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To: Joshua Aguilar, PE, Senior Engineer, IEUA

From: Abhishek Singh, PhD, PE[1]; Dan Haddock, PE[2]; Erick Fox

Date: March 19, 2021

Re: Integrated Water Resources Plan (IRP) Regional Water Supply Infrastructure Model Final Technical Memorandum 2 (TM-2): 2020 Baseline and Evaluation of Water Supply Vulnerabilities for Scenarios 1 to 6

1.0 EXECUTIVE SUMMARY

The Integrated Water Resources Plan (IRP) Regional Water Supply Infrastructure Model (Model) was developed through the collaboration of IEUA and its member agencies. The purpose of this modeling effort is to support regional and local water supply planning by facilitating the assessment of water supply vulnerabilities and the evaluation of strategies to improve resiliency. The Model incorporates existing regional and local supplies, key local and regional infrastructure, interconnections between agencies, and current and projected annual potable water demands at the pressure zone scale. It simulates requirements for imported water or other sources to blend with and utilize wells with impaired groundwater quality. Based on the results, the potential value of specific types of infrastructure projects and strategies is revealed. However, this memorandum does not recommend specific projects for implementation.

The model was developed and validated using 2015 annual demands, supplies, and infrastructure. The model was documented in a technical memorandum, which was reviewed by IEUA and all member agencies (INTERA, 2018). Based on the feedback and comments from all member agencies, the model was updated with 2020 demands and current water supplies, resulting in the 2020 Baseline.

For comparison to the 2020 Baseline, multiple scenarios were modeled to identify water supply vulnerabilities under a variety of current and future conditions identified by the member agencies. Each scenario assessed the ability of agencies to meet annual water demands with limitations on imported and/or local water supplies due to one or more of the following reasons: loss of imported water, Water Supply Allocation Plan (WSAP) implementation, multi-year drought, and groundwater quality impairment and regulatory changes. Areas with unmet demands were identified as having deficits, while areas with additional (unused) supply capacities were identified as having surpluses. On February 7, 2019 IEUA and member agencies participated in an IRP Infrastructure Charette workshop to review baseline model results, member agency and regional infrastructure priorities, and development of modeling scenarios. Draft Technical Memorandum 2 (TM-2) presented the draft results of model scenarios

1 – Licensed in California, Texas
2 - Licensed in Colorado, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Missouri, New Jersey, New Mexico, Ohio, Pennsylvania, Texas, Wisconsin, Oklahoma

representing current and future water supply vulnerabilities. The memo was provided to IEUA's member agencies for review and was presented in a meeting on June 26, 2019. Subsequently, INTERA and IEUA met one-on-one with member agencies to solicit detailed feedback to ensure the accuracy of model parameters and the alignment of scenarios with member agency priorities. As a result, several aspects of the Model were revised to improve its accuracy. These include changes to the allocation of Tier 1 imported water supplies from Water Facilities Authority (WFA) and refinements to the basis for scenarios reflecting the impact of future changes to drinking water regulations on groundwater availability. Also, model parameters specific to some member agencies were revised based on their direct input. These changes are discussed in detail in Appendix B. Finally, a sixth scenario – representing 'extreme conditions' with respect to water supply availability – was added to better assess the potential impact of future changes to drinking water regulations.

The modeled scenarios include:

- Scenario 1 - Loss of imported water from Metropolitan Water District (MWD) supplied via the Rialto Feeder, current (2020) conditions
- Scenario 2 - Water Supply Allocation Plan (WSAP) curtailment of imported water from Metropolitan Water District (MWD), future (2035) conditions
- Scenario 3 – Anticipated water quality regulatory changes, current (2020) conditions
- Scenario 4 – Anticipated water quality regulatory changes, future (2035) conditions
- Scenario 5 – Anticipated and unknown water quality regulatory changes, future (2035) conditions
- Scenario 6 – Multi-year drought and future water quality impairment and regulatory changes, future (2035) conditions

The likelihood of occurrence ranges from almost certain for Scenario 1 (shut down of Rialto Feeder) to very unlikely for Scenario 6 (multi-year drought and water quality impairment and regulatory changes). For each scenario, model parameters were used that represent annual demands, supplies, and available infrastructure based on review of IEUA and member agency 2015 Urban Water Management Plans (UWMPs), the 2015 IRP, and information provided directly by member agencies, including information about some projects in implementation. Model parameters for each agency are detailed in Appendix A. The scenarios were used to quantify agency-level surpluses and deficits, with interagency transfers limited to existing water supply agreements. Currently planned, future projects were not modeled. The potential benefit of additional transfers may be evaluated in the future by modeling projects and management strategies to address the supply deficits identified in the scenario modeling results.

Table 1 summarizes the results of the scenario modeling phase for each member agency and the region. Key observations are:

- Under 2020 Baseline conditions, demands are met for all agencies.
- Groundwater quality impairment has impacted significant supplies across the basin. Including CDA, approximately 23% (73,281 AFY) of existing groundwater supply

capacity is currently offline due to impairment, and an additional 9% (29,486 AFY) requires clean water for blending purposes to meet water quality regulations.

- Complete loss of imported water supplied by the Rialto Feeder (Scenario 1) causes three agencies (Chino, Chino Hills, and CVWD) to experience supply deficits. In this scenario, all MVWD's surplus capacity is delivered to Chino Hills under their existing water purchase agreement. At the regional level, there is adequate supply; agencies with surplus groundwater supply capacity (Fontana, Ontario, SAWCo, and Upland) could potentially assist agencies with deficits.
- The loss of imported water has a dual effect on some agencies, direct as well as indirect due to unmet blending requirements for use of impaired groundwater supplies.
- Future water quality regulatory changes have a significant impact on water supply availability in the absence of appropriate treatment, resulting in local and regional supply deficits. Anticipated regulatory changes reflecting a reduction in the Maximum Contaminant Level (MCL) for perchlorate and new MCLs for per- and polyfluoroalkyl substances (PFAS) are estimated to reduce available groundwater capacity in the region by 42%. Additional future regulations for yet-to-be-identified contaminants would further reduce available groundwater capacity.
- In the worst case modeled scenario, which couples long-term multi-year drought and future water quality regulatory changes, all but one of the agencies in the region have supply deficits. MVWD avoids a supply deficit thanks to a recently implemented groundwater treatment project.

Table 1. Summary of Modeled Available Capacity Surplus or Deficit for Scenarios 1 to 6

Scenario	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6		Notes
	Loss of MWD Imported Water		WSAP Level 5 Conditions		Anticipated Regulatory Changes (Current)		Anticipated Regulatory Changes (Future)		Anticipated & Unknown Regulatory Changes		Multiyear Drought and Anticipated Regulatory Changes		
	Very Likely		*Possible*		*Likely*		*Likely*		*Possible*		*Very Unlikely*		
Demand	**2020**		**2035**		**2020**		**2035**		**2035**		**2035**		
Member Agency	Supply Capacity Surplus or Deficit (AFY, % of demand)		Supply Capacity Surplus or Deficit (AFY, % of demand)		Supply Capacity Surplus or Deficit (AFY, % of demand)		Supply Capacity Surplus or Deficit (AFY, % of demand)		Supply Capacity Surplus or Deficit (AFY, % of demand)		Supply Capacity Surplus or Deficit (AFY, % of demand)		
Chino	(1,857)	-10.8%	359	1.7%	1,800	10.4%	1,277	6.10%	1,277	6.10%	(1,681)	-8.0%	Significant groundwater capacity off-line due to water quality impairment (7,379 AFY). Impacted by reductions in imported water.
Chino Hills[1]	(7,202)	-39.8%	(6,170)	-27.9%	(3,546)	-19.6%	(8,410)	-38.0%	(10,451)	-47.2%	(14,701)	-66.4%	All groundwater capacity off-line due to water quality (10,162 AFY). Dependent on imported water, CDA and available purchased supplies from MVWD.
CVWD	(11,133)	-18.9%	6,692	10.5%	(12,578)	-21.4%	(12,483)	-19.6%	(16,951)	-26.6%	(33,903)	-53.2%	Significant groundwater capacity off-line due to water quality (18,950 AFY). Impacted by reductions in imported water. Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes.
Fontana	7,973	20.4%	5,379	10.5%	1,461	3.7%	(7,384)	-14.4%	(12,490)	-24.4%	(18,124)	-35.4%	Significant groundwater capacity off-line due to water quality (24,764 AFY). Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes.
MVWD[1]	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	Adequate supply to meet MVWD demand in all scenarios but purchased water deliveries to Chino Hills are impacted. Significant portion of groundwater capacity is reliant on imported water for blending. Surplus supplies significantly impacted by future regulatory changes.
Deliveries from MVWD to Chino Hills	*6,707*	-	*10,641*	-	*8,547*	-	*7,720*	-	*5,679*	-	*2,655*	-	
Ontario	31,039	98.7%	28,376	59.4%	14,489	46.1%	5,522	11.6%	(1,766)	-3.7%	(1,287)	-2.7%	Significant groundwater capacity off-line due to water quality (7,976 AFY). Resilient to reductions in imported water with capacity available for potential transfer to other agencies. Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes.
SAWCo	1,579	107.5%	1,479	94.2%	(623)	-42.4%	(723)	-46.0%	(723)	-46.0%	(1,107)	-70.5%	Resilient to reductions in imported water. Limited excess capacity available for potential transfer to other agencies. Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes.
Upland	3,908	18.0%	6,394	26.7%	(1,354)	-6.2%	(3,615)	-15.1%	(6,943)	-29.0%	(10,024)	-41.9%	Vulnerable to simultaneous loss of local surface water supplies and imported water during multi-year drought. Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes.
Region Total	24,309	12.2%	42,510	17.45%	(349)	-0.2%	(25,816)	-10.60%	(48,048)	-19.72%	(80,827)	-33.17%	Significant groundwater capacity off-line due to water quality (73,281 AFY). Opportunities for potential inter-agency transfer of excess capacity. Without additional treatment, the availability of groundwater supplies is significantly impacted by future regulatory changes. Region is vulnerable to drought.

1) The results shown for MVWD and Chino Hills reflect water deliveries to Chino Hills under their purchase agreement with MVWD. The water purchase agreement entitles Chino Hills to receive up to 20.22 million gallons per day (MGD). In each scenario, all MVWD capacity not used to meet demands in MVWD's service territory is delivered to Chino Hills as purchased water. Quantities delivered range from 2,655 to 10,641 AFY. Details for each scenario are provided in Tables 7 to 12.

The results of each scenario were used to rate the severity of the impacts, based on the magnitude of the regional supply deficit and number of member agencies with supply deficits. The likelihood of each scenario and the severity of impacts were used to calculate the risk rating of each scenario. **Figure 1** shows the relative risk ratings of each scenario.

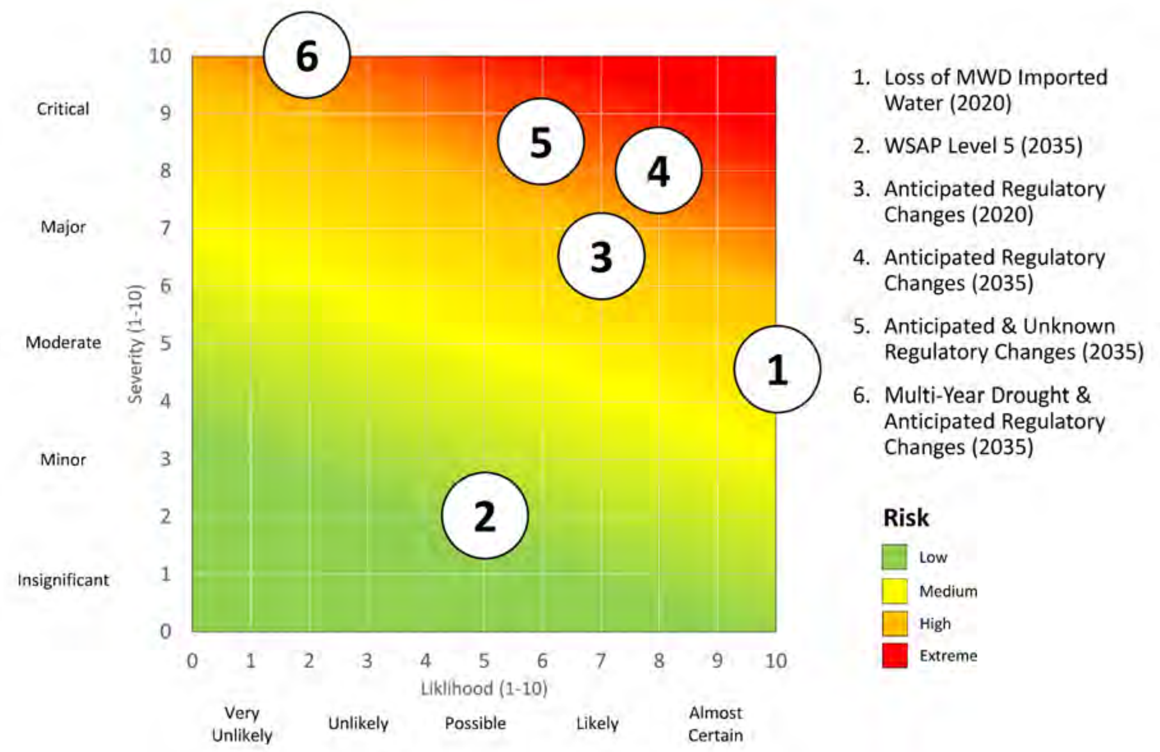

Figure 1. Risk Matrix for Scenarios 1 to 6

Overall, it is apparent that additional groundwater treatment and the capacity for additional inter-agency transfers would significantly increase the resilience of regional and local water supplies. The Model can be used in future planning efforts to evaluate project portfolios with the potential to address key regional and local water supply vulnerabilities. These may include treatment, conveyance, interconnections, and supplemental supplies from external sources.

2.0 INTRODUCTION

IEUA's 2015 Integrated Water Resources Plan (IRP) and this subsequent modeling effort were developed to integrate and update water resource planning documents in a focused, holistic manner and to develop an implementation strategy that will improve near-term and long-term water resources management for the region and position the region for funding opportunities. The 2020 Model has been developed to evaluate current and future potable water supply vulnerabilities under multiple scenarios, and to demonstrate for planning and funding purposes the potential local and regional benefits of various infrastructure projects (**Figure 2**). The Model may be used to support member agency planning, future IRP updates, UWMP's, regional drought planning, and other purposes.

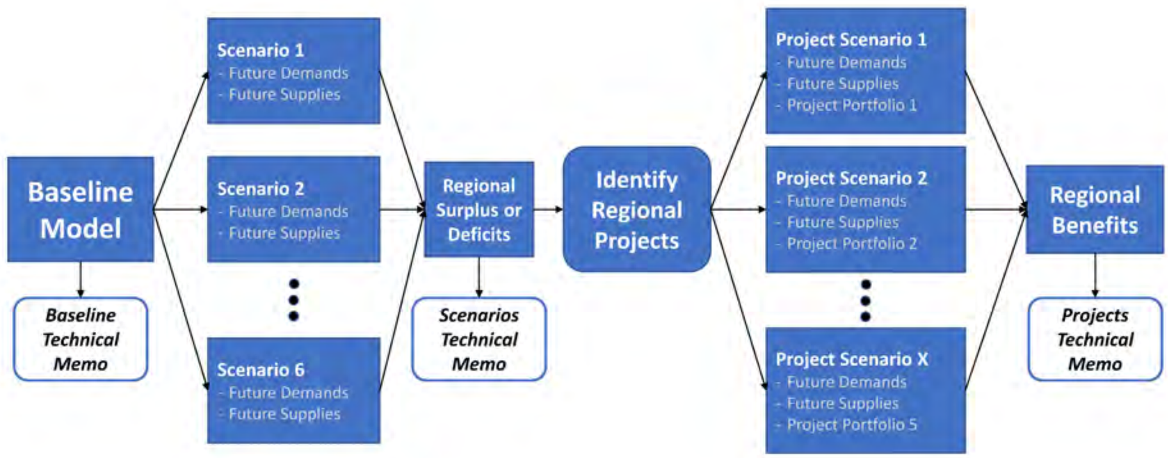

Figure 2. 2020 IRP Water Supply Infrastructure Modeling Process

2.1 Regional Water Supply Infrastructure Model

The Model includes existing regional and local potable water demands, supplies, key infrastructure, and interconnections allowing the movement of potable water from agency to agency within the IEUA service area. Note, that while the IRP and UWMPs include recycled water demands and supplies, the current model focuses primarily on the potable water system and does not include recycled water use and infrastructure. **Figure 3** presents a schematic of IEUA member agencies' interconnections, as developed in coordination with member agencies. The model simulates the system water balance and distribution capacity between agencies and from pressure zone to pressure zone (PZ-to-PZ) within agencies. It also includes checks on blending requirements of water quality impaired groundwater and source tracing to estimate the mix of IEUA imported and local supplies used to meet demands at the pressure zone level. The model simulates 'steady state' conditions without accounting for seasonal variability in demands and supplies and may be run for monthly or longer time-periods as long as the demands, supplies, and capacities are consistent. The Model does not have the requisite resolution to simulate shorter time-periods. The current model is set up with annual demands, supplies, and capacities based on the 2015 IRP, IEUA and member agency 2015 UWMPs, as well as discussions with and information provided by the member agencies. The Model is not integrated with existing regional groundwater flow models, and as a result does not directly simulate the impacts of modeled scenarios on basin management objectives. However, the results may be evaluated in conjunction with groundwater flow models and analysis of pumping rights and groundwater storage to evaluate the costs and benefits of various management strategies and project portfolios.

Member agencies provided information on existing infrastructure and water supplies through Utility Master Plans, UWMPs, engineering drawings, and one-on-one meetings and other exchanges of information. The collected data has been integrated into a GIS/Geodatabase format and a hydraulic model has been developed in InfoWater. **Attachment 1** shows the GIS map of key member agency and regional water supply infrastructure. Data used for the development of the model was documented and submitted to member agencies for review and comment, and the model was subsequently revised based on member agency feedback. Complete summaries of the member agency data represented in the model may be found in Appendix A of this document. The development of the model is described in *Technical Memorandum IEUA Infrastructure Model and 2015 Baseline Scenario Results* (INTERA, 2018).

2.2 Baseline and Scenarios

As part of the model development and testing process, the model was used to simulate 2015 baseline conditions using actual annual demands, imported water deliveries, local water production, and inter-agency water transfers for calendar year 2015 (INTERA, 2018).

Based on feedback and comments from IEUA and the members agencies, it was decided to update the baseline to be more representative of current conditions, wherein significant groundwater supplies in the basin are impacted by water quality impairment. The ‘2020 Baseline’ was developed based on projected 2020 demands and current supplies based on member agency’s UWMPs and the IRP and incorporating comments and additional information received from member agencies after review of the 2015 Baseline.

Using the 2020 Baseline, multiple scenarios were modeled to identify water supply vulnerabilities under a variety of current and future conditions. The modeled scenarios include:

- Scenario 1 - Loss of imported water from Metropolitan Water District (MWD) supplied via the Rialto Feeder, current (2020) conditions
- Scenario 2 - Water Supply Allocation Plan (WSAP) curtailment of imported water from Metropolitan Water District (MWD), future (2035) conditions
- Scenario 3 – Anticipated water quality regulatory changes, current (2020) conditions
- Scenario 4 – Anticipated water quality regulatory changes, future (2035) conditions
- Scenario 5 – Anticipated and unknown water quality regulatory changes, future (2035) conditions
- Scenario 6 – Multi-year drought and future water quality impairment and regulatory changes, future (2035) conditions

Primary characteristics of the 2015 and 2020 baselines and modeled scenarios are summarized in **Table 2** and discussed in greater detail in the following sub-sections of this memorandum.

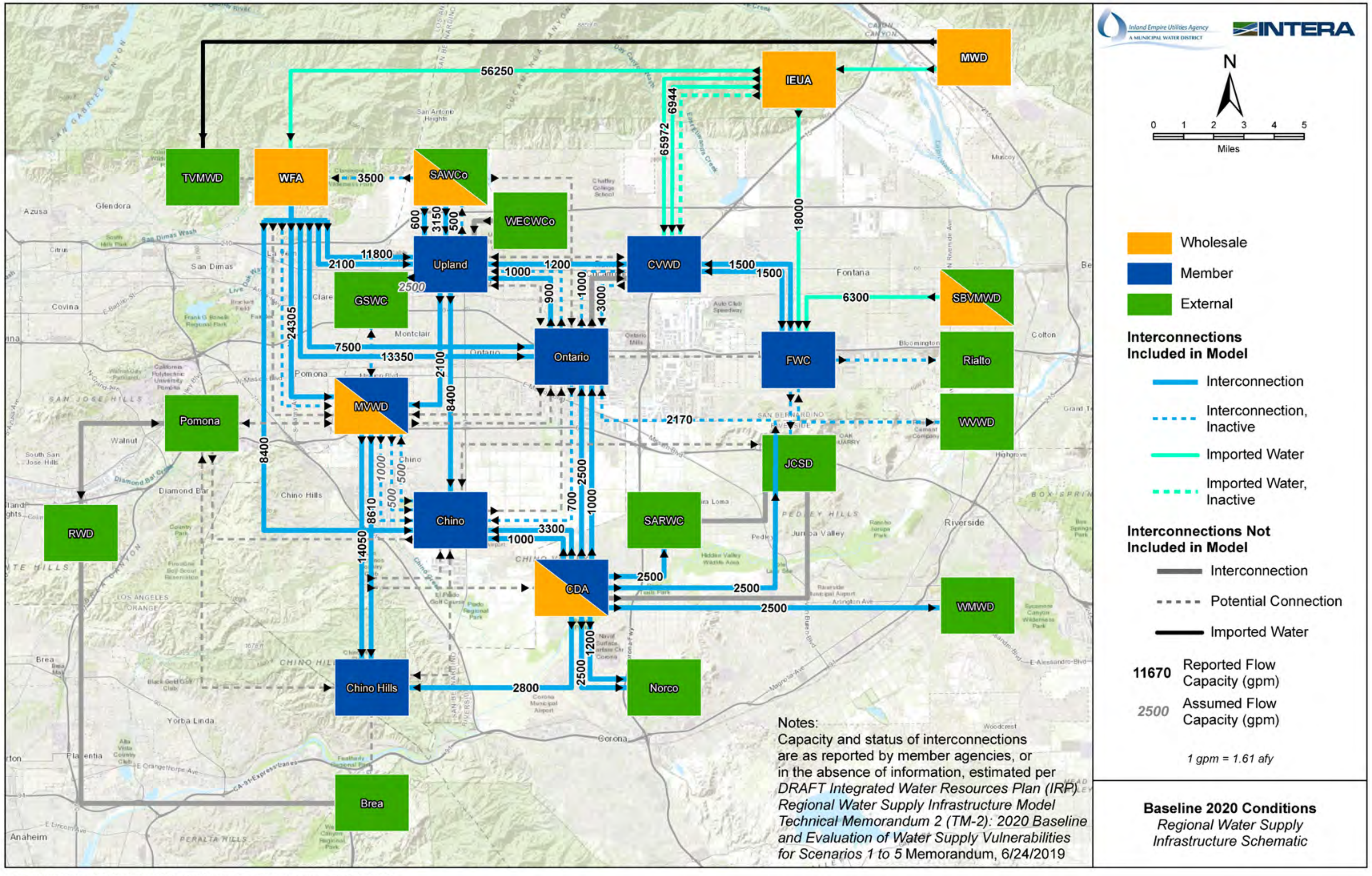

Figure 3. Regional Water Supply Infrastructure Schematic

External agencies include TVMWD – Three Valleys Municipal Water District, GSWC – Golden State Water Company, WECWCo – West End Consolidated Water Company, SBVMWD – San Bernardino Valley Municipal Water District, WVWD – West Valley Water District, JCSD – Jurupa Community Service District, WMWD – Western Municipal Water District, SARWC – Santa Ana River Water Company, RWD – Rowland Water District

Table 2. Primary Characteristics of Modeled Scenarios

	Baseline Model	Updated Baseline	Scenarios					
			1	2	3	4	5	6
	2015	2020	*Loss of MWD Imported Water*	*WSAP Level 5 Conditions*	*Anticipated Regulatory Changes (Current)*	*Anticipated Regulatory Changes (Future)*	*Anticipated & Unknown Regulatory Changes*	*Multi-Year Drought & Anticipated Regulatory Changes*
			Very Likely	*Possible*	*Likely*	*Likely*	*Possible*	*Very Unlikely*
	2015	**2020**	**Current (2020)**	**Future (2035)**	**Current (2020)**	**Future (2035)**	**Future (2035)**	**Future (2035)**
Water Supply Infrastructure	2015 Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)
Member Agency Demand	2015 Demand (2015 IRP, Member Agency 2015 UWMP's)	2020 Demand (2015 UWMP's)	2020 Demand (2015 UWMP's)	2035 Demand (2015 UWMP's)	2020 Demand (2015 UWMP's)	2035 Demand (2015 UWMP's)	2035 Demand (2015 UWMP's)	2035 Demand (2015 UWMP's)
MWD Imported Water Supply	2015 Demand (2015 IRP, Member Agency 2015 UWMP's)	2020 Supply (2015 UWMP's)	No Imported Water	WSAP 62.5% (MWD Regional Shortage Level 5)	2020 Supply (2015 UWMP's)	2035 Supply (2015 UWMP's)	2035 Supply (2015 UWMP's)	WSAP 32.5% (MWD Regional Shortage Level 9)
Local Supply Availability - Groundwater	2015 Supplies (Member Agency 2015 UWMP's)	Current Capacities for Active Wells*	Current Capacities for Active Wells*	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP's)	Current Capacities for Active Wells*	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP's)	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP's)	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP's)
Local Supply Availability - Surface Water	2015 Supplies (Member Agency 2015 UWMP's)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected Multiple Dry Year 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)
Local Groundwater Impairment	Specific Wells (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Anticipated changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS	Anticipated changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS	Anticipated and Unknown changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS and other contaminants	Anticipated changes to drinking water regulations: perchlorate and PFAS
Model Output	Simulation of 2015 supplies and demands	Simulation of current supplies and 2020 demands	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity
Questions Addressed	Verify that baseline model is representative of member agency infrastructure constraints, supplies, and demands	Base current scenario for comparison with modeled scenarios	How does loss of imported water used for blending impact water supply availability? Where do deficits and surpluses occur at the pressure zone level?	How does reduction of imported water used for blending impact water supply availability in the future? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated and future unknown changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?	How does reduction of local water supplies and of imported water used for blending impact water supply availability in the future? Where do deficits and surpluses occur at the pressure zone level?

***2020 Baseline Assumptions Document (5/9/2019)**

2.3 Presentation of Results

Baseline results represent 2015 and 2020 demands and imported and local supplies, including transfers between member agencies, based on data from the IRP and member agency UWMPs.

The results for Scenarios 1 through 6 represent projected available supplies and projected demands per **Table** 2. They are intended to quantify water supply surpluses and deficits under a range of moderate to adverse conditions to identify existing constraints and help prioritize local and regional projects for further evaluation. The results do not reflect planned projects which may have been implemented since the model was developed. Imported water from IEUA and supplies from the Chino Desalter Authority (CDA) are proportioned to member agencies according to their respective entitlements. The modeled capacity of local surface water supplies is consistent with *reasonably available*[1] supplies in normal and multiple dry year conditions as reported in member agencies' UWMPs. The modeled capacities of local groundwater supplies are based on information obtained from member agencies and the Chino Basin Watermaster (CBWM), adjusted for water quality impairment and blending requirements, and allowance for maintenance downtime as detailed in TM-1 (INTERA, 2018). The modeled capacity of groundwater supplies is not constrained by appropriative or other rights; these constraints may be evaluated separately.

Because the results are intended to assess agency-level surpluses and deficits, they only reflect inter-agency transfers under existing water purchase agreements, including deliveries from WFA and CDA to member agencies and from MVWD to Chino Hills. In the future, the Model may be used to evaluate the benefits of potential transfers to address the supply deficits identified in the scenario modeling results.

As previously noted, the purpose of this modeling effort is to support regional and local water supply planning by assessing supply vulnerabilities and evaluating potential regional infrastructure projects and strategies to improve resiliency. It is not intended to conflict with or contradict long-term projections and needs identified by member agencies.

[1] In this technical memorandum, references to *reasonably available* supplies indicate that the source of the information is the 2015 Urban Water Management Plan of the respective agency.

3.0 2020 BASELINE

The 2020 Baseline represents projected demands and imported and local supplies, including transfers between member agencies, based on data from the IRP and member agency UWMPs. Details are provided in Appendix A.

3.1 Updates and Changes from 2015 Baseline

The 2015 Baseline model was updated based on additional information and input from member agencies following the delivery of the 2015 Baseline Technical Memo (INTERA, 2018), the IRP Infrastructure Charrette workshop held on February 7, 2019, and comments received from member agencies on draft TM-2 delivered in June 2019. The updates to the model for the 2020 Baseline are briefly summarized below:

City of Chino:

- Demand allocated to pressure zones based on 2010 census population instead of area
- Updated water quality impairments for some wells
- Updated capacity of water treatment plants
- Updated capacity of interconnections

Chino Desalter Authority

- Updated some wells as inactive
- Updated pump station ownership and capacities
- Updated interconnection capacities

City of Chino Hills

- Demand allocated to pressure zones based on 2010 census population instead of area
- Updated well capacities
- Updated pressure reducing station capacities
- Updated interconnection capacities

Cucamonga Valley Water District

- Removed interconnection to Ontario

Fontana Water Company

- Demand allocated to pressure zones based on 2010 census population instead of area
- Updated well capacities, blending requirements, and pressure zone assignment
- Updated water treatment plant capacity
- Updated pump station capacities
- Updated operational status and capacities of interconnections

Monte Vista Water District

- Demand allocated to pressure zones based on 2010 census population instead of area

- Updated water quality impairments and capacities for some wells
- Added Water Treatment Plant 30 for MVWD Wells 30, 32, and 33
- Updated operational status and capacities of interconnections

City of Ontario

- Demand allocated to pressure zones based on 2010 census population instead of area
- Updated water quality impairments and capacities for some wells

San Antonio Water Company

- Updated well capacities, blending requirements, and pressure zone assignment

City of Upland

- Updated water quality impairments and capacities for some wells
- Updated water treatment plant operational status
- Updated pressure reducing station capacities
- Updated interconnection diameters and operational status

IEUA/WFA

- Updated Agua de Lejos water treatment plant capacity
- Updated interconnection operational status and capacity
- Updated allocation of WFA treated water based on 10 year rolling average

3.2 Allocation of IEUA Imported and CDA Supplies

IEUA has a purchase order agreement with MWD for 93,283 AFY at Tier 1 rates, which includes 69,752 AFY for potable water use. 2015 IRP projections are that 69,752 AFY will be available for potable use in the years 2020 to 2040. This supply is allocated to IEUA's member agencies as follows and is the basis for modeling the 2020 Baseline and Scenarios.

- WFA 31,384 AFY
- CVWD 28,368 AFY
- FWC 10,000 AFY

WFA treats and delivers IEUA imported water to Chino, Chino Hills, MVWD, Ontario, and Upland. In the 2020 Baseline, each agency receives an allocation according to the 10-year rolling average of member agency usage for the prior 10 fiscal years. Appendix B provides additional information. For 2020, these allocations are:

- Chino 4,382 AF
- Chino Hills 1,816 AF
- MVWD 7,504 AF
- Ontario 10,087 AF
- Upland 7,595 AF

Imported supplies exceeding Tier 1 are not modeled in the 2020 Baseline and Scenarios. In the future, the Model may be used to help evaluate the costs and benefits of utilizing Tier 2 supplies as a management strategy.

CDA has a mandate to continually pump 40,000 AFY from the Chino Basin, resulting in total water deliveries of 35,200 AFY to CDA-participating agencies and 4,800 AFY of associated brine disposal. CDA delivers water to both IEUA member agencies (17,733 AFY) and non-IEUA member agencies (17,467 AFY). In the 2020 Baseline and Scenarios, each IEUA member agency receives their full CDA entitlement. These are:

- Chino 5,000 AFY
- Chino Hills 4,200 AFY
- Ontario 8,533 AFY

In the future, the Model may be used to evaluate the benefits of transferring IEUA/WFA and CDA allocations between agencies to address the supply deficits identified in the scenario modeling results.

3.3 Baseline 2020 Results

The Model was calibrated to reflect projected 2020 demands and supplies. The results are described below, and additional details are provided in Appendix A.

Figure 4 shows agency-level projected 2020 demands, allocated Tier 1 imported and CDA supplies, 2020 reasonably available local surface water supplies, estimated available groundwater capacity, and delivery of purchased available water from MVWD to Chino Hills. **Figure 5** shows projected 2020 interagency transfers of water, based on information obtained from member agency UWMPs and allocated within capacity constraints to active interconnections represented in the model. **Figure 6** shows the modeled average percentage of IEUA imported water used to meet projected 2020 demands in each pressure zone.

Table 3 summarizes the Baseline 2020 demands, supply capacity, and any surplus supplies for the member agencies[1]. **Table 4** summarizes the projected 2020 demands and imported and local supplies utilized, including transfers between member agencies, based on data from member agency UWMPs, the 2015 IRP, and other information obtained from the member agencies. For the 2020 Baseline model simulation (**Table 4**), 12,093 AFY is transferred from MVWD to Chino Hills. **Table 5** summarizes the estimated percentages of MWD imported water at the agency level for the 2020 Baseline.

[1]Note that MVWD surpluses are delivered to Chino Hills under the terms of their purchase agreement, which provides for deliveries of up to 22,663 AFY, based on demand and availability.

