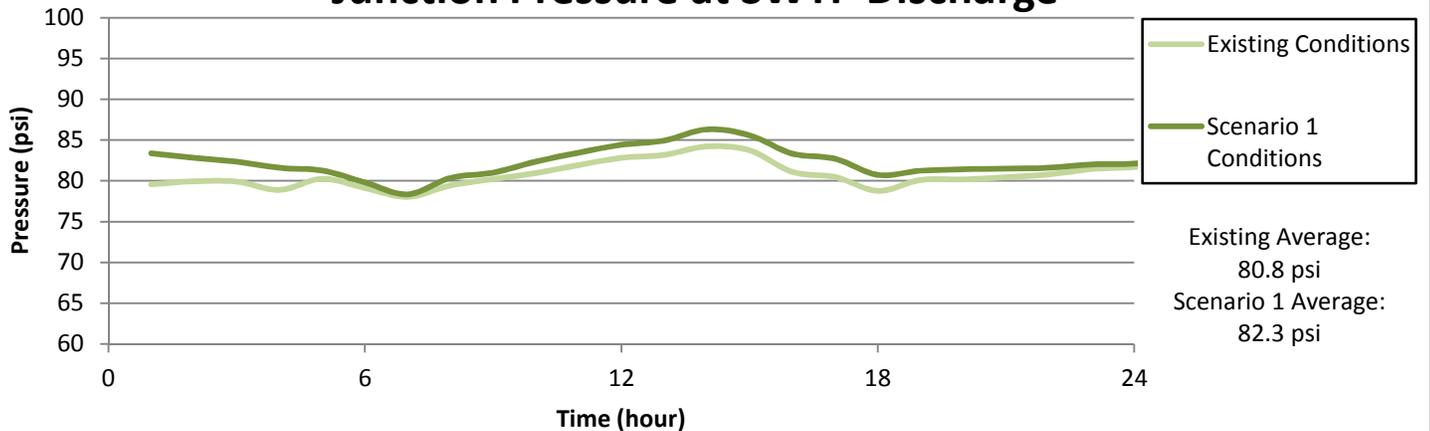
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point A
 SWTP Production = **20,819 gpm**
 Wells with CR-6 > 8 ppb inactive
 Zone interconnections to Lake Cahuilla and Valley closed

PRELIMINARY

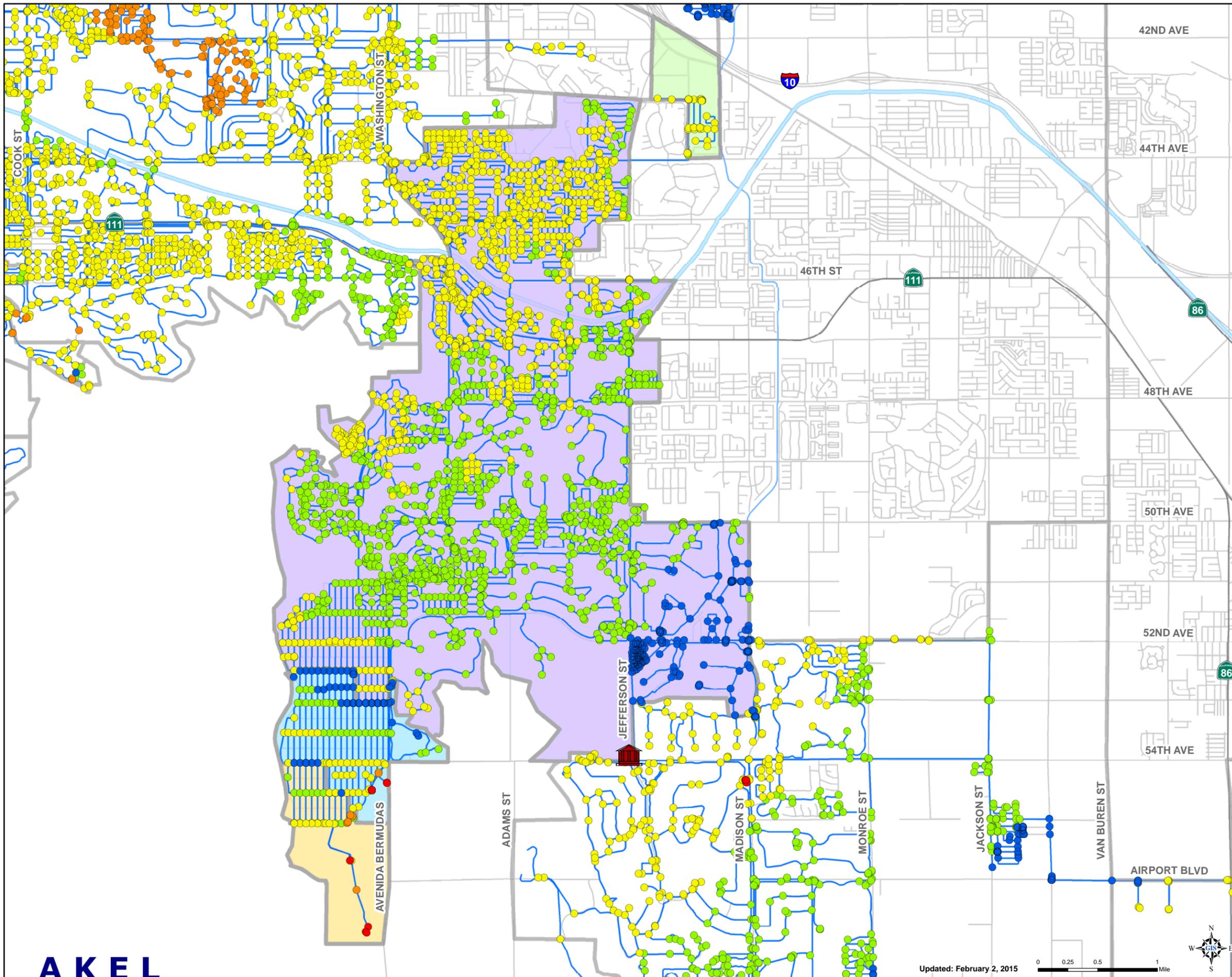
Figure 1-4

Scenario 1 - Lower La Quinta New Supply at Point A

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District



May 29, 2014



Legend

 New Supply Location
 Scenario 1A Junctions
 By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

 Modeled Pipes

Pressure Zones

-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Nairobi (190)
-  Other

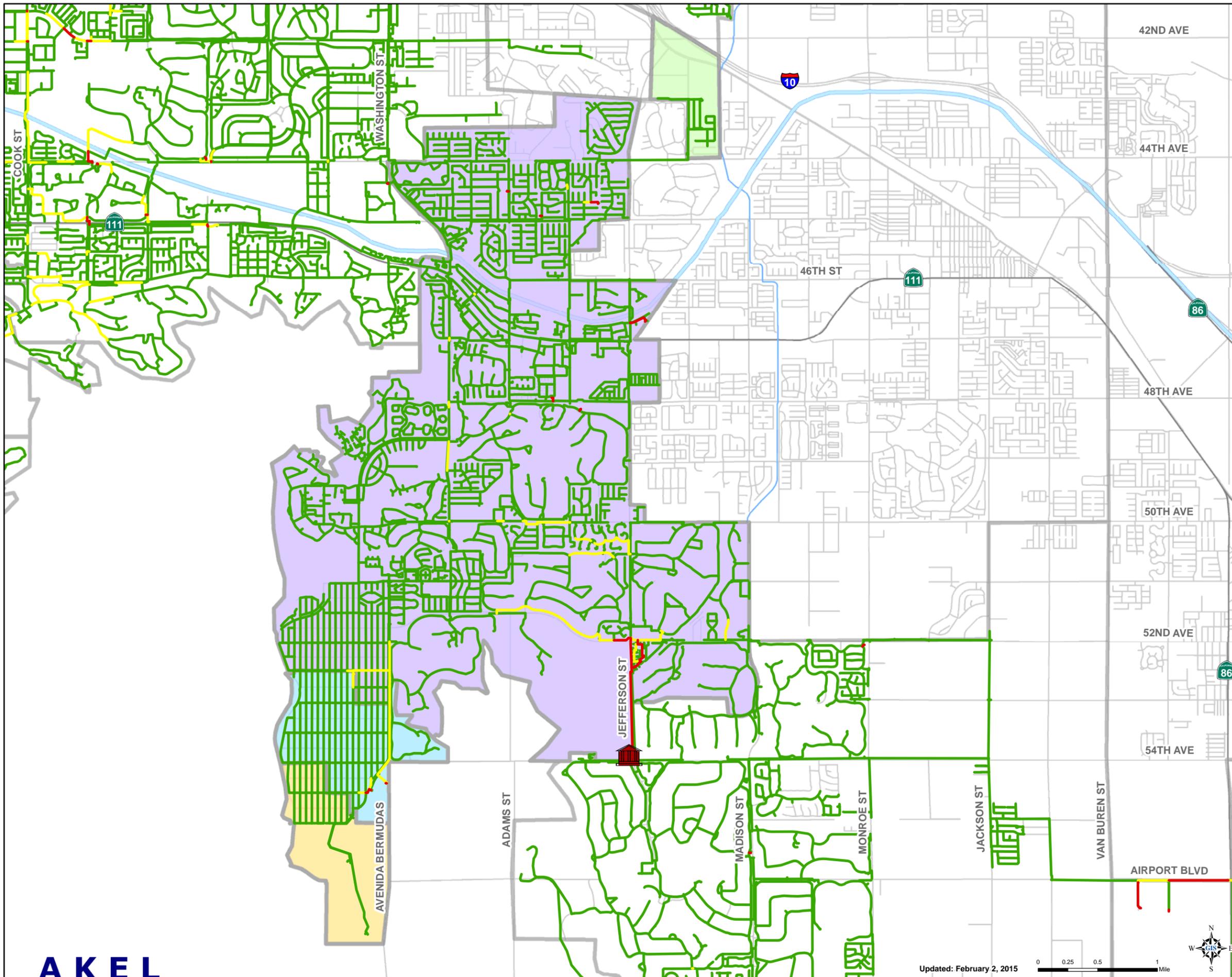
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 1A-1
Scenario 1A
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

-  New Supply Location
- Scenario 1A Pipes
- By Maximum Velocity (ft/s)

-  0 - 3
-  3.01 - 5
-  > 5

Pressure Zones

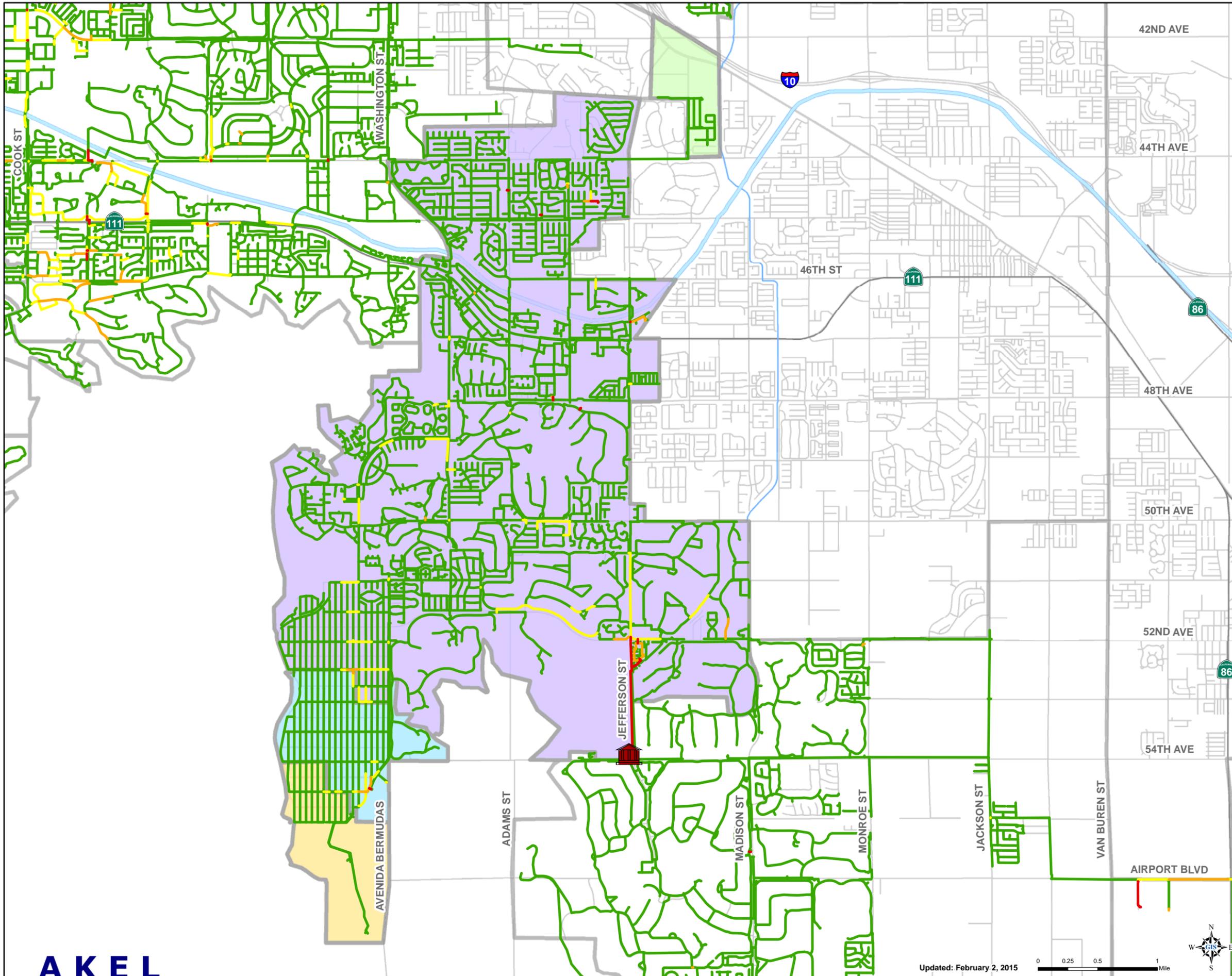
-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Nairobi (190)
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 1A-2
Scenario 1A
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

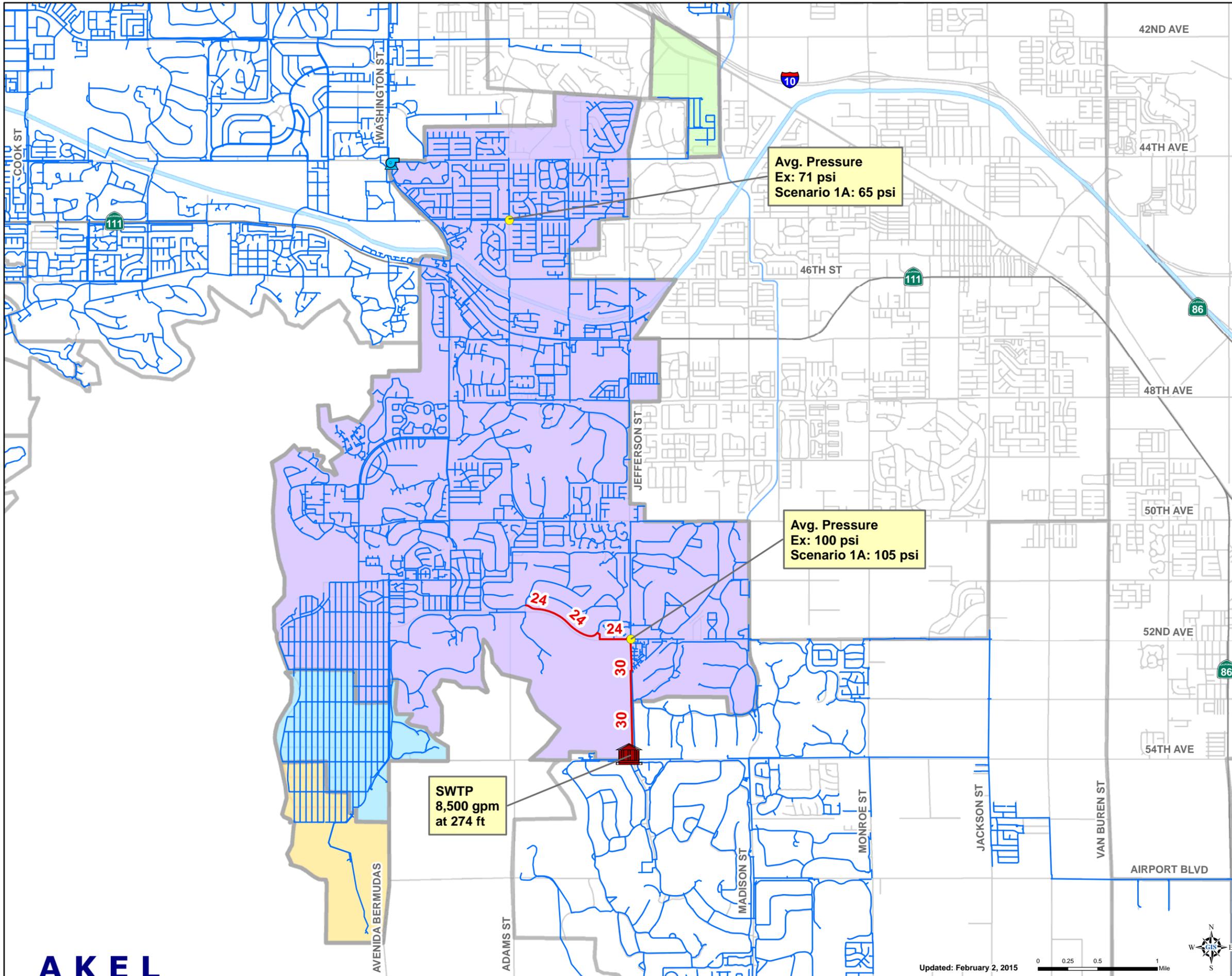
-  New Supply Location
- Scenario 1A Pipes
- By Maximum Headloss (ft/kft)
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones
-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Nairobi (190)
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 1A-3
Scenario 1A
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

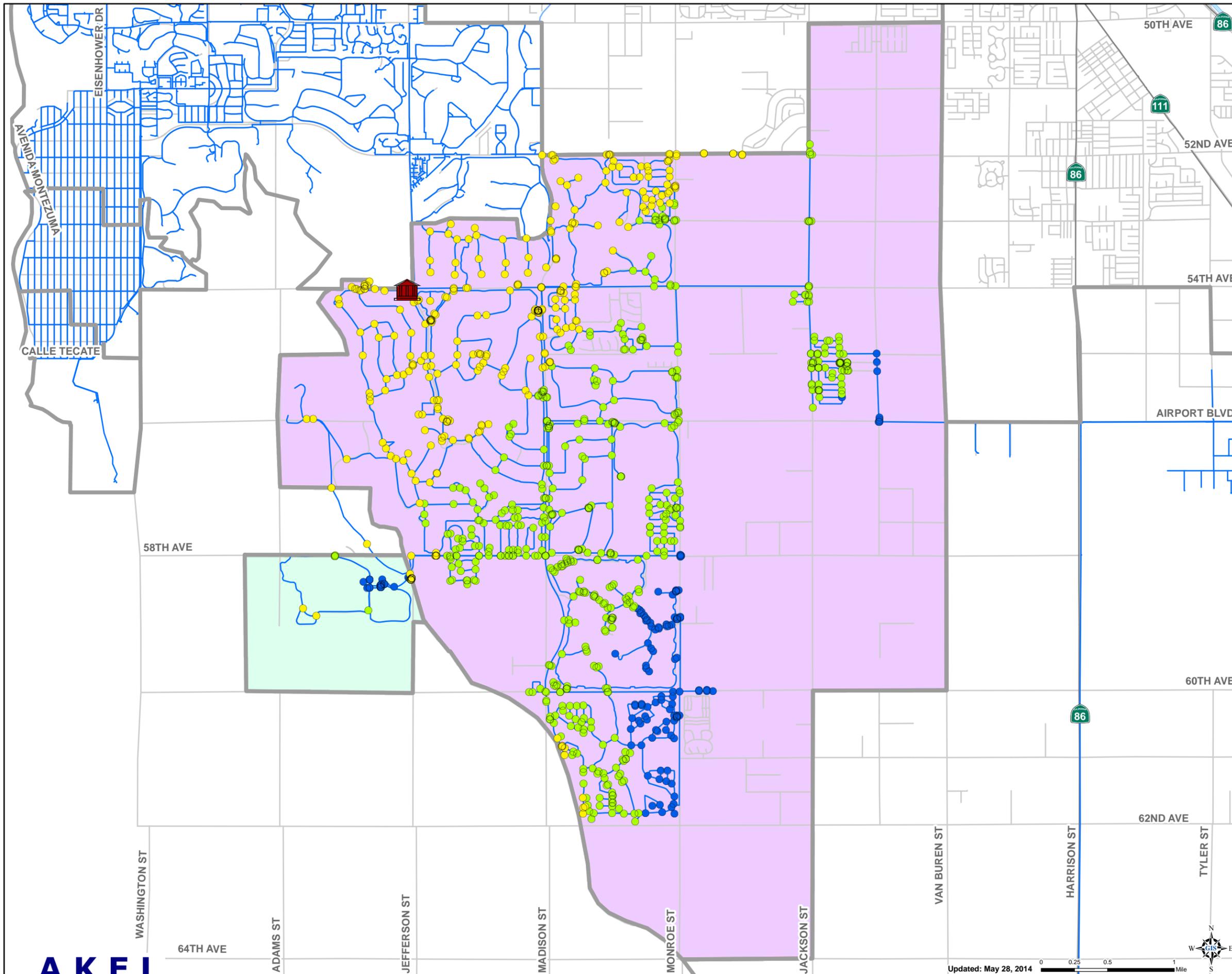
-  New Supply Location
-  Pipe Improvements
- Existing
 -  Pump
 -  Modeled Pipes
- Pressure Zones
 -  Lower La Quinta
 -  Middle La Quinta
 -  Upper La Quinta
 -  Nairobi (190)
 -  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

**Figure 1A-4
Transmission Main
Improvements**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





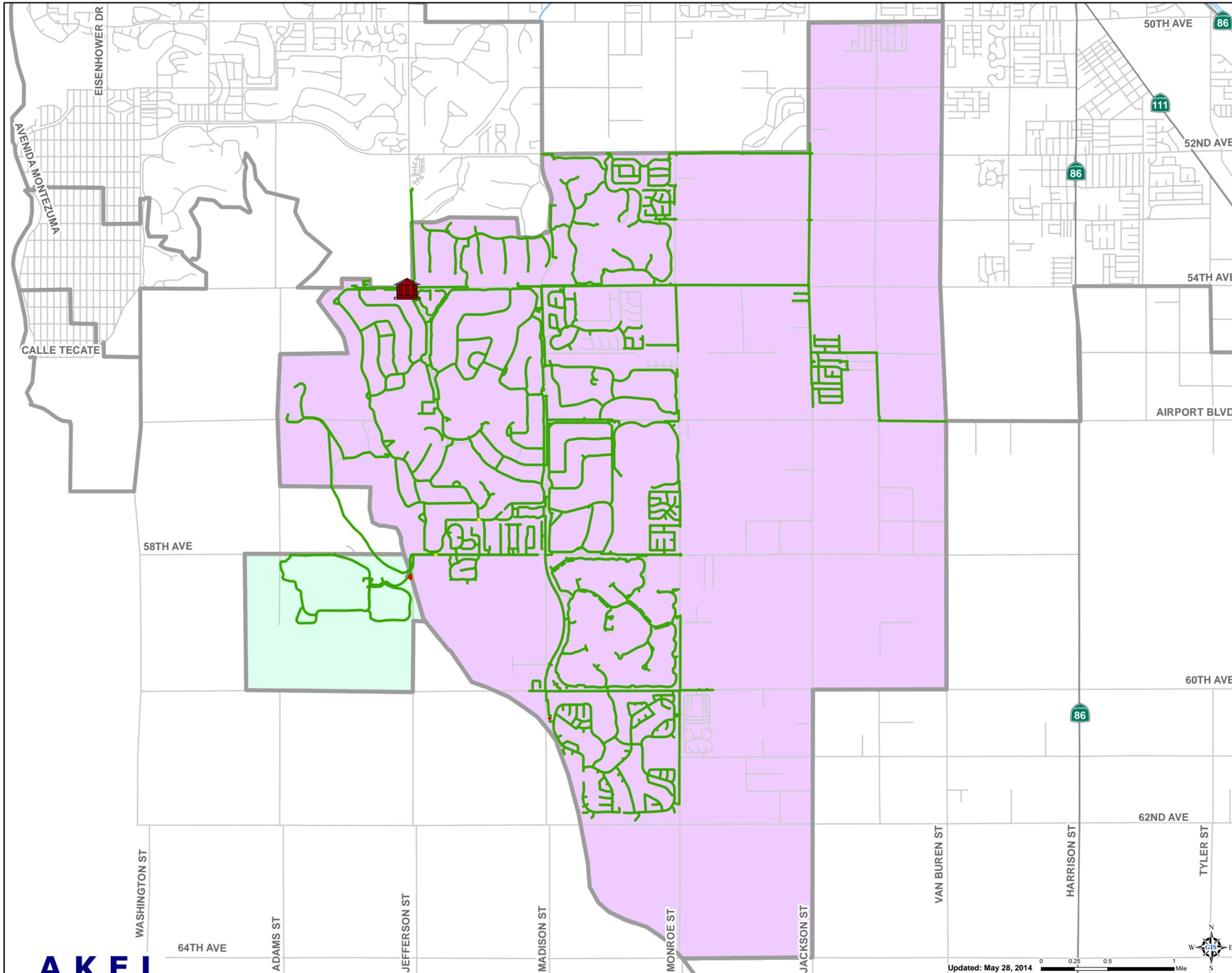
Legend

- New Supply Location
- Scenario 2 Junctions**
- By Minimum Pressure (psi)**
- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100
- Modeled Pipes
- Pressure Zones**
- Lake Cahuilla
- Quarry
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 2-1
Scenario 2
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





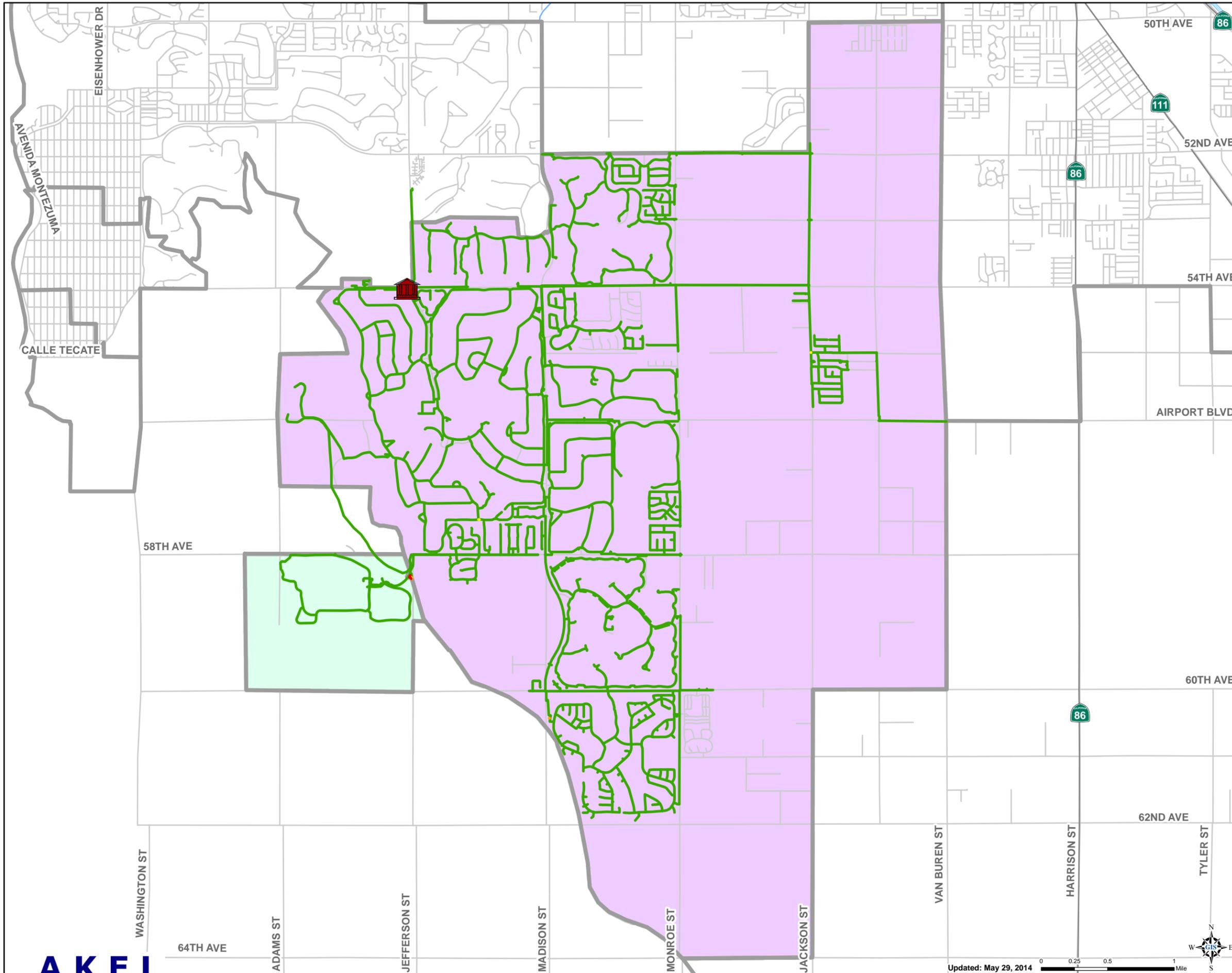
Legend

-  New Supply Location
- Scenario 2 Pipes
- By Maximum Velocity (ft/s)
-  0 - 3
-  3.01 - 5
-  > 5
- Pressure Zones
-  Lake Cahuilla
-  Quarry
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 2-2
Scenario 2
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





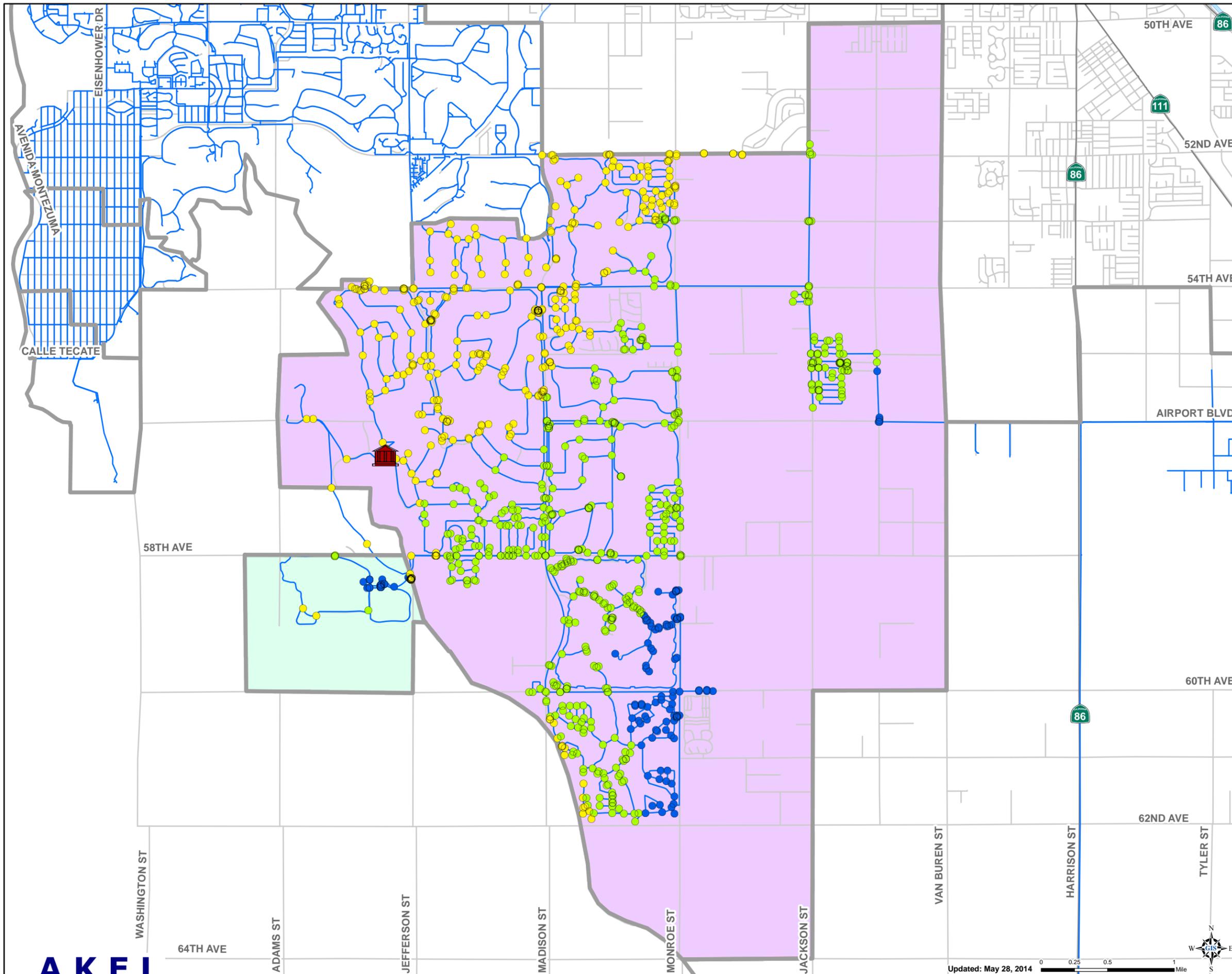
Legend

-  New Supply Location
- Scenario 2 Pipes**
- By Maximum Headloss (ft/kft)**
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones**
-  Lake Cahuilla
-  Quarry
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 2-3
Scenario 2
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