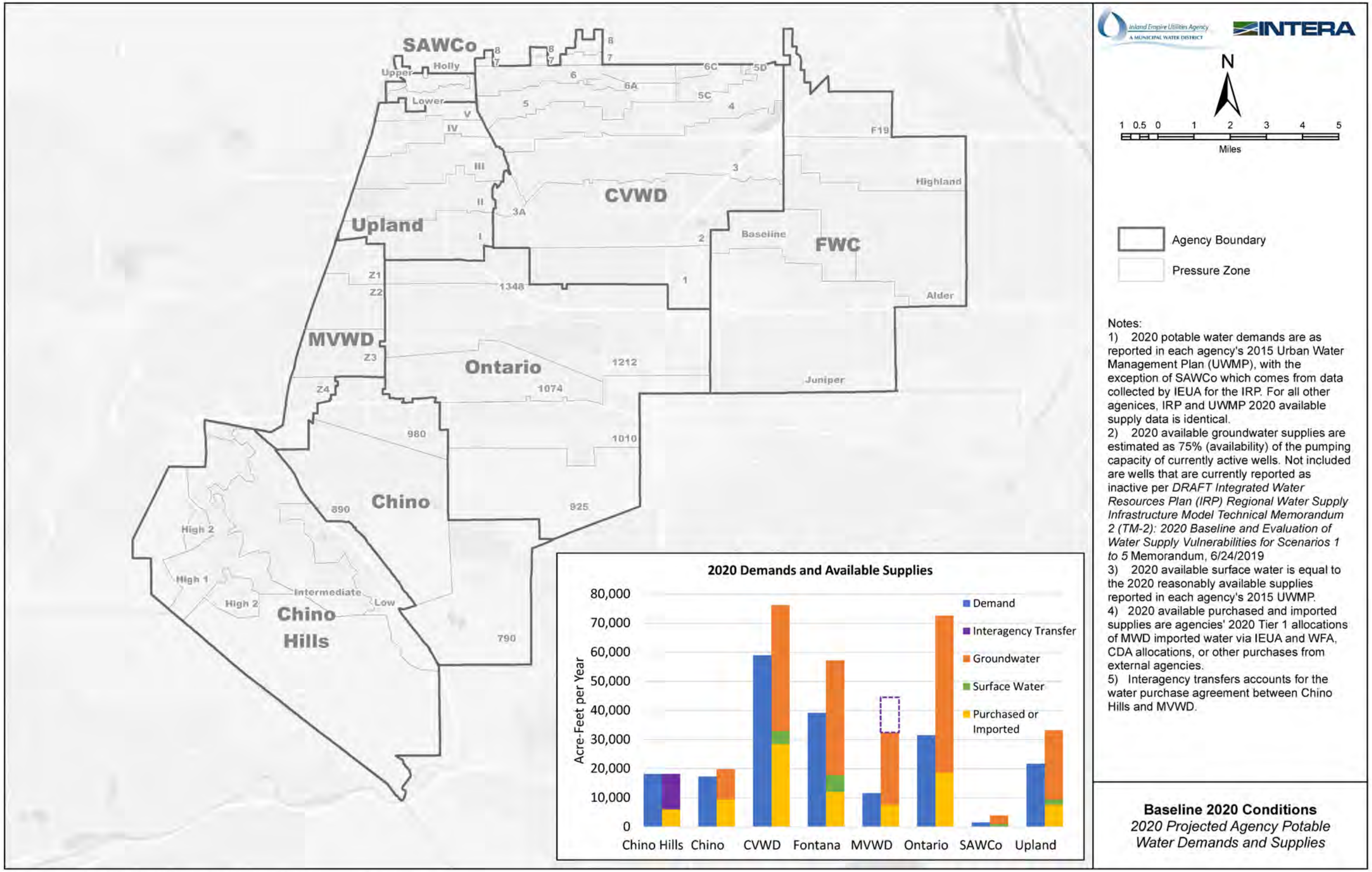

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Figure 4. 2020 Baseline projected demands and available supplies

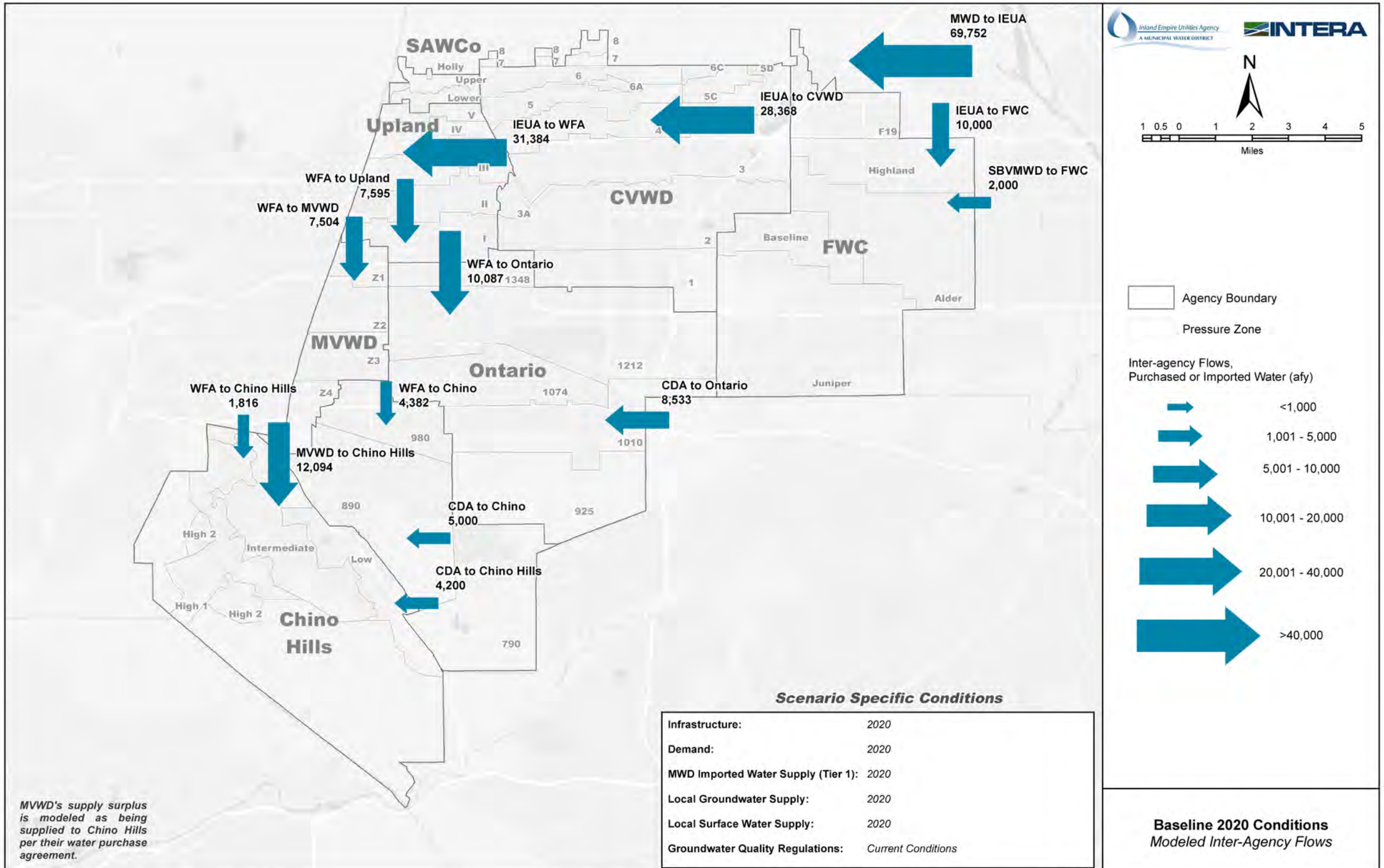

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Figure 5. 2020 Baseline (Net) Interagency flows

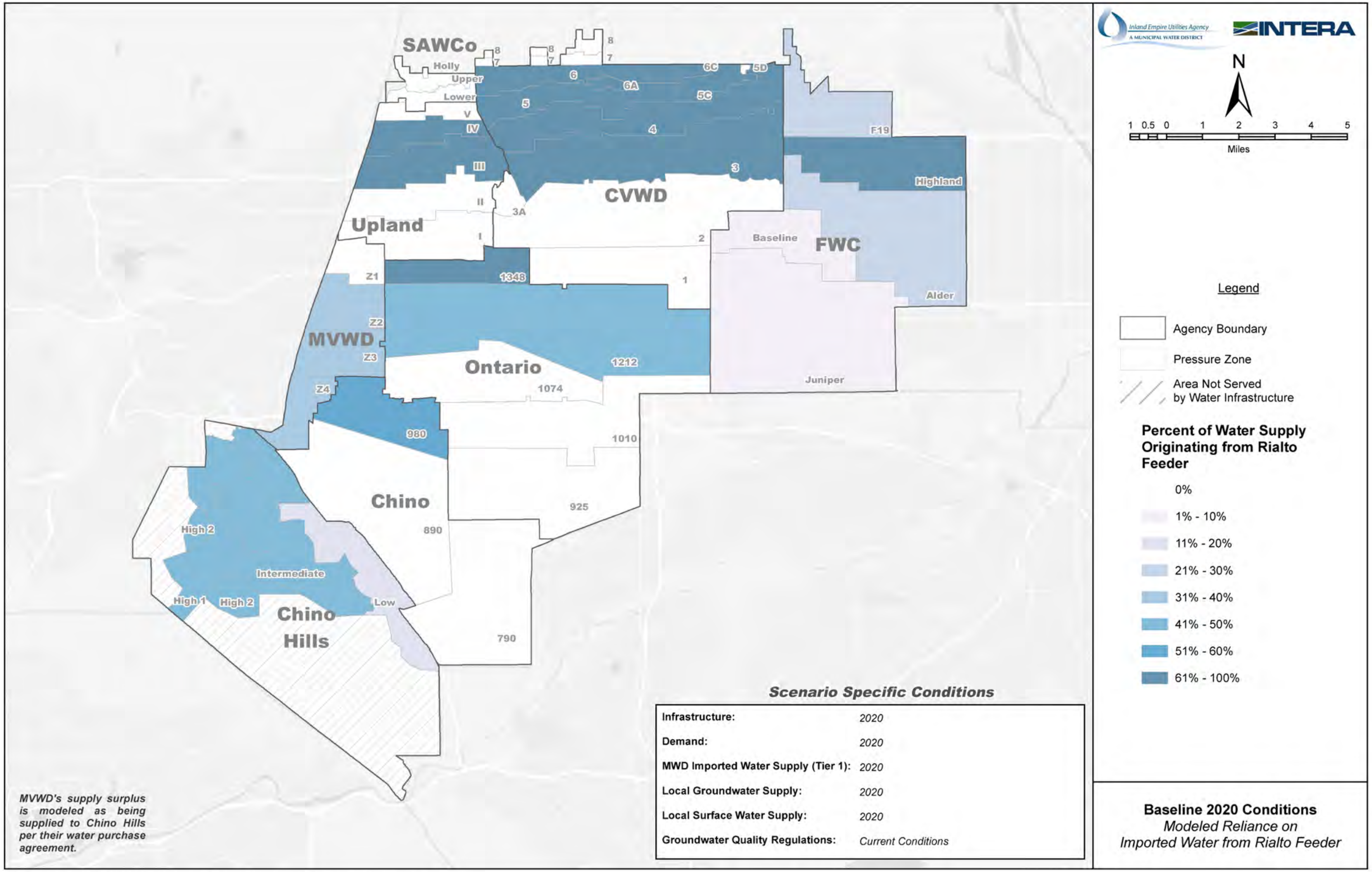

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Figure 6. 2020 Modeled Reliance on Imported Water from Rialto Feeder

Table 3. Summary of 2020 Baseline Available Capacity

Member Agency	Demand	Supply Capacity								Surplus or Deficit	
	Demand (2020)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply Capacity	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand
Chino	17,262	4,382	5,000	0	0	10,404	0	0	19,786	**2,524**	**14.6%**
Chino Hills	18,109	1,816	4,200	0	12,093	0	0	0	18,109	**0**	**0.0%**
CVWD	58,900	28,368	0	0	0	32,684	10,541	4,540	76,132	**17,232**	**29.3%**
Fontana	39,139	10,000	0	2,000	0	23,972	15,436	5,700	57,108	**17,969**	**45.9%**
MVWD	11,518	7,504	0	0	(12,093)	24,860	0	0	20,271	**8,753**	**76.0%**
Ontario	31,441	10,087	8,533	0	0	53,942	0	0	72,561	**41,121**	**130.8%**
SAWCo	1,469	0	0	0	0	2,201	772	950	3,922	**2,452**	**166.9%**
Upland	21,664	7,595	0	0	0	11,852	11,932	1,780	33,159	**11,494**	**53.1%**
Totals	**199,504**	**69,752**	**17,733**	**2,000**	**0**	**159,914**	**38,680**	**12,970**	**301,049**	**101,545**	**50.9%**

***Demand (2020)** – Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
***Imported, IEUA** – Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
***Chino Desalter Authority** – CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
***Imported, External Agency** – Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
***Inter-Agency Transfer** – Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
***Chino Groundwater (GW)** – Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
***Non-Chino GW** – Same as Chino GW, but for wells not in the Chino Basin.*
***Local Surface Water (SW)** – Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

Table 4. Summary of Modeled 2020 Baseline Supplies Used to Meet Demands

Member Agency	Demand	Supplies Used to Meet Demand							
	Demand (2020)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY
Chino	17,262	4,382	5,000	0	0	7,880	0	0	17,262
Chino Hills	18,109	1,816	4,200	0	12,093	0	0	0	18,109
CVWD	58,900	28,368	0	0	0	21,587	4,545	4,400	58,900
Fontana	39,139	10,000	0	2,000	0	25,901	940	298	39,139
MVWD	11,518	7,504	0	0	(12,093)	16,107	0	0	11,518
Ontario	31,441	10,087	8,533	0	0	12,821	0	0	31,441
SAWCo	1,469	0	0	0	0	1,137	0	332	1,469
Upland	21,664	7,595	0	0	0	3,970	8,318	1,781	21,664
Totals	**199,504**	**69,752**	**17,733**	**2,000**	**0**	**89,403**	**13,804**	**6,812**	**199,504**

Demand (2020) *– Estimated agency-level 2020 demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Estimated 2020 Tier 1 supplies from Metropolitan Water District (MWD) for potable water use, per agency UWMPs.*
Chino Desalter Authority *– Estimated 2020 CDA supplies to Chino, Chino Hills, and Ontario, per agency UWMPs.*
Imported, External Agency *– Estimated imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD), per agency UWMPs.*
Inter-Agency Transfer *– Estimated deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD, per agency UWMPs.*
Chino Groundwater (GW) *– Estimated 2020 production from Chino Basin wells, per agency UWMPs.*
Non-Chino GW *– Estimated 2020 production from non-Chino Basin wells, per agency UWMPs.*
Local Surface Water (SW) *– Estimated 2020 production from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

Table 5. Modeled Reliance on Imported Water, 2020 Baseline

Member Agency	Modeled Reliance on Imported Water	Modeled Reliance on Imported Water
	(% of total supply)	AFY
Chino	25%	4,382
Chino Hills	10%	1,816
CVWD	48%	28,368
Fontana*	31%	12,000
MVWD	65%	7,504
Ontario	32%	10,087
SAWCo	0%	0
Upland	35%	7,595
Totals	**36%**	**71,752**

** Includes imported water from SBVMWD*

Table 6 and **Figure 7** summarize available groundwater supply capacity according to groundwater quality impairment, accounting for wells that either require treatment or blending and those currently offline.

Table 6. Summary of Total, Unimpaired, and Impaired Groundwater Supply Capacity

Member Agency	Basin	Total	Unimpaired	Impaired Treated	Impaired Blended	Impaired Off-line
		AFY	AFY	AFY	AFY	AFY
CDA	Chino	44,382	0	42,180	0	2,202
	Non-Chino	0	0	0	0	0
Chino	Chino	17,783	0	9,678	726	7,379
	Non-Chino	0	0	0	0	0
Chino Hills	Chino	10,162	0	0	0	10,162
	Non-Chino	0	0	0	0	0
CVWD	Chino	32,684	32,684	0	0	0
	Non-Chino	29,490	8,534	0	2,007	18,950
Fontana	Chino	48,736	20,935	3,038	0	24,764
	Non-Chino	15,436	8,130	5,094	2,213	0
MVWD	Chino	24,860	0	7,259	17,602	0
	Non-Chino	0	0	0	0	0
Ontario	Chino	61,917	44,520	5,444	3,978	7,976
	Non-Chino	0	0	0	0	0
SAWCo	Chino	2,201	2,201	0	0	0
	Non-Chino	772	0	772	0	0
Upland	Chino	12,914	8,890	0	2,961	1,062
	Non-Chino	12,718	11,932	0	0	786
Totals	Chino	255,640	109,230	67,598	25,267	53,545
	Percent of Total	*100%*	*43%*	*26%*	*10%*	*21%*
	Non-Chino	58,416	28,595	5,866	4,220	19,736
	Percent of Total	*100%*	*49%*	*10%*	*7%*	*34%*
	All Basins	314,056	137,824	73,464	29,486	73,281
	Percent of Total	*100%*	*44%*	*23%*	*9%*	*23%*

Annual supply capacity is estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime.
Wells are classified as Unimpaired, Impaired Treated, Impaired Blended, or Impaired Off-Line, per member agencies.
***Unimpaired** – Wells that require minimal treatment and do not have blending requirement.*
***Impaired Treated** – Wells with water quality that require treatment.*
***Impaired Blended** – Wells with water quality that requires blending, but not treatment.*
***Impaired Off-Line** – Wells that have been removed from service by the member agency due to water quality.*

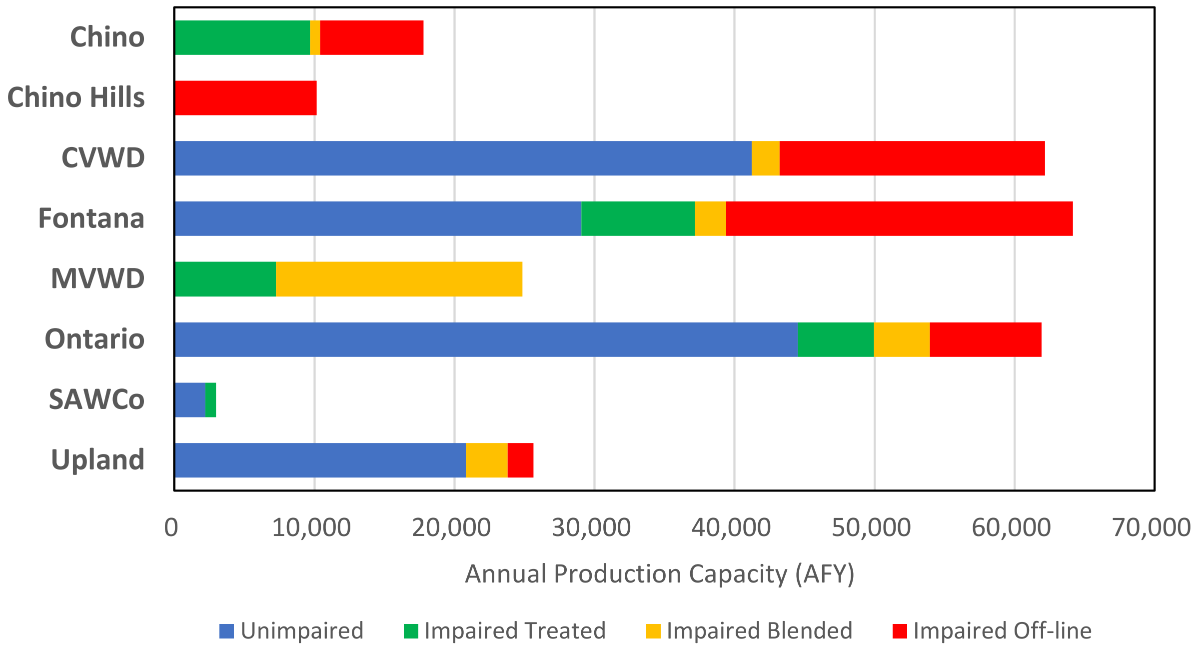

Figure 7. Groundwater Quality and Status

NOTES:
Annual supply capacity is estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime.
Wells are classified as Unimpaired, Impaired Treated, Impaired Blended, or Impaired Off-Line, per member agencies.
***Unimpaired** – Wells that require minimal treatment and do not have blending requirement.*
***Impaired Treated** – Wells with water quality that require treatment.*
***Impaired Blended** – Wells with water quality that requires blending, but not treatment.*
***Impaired Off-Line** – Wells that have been removed from service by the member agency due to water quality.*

4.0 SCENARIO 1 – LOSS OF MWD IMPORTED WATER

4.1 Scenario 1 Description

This *very likely* scenario reflects situations in which, due to planned or emergency shutdown, the region experiences a complete loss of imported water from the Rialto Feeder for 12 months. As previously shown in **Figure 6**, member agencies rely on imported water to varying degrees. The results of this scenario show which member agencies may experience supply deficits without imported water supplies. It also identifies agencies with a surplus of local supplies which may be available for use by other member agencies under these circumstances.

This scenario is defined by the following parameters:

- 2020 water demands,
- no imported water deliveries from MWD via the Rialto Feeder,
- current available capacity for groundwater wells,
- projected 2020 reasonably available surface water supplies,
- normal CDA entitlements, and
- current groundwater blending requirements.

4.2 Scenario 1 Results

The results of this scenario indicate that if the Rialto Feeder is out of service for 12 months, three member agencies would experience supply deficits ranging from 11% to 40% of 2020 demand. Five member agencies have surpluses and overall, the region has a surplus of 12% of 2020 demand.

In this scenario, direct loss of water supply capacity results from the loss of IEUA imported water supplied via the Rialto Feeder to CVWD, FWC, and via WFA to MVWD, Chino, Chino Hills, Ontario, and Upland. For MVWD, the loss of imported water also reduces their water supply capacity because the imported water is needed to blend with water quality-impaired groundwater supplies, based on current blending requirements shown in Appendix A. Without the required supply for blending, production from some impaired groundwater sources is reduced or unavailable.

Figure 8 shows the flows from CDA to their member agencies and the absence of flows from IEUA in this scenario. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and may be evaluated as potential opportunities in the projects phase. **Figure 9** and **Figure 10** show the supply surplus or deficit as a percentage of 2020 demand at the agency and pressure-zone level, respectively. Typical of all pressure zone level surplus and deficit figures in this memorandum, the results represent one possible distribution of supply surpluses and deficits, as applicable, among the pressure zones of each member agency. Pressure zone level results will be useful when modeling potential projects to redistribute available supplies to agencies with potential supply deficits.

4.3 Scenario 1 Observations

Table 7 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from a complete loss of imported water from the Rialto Feeder for a 12-month period. Key observations from this scenario are:

- Loss of imported water results in deficits showing for CVWD, Chino, and Chino Hills.
- The loss of imported water doubly impacts some agencies due to unmet blending requirements.
- MVWD shows adequate supplies to meet its demands.
- Fontana, SAWCo, and Upland show supply surpluses.
- Chino Hills is significantly impacted due to reliance on both imported supplies and reduced availability of purchased groundwater from MVWD affected by the loss of water for blending.
- Ontario shows a significant supply surplus and is centrally located with respect to agencies with deficits.
- As a whole, the region shows a surplus of 12.2% of total demand.

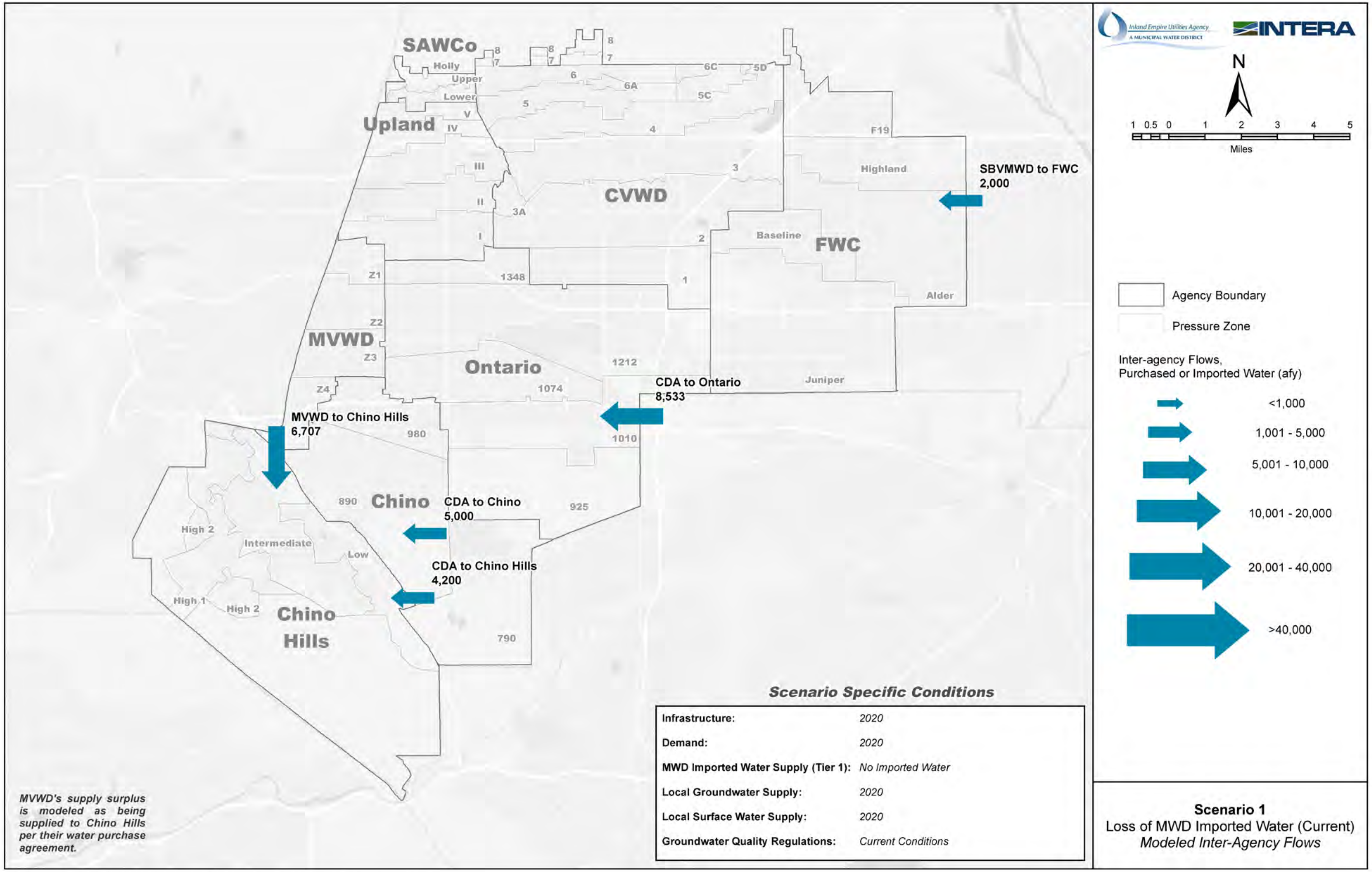

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Figure 8. Scenario 1 - Loss of Imported Water from the Rialto Feeder, Projected Purchased or Imported Flows

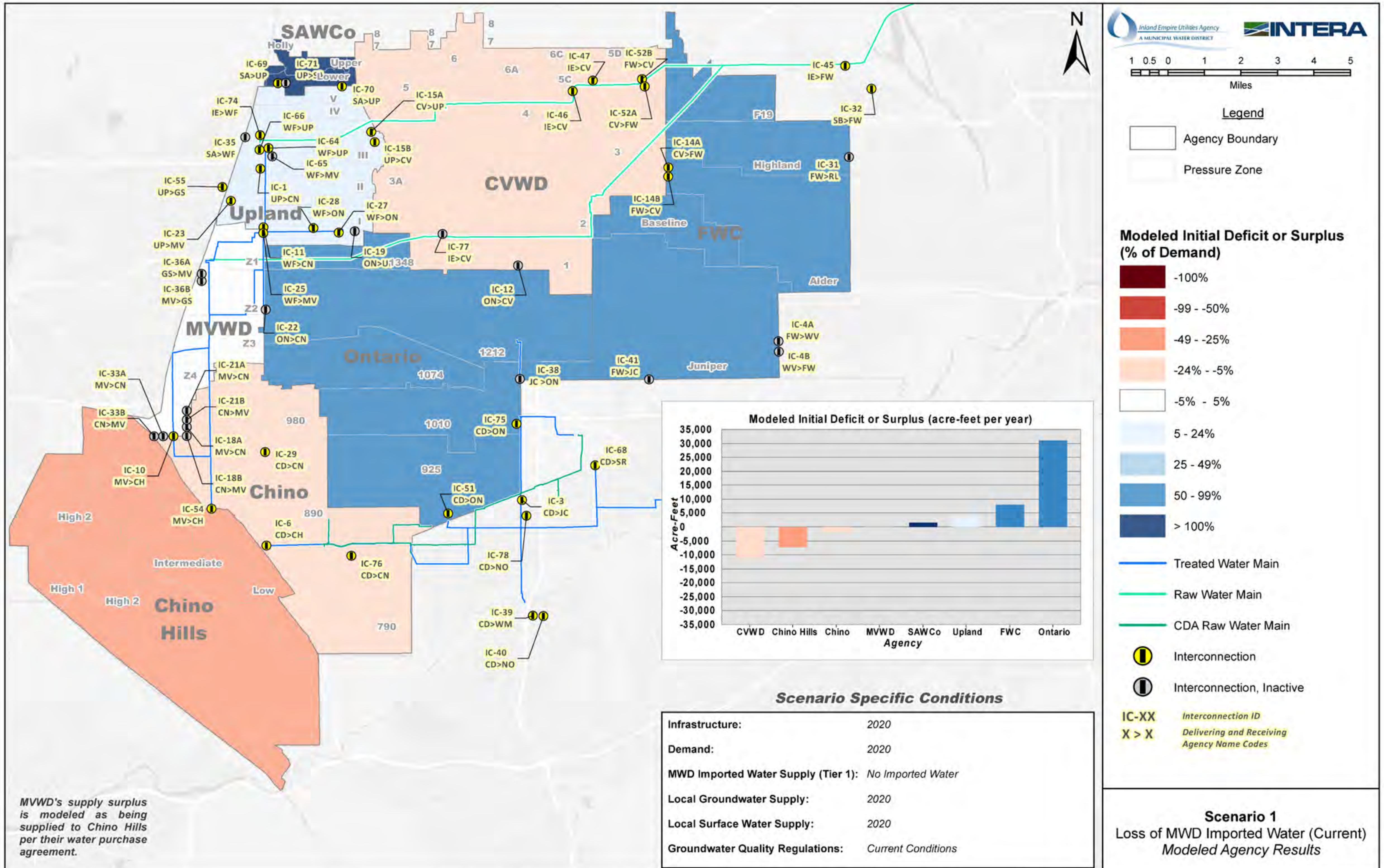

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Figure 9. Scenario 1 - Loss of Imported Water from the Rialto Feeder, Projected Agency-Level Surplus or Deficit

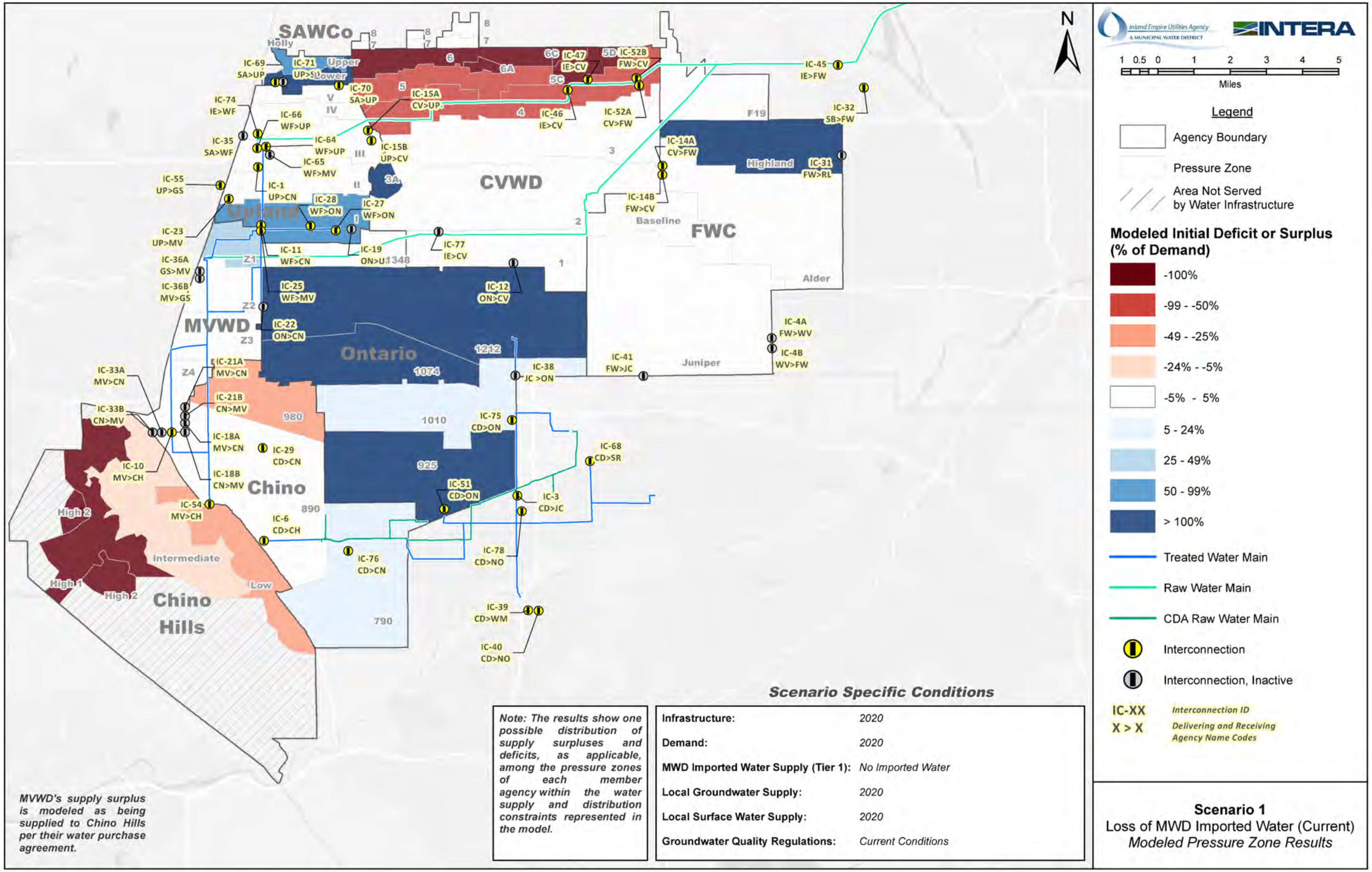

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Figure 10. Scenario 1 - Loss of Imported Water from the Rialto Feeder, Projected Pressure Zone-Level Surplus or Deficit

Table 7. Summary of Results for Scenario 1 Loss of Imported Water from the Rialto Feeder

	Demand	Supply Capacity								Surplus or Deficit	
Member Agency	Demand (2020)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply Capacity	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand
Chino	17,262	0	5,000	0		10,405	0	0	15,406	**-1,857**	**-10.8%**
Chino Hills	18,109	0	4,200	0	6,707	0	0	0	10,907	**-7,202**	**-39.8%**
CVWD	58,900	0	0	0		32,687	10,539	4,541	47,767	**-11,133**	**-18.9%**
Fontana	39,139	0	0	2,000		27,566	11,846	5,700	47,112	**7,973**	**20.4%**
MVWD	11,518	0	0	0	(6,707)	18,225	0	0	11,518	**0**	**0.0%**
Ontario	31,441	0	8,533	0		53,947	0	0	62,480	**31,039**	**98.7%**
SAWCo	1,469	0	0	0		2,202	0	847	3,049	**1,579**	**107.5%**
Upland	21,664	0	0	0		14,304	9,488	1,781	25,573	**3,908**	**18.0%**
Totals	**199,504**	**0**	**17,733**	**2,000**	**0**	**159,337**	**31,873**	**12,869**	**223,812**	**24,308**	**12.2%**

Demand (2020) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

5.0 SCENARIO 2 – WATER SUPPLY ALLOCATION PLAN (WSAP) LEVEL 5 CONDITIONS

5.1 Scenario 2 Description

This *possible* scenario reflects the curtailment of imported water deliveries from MWD under the Water Supply Allocation Plan (WSAP).