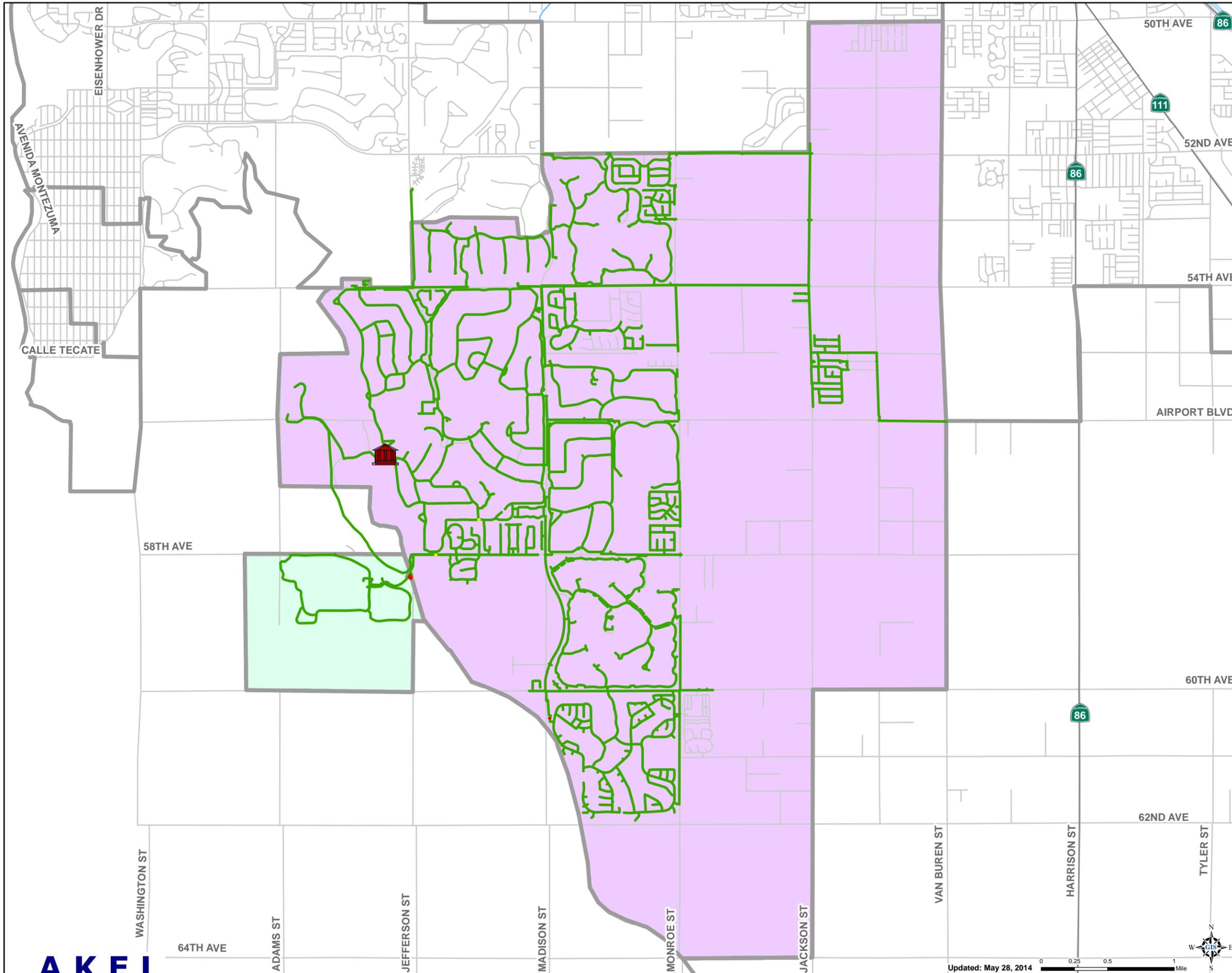
Legend

-  New Supply Location
- Scenario 3 Junctions**
- By Minimum Pressure (psi)**
-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100
-  Modeled Pipes
- Pressure Zones**
-  Lake Cahuilla
-  Quarry
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 3-1
Scenario 3
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





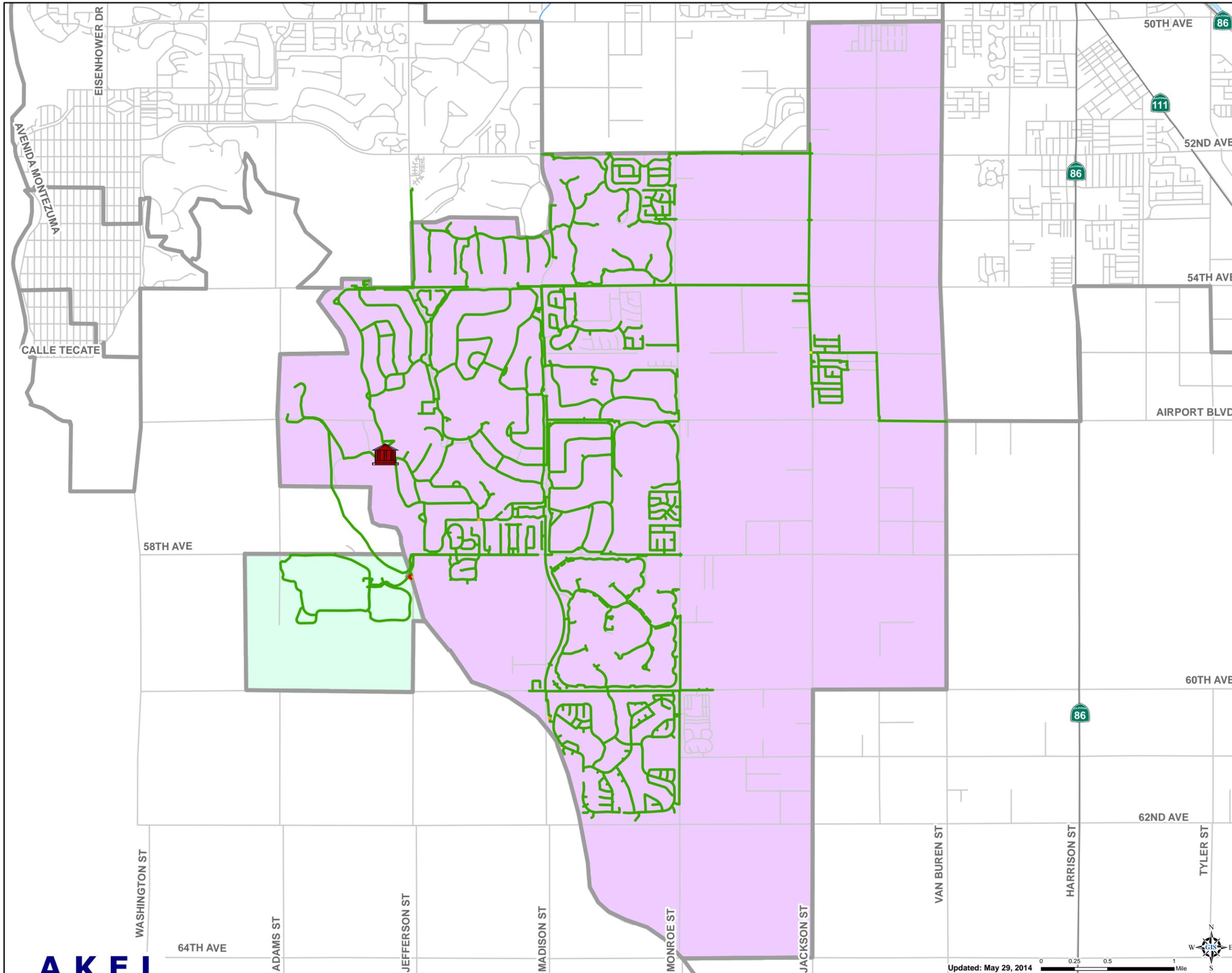
Legend

-  New Supply Location
- Scenario 3 Pipes
- By Maximum Velocity (ft/s)
-  0 - 3
-  3.01 - 5
-  > 5
- Pressure Zones
-  Lake Cahuilla
-  Quarry
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 3-2
Scenario 3
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

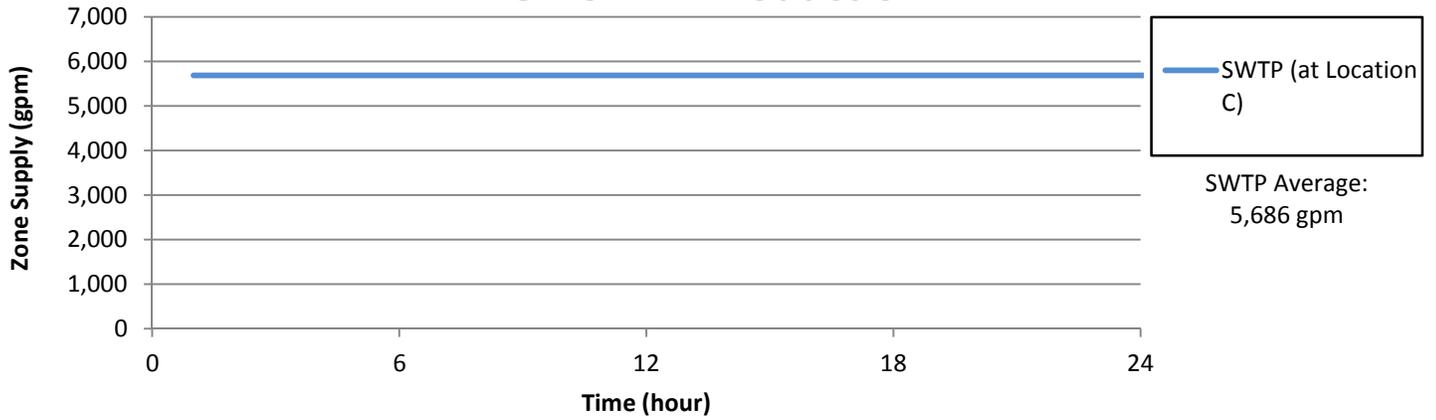
-  New Supply Location
- Scenario 3 Pipes**
- By Maximum Headloss (ft/kft)**
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones**
-  Lake Cahuilla
-  Quarry
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

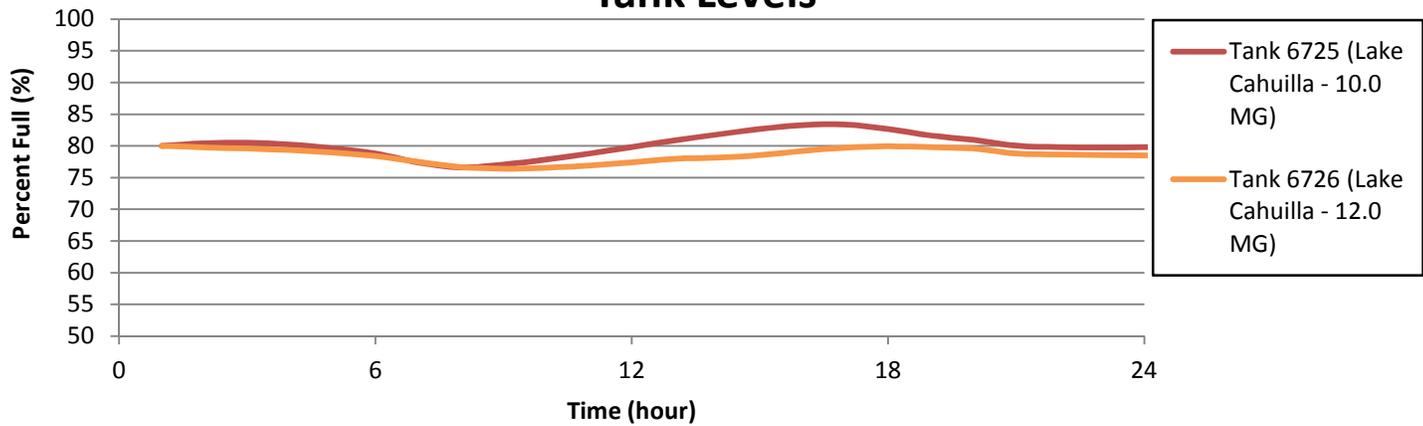
Figure 3-3
Scenario 3
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



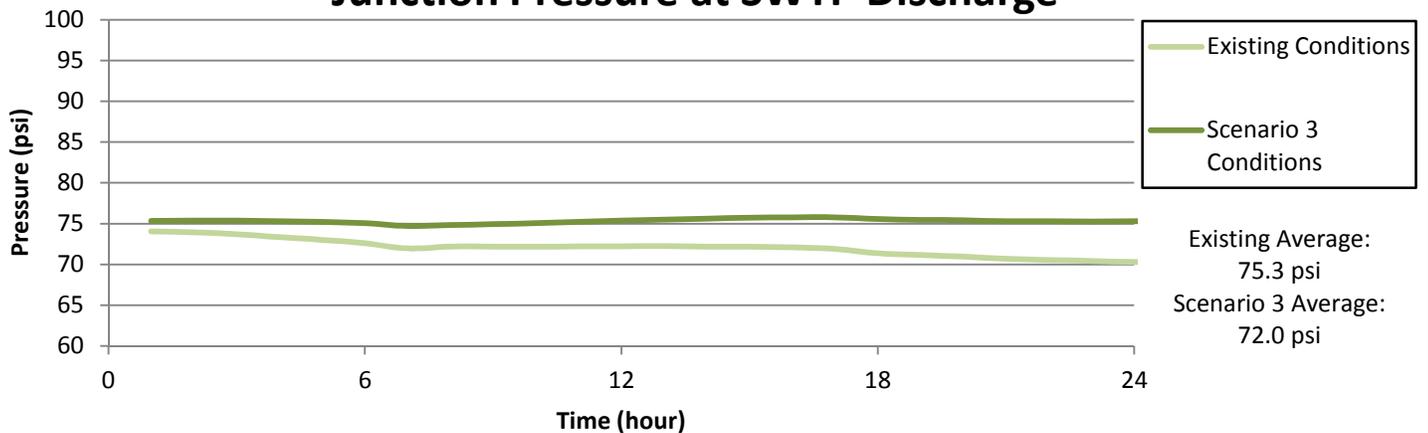
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point C
 SWTP Production = **5,686 gpm**
 Wells with CR-6 > 8 ppb inactive
 Zone interconnections to La Quinta and Middleton closed

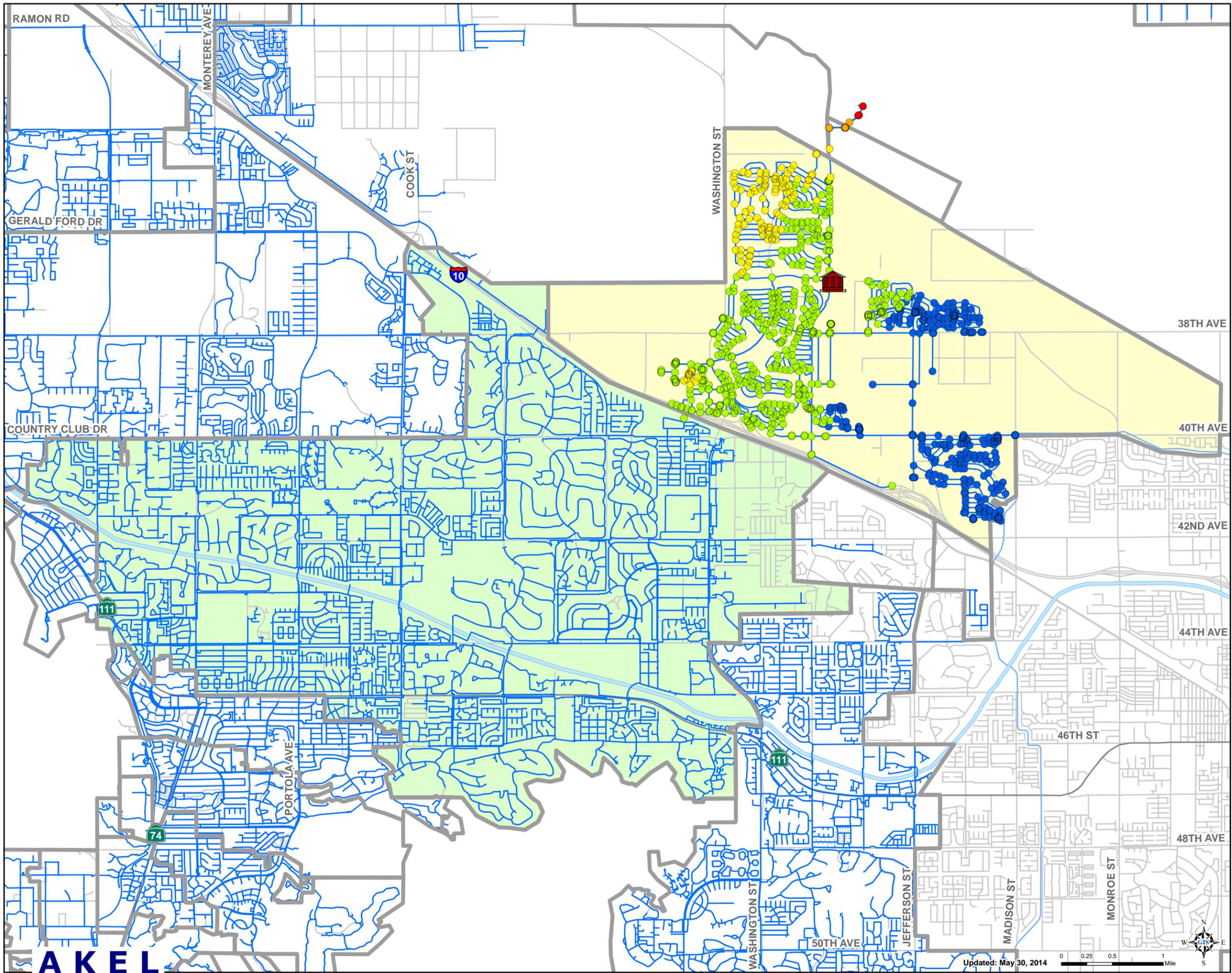
PRELIMINARY

Figure 3-4 Scenario 3 - Lake Cahuilla New Supply at Point C

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District



May 29, 2014



Legend

New Supply Location

Scenario 4 Junctions

By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

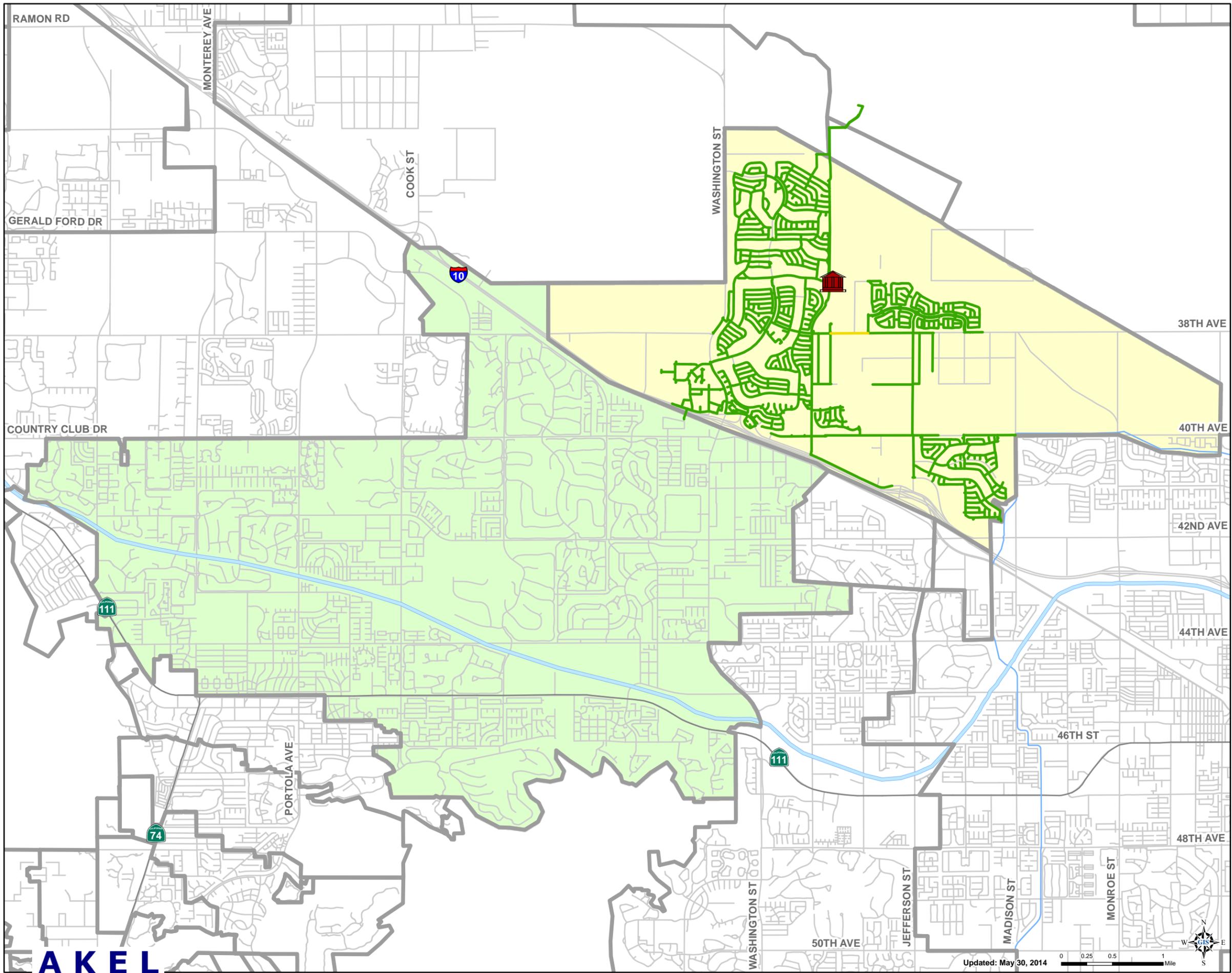
Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 4-1
Scenario 4
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



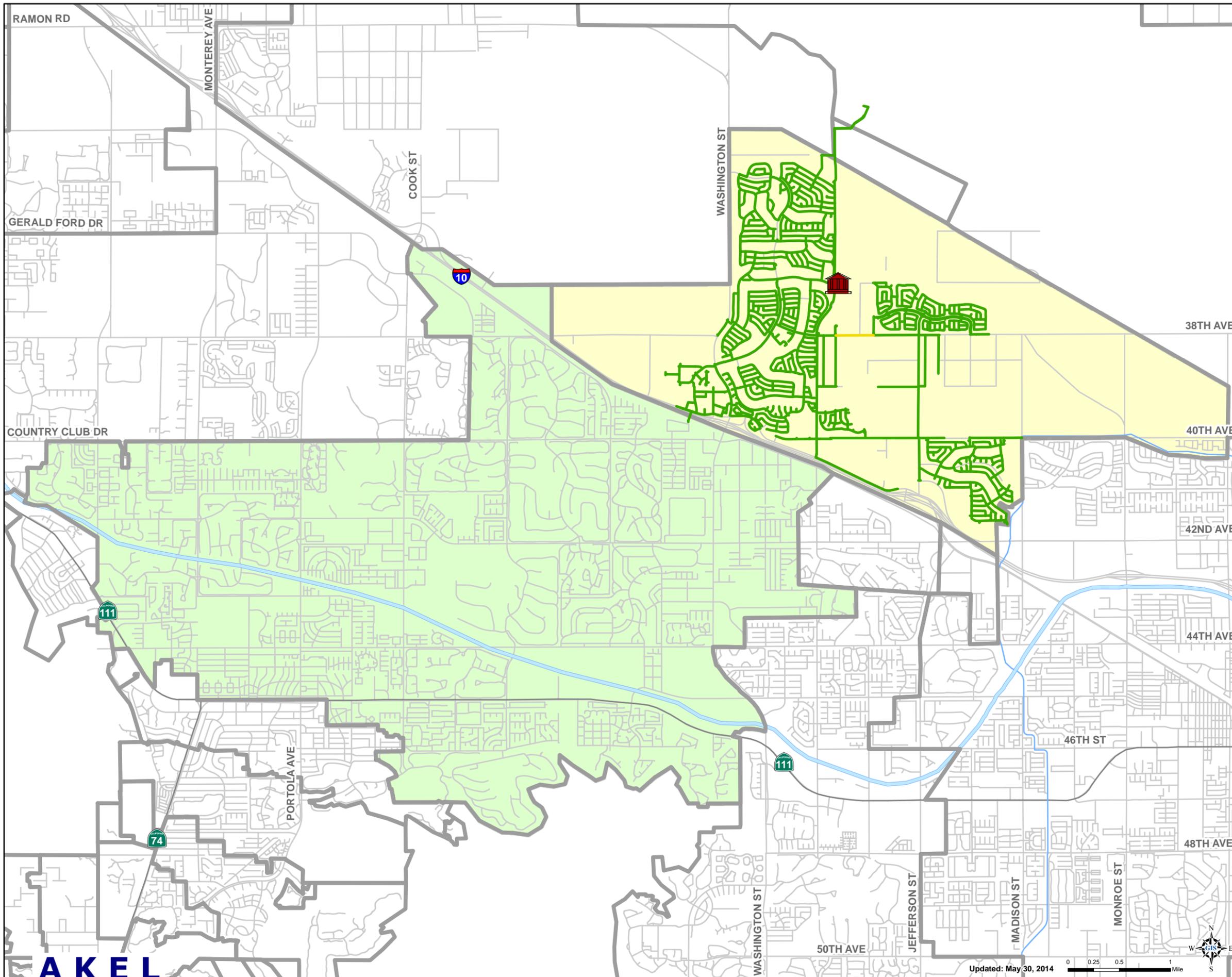


- Legend**
- New Supply Location
 - Scenario 4 Pipes**
 - By Maximum Velocity (ft/s)**
 - 0 - 3
 - 3.01 - 5
 - > 5
 - Pressure Zones**
 - Sun City
 - Valley
 - Other
 - Street Centerlines
 - Highways
 - Canals/Creeks/Rivers
 - White Water River

PRELIMINARY

Figure 4-2
Scenario 4
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

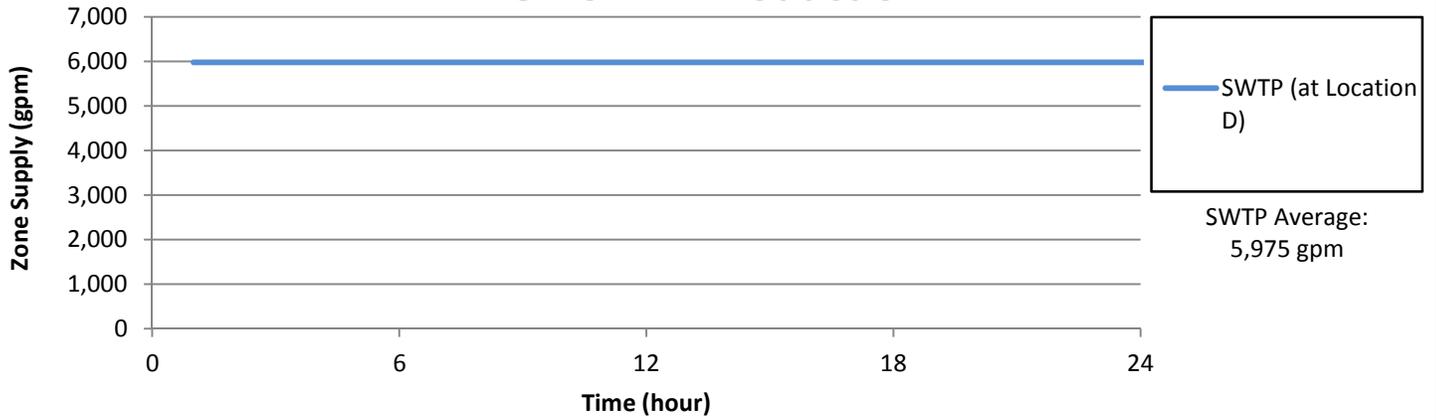
-  New Supply Location
- Scenario 4 Pipes
- By Maximum Headloss (ft/kft)
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

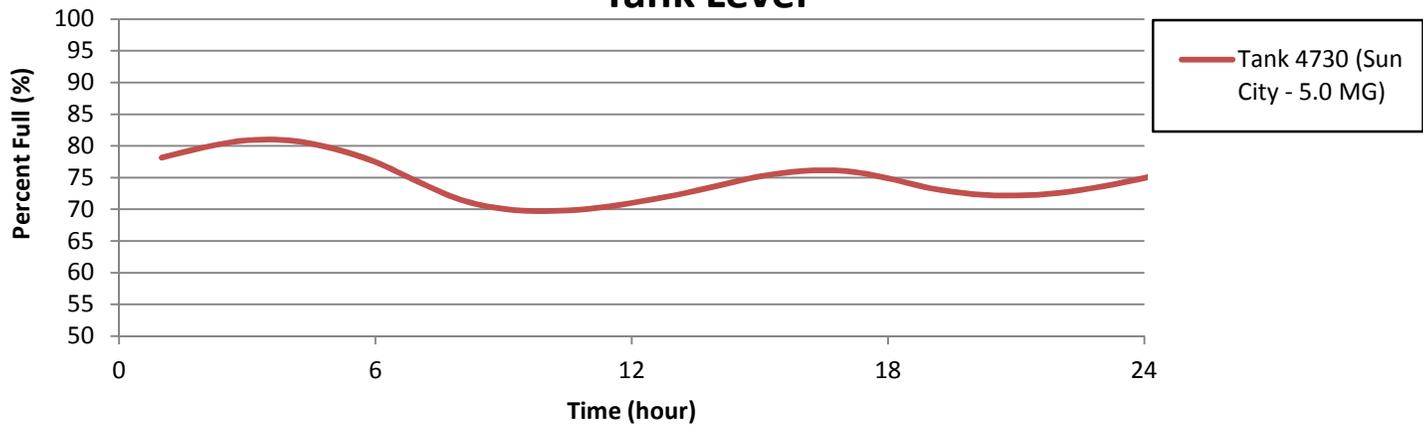
Figure 4-3
Scenario 4
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



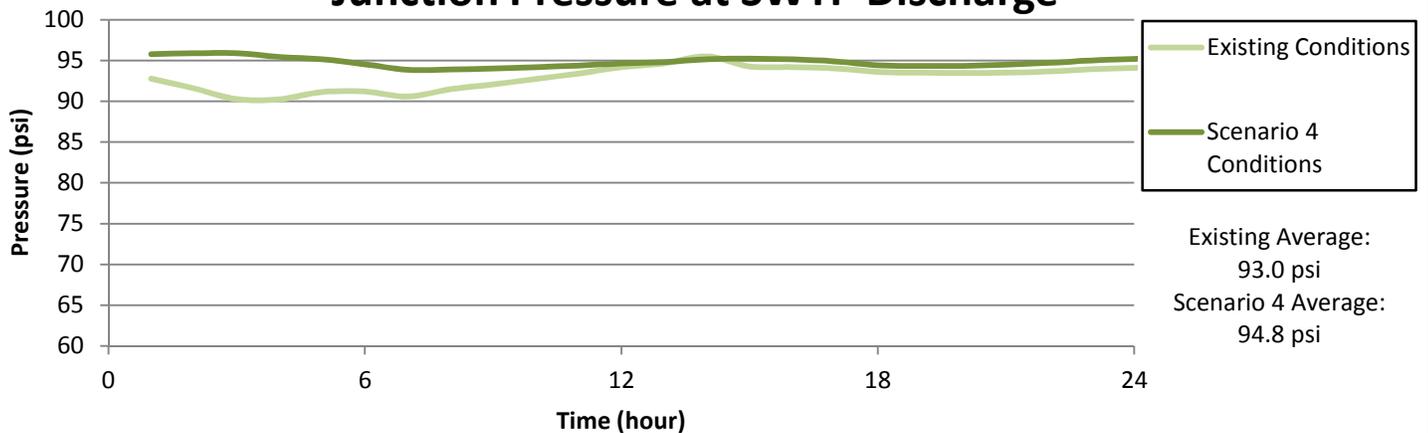
New SWTP Production



Tank Level



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point D
 SWTP Production = **5,975 gpm**
 Wells with CR-6 > 8 ppb inactive
 Zone interconnections to Valley closed

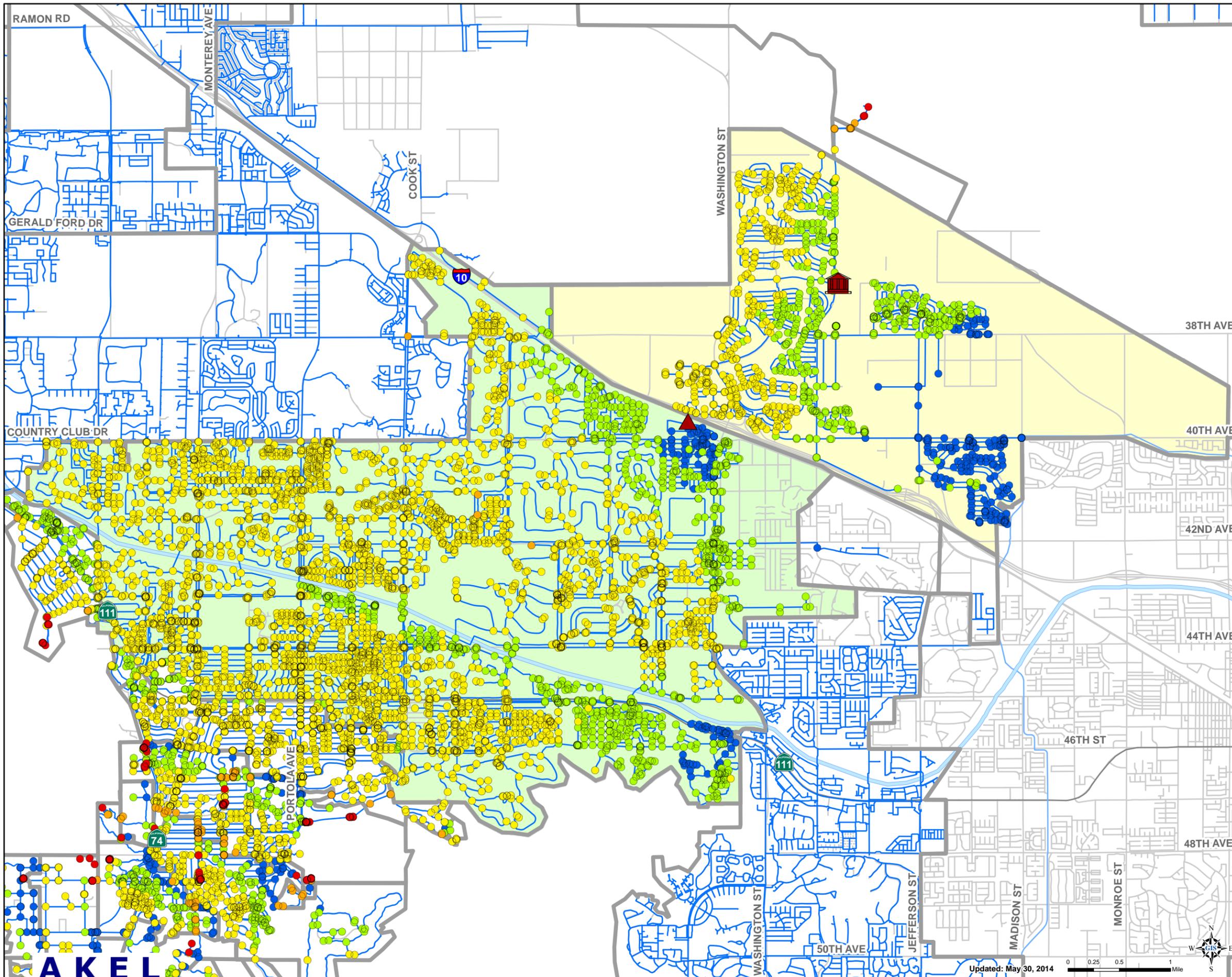
PRELIMINARY

Figure 4-4

Scenario 4 - Sun City New Supply at Point D

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District





Legend

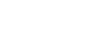
-  New Supply Location
-  New Pump Station

Scenario 5 Junctions By Minimum Pressure (psi)

-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100

Modeled Pipes

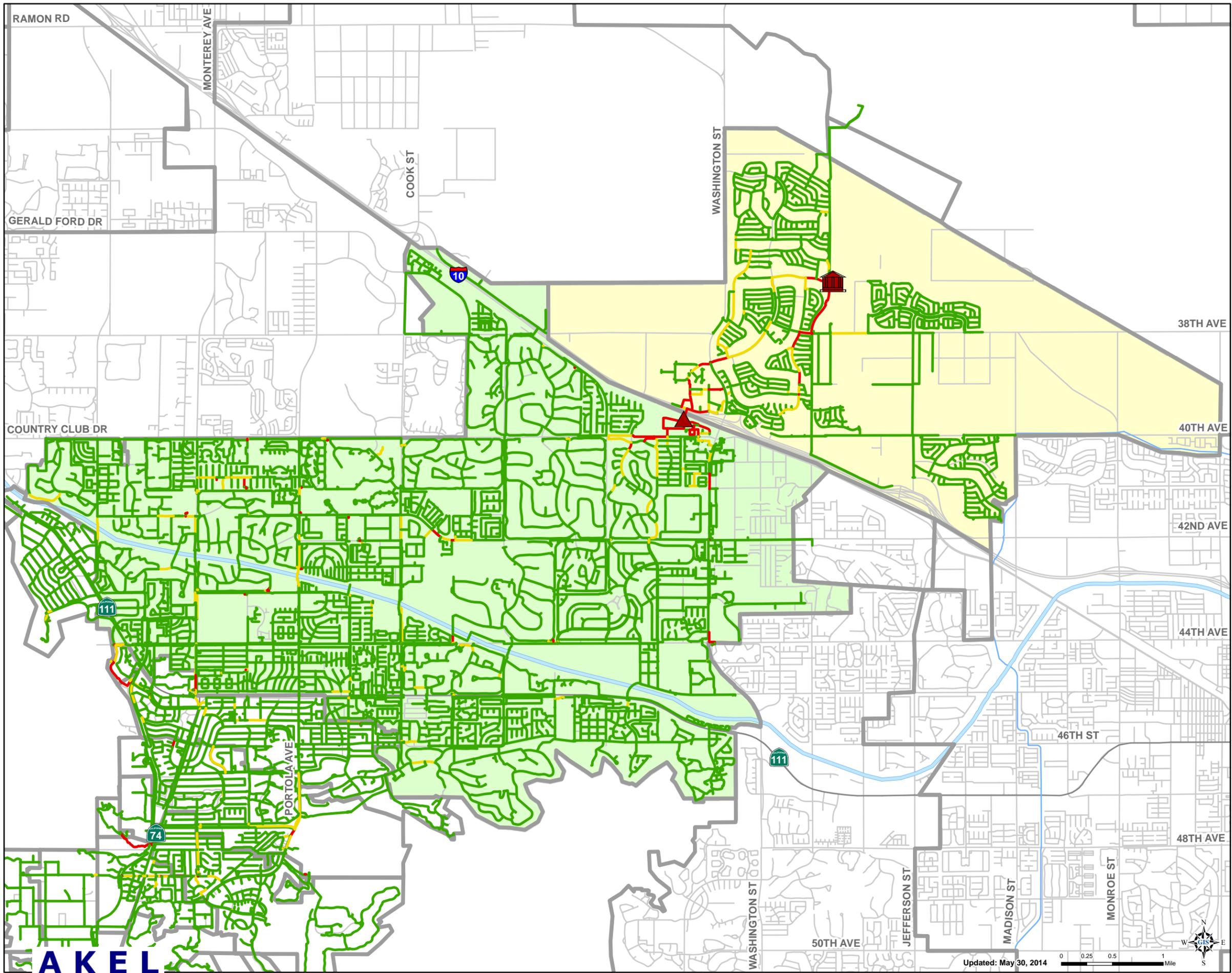
Pressure Zones

-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

**Figure 5-1
Scenario 5
Minimum Pressure (psi)**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

-  New Supply Location
-  New Pump Station

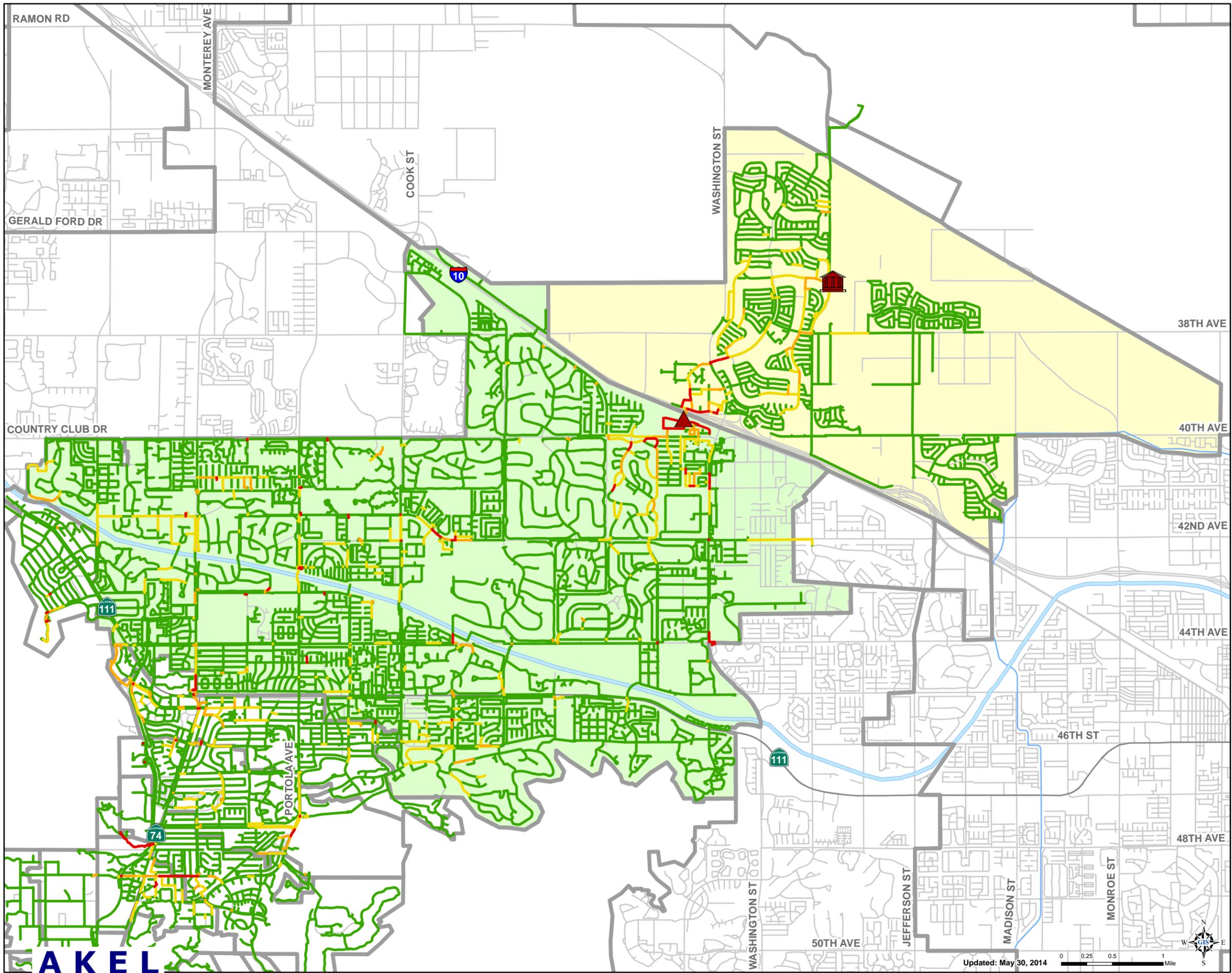
- Scenario 5 Pipes
By Maximum Velocity (ft/s)
-  0 - 3
 -  3.01 - 5
 -  > 5

- Pressure Zones
-  Sun City
 -  Valley
 -  Other
 -  Street Centerlines
 -  Highways
 -  Canals/Creeks/Rivers
 -  White Water River

PRELIMINARY

Figure 5-2
Scenario 5
Maximum Velocity (ft/s)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

-  New Supply Location
-  New Pump Station

Scenario 5 Pipes
By Maximum Headloss (ft/kft)

-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10

Pressure Zones

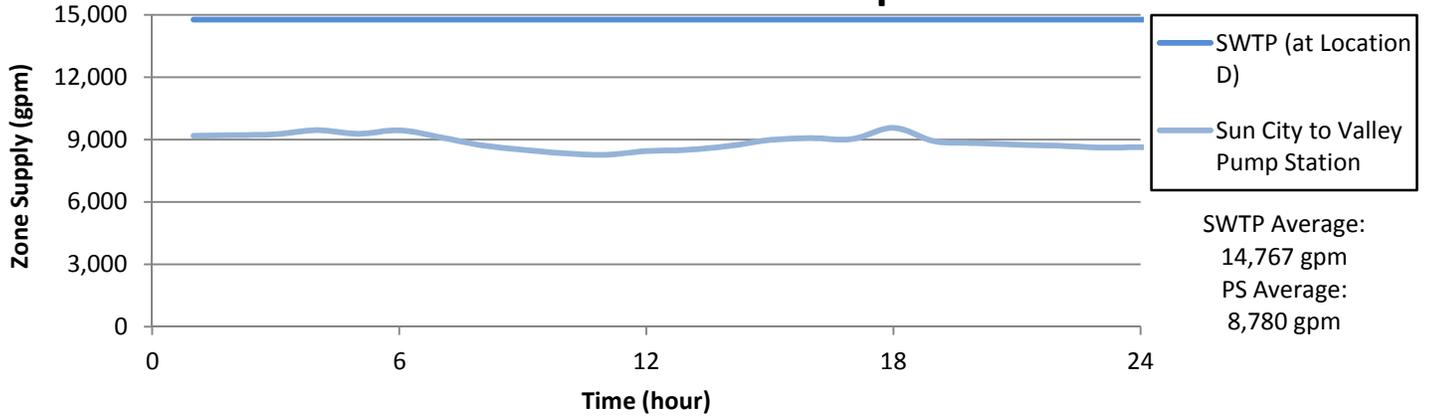
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

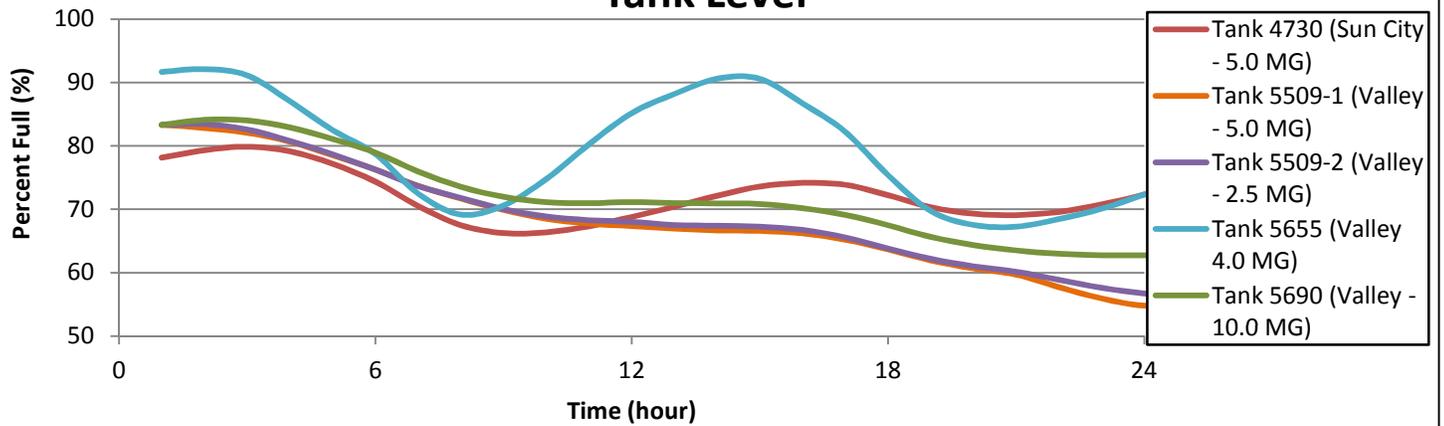
Figure 5-3
Scenario 5
Maximum Headloss (ft/kft)
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



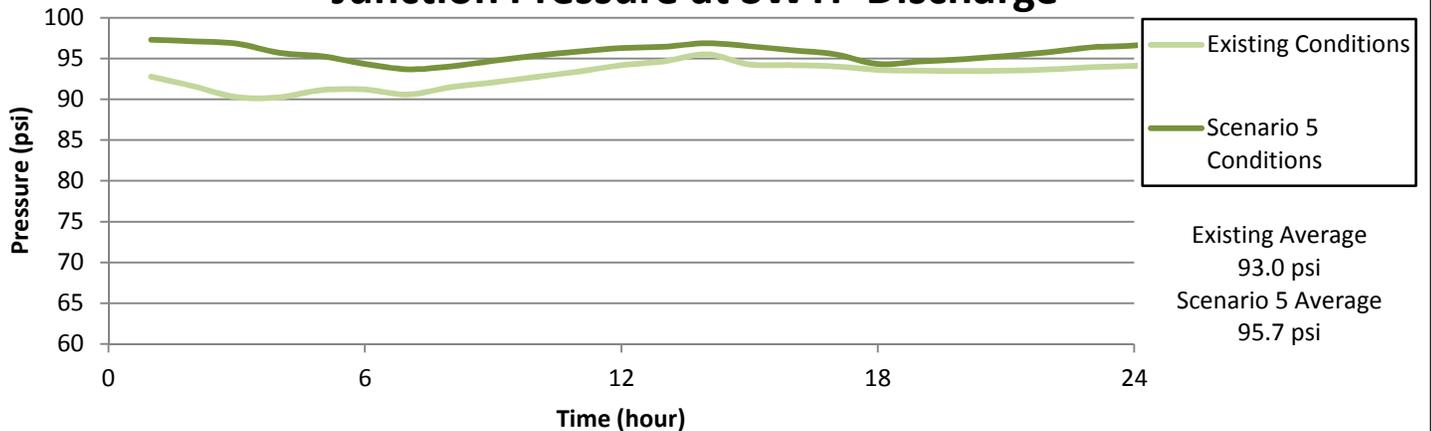
New SWTP Production and Pump Station Flow



Tank Level



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point D
 SWTP Production = **14,767 gpm**
 Wells with CR-6 > 8 ppb inactive
 Pump Station at location F provides additional supply to Valley zone

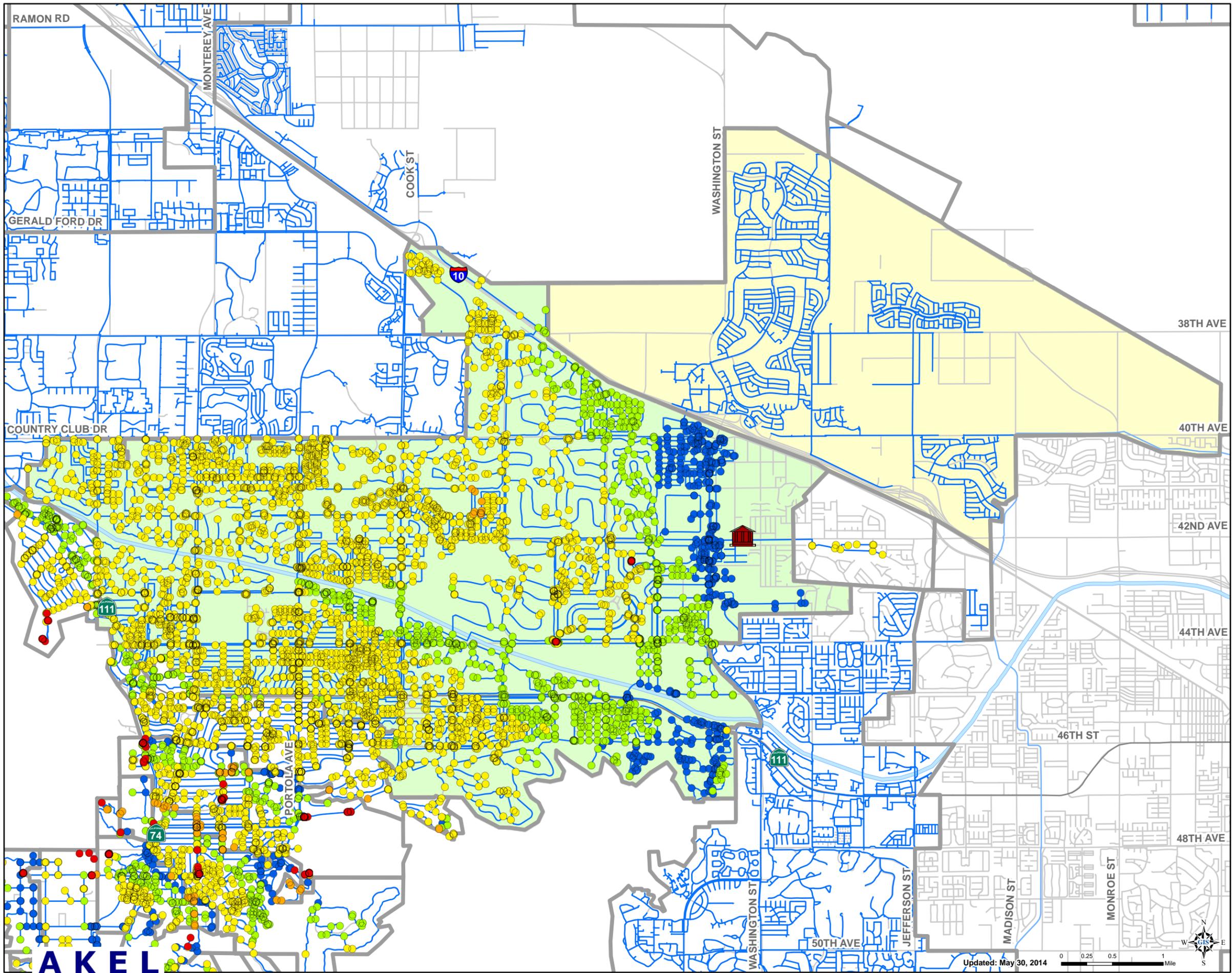
PRELIMINARY

Figure 5-4 Scenario 5 - Sun City New Supply at Point D

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District



May 29, 2014



Legend

New Supply Location

Scenario 6 Junctions

By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

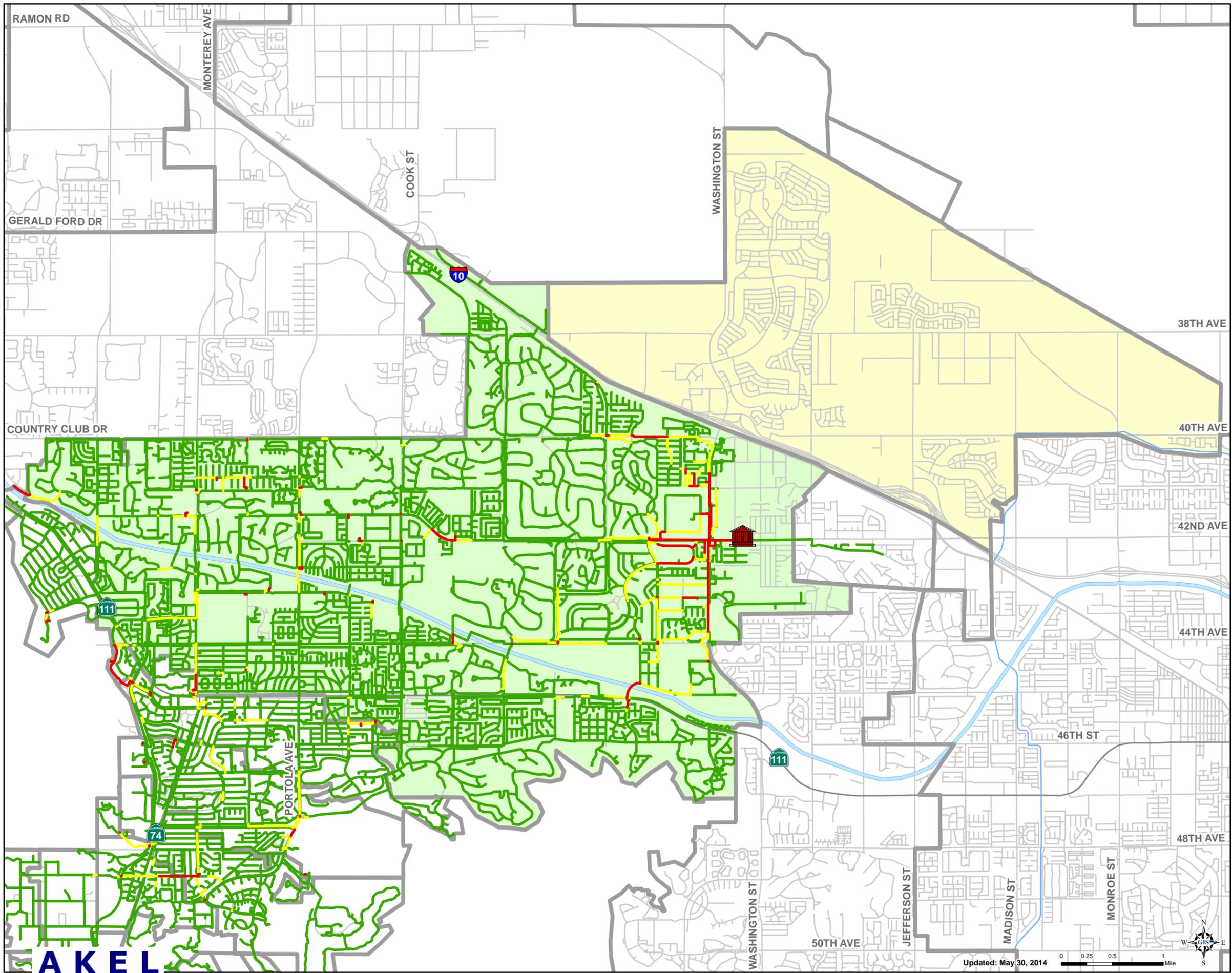
Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 6-1
Scenario 6
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





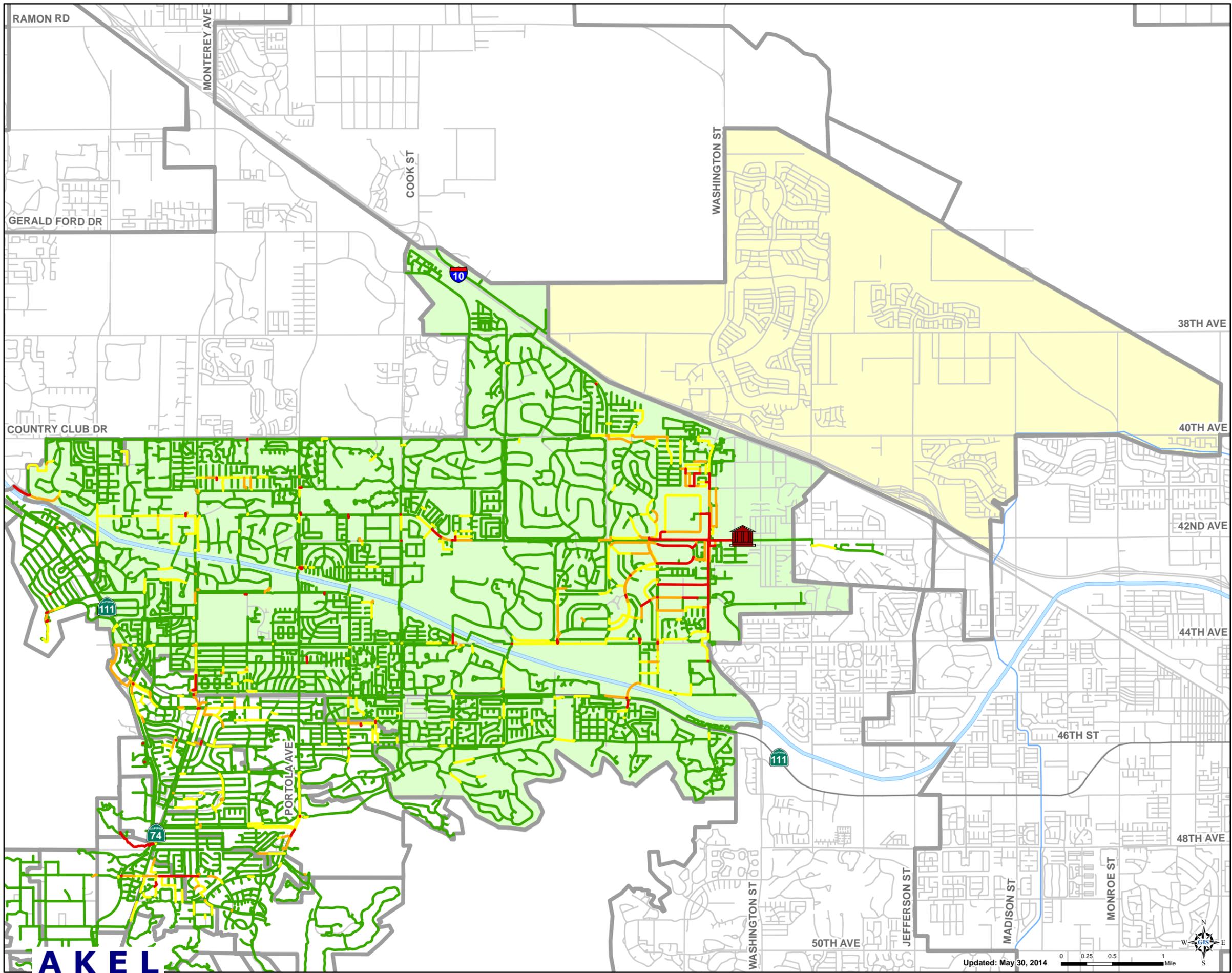
Legend

-  New Supply Location
- Scenario 6 Pipes
- By Maximum Velocity (ft/s)
-  0 - 3
-  3.01 - 5
-  > 5
- Pressure Zones
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 6-2
Scenario 6
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 6 Pipes

By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

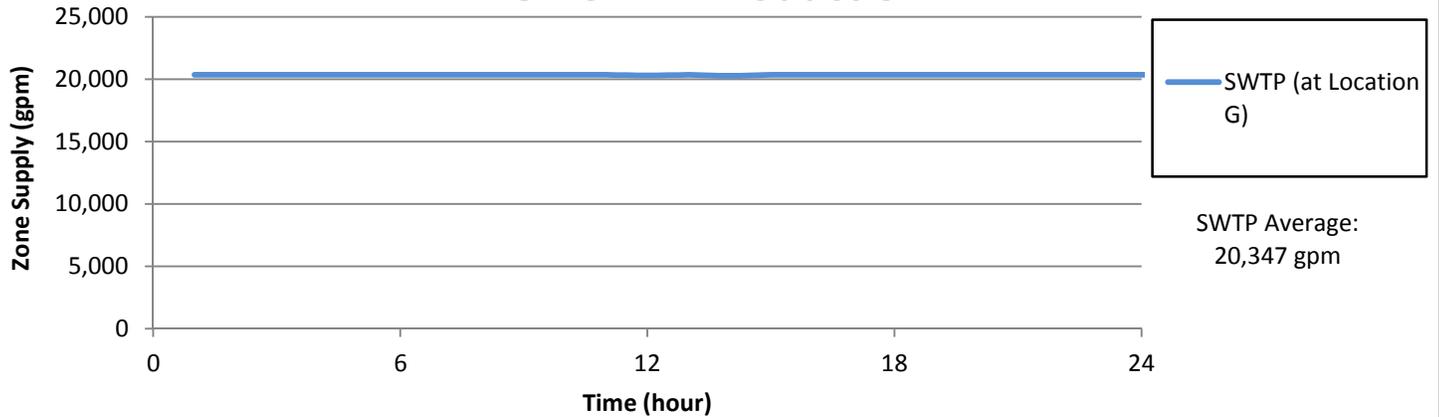
PRELIMINARY

Figure 6-3
Scenario 6
Maximum Headloss (ft/kft)

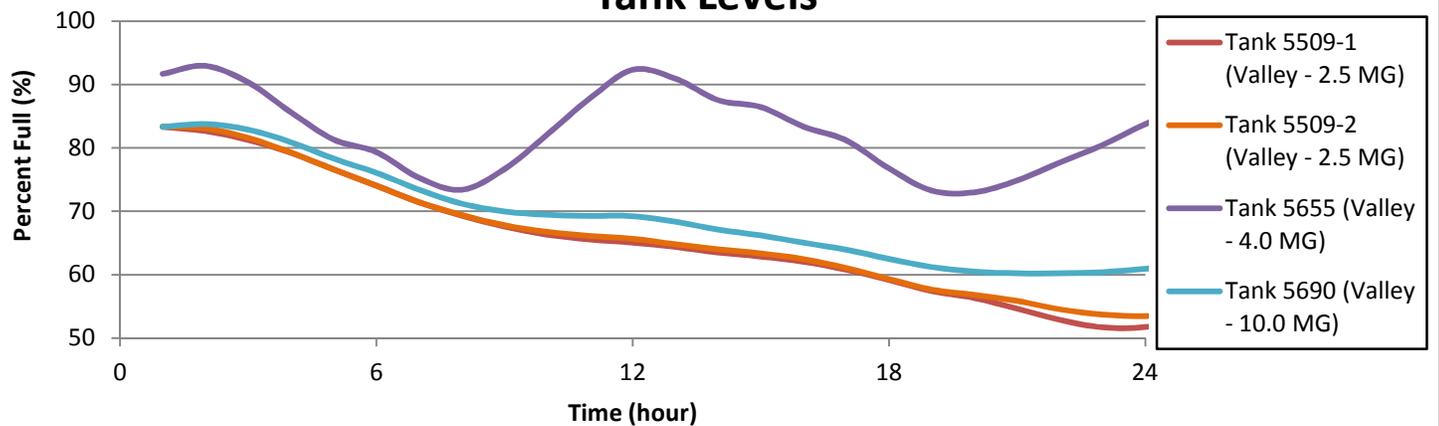
Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