The WSAP provides a formula for allocating available water supplies to the member agencies in case of extreme water shortages within Metropolitan's service area, with the objective of creating an equitable needs-based allocation. The WSAP has been implemented three times since it was implemented in February 2008, most recently in April 2015. There are 10 stages in the WSAP with increasing levels of curtailment, as shown in **Table 8**. Shortage Level 5 is used as the basis for this scenario, which requires a 37.5% reduction in MWD deliveries of imported water. This level was chosen to reflect a moderate drought. The impact of severe drought is presented in Scenario 6.

Table 8. MWD WSAP Shortage Allocation Index

Regional Shortage Level	Wholesale Minimum Percentage	Wholesale Reduction Percentage
1	92.5%	7.5%
2	85.0%	15.0%
3	77.5%	22.5%
4	70.0%	30.0%
5	62.5%	37.5%
6	55.0%	45.0%
7	47.5%	52.5%
8	40.0%	60.0%
9	32.5%	67.5%
10	25.0%	75.0%

This scenario is defined by the following parameters:

- 2035 water demands,
- 37.5% reduction in Tier 1 deliveries from MWD via the Rialto Feeder,
- current available capacity for groundwater wells,
- projected 2035 reasonably available surface water supplies,
- normal CDA entitlements, and
- current groundwater blending requirements.

Additional groundwater capacity that member agencies project they will add by 2035 is also considered. These 'projected additional 2035 supplies' are estimated based on the difference between reasonably available groundwater supplies in 2020 and 2035 indicated in each member agency's UWMP. The results of this scenario are intended to show which member agencies may experience supply deficits under WSAP Shortage Level 5. It also identifies those agencies with a surplus of local supplies under these circumstances.

5.2 Scenario 2 Results

The results of this scenario indicate that under WSAP Shortage Level 5, Chino and Chino Hills experience supply deficits with current supplies, with MVWD delivering all available surplus to Chino Hills. With the addition of projected 2035 supplies, only Chino Hills experiences a deficit. Other member agencies have surpluses and overall, the region has a surplus of 10% of 2035 demand with current supplies, and 17% with the addition of projected 2035 supplies.

In this scenario, direct loss of water supply capacity results from the loss of MWD imported water supplied by IEUA to CVWD, FWC, and via WFA to MVWD, Chino, Chino Hills, Ontario, and Upland. For MVWD, the loss of imported water further reduces water supply capacity because the imported water is needed to blend with water quality-impaired groundwater supplies, based on current blending requirements shown in Appendix A.

Figure 11 shows the flows from IEUA and CDA to their member agencies. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and may be evaluated as potential opportunities in the projects phase. **Figure 12** shows the supply surplus or deficit as a percentage of 2035 demand at the agency level with 2035 additional supplies. **Figure 13** shows the supply surplus or deficit as a percentage of 2035 demand at the pressure zone level but does not include 2035 additional supplies, because information about those supplies is not available at the pressure zone level.

5.3 Scenario 2 Observations

Table 9 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from imported water curtailments under WSAP Level 5. Key observations from this scenario are:

- The reduction in imported water reduces MVWD's groundwater production due to unmet blending requirements. MVWD has adequate supplies to meet its demands.
- Chino Hills is significantly impacted due to reliance on both imported supplies and purchased groundwater from MVWD.
- Ontario shows a significant supply surplus and is centrally located.
- Chino shows a supply deficit with current supplies, and a small supply surplus with additional 2035 supplies identified in the UWMP.
- CVWD, Fontana, SAWCo, and Upland all show supply surpluses with current supplies.
- As a whole, the region shows a supply surplus of 9.8% of total demand with current supplies and 17.5% with additional 2035 supplies.

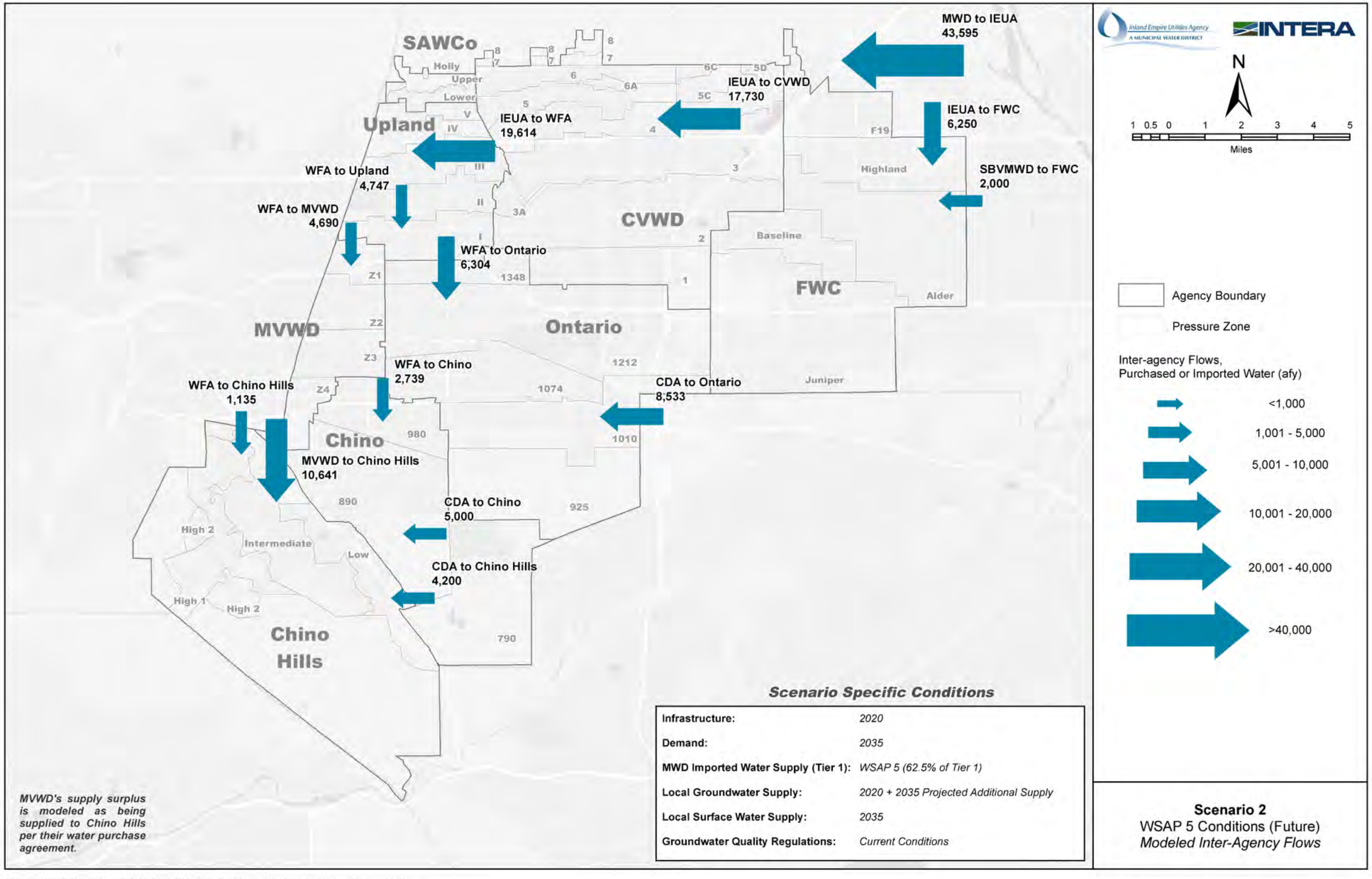

Figure 11. Scenario 2 - WSAP Level 5 Conditions, Projected Purchased or Imported Flows

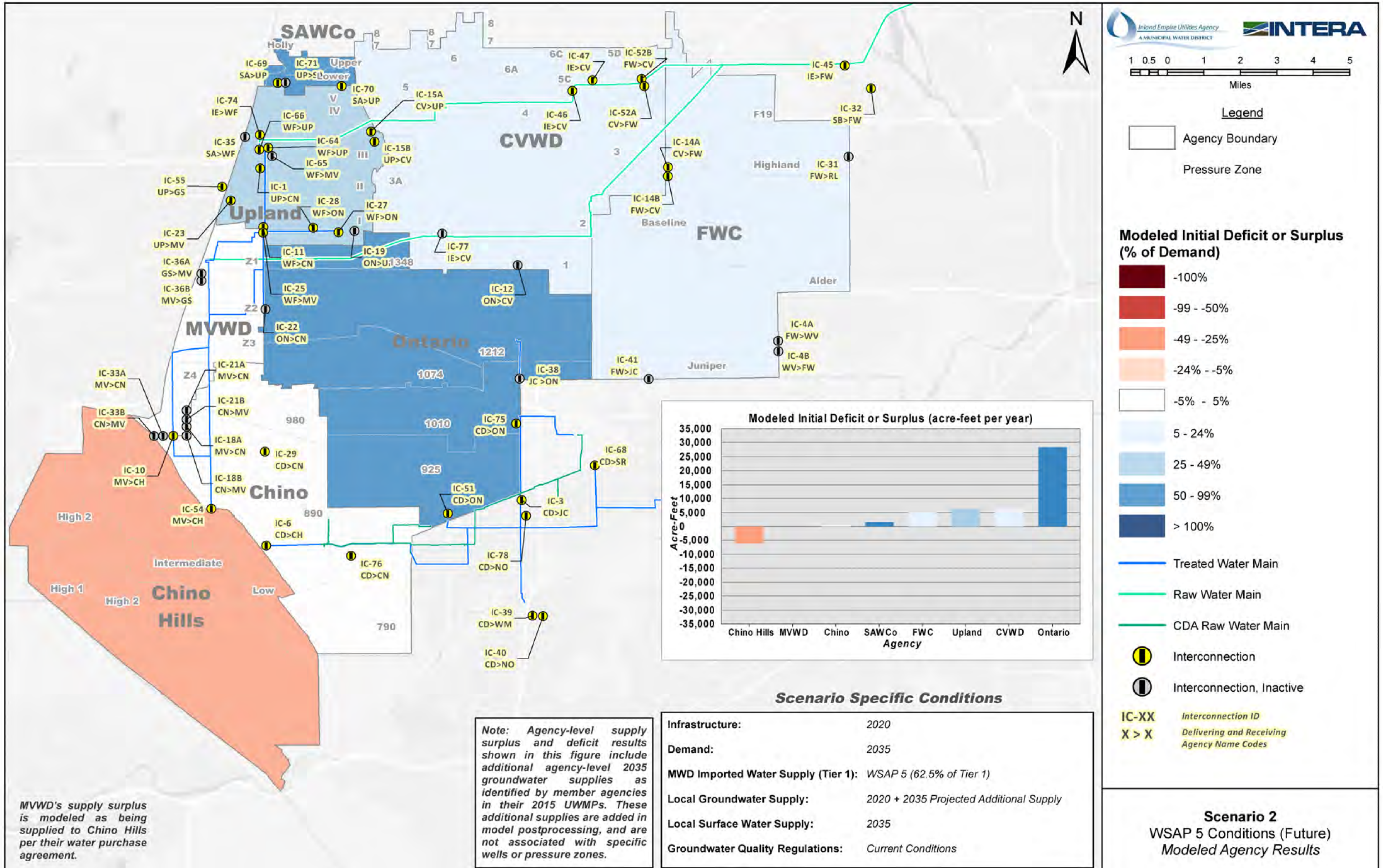

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Figure 12. Scenario 2 - WSAP Level 5 Conditions, Projected Agency-Level Surplus or Deficit (2035 Supplies)

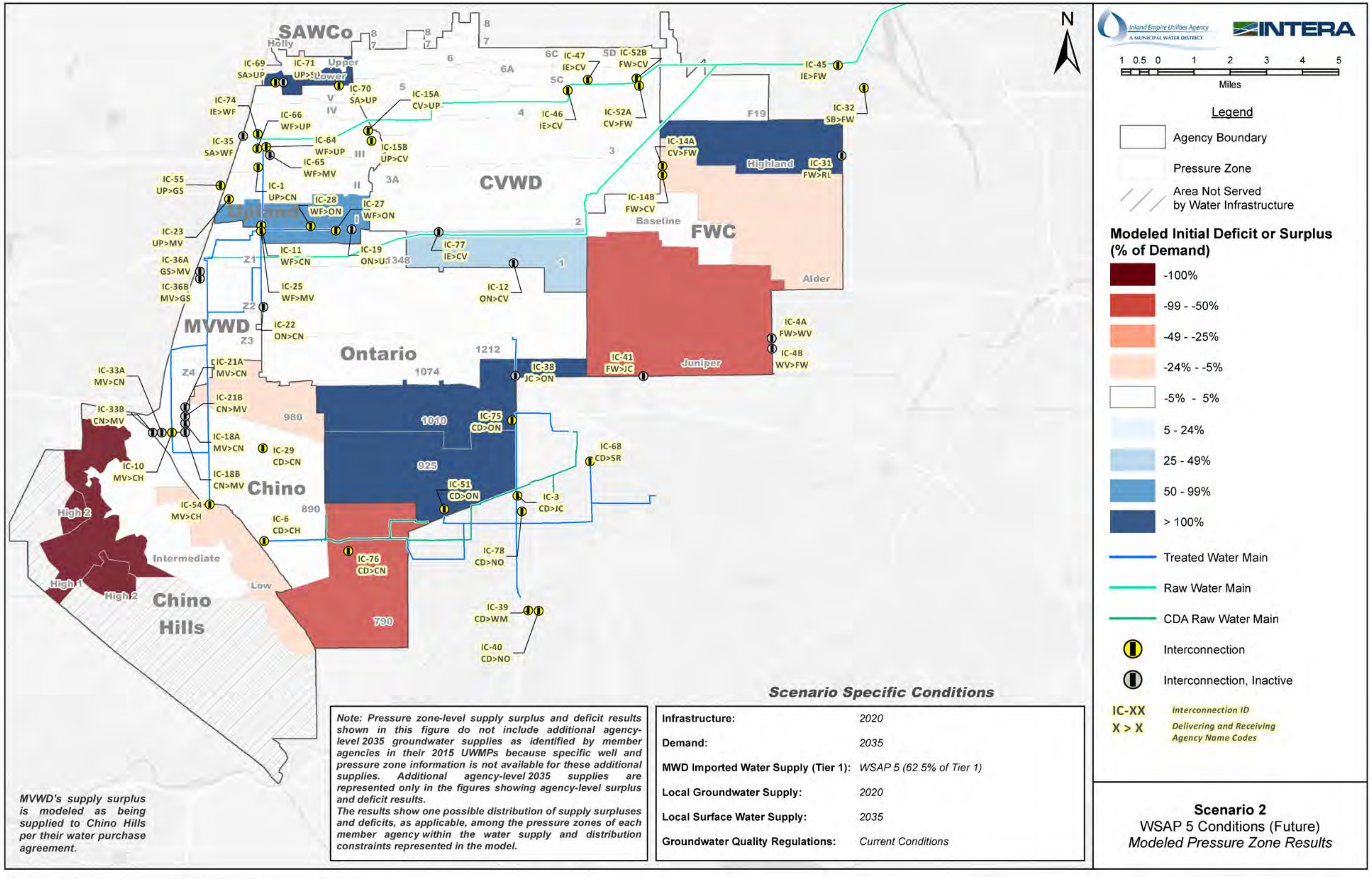

Figure 13. Scenario 2 - WSAP Level 5 Conditions, Projected Pressure Zone-Level Surplus or Deficit (Current Supplies)

Table 9. Summary of Results for Scenario 2 WSAP Level 5 Conditions

Member Agency	Demand	Supply Capacity								Surplus or Deficit				
	Demand (2035)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply Capacity	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity		
												Projected Additional Supply Capacity	Projected Supply Capacity Surplus or Deficit	Projected Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand			
Chino	20,946	2,739	5,000	0	0	10,405	0	0	18,145	**(2,802)**	**-13.38%**	3,161	**359**	**1.72%**
Chino Hills	22,146	1,135	4,200	0	10,641	0	0	0	15,976	**(6,170)**	**-27.86%**	0	**(6,170)**	**-27.86%**
CVWD	63,701	17,730	0	0	0	32,687	10,539	4,541	65,497	**1,797**	**2.82%**	4,895	**6,692**	**10.51%**
Fontana	51,211	6,250	0	2,000	0	27,566	11,846	5,700	53,363	**2,151**	**4.20%**	3,227	**5,379**	**10.50%**
MVWD	12,360	4,690	0	0	(10,641)	18,311	0	0	12,360	**0**	**0.00%**	0	**0**	**0.00%**
Ontario	47,792	6,304	8,533	0	0	53,947	0	0	68,784	**20,992**	**43.92%**	7,384	**28,376**	**59.37%**
SAWCo	1,569	0	0	0	0	2,202	0	847	3,049	**1,479**	**94.24%**	0	**1,479**	**94.24%**
Upland	23,926	4,747	0	0	0	14,304	9,488	1,781	30,319	**6,394**	**26.72%**	0	**6,394**	**26.72%**
Totals	**243,652**	**43,595**	**17,733**	**2,000**	**0**	**159,423**	**31,873**	**12,869**	**267,493**	**23,841**	**9.78%**	**18,668**	**42,509**	**17.45%**

Demand (2035) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

6.0 SCENARIO 3 – ANTICIPATED REGULATORY CHANGES (CURRENT)

6.1 Scenario 3 Description

This *likely* scenario reflects the impacts of *Anticipated* regulatory changes to drinking water quality standards on water supply availability in the near-term (2020). In response to feedback from member agencies, the scenarios that involve regulatory changes were revised to be specific in terms of contaminants of concern to the member agencies and, to the extent possible with available data, to reflect the varying impacts to member agencies. The revised approach was developed based on review of well-specific information provided by member agencies, groundwater quality information reported in the 2020 Optimum Basin Management Program (OBMP), and member agency priorities and concerns expressed in one-on-one meetings. Perchlorate, and per- and polyfluoroalkyl substances (PFAS) were identified as contaminants that will likely be subject to changes in regulation, are known or expected to be prevalent, and for which member agencies have not yet implemented treatment or other mitigating measures. Considering these factors, they were selected as the basis for scenarios involving *Anticipated* regulatory changes.

In 2015, the California EPA's Office of Environmental Health Hazard Assessment (OEHHA) revised the Public Health Goal (PHG) for perchlorate from 6 parts per billion (ppb) to 1 ppb, prompting review by DDW of the current Maximum Contaminant Level (MCL) of 6 ppb for perchlorate. In scenarios involving *Anticipated* regulatory changes, wells with reported historical perchlorate levels of 1 ppb or more are removed from service, unless they have existing ion exchange (IX) or reverse osmosis (RO) treatment.

In August 2019, DDW established Notification Levels (NL's) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) of 5.1 parts per trillion (ppt) and 6.5 ppt, respectively. In February 2020, DDW announced that the Response Levels (RLs) for PFOA and PFOS were lowered to 10 ppt and 40 ppt, respectively, based on health recommendations from the OEHHA. At the time of the analysis, little PFOA and PFOS occurrence data was available from CBWM or DDW. Based on the percentage of wells for which data was available, the rate of occurrence of PFOA or PFOS was approximately 50%. Based on this and because well specific data is not available for most wells, for scenarios involving *Anticipated* regulatory changes, impacts are generalized by assuming that the capacity of all wells is reduced by 25%, unless they have existing granular activated carbon (GAC), IX, or RO treatment.

As modeled, *Anticipated* regulatory changes result in a 42% (100,405 AFY) reduction in currently available regional groundwater capacity. Additional details pertaining to the parameters used to model future regulatory changes and agency-level reductions in available groundwater capacity are provided in Appendix B.

This scenario is defined by the following parameters:

- 2020 water demands,

- 2020 reasonably available local surface water supplies,
- allocation of Tier 1 imported and CDA supplies according to each agency's entitlement,
- reduced available capacity of groundwater wells without appropriate treatment for perchlorate or PFAS, and
- current groundwater blending requirements.

The results of this scenario are intended to show which member agencies may experience supply deficits in the near-term without additional treatment if *Anticipated* regulatory changes are implemented. It also identifies those agencies with a surplus of local supplies under these circumstances.

6.2 Scenario 3 Results

The results of this scenario indicate that, in the near-term, *Anticipated* changes to regulations for perchlorate and PFAS would cause half of the member agencies (Chino Hills, CVWD, SAWCo, and Upland) to experience supply deficits ranging from 6% to 42% of 2020 demand, with MVWD delivering all available surplus to Chino Hills. Three member agencies (Chino, Fontana, and Ontario) have surpluses, and overall, the region has a slight deficit of less than 1% of 2020 demand.

In this scenario, all member agencies lose a portion of their available groundwater capacity due to *Anticipated* changes to regulations for perchlorate and PFAS. **Figure 14** shows the flows from IEUA and CDA to their member agencies. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and may be evaluated as potential solutions in the projects phase. **Figure 15** and **Figure 16** show the supply surplus or deficit as a percentage of 2020 demand at the agency level with current supplies, and at the agency and pressure-zone level, respectively.

6.3 Scenario 3 Observations

Table 10 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from these conditions. Key observations from this scenario are:

- All member agencies lose significant available groundwater capacity due to *Anticipated* changes to regulations for perchlorate and PFAS without additional treatment. Agency-level reductions range from 7% to 81%.
- Without additional treatment, the region loses 42% (100,405 AFY) of available groundwater capacity, or approximately 33% of total regional potable water supplies.
- MVWD shows adequate supplies to meet its demands.
- Chino Hills, CVWD, SAWCo, and Upland all show supply deficits, which may be limited to specific pressure zones based on operations.
- Chino and Fontana both show supply surpluses, due in part to existing groundwater treatment.
- Ontario shows a significant supply surplus and is centrally located to three of the four agencies with deficits.
- As a whole, the region shows a slight supply deficit of 0.2%.

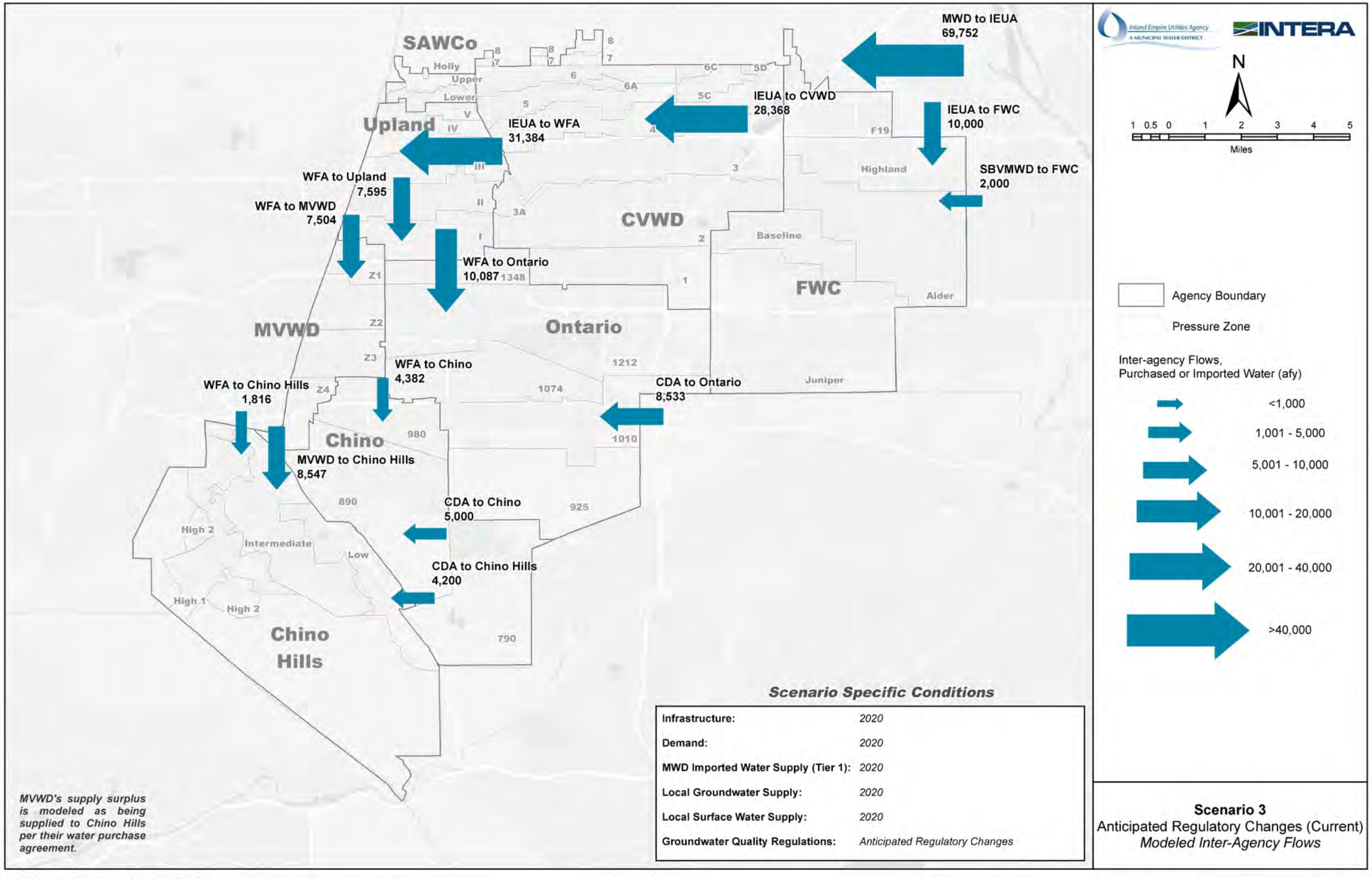

Figure 14. Scenario 3 - Anticipated Regulatory Changes (Current), Projected Purchased or Imported Flows

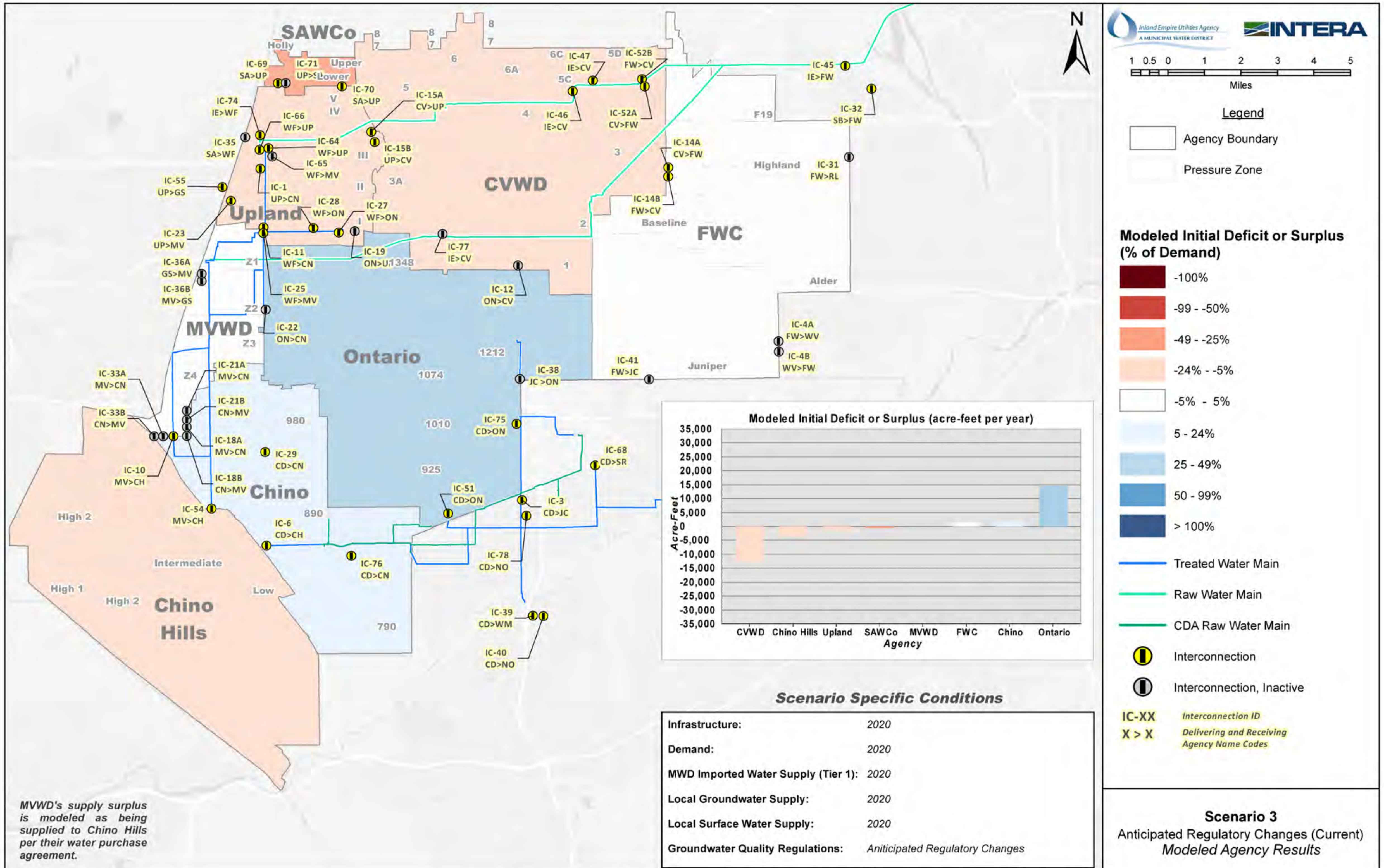

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Figure 15. Scenario 3 - Anticipated Regulatory Changes (Current), Projected Agency-Level Surplus or Deficit (Current Supplies)

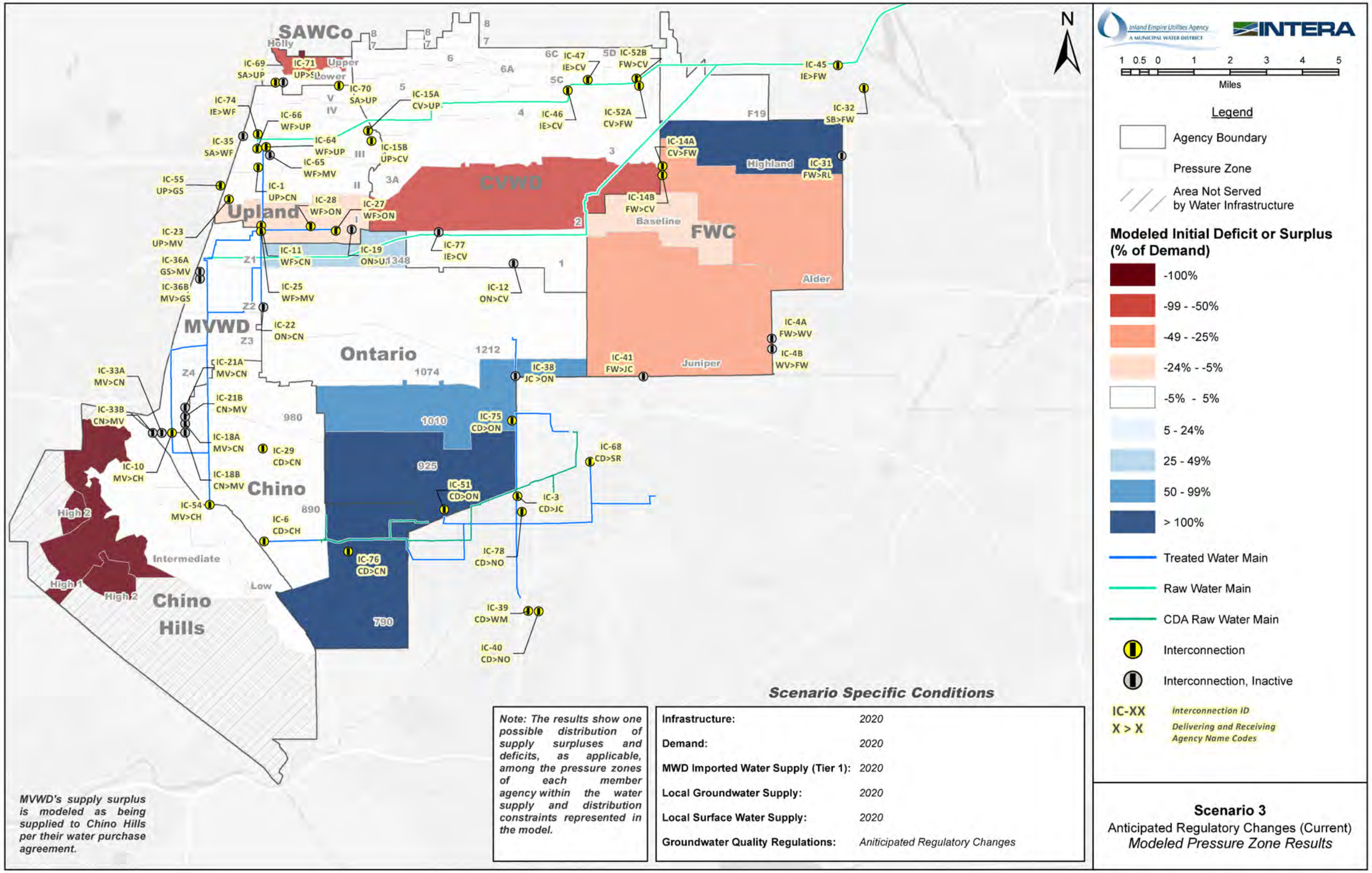

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Figure 16. Scenario 3 - Anticipated Regulatory Changes (Current), Projected Pressure Zone-Level Surplus or Deficit (Current Supplies)

Table 10. Summary of Results for Scenario 3 Anticipated Regulatory Changes (Current)

Member Agency	Demand	Supply Capacity								Surplus or Deficit	
	Demand (2020)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply Capacity	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand
Chino	17,262	4,382	5,000	0	0	9,680	0	0	19,062	**1,800**	**10.4%**
Chino Hills	18,109	1,816	4,200	0	8,547	0	0	0	14,563	**-3,546**	**-19.6%**
CVWD	58,900	28,368	0	0	0	9,465	3,949	4,541	46,322	**-12,578**	**-21.4%**
Fontana	39,139	10,000	0	2,000	0	15,128	7,771	5,700	40,600	**1,461**	**3.7%**
MVWD	11,518	7,504	0	0	(8,547)	12,561	0	0	11,518	**0**	**0.0%**
Ontario	31,441	10,087	8,533	0	0	27,310	0	0	45,929	**14,489**	**46.1%**
SAWCo	1,469	0	0	0	0	0	0	847	847	**-623**	**-42.4%**
Upland	21,664	7,595	0	0	0	8,186	2,749	1,781	20,310	**-1,354**	**-6.2%**
Totals	**199,504**	**69,752**	**17,733**	**2,000**	**0**	**82,330**	**14,469**	**12,869**	**199,153**	**-351**	**-0.2%**

Demand (2020) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

7.0 SCENARIO 4 – ANTICIPATED REGULATORY CHANGES (FUTURE)

7.1 Scenario 4 Description

This *likely* scenario reflects the impacts of *Anticipated* regulatory changes to drinking water quality standards on water supply availability in the future (2035). Scenario 4 may be compared to Scenario 3, the only difference being 2035 demands and local supplies. In response to feedback from member agencies, the scenarios that involve regulatory changes were revised to be specific in terms of contaminants of concern to the member agencies and, to the extent possible with available data, to reflect the varying impacts to member agencies. The revised approach was developed based on review of well-specific information provided by member agencies, groundwater quality information reported in the 2020 Optimum Basin Management Program (OBMP), and member agency priorities and concerns expressed in one-on-one meetings. Perchlorate, and per- and polyfluoroalkyl substances (PFAS) were identified as contaminants that will likely be subject to changes in regulation, are known or expected to be prevalent, and for which member agencies have not yet implemented treatment or other mitigating measures. Considering these factors, they were selected as the basis for scenarios involving *Anticipated* regulatory changes.