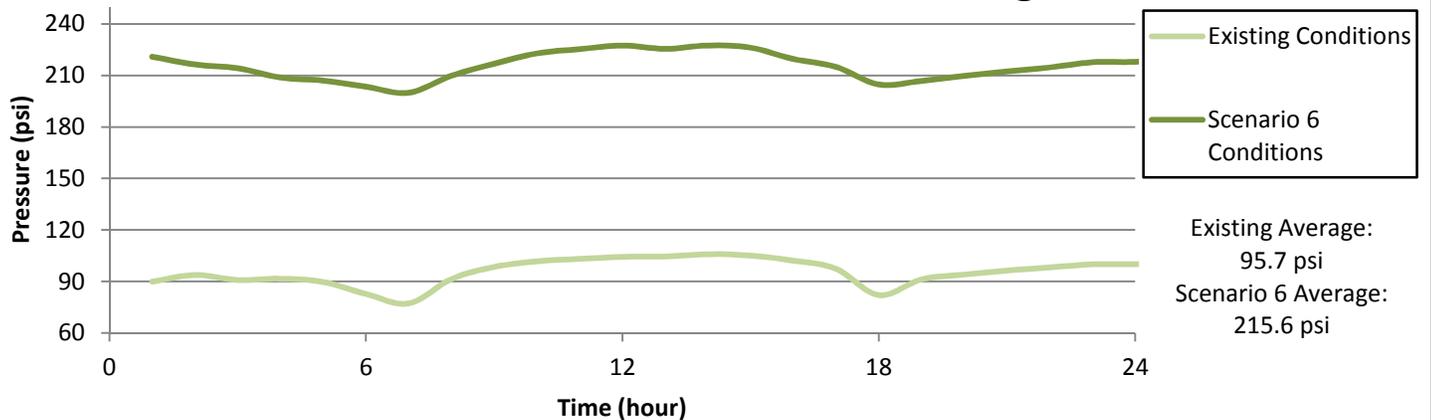
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point G
 SWTP Production = **20,347 gpm**
 Wells with CR-6 > 8 ppb inactive
 Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Quinita closed

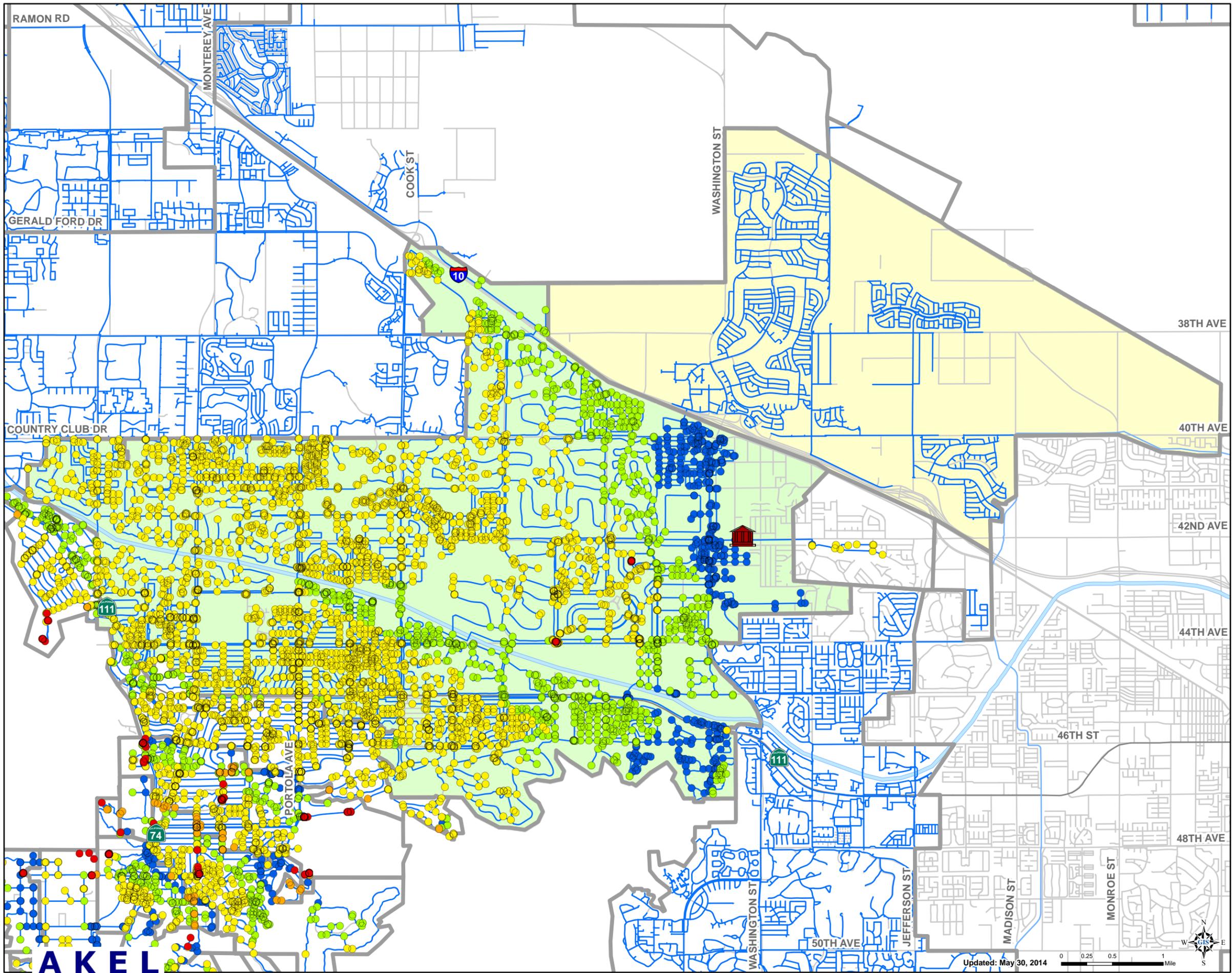
PRELIMINARY

Figure 6-4

Scenario 6 - Valley New Supply at Point G

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 7 Junctions

By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

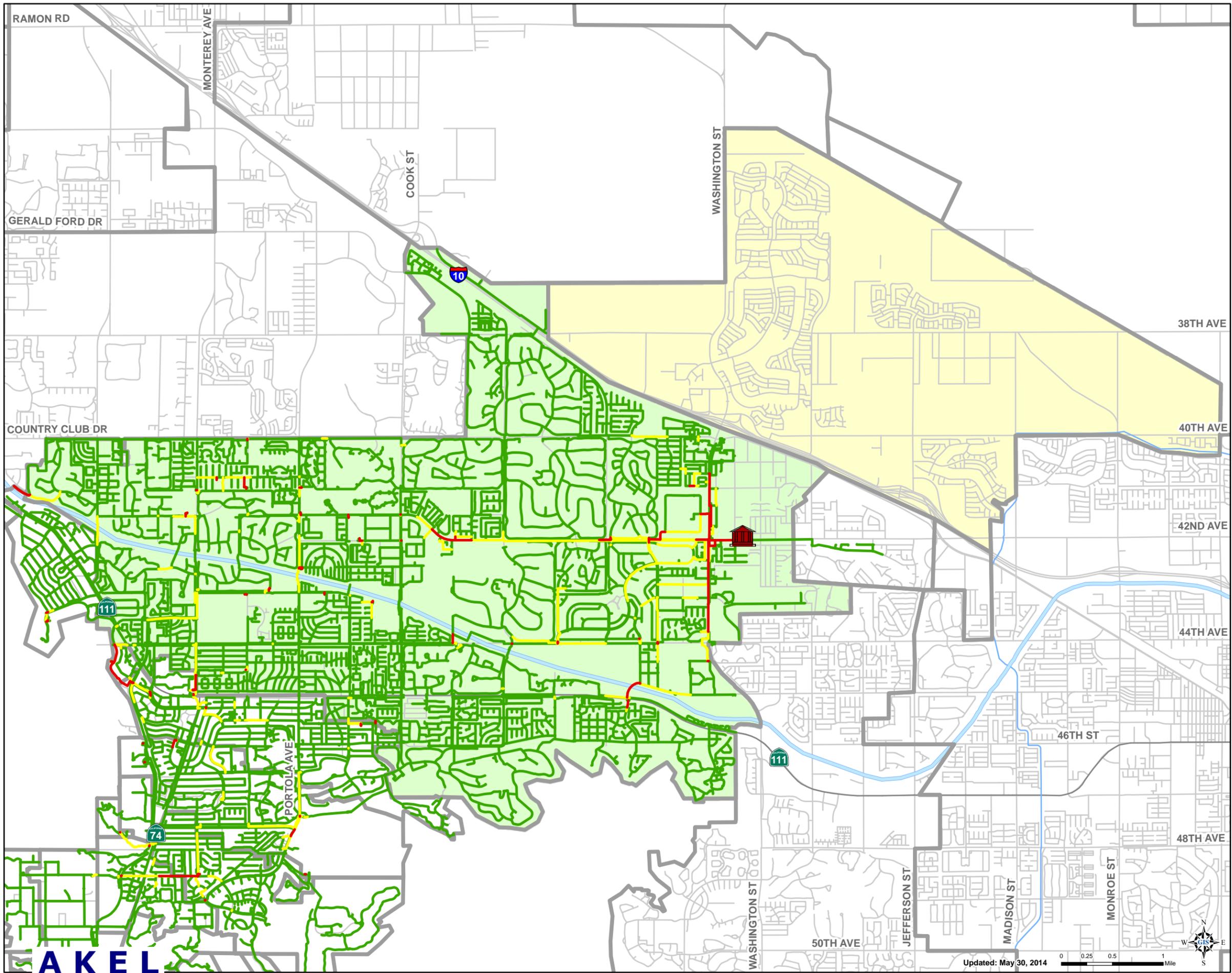
Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 7-1
Scenario 7
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 7 Pipes

By Maximum Velocity (ft/s)

0 - 3

3.01 - 5

> 5

Pressure Zones

Sun City

Valley

Other

Street Centerlines

Highways

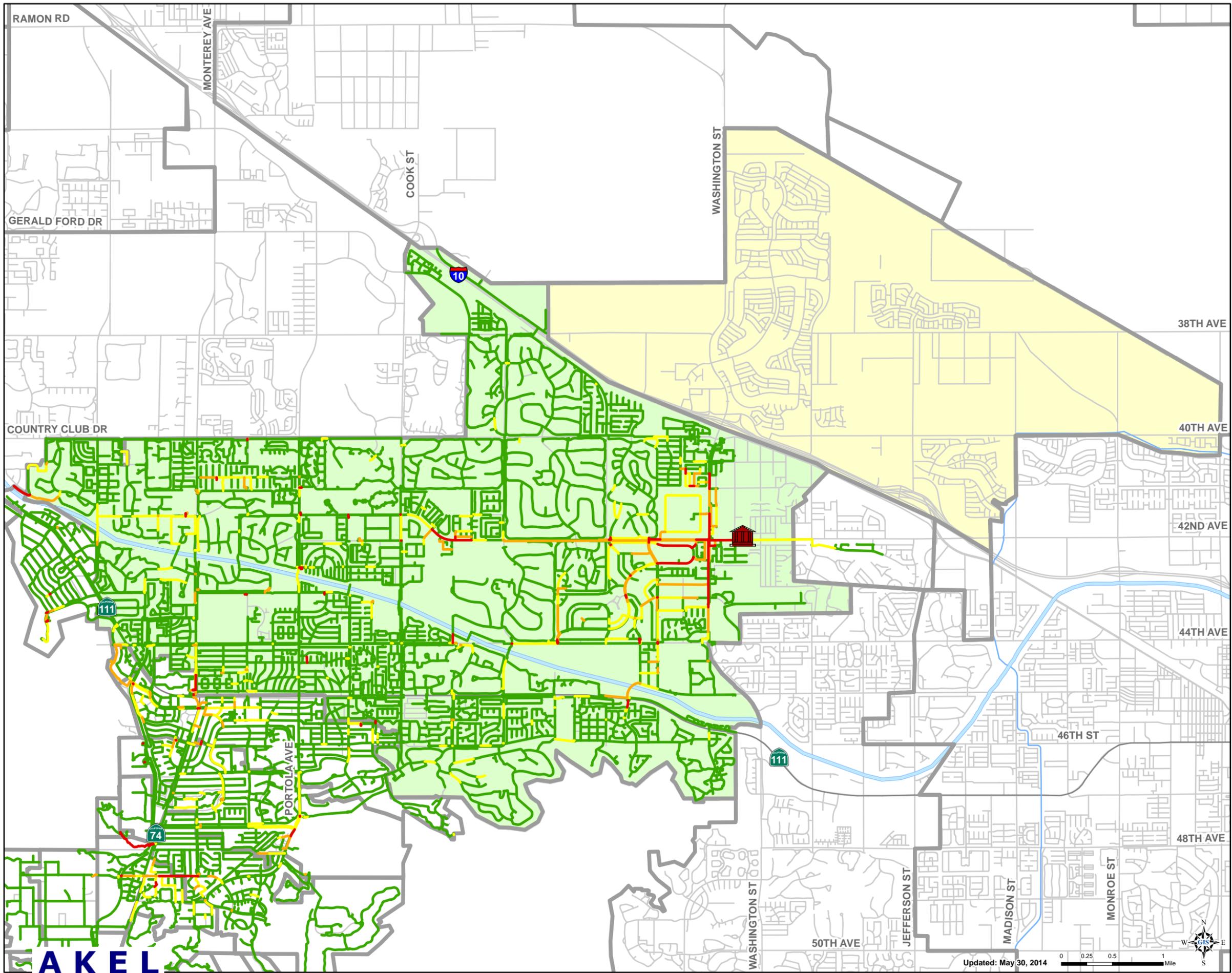
Canals/Creeks/Rivers

White Water River

PRELIMINARY

Figure 7-2
Scenario 7
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 7 Pipes

By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

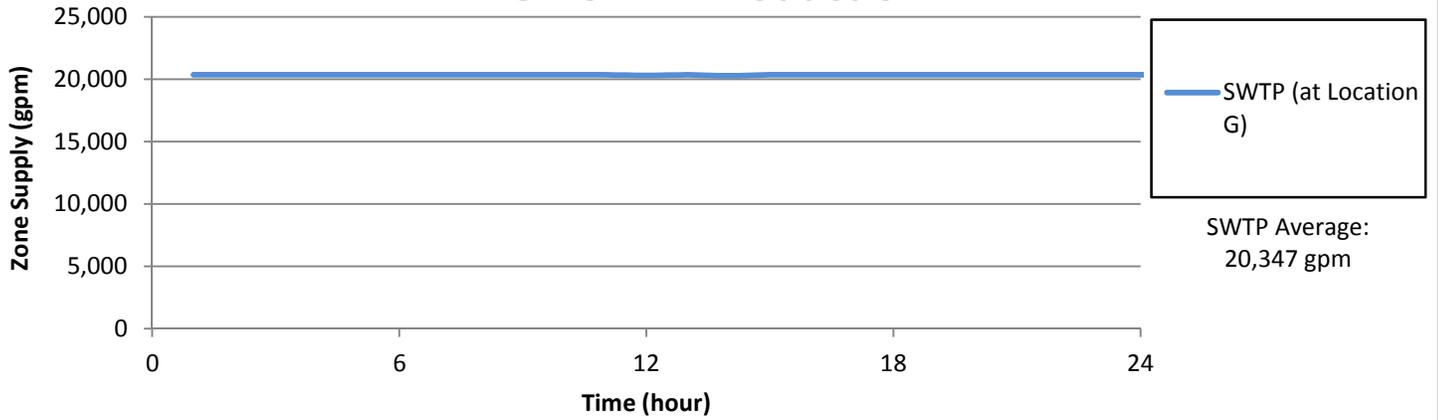
PRELIMINARY

Figure 7-3
Scenario 7
Maximum Headloss (ft/kft)

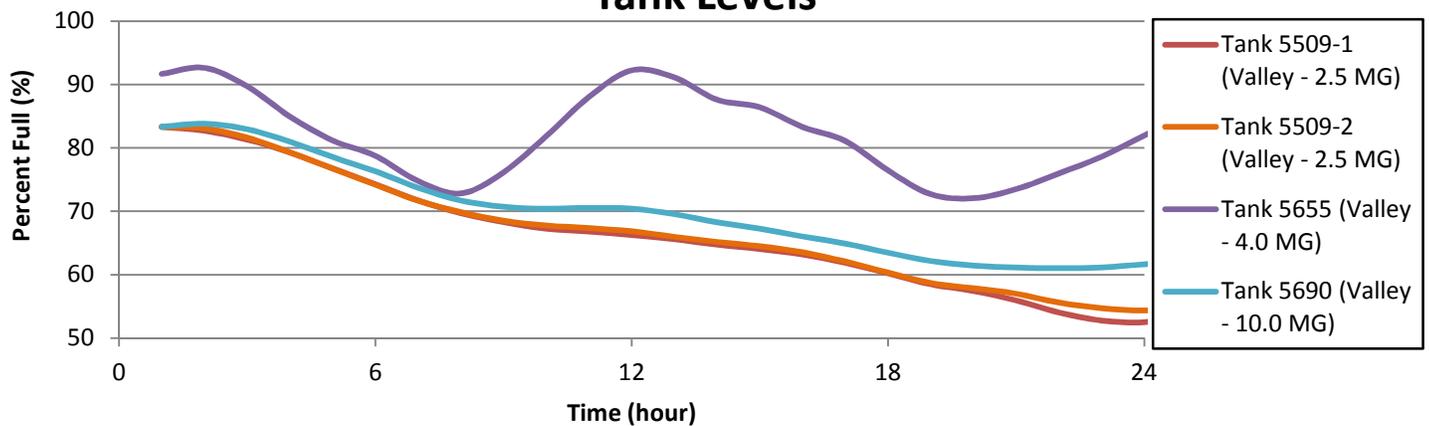
Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



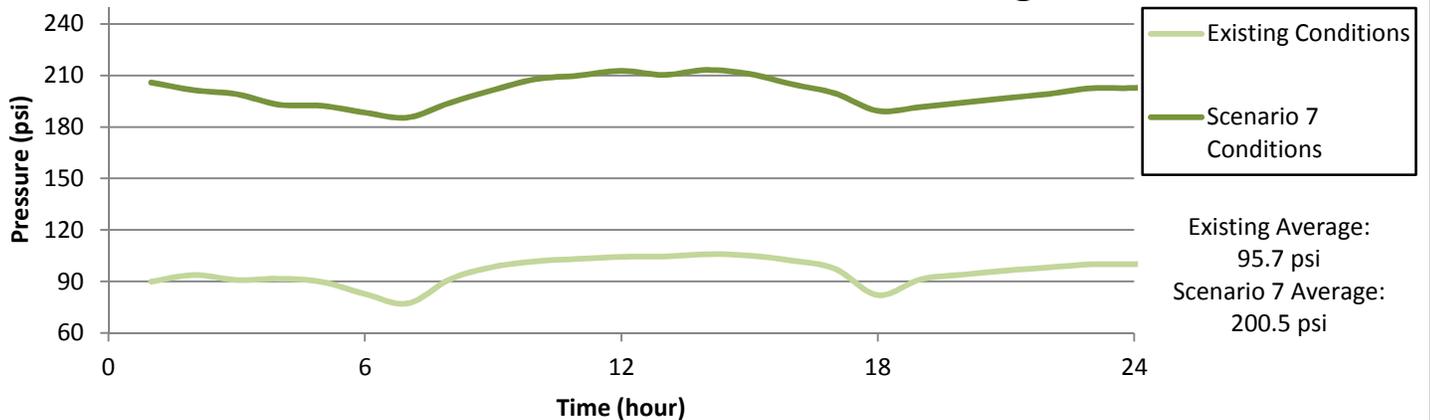
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point G
 SWTP Production = **20,347 gpm**
 Wells with CR-6 > 8 ppb inactive
 Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed
 18-in main in 42nd Ave. extended from Washington St. To El Dorado Dr.

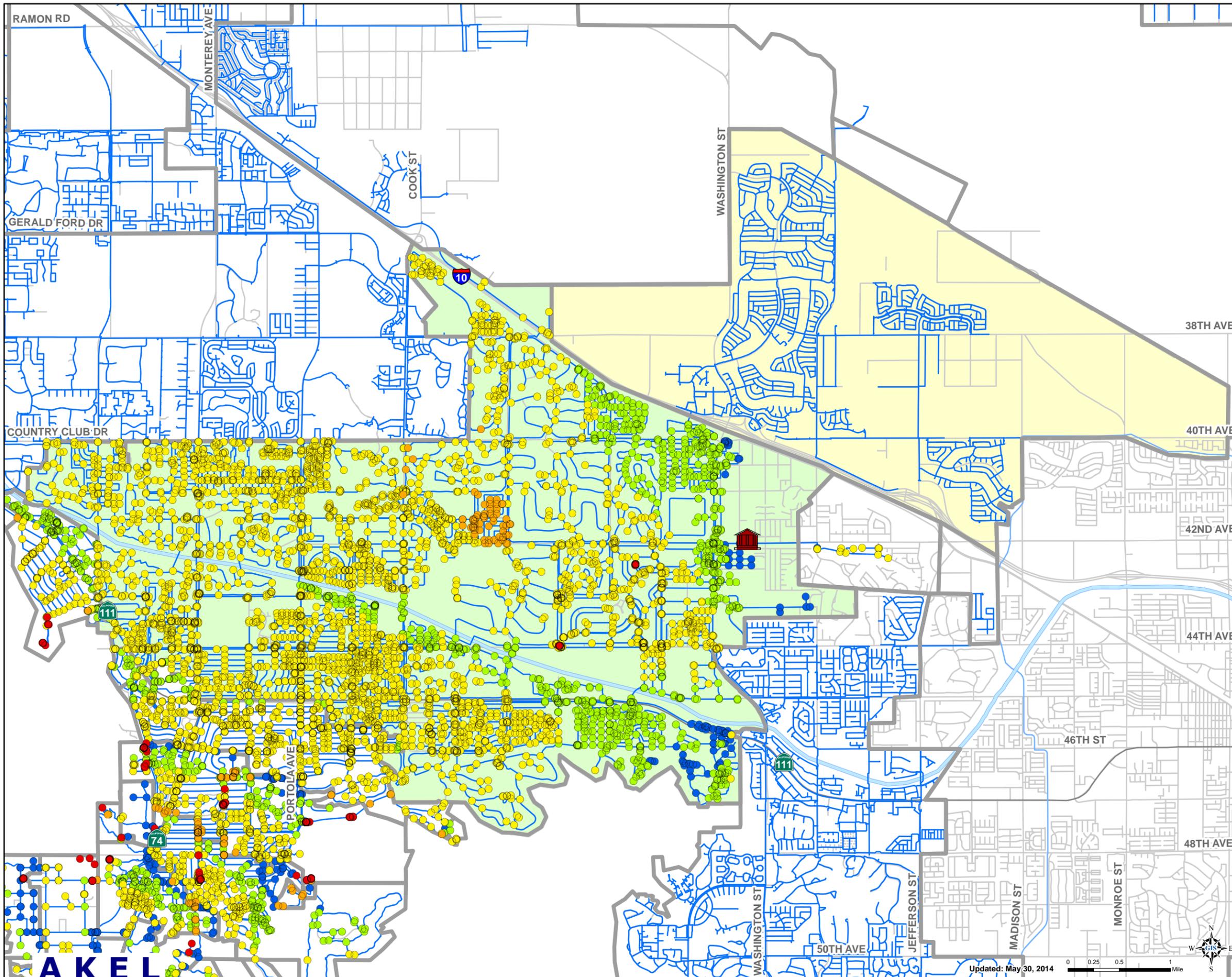
PRELIMINARY

Figure 7-4

Scenario 7 - Valley New Supply at Point G

Hydraulic Analysis for Supply Treatment
 Alternatives
 Coachella Valley Water District





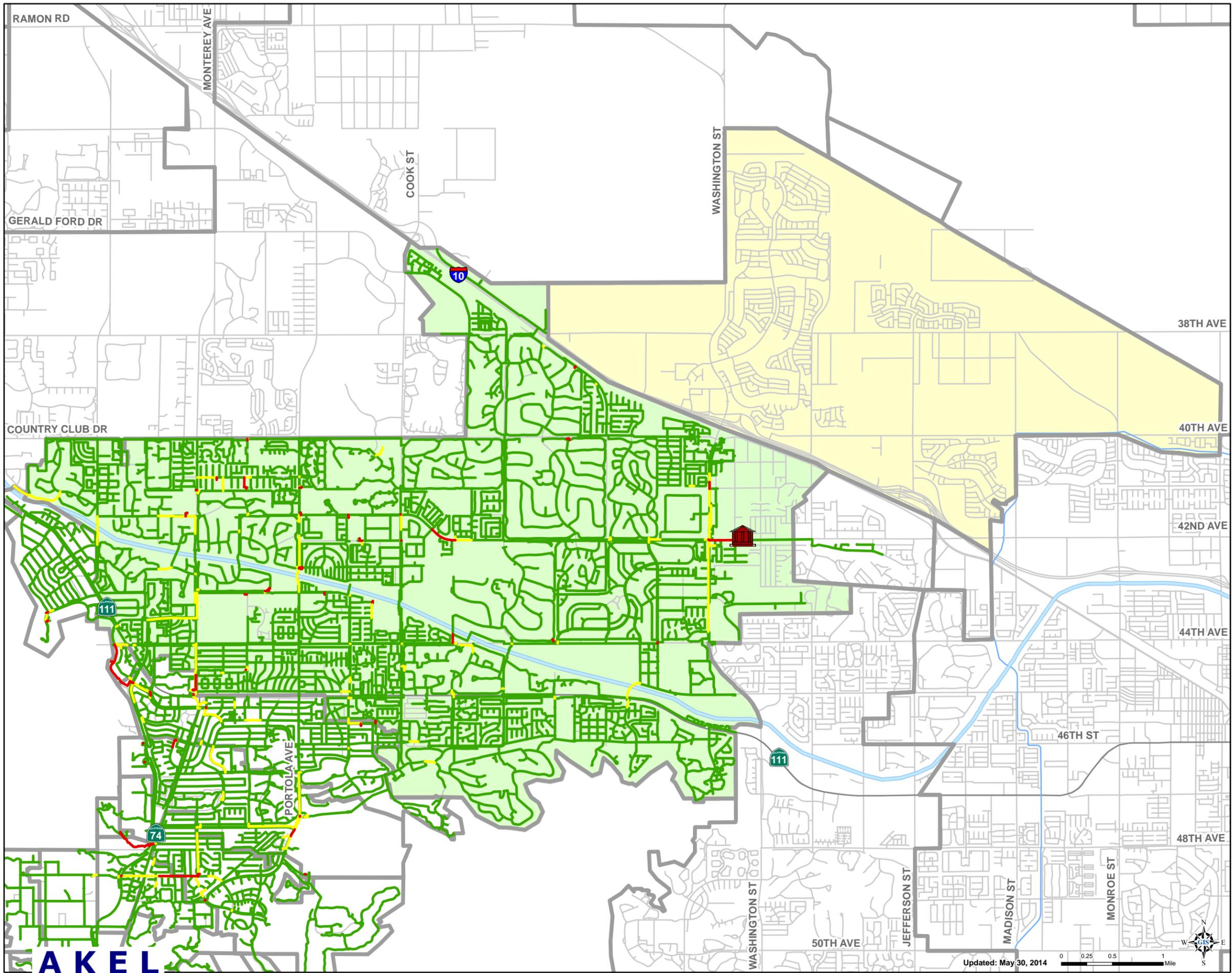
Legend

-  New Supply Location
- Scenario 8 Junctions
- By Minimum Pressure (psi)
 -  < 0 - 20
 -  20.01 - 40
 -  40.01 - 80
 -  80.01 - 100
 -  > 100
-  Modeled Pipes
- Pressure Zones
 -  Sun City
 -  Valley
 -  Other
 -  Street Centerlines
 -  Highways
 -  Canals/Creeks/Rivers
 -  White Water River

PRELIMINARY

Figure 8-1
Scenario 8
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 8 Pipes

By Maximum Velocity (ft/s)

0 - 3

3.01 - 5

< 5

Pressure Zones

Sun City

Valley

Other

Street Centerlines

Highways

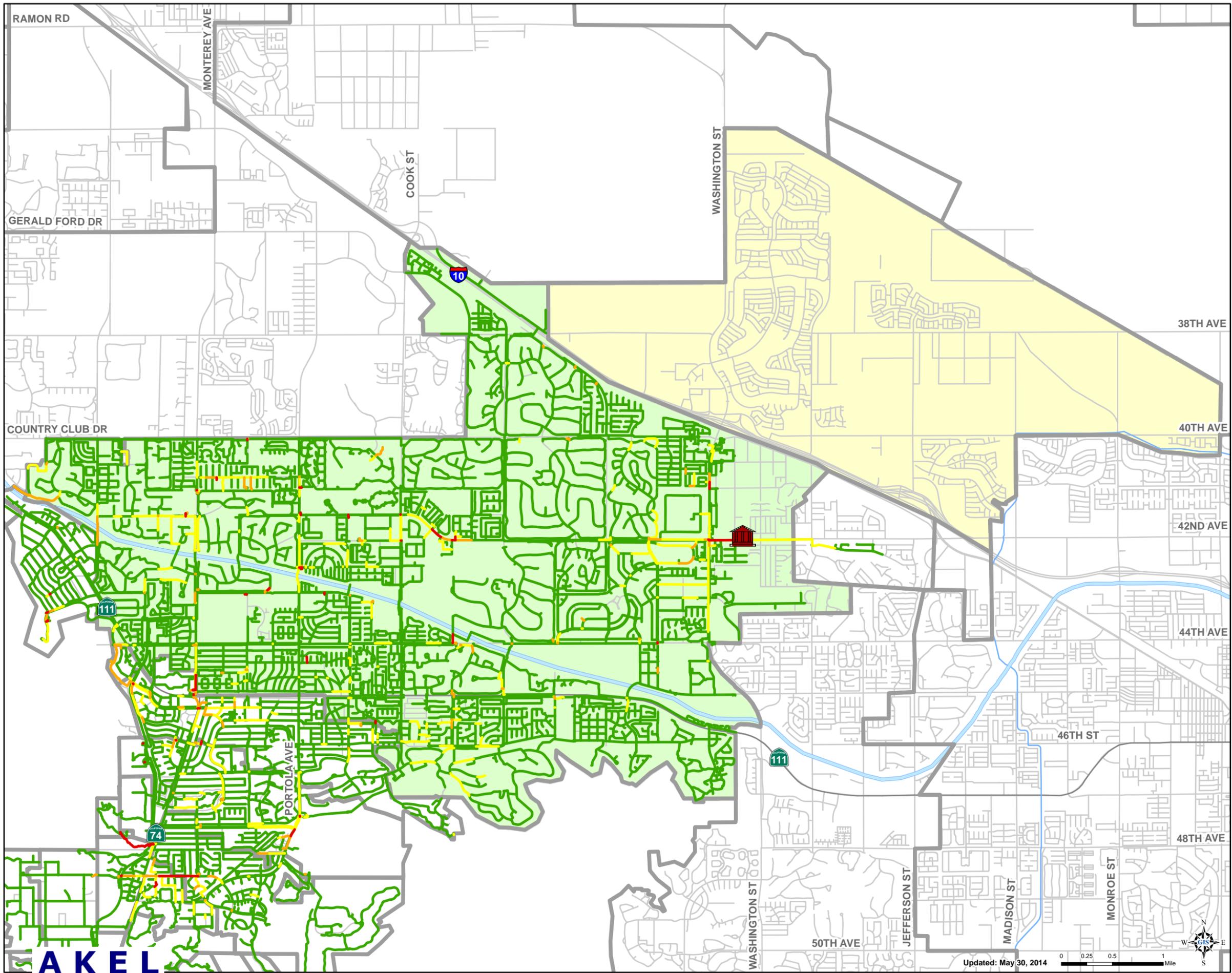
Canals/Creeks/Rivers

White Water River

PRELIMINARY

Figure 8-2
Scenario 8
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

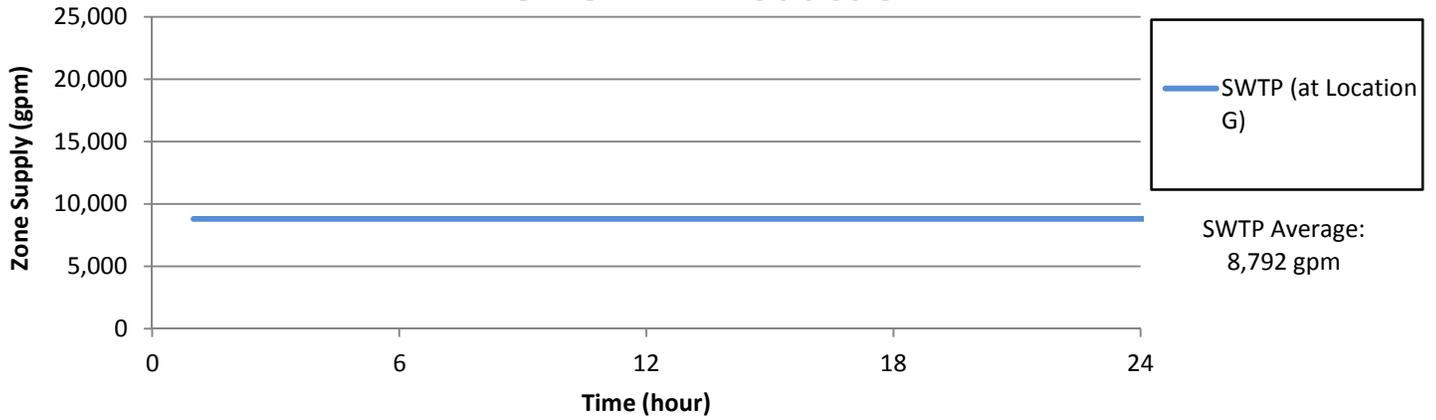
-  New Supply Location
- Scenario 8 Pipes**
- By Maximum Headloss (ft/kft)**
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones**
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