In 2015, the California EPA's Office of Environmental Health Hazard Assessment (OEHHA) revised the Public Health Goal (PHG) for perchlorate from 6 parts per billion (ppb) to 1 ppb, prompting review by DDW of the current Maximum Contaminant Level (MCL) of 6 ppb for perchlorate. In scenarios involving *Anticipated* regulatory changes, wells with reported historical perchlorate levels of 1 ppb or more are removed from service, unless they have existing ion exchange (IX) or reverse osmosis (RO) treatment.

In August 2019, DDW established Notification Levels (NL's) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) of 5.1 parts per trillion (ppt) and 6.5 ppt, respectively. In February 2020, DDW announced that the Response Levels (RLs) for PFOA and PFOS were lowered to 10 ppt and 40 ppt, respectively, based on health recommendations from the OEHHA. At the time of the analysis, little PFOA and PFOS occurrence data was available from CBWM or DDW. Based on the percentage of wells for which data was available, the rate of occurrence of PFOA or PFOS was approximately 50%. Based on this and because well specific data is not available for most wells, for scenarios involving *Anticipated* regulatory changes, impacts are generalized by assuming that the capacity of all wells is reduced by 25%, unless they have existing granular activated carbon (GAC), IX, or RO treatment.

As modeled, *Anticipated* regulatory changes result in a 42% (100,405 AFY) reduction in currently available regional groundwater capacity. Additional details pertaining to the parameters used to model future regulatory changes and agency-level reductions in available groundwater capacity are provided in Appendix B.

This scenario is defined by the following parameters:

- 2035 water demands,
- 2035 reasonably available local surface water supplies,
- allocation of Tier 1 imported and CDA supplies according to each agency's entitlement,
- reduced available capacity of groundwater wells without appropriate treatment for perchlorate or PFAS, and.
- current groundwater blending requirements.

The results of this scenario are intended to show which member agencies may experience supply deficits in the long-term without additional treatment if *Anticipated* regulatory changes are implemented. It also identifies those agencies with a surplus of local supplies under these circumstances.

7.2 Scenario 4 Results

The results of this scenario indicate that, in the long-term, *Anticipated* changes to regulations for perchlorate and PFAS would cause all member agencies except for MVWD to experience supply deficits ranging from 4% to 46% of 2035 demand with current supplies, with MVWD delivering all available surplus to Chino Hills. With the addition of projected 2035 supplies, five agencies (Chino Hills, CVWD, Fontana, SAWCo, and Upland) experience deficits ranging from 14% to 46%, with MVWD delivering all available surplus to Chino Hills. Two member agencies (Chino and Ontario) have small surpluses, and overall, the region has a deficit of 18% of 2035 demand with current supplies, and 11% with the addition of projected 2035 supplies.

Figure 17 shows the flows from IEUA and CDA to their member agencies. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and will be evaluated as potential solutions in the projects phase. **Figure 18** and **Figure 19** show the supply surplus or deficit as a percentage of 2035 demand at the agency and pressure-zone level, respectively.

7.3 Scenario 4 Observations

Table 11 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from current water quality impairment. Key observations from this scenario are:

- All member agencies lose significant available groundwater capacity due to *Anticipated* changes to regulations for perchlorate and PFAS without additional treatment. Reductions for each agency range from 7% to 81%.
- Without additional treatment, the region loses 42% (100,405 AFY) of available groundwater capacity, or approximately 33% of total regional potable water supplies.
- Increased future demand results in more agencies with deficits due to *Anticipated* changes to regulations. With current supplies, all agencies except for MVWD show deficits. Chino and Ontario move from supply deficits to surpluses with additional 2035 supplies identified in the UWMP.

- MVWD shows adequate supplies to meet its demands.
- As a whole, the region shows supply deficits of 18.3% of total demand with current supplies and 10.6% with additional 2035 supplies.

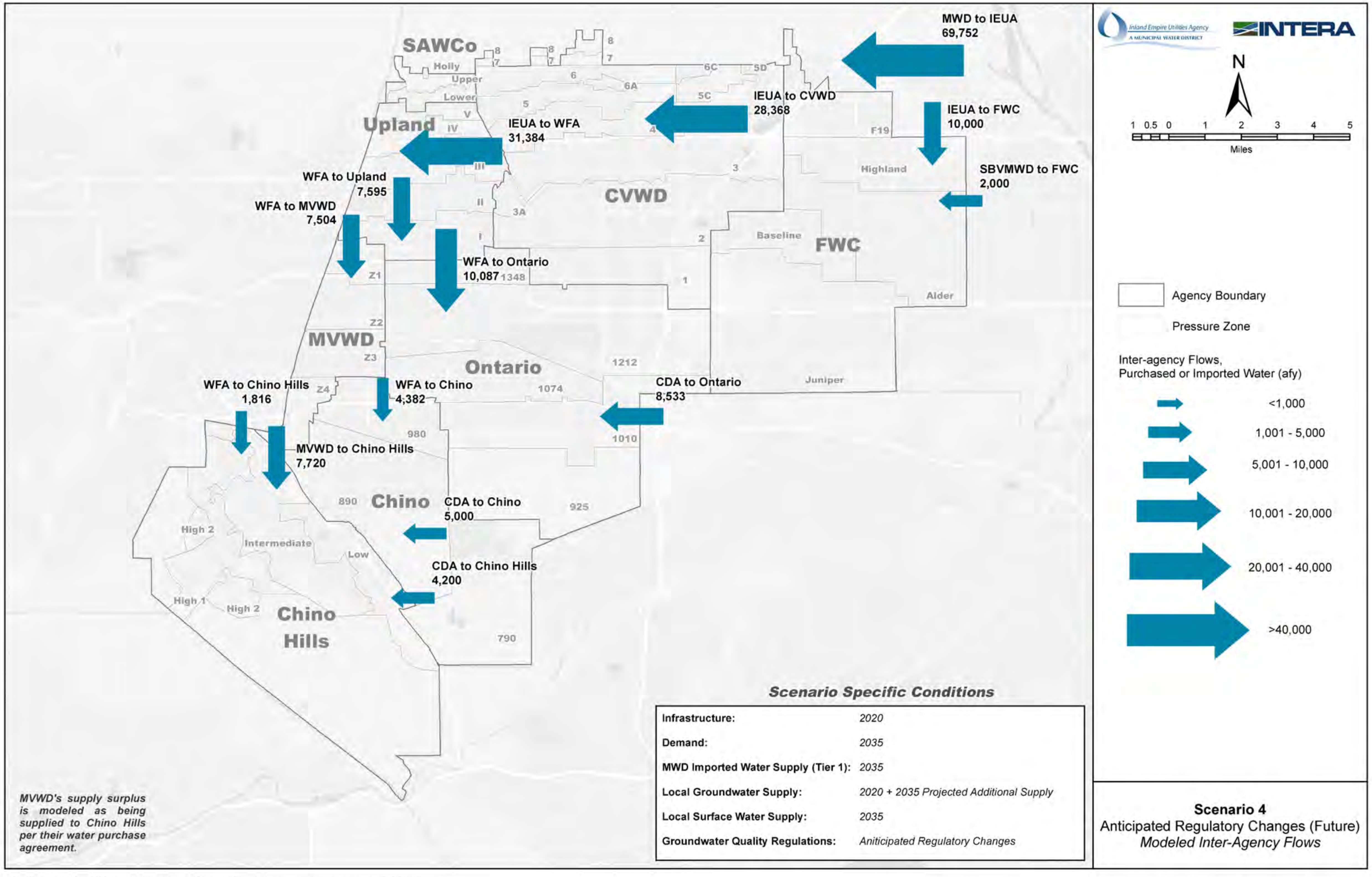

Figure 17. Scenario 4 - Anticipated Regulatory Changes (Future), Projected Purchased or Imported Flows

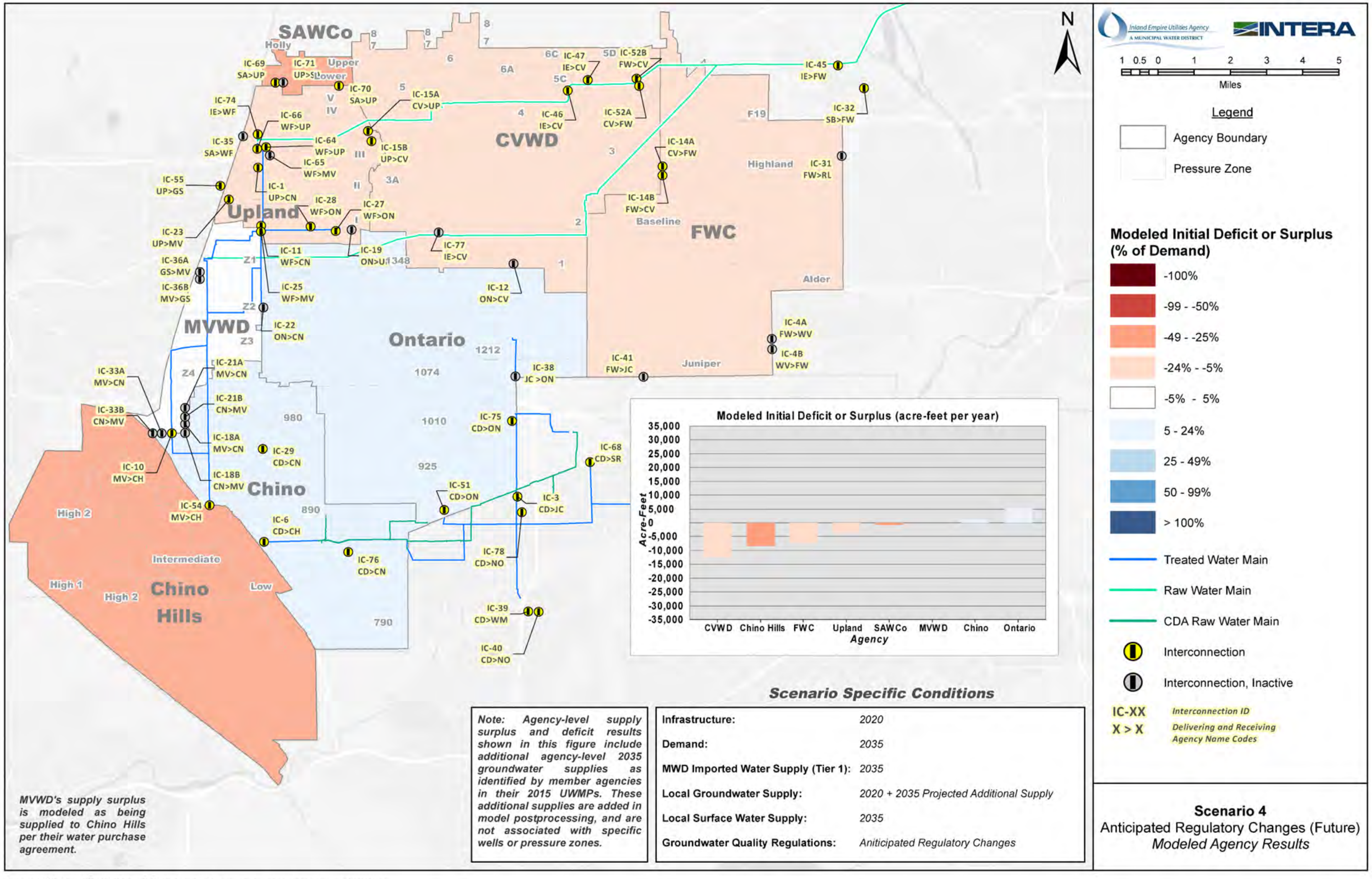

Figure 18. Scenario 4 - Anticipated Regulatory Changes (Future), Projected Agency-Level Surplus or Deficit

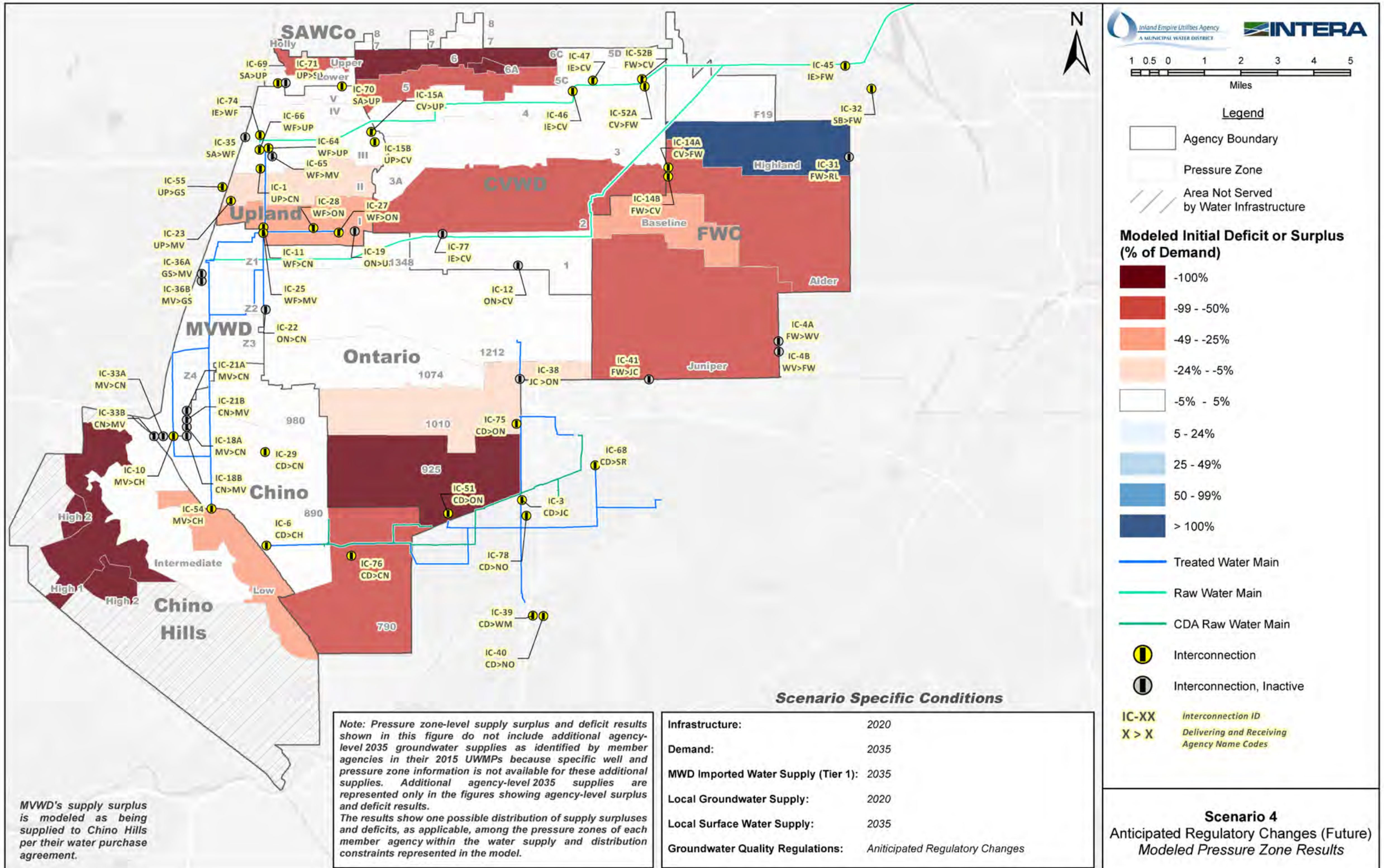

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Figure 19. Scenario 4 - Anticipated Regulatory Changes (Future), Projected Pressure Zone-Level Surplus or Deficit (Current Supplies)

Table 11. Summary of Results for Scenario 4 Anticipated Regulatory Changes (Future)

Member Agency	Demand	Supply Capacity								Supply Capacity Surplus or Deficit				
	Demand (2035)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity		
												Projected Additional Supply Capacity	Projected Supply Capacity Surplus or Deficit	Projected Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand			
Chino	20,946	4,382	5,000	0	0	9,680	0	0	19,062	**(1,885)**	**-9.00%**	3,161	**1,277**	**6.10%**
Chino Hills	22,146	1,816	4,200	0	7,720	0	0	0	13,736	**(8,410)**	**-37.98%**	0	**(8,410)**	**-37.98%**
CVWD	63,701	28,368	0	0	0	9,465	3,949	4,541	46,322	**(17,378)**	**-27.28%**	4,895	**(12,483)**	**-19.60%**
Fontana	51,211	10,000	0	2,000	0	15,128	7,771	5,700	40,600	**(10,611)**	**-20.72%**	3,227	**(7,384)**	**-14.42%**
MVWD	12,360	7,504	0	0	(7,720)	12,577	0	0	12,361	**0**	**0.00%**	0	**0**	**0.00%**
Ontario	47,792	10,087	8,533	0	0	27,310	0	0	45,929	**(1,862)**	**-3.90%**	7,384	**5,522**	**11.55%**
SAWCo	1,569	0	0	0	0	0	0	847	847	**(723)**	**-46.04%**	0	**(723)**	**-46.04%**
Upland	23,926	7,595	0	0	0	8,186	2,749	1,781	20,310	**(3,615)**	**-15.11%**	0	**(3,615)**	**-15.11%**
Totals	**243,652**	**69,752**	**17,733**	**2,000**	**0**	**82,345**	**14,469**	**12,869**	**199,168**	**(44,484)**	**-18.26%**	**18,668**	**(25,816)**	**-10.60%**

Demand (2035) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

8.0 SCENARIO 5 – ANTICIPATED & UNKNOWN REGULATORY CHANGES

8.1 Scenario 5 Description

This *possible* scenario reflects the impacts of *Anticipated* and *Unknown* regulatory changes to drinking water quality standards on water supply availability in the long-term (2035). Scenario 5 may be compared to Scenario 4 with additional *Unknown* regulatory changes. *Anticipated* regulatory changes related to known contaminants perchlorate and per- and polyfluoroalkyl substances (PFAS) are as described in Scenarios 3 and 4. In this scenario, additional *Unknown* regulatory changes are modeled to represent future regulations for a yet-to-be identified contaminant of emerging concern (CEC). Because contaminant-specific and well-specific information is not available the impact of future *Unknown* regulatory changes is generalized as a 25% reduction in capacity for all wells without some form of treatment. As modeled, the cumulative effect of *Anticipated* and *Unknown* regulatory changes results in a 51% (122,637 AFY) reduction in available regional groundwater capacity. Additional details pertaining to the parameters used to model future regulatory changes and agency-level reductions in available groundwater capacity are provided in Appendix B.

This scenario is defined by the following parameters:

- 2035 water demands,
- 2035 reasonably available local surface water supplies,
- allocation of Tier 1 imported and CDA supplies according to each agency's entitlement,
- reduced available capacity of groundwater wells without appropriate treatment for perchlorate or PFAS,
- reduced available capacity of groundwater wells without treatment for a future yet-to-be identified contaminant of emerging concern (CEC), and
- current groundwater blending requirements.

The results of this scenario are intended to show which member agencies may experience supply deficits in the long-term without additional treatment if *Anticipated* and *Unknown* regulatory changes are implemented. It also identifies those agencies with a surplus of local supplies under these circumstances.

8.2 Scenario 5 Results

The results of this scenario indicate that, in the near-term, *Anticipated* and *Unknown* regulatory changes would cause all member agencies except for MVWD to experience supply deficits ranging from 9% to 47% of 2035 demand with current supplies, with MVWD delivering all available surplus to Chino Hills. With the addition of projected 2035 supplies, all agencies except for Chino and MVWD experience deficits ranging from 4% to 47%, with MVWD delivering all available surplus to Chino Hills. Chino has a small surplus of 6% with projected 2035 supplies, and overall, the region has a deficit of 27% of 2035 demand with current supplies, and 20% with the addition of projected 2035 supplies.

Figure 20 shows the flows from IEUA and CDA to their member agencies. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and will be evaluated as potential solutions in the projects phase. **Figure 21** shows the supply surplus or deficit as a percentage of 2035 demand at the agency level with projected 2035 supplies. **Figure 22** shows the supply surplus or deficit as a percentage of 2035 demand at the pressure-zone level with current supplies.

8.3 Scenario 5 Observations

Table 12 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from future water quality impairment. Key observations from this scenario are:

- All member agencies lose significant available groundwater capacity due to *Anticipated* and *Unknown* changes to regulations without additional treatment. Reductions for each agency range from 7% to 81%.
- Without additional treatment, the region loses 51% (122,637 AFY) of available groundwater capacity, or approximately 41% of current total regional potable water supplies.
- With current supplies, all agencies except for MVWD show deficits. Chino moves from a supply deficit to a surplus with additional 2035 supplies identified in the UWMP.
- MVWD shows adequate supplies to meet its demands.
- As a whole, the region shows supply deficits of 27.4% of total demand with current supplies and 19.7% with additional 2035 supplies.

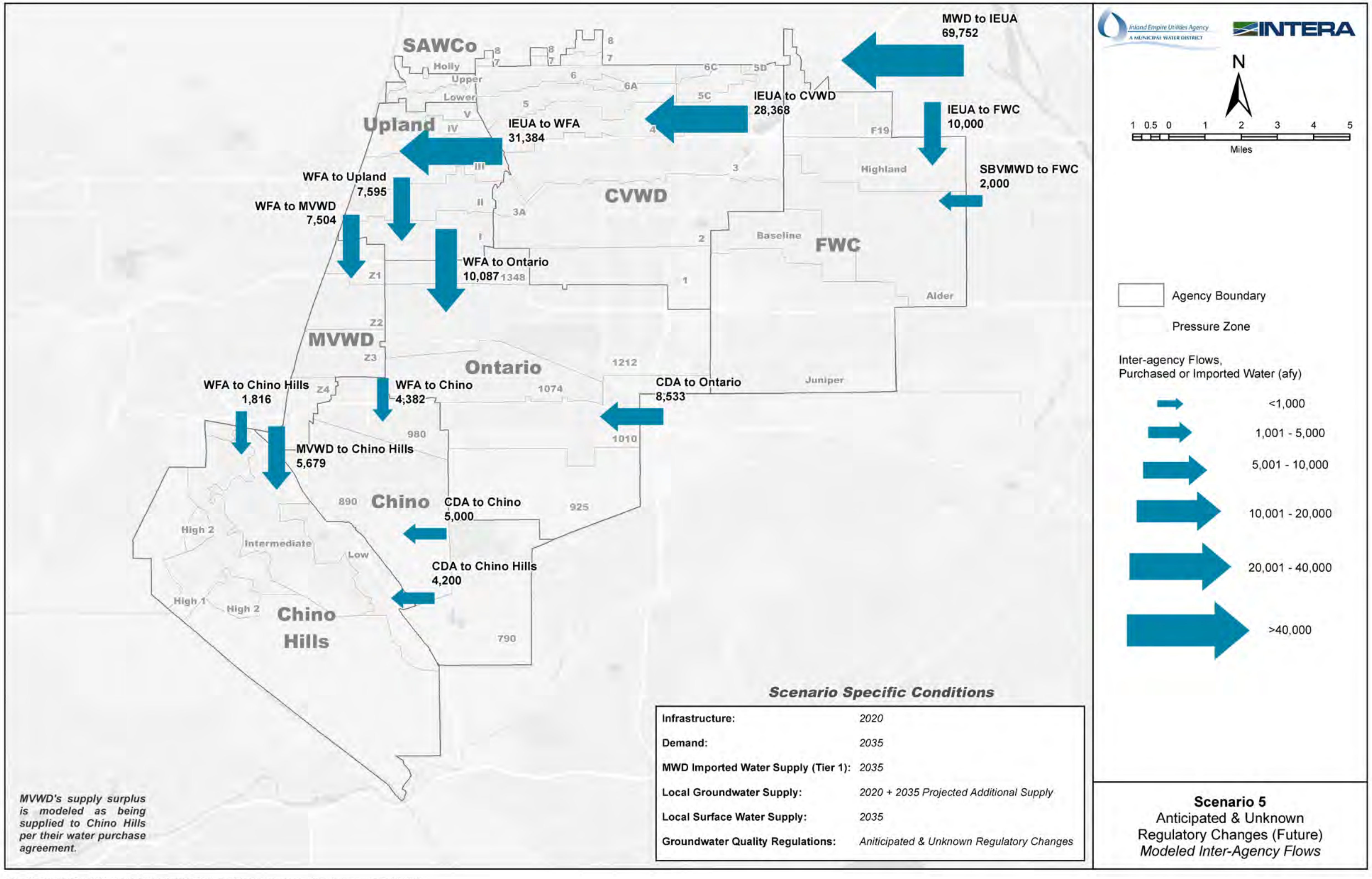

Figure 20. Scenario 5 - Anticipated & Unknown Regulatory Changes, Projected Purchased or Imported Flows

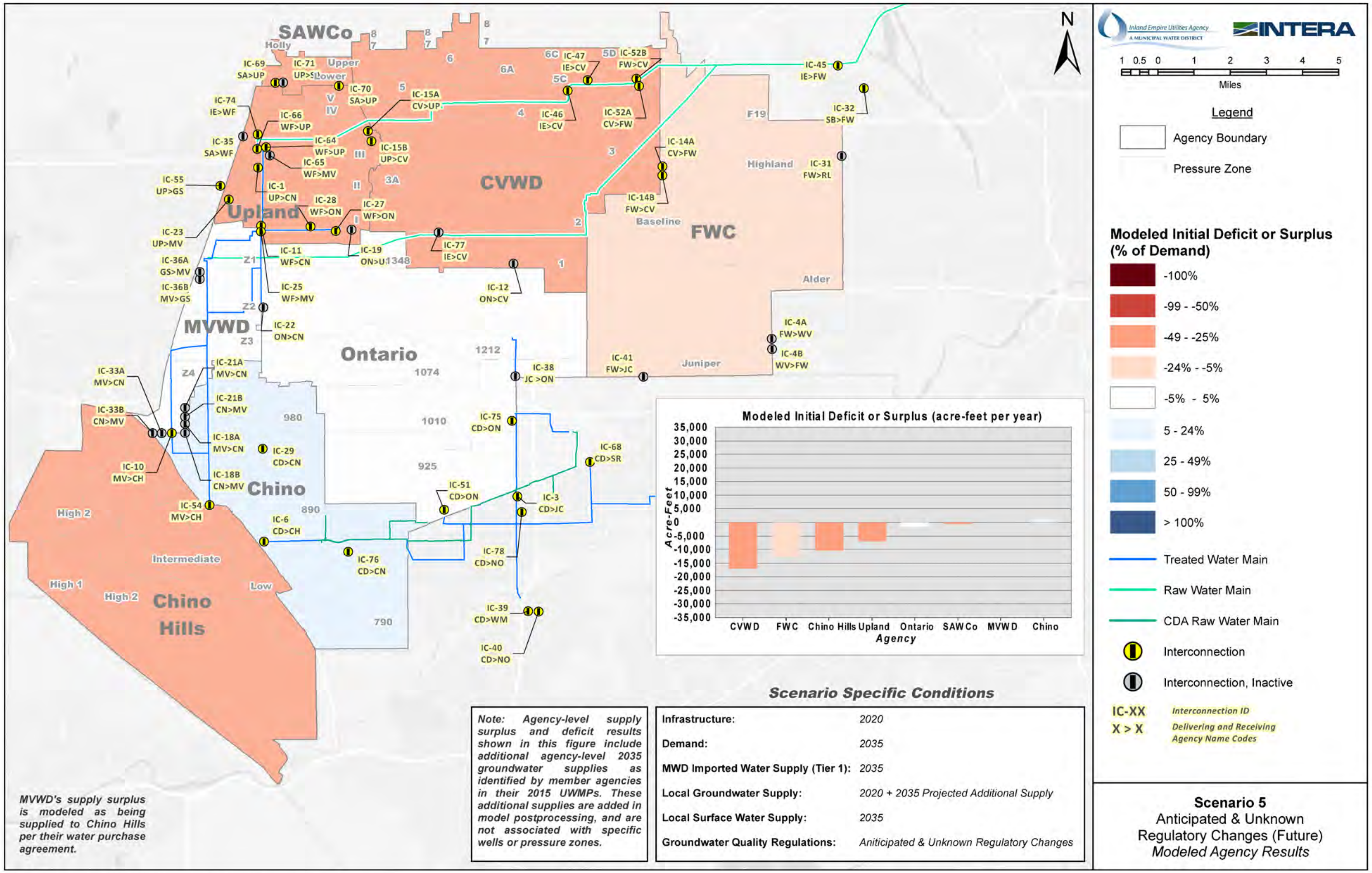

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Figure 21. Scenario 5 - Anticipated & Unknown Regulatory Changes, Projected Agency-Level Surplus or Deficit

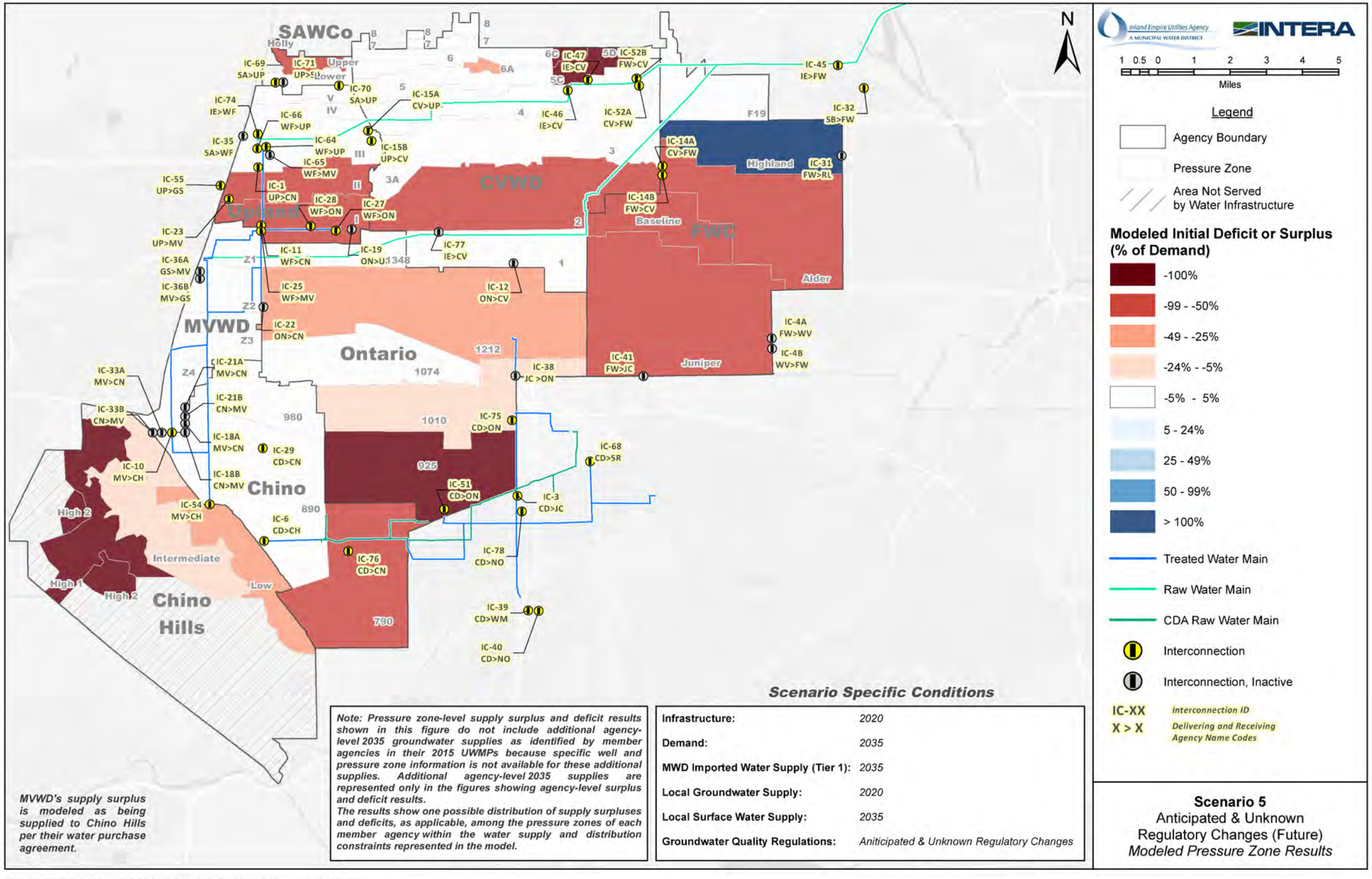

Figure 22. Scenario 5 - Anticipated & Unknown Regulatory Changes, Projected Pressure Zone-Level Surplus or Deficit (Current Supplies)

Table 12. Summary of Results for Scenario 5 Anticipated & Unknown Regulatory Changes

Member Agency	Demand	Supply Capacity								Supply Capacity Surplus or Deficit				
	Demand (2035)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity: Projected Additional Supply Capacity	Estimated 2035 Added Capacity: Projected Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity: Projected Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand			
Chino	20,946	4,382	5,000	0	0	9,680	0	0	19,062	**(1,885)**	**-9.00%**	3,161	**1,277**	**6.10%**
Chino Hills	22,146	1,816	4,200	0	5,679	0	0	0	11,695	**(10,451)**	**-47.19%**	0	**(10,451)**	**-47.19%**
CVWD	63,701	28,368	0	0	0	6,312	2,634	4,541	41,854	**(21,846)**	**-34.30%**	4,895	**(16,951)**	**-26.61%**
Fontana	51,211	10,000	0	2,000	0	11,441	6,352	5,700	35,493	**(15,718)**	**-30.69%**	3,227	**(12,490)**	**-24.39%**
MVWD	12,360	7,504	0	0	(5,679)	10,535	0	0	12,360	**0**	**0.00%**	0	**0**	**0.00%**
Ontario	47,792	10,087	8,533	0	0	20,022	0	0	38,642	**(9,150)**	**-19.14%**	7,384	**(1,766)**	**-3.69%**
SAWCo	1,569	0	0	0	0	0	0	847	847	**(723)**	**-46.04%**	0	**(723)**	**-46.04%**
Upland	23,926	7,595	0	0	0	5,457	2,150	1,781	16,983	**(6,943)**	**-29.02%**	0	**(6,943)**	**-29.02%**
Totals	**243,652**	**69,752**	**17,733**	**2,000**	**0**	**63,447**	**11,136**	**12,869**	**176,937**	**(66,715)**	**-27.38%**	**18,668**	**(48,047)**	**-19.72%**

Demand (2035) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

9.0 SCENARIO 6 – MULTI-YEAR DROUGHT & ANTICIPATED REGULATORY CHANGES

9.1 Scenario 6 Description

This *very unlikely* scenario reflects severe circumstances including future multi-year drought conditions involving curtailment of imported water deliveries and reduced availability of local surface water and groundwater supplies due to drought conditions, and *Anticipated* changes to groundwater regulations. A multi-year drought generally results in reduced availability of local surface water, reduced imported water deliveries from MWD, constraints on use of impaired groundwater due to lack of imported water for blending, and conservation measures and restrictions. In the UWMPs, supply availability in multi-year drought conditions is reported for the third year, hence this scenario represents the vulnerability of the agencies to water supply shortages in the third dry year of a multi-year drought. WSAP Shortage Level 9 (**Table 8**) is used as the basis for this scenario.