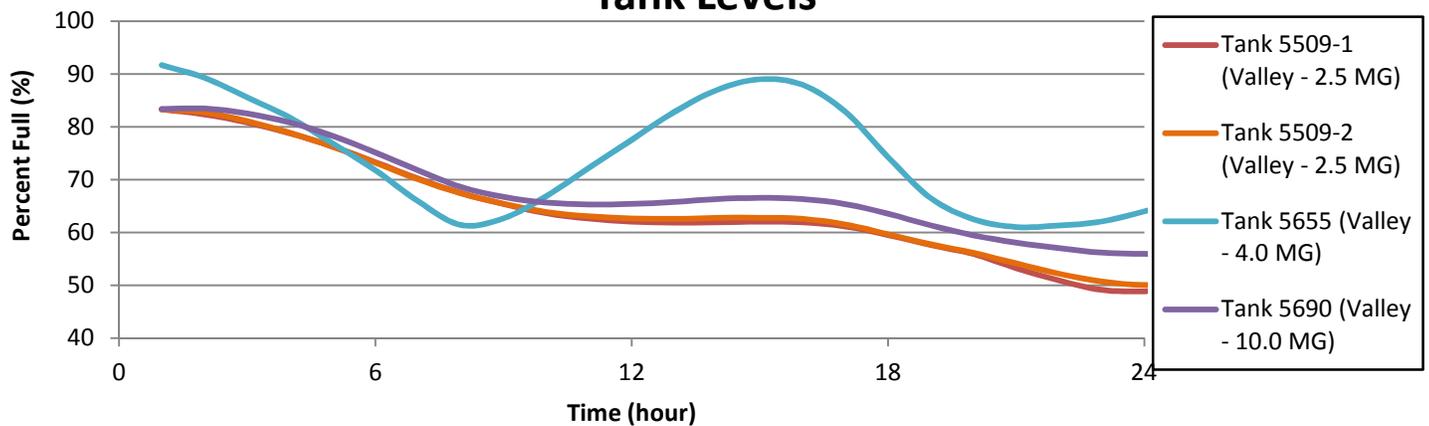
Figure 8-3
Scenario 8
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



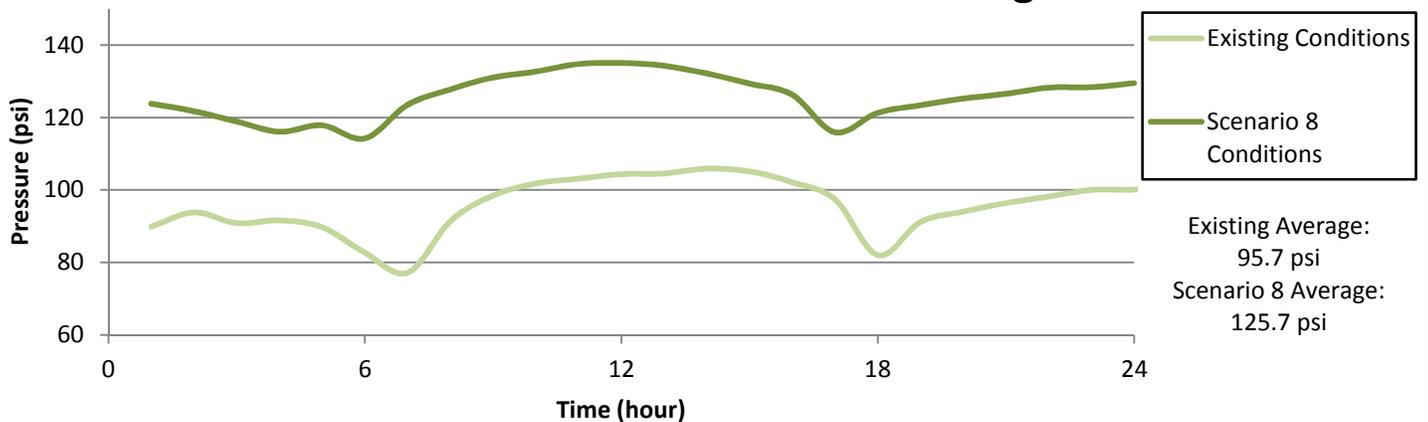
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point G
 SWTP Production = **8,792 gpm**
 Wells with CR-6 > 8 ppb locally treated
 Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Quinita closed

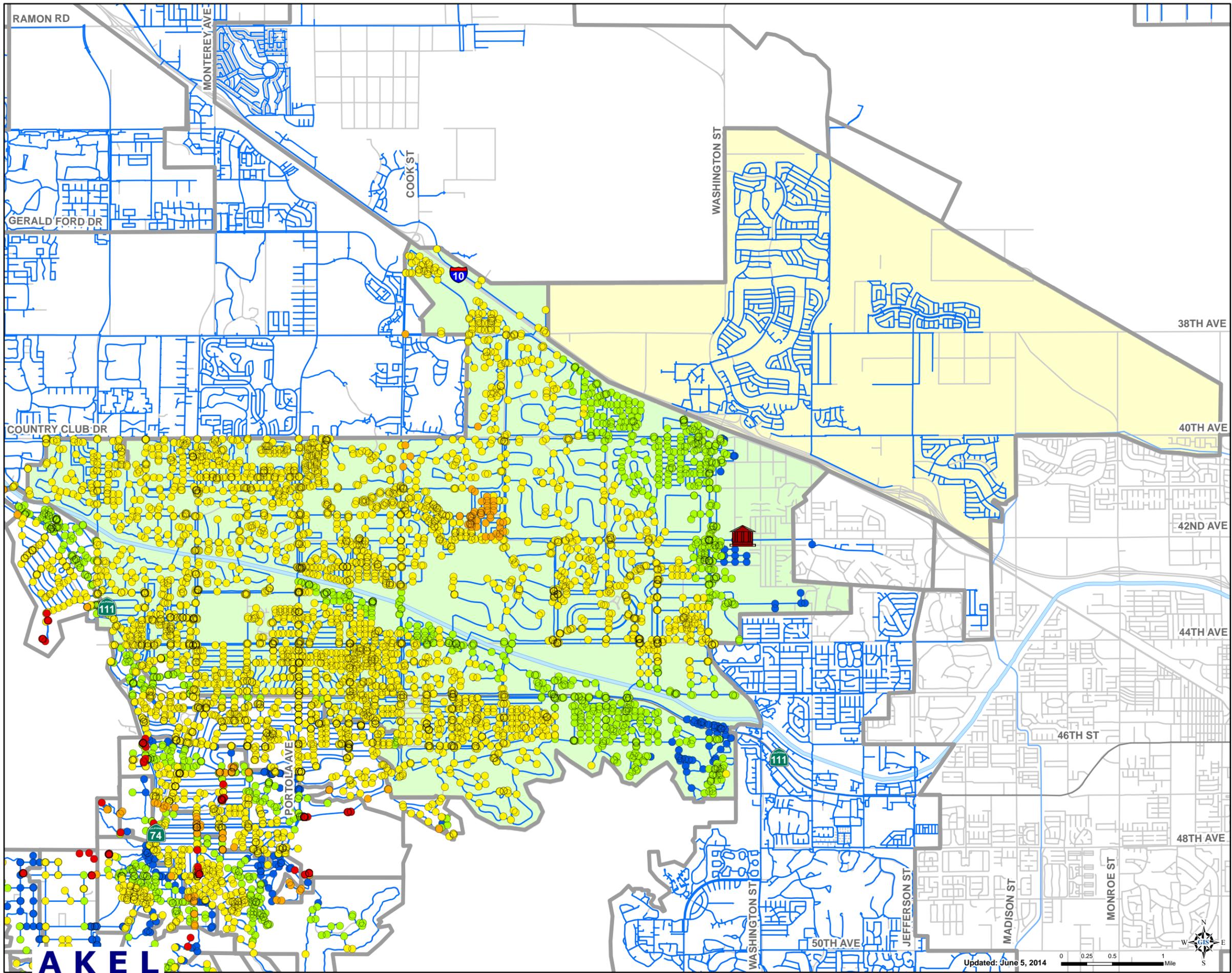
PRELIMINARY

Figure 8-4

Scenario 8 - Valley New Supply at Point G

Hydraulic Analysis for Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 8A Junctions

By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

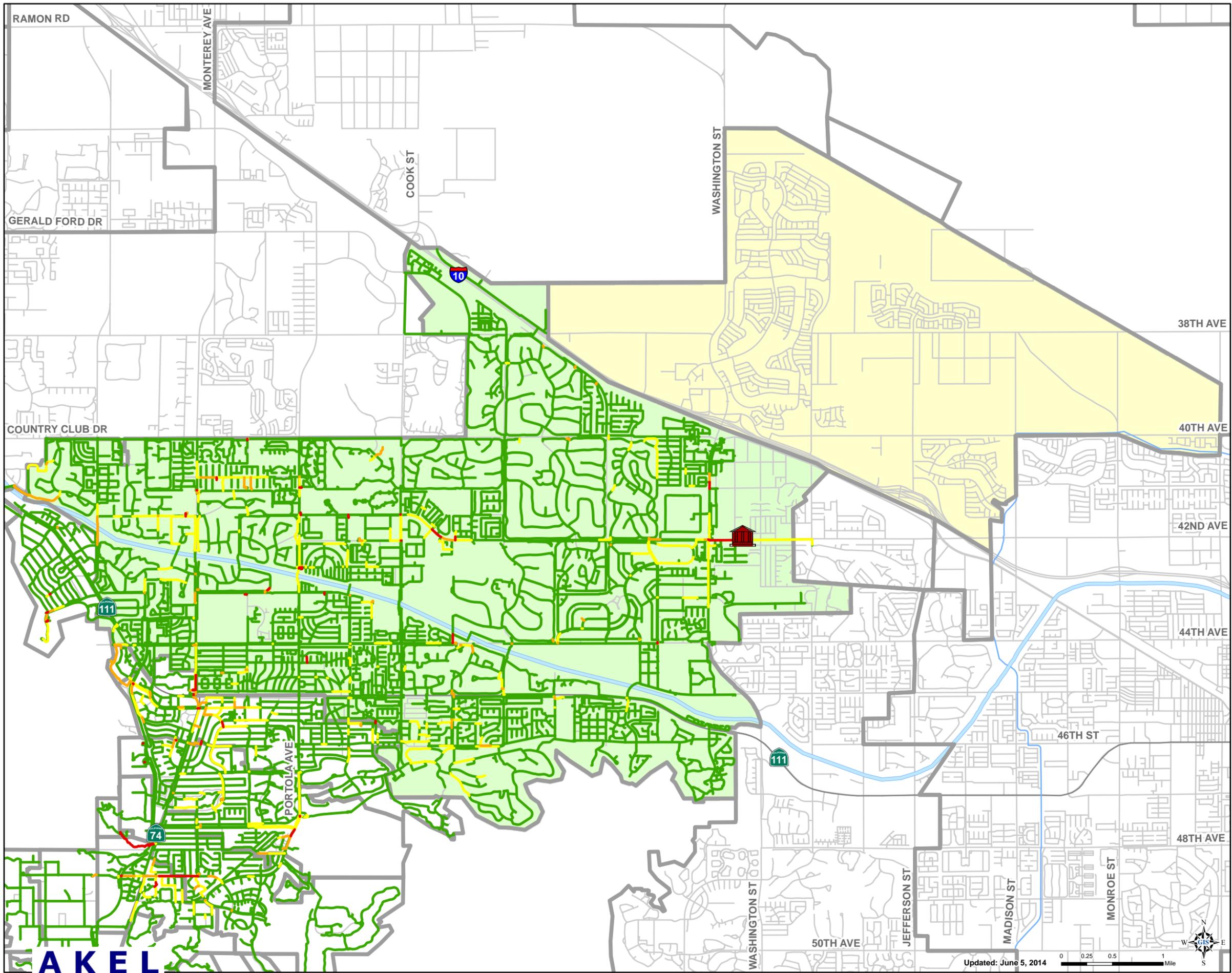
Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 8-5
Scenario 8A
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 8A Pipes

By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

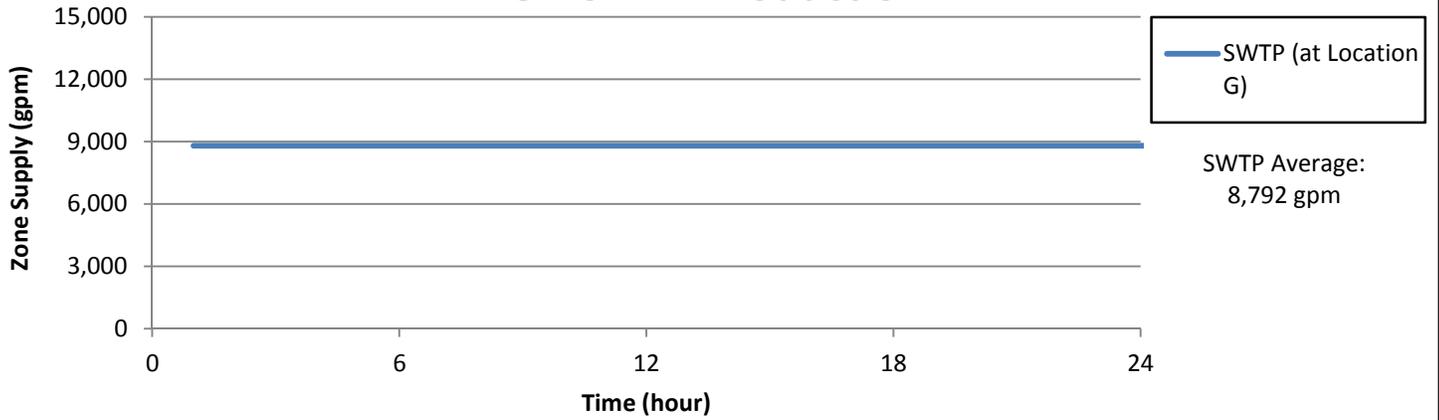
- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

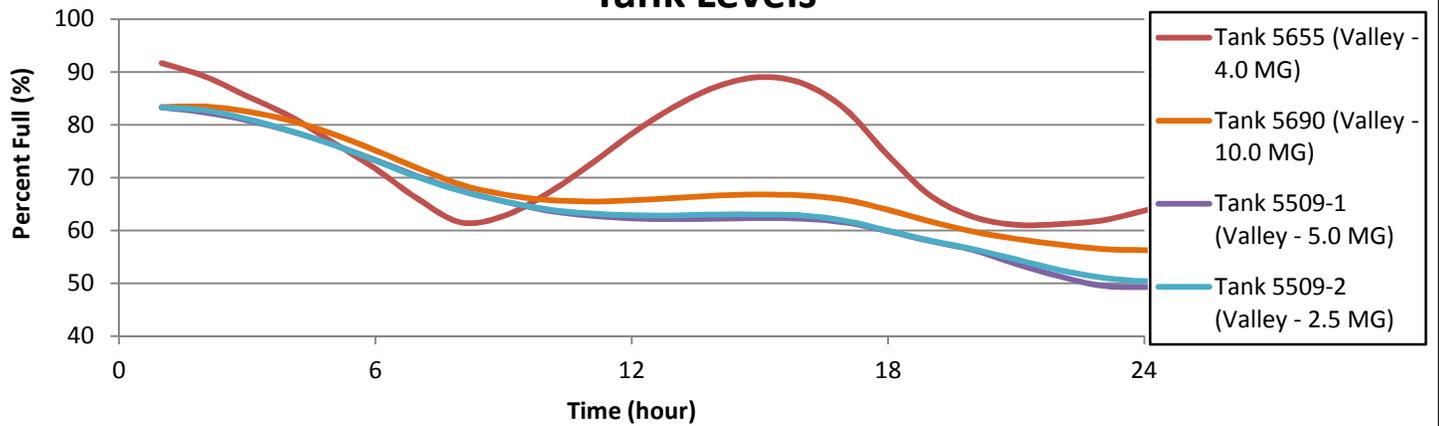
Figure 8-6
Scenario 8A
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District



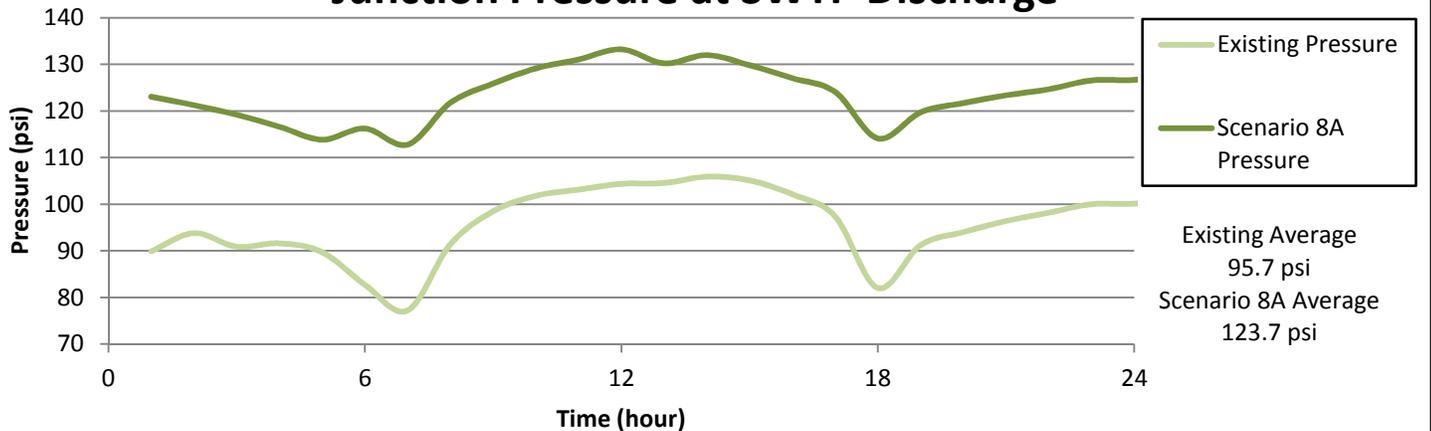
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point G

SWTP Production = **8,792 gpm**

Wells in the Valley Zone with CR-6 > 8 ppb are assumed to be locally treated

Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La

Qunita closed

PRELIMINARY

Figure 8-7

Scenario 8A - Valley

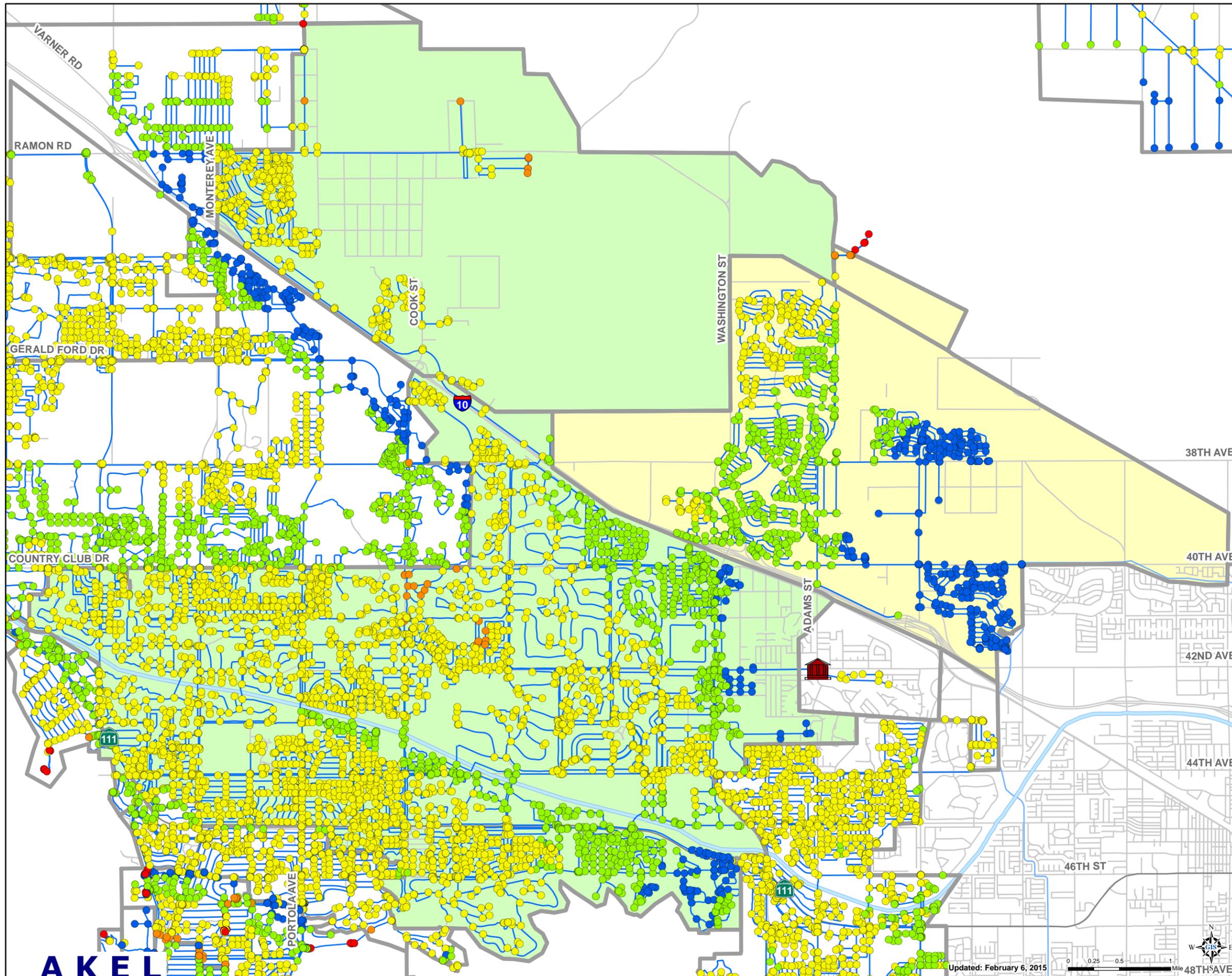
New Supply at Point G

Hydraulic Analysis for Supply Treatment

Alternatives

Coachella Valley Water District





Legend

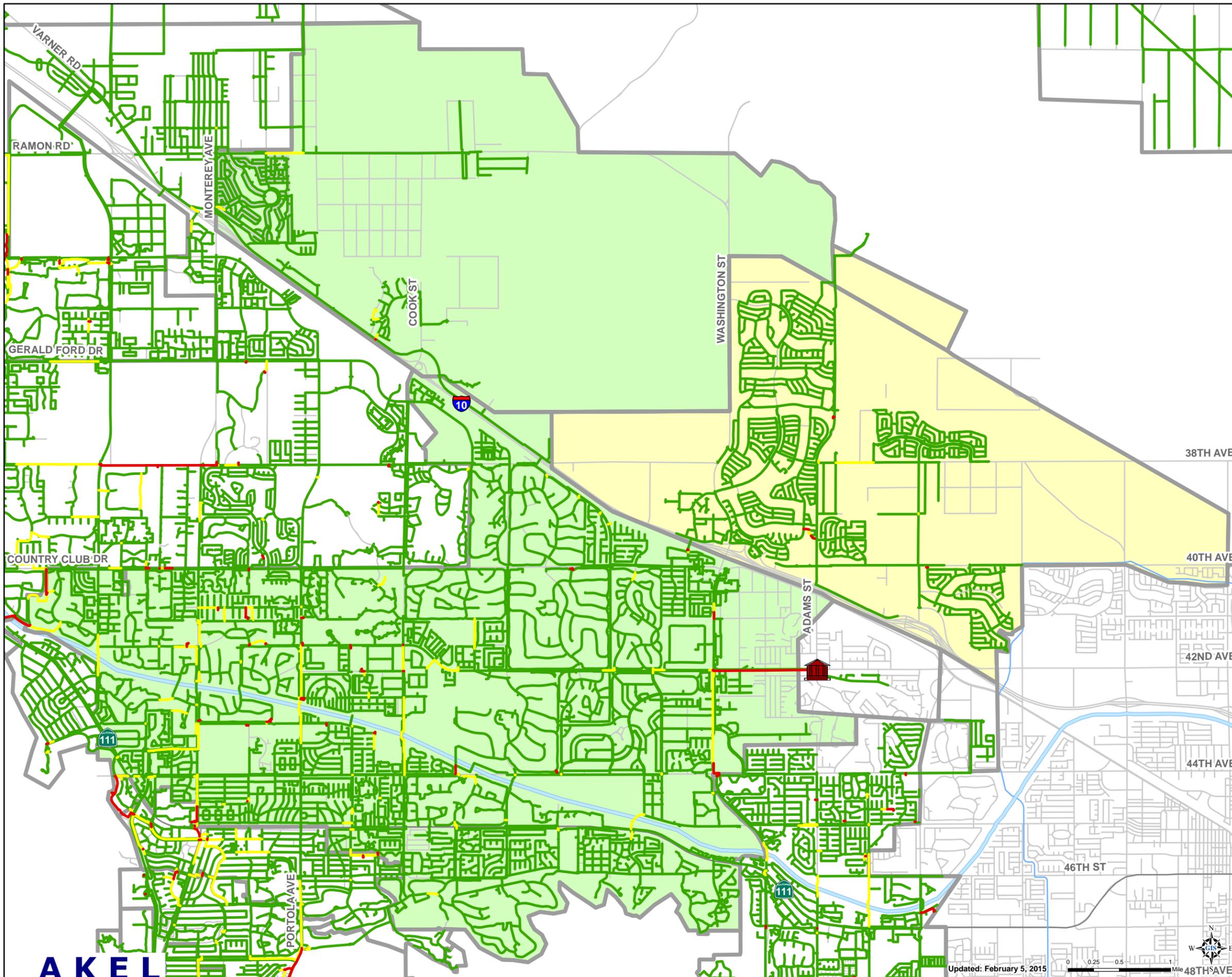
-  New Supply Location
- Scenario 8B Junctions**
- By Minimum Pressure (psi)**
-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100
-  Modeled Pipes
- Pressure Zones**
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 8B-1
Scenario 8B
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

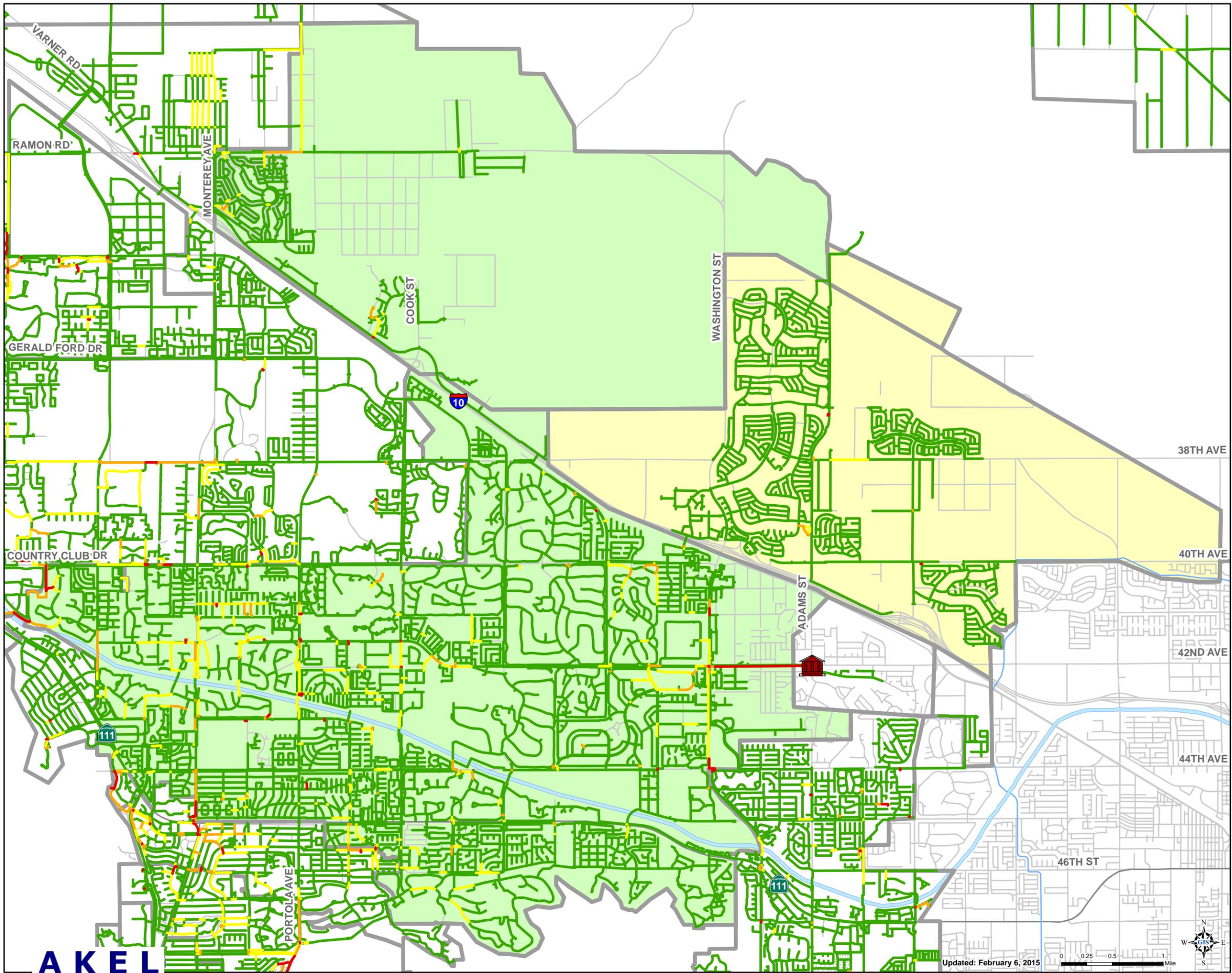
-  New Supply Location
- Scenario 8B Pipes
- By Maximum Velocity (ft/s)
-  0 - 3
-  3.01 - 5
-  > 5
- Pressure Zones
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 8B-2
Scenario 8B
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 8B Pipes

By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

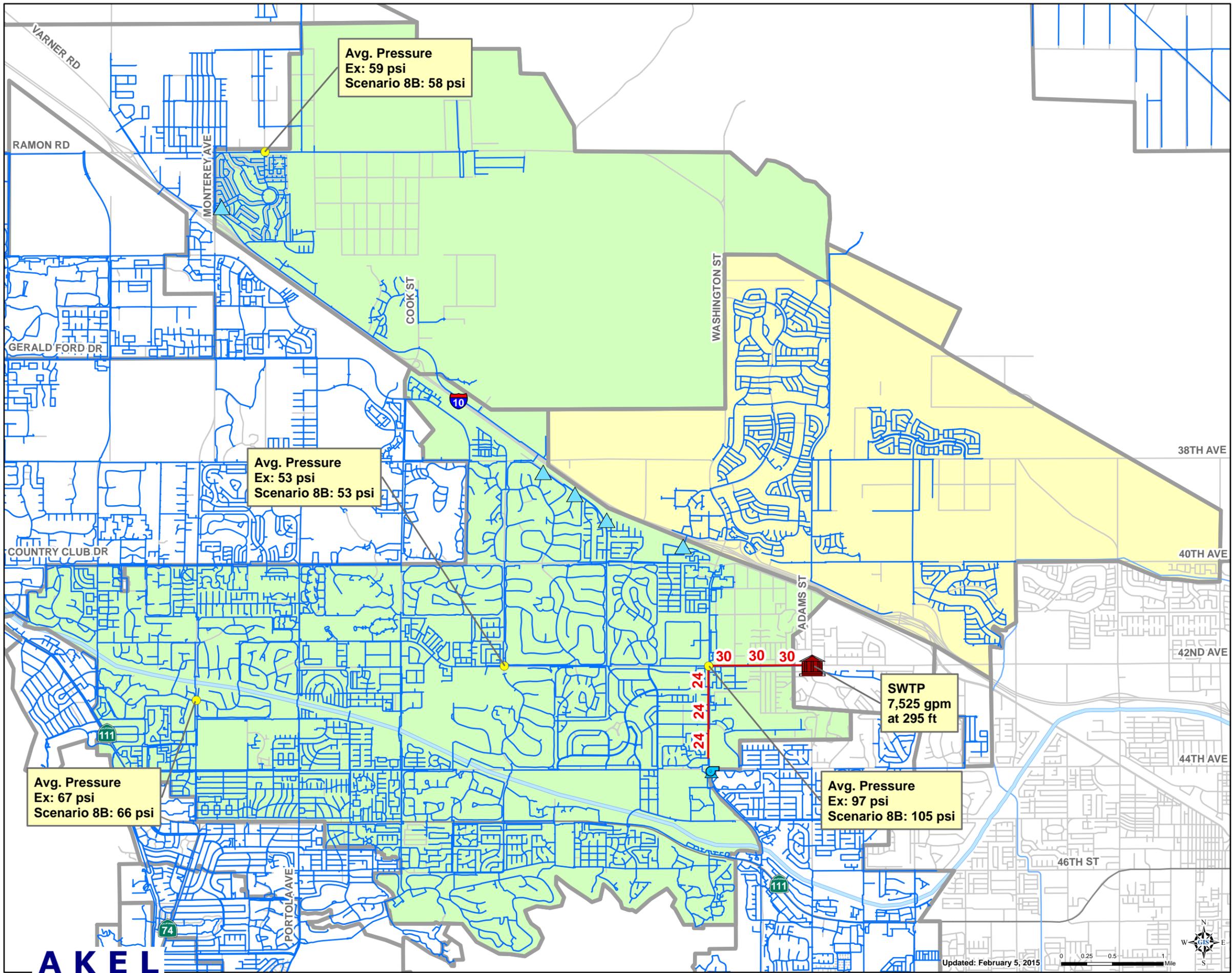
PRELIMINARY

Maximum Day Demands

Figure 8B-3
Scenario 8B
Maximum Headloss (ft/kft)

Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Avg. Pressure
Ex: 59 psi
Scenario 8B: 58 psi