This scenario is defined by the following parameters:

- 2035 water demands,
- 67.5% reduction in deliveries from MWD,
- reduction in imported water from SBVMWD to Fontana and local surface water supplies according to multiple dry-year reasonably available supplies,
- normal CDA entitlements,
- reduced available capacity of groundwater wells without appropriate treatment for perchlorate or PFAS, and
- current groundwater blending requirements.

Additional groundwater capacity that member agencies project they will add by 2035 is also considered. These additional supplies are estimated based on the difference between reasonably available supplies in 2020 and 2035 indicated in each member agency's UWMP. The results of this scenario show which member agencies may experience supply deficits under conditions of multi-year drought. It also identifies those agencies with a surplus of local supplies under these circumstances.

9.2 Scenario 6 Results

The results of this scenario indicate that under extreme conditions of severe drought and *Anticipated* regulatory changes all member agencies except for MVWD would experience supply deficits ranging from 18% to 71% of 2035 demand with current supplies, with MVWD delivering all available surplus to Chino Hills. With the addition of projected 2035 supplies, all agencies except for MVWD experience deficits ranging from 3% to 71%, with MVWD delivering all available surplus to Chino Hills. Overall, the region has a deficit of 41% of 2035 demand with current supplies, and 33% with the addition of projected 2035 supplies.

Figure 23 shows the flows from IEUA and CDA to their member agencies. MVWD transfers its surplus supplies to Chino Hills per their water purchase agreement. Other potential inter-agency transfers are not represented and will be evaluated as potential solutions in the projects phase. **Figure 24** shows the supply surplus or deficit as a percentage of 2035 demand at the agency level with projected 2035 supplies. **Figure 25** shows the supply surplus or deficit as a percentage of 2035 demand at the pressure-zone level with current supplies.

9.3 Scenario 6 Observations

Table 13 summarizes the demands, available supplies, and estimated deficit or surplus for each member agency resulting from severe drought and Anticipated changes to water quality regulations. Key observations from this scenario are:

- All member agencies lose significant available groundwater capacity due to *Anticipated* changes to regulations without additional treatment. Reductions for each agency range from 7% to 81%.
- Without additional treatment, the region loses 42% (100,405 AFY) of available groundwater capacity, or approximately 33% of current total regional potable water supplies.
- In this extreme scenario, all agencies except for MVWD show deficits and none show surplus supply capacity.
- All agencies except for MVWD show deficits with current supplies and with additional 2035 supplies identified in the UWMP.
- MVWD shows adequate supplies to meet its demands.
- As a whole, the region shows supply deficits of 40.8% of total demand with current supplies and 33.2% with additional 2035 supplies.

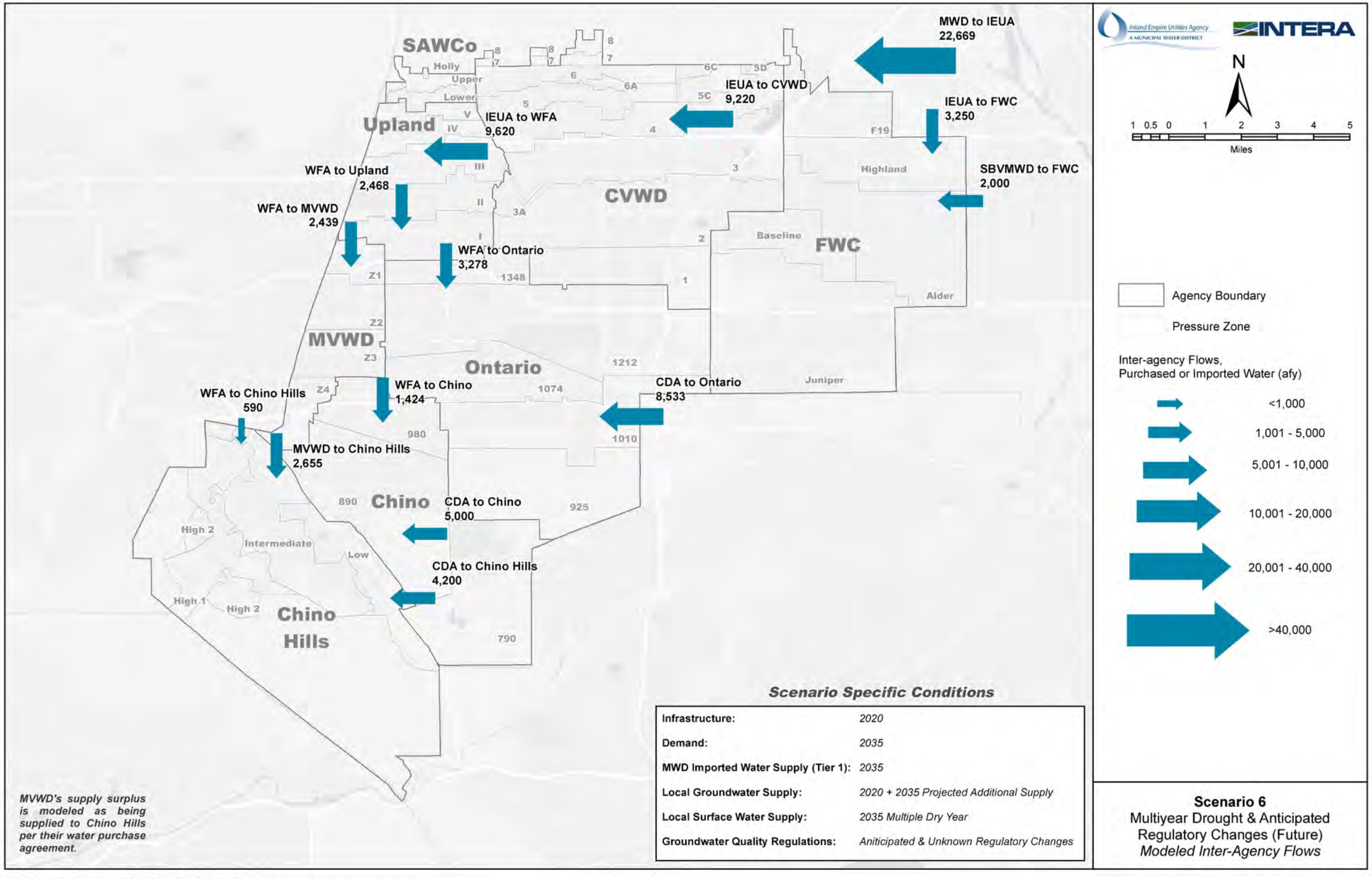

Figure 23. Scenario 6 - Multi-Year Drought & Anticipated Regulatory Changes, Projected Purchased or Imported Flows

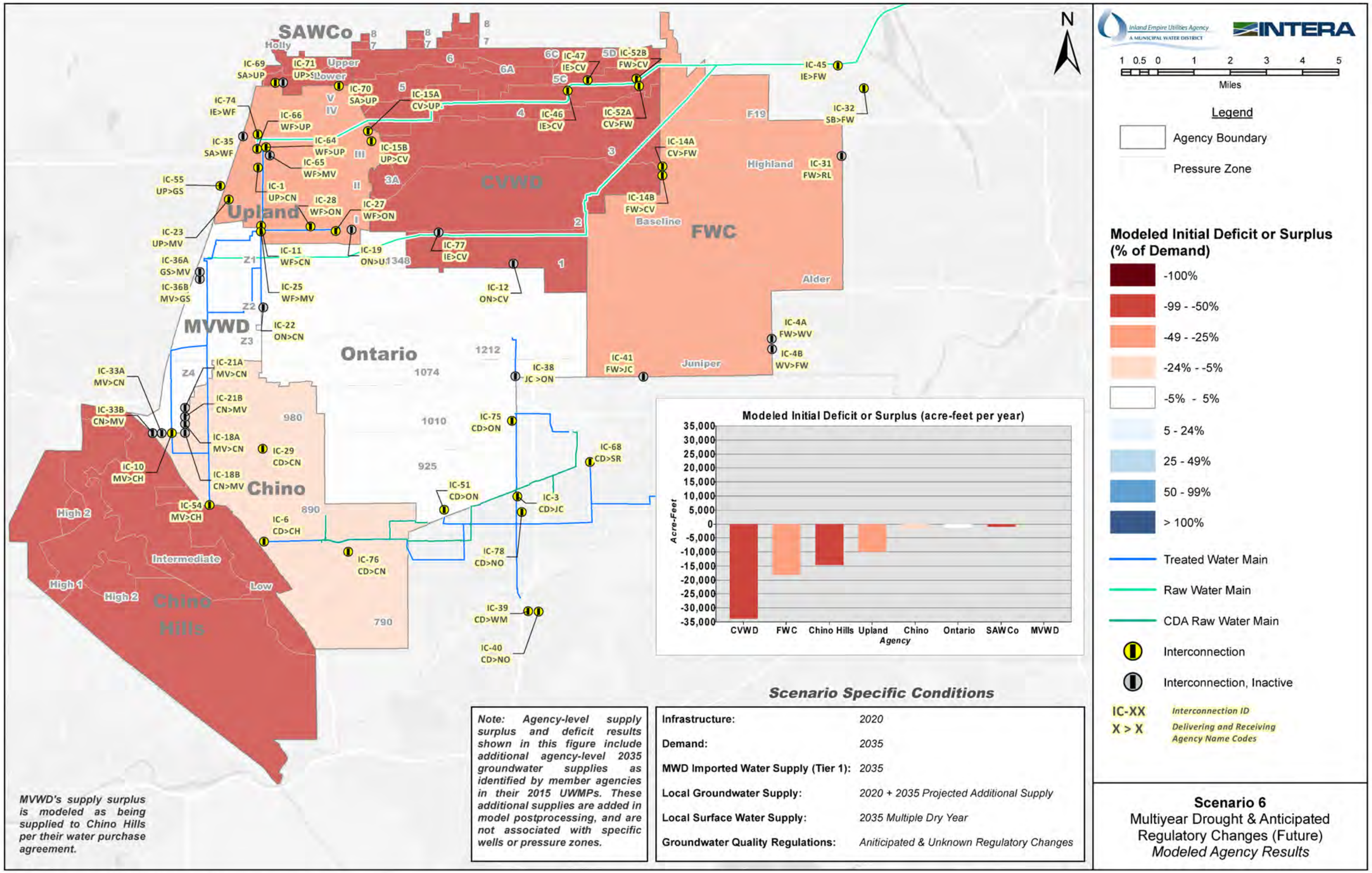

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Figure 24. Scenario 6 - Multi-Year Drought & Anticipated Regulatory Changes, Projected Agency-Level Surplus or Deficit

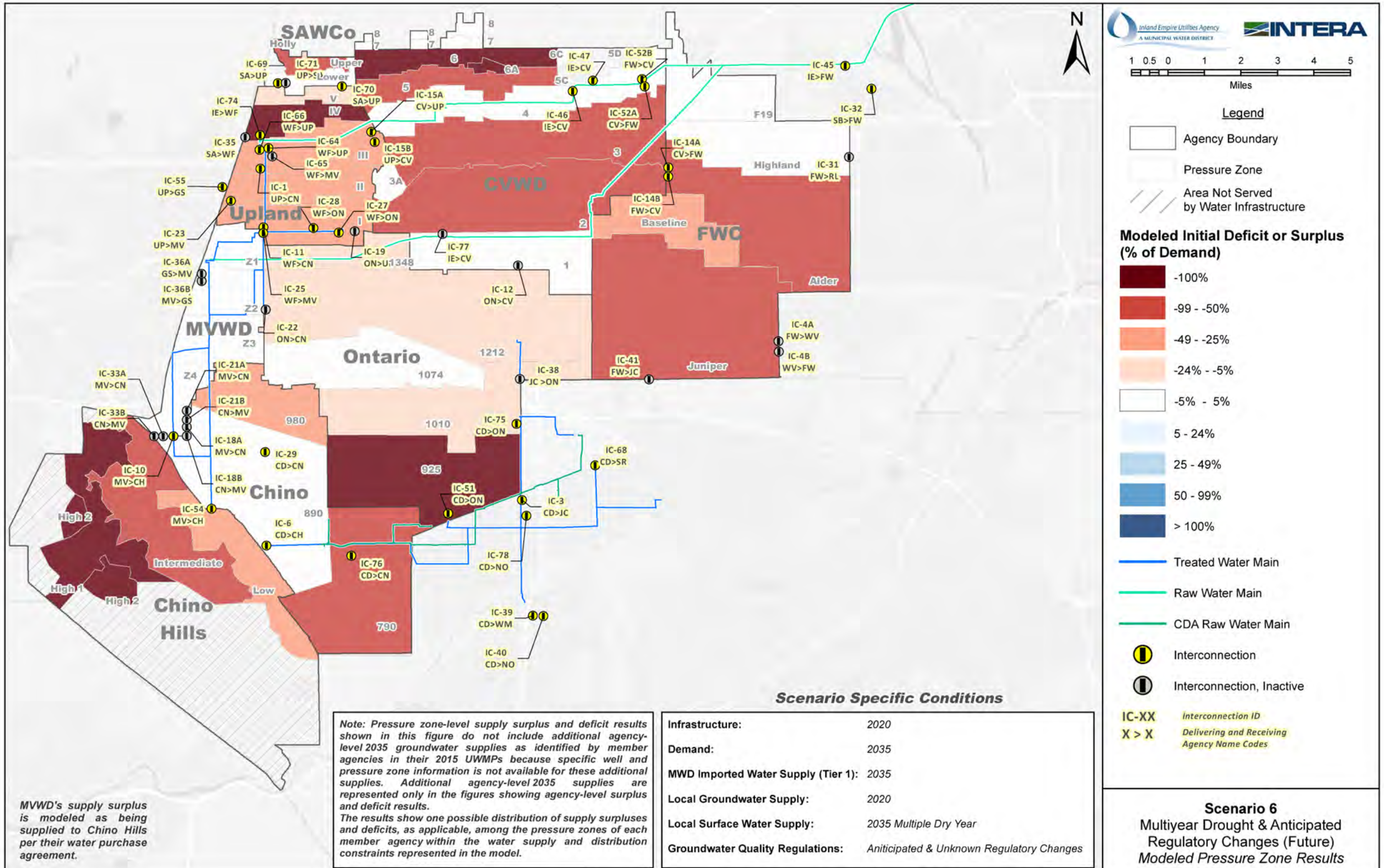

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Figure 25. Scenario 6 - Multi-Year Drought & Anticipated Regulatory Changes, Projected Pressure Zone-Level Surplus or Deficit (Current Supplies)

Table 13. Summary of Results for Scenario 6 Multi-Year Drought & Anticipated Regulatory Changes

Member Agency	Demand	Supply Capacity								Supply Capacity Surplus or Deficit				
	Demand (2035)	Imported, IEUA	Chino Desalter Authority	Imported, External Agency	Inter-Agency Transfer	Chino GW	Non-Chino GW	Local SW	Total Supply	Supply Capacity Surplus or Deficit	Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity: Projected Additional Supply Capacity	Estimated 2035 Added Capacity: Projected Supply Capacity Surplus or Deficit	Estimated 2035 Added Capacity: Projected Supply Capacity Surplus or Deficit
	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	AFY	% of demand			
Chino	20,946	1,424	5,000	0	0	9,680	0	0	16,104	**(4,842)**	**-23.12%**	3,161	**(1,681)**	**-8.03%**
Chino Hills	22,146	590	4,200	0	2,655	0	0	0	7,445	**(14,701)**	**-66.38%**	0	**(14,701)**	**-66.38%**
CVWD	63,701	9,220	0	0	0	9,465	3,949	2,269	24,903	**(38,798)**	**-60.91%**	4,895	**(33,903)**	**-53.22%**
Fontana	51,211	3,250	0	2,000	0	15,128	7,771	1,710	29,860	**(21,352)**	**-41.69%**	3,227	**(18,124)**	**-35.39%**
MVWD	12,360	2,439	0	0	(2,655)	12,577	0	0	12,360	**0**	**0.00%**	0	**0**	**0.00%**
Ontario	47,792	3,278	8,533	0	0	27,310	0	0	39,121	**(8,671)**	**-18.14%**	7,384	**(1,287)**	**-2.69%**
SAWCo	1,569	0	0	0	0	0	0	463	463	**(1,107)**	**-70.50%**	0	**(1,107)**	**-70.50%**
Upland	23,926	2,468	0	0	0	8,186	2,749	498	13,901	**(10,024)**	**-41.90%**	0	**(10,024)**	**-41.90%**
Totals	**243,652**	**22,669**	**17,733**	**2,000**	**0**	**82,345**	**14,469**	**4,941**	**144,157**	**(99,494)**	**-40.83%**	**18,668**	**(80,827)**	**-33.17%**

Demand (2035) *– Estimated agency-level demand for potable water, per agency Urban Water Management Plans (UWMPs). Does not include recycled water.*
Imported, IEUA *– Tier 1 supplies from Metropolitan Water District (MWD) for potable water use as allocated to WFA, CVWD, and Fontana. Imported water treated by WFA allocated to Chino, Chino Hills, MVWD, Ontario, and Upland proportionately according to the 10-year rolling average (10 YRA).*
Chino Desalter Authority *– CDA supplies allocated to Chino, Chino Hills, and Ontario per their respective entitlements. CDA supplies to non-IEUA member agencies are not shown.*
Imported, External Agency *– Imported water delivered to IEUA member agencies by others, such as San Bernardino Valley Municipal Water District (SBVMWD).*
Inter-Agency Transfer *– Deliveries of water from one IEUA agency to another, such as Chino Hills water purchase agreement with MVWD.*
Chino Groundwater (GW) *– Available annual production capacity from Chino Basin wells, estimated to be 75% of maximum pumping capacity to allow for maintenance and downtime. The capacities of wells with blending requirements are adjusted according to the availability of supplies used for blending. In scenarios that model future regulatory changes, wells are removed from service or reduced in capacity according to the modeled impacts.*
Non-Chino GW *– Same as Chino GW, but for wells not in the Chino Basin.*
Local Surface Water (SW) *– Available annual production capacity from local surface water supplies, per agency UWMPs.*
For more details see Appendix A – Summary of Data Used as the Basis for the Model

10.0 CONCLUSIONS

The results of the modeled scenarios reveal vulnerabilities and limitations of current infrastructure that impact the ability of member agencies to sustain reliable water service under adverse conditions. As previously summarized in **Table 2**, the modeled scenarios represent combinations of various factors including shutdown of the Rialto Feeder, implementation by MWD of the WSAP, drought, and changes in drinking water regulations affecting the availability of local groundwater supplies. The *likelihood* of occurrence of these scenarios ranges from very likely (Scenario 1) to very unlikely (Scenario 6), as follows:

1. Loss of MWD Imported Water, Current - VERY LIKELY
2. WSAP Level 5, Future - POSSIBLE
3. Anticipated Regulatory Changes, Current - LIKELY
4. Anticipated Regulatory Changes, Future - LIKELY
5. Anticipated and Unknown Regulatory Changes, Future - POSSIBLE
6. Multi-Year Drought & Anticipated Regulatory Changes, Future - VERY UNLIKELY

The model was used to assess the supply resiliency of the regional system under each scenario, as described in Sections 4 through 9, above. The *severity* of consequences of each scenario was assessed based on a combination of the magnitude of the regional supply surplus or deficit, and the number of member agencies with supply deficits (**Table 14**).

Table 14. Severity of Consequences of Scenarios 1 to 6

Scenario	Regional Supply Surplus or Deficit (% of regional demand)	Number of Agencies with Supply Deficits
1) Loss of MWD Imported Water (Current)	12.2%	3
2) WSAP Level 5 Conditions (Future)	17.5%	1
3) Anticipated Regulatory Changes (Current)	-0.2%	4
4) Anticipated Regulatory Changes (Future)	-10.6%	5
5) Anticipated & Unknown Regulatory Changes (Future)	-19.7%	6
6) Multiyear Drought and Anticipated Regulatory Changes (Future)	-33.2%	7

Finally, *likelihood* and *severity* were used to calculate a *risk* rating for each scenario. **Figure 26** shows a risk matrix illustrating the relative likelihood, severity, and risk of each scenario.

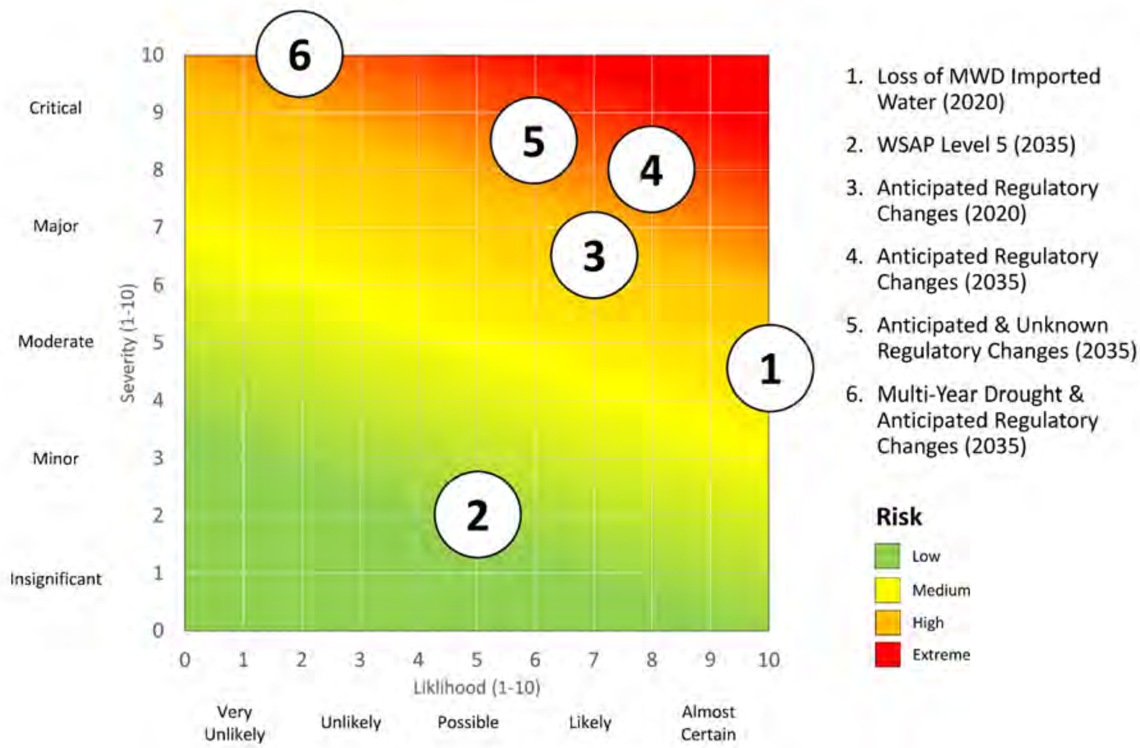


Figure 26. Risk Matrix for Scenarios 1 to 6

One major issue that the highest risk scenarios all have in common is the vulnerability of local groundwater supplies to water quality impairment or changes in regulatory standards which may result in the inability to utilize some supplies. Scenarios 3 and 4 are considered LIKELY; they simulate the anticipated impact of regulatory changes based on current regulatory activity, including a reduction in the maximum contaminant level (MCL) for perchlorate and additional occurrence testing and regulation of PFOA and PFOS.

The loss of imported water is another factor common to those agencies that rely on it for a significant portion of their supplies, or that require it for blending with impaired local groundwater. Interruption of the imported water supply (Scenario 1) is considered VERY LIKELY, as may occur during planned shutdown of the Rialto Feeder or an unanticipated interruption of supplies from the State Water Project.

There is sufficient local groundwater supply capacity in the region to ensure supply resiliency, but much of that capacity is vulnerable to impaired water quality. **Figure 27** shows the percentages and acre-feet per year of local groundwater supply in the region that are unimpaired, impaired with existing treatment, impaired with required blending, or impaired and off-line.

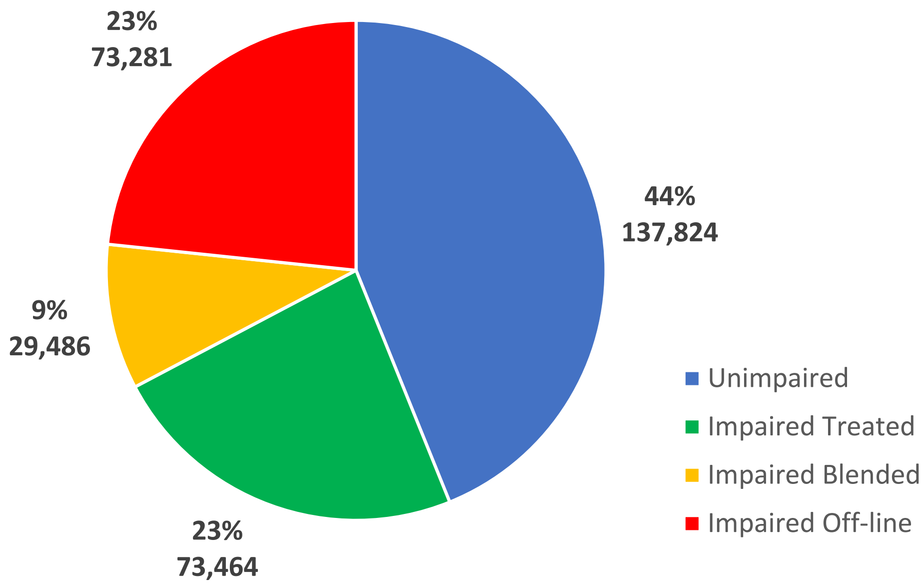


Figure 27. Groundwater Quality and Status

Nearly a quarter of the current annual production capacity of the region, 73,281 AFY (23%) is currently off-line due to water quality impairment. For comparison, this is greater than the projected regional deficits for all but Scenario 6, which is considered to be very unlikely to occur. Another 29,486 AFY (9%) of groundwater capacity relies on blending rather than treatment to meet regulatory standards and is vulnerable to interruptions of imported and other supplies used for blending. Finally, all groundwater supplies, including those that are currently categorized here as unimpaired, are vulnerable to future changes in regulation which may require that wells be removed from service, in the absence of additional treatment.

Referencing **Figure 26**, projects and other measures that mitigate the impacts of the conditions reflected in the modeled scenarios reduce *severity* and effectively move them down to lower risk regions. Project portfolios that include groundwater treatment to allow the use of impaired groundwater have the potential to significantly reduce the risk of regional supply deficits under adverse conditions. These project portfolios may include agency-level treatment projects currently planned and in various stages of implementation by member agencies, and complementary collaborative projects to improve regional transmission with the potential to share the costs and benefits of treatment and other projects and increase the efficiency of infrastructure investments for all agencies.

Vulnerabilities

In summary, the primary causes of the region's current and future water supply vulnerabilities are the following:

- Impaired groundwater supplies that lack treatment are vulnerable to interruption of imported water required for blending.
- In the absence of additional treatment, future changes to water quality regulations will likely have a significant impact on the availability of local groundwater supplies.
- The ability of agencies to share supply surpluses is limited by regional transmission capacity.
- Interruption of imported supplies for those agencies that rely on them for a significant portion of their available supply capacity.

Opportunities & Next Steps

The IRP Infrastructure Model has been used by IEUA in collaboration with member agencies to identify and better understand regional and local supply vulnerabilities under adverse conditions. The model may be used in a future IRP update to inform and support the development of regional project portfolios with member agencies and other stakeholders. Using the model, the project portfolios can be tested against the scenarios described in this memorandum, and others if desired. The ability to "stress-test" project portfolios will be useful for the IRP and other purposes as noted below.

- Model results will allow IEUA to quantify and compare the regional and local supply resiliency gains of various IRP project portfolios to select those with the greatest benefits relative to costs.
- The model may be used to evaluate the resiliency benefits of project portfolios proposed through other programs.
- Model results may be used to quantify shared benefits to support negotiation of shared costs among participants in collaborative projects.
- Model results may be used to document regional project benefits to support efforts to obtain grant funding to reduce project costs for IEUA member agencies.

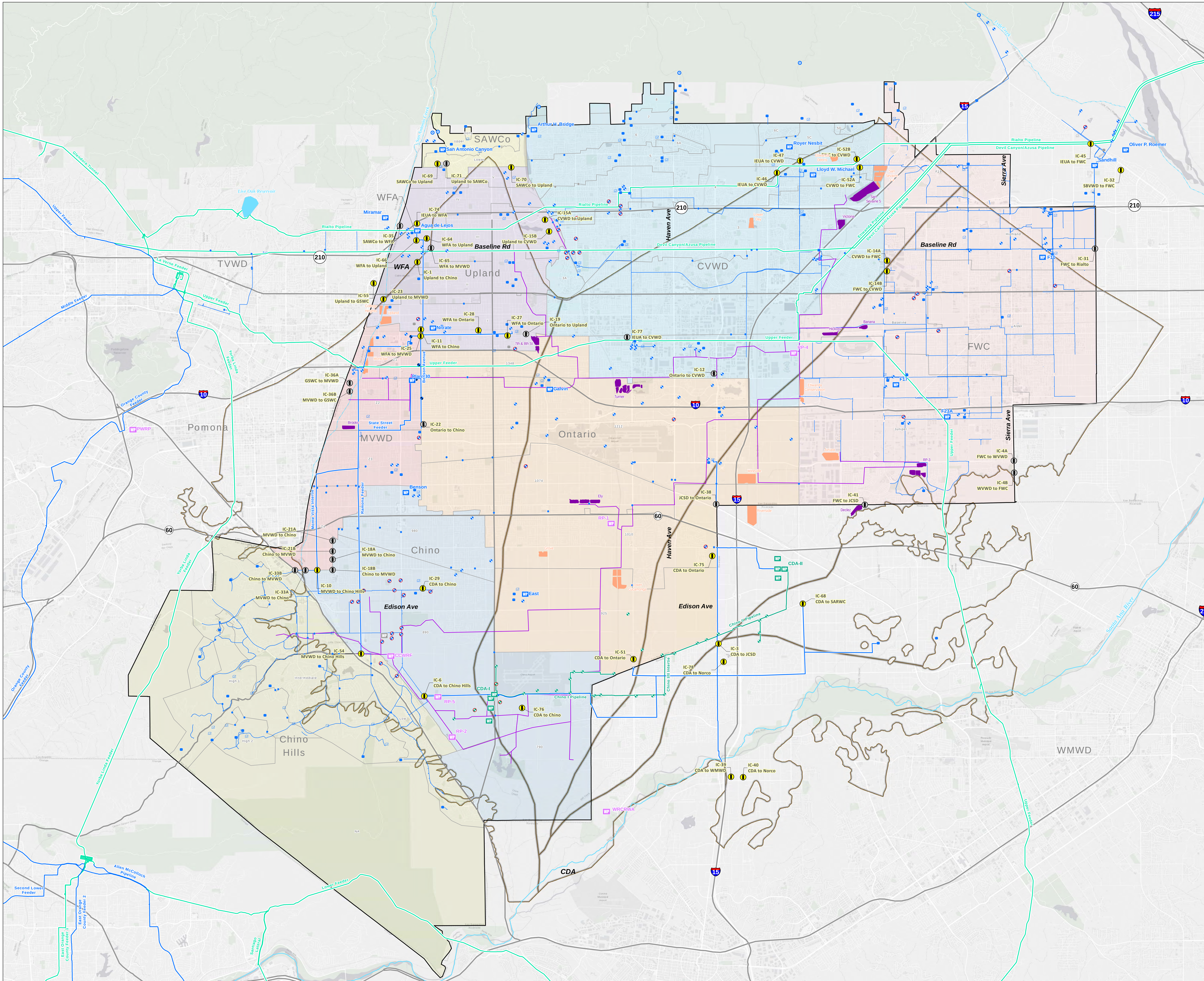
Based on the modeling and analysis performed to date, the following focus areas are recommended for the future update of the IRP.

- Assess the supply resiliency benefits of infrastructure projects currently planned by member agencies. Identify potential shared benefits of these projects.

- Assess the collective capacity of member agencies to mitigate supply vulnerabilities through additional transfers of capacity rights (WFA, CDA) and deliveries of supplies through existing interconnections. Identify constraints and potential improvements.
- Develop and assess the supply resiliency benefits of additional groundwater treatment projects (not currently planned by member agencies) to address vulnerabilities related to impaired groundwater quality.
- Develop and assess the supply resiliency benefits of projects designed to improve the reliability of supply of the Rialto Feeder, potentially including use of local supplies or supplemental external supplies.
- Develop and assess the benefits of additional east to west and/or north to south regional transmission capacity to leverage other improvements.
- Collaborate with the Chino Basin Watermaster (CBWM) to further refine the assessment of vulnerability to impaired groundwater quality and future regulatory changes.
- Collaborate with CBWM to identify potential IRP Infrastructure Model applications and improvements to incorporate consideration of groundwater storage, allocations, and hydrogeological constraints.

ATTACHMENT 1

IEUA Regional Infrastructure Map



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

INTERA

N

0 1 2
Miles

- Interconnection
- Interconnection, Inactive
- Pressure Reducing Station
- Pressure Reducing Station, Inactive
- Pump Station
- Pump Station, Inactive
- Treatment Plant
- Treatment Plant, Inactive
- Desalter Plant
- Distribution Storage
- Distribution Storage, Inactive
- Production Well
- Production Well, Inactive
- Desalter Well
- Desalter Well, Inactive
- ASR Well
- ASR Well, Inactive
- Surface Water Intake
- Recycled Water Treatment Plant
- Raw Water Main
- Treated Water Main
- CDA Raw Water Main
- Recycled Water Main
- Local Water Line
- IEUA Boundary
- Recharge Basin
- Recharge Basin Permitted for Recycled Water
- Freeway
- Stream
- River

Chino Basin Management Zones

IC-XX Interconnection ID
X > X Delivering and Receiving Agencies

Agency boundaries and feature locations are approximate

1 gpm = 1.61 afy

IRP Phase 2
GIS Infrastructure Map

August 2020

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APPENDIX A

Summary of Agency Data Represented in the 2020 Baseline Model

City of Chino
Chino Desalter Authority
City of Chino Hills
Cucamonga Valley Water District
Fontana Water Company
Monte Vista Water District
City of Ontario
San Antonio Water Company
City of Upland
Water Facilities Authority

IEUA Infrastructure Model: Baseline 2020

Basis for Model – City of Chino

This document and accompanying infrastructure map summarize data and assumptions related to the City of Chino (Chino) water utility used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by Chino, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include 2015 Urban Water Management Plan (UWMP), 2017 Hydraulic Schematic, and meeting notes. Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 17,262 acre-feet, equivalent to an average day demand of 15.41 million gallon per day (10,702 gpm). Demand for recycled water is not included in the model.

Water demand was allocated to each pressure zone based on 2010 census population.

PRESSURE ZONE	HGL (FT)	POPULATION	% OF TOTAL POPULATION	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-CN-790	790	7,066	9.58%	9.58%	1025	Demand allocated to zone by 2010 census population
PZ-CN-890	890	31,943	43.3%	43.3%	4634	Demand allocated to zone by 2010 census population
PZ-CN-980	980	34,766	47.12%	47.12%	5043	Demand allocated to zone by 2010 census population

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include 2017 Hydraulic Schematic, 2018 Chino Basin Water Master (CBWM) data for well production capacities, Draft 2018 Water Quality Feasibility Study, and meeting notes. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-CN-890-13	Chino	Yes	Nitrate, TCP	WP-CN-890-EAST	1650	100%	0	
WL-CN-890-16	Chino	No	Nitrate, TCP	WP-CN-890-EAST	600	100%	0	11/19/18: off line in short-term, will be 100% treated when brought back on line with expansion of East WTP.
WL-CN-890-18	Chino	Yes	Nitrate, TCP	WP-CN-890-EAST	1450	100%	0	
WL-CN-890-19	Chino	Yes	Nitrate, TCP	WP-CN-890-EAST	600	100%	0	
WL-CN-890-4	Chino	No	Nitrate, TCP	None	700	0%	0	
WL-CN-890-6	Chino	No	Nitrate, TCP	None	1000	0%	0	
WL-CN-980-10	Chino	Yes	Nitrate, Perchlorate, TCP	WP-CN-980-BENS	1200	100%	0	
WL-CN-980-11	Chino	No	TCP	None	1800	0%	0	
WL-CN-980-12	Chino	Yes	Nitrate, Perchlorate, TCP	Blending	600	50%	0	Blends with WFA
WL-CN-980-14	Chino	No	Nitrate, Perchlorate, TCP	None	2000	0%	0	
WL-CN-980-5	Chino	Yes	Nitrate, Perchlorate, TCP	WP-CN-980-BENS	1200	100%	0	
WL-CN-980-9	Chino	Yes	Nitrate, Perchlorate, TCP	WP-CN-980-BENS	1900	100%	0	

Chino shares ownership (50%-50%) with MVWD of ASR well WL-MV-Z1-33. The well is not currently used by Chino due to operational constraints related to the WFA feeder. See MVWD assumptions WL-MV-Z1-33 for more information.

Intakes

Chino does not have surface water intakes.

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-TREATMENT PLANT NAME". Sources used for treatment plant data include the draft 2018 Water Quality Feasibility Study.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-CN-890-EAST	Yes	3500	IX and Blending; Draft WQ Feasibility Study; Chino_HydraulicSchematic.tiff, 11/19/18 meeting notes. Plans to double capacity to 7,000 gpm in next 3-5 years. East WTP can also pump directly to PZ-CN-790.
WP-CN-980-BENS	Yes	3500	IX; Draft WQ Feasibility Study; Chino_HydraulicSchematic.tiff, 11/19/18 meeting notes

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources for distribution storage data included the 2017 Revised Chino Hydraulic Schematic and 2018 Draft Water Quality Feasibility Study.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-CN-890-10	See map	0.50	Yes	Chino_HydraulicSchematic.tiff
TK-CN-890-7	See map	3.00	Yes	Owned by Chino, or CDA?; CDA_Facilities.tiff, Chino_HydraulicSchematic.tiff
TK-CN-890-9	See map	4.00	Yes	Chino_HydraulicSchematic.tiff
TK-CN-980-2	See map	1.00	Yes	Chino_HydraulicSchematic.tiff
TK-CN-980-3	See map	1.50	Yes	Chino_HydraulicSchematic.tiff
TK-CN-980-4	See map	6.00	Yes	WL-CN-980-12 blended with WF imported water in Reservoir 4; Chino_HydraulicSchematic.tiff
TK-CN-980-5	See map	7.00	Yes	WL-CN-980-33 ASR blended with WF imported water in Reservoir 5; Email from Chino, Chino_HydraulicSchematic.tiff

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PR STATION NUMBER". Sources used for PR Station data include the 2017 Revised Chino Hydraulic Schematic and 2018 Draft Water Quality Feasibility Study. No information was provided on the size or capacity of the PR stations. The maximum hydraulic capacity of the distribution system supplying the PR station was estimated to be equivalent to a flow velocity of 5 feet/second in a 12-inch ductile iron water main, approximately 1,900 gpm.

PR STATION LABEL	ACTIVE	PSI	MAXIMUM PR STATION CAPACITY (GPM)	NOTES
PR-CN-890-A	Yes	(blank)	1900	See above.
PR-CN-890-B	Yes	(blank)	1900	See above.
PR-CN-890-C	Yes	(blank)	1900	See above.
PR-CN-980-D	Yes	(blank)	1900	See above.
PR-CN-980-E	Yes	(blank)	1900	See above.
PR-CN-980-F	Yes	(blank)	1900	See above.
PR-CN-980-G	Yes	(blank)	1900	See above.
PR-CN-980-H	Yes	(blank)	1900	See above.
PR-CN-980-I	Yes	(blank)	1900	See above.
PR-CN-980-J	Yes	(blank)	1900	See above.

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources for Pump Station data include the 2017 Revised Chino Hydraulic Schematic and 2015 Urban Water Management Plan. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented. None of the Pump Stations pump from one pressure zone to another, and as a result are not modeled.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-CN-890-A	Yes	PZ-CN-890				intrazone pump stations not modelled
PS-CN-890-D	Yes	PZ-CN-890				intrazone pump stations not modelled
PS-CN-980-B	Yes	PZ-CN-980				intrazone pump stations not modelled
PS-CN-980-C	Yes	PZ-CN-980				intrazone pump stations not modelled

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2015 Urban Water Management Plan (UWMP) and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
22	ON > CN	14"	No	PZ-ON-1212	PZ-CN-980	700	n/a	Treated Water	Uses WF pipeline, only avail when WF I-11 connection closed; Ontario_System.tiff
11	WF > CN	20"	Yes	WP-WF-XX-ADL	PZ-CN-980	8400	n/a	Treated Water	Location approximate; WFA_Pipeline.tiff, Chino meeting notes
21	MV< > CN	6"	No	PZ-MV-Z4	PZ-CN-890	500	500	Treated Water	emergency connection; not typically used; MVWDInfrastructure.tiff, MVWDInfrastructureDataSheet2.jpg; assumed capacity 500 gpm
18	MV< > CN	6"	No	PZ-MV-Z4	PZ-CN-890	500	500	Treated Water	emergency connection; not typically used; MVWDInfrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg; assumed capacity 500 gpm

33	MV< > CN	8"	No	PZ-MV-Z4	PZ-CN-890	1000	1000	Treated Water	emergency connection; not typically used; MVWDInfrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg; assumed capacity 1000 gpm
1	UP > CN	24”	Yes	PZ-UP-II	PZ-CN-980	8400	n/a	Treated Water	Location approximate; Email/meeting notes from Chino
29	CD > CN	16"	Yes	PZ-CD-I	PZ-CN-890	3300	n/a	Treated Water	Location approximate, at Reservoir 9; Email from Chino; meeting notes
76	CD > CN	12”	Yes	PZ-CD-I	PZ-CN-790	1000	n/a	Treated Water	secondary CD supply for Zone 790; Chino meeting notes, CDA system map

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect partial comments regarding wells provided by City of Chino via e-mail on 7/12/18, and corrections discovered during modeling.

IEUA Infrastructure Model: Baseline 2020

Basis for Model – Chino Desalter Authority

This document and accompanying infrastructure map summarize data and assumptions related to the Chino Desalter Authority (CDA) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by CDA, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

CDA's member agencies include the cities of Chino, Chino Hills, and Ontario, within the boundaries of IEUA; and Jurupa Community Services District (JCSD), Santa Ana River Water Company (SARWC), and the City of Norco, within the boundaries of wholesale and retail water provider Western Municipal Water District (WMWD).

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". As a wholesale supplier, CDA does not have pressure zone-based demands. CDA interconnections deliver desalinated brackish groundwater to various member agency pressure zones. Sources for the member agency pressure zones include 2015 Urban Water Management Plans (UWMPs), Master Plans, and other documents. Interconnections are addressed later in this document. Sources used for CDA include the 2015 UWMP and 2010 Comprehensive Design Report for Phase 3.

CDA is mandated to pump 40,000 acre-feet/year (afy) for groundwater quality improvement. Of that approximately 35,200 afy is available for delivery to member agencies, and the remainder is waste process water. CDA's member agencies have contractual commitments to purchase water. The member agencies and their contractual obligations are summarized below. CDA deliveries to member agencies are assumed to be equal to their entitlements.

MEMBER AGENCY	WHOLESALE AGENCY	ENTITLEMENT - PURCHASE OBLIGATION (AFY)
CHINO	IEUA	5,000
CHINO HILLS	IEUA	4,200
JCSD	WMWD	11,733
NORCO	WMWD	1,000
ONTARIO	IEUA	8,533
SARWC	WMWD	1,200
WMWD	WMWD	3,534
TOTAL		35,200

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the 2018 Facilities Location Map, 2015 UWMP, 2010 Comprehensive Design Report for Phase 3, 2018 Chino Basin Water Master (CBWM) data, meeting notes, and additional recent correspondence with IEUA related to wells currently off-line due to excessive water quality impairment. Assumed production well capacities for CDA are based on 2018 CBWM data. All CDA wells have impaired water quality and require treatment and blending. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. While treatment at CDA-1 and CDA-2 involves blending, for purposes of the model it is assumed that the designs of the treatment facilities allow for 100% utilization of all active wells with respect to water quality. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-CD-I-1	Chino	No	TDS, Nitrate	WP-CD-I-VOC	385	0%	n/a	4/19/19 – IEUA noted out of service due to WQ
WL-CD-I-2	Chino	No	TDS, Nitrate, VOC	WP-CD-1-VOC	150	0	n/a	CBWM notes water quality too poor for plant; 4/19/19 – IEUA noted out of service due to WQ
WL-CD-I-3	Chino	No	TDS, Nitrate, VOC, TCP	WP-CD-1-VOC	950	0%	n/a	CBWM notes out of service for rehab; 4/19/19 – IEUA noted out of service due to WQ
WL-CD-I-4	Chino	No	TDS, Nitrate	WP-CD-1-VOC	335	0%	n/a	4/19/19 – IEUA noted out of service due to WQ
WL-CD-I-5	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1261	100%	n/a	
WL-CD-I-6	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	993	100%	n/a	
WL-CD-I-7	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1251	100%	n/a	
WL-CD-I-8	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1120	100%	n/a	
WL-CD-I-9	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1183	100%	n/a	
WL-CD-I-10	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1336	100%	n/a	
WL-CD-II-11	Chino	Yes	TDS, Nitrate	WP-CD-2	525	100%	n/a	
WL-CD-I-13	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	1290	100%	n/a	

WL-CD-I-14	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	2290	100%	n/a	
WL-CD-I-15	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	2350	100%	n/a	
WL-CD-I-16	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	227	100%	n/a	
WL-CD-I-17	Chino	No	TDS, Nitrate, TCP?	WP-CD-1-RO/IX	0	0	n/a	CBWM notes that shut down per SWRCB;
WL-CD-I-18	Chino	No	TDS, Nitrate, TCP?	WP-CD-1-RO/IX	0	0	n/a	CBWM notes not used;
WL-CD-I-19	Chino	No	TDS, Nitrate, TCP?	WP-CD-1-RO/IX	0	0	n/a	CBWM notes abandoned;
WL-CD-I-20	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	430	100%	n/a	
WL-CD-I-21	Chino	Yes	TDS, Nitrate	WP-CD-1-RO/IX	361	100%	n/a	
WL-CD-II-1	Chino	Yes	TDS, Nitrate	WP-CD-2	1800	100%	n/a	
WL-CD-II-2	Chino	Yes	TDS, Nitrate	WP-CD-2	1800	100%	n/a	
WL-CD-II-3	Chino	Yes	TDS, Nitrate	WP-CD-2	1800	100%	n/a	
WL-CD-II-4	Chino	Yes	TDS, Nitrate	WP-CD-2	1700	100%	n/a	
WL-CD-II-6	Chino	Yes	TDS, Nitrate	WP-CD-2	1600	100%	n/a	
WL-CD-II-7	Chino	Yes	TDS, Nitrate	WP-CD-2	900	100%	n/a	
WL-CD-II-8	Chino	Yes	TDS, Nitrate	WP-CD-2	1100	100%	n/a	
WL-CD-II-9A	Chino	Yes	TDS, Nitrate	WP-CD-2	1800	100%	n/a	
WL-CD-II-10	Chino	Yes	TDS, Nitrate	WP-CD-2	2750	100%	n/a	
WL-CD-II-11	Chino	Yes	TDS, Nitrate	WP-CD-2	3000	100%	n/a	
WL-CD-II-12	Chino	Yes	TDS, Nitrate	WP-CD-2	2000	100%	n/a	referenced by CBWM as CDA II-Opt 1;

Intakes

CDA does not have surface water intakes.

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-TREATMENT PLANT NAME". Sources used for treatment plant data include the 2018 Facilities Location Map, 2015 UWMP, 2010 Comprehensive Design Report for Phase 3, and meeting notes.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-CD-I-VOC	Yes	1389	2.0 mgd VOC capacity; 2015 UWMP
WP-CD-I-RO	Yes	4653	6.7 mgd RO permeate capacity; 2015 UWMP
WP-CD-I-IX	Yes	3403	4.9 mgd IX capacity; 2015 UWMP
WP-CD-II-RO	Yes	8681	2010 CDR notes 12.5 mgd RO permeate capacity, 2015 UWMP notes 6.0 mgd; 2015 UWMP, 2010 CDR
WP-CD-II-IX	Yes	5556	2010 CDR notes 8.0 mgd IX capacity, 2015 UWMP notes 4.0 mgd; 2015 UWMP, 2010 CDR
WP-CD-II-BYPS	Yes	3472	2010 CDR notes 5.0 mgd bypass capacity, 2015 UWMP notes 2.0 mgd bypass capacity; 2015 UWMP, 2010 CDR

In 11/11/2018 meeting, CDA noted that the total capacities of CDA-I and CDA-II are approximately 12 MGD and 16 MGD, respectively. The goal for CDA-II capacity is 20.5 MGD. Production capacity is constrained by the Concentrate Reduction Facility (CRF).

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". CDA does not own and operate distribution storage of its own. Distribution storage facilities receiving CDA water are owned by the member agencies.

Pressure Reducing Stations

CDA does not have pressure reducing stations.

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources used for Pump Station data include the 2018 Facilities Location Map, 2010 Comprehensive Design Report for Phase 3, and meeting notes. The Pumping Heads are as indicated in 2010 Phase 3 CDR. The regional model represents pumping capacity at the level of pressure zone to pressure zone (or agency to agency), as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented. Pump stations serving only non-IEUA member agencies are not included in the model.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-CH-B-15	Yes	CD-I			2800	Chino Hills PS B-15 Soquel Canyon Rd; internal to CH boosts water to Intermediate zone; 2018 Facilities Location Map, 2010 CDR Phase 3, capacity reported by CDA 11/11/18 meeting. Not currently modeled in EPANET, water from IC-6 is delivered to CH-I by pump station PS-CH-I-B-9. May be explicitly modeled in the future
PS-CD-1010-ARCH	Yes	CD-I				Not modeled. Archibald PS; 2018 Facilities Location Map, 2010 CDR Phase 3

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2018 Facilities Location Map, 2015 UWMP, 2010 Comprehensive Design Report for Phase 3, GIS, and meeting notes. Sources for member agencies were also used where applicable.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	WATER TYPE	NOTES
51	CD> ON	12”	Yes	PZ-CD-II	PZ-ON-1010	1000	Treated Water	Archibald Ave and Schaefer Ave; From CD-I to Ontario 1010, avg supply 1500 afy; 24-inch suction and 12-inch discharge side pipelines per GIS; Ontario_System.tiff, CDA_Facilities.tiff, Ontario Master Plan
29	CD> CN	16"	Yes	PZ-CD-I	PZ-CN-890	3300	Treated Water	Location approximate, at Reservoir 9; Email from Chino; 12-inch pipeline per GIS; max capacity 3900 gpm, normal capacity 3300 gpm per meeting 11/11/2018
6	CD> CH	16”	Yes	PZ-CD-I	PZ-CH-L	2800	Treated Water	3 MGD per Chino Hills meeting notes; 16-inch pipeline per GIS; CDA_Facilities.tiff, Chino Hills meeting notes; max capacity 4100 gpm, but constrained to 2800 gpm by CH booster station per meeting 11/11/2018
68	CD> SR	16”	Yes	PZ-CD-I	RS-SR-XX-1	2500	Treated Water	24-inch pipeline and 16-inch lateral per GIS; CDA_Facilities.tiff; assumed capacity 2500 gpm
39	CD> WM	16”	Yes	PZ-CD-II	RS-WM-XX-1	2500	Treated Water	30-inch pipeline and 16-inch lateral per GIS; CDA_FacilityMap.tiff; assumed capacity 2500 gpm
40	CD> NO	16”	Yes	PZ-CD-II	RS-NO-XX-1	2500	Treated Water	30-inch pipeline and 16-inch lateral per GIS; CDA_FacilityMap.tiff; assumed capacity 2500 gpm; Norco A
3	CD> JC	30"	Yes	PZ-CD-II	RS-JC-XX-1	2500	Treated Water	30-inch pipeline and 16-inch lateral per GIS; CDA_FacilityMap.tiff; assumed capacity 2500 gpm
75	CD> ON	18”	Yes	PZ-CD-II	PZ-ON-1010	2500	Treated Water	Capacity is an estimate based on Ontario meeting notes; Ontario meeting notes; 30-inch pipeline and 18-inch lateral per GIS;
76	CD> CN	12”	Yes	PZ-CD-I	PZ-CN-790	1000	Treated Water	Secondary CD supply for Zone 790; 4/9/18 Chino meeting notes, CD system map; 30-inch pipeline and 12-inch lateral per GIS; emergency connection; capacity per meeting 11/11/2018
38	CD> ON	12”	No	PZ-CD-II	PZ-ON-1010	2170	Treated Water	CDA water passed through JCSD, not in use per Ontario

78	CD> NO	16"	Yes	PZ-CD-II	RS-NO-XX-2	1200	Treated Water	Norco B; diameter assumed; capacity per meeting 11/11/2018

Revision Notes

5/9/2019: *Revised to reflect comments received prior to update to 2020 Baseline*

8/27/2018: *Revised to reflect corrections discovered during modeling. No agency comments received to date on the model data and assumptions.*

IEUA Infrastructure Model: Baseline 2020

Basis for Model – City of Chino Hills

This document and accompanying infrastructure map summarize data and assumptions related to the City of Chino Hills (Chino Hills) water utility used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by Chino Hills, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include 2015 Urban Water Management Plan (UWMP), Water Zones Map, and Water Supply Plan Map. Demands are allocated at the pressure zone level in the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 18,109 acre-feet, equivalent to an average day demand of 16.17 million gallon per day (11,227 gpm). Demand for recycled water is not included in the model.

Water demand was allocated to each pressure zone based on 2010 census population.

PRESSURE ZONE	HGL (FT)	POPULATION	% OF TOTAL POPULATION	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-CH-H1	1175	12,217	16.87%	16.87%	1,894	HGL assumed. Demand allocated to zone by 2010 census population
PZ-CH-H2	1400	1,763	2.43%	2.43%	273	HGL assumed. Demand allocated to zone by 2010 census population
PZ-CH-I	925	32,321	44.63%	44.63%	5,011	HGL from 4/9/18 meeting notes. Demand allocated

						to zone by 2010 census population
PZ-CH-L	725	26,124	36.07%	36.07%	4,050	HGL from 4/9/18 meeting notes Demand allocated to zone by 2010 census population

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the Water Zones Map, 2018 CBWM data for well production capacities, and meeting notes. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. Based on information received in 4/9/18 meeting it is assumed that all wells are currently out of service due to water quality issues. Michael Baker is performing study for TCP treatment to It is assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX% OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-CH-L-W-16 ASR	Chino	No	Arsenic, TCP		800	0%	400	4/9/18 meeting notes - ASR Well, currently in review by SWRCB
WL-CH-L-13	Chino	No	Arsenic, TCP		800	0%	n/a	out of service, water quality issues
WL-CH-L-14	Chino	No	Nitrate		0	0%	n/a	destroyed
WL-CH-L-15A	Chino	No	Arsenic, TCP		1200	0%	n/a	out of service, water quality issues
WL-CH-L-15B	Chino	No	Nitrate, TCP	WP-CH-L-15B	0	0%	n/a	out of service, water quality issues
WL-CH-L-17	Chino	No	Arsenic, TCP		1300	0%	n/a	out of service, water quality issues
WL-CH-L-18	Chino	No	TCP		0	0%	n/a	not equipped
WL-CH-L-19	Chino	No	Arsenic, TCP		1400	0%	n/a	out of service, water quality issues
WL-CH-L-1A	Chino	No	Nitrate, TCP		800	0%	n/a	out of service, water quality issues
WL-CH-L-1B	Chino	No	Nitrate, TCP		1000	0%	n/a	out of service, water quality issues
WL-CH-L-5	Chino	No	Nitrate, TCP		800	0%	n/a	out of service, water quality issues
WL-CH-L-7A	Chino	No	Nitrate, Perchlorate, TCP		400	0%	n/a	out of service, water quality issues
WL-CH-L-7B	Chino	No	Nitrate, Perchlorate, TCP		600	0%	n/a	out of service, water quality issues

Intakes

Chino Hills does not have surface water intakes.

Treatment Plants

Well 15B is equipped with wellhead IX treatment for nitrate removal, but well is currently inactive (see wells, above).

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources for distribution storage data include Water Zones Map and meeting notes.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-CH-H1-R11	Village Oaks	2.00	Yes	
TK-CH-H1-R12	Chino Ave	2.30	Yes	
TK-CH-H1-R2	Fetlock	1.00	Yes	
TK-CH-H1-R7	Canon Lane	0.28	Yes	
TK-CH-H1-R8	Sleepy Hollow	0.25	Yes	
TK-CH-H2-R16	Gordon Ranch	2.00	Yes	
TK-CH-H2-R17	Pacific Scene	4.00	Yes	
TK-CH-H2-R4	Valley Springs	1.00	Yes	
TK-CH-I-R1	Carbon Canyon	1.00	Yes	
TK-CH-I-R14	State Park	5.00	Yes	
TK-CH-I-R15	Laband Ranch	5.00	Yes	
TK-CH-I-R9	Rolling Ridge	2.00	Yes	
TK-CH-L-R13	Butterfield	2.00	Yes	
TK-CH-L-R19	Rincon #1	4.00	Yes	
TK-CH-L-R5	Glenmeade	2.00	Yes	

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PR STATION NAME". The source used for PR Station data was the Chino Hills 2012 Water Map Book. The maximum hydraulic capacity of the each PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in the associated distribution main. According to map books provided for review, Chino Hills has 53 PRV's. Only those between pressure zones were included in the model.

PR STATION LABEL	ACTIVE	PSI	MAXIMUM PR STATION CAPACITY (GPM)	NOTES
PR-CN-H1-BRKS	Yes	(blank)	800	See above.
PR-CN-H1-FICS	Yes	(blank)	800	See above.
PR-CN-H1-GRND	Yes	(blank)	1900	See above.
PR-CN-H1-QTOK	Yes	(blank)	800	See above.
PR-CN-H1-VENZ	Yes	(blank)	800	See above.
PR-CN-H1-VLGC	Yes	(blank)	800	See above.
PR-CN-H1-WLCR	Yes	(blank)	800	See above.
PR-CN-H2-EUCA	Yes	(blank)	3400	See above.
PR-CN-H2-FRWY	Yes	(blank)	3400	See above.
PR-CN-H2-HUNT	Yes	(blank)	450	See above.
PR-CN-H2-OKCN	Yes	(blank)	800	See above.
PR-CN-H2-PNCL	Yes	(blank)	800	See above.

PR-CN-H2-RNHL	Yes	(blank)	1900	See above.
PR-CN-H2-VERS	Yes	(blank)	1900	See above.
PR-CN-I-BIRD	Yes	(blank)	1900	See above.
PR-CN-I-BUCK	Yes	(blank)	450	See above.
PR-CN-I-CHRY	Yes	(blank)	800	See above.
PR-CN-I-FXGL	Yes	(blank)	1900	See above.
PR-CN-I-HYSL	Yes	(blank)	450	See above.
PR-CN-I-LSER	Yes	(blank)	3400	See above.
PR-CN-I-PIPE	Yes	(blank)	1900	See above.
PR-CN-I-TACT	Yes	(blank)	800	See above.
PR-CN-I-VVST	Yes	(blank)	1250	See above.
PR-CN-I-YRBA	Yes	(blank)	450	See above.

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources for Pump Station data include Water Zones Map, Water Supply Plan Map, and meeting notes. Locations are known, but no data was provided on capacities. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented. One pump station was modeled between each pressure zone, with assumed firm capacity equal to 3x the average demand of the discharge side pressure zone.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-CH-H1-B-11	Yes	PZ-CH-I				Not modeled, all pumping from Intermediate to High 1 modeled in B-6
PS-CH-H1-B-4	Yes	PZ-CH-I				Not modeled, all pumping from Intermediate to High 1 modeled in B-6
PS-CH-H1-B-5	Yes	PZ-CH-I				Not modeled, all pumping from Intermediate to High 1 modeled in B-6
PS-CH-H1-B-6	Yes	PZ-CH-I	9000	300	7500	No data provided. Model as assumed pump station for all pumping from Intermediate to High 1. Capacity and TDH assumed.
PS-CH-H1-B-8	Yes	PZ-CH-H1				Intrazone, do not model.
PS-CH-H1-HP-2	Yes	PZ-CH-H1				Intrazone, do not model.
PS-CH-H1-HP-3	Yes	PZ-CH-H1				Intrazone, do not model.
PS-CH-H2-B-10	Yes	PZ-CH-H1				Not modeled.
PS-CH-H2-B-2	Yes	PZ-CH-H1	2000	250	1500	No data provided. Model as assumed pump station for all pumping from High 1 to High 2. Two locations shown in GIS, verify. Capacity and TDH assumed.
PS-CH-H2-HP-5	Yes	PZ-CH-H2				Intrazone, do not model.
PS-CH-I-B-15	Yes	PZ-CH-H2				Intrazone, do not model.

PS-CH-I-HP-4	Yes	PZ-CH-H2				Intrazone, do not model.
PS-CH-I-HP-6	Yes	PZ-CH-H2				Intrazone, do not model.
PS-CH-I-B-9	Yes	PZ-CH-L	4200	120	3500	No data provided. 4/9/18 meeting notes indicate pumps from Low to Intermediate, need to confirm. Model as sole PS between Low and Intermediate. Capacity and TDH assumed. In EPANET model transfers CDA water delivered to PZ-CH-L to PZ-CH-I

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2015 Urban Water Management Plan (UWMP), Water Zones Map, Water Supply Plan Map, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
10	MV> CH	30”	Yes	PZ-MV-Z4	PZ-CH-I	8610	n/a	Treated Water	capacity is WFA rights from meeting notes; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg
54	MV> CH	42”	Yes	PZ-MV-Z4	PZ-CH-I	14050	n/a	Treated Water	Location approximate; capacity is MVWD rights from meeting notes; Schematic
6	CD> CH	24”	Yes	PZ-CD-I	PZ-CH-L	2800	n/a	Treated Water	CDA_Facilities.tiff, Chino Hills meeting notes; CDA comments. Maximum capacity of IC is 4100 gpm, but limited to 2800 gpm by CDA/CH booster PS-CH-I-B-9 to PZ-CH-I

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect comments on original assumptions document received from Chino Hills on 7/5/18, data from provided detailed map book, and corrections during modeling

IEUA Infrastructure Model: Baseline 2020

Basis for Model – Cucamonga Valley Water District

This document and accompanying infrastructure map summarize data and assumptions related to the Cucamonga Valley Water District (CVWD) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by CVWD, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include the 2015 Urban Water Management Plan (UWMP), 2016 Master Plan, and Site Locations Map.

Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 58,900 acre-feet, equivalent to an average day demand of 52.58 million gallon per day (36,516 gpm). Demand for recycled water is not included in the model.

The 2016 Master Plan includes a summary of system demand by pressure zone. This data was used to calculate the percentages of total system demand to allocate to each pressure zone. These percentages were used to estimate the 2020 average demand for each pressure zone.