Avg. Pressure
Ex: 53 psi
Scenario 8B: 53 psi

Avg. Pressure
Ex: 67 psi
Scenario 8B: 66 psi

Avg. Pressure
Ex: 97 psi
Scenario 8B: 105 psi

SWTP
7,525 gpm
at 295 ft

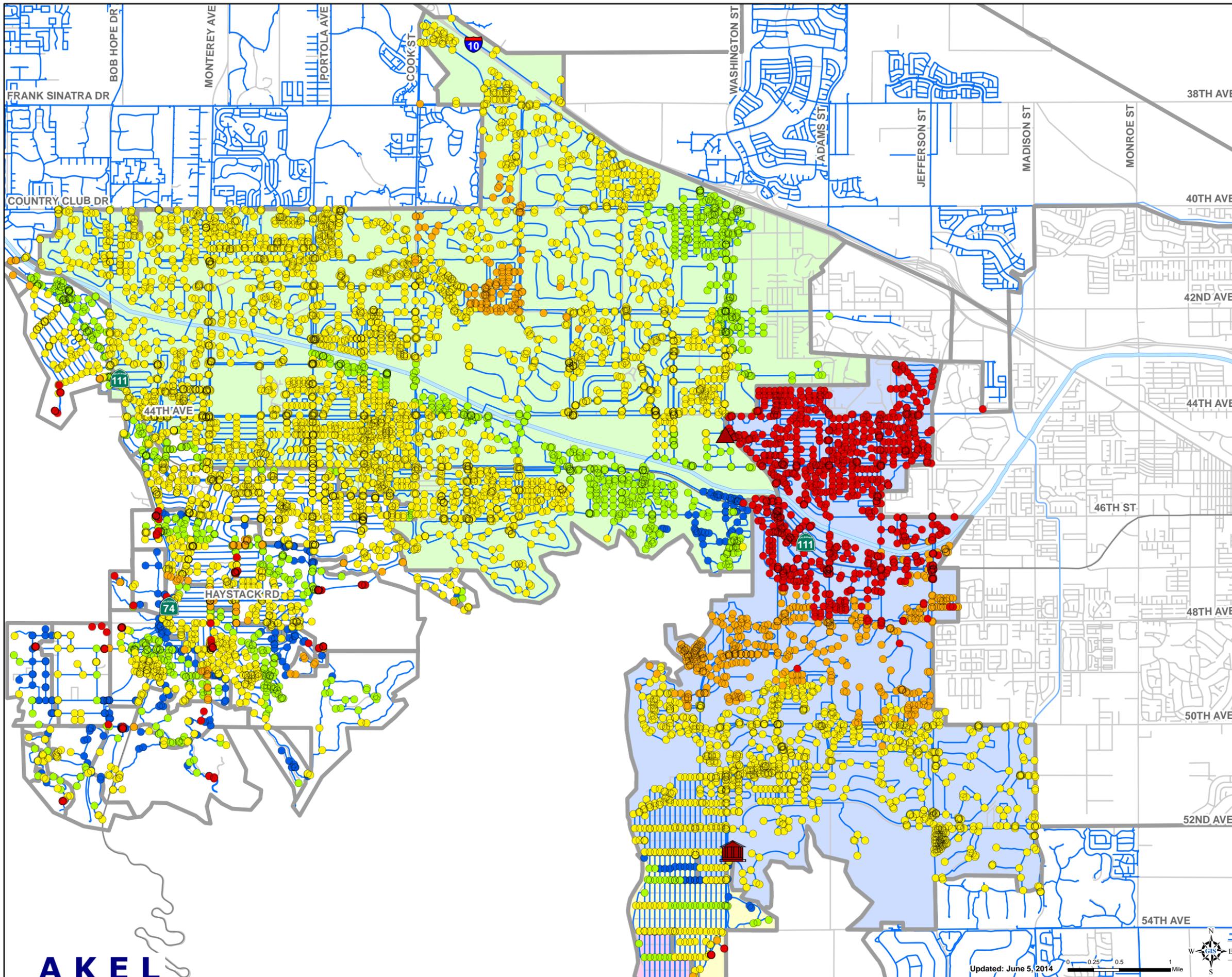
Legend

- New Supply Location
- Pipe Improvements
- Existing
 - CR-6 Treatment Wells
 - Pump
 - Model Pipes
- Pressure Zones
 - Sun City
 - Valley
 - Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Maximum Day Demands

**Figure 8B-4
Transmission Main
Improvements**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



Legend

- New Supply Location
- New Pump Station

Scenario 9 Junctions By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

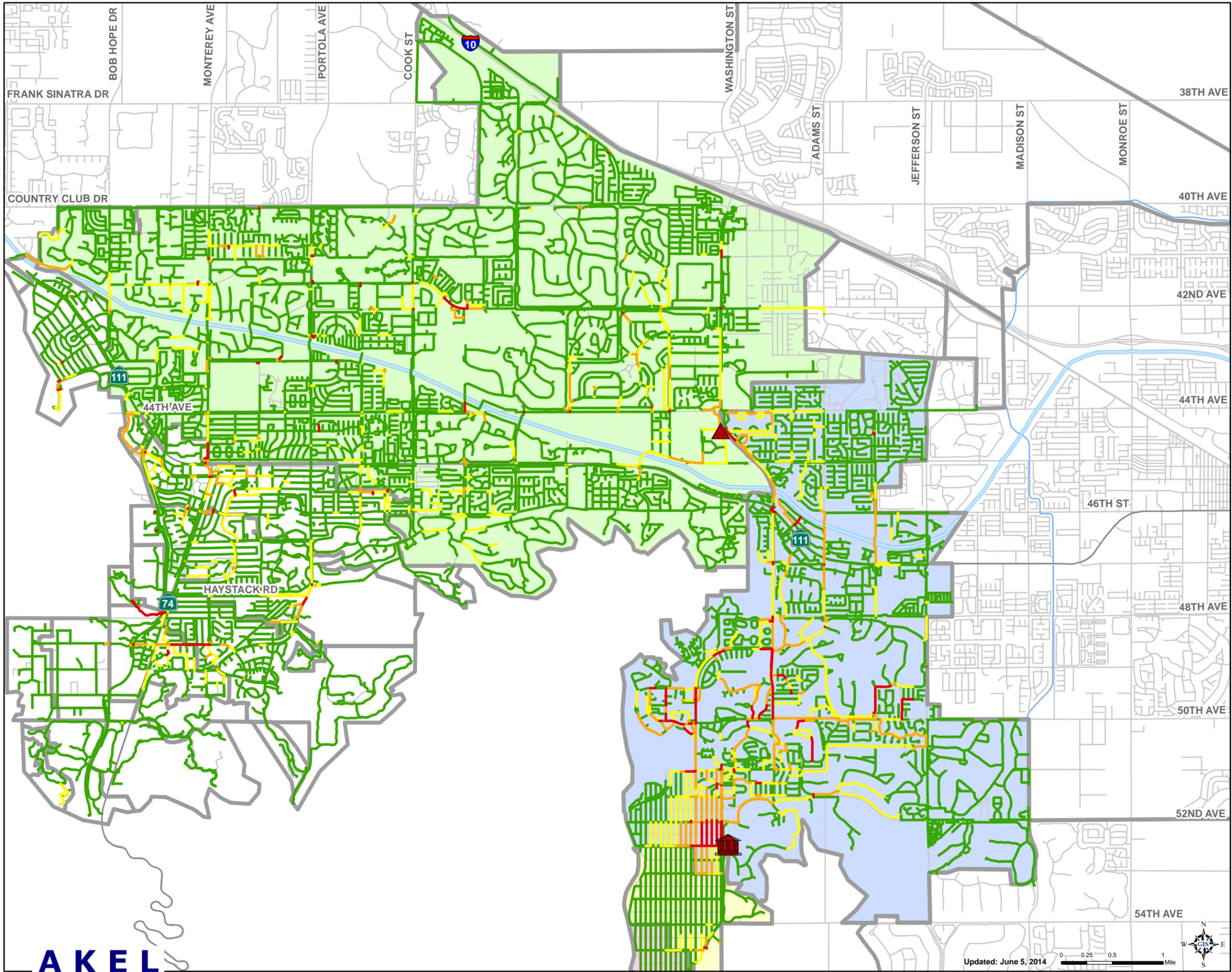
- Modeled Pipes
- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Valley
- Other

- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

**Figure 9-1
Scenario 9
Minimum Pressure (psi)**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

-  New Supply Location
-  New Pump Station

**Scenario 9 Pipes
By Maximum Headloss (ft/kft)**

-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10

Pressure Zones

-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Valley
-  Other

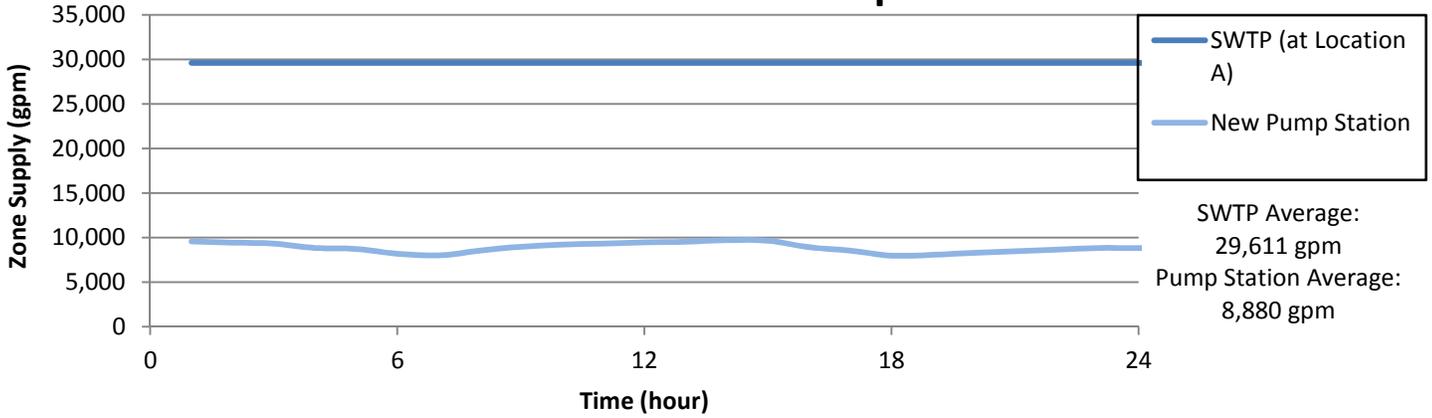
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

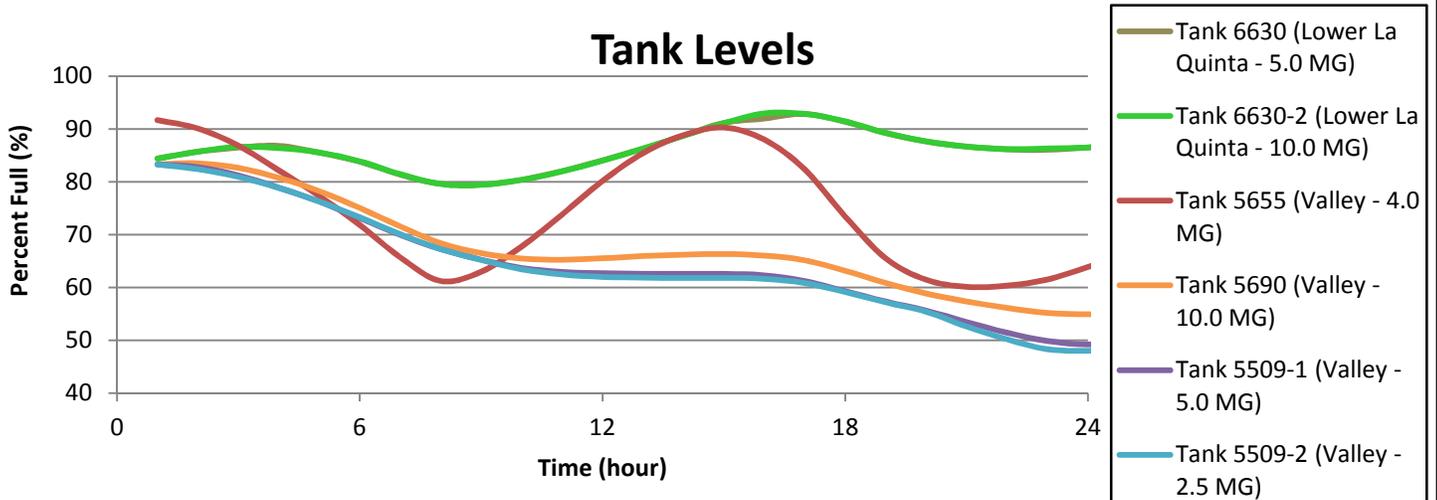
**Figure 9-2
Scenario 9
Maximum Headloss (ft/kft)**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



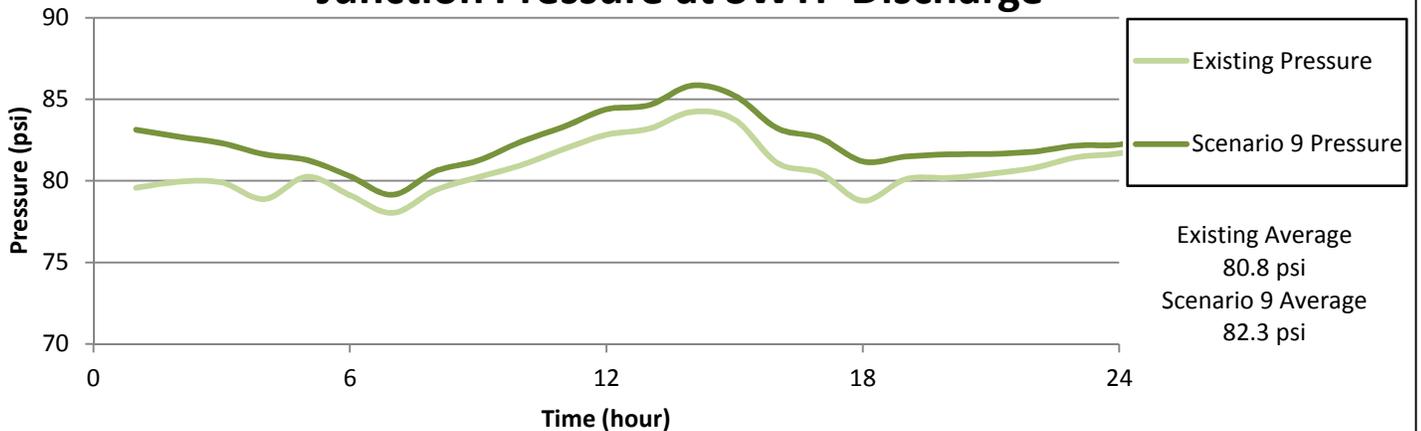
New SWTP Production and Pump Station Flow



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point A

SWTP Production = **29,611 gpm**

Wells in the La Qunita Zone with CR-6 > 8 ppb are inactive and wells in the Valley Zone are assumed to be locally treated

Zone interconnections to Lake Cahuilla, Sky Mountain, Lower 1000 Palms, and Sun City closed

PRELIMINARY

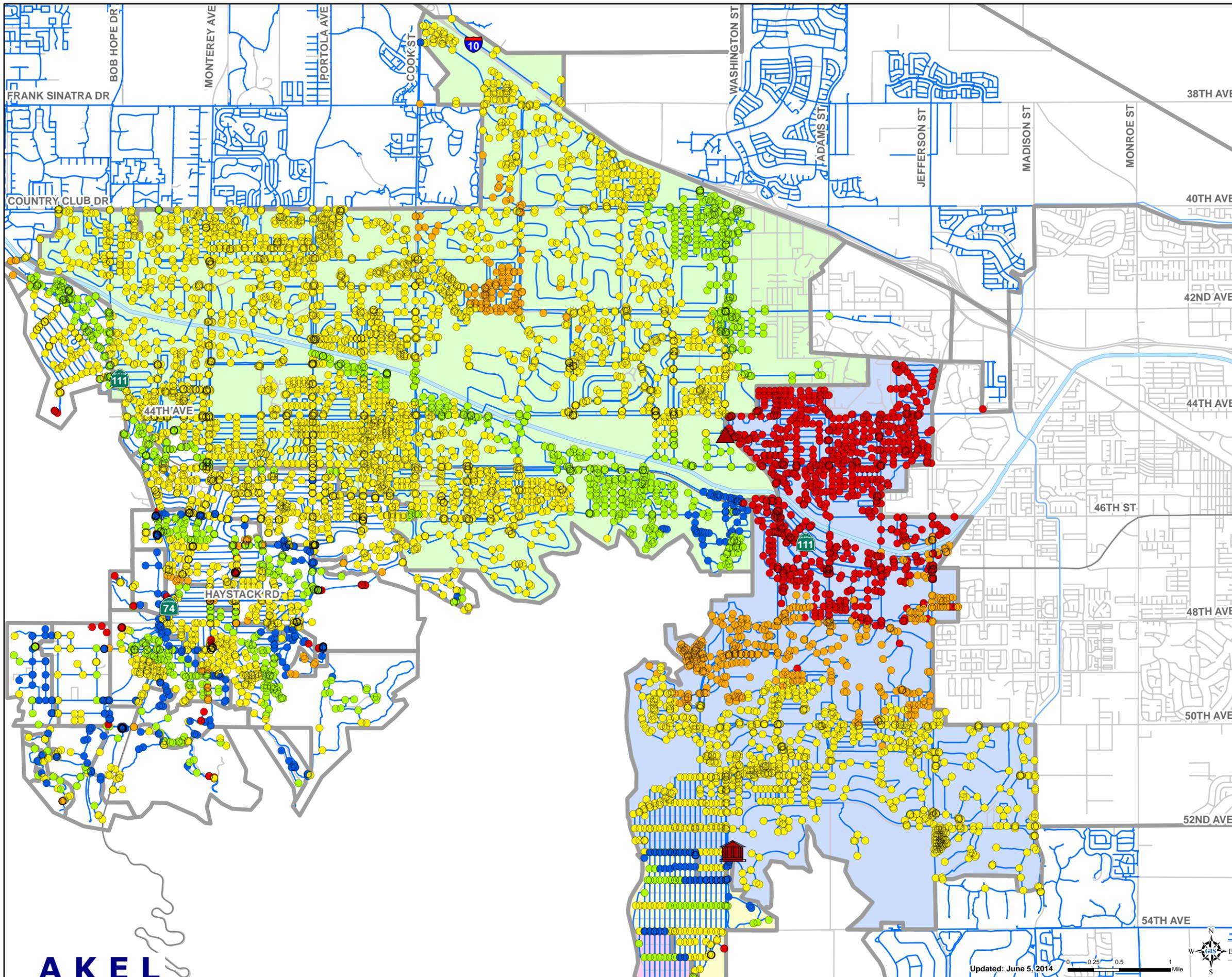
June 5, 2014

Figure 9-3

Scenario 9 - La Quinta/Valley New Supply at Point A

Hydraulic Analysis for Supply Treatment
Alternatives
Coachella Valley Water District





Legend

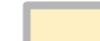
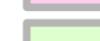
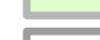
-  New Supply Location
-  New Pump Station

Scenario 9A Junctions By Minimum Pressure (psi)

-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100

Modeled Pipes

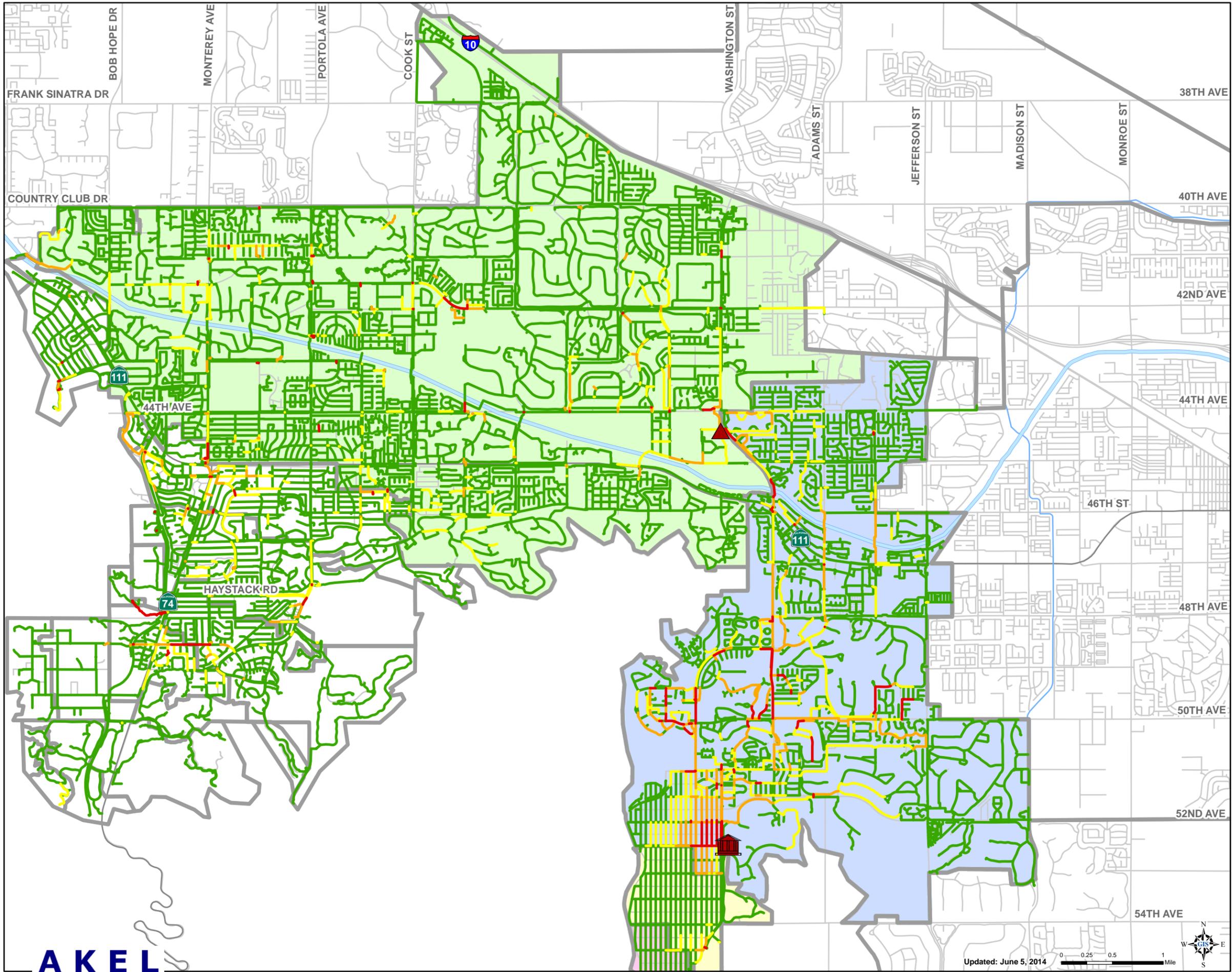
Pressure Zones

-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 9-4
Scenario 9A
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

-  New Supply Location
-  New Pump Station

**Scenario 9A Pipes
By Maximum Headloss (ft/kft)**

-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10

Pressure Zones

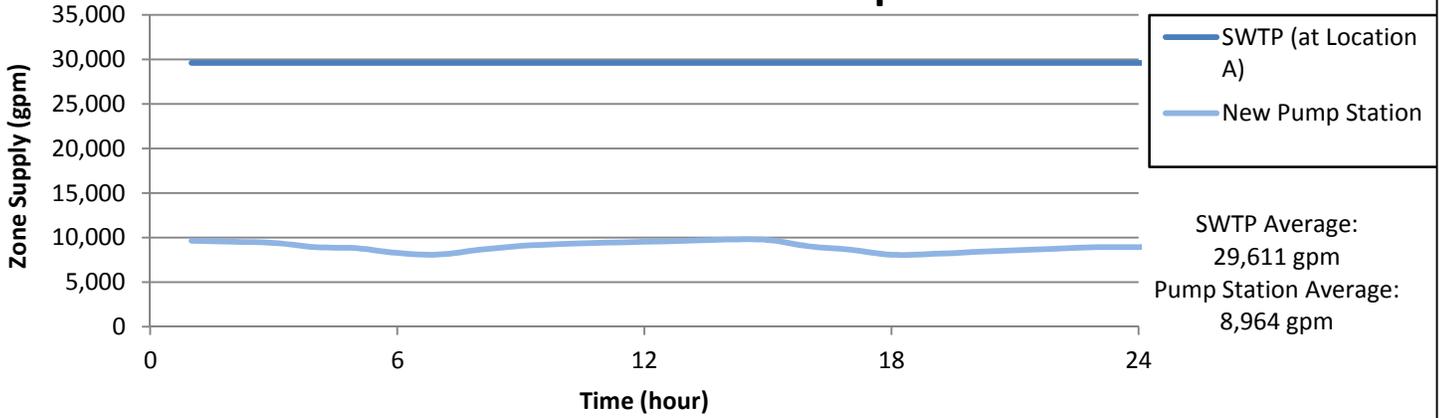
-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

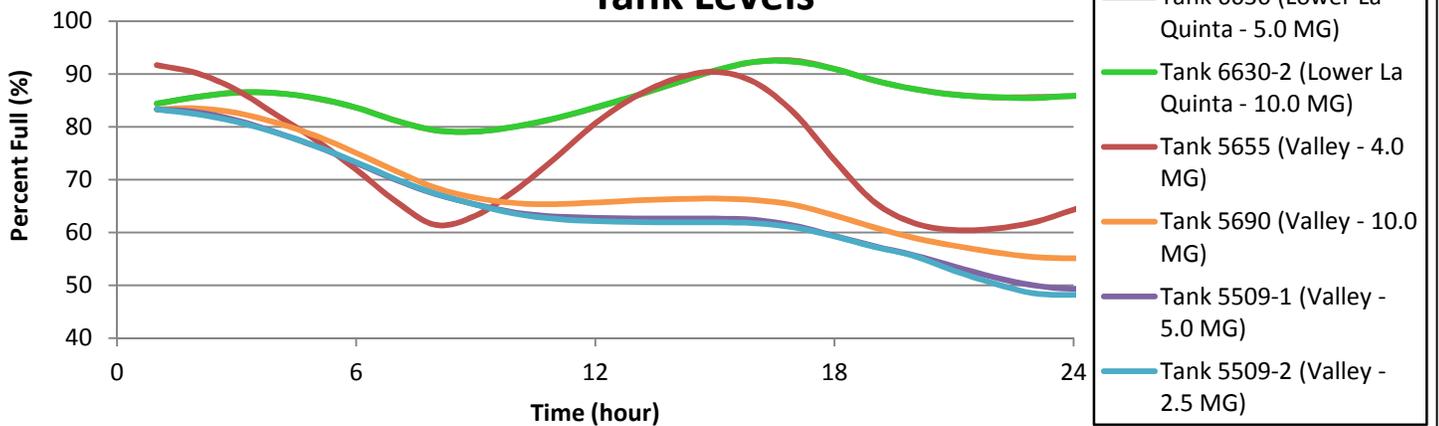
**Figure 9-5
Scenario 9A
Maximum Headloss (ft/kft)**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



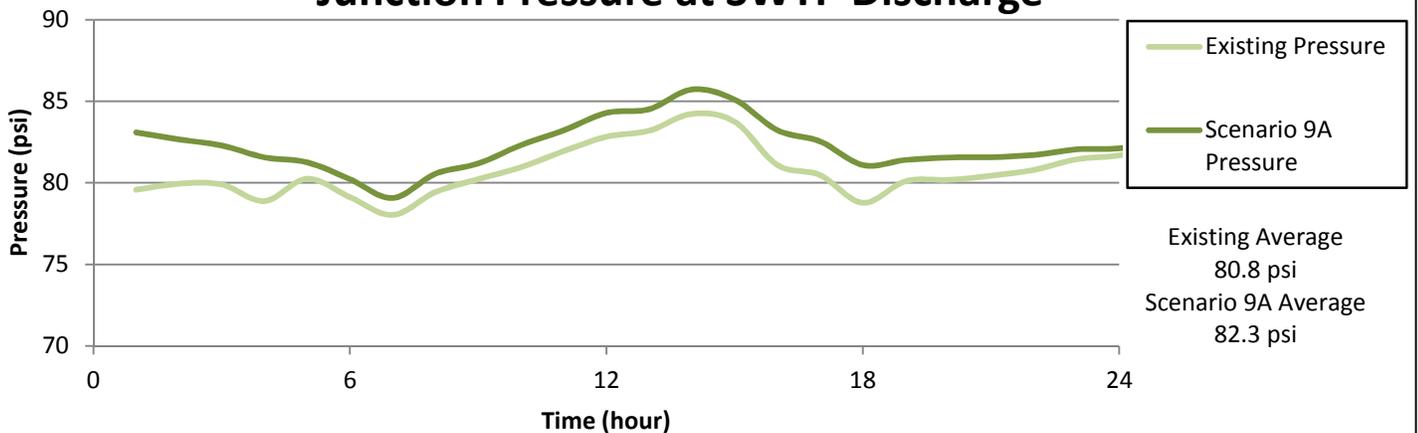
New SWTP Production and Pump Station Flow



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTP at point A

SWTP Production = **29,611 gpm**

Wells in the La Qunita Zone with CR-6 > 8 ppb are inactive and wells in the Valley Zone are assumed to be locally treated

Zone interconnections to Lake Cahuilla, Sky Mountain, Lower 1000 Palms, and Sun City closed

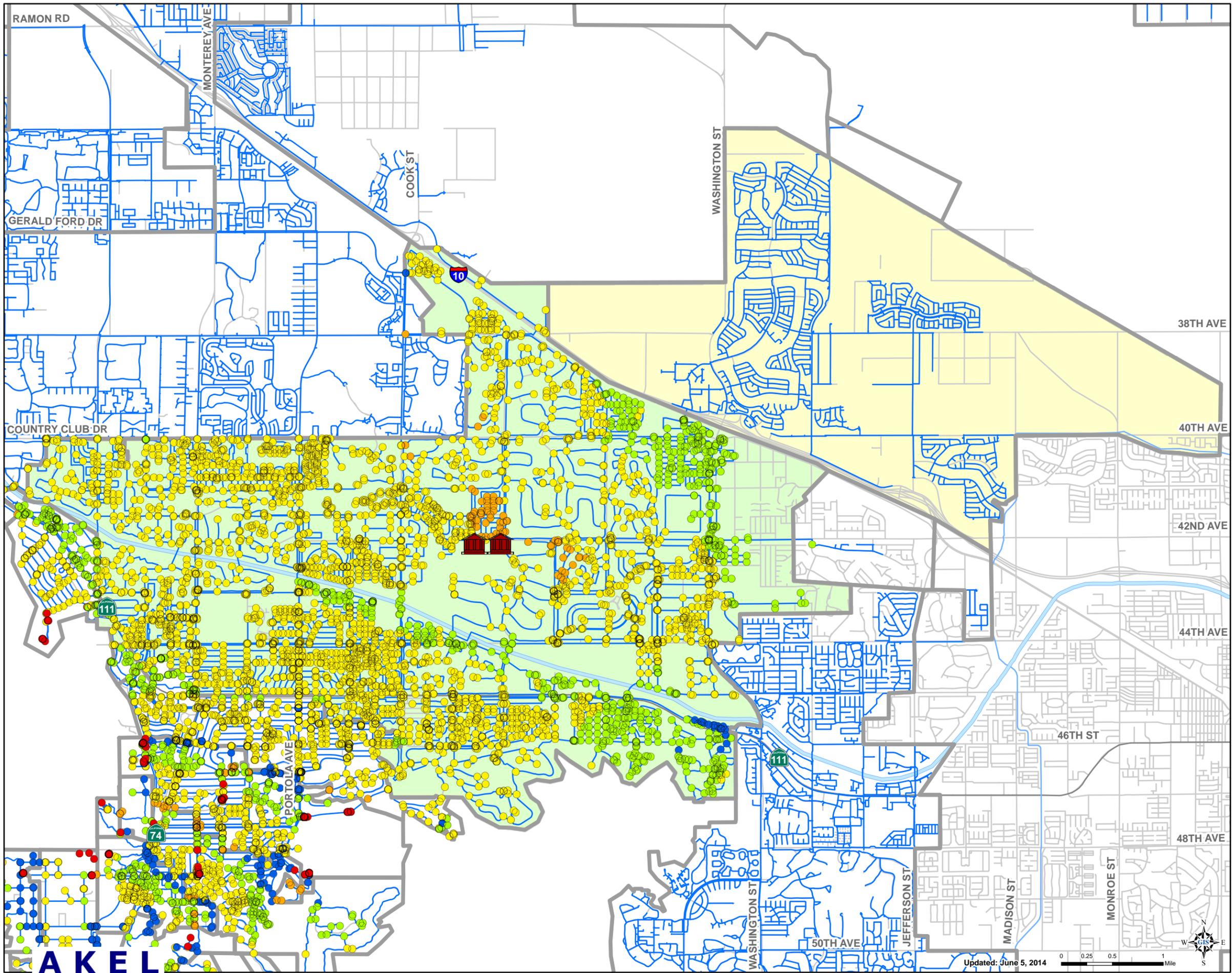
PRELIMINARY

Figure 9-6

Scenario 9A - La Quinta/Valley New Supply at Point A

Hydraulic Analysis for Supply Treatment
Alternatives
Coachella Valley Water District





Legend

New Supply Locations

Scenario 10 Junctions

By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

Modeled Pipes

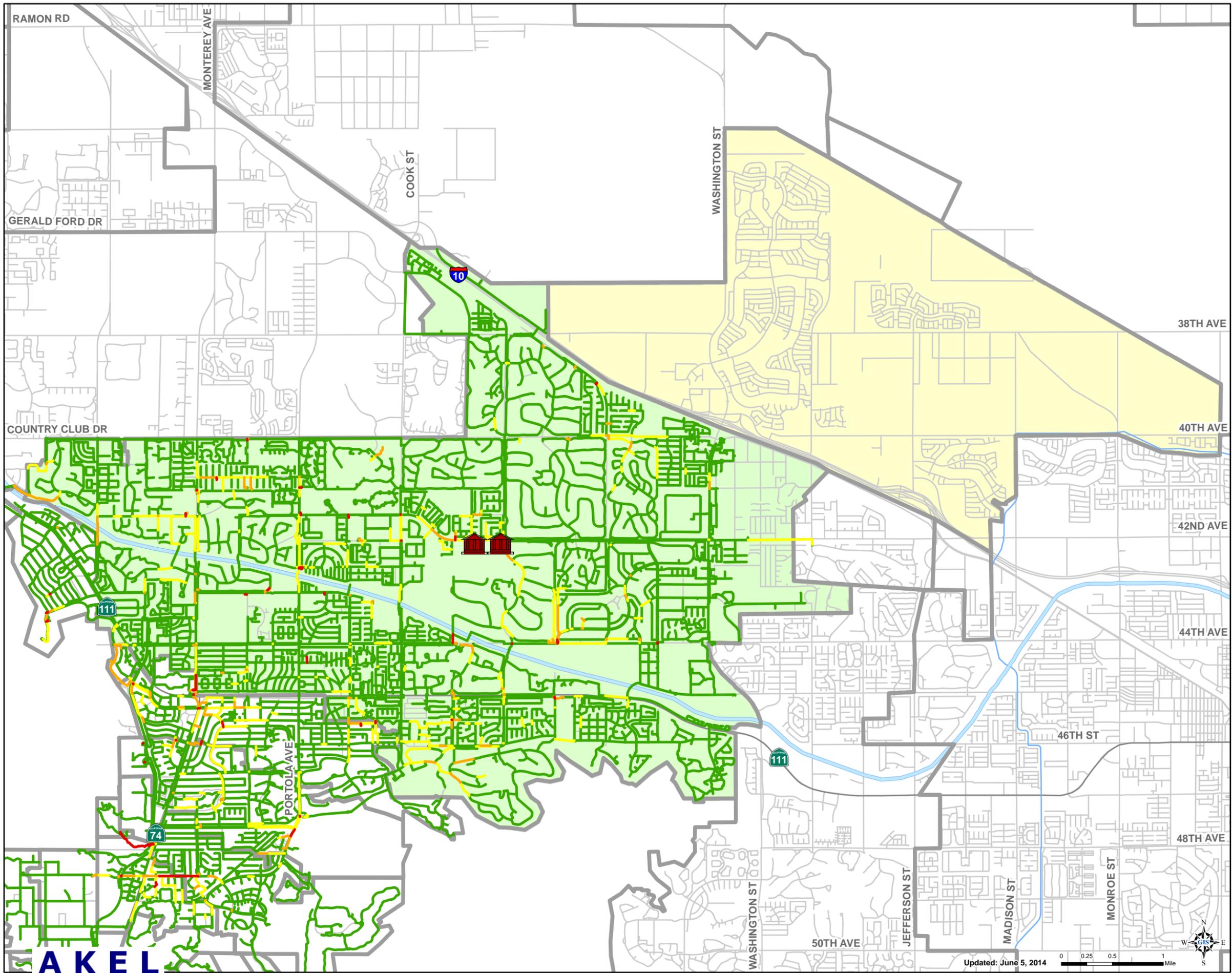
Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Figure 10-1
Scenario 10
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Locations

Scenario 10 Pipes

By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

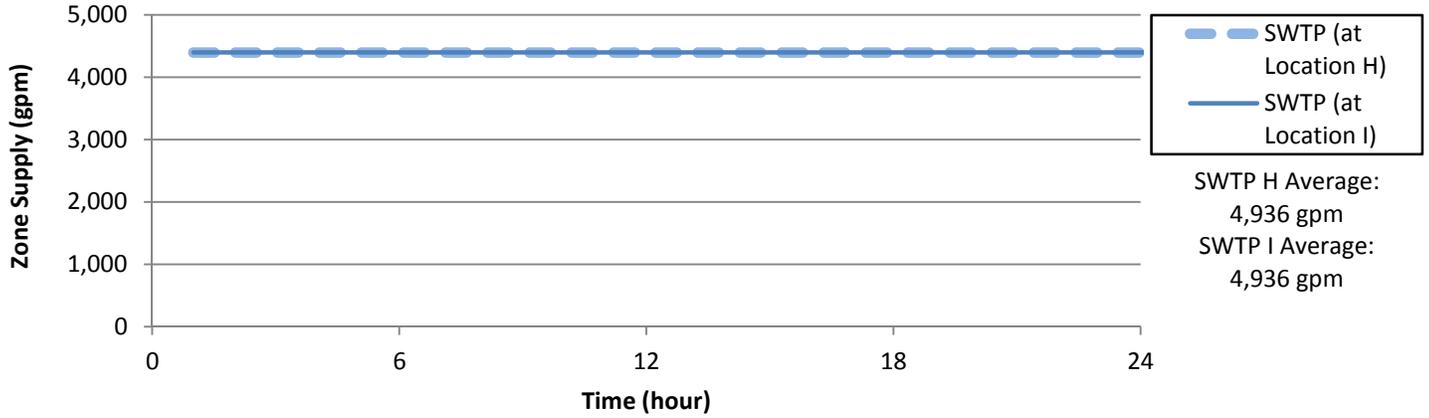
PRELIMINARY

**Figure 10-2
Scenario 10
Maximum Headloss (ft/kft)**

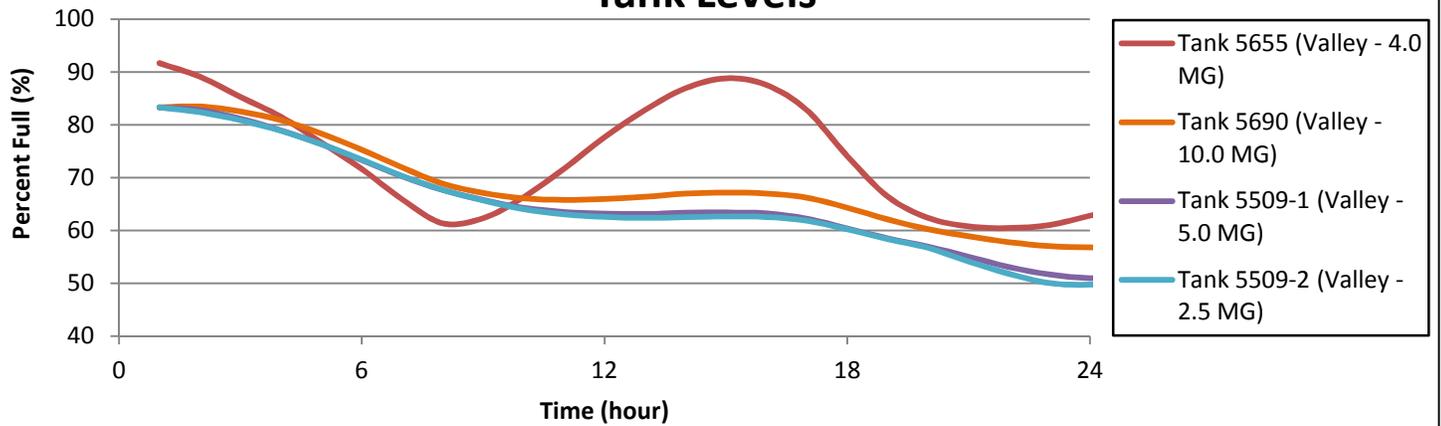
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



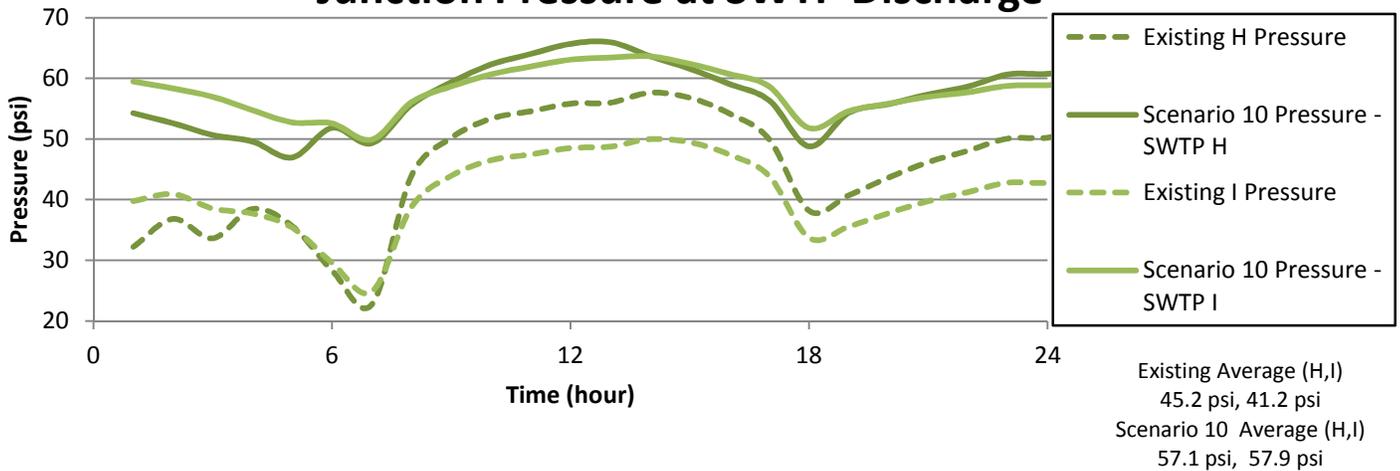
New SWTP Production



Tank Levels



Junction Pressure at SWTP Discharge



Scenario Assumptions

Supply deficit provided by new SWTPs at points H and I

SWTP H Production = **4,396 gpm**

SWTP I Production = **4,396 gpm**

Wells in the Valley Zone with CR-6 > 8 ppb are assumed to be locally treated

Zone interconnections to Sky Mountain, Lower 1000 Palms, Sun City, and La Qunita closed

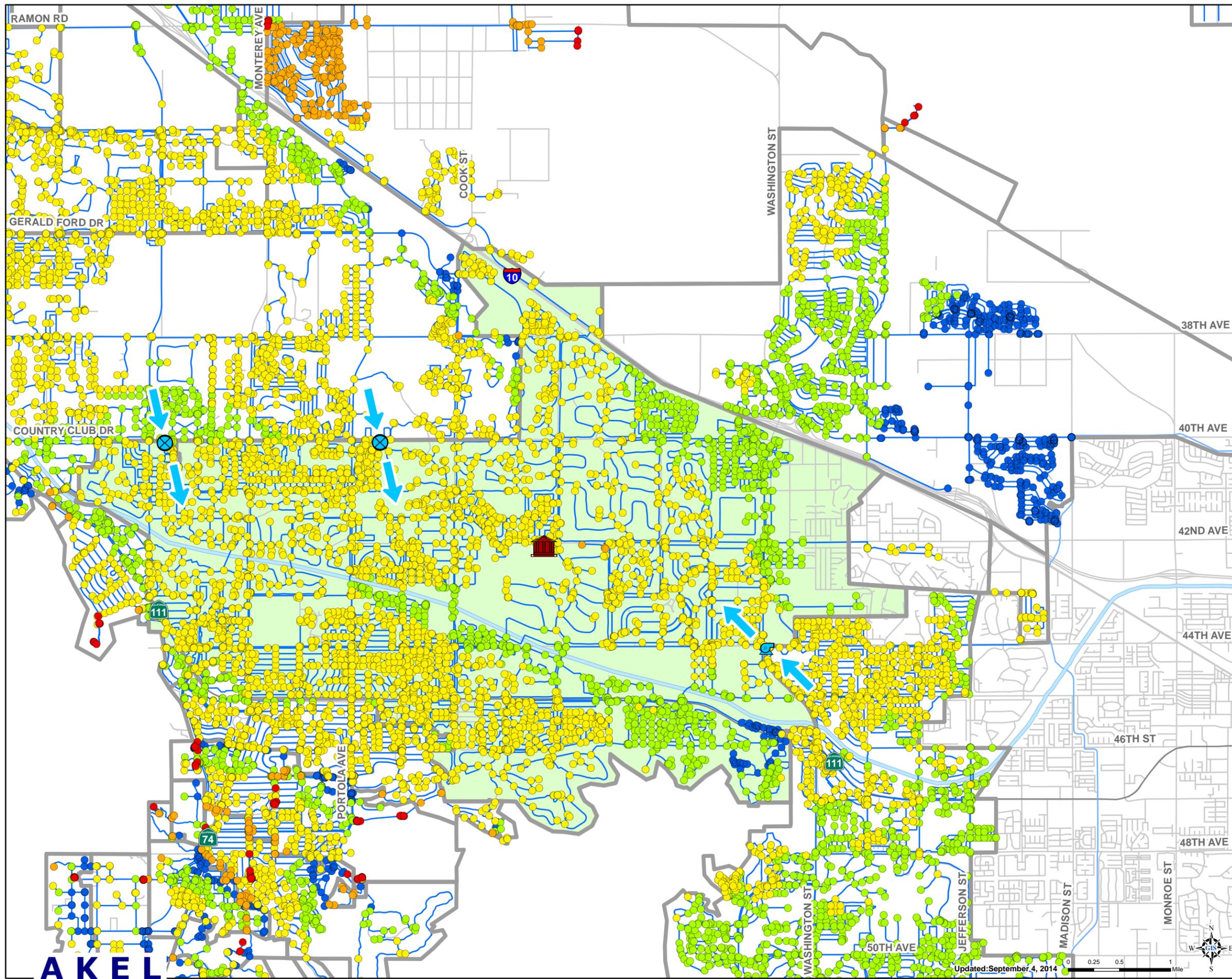
PRELIMINARY

Figure 10-3

Scenario 10 - Valley New Supply at Points H & I

Hydraulic Analysis for Supply Treatment
Alternatives
Coachella Valley Water District





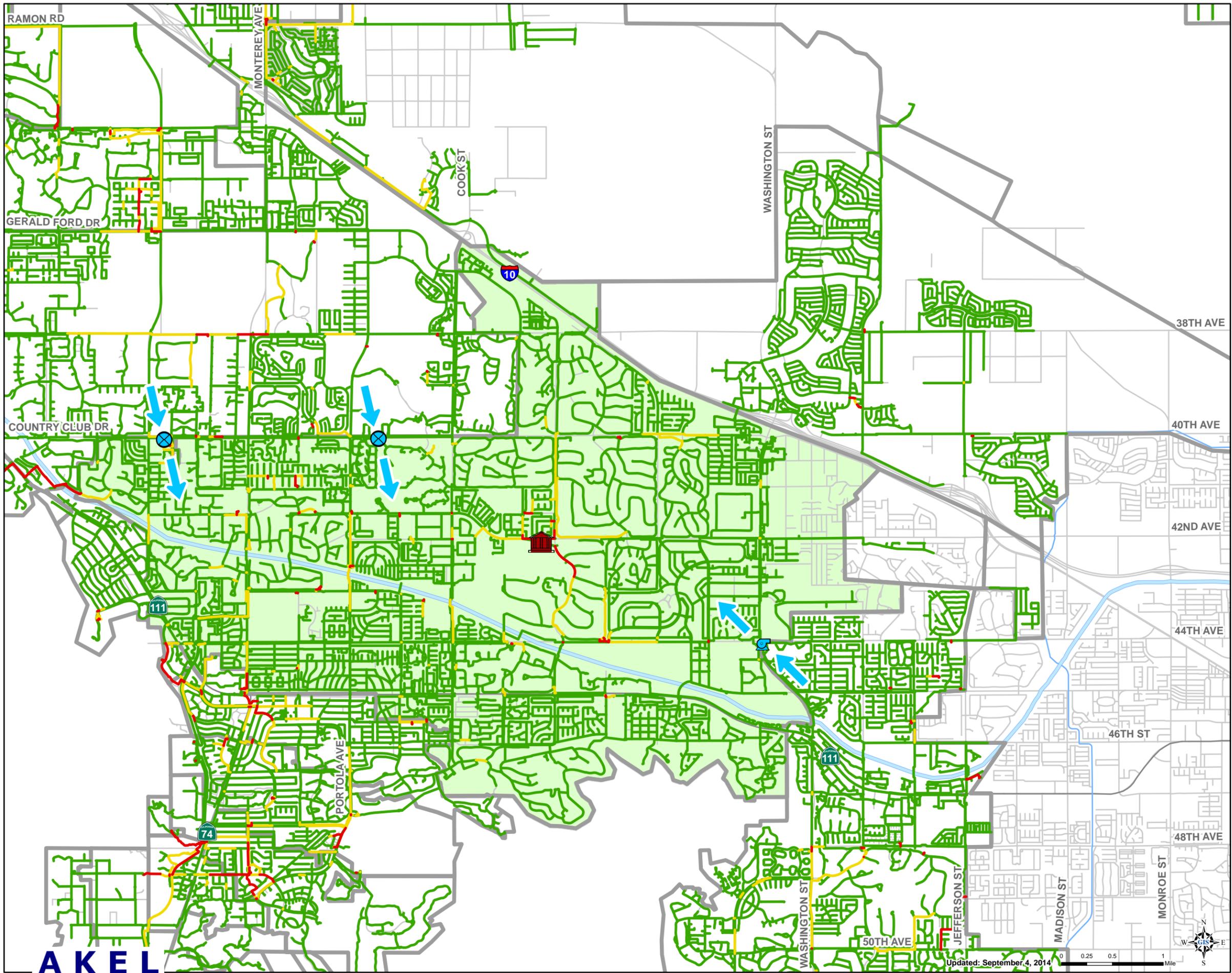
Legend

-  New Supply Location
- Scenario 11 Junctions**
- By Minimum Pressure (psi)**
-  < 0 - 20
-  20.01 - 40
-  40.01 - 80
-  80.01 - 100
-  > 100
- Existing**
-  Pump
-  PRVs
-  Modeled Pipes
- Pressure Zones**
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 11-1
Scenario 11
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 11 Pipes

By Maximum Velocity (ft/s)

0 - 3

3.01 - 5

> 5

Existing

Pump

PRVs

Pressure Zones

Valley

Other

Street Centerlines

Highways

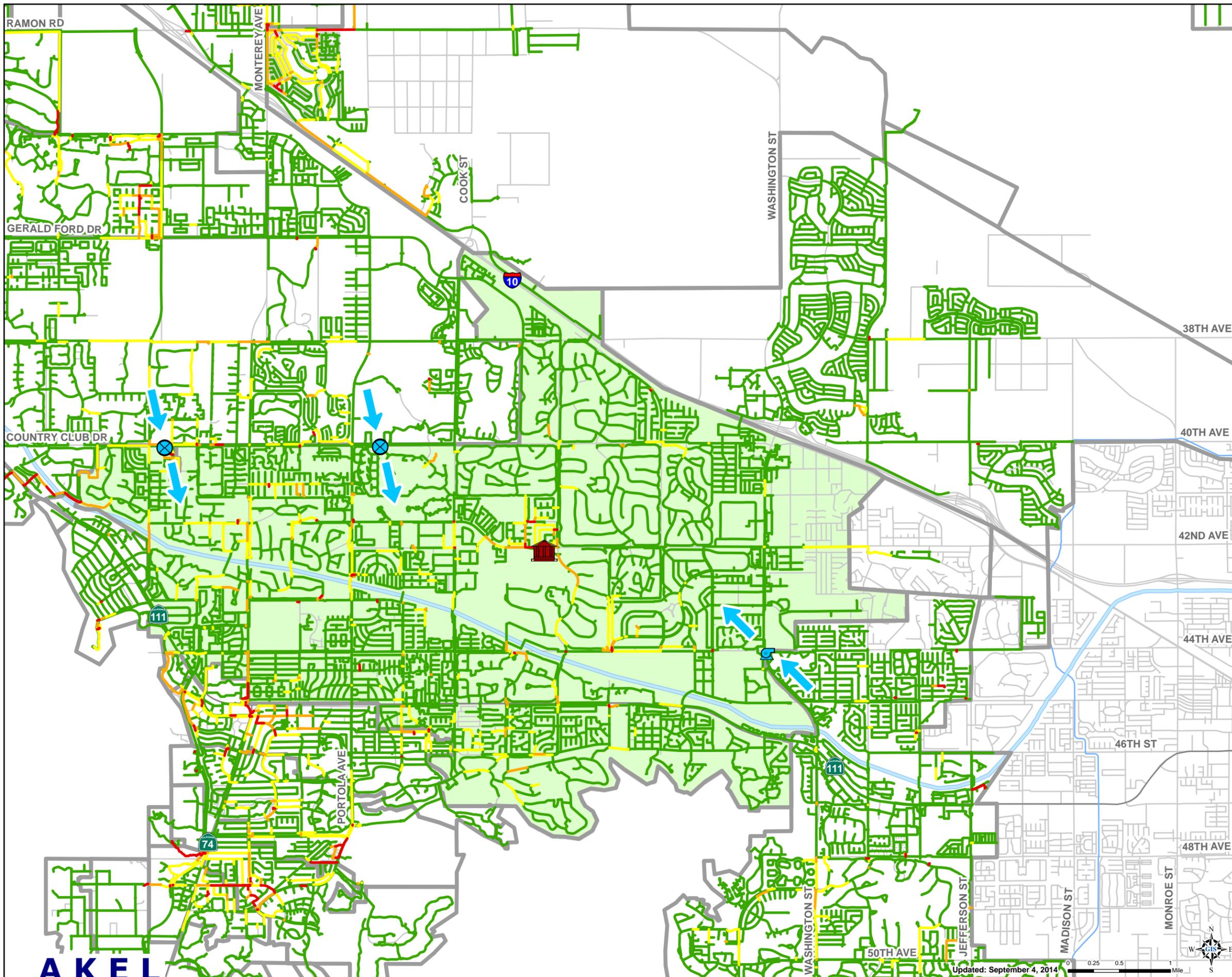
Canals/Creeks/Rivers

White Water River

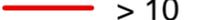
PRELIMINARY

Figure 11-2
Scenario 11
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





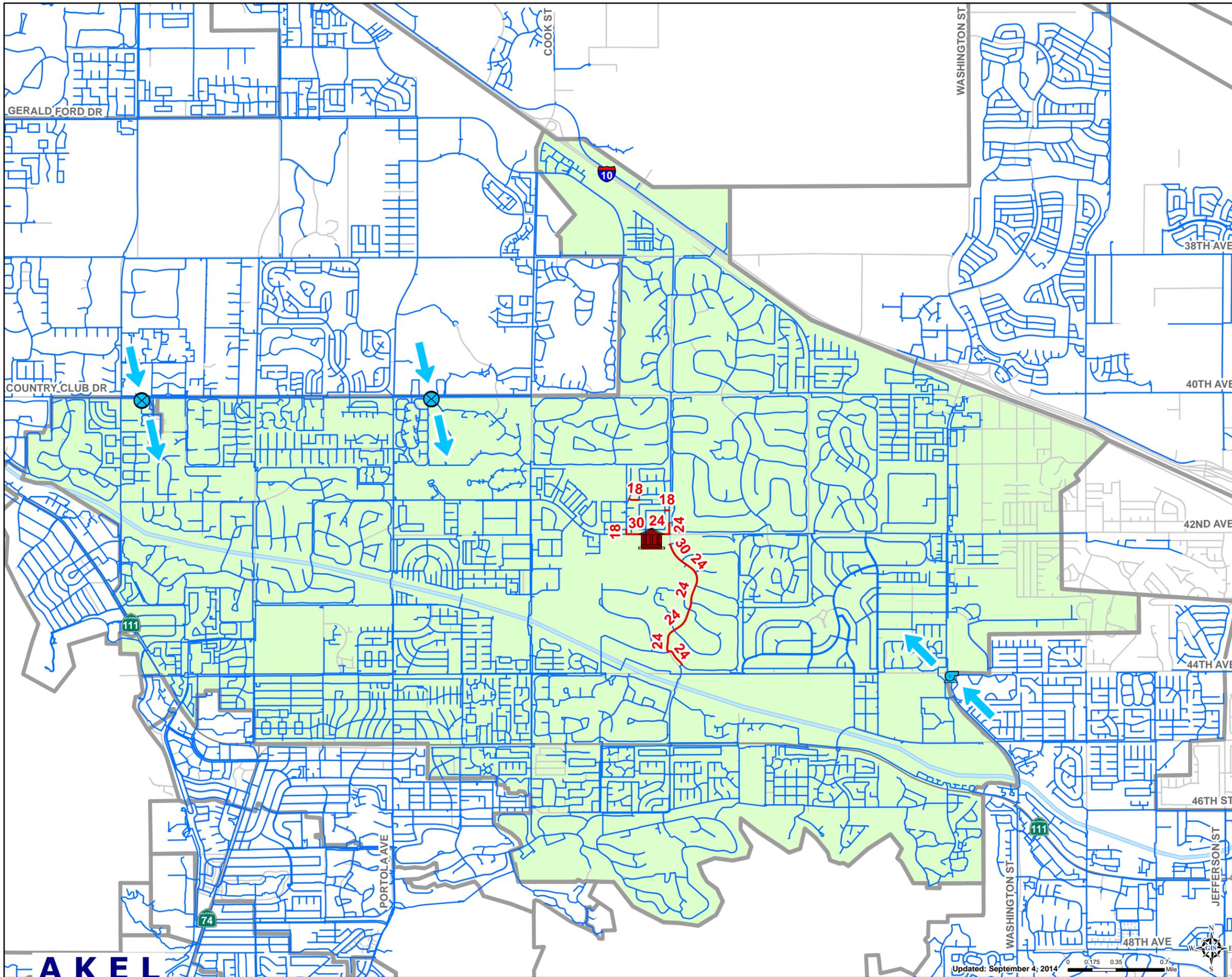
Legend

-  New Supply Location
- Scenario 11 Pipes
- By Maximum Headloss (ft/kft)
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Existing
-  Pump
-  PRVs
- Pressure Zones
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Figure 11-3
Scenario 11
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

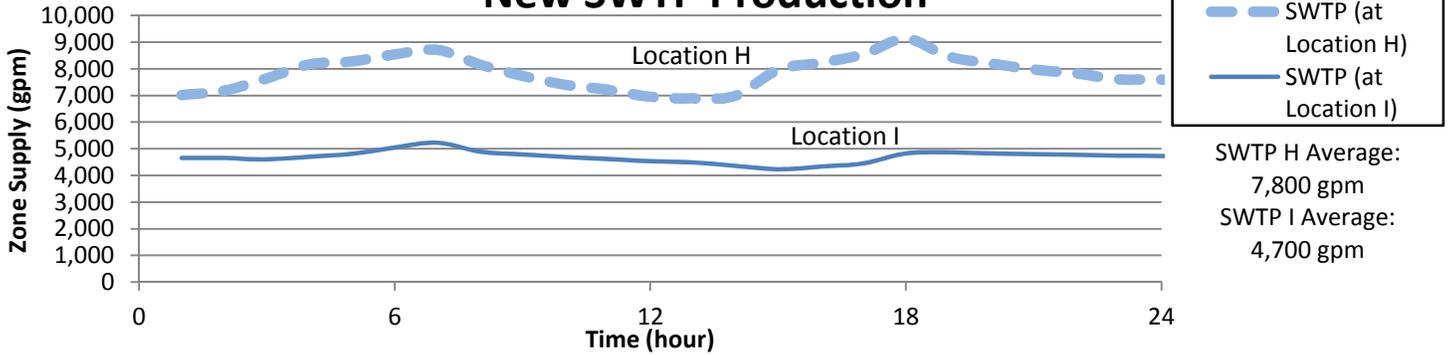
-  New Supply Location
-  Pipe Improvements
- Existing
 -  Pump
 -  PRVs
 -  Modeled Pipes
- Pressure Zones
 -  Valley
 -  Other
 -  Street Centerlines
 -  Highways
 -  Canals/Creeks/Rivers
 -  White Water River

PRELIMINARY

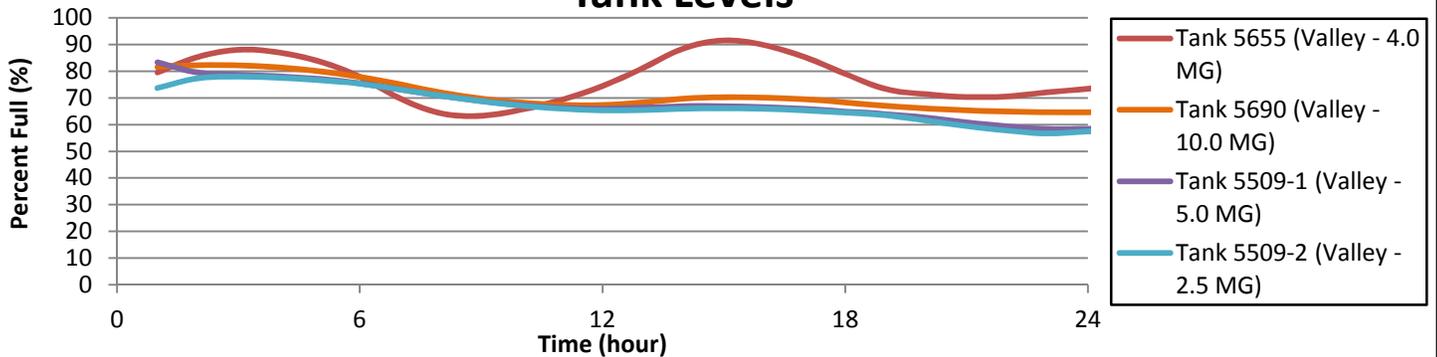
**Figure 11-4
Transmission Main
Improvements**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



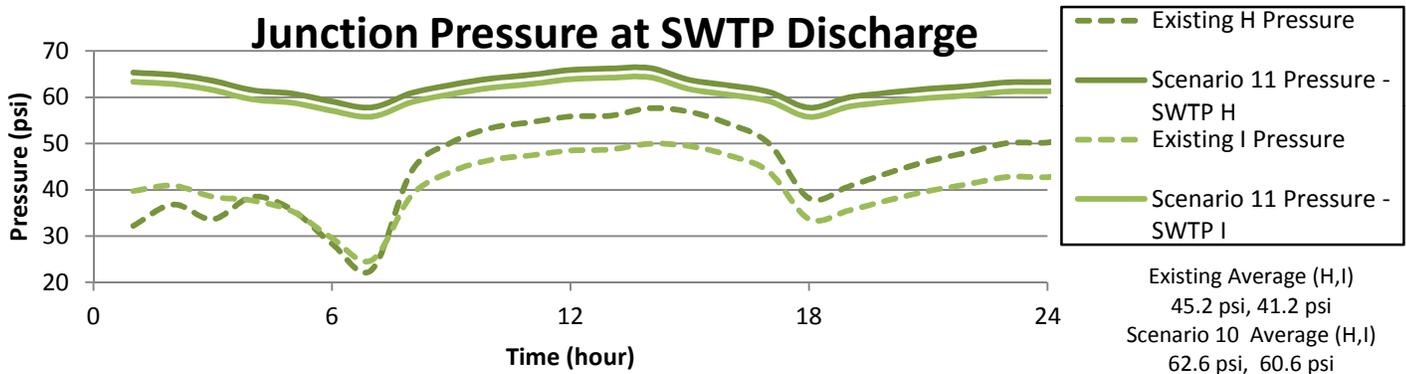
New SWTP Production



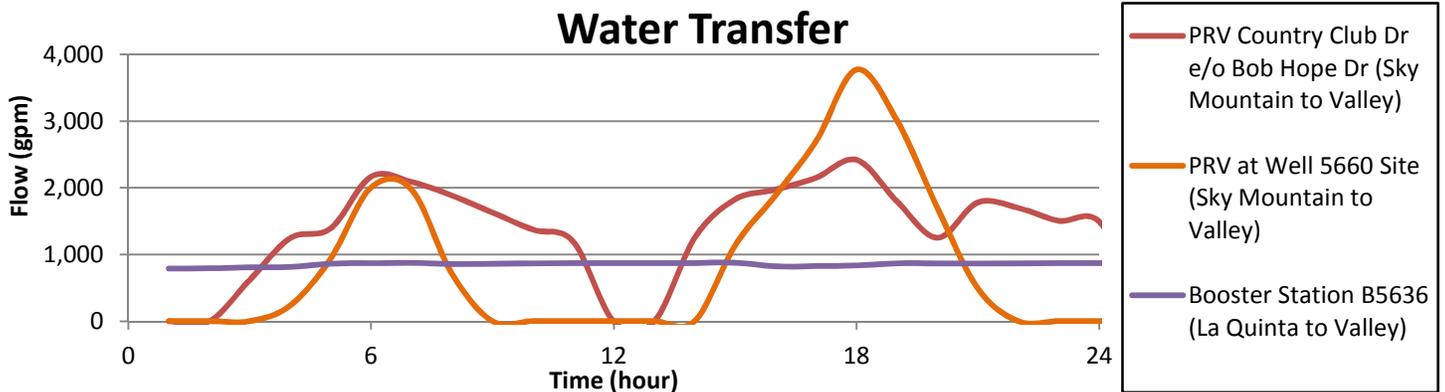
Tank Levels



Junction Pressure at SWTP Discharge



Water Transfer



Scenario Assumptions

PRELIMINARY

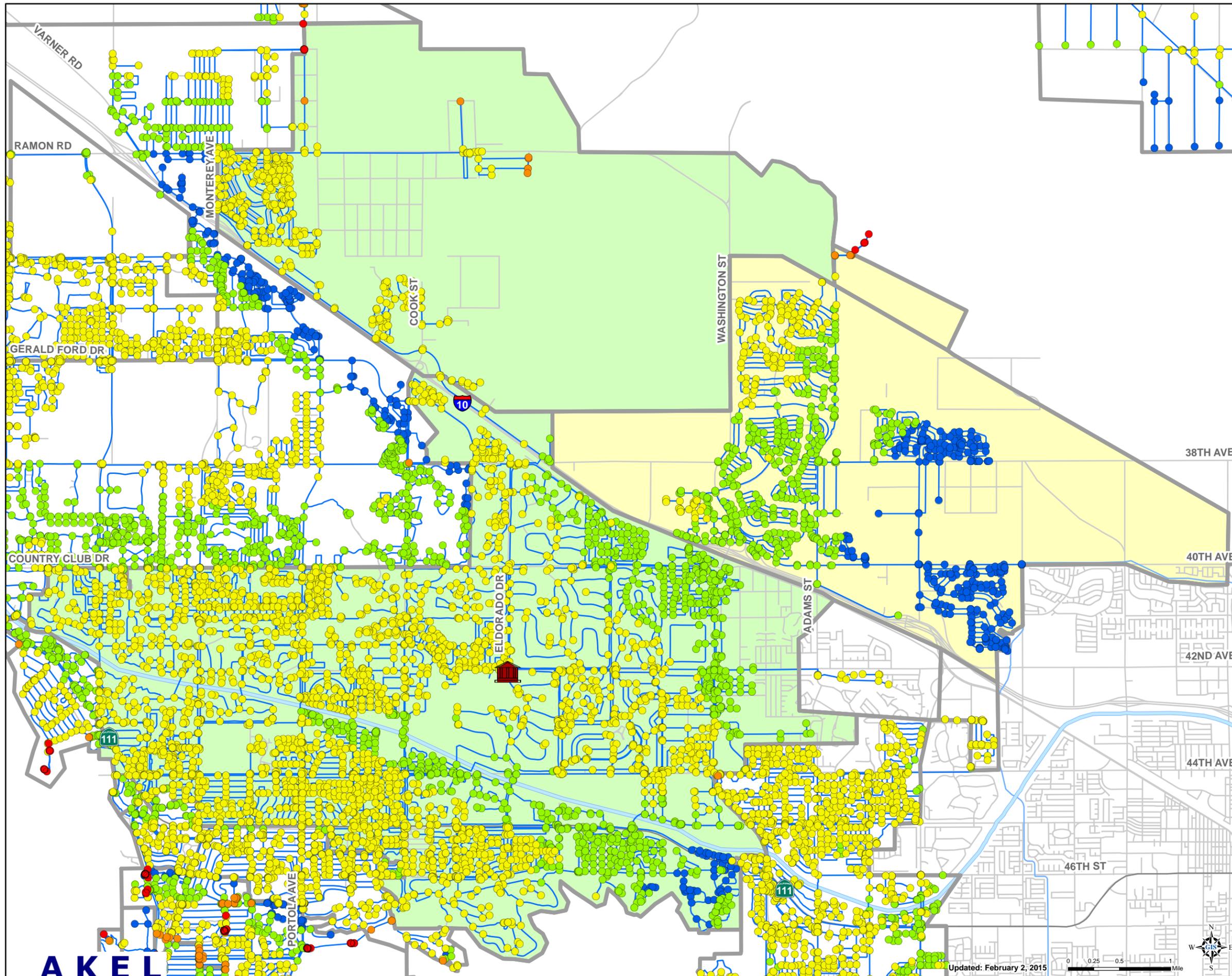
- Supply deficit provided by new SWTPs at points H and I (14,000 gpm max)
- SWTP H Production = **7,800 gpm** (average)
- SWTP I Production = **4,700 gpm** (average)
- Wells in the Valley Zone with CR-6 > 10 ppb are inactive
- Zone interconnections to Sky Mountain (PRVs) and La Quinta (pump station) are active