PRESSURE ZONE	HGL (FT)	AREA (SQ MI)	% OF TOTAL AREA	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-CV-1	1119	5.98	13.1%	10.3%	3,761	Allocated based on 2016 demand data
PZ-CV-2	1420	12.21	26.7%	31.3%	11,430	Allocated based on 2016 demand data
PZ-CV-3	1657	10.60	23.2%	25.5%	9,312	Allocated based on 2016 demand data
PZ-CV-3A	1599	0.72	1.6%	1.0%	365	Allocated based on 2016 demand data
PZ-CV-4	1877	6.95	15.2%	17.0%	6,208	Allocated based on 2016 demand data
PZ-CV-5	2099	3.49	7.6%	6.7%	2,447	Allocated based on 2016 demand data
PZ-CV-5C	2247	1.28	2.8%	1.8%	657	Allocated based on 2016 demand data

PZ-CV-5D	2099	0.05	0.1%	0.0%	0	Allocated based on 2016 demand data
PZ-CV-6	2393	3.02	6.6%	4.4%	1,607	Allocated based on 2016 demand data. Verify HGL of zone 6. 2016 Master Plan indicates 2393 in profile, but 2099 in tables 4.3 and 4.4
PZ-CV-6A	2393	0.32	0.7%	1.1%	402	Allocated based on 2016 demand data
PZ-CV-6C	2267	0.35	0.8%	0.9%	329	Allocated based on 2016 demand data
PZ-CV-7	2665	0.36	0.8%	0.0%	0	Allocated based on 2016 demand data
PZ-CV-8	2925	0.44	1.0%	0.0%	0	Allocated based on 2016 demand data

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the 2016 Master Plan, 2015 UWMP, 2018 Chino Basin Water Master (CBWM) data, and meeting notes. Assumed production well capacities for CVWD are based on data in the 2016 Master Plan. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-CV-1-1	Chino	Yes	None	n/a	1480	100%	n/a	
WL-CV-1-3	Chino	Yes	None	n/a	1141	100%	n/a	
WL-CV-1-30	Chino	Yes	None	n/a	2356	100%	n/a	
WL-CV-1-38	Chino	Yes	None	n/a	2699	100%	n/a	
WL-CV-1-39	Chino	Yes	None	n/a	2985	100%	n/a	
WL-CV-1-4	Chino	Yes	None	n/a	1530	100%	n/a	
WL-CV-1-40	Chino	Yes	None	n/a	2122	100%	n/a	
WL-CV-1-41	Chino	Yes	None	n/a	2714	100%	n/a	
WL-CV-1-42	Chino	Yes	None	n/a	2780	100%	n/a	
WL-CV-1-46	Chino	Yes	None	n/a	2500	100%	n/a	
WL-CV-1-5	Chino	Yes	None	n/a	2145	100%	n/a	
WL-CV-2-10	Cucamonga	No	Nitrate	n/a	1085	0%	n/a	Emergency use only: high-moderate nitrate.
WL-CV-2-12	Cucamonga	No	Nitrate	n/a	1911	0%	n/a	Emergency use only: high-moderate nitrate.
WL-CV-2-20	Cucamonga	No	Nitrate	n/a	864	0%	n/a	Non-operational: high nitrate.
WL-CV-2-22	Cucamonga	No	Nitrate	n/a	2024	0%	n/a	Emergency use only: high-moderate nitrate.
WL-CV-2-43	Chino	Yes	None	n/a	2565	100%	n/a	
WL-CV-2-8	Cucamonga	No	Nitrate	n/a	2160	0%	n/a	Emergency use only: high-moderate nitrate.
WL-CV-3-13	Cucamonga	Yes	None	n/a	475	100%	n/a	
WL-CV-3-15	Cucamonga	No	Nitrate	n/a	1420	0%	n/a	Non-operational: high nitrate.
WL-CV-3-17	Cucamonga	No	Nitrate	n/a	814	0%	n/a	Non-operational: high nitrate.
WL-CV-3-23	Cucamonga	No	Nitrate	n/a	860	0%	n/a	Non-operational: high nitrate.
WL-CV-3-26	Cucamonga	Yes	None	n/a	1436	100%	n/a	
WL-CV-3-31	Cucamonga	Yes	Nitrate	n/a	1131	50%	n/a	Limited operation, blending required: moderate nitrate.

WL-CV-3-33	Cucamonga	Yes	Nitrate	n/a	528	50%	n/a	Limited operation, blending required: moderate nitrate.
WL-CV-3A-16	Cucamonga	Yes	None	n/a	1311	100%	n/a	
WL-CV-3A-19	Cucamonga	Yes	None	n/a	1083	100%	n/a	
WL-CV-3A-21	Cucamonga	No	Nitrate	n/a	2558	0%	n/a	Non-operational: high nitrate.
WL-CV-3A-24	Cucamonga	Yes	None	n/a	2749	100%	n/a	
WL-CV-3A-34	Cucamonga	No	Nitrate	n/a	1968	0%	n/a	Non-operational: high nitrate.

Intakes

Surface water intakes are labeled as follows: "IN-AGENCY-PRESSURE ZONE-INTAKE NAME". Sources used for intake data include the 2016 Master Plan and 2015 UWMP. CVWD has three local surface water intakes, including Deer Canyon which is classified as groundwater and does not require full treatment. Assumed intake capacities are assumed to be equal to yield as noted in the 2015 UWMP for normal climatic conditions. The UWMP indicates that the drought yield of CVWD's intakes is estimated to be 50% of normal yield.

INTAKE LABEL	LOCATION	ACTIVE	WATER TYPE	TREATMENT	INTAKE YIELD (AFY)	MODEL INTAKE CAPACITY (GPM)	NOTES
IN-CV-4-DEE	See map	Yes	Raw Water	WP-CV-3-LWM (Lloyd Michael)	3400	2108	CVWD_MasterPlan.tiff; Intake yield from 2015 UWMP. Use yield as capacity? Check vs other sources of information
IN-CV-5-CUCN	See map	Yes	Raw Water	WP-CV-5-AHB (Arthur H. Bridge)	1000	620	CVWD_MasterPlan.tiff; Intake yield from 2015 UWMP. Use yield as capacity? Check vs other sources of information
IN-CV-8-DRCN	See map	Yes	Treated Water	None	140	87	CVWD_MasterPlan.tiff; Intake yield from 2015 UWMP. Use yield as capacity? Check vs other sources of information

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-WTP NAME". Sources used for intake data include the 2016 Master Plan, 2015 UWMP, and meeting notes.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-CV-3-LWM	Yes	41650	From CB-16/IC#47
WP-CV-4-RN	Yes	7700	From CB-7/IC#46 and Day-East/Etiwanda
WP-CV-5-AHB	Yes	2100	From Cucamonga Canyon

Distribution Storage

Distribution storage tanks are labeled as follows: “TK-AGENCY-PRESSURE ZONE-TANK NUMBER”. Sources used for distribution storage data include the 2016 Master Plan and 2015 UWMP.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-CV-1-1	See map	2.70	Yes	
TK-CV-1-1B-1	See map	1.60	Yes	
TK-CV-1-1B-2	See map	1.60	Yes	
TK-CV-1-1C-2	See map	4.30	Yes	
TK-CV-2-2-1	See map	0.80	Yes	
TK-CV-2-2-2	See map	1.90	Yes	
TK-CV-2-2A	See map	1.90	Yes	
TK-CV-2-2C	See map	10.30	Yes	
TK-CV-3-3-1	See map	0.40	Yes	
TK-CV-3-3-2	See map	0.80	Yes	
TK-CV-3-3-3	See map	3.50	Yes	
TK-CV-3-3C	See map	1.90	Yes	
TK-CV-3-3C2	See map	10.30	Yes	
TK-CV-3-3C3	See map	4.00	Yes	
TK-CV-3A-3A	See map	0.60	Yes	
TK-CV-4-4-1	See map	0.40	Yes	
TK-CV-4-4-2	See map	1.10	Yes	
TK-CV-4-4B-1	See map	1.80	Yes	
TK-CV-4-4B-2	See map	2.00	Yes	
TK-CV-4-4C-1	See map	0.80	Yes	
TK-CV-4-4C-2	See map	4.50	Yes	
TK-CV-4-4D	See map	2.30	Yes	
TK-CV-5-5-1	See map	0.40	Yes	
TK-CV-5-5-2	See map	0.80	Yes	
TK-CV-5-5A	See map	1.30	Yes	
TK-CV-5-5B	See map	0.80	Yes	
TK-CV-5C-5C	See map	1.60	Yes	
TK-CV-5D-5D	See map	0.20	Yes	
TK-CV-6-6-1	See map	0.30	Yes	
TK-CV-6-6-2	See map	0.60	Yes	
TK-CV-6-6-3	See map	0.00	Yes	
TK-CV-6-6B	See map	0.80	Yes	
TK-CV-6-6B-2	See map	0.00	Yes	
TK-CV-6C-6C	See map	1.80	Yes	
TK-CV-7-7B	See map	0.50	Yes	
TK-CV-8-8B-1	See map	0.16	Yes	
TK-CV-8-8B-2	See map	0.13	Yes	
TK-CV-8-8B-3	See map	0.50	Yes	

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: “PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER”. Sources used for PRV Station data include the 2016 Master Plan and 2015 UWMP. The capacity of each station is constrained by the lesser of the total capacity of the pressure reducing valves (PRV’s) in the station, or by the assumed hydraulic capacity of the distribution system supplying the station. The total capacity of the pressure reducing valves (PRV's) in the station was estimated based on the valve diameter and estimated pressure drop across the pressure zone boundary, using engineering data for globe-style flow control valves. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in a 16-inch ductile iron water main, approximately 3,400 gpm.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-CV-1-49	Yes	?	0	no information in 2016 Master Plan
PR-CV-2-28	Yes	92	3067	
PR-CV-2-26	?	?	3400	in 2016 Master Plan, not in GIS
PR-CV-3-14	Yes	60	1391	
PR-CV-3-16	Yes	60	3400	
PR-CV-3-17	?	?	3400	in 2016 Master Plan, not in GIS
PR-CV-3-19	Yes	70	3400	
PR-CV-3-20	Yes	42	3400	
PR-CV-3-22	?	?	3400	in 2016 Master Plan, not in GIS
PR-CV-3-30	Yes	30	3400	
PR-CV-3-32	Yes	60	3400	
PR-CV-3-39	Yes	60	3400	
PR-CV-3-47	?	?	3400	in 2016 Master Plan, not in GIS
PR-CV-3A-23	Yes	95	1800	
PR-CV-4-13	Yes	60	3400	
PR-CV-4-34	Yes	37	3400	
PR-CV-4-40	Yes	70	3400	
PR-CV-4-41	Yes	70	3400	
PR-CV-4-42	Yes	70	3400	
PR-CV-4-50	Yes	28	3400	
PR-CV-4-51	Yes	30	3400	
PR-CV-4-52	Yes	?	3400	no information in 2016 Master Plan
PR-CV-4-53	Yes	80	3400	
PR-CV-4-54	Yes	70	3400	
PR-CV-5-10	Yes	76	3400	
PR-CV-5-31	Yes	141	1391	
PR-CV-5D-46	Yes	125	3067	
PR-CV-6-36	Yes	42	3400	
PR-CV-6-37	Yes	60	3400	
PR-CV-6-6	Yes	75	3400	
PR-CV-6-9	Yes	40	3400	
PR-CV-6C-43	Yes	57	3400	
PR-CV-6C-44	Yes	40	3400	
PR-CV-6C-45	Yes	52	3400	
PR-CV-8-38	Yes	50	3400	

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources used for Pump Station data include the 2016 Master Plan, 2015 UWMP, and Site Locations Map. The Total and Firm Pumping Capacities are as reported in the 2016 Master Plan. The Pumping Head is calculated to be the difference in HGL's of the higher-pressure zone (discharge side) and lower-pressure zone (suction side). The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-CV-1-1A	Yes					not modeled, pumps from tank to same zone
PS-CV-1-1B	Yes					not modeled, pumps from tank to same zone
PS-CV-2-1	Yes	PZ-CV-1	9655	301	7115	
PS-CV-2-1C	Yes	PZ-CV-1	14824	301	11712	
PS-CV-3-2	Yes	PZ-CV-2	6520	237	3885	
PS-CV-3-2A	No	PZ-CV-2	4100	237	1720	Noted in 2016 Master Plan as inactive due to high nitrate. This station pumps to 3 different zones: 2, 3, 3A. Pumps 1 & 2 to Zone 3, Pump 3 Red Hill to Zone 3A, "Equalizer" intrazone pump is not modeled.
PS-CV-3-2A	No	PZ-CV-2	1000	179	0	Noted in 2016 Master Plan as inactive due to high nitrate. This station pumps to 3 different zones: 2, 3, 3A. Pumps 1 & 2 to Zone 3, Pump 3 Red Hill to Zone 3A, "Equalizer" intrazone pump is not modeled.
PS-CV-3-2C	Yes	PZ-CV-2	13256	237	10561	
PS-CV-4-3	Yes	PZ-CV-3	7323	220	5155	
PS-CV-4-3A	Yes	PZ-CV-3A	6668	278	4370	
PS-CV-4-3C2	Yes	PZ-CV-3	9580	220	7120	
PS-CV-5-4	Yes	PZ-CV-4	3690	222	2220	
PS-CV-5-4B	Yes	PZ-CV-4	3966	222	2435	
PS-CV-5-4C	Yes	PZ-CV-4	4176	370	2780	
PS-CV-5-4D	Yes	PZ-CV-4	4253	222	2792	
PS-CV-6-5	Yes	PZ-CV-5	2775	294	1680	
PS-CV-6-5A	Yes	PZ-CV-5	2960	294	1400	
PS-CV-6-5B	Yes	PZ-CV-5	1920	294	720	
PS-CV-6-5C	Yes	PZ-CV-5C	5398	146	1081	
PS-CV-7-6B	Yes	PZ-CV-6	2186	272	3571	
PS-CV-8-7B	Yes	PZ-CV-7	670	260	0	

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2016 Master Plan and 2015 Urban Water Management Plan (UWMP).

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
52	CV<>FW	10"	Yes	PZ-CV-4	PZ-FW-F19	1500	1500	Treated Water	Wilson Ave and Fields Pl

14	CV<>FW	12"	Yes	PZ-CV-3	PZ-FW-ALDR	1500	1500	Treated Water	Cherry Ave and Roanoke Rd
15	CV<>UP	10"	Yes	PZ-CV-4	PZ-UP-III	1200	2500	Treated Water	At CVWD Reservoir 3A
12	ON>CV	12"	No	PZ-CV-1	PZ-ON-1348	1000	n/a	Treated Water	Shown on master plan figure 4.1, but not described in master plan table 4.10; inactive per Ontario
47	IE>CV	60"	Yes	IE	WP-CV-3-LWM	65972	n/a	Raw Water	CB-16; 24th St and Etiwanda Ave; From Rialto Feeder to Lloyd Michael WTP
46	IE>CV	18"	Yes	IE	WP-CV-4-RN	6944	n/a	Raw Water	CB-07; Hanley Ave and 24th St; From Rialto Feeder to booster station 3C and Royer-Nesbit WTP
77	IE>CV	24"	No	IE	PZ-CV-1	?	n/a	Raw Water	CB-05; Due to a lack of treatment facilities at CB-05, the District does not utilize this service connection
13	CV>ON	8"	No	PZ-CV-1	PZ-ON-1348	3000	n/a	Treated Water	East of 6th Street and Corona Avenue; Represents combined capacity of the two IC's listed in CVWD's MP table 4.10; inactive per CVWD meeting notes. Per Ontario (3/18/19) does not exist, has been removed

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect corrections discovered during modeling. No agency comments received to date on the model data and assumptions.

IEUA Infrastructure Model

Basis for Model – Fontana Water Company

This document and accompanying infrastructure map summarize data and assumptions related to the Fontana Water Company (Fontana) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies, but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by Fontana, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include 2015 Urban Water Management Plan (UWMP), 2017 System Map, and System Schematic. Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 39,140 acre-feet, equivalent to an average day demand of 34.94 million gallon per day (24,265 gpm). Demand for recycled water is not included in the model.

Water demand was allocated to each pressure zone based on 2010 census population.

PRESSURE ZONE	HGL (FT)	POPULATION	% OF TOTAL POPULATION	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-FW-ALDR	1365	88,307	41.3%	41.3%	10,016	Demand apportioned to zones based on 2010 population
PZ-FW-BASE	1265	25,897	12.1%	12.1%	2,937	Demand apportioned to zones based on 2010 population
PZ-FW-F19	2464	18,988	8.9%	8.9%	2,154	Demand apportioned to zones based on 2010 population
PZ-FW-HIGH	1504	32,393	15.1%	15.1%	3,674	Demand apportioned to zones based on 2010 population
PZ-FW-JUNP	1103	48,358	22.6%	22.6%	5,485	Demand apportioned to zones based on 2010 population

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include 2015 Urban Water Management Plan (UWMP), 2017 System Map, System Schematic, 2018 Chino Basin Water Master (CBWM) data for well production capacities, and meeting notes. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX% OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-FW-ALDR-F18A	Chino	No	Perchlorate Nitrate	None	2400	0%	n/a	Perchlorate exceeds MCL, Nitrate at MCL; replacement or treatment planned
WL-FW-ALDR-F44A	Chino	Yes	None	None	2280	100%	n/a	Perchlorate below MCL;
WL-FW-ALDR-F44B	Chino	No	Nitrate, Perchlorate	Blending?	2300	0%	n/a	Perchlorate above MCL, treatment planned
WL-FW-ALDR-F44C	Chino	Yes	None	None	2422	100%	n/a	
WL-FW-BASE-F22A	Chino	No	Perchlorate , Nitrate	None	1850	0%	n/a	Perchlorate below MCL; replacement or treatment planned
WL-FW-BASE-F2A	Chino	No	Nitrate, Perchlorate	None	2321	0%	n/a	Perchlorate and nitrate exceed MCL, treatment planned
WL-FW-BASE-F30A	Chino	No	Nitrate, Perchlorate	None	1020	0%	n/a	Treatment planned
WL-FW-BASE-F3A	Chino	No	(blank)	None	1850	0%	n/a	Abandoned
WL-FW-BASE-F7A	Chino	Yes	None	None	2334	100%	n/a	
WL-FW-BASE-F7B	Chino	Yes	None	None	2570	100%	n/a	
WL-FW-F19-F15A	Rialto-Colton	Yes	None	None	1377	100%	n/a	
WL-FW-F19-F33A	Lytle	Yes	None	None	420	100%	n/a	
WL-FW-F19-F42A	Lytle	Yes	None	None	520	100%	n/a	
WL-FW-HIGH-F10B	No Man's Land	Yes	PCE	WP-FW-HIGH-F10	1075	100%	n/a	
WL-FW-HIGH-F10C	No Man's Land	Yes	PCE	WP-FW-HIGH-F10, Blending	379	100%	n/a	Treated with GAC, blended w effluent from plant F10;
WL-FW-HIGH-F10D	No Man's Land	Yes	None	WP-FW-HIGH-F10	1232	100%	n/a	
WL-FW-HIGH-F13A	Rialto-Colton	Yes	None	None	1739	100%	n/a	
WL-FW-HIGH-F13B	Rialto-Colton	Yes	None	None	1829	100%	n/a	
WL-FW-ALDR-F24A	Chino	Yes	Nitrate, Perchlorate (low)	None	1843	100%	n/a	Perchlorate below MCL

WL-FW-ALDR-F26A	Chino	Yes	Perchlorate (low)	None	1886	100%	n/a	
WL-FW-HIGH-F28A	Lytle	Yes	Other	None	556	100%	n/a	
WL-FW-HIGH-F29A	Lytle	Yes	Other	None	670	100%	n/a	
WL-FW-HIGH-F31A	Chino	Yes	Nitrate (low), Perchlorate	None	1550	100%	n/a	Perchlorate and nitrate below MCL
WL-FW-HIGH-F32A	Lytle	Yes	Other	WP-FW-HIGH-F14	304	100%	n/a	
WL-FW-HIGH-F34A	Lytle	Yes	Other	None	0	100%	n/a	Low water level
WL-FW-HIGH-F36A	Lytle	Yes	Other	None	0	100%	n/a	Low water level
WL-FW-HIGH-F40A	Lytle	Yes	Other	None	510	100%	n/a	
WL-FW-HIGH-F49A	Rialto-Colton	Yes	PCE	WP-FW-HIGH-F10	1600	100%	n/a	Treated with GAC
WL-FW-HIGH-F4A	Chino	No	Nitrate, Perchlorate	None	0	0%	n/a	Perchlorate exceeds MCL, Nitrate exceeds MCL
WL-FW-ALDR-F54A	Lytle	?	Other	None	739	100%	n/a	
WL-FW-JUNP-F17B	Chino	Yes	Nitrate, Perchlorate	WP-FW-HIGH-F17	2132	50%	n/a	Perchlorate exceeds MCL, Nitrate exceeds MCL
WL-FW-JUNP-F17C	Chino	No	Nitrate, Perchlorate	WP-FW-HIGH-F17	2955	0%	n/a	Perchlorate exceeds MCL, Nitrate exceeds MCL
WL-FW-JUNP-F21A	Chino	No	Nitrate, Perchlorate	None	0	0%	n/a	Abandoned. Perchlorate below MCL, Nitrate exceeds MCL
WL-FW-JUNP-F21B	Chino	Yes	None	None	2365	100%	n/a	
WL-FW-JUNP-F23A	Chino	No	Nitrate, Perchlorate	WP-FW-JUNP-F23A	2474	0%	n/a	Perchlorate below MCL, nitrate exceeds MCL, needs treatment
WL-FW-F19-F27A	Lytle	Yes	None	None	189	100%	n/a	

Intakes

Surface water intakes are labeled as follows: "IN-AGENCY-PRESSURE ZONE-INTAKE NAME". Sources used for intake data include the 2015 Urban Water Management Plan (UWMP), System Schematic, and 2017 System Map. Fontana has one local surface water intake.

INTAKE LABEL	LOCATION	ACTIVE	WATER TYPE	TREATMENT FACILITY	INTAKE YIELD (AFY)	MODEL INTAKE CAPACITY (GPM)	NOTES
IN-FW-HIGH-F27	Lytle Creek	Yes	Raw Water	WP-FW-F14	Varies	177	FWC_Infrastructure.tiff, FWC_ServiceArea.tiff;

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-WTP NAME". Sources used for treatment plant data include the 2015 UWMP and the System Schematic.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-FW-HIGH-F10	Yes	5,000	GAC; ; FWC_Infrastructure.tiff, FWC_ServiceArea.tiff
WP-FW-HIGH-F14	Yes	22,222	Sandhill, Rialto Feeder head reduced from 1872 (140psi) to 1580 (5psi); 12,500 gpm conventional treatment capacity / 8,333 gpm permitted; 13,889 gpm diatomaceous earth filter treatment capacity; FWC_Infrastructure.tiff, FWC_ServiceArea.tiff
WP-FW-JUNP-F17	Yes	6,000	perchlorate and nitrate removal; ; FWC_Infrastructure.tiff, FWC_ServiceArea.tiff
WP-FW-JUNP-F23A	Yes	2,500	

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources for distribution storage data included the 2015 UWMP, System Schematic, and meeting notes.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-FW-ALDR-F44	See map	0.35	Yes	
TK-FW-ALDR-F9	See map	0.78	Yes	
TK-FW-BASE-F2	See map	1.37	Yes	
TK-FW-BASE-F7	See map	1.07	Yes	
TK-FW-F19-F15	See map	3.59	Yes	
TK-FW-F19-F19	See map	2.09	Yes	
TK-FW-F19-F46	See map	1.49	Yes	
TK-FW-F19-F47	See map	0.19	Yes	
TK-FW-F19-F48E	See map	0.41	Yes	
TK-FW-F19-F48W	See map	0.17	Yes	
TK-FW-HIGH-F10	See map	2.62	Yes	
TK-FW-HIGH-F11	See map		No	After bay diversion facility for surface water
TK-FW-HIGH-F13E	See map	1.00	Yes	
TK-FW-HIGH-F13W	See map	3.03	Yes	
TK-FW-HIGH-F14	See map		No	
TK-FW-HIGH-F16E	See map	0.42	Yes	
TK-FW-HIGH-F16W	See map	0.32	Yes	
TK-FW-HIGH-F53E	See map	1.05	Yes	
TK-FW-HIGH-F53W	See map	1.05	Yes	
TK-FW-JUNP-F17	See map	2.68	Yes	
TK-FW-JUNP-F20	See map	3.76	Yes	
TK-FW-JUNP-F21W	See map	0.53	Yes	
TK-FW-JUNP-F23N	See map	0.38	Yes	
TK-FW-JUNP-F23S	See map	0.38	Yes	
TK-FW-JUNP-F37	See map	0.75	Yes	
TK-FW-JUNP-F43	See map	1.93	Yes	

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER". Sources used for PRV Station data include the System Schematic. No information was provided on the specific location, size or capacity of the PRV stations. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in a 16-inch ductile iron water main, approximately 3,400 gpm.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-FW-F19-1	Yes	?	3400	existence assumed, capacity assumed; SGVWC/FWC System Schematic, to Highland
PR-FW-HIGH-2	Yes	?	3400	existence assumed, capacity assumed; SGVWC/FWC System Schematic, to Alder
PR-FW-ALDR-3	Yes	?	3400	noted on system schematic, location assumed, capacity assumed; SGVWC/FWC System Schematic, to Baseline
PR-FW-ALDR-4	Yes	?	3400	noted on system schematic, location assumed, capacity assumed; SGVWC/FWC System Schematic, to Juniper
PR-FW-BASE-5	Yes	?	3400	noted on system schematic, location assumed, capacity assumed; SGVWC/FWC System Schematic, to Juniper

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources for Pump Station data include the System Schematic, Booster Station table data, and meetings. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented. Most of the pump stations pump within the same pressure zone, and are not modeled. One exception is the pump station for the CVWD interconnection.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-FW-ALDR-F44	Yes					Wells to Alder, Juniper; intrazone, not modeled
PS-FW-ALDR-F9	Yes					Reservoir to Alder and Juniper; intrazone, not modeled
PS-FW-BASE-F2	Yes					Wells, reservoir to Baseline and Alder; intrazone, not modeled
PS-FW-BASE-F3	No					Inactive, to be abandoned
PS-FW-BASE-F7	Yes					Wells, reservoir to Baseline and Juniper; intrazone, not modeled
PS-FW-F19-F15	Yes	PZ-FW-HIGH	7500	960	6250	Highland to F19 and F46; TDH estimated to be difference in HGL between zones.
PS-FW-F19-F45	Yes	PZ-CV-4				Not modeled, PZ-FW-46 modeled with PZ-FW-19. CVWD to F46; 2500 gpm, 2 pumps. TDH estimated to be difference between CVWD and FW zone HGL's
PS-FW-F19-F46	Yes					F46 to F47; intrazone, not modeled

PS-FW-F19-F47	Yes	F47 to F48; intrazone, not modeled
PS-FW-F19-F48	Yes	F47 to Upper Hunters Ridge; intrazone, not modeled
PS-FW-HIGH-F10	Yes	Wells, reservoir to Highland, Alder, Juniper; intrazone, not modeled
PS-FW-HIGH-F13	Yes	Wells, F14, well field, to Alder and Highland; intrazone, not modeled
PS-FW-HIGH-F16	Yes	Alder to Highland; intrazone, not modeled
PS-FW-HIGH-F53	No	inactive
PS-FW-HIGH-F58	No	inactive

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include 2015 Urban Water Management Plan (UWMP), System Schematic, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
52	CV<> FW	10"	Yes	PZ-CV-4	PZ-FW-F19	1500	1500	Treated Water	Wilson Ave and Fields Pl; CVWD PZ 4; CVWD_MasterPlan.tiff, FWC_Schematic.tiff, CVWD_Interconnection.csv
14	CV<> FW	12"	Yes	PZ-CV-3	PZ-FW-Alder	1500	1500	Treated Water	Cherry Ave and Roanoke Rd; CVWD PZ 2; CVWD_MasterPlan.tiff, FWC_Schematic.tiff, CVWD_Interconnection.csv
4	FW<> WV	12”	No	PZ-FW-JUNP	WV	0	0	Treated Water	FWC_Infrastructure.tiff, FWC_Schematic.tiff
31	FW> RLT	16"	No	PZ-FW-HIGH	RLT	?	n/a	Treated Water	FWC-Rialto; FWC_Infrastructure.tiff
32	SB> FW	24”	Yes	SB	WP-FW-HIGH-F14	6300	n/a	Raw Water	Location unknown; annotated IEUA schematic says 26cfs, UWMP says 14cfs; FWC_Schematic.tiff, FWC UWMP
41	FW> JC	12”	No	PZ-FW-JUNP	JC	?	n/a	Treated Water	Emergency, location unknown; FWC_Schematic.tiff; not shown. Noted as potential connection on schematic markups
45	IE> FW	30"	Yes	IE	WP-FW-HIGH-F14	18000	n/a	Raw Water	IEUA GIS, FWC UWMP

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect comments on original assumptions document received from Fontana Water Company on 7/5/18, data from provided detailed map book, and corrections discovered during modeling.

IEUA Infrastructure Model: Baseline 2020

Basis for Model – Monte Vista Water District

This document and accompanying infrastructure map summarize data and assumptions related to the Monte Vista Water District (MVWD) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by MVWD, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include 2015 Urban Water Management Plan (UWMP), Infrastructure Map, 2007 WEI System Map, and meeting notes. Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 11,519 acre-feet, equivalent to an average day demand of 10.28 million gallon per day (7,141 gpm). Demand for recycled water is not included in the model.

Pressure zone HGL data was not provided. HGL's were estimated based on various assumptions, noted in the table below. Water demand was allocated to each pressure zone based on 2010 census population.

PRESSURE ZONE	HGL (FT)	POPULATION	% OF TOTAL POPULATION	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-MV-Z1	1351?	7,690	14.4%	14.4%	1,029	no pressure zone-specific demand or HGL information was provided, 2020 demand apportioned to zones based on 2010 census population, estimated HGL based on Tank 18-1 elevation + 20 ft = 1351 ft.

PZ-MV-Z2	1191?	23,269	43.6%	43.6%	3,114	no pressure zone-specific demand or HGL information was provided, 2020 demand apportioned to zones based on 2010 census population, estimated HGL based on 60 psi at PR-A GIS elevation = 1191 ft.
PZ-MV-Z3	1085?	15,496	29.0%	29.0%	2,074	no pressure zone-specific demand or HGL information was provided, 2020 demand apportioned to zones based on 2010 census population, estimated HGL based on 60 psi at PR-MV-Z2-B GIS elevation = 1085 ft.
PZ-MV-Z4	973?	6,912	13.0%	13.0%	925	no pressure zone-specific demand or HGL information was provided, 2020 demand apportioned to zones based on 2010 census population, estimated HGL based on 60 psi at PR-MV-Z3-I GIS elevation = 973 ft.

Wells

Wells are labeled as follows: “WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER”. Sources used for well data include the 2015 UWMP, 2007 WEI System Map, 2018 Chino Basin Water Master (CBWM) data, 2019 Hazen Plant 30 Wellhead Treatment Project BODR and meeting notes. Assumed production well capacities for MVWD are based on data in 4/24/18 email correspondence. Wells with impaired water quality which require treatment or blending are identified. The 2015 UWMP notes that some (non-identified) wells have nitrate, perchlorate, and DBCP levels that are approaching or exceed the MCL for those contaminants and are operated by blending with other wells or imported water to meet drinking water standards. Meeting notes indicate that some wells are also contaminated with TCP. Specific information on individual wells was not provided and blending requirements have been assumed. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. The maximum blend is estimated to be 50% for wells assumed to pump to the Blending Station shown in the 2007 WEI System Map, and 70% for all other wells not otherwise treated. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX% OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-MV-Z1-10	Chino	Yes	Other	Blending	800	50%	n/a	listed as 0 in 4/24/18 email, CBWM notes as seasonal use. Well assumed to pump to nearby Blending Station shown in 2007 WEI System Map
WL-MV-Z1-26	Chino	Yes	Other	?	2000	70%	n/a	production rate from 1/21/19 email.
WL-MV-Z1-27	Chino	Yes	Other	?	1950	50%	n/a	production rate from 1/21/19 email, CBWM notes as seasonal use.
WL-MV-Z1-31	Chino	Yes	Other	?	2000	70%	n/a	production rate from 4/24/18 email.
WL-MV-Z1-33	Chino	Yes	Nitrate	Plant 30	2000	100%	1000	ASR well, 2015 UWMP: 2000 gpm production 1000 injection. Shared with Chino 50/50. Treatment for wells 30, 32, and 33 at Plant 30. Connection to deliver 50% to Chino PZ-CN-890.
WL-MV-Z1-4	Chino	Yes	Other	?	800	70%	400	ASR well, 2015 UWMP: 800 gpm production 400 injection.
WL-MV-Z1-5	Chino	Yes	Other	?	1400	70%	n/a	production rate from 1/21/19 email.
WL-MV-Z2-19	Chino	Yes	Other	Blending	1800	50%	n/a	production rate from 1/21/19 email. Well assumed to pump to nearby Blending Station shown in 2007 WEI System Map
WL-MV-Z2-28	Chino	Yes	Other	Blending	1800	50%	n/a	production rate from 1/21/19 email. Well assumed to pump to nearby Blending Station shown in 2007 WEI System Map
WL-MV-Z2-30	Chino	Yes	Other	Plant 30	2000	100%	1000	ASR well, 2015 UWMP: 2000 gpm production 1000 injection, CBWM notes as seasonal use. Treatment at Plant 30.
WL-MV-Z2-32	Chino	Yes	Other	Plant 30	2000	100%	1000	ASR well, 2015 UWMP: 2000 gpm production 1000 injection, CBWM notes as seasonal use. Treatment at Plant 30.
WL-MV-Z2-34	Chino	Yes	Other	Blending	2000	50%	n/a	listed as 0 in 4/24/18 email, CBWM notes as seasonal use. Well assumed to pump to nearby Blending Station shown in 2007 WEI System Map

Intakes

MVWD does not have surface water intakes.

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-WTP NAME". Sources used for treatment plant data include the 2015 UWMP, Infrastructure Map, 2007 WEI System Map, 2019 Hazen Plant 30 Wellhead Treatment Project BODR, and meeting notes.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-MV-Z1-IX	Yes	2000* (see WP-MV-Z1-PL30)	Located at ASR Well 33, used for nitrate and perchlorate removal, originally stand-alone. Will be integrated with new treatment facilities at Well 30 for treatment of nitrate, perchlorate, 1,2,3-TCP, and DBCP. Capacity is for partial treatment before piped to Well 30 Plant.
WP-MV-Z1-PL30	Yes	4000 (Phase 1)	Located at Well 30. Raw water from Well 32 and partially treated water from Well 33 is piped to the site for treatment of combined production from Wells 30, 32, and 33 with IX and GAC for treatment of nitrate, perchlorate, and 1,2,3-TCP (exceed MCL) and low levels of DBCP. Phase 1 treatment capacity is 4,000 gpm and assumed operational in the model. Future Phase 2 will increase the treatment capacity to 6,000 gpm.