September 4, 2014

Figure 11-5 Scenario 11

Valley Pressure Zone Graphs
Hydraulic Analysis for Supply Treatment
Alternatives
Coachella Valley Water District





Legend

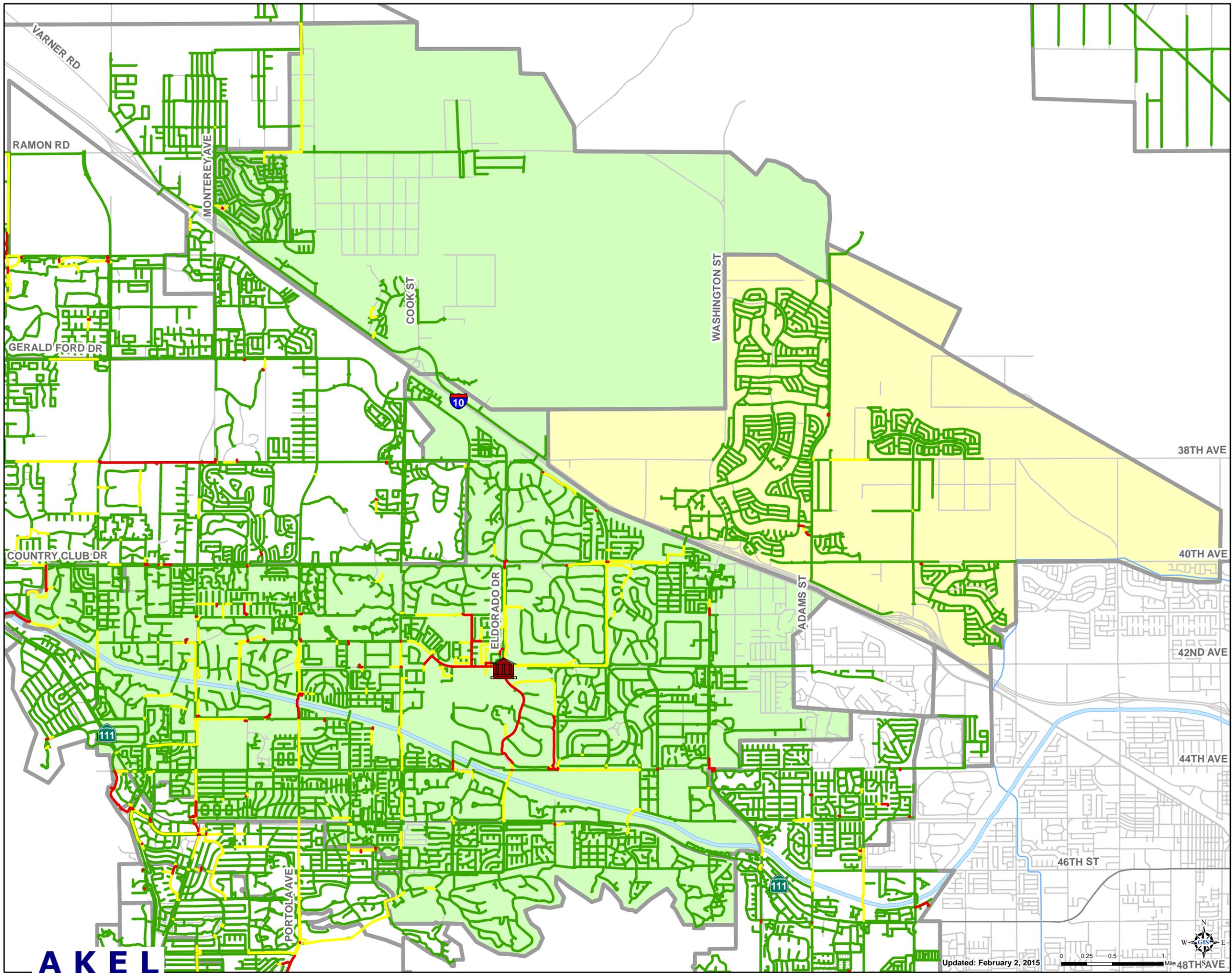
-  New Supply Location
- Scenario 11A Junctions
By Maximum Headloss (ft/kft)
- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100
- Modeled Pipes
- Pressure Zones
- Sun City
- Valley
- Other
- Street Centerlines
- Highways
- ~ Canals/Creeks/Rivers
- ~ White Water River

PRELIMINARY

Maximum Day Demands

Figure 11A-1
Scenario 11A
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

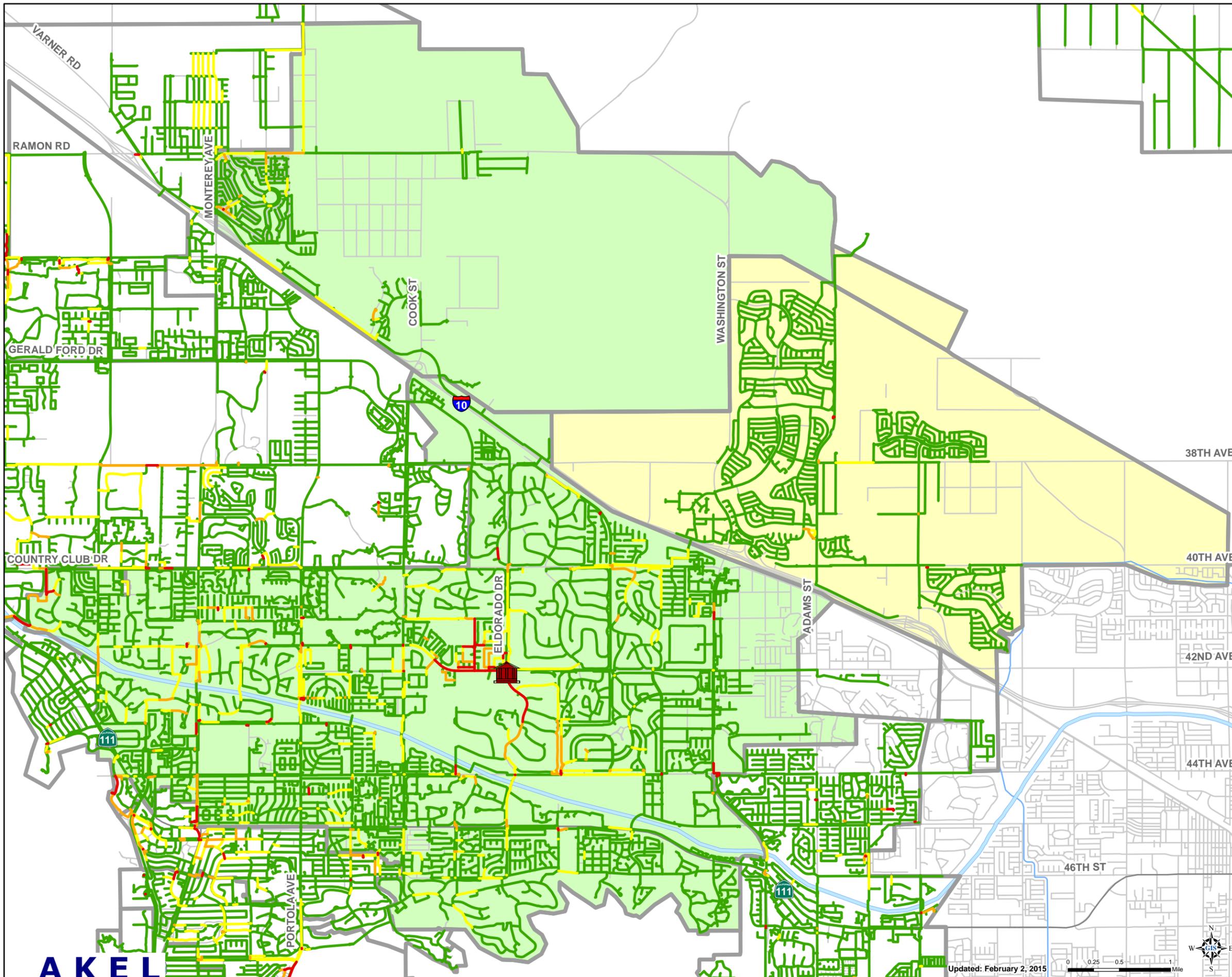
-  New Supply Location
- Scenario 11A Pipes
- By Maximum Velocity (ft/s)
-  0 - 3
-  3.01 - 5
-  > 5
- Pressure Zones
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 11A-2
Scenario 11A
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

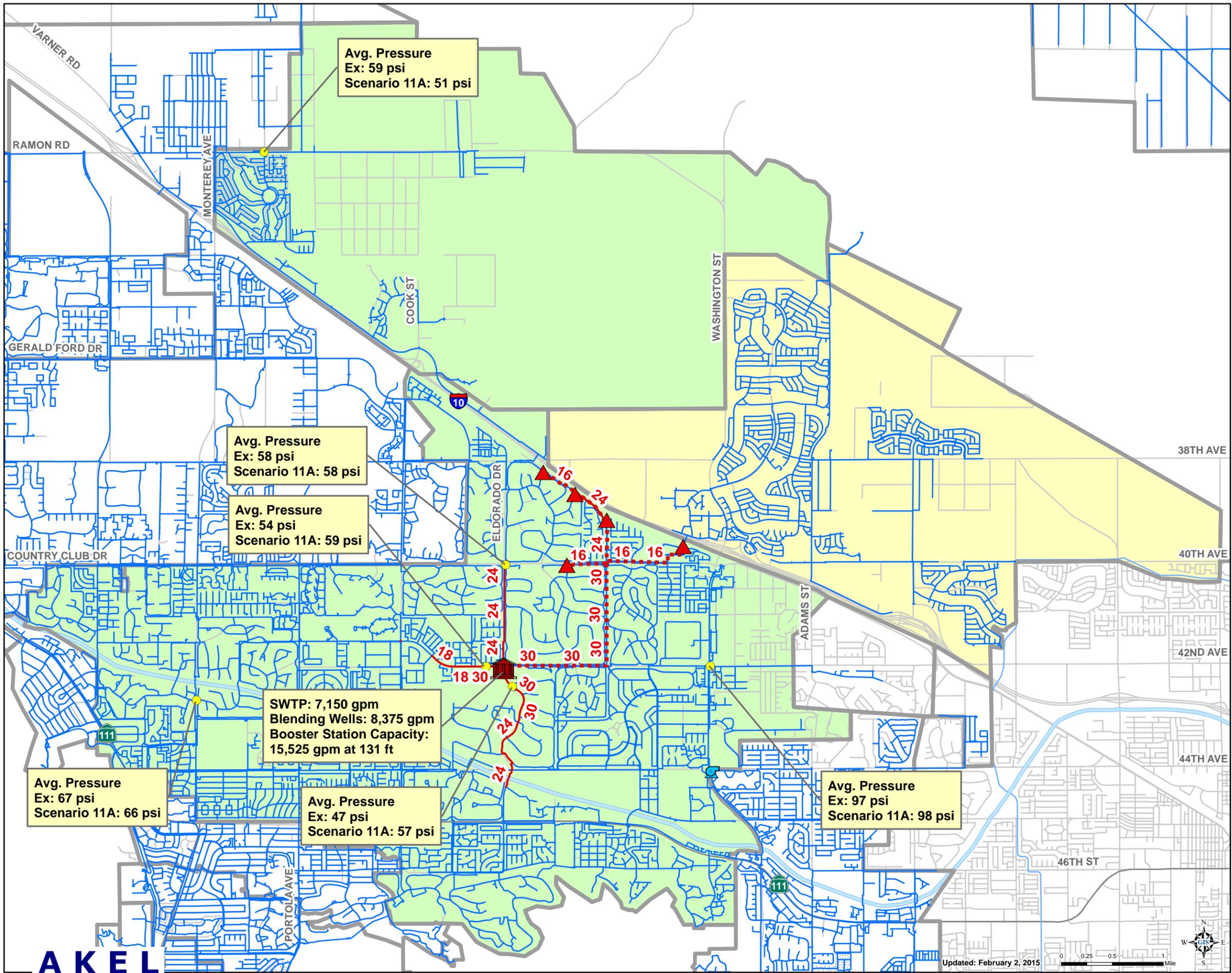
-  New Supply Location
- Scenario 11A Pipes
- By Maximum Headloss (ft/kft)
-  0 - 2.31
-  2.32 - 5
-  5.01 - 10
-  > 10
- Pressure Zones
-  Sun City
-  Valley
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 11A-3
Scenario 11A
Maximum Headloss (ft/kft)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

- New Supply Location
- Blending Wells
- Pipe Improvements
- Blending Pipe
- Existing
 - Pump
 - Model Pipes
- Pressure Zones
 - Sun City
 - Valley
 - Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Maximum Day Demands

Figure 11A-4
Transmission Main
Improvements
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District



Table 12-1 Scenario 12 - Sky Mountain Storage Analysis
 Hydraulic Analysis for Supply Treatment Alternatives
 Coachella Water Valley District

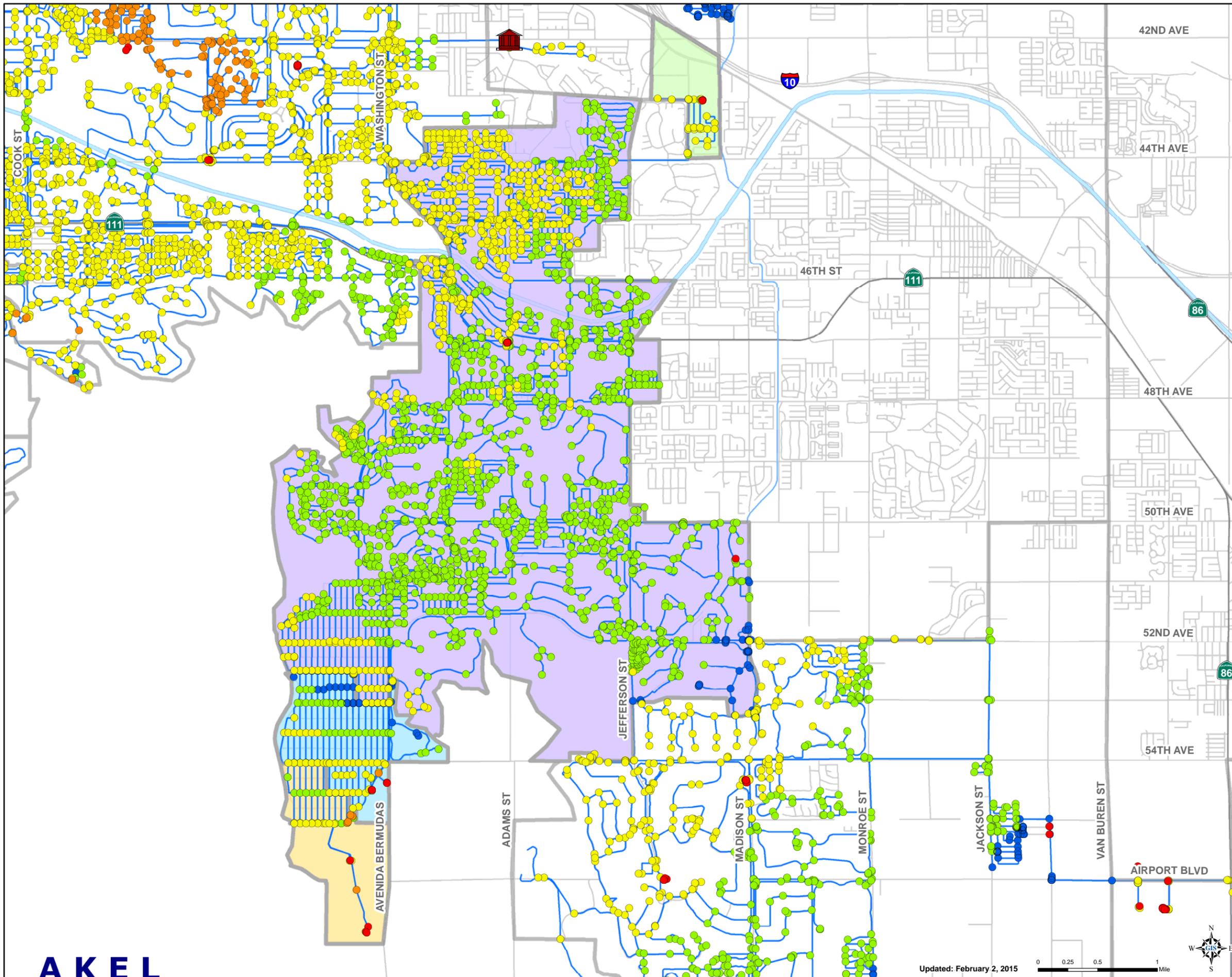
PRELIMINARY

Existing Storage Conditions	
Existing Storage Capacity	9.5 MG
Required Storage ¹	33.1 MG
Surplus Well Capacity over Peak Day Demand ²	8.1 MGD
Existing Storage Deficiency	15.4 MG
CR-6 at 10ppb Implemented - Storage Conditions	
Existing Storage Capacity	9.5 MG
Required Storage ¹	33.1 MG
Deficient Well Capacity to Peak Day Demands ³	-11.0 MGD per day
Storage Deficiency for Cr-6 @ 10ppb	34.6 MG

9/8/2014

Notes:

1. Per CVWD DDM, Required Storage = 0.5 x PDD (Diurnal) + 0.5 x PDD (Emergency) + Required Fire Flow
2. Well capacity exceeding peak day demand is assumed available for peak hour demand conditions
3. California Waterworks Standards required supply to meet Peak Day Demands



Legend

 New Supply Location
 Scenario 13 Junctions
 By Minimum Pressure (psi)

- < 0 - 20
- 20.01 - 40
- 40.01 - 80
- 80.01 - 100
- > 100

 Modeled Pipes

Pressure Zones

-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Nairobi (190)
-  Other

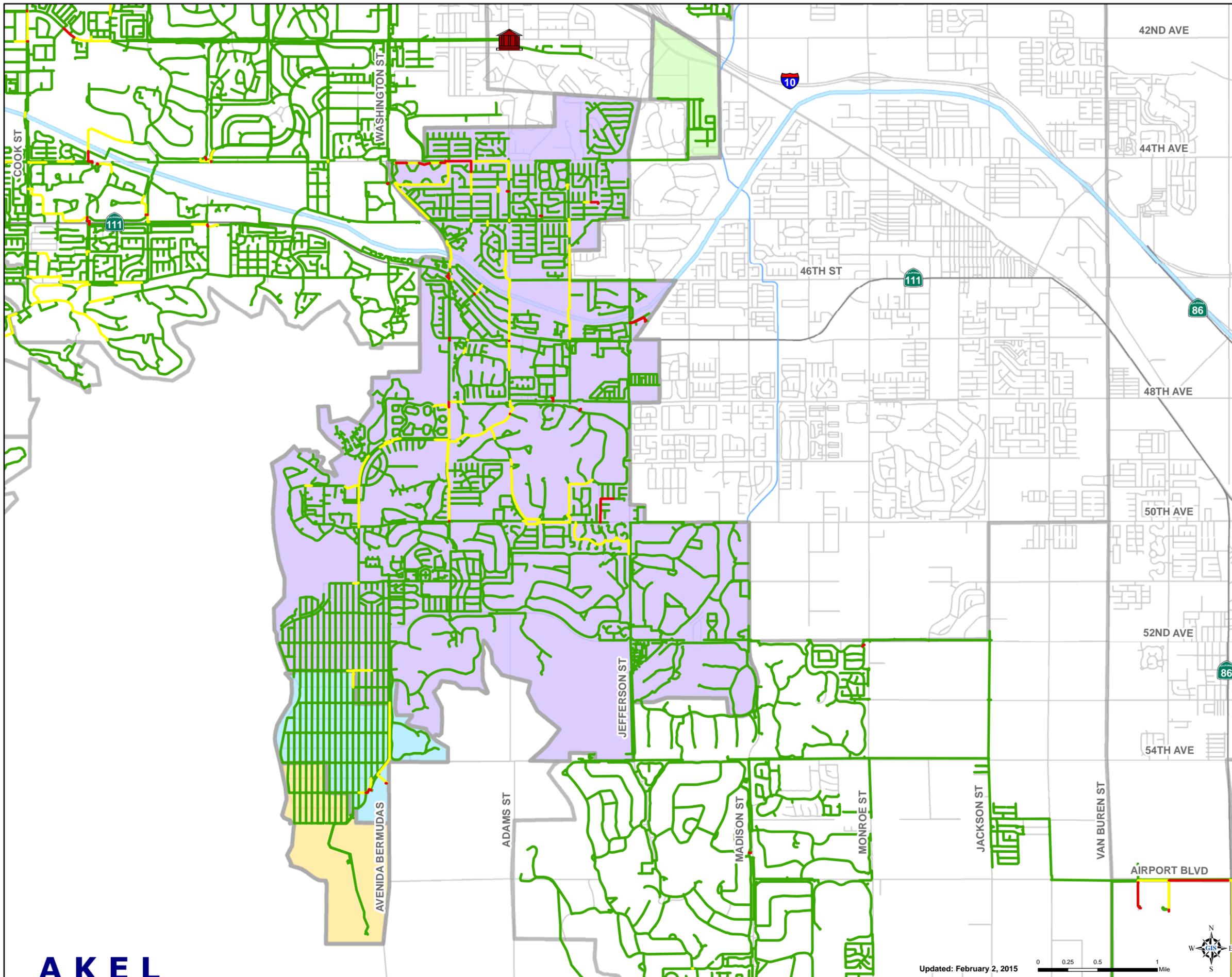
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 13-1
Scenario 13
Minimum Pressure (psi)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

-  New Supply Location
- Scenario 13 Pipes
- By Maximum Velocity (ft/s)

-  0 - 3
-  3.01 - 5
-  > 5

Pressure Zones

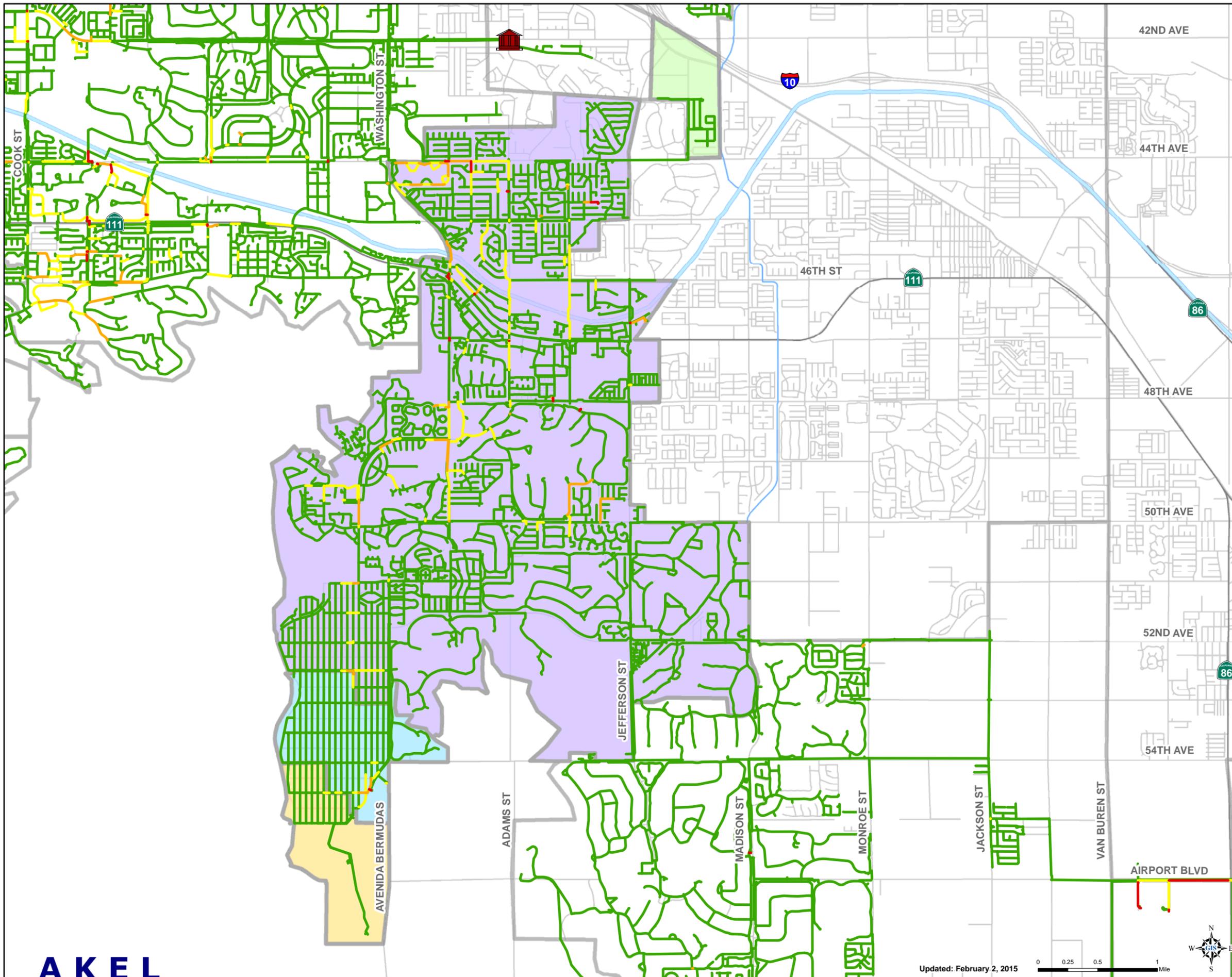
-  Lower La Quinta
-  Middle La Quinta
-  Upper La Quinta
-  Nairobi (190)
-  Other
-  Street Centerlines
-  Highways
-  Canals/Creeks/Rivers
-  White Water River

PRELIMINARY

Maximum Day Demands

Figure 13-2
Scenario 13
Maximum Velocity (ft/s)
 Hydraulic Analysis for
 Supply Treatment Alternatives
 Coachella Valley Water District





Legend

New Supply Location

Scenario 13 Pipes
By Maximum Headloss (ft/kft)

- 0 - 2.31
- 2.32 - 5
- 5.01 - 10
- > 10

Pressure Zones

- Lower La Quinta
- Middle La Quinta
- Upper La Quinta
- Nairobi (190)
- Other

- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

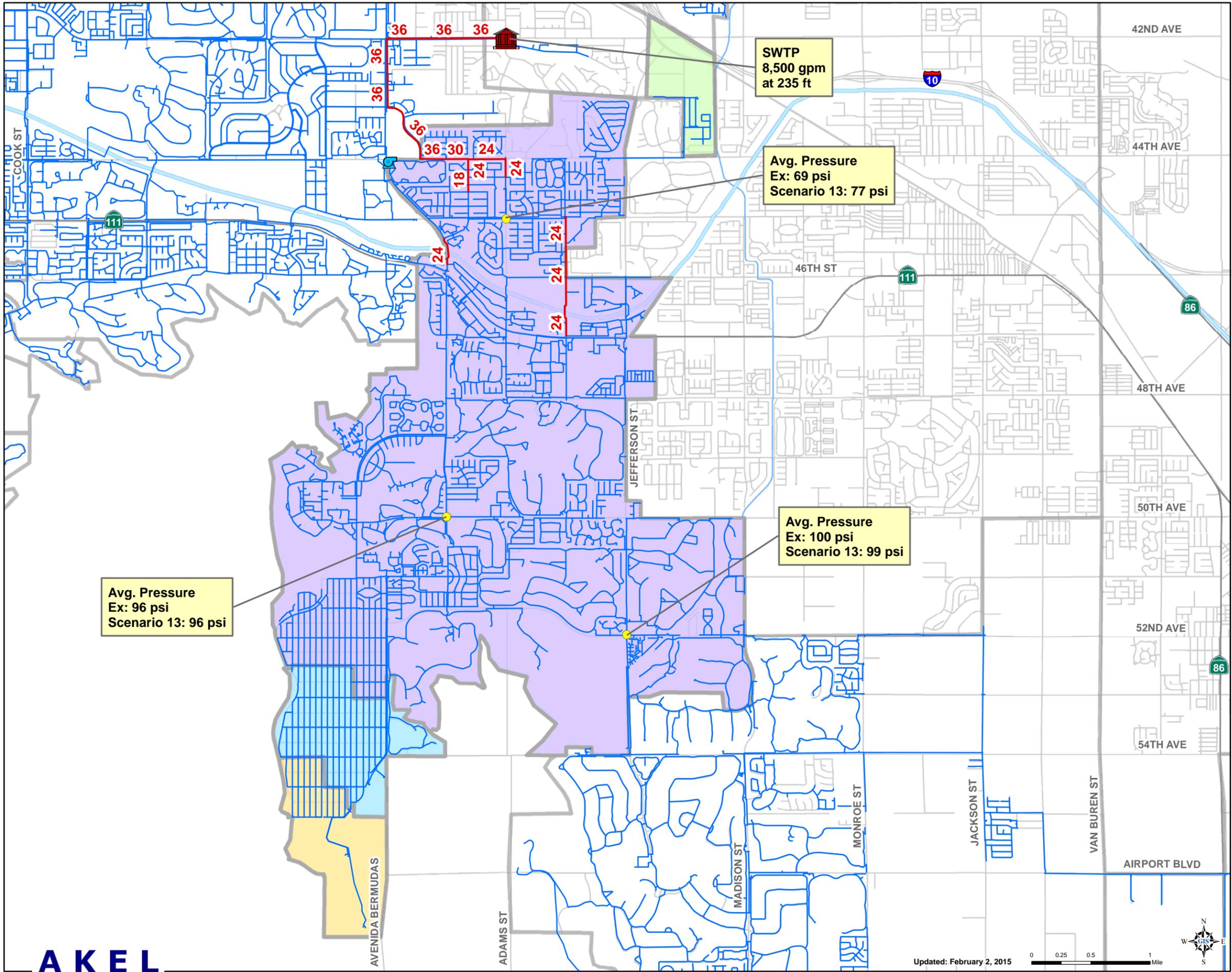
PRELIMINARY

Maximum Day Demands

Figure 13-3 Scenario 13 Maximum Headloss (ft/kft)

Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District





Legend

- New Supply Location
- Pipe Improvements
- Existing
 - Pump
 - Modeled Pipes
- Pressure Zones
 - Lower La Quinta
 - Middle La Quinta
 - Upper La Quinta
 - Nairobi (190)
 - Other
- Street Centerlines
- Highways
- Canals/Creeks/Rivers
- White Water River

PRELIMINARY

Maximum Day Demands

**Figure 13-4
Transmission Main
Improvements**
Hydraulic Analysis for
Supply Treatment Alternatives
Coachella Valley Water District