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources used for distribution storage data include the 2015 UWMP, meeting notes, and correspondence.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-MV-Z1-16	See map	3.02	Yes	
TK-MV-Z1-18-1	See map	1.21	Yes	
TK-MV-Z1-18-2	See map	1.09	Yes	
TK-MV-Z1-18-3	See map	3.37	Yes	
TK-MV-Z1-4	See map	1.56	Yes	
TK-MV-Z1-5	See map	2.34	Yes	
TK-MV-Z2-28	See map	3.17	No	Inactive, not modeled

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER". Sources used for PRV Station data include general system maps and meeting notes. Location data was obtained, but no information was provided on the size or capacity of the PRV stations. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in a 12-inch ductile iron water main, approximately 1,900 gpm.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-MV-Z1-A	Yes		1900	Assumed capacity
PR-MV-Z2-B	Yes		1900	Assumed capacity
PR-MV-Z3-C	Yes		1900	Assumed capacity
PR-MV-Z3-D	Yes		1900	Assumed capacity

PR-MV-Z3-E	Yes	1900	Assumed capacity
PR-MV-Z3-F	Yes	1900	Assumed capacity
PR-MV-Z3-G	Yes	1900	Assumed capacity
PR-MV-Z3-H	Yes	1900	Assumed capacity
PR-MV-Z3-I	Yes	1900	Assumed capacity
PR-MV-Z3-J	Yes	1900	Assumed capacity

Pump Stations

Pump Stations are labeled as follows: “PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER”. Sources used for Pump Station data include the 2015 Urban Water Management Plan (UWMP) and meeting notes. The 2015 UWMP indicates that there are 7 booster pumps in the system, and meeting notes indicate that pumping occurs from PZ-2 to PZ-1. No information was provided on the location or capacity of pump stations. One pumping station is assumed between PZ-2 and PZ-1 with an assumed firm pumping capacity equal to approximately 3x average demand in PZ1. The Pumping Head is calculated to be the difference in HGL’s of the higher-pressure zone (discharge side) and lower-pressure zone (suction side). The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-MV-Z1-1	Yes	PZ-MV-Z2	3500	160	2800	Assumed location and capacity; No information provided. 4/9/18 meeting notes reference pumping from PZ 2 to PZ 1;

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2015 Urban Water Management Plan (UWMP), general system maps, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
25	WF > MV	30"	Yes	WP-WF-XX-ADL	PZ-MV-Z1	24305	n/a	Treated Water	WFA-MVWD 1; ; ; WFA_Pipeline.tiff
65	WF > MV	16"	No	WP-WF-XX-ADL	PZ-MV-Z1	?	n/a	Treated Water	WFA-MVWD 2; ; ; WFA_Pipeline.tiff; out of service >15 years
21	MV <> CN	6"	No	PZ-MV-Z4	PZ-CN-890	500	500	Treated Water	4000 block of Riverside Dr; emergency connection; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg; assumed capacity 500 gpm

18	MV > CN	6"	No	PZ-MV-Z4	PZ-CN-890	500	500	Treated Water	Pamela Dr and Melrose Ave; emergency connection; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg; assumed capacity 500 gpm
33	MV <> CN	8"	No	PZ-MV-Z4	PZ-CN-890	1000	1000	Treated Water	Chino Ave and Saddle Ln; emergency connection; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg; assumed capacity 1000 gpm
10	MV > CH	30"	Yes	PZ-MV-Z4	PZ-CH-I	8610	n/a	Treated Water	capacity is WFA rights from meeting notes; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg
36	GS <> MV	12"	No	GS	PZ-MV-Z2	?	?	Treated Water	Currently unpermitted and inactive; Flow bidirectional to/from GSWC; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg
23	UP > MV	12"	Yes	PZ-UP-II	PZ-MV-Z1	2100	n/a	Treated Water	Dewey Wy and Reservoir 18; emergency connection; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg

Revision Notes

2/25/2020: Revised to include the water treatment facility for Wells 30, 32, and 33 located at Well 30. Wells 30, 32, and 33 revised to indicate treatment without supplemental blending requirements.

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect corrections discovered during modeling. No agency comments received to date on the model data and assumptions.

IEUA Infrastructure Model: Baseline 2020

Basis for Model - City of Ontario

This document and accompanying infrastructure map summarize data and assumptions related to the City of Ontario (Ontario) water system used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies, but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by Ontario, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include the 2012 Master Plan, 2015 Urban Water Management Plan (UWMP), and Water System Map.

Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 was 31,440 acre-feet, equivalent to an average day demand of 28.07 million gallon per day (19,492 gpm). Demand for recycled water is not included in the model.

Water demand was allocated to each pressure zone based on 2010 census population.

PRESSURE ZONE	HGL (FT)	POPULATION	% OF TOTAL POPULATION	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-ON-1348	1348	24,248	15.2%	15.2%	2961	Demand allocated to zone by 2010 census population
PZ-ON-1212	1212	67,903	42.5%	42.5%	8292	Demand allocated to zone by 2010 census population
PZ-ON-1074	1074	28,271	17.7%	17.7%	3452	Demand allocated to zone by 2010 census population

PZ-ON-1010	1010	37,224	23.3%	23.3%	4545	Demand allocated to zone by 2010 census population
PZ-ON-925	925	1,985	1.2%	1.2%	242	Demand allocated to zone by 2010 census population

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the 2012 Master Plan, 2015 UWMP, Water System Map, 2018 Chino Basin Water Master (CBWM) production data, and meeting notes. Associated treatment facilities are identified for those wells which require more than basic chemical treatment. Assumed production well capacities for the City of Ontario are based on 2018 data reported by the Chino Basin Water Master, rather than the older 2012 Master Plan data. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-ON-1010-34	Chino	No	Other	None	1572	100%	n/a	Inactive due to WQ issues. 4/9/18 meeting notes
WL-ON-1010-39	Chino	No	Perchlorate	None	2195	0%	n/a	
WL-ON-1074-17	Chino	Yes	None	None	1274	100%	n/a	inactive, per CBWM
WL-ON-1074-35	Chino	Yes	None	None	2709	100%	n/a	
WL-ON-1074-36	Chino	Yes	None	None	1666	100%	n/a	
WL-ON-1074-40	Chino	Yes	Nitrate	None	3288	50%	n/a	2012 Master Plan notes that has perchlorate
WL-ON-1074-44	Chino	Yes	Nitrate, Perchlorate	WP-ON-1074-GALV	2500	100%	n/a	
WL-ON-1074-45	Chino	Yes	None	None	2500	100%	n/a	
WL-ON-1074-52	Chino	Yes	Nitrate, Perchlorate	WP-ON-1074-GALV	2000	100%	n/a	
WL-ON-1212-20	Chino	Yes	None	None	775	100%	n/a	standby, per CBWM
WL-ON-1212-24	Chino	Yes	None	None	1626	100%	n/a	
WL-ON-1212-25	Chino	Yes	None	None	1407	100%	n/a	
WL-ON-1212-26	Chino	No	None	None	1626	0%	n/a	inactive, per CBWM and 4/9/18 meeting notes
WL-ON-1212-27	Chino	Yes	None	None	1097	100%	n/a	standby, per CBWM
WL-ON-1212-29	Chino	Yes	Perchlorate	None	2625	100%	n/a	2012 Master Plan notes that has nitrate. Per CBWM review and RMPU/SFI data the capacity of this well is 2625 gpm. Proposed changes to Ontario, no response.

WL-ON-1212-30	Chino	Yes	None	None	1850	100%	n/a	
WL-ON-1212-31	Chino	Yes	Perchlorate	None	2944	100%	n/a	2012 Master Plan notes that has nitrate
WL-ON-1212-37	Chino	Yes	None	None	2925	100%	n/a	
WL-ON-1212-38	Chino	Yes	None	None	2377	100%	n/a	
WL-ON-1212-41	Chino	Yes	None	None	2676	100%	n/a	
WL-ON-1212-47	Chino	Yes	None	None	2500	100%	n/a	
WL-ON-1348-46	Chino	Yes	None	None	2500	100%	n/a	
WL-ON-925-49	Chino	Yes	None	None	1800	100%	n/a	
WL-ON-1212-43	Chino	Yes	None	None	1550	100%	n/a	listed as existing by CBWM, do they exist? Which PZ?
WL-ON-1010-50	Chino	No	Perchlorate, Color	None	1200	0%	n/a	listed as existing by CBWM, 4/9/18 meeting notes indicate on standby

Intakes
Not applicable to Ontario.

Treatment Plants
Treatment plants are labeled as follows: “WP-AGENCY-PRESSURE ZONE-WTP NAME”. Sources used for treatment plants include the 2012 Master Plan, 2015 UWMP, Water System Map, and meeting notes.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-ON-1074-GALV	Yes	5000	Treats water from Wells 44 and 52

Distribution Storage
Distribution storage tanks are labeled as follows: “TK-AGENCY-PRESSURE ZONE-TANK NUMBER”. Sources used for distribution storage data include the 2012 Master Plan, 2015 UWMP, and Water System Map.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-ON-1010-1	Campus Ave and Main St	5.5	Yes	
TK-ON-1010-2A	Milliken Ave and I-10	9	Yes	
TK-ON-1010-2B	Milliken Ave and I-10	9	Yes	
TK-ON-1074-1A	Cucamonga Ave and Fourth St	2.75	Yes	
TK-ON-1074-1B	Cucamonga Ave and Fourth St	2	Yes	
TK-ON-1212-1A	Fern Ave and Euclid Pl	20	Yes	
TK-ON-1212-1B	Fern Ave and Euclid Pl	2	Yes	
TK-ON-1212-3	Campus Ave and 8th St	10	Yes	
TK-ON-1348-1A	Campus Ave and 13th St	3	Yes	
TK-ON-1348-1B	Campus Ave and 13th St	2	Yes	
TK-ON-1348-1C	Campus Ave and 13th St	3.75	Yes	
TK-ON-925-2A	Dupont Ave and Jurupa St	6	Yes	

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER". Sources used for PRV Station data include the 2012 Master Plan, 2015 UWMP, Water System Map, and meeting notes. The capacity of each station is constrained by the lesser of the total capacity of the pressure reducing valves (PRV's) in the station, or by the assumed hydraulic capacity of the distribution system supplying the station. The total capacity of the pressure reducing valves (PRV's) in the station was estimated based on the valve diameter and estimated pressure drop across the pressure zone boundary, using engineering data for globe-style flow control valves. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in a 16-inch ductile iron water main, approximately 3,400 gpm.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-ON-1010-17	Yes	(blank)	3400	
PR-ON-1010-18	Yes	(blank)	3400	
PR-ON-1074-2	Yes	(blank)	3400	
PR-ON-1074-3	Yes	(blank)	3400	
PR-ON-1074-4	Yes	(blank)	2200	
PR-ON-1074-5	Yes	(blank)	2400	
PR-ON-1212-10	Yes	(blank)	3400	
PR-ON-1212-11	Yes	(blank)	3400	
PR-ON-1212-12	Yes	(blank)	3400	
PR-ON-1212-13	Yes	(blank)	3400	
PR-ON-1212-21	Yes	(blank)	3400	no information, assumed identical to PR-ON-1212-9
PR-ON-1212-6	Yes	(blank)	3400	
PR-ON-1212-7	Yes	(blank)	2500	
PR-ON-1212-8	Yes	(blank)	3400	
PR-ON-1212-9	Yes	(blank)	3400	
PR-ON-1212-14	?	?	3400	not currently in GIS, interconnection with CVWD to deliver supply from Well 20.
PR-ON-1348-15	Yes	(blank)	3400	

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources used for Pump Station data include the 2012 Master Plan, 2015 UWMP, Water System Map, and meeting notes. The Total Pumping Capacity is the reported capacity of the pump station, or the sum of capacities of the pumps in the station. The Pumping Head is the maximum pumping head of the pumps in the station. If not available, the pumping head is calculated to be the difference in HGL's of the higher-pressure zone (discharge side) and lower-pressure zone (suction side). The firm capacity is the reported firm capacity, or if not available the total capacity of the station with the largest pump out of service. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-ON-1074-1BS2	Yes		2200	300	0	
PS-ON-1074-1GAL	Yes		11952	162	7186	
PS-ON-1212-5ONT	Yes		3895	314	2580	
PS-ON-1348-2	Yes		4782	159	1803	
PS-ON-1348-3	Yes		4292	230	2137	

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2012 Master Plan, 2015 UWMP, Water System Map, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
12	ON > CV	12"	No	PZ-CV-1	PZ-ON-1348	1000	n/a	Treated Water	Shown on master plan figure 4.1, but not described in master plan table 4.10; inactive per Ontario; CVWD_MasterPlan.tiff
19	ON > UP	16"	No	PZ-ON-1348	PZ-UP-II	1000	n/a	Treated Water	Currently offline due to damaged meter structure, per meeting notes; Ontario_System.tiff, Schematic
22	ON > CN	14"	No	PZ-ON-1212	PZ-CN-980	700	n/a	Treated Water	Uses WFA pipeline, only avail when WFA I-11 is offline; inactive; Ontario_System.tiff
51	CD > ON	12”	Yes	PZ-CD-I	PZ-ON-1010	1000	n/a	Treated Water	Archibald Ave and Schaefer Ave; From CDA-I to Ontario 1010 via JCSD, annual avg supply 1500 afy; Ontario_System.tiff, CDA_Facilities.tiff, Ontario Master Plan
27	WF > ON	16"	Yes	WP-WF-XX-ADL	PZ-ON-1348	7500	n/a	Treated Water	WFA-Ontario 2; ; WFA #2; WFA_Pipeline.tiff, Ontario Master Plan
28	WF > ON	30"	Yes	WP-WF-XX-ADL	PZ-ON-1212	13350	n/a	Treated Water	WFA-Ontario 1; ; WFA #1; WFA_Pipeline.tiff, Ontario Master Plan
38	JC > ON	12”	No	JC	PZ-ON-1010	2170	n/a	Treated Water	Philadelphia St and Milliken Ave; From CDAII at 1110 to Ontario 1010 or 925; not in use per

									Ontario; CDA_Facilities.tiff, Ontario Master Plan
75	CD > ON	18”	Yes	PS-CD-II	PZ-ON-1010	2500	n/a	Treated Water	Capacity is an estimate based on Ontario meeting notes; Ontario meeting notes; also reported to connect to PZ-ON-925

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect corrections discovered during modeling. No agency comments received to date on the model data and assumptions.

IEUA Infrastructure Model: Baseline 2020

Basis for Model – San Antonio Water Company

This document and accompanying infrastructure map summarize data and assumptions related to the San Antonio Water Company (SAWC) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by SAWC, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include the 2015 Urban Water Management Plan (UWMP), 2017 Master Plan, and System Map.

Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total non-wholesale Potable and Raw Water demand in 2020 is projected to be 1,469 acre-feet (af), equivalent to an average day demand of 1.31 million gallon per day (911 gpm). Wholesale deliveries totaled 6,034 af in 2015. Demand for recycled water is not included in the model. SAWCo dedicates a portion of its water supply to groundwater recharge in the Cucamonga Basin. In 2015, 903 af of surface water was recharged to groundwater via spreading basins.

The 2017 Master Plan includes a summary of system demand by pressure zone. This data was used to calculate the percentages of total system demand to allocate to each pressure zone. These percentages were used to estimate the 2020 average demand for each pressure zone.

PRESSURE ZONE	HGL (FT)	AREA (SQ MI)	% OF TOTAL AREA	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-SA-HLLY	2675	0.04	2.1%	1.3%	12	allocations based on zone-level demands provided in 2017 master plan
PZ-SA-LOW	2207	1.11	54.7%	22.7%	206	allocations based on zone-level demands provided in 2017 master plan
PZ-SA-UP	2400	0.88	43.2%	76.1%	693	allocations based on zone-level demands provided in 2017 master plan

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the 2017 Master Plan, 2015 UWMP, 2018 Chino Basin Water Master (CBWM) data, System Map, and meeting notes. Assumed production well capacities for SAWC are based on data in the 2017 Master Plan. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. Many of the SAWC wells are dedicated to use by Upland. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-SA-LOW-32	Cucamonga	Yes	None	None	354	100%	n/a	capacity from 2017 master plan
WL-UP-I-S2	Cucamonga	Yes	Nitrate, DBCP	See Upland	882	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-UP-I-S22	Cucamonga	Yes	None	See Upland	1694	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-UP-I-S24	Cucamonga	Yes	Nitrate, DBCP	See Upland	2432	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-UP-I-S3	Cucamonga	Yes	Nitrate, DBCP	See Upland	1171	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-UP-II-S25A	Six Basins	Yes	None	See Upland	500	n/a	n/a	used by Upland;
WL-UP-II-S26	Six Basins	Yes	None	See Upland	524	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-UP-II-S27A	Six Basins	Yes	None	See Upland	654	n/a	n/a	used by Upland; capacity from 2017 master plan
WL-SA-UP-15	Chino	Yes	None		542	100%	n/a	used by Upland (verify); capacity from 2017 master plan, 2017 master plan notes that used for domestic - SAWCO use or Upland use?
WL-SA-UP-16	Chino	Yes	None		923	100%	n/a	capacity from2017 master plan, 2017 master plan notes that used for domestic - SAWCO use or Upland use?
WL-WF-XX-S35	Six Basins	Yes	None	WP-WF-XX-ADL	638	100%	n/a	

Intakes

Surface water intakes are labeled as follows: "IN-AGENCY-PRESSURE ZONE-INTAKE NAME". Sources used for intake data include the 2017 Master Plan, 2015 UWMP, System Map, and meeting notes. SAWC has one surface water intake on San Antonio Creek, a portion of which is delivered to Upland for treatment at their San Antonio Canyon WTP and is also used for groundwater recharge. In addition, SAWC has the San Antonio Tunnel, which collects groundwater for use by SAWC. Intake capacities are assumed to be equal to yield as noted in the 2017 Master Plan.

INTAKE LABEL	LOCATION	ACTIVE	WATER TYPE	TREATMENT	INTAKE YIELD (AFY)	MODEL INTAKE CAPACITY (GPM)	NOTES

IN-SA-UP-V-SACR	See map	Yes	Raw Water	WP-UP-V-SACN	13864	8596	2017 master plan; supplies Upland San Antonio Canyon WTP
IN-SA-LOW-SATN	See map	Yes	Treated Water	None	847.2	525	2017 master plan; annual yield estimated as 50% exceedance per 2017 master plan

Treatment Plants

SAWC does not have any treatment plants of its own. San Antonio Creek surface water is delivered to Upland for treatment at its San Antonio Canyon WTP.

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources used for distribution storage data include the 2017 Master Plan, 2015 UWMP, and System Map.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-SA-HLLY-HLLY	See map	0.06	Yes	SAWCo_SystemMap.tiff, 2017 Master Plan
TK-SA-LOW-12	See map	5.00	Yes	SAWCo_SystemMap.tiff, Upland_HydraulicSchematic.tiff, 2017 Master Plan
TK-SA-LOW-7	See map	0.50	Yes	SAWCo_SystemMap.tiff, 2017 Master Plan
TK-SA-UP-6	See map	1.00	Yes	SAWCo_SystemMap.tiff, 2017 Master Plan

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER". Sources used for PRV Station data include the 2017 Master Plan and System Map. SAWC has one PRV Station between the Upper and Lower zones. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in a 12-inch ductile iron water main, approximately 1,900 gpm.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-SA-UP-PRSP	Yes	55	1900	SAWCo_SystemMap.tiff, 2017 master plan

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources used for Pump Station data include the 2017 Master Plan and System Map. Total Pumping Capacity and Pumping Head are as noted in the 2017 Master Plan. Firm Pumping Capacity is estimated as the capacity of the station with the largest pump out of service. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES

PS-SA-HLLY-19	Yes	PZ-SA-Upper	875	311	414	Holly Drive; SAWCo_SystemMap.tiff, 2017 master plan
PS-SA-LOW-18	Yes	Wells 15 & 16	997	376	0	Station 18; pumps wells 15 and 16 to lower zone, not modeled; SAWCo_SystemMap.tiff, 2017 master plan
PS-SA-UP-25HP	Yes	PZ-SA-Lower	534	215	232	Euclid; SAWCo_SystemMap.tiff, 2017 master plan
PS-SA-LOW-FBAY	Yes	SA-Tunnel	1000	300	500	Forebay; From surface intake to SAWC WTP? (verify); 2017 master plan refers to tunnel, not creek; 2017 master plan; SAWCo_SystemMap.tiff; not modeled

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2017 Master Plan, 2015 UWMP, System Map, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
69	SA > UP	12"	Yes	PZ-SA-LOW	PZ-UP-V	600	n/a	Treated Water	Upland mtg notes refer to I-70, but I-69 makes more sense; SAWCo_SystemMap.tiff, Upland Meeting Notes
71	UP > SA	6"	No	PZ-UP-V	PZ-SA-LOW	500	n/a	Treated Water	SAWCo Master Plan, emergency use
35	SA > WF	12”	No	PZ-SA-LOW	WP-WF-XX-ADL	3500	n/a	Untreated Water	Emergency; capacity range given in mtg notes is 3500-6000 gpm; Meeting notes. Raw water
70	SA > UP	6"	Yes	PZ-SA-LOW	PZ-UP-V	3150	n/a	Treated Water	24th and Campus; Location approximate; IEUA.tiff, Upland_HydraulicSchematic.tiff, SAWCo_SystemMap.tiff

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect comments on original assumptions document received from SAWCO on 7/5/18, and corrections discovered during modeling.

IEUA Infrastructure Model: Baseline 2020

Basis for Model – City of Upland

This document and accompanying infrastructure map summarize data and assumptions related to the City of Upland (Upland) water utility used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by Upland, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

Pressure Zones are labeled as follows: "PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER". Sources used for pressure zones and demands include the 2015 Urban Water Management Plan (UWMP), 2018 Hydraulic Schematic, Water Distribution Map, and meeting notes. Demands are allocated at the pressure zone level for the regional model. The 2020 baseline model represents projected 2020 average demand for Potable and Raw Water, as reported in IEUA's Integrated Resource Plan (IRP) of 2016. Total Potable and Raw Water demand in 2020 is projected to be 21,665 acre-feet, equivalent to an average day demand of 19.34 million gallon per day (13,431 gpm). Demand for recycled water is not included in the model.

Data was not provided for the HGL of each pressure zone. The HGL of each pressure zone was assumed to be approximately 200 ft above the elevation of the area centroid of the pressure zone. Pressure zone-level average day demand data was provided in the 2018 Hydraulic Schematic. The zone demands in the schematic were used to estimate demand allocation percentages for each zone.

PRESSURE ZONE	HGL (FT)	AREA (SQ MI)	% OF TOTAL AREA	ALLOCATION OF TOTAL DEMAND	2020 AVERAGE DEMAND (GPM)	NOTES
PZ-UP-I	1436	4.35	27.8%	29.7%	3995	HGL from 2010 Master Plan Table 5.8, demand allocated based on data in 2018 hydraulic schematic
PZ-UP-II	1644	3.72	23.8%	22.6%	3035	HGL from 2010 Master Plan Table 5.8, demand allocated based on data in 2018 hydraulic schematic

PZ-UP-III	1840	4.18	26.8%	28.0%	3759	HGL from 2010 Master Plan Table 5.8, demand allocated based on data in 2018 hydraulic schematic
PZ-UP-IV	2027	2.19	14.0%	12.0%	1614	HGL from 2010 Master Plan Table 5.8, demand allocated based on data in 2018 hydraulic schematic
PZ-UP-V	2135	1.18	7.6%	7.7%	1029	HGL from 2010 Master Plan Table 5.8, demand allocated based on data in 2018 hydraulic schematic

Wells

Wells are labeled as follows: "WL-AGENCY-PRESSURE ZONE-WELL NAME OR NUMBER". Sources used for well data include the 2018 Hydraulic Schematic, 2015 Urban Water Management Plan (UWMP), 2018 CBWM data for well production capacities, and meeting notes. Wells with impaired water quality which require treatment or blending are identified. Maximum percentage of blend is the portion of blended supply that may come from the referenced well. This is 100% for a well that does not require blending, and less than 100% for wells that require blending. San Antonio Water Company wells that are dedicated to supply for Upland are addressed in the model assumptions document for SAWCO. It will be assumed that the maximum annual production of a well is 75% of its production capacity to allow for maintenance and other downtime.

WELL	BASIN	ACTIVE	WATER QUALITY IMPAIRED	TREATMENT	PROD CAPACITY (GPM)	MAX % OF BLEND	ASR WELL INJECT CAPACITY (GPM)	NOTES
WL-UP-I-13	Chino	No	Nitrate	None	878	0%	n/a	WP-UP-I-NITR out of service per email notes
WL-UP-I-21A	Chino	Yes	Nitrate, DBCP, TCP	None	970	50%	n/a	WP-UP-I-NITR out of service per email notes
WL-UP-I-3	Chino	Yes	Nitrate, DBCP	None	878	50%	n/a	WP-UP-I-NITR out of service per email notes
WL-UP-I-7A	Chino	Yes	None	None	970	100%	n/a	
WL-UP-I-8	Chino	Yes	Nitrate, DBCP	None	600	50%	n/a	WP-UP-I-NITR out of service per email notes
WL-UP-I-9	Chino	No	None	None	0	100%	n/a	
WL-UP-II-15	Cucamo nga	Yes	None	None	1850	100%	n/a	
WL-UP-II-17	?	Yes	None	None	1065	100%	n/a	
WL-UP-II-20	Chino	Yes	None	None	350	100%	n/a	
WL-UP-II-LH4	?	Yes	None	None	800	100%	n/a	
WL-UP-II-WE3	?	Yes	123 TCP	None	800	100%	n/a	WECWCo;
WL-UP-II-WE4	?	Yes	123 TCP	None	800	100%	n/a	WECWCo;
WL-UP-III-5	?	Yes	None	None	1070	100%	n/a	
WL-UP-III-FTL3	?	Yes	None	None	600	100%	n/a	Location unknown;
WL-UP-V-1A	Six Basins?	Yes	Other	WP-UP-V-SACN	1050	100%	n/a	
WL-UP-V-2	Six Basins?	No	Manganes e	WP-UP-V-SACN	650	100%	n/a	

Intakes

Upland receives surface water from SAWCO but does not have a direct surface water intake.

Treatment Plants

Treatment plants are labeled as follows: "WP-AGENCY-PRESSURE ZONE-WTP NAME". Sources used for treatment plant data include the 2018 Hydraulic Schematic, 2015 UWMP, Water Distribution Map, and meeting notes.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-UP-I-NITR	No	2400	IX, Upland_Distribution.tiff, Upland_HydraulicSchematic.tiff. Not in use, per 3/12/19 meeting notes.
WP-UP-V-SACN	Yes	5004	Upland UWMP, Upland_Distribution.tiff, Upland_HydraulicSchematic.tiff

Distribution Storage

Distribution storage tanks are labeled as follows: "TK-AGENCY-PRESSURE ZONE-TANK NUMBER". Sources for distribution storage data included the 2018 Hydraulic Schematic, 2015 UWMP, Reservoir Table, SAWCO Distribution Map, and meeting notes.

TANK LABEL	LOCATION	CAPACITY (MG)	ACTIVE	NOTES
TK-UP-1-9	See map	0.20	No	
TK-UP-I-10	See map	1.50	Yes	
TK-UP-I-11	See map	0.20	Yes	
TK-UP-I-4	See map	0.20	Yes	
TK-UP-I-8	See map	0.20	No	
TK-UP-II-12	See map	4.00	Yes	In zone II or zone I?
TK-UP-II-12A	See map	5.00	Yes	In zone II or zone I?
TK-UP-II-13	See map	5.40	Yes	
TK-UP-II-13A	See map	5.60	Yes	
TK-UP-III-14	See map	0.23	Yes	In zone III or zone I?
TK-UP-III-15	See map	7.50	Yes	
TK-UP-III-3	See map	4.30	Yes	
TK-UP-III-7	See map	1.50	Yes	
TK-UP-V-16	See map	10.00	Yes	
TK-UP-V-2	See map	5.00	Yes	

Pressure Reducing Stations

Pressure Reducing Stations are labeled as follows: "PR-AGENCY-HIGH SIDE PRESSURE ZONE-PRV STATION NUMBER". Sources used for PRV Station data include the 2018 Hydraulic Schematic and Water Distribution Map. Based on the schematic, pressure reducing stations only exist between Zones III and II, and Zones II and I. No information was provided on the size or capacity of the PRV stations. The maximum hydraulic capacity of the distribution system supplying the PRV station was estimated to be equivalent to a flow velocity of 5 feet/second in the associated distribution main.

PRV STATION LABEL	ACTIVE	PSI	MAXIMUM PRV STATION CAPACITY (GPM)	NOTES
PR-UP-II-A	Yes	?	3400	location assumed, capacity assumed
PR-UP-III-B	Yes	?	3400	location assumed, capacity assumed

PR-UP-IV-C	Yes	?	1400	location assumed, capacity assumed
PR-UP-V-D	Yes	?	1400	location assumed, capacity assumed
PR-UP-V-E	Yes	?	1400	location assumed, capacity assumed

Pump Stations

Pump Stations are labeled as follows: "PS-AGENCY-HIGH SIDE PRESSURE ZONE-PUMP STATION NAME OR NUMBER". Sources for Pump Station data include the 2018 Hydraulic Schematic. Data was provided on the number and capacity of each pump. TDH data was not provided and is assumed to be equal to the difference in HGL's of the suction and discharge pressure zones. The regional model represents pumping capacity at the pressure zone to pressure zone level, as a result only pump stations that deliver water from one zone (or agency) to another are explicitly represented.

LABEL	ACTIVE	SUCTION SIDE PRESSURE ZONE	TOTAL PUMPING CAPACITY (GPM)	PUMPING HEAD (TDH)	FIRM CAPACITY (GPM)	NOTES
PS-UP-II-PLT5	Yes	PZ-UP-I	4748	162	3150	Location unknown; 3 pumps (1598, 1598, 1552 gpm), TDH assumed to be difference of zone HGL's
PS-UP-II-PLT6	Yes	PZ-UP-I	6556	162	4800	Location unknown; 4 pumps (1556, 1646, 1670, 1684 gpm), TDH assumed to be difference of zone HGL's
PS-UP-III-PLT4	Yes	PZ-UP-II	6627	168	4892	Location unknown; 4 pumps (1735, 1508, 1709, 1675 gpm), TDH assumed to be difference of zone HGL's
PS-UP-III-PLT7	Yes	PZ-UP-II	6721	168	5231	Location unknown; 5 pumps (1298, 1315, 1318, 1490, 1300 gpm), TDH assumed to be difference of zone HGL's
PS-UP-IV-PLT3	Yes	PZ-UP-III	4963	204	3607	4 pumps (1198, 1356, 1321, 1088 gpm), TDH assumed to be difference of zone HGL's
PS-UP-V-PLT2	Yes	PZ-UP-IV	2725	62	1749	3 pumps (945, 976, 804 gpm), TDH assumed to be difference of zone HGL's

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2015 Urban Water Management Plan (UWMP), 2018 Hydraulic Schematic, Water Distribution Map, and meeting notes.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
15	CV<> UP	10"	Yes	PZ-CV-4	PZ-UP-III	1200	2500	Treated Water	At CVWD Reservoir 3A; At CVWD Reservoir 3A; ; CVWD_MasterPlan.tiff, CVWD_Interconnection.csv
19	ON > UP	16"	No	PZ-ON-1348	PZ-UP-II	1000	n/a	Treated Water	Offline due to damaged meter structure, per meeting notes; Ontario_System.tiff, Schematic

64	WF > UP	36"	Yes	WP-WFA-XX-ADL	PZ-UP-III	11800	n/a	Treated Water	WFA-Upland 1; 17 MGD per Upland; WFA_WTP.tiff, Upland Meeting Notes; free chlorine, diverted prior to chloramination
66	WF > UP	20"	Yes	WP-WFA-XX-ADL	PZ-UP-III	2100	n/a	Treated Water	WFA-Upland 2; 3 MGD per Upland; WFA_WTP.tiff; chloramine, only used as backup to I-64
69	SA > UP	12"	Yes	PZ-SA-LOW	PZ-UP-V	600	n/a	Treated Water	Upland mtg notes refer to I-70, but I-69 makes more sense; SAWCo_SystemMap.tiff, Upland Meeting Notes
71	UP > SA	6"	No	PZ-UP-V	PZ-SA-LOW	500	n/a	Treated Water	SAWCo Master Plan
23	UP > MV	12"	Yes	PZ-UP-II	PZ-MV-Z1	2100	n/a	Treated Water	Dewey Wy and Reservoir 18; emergency only; MVWD_Infrastructure.tiff, MVWD_InfrastructureDataSheet2.jpg
1	UP > CN	24”	Yes	PZ-UP-II	PZ-CN-980	8400	n/a	Treated Water	Location approximate; Email/meeting notes from Chino
70	SA > UP	6”	Yes	PZ-SA-LOW	PZ-UP-V	3150	n/a	Treated Water	24th and Campus; Location approximate; IEUA.tiff, Upland_HydraulicSchematic.tiff, SAWCo_SystemMap.tiff
55	UP > GS	16”	Yes	PZ-UP-II	RS-GS-XX-1	2500	n/a	Treated Water	

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect corrections discovered during modeling. No agency comments received to date on the model data and assumptions.

IEUA Infrastructure Model: 2020 Baseline

Basis for Model – Water Facilities Authority

This document and accompanying infrastructure map summarize data and assumptions related to the Water Facilities Authority (WFA) used for the development of a regional water infrastructure model for IEUA and its member agencies. The model represents existing regional and local water supplies, key regional infrastructure, and interconnections which allow the movement of water from agency to agency within the IEUA service area. The intended use of the model is to identify existing operational constraints and redundant capabilities, assess supply vulnerabilities, and identify and assess the potential local and regional benefits of various infrastructure projects for IEUA and its member agencies. The model will complement existing water distribution models used by IEUA member agencies, but is not intended to duplicate the detail and precision of those models. The objective is to screen, compare, and prioritize projects for further, more detailed evaluation. The model does not include recycled water use and infrastructure.

Based on review of documents and data provided to IEUA by WFA, the data presented below has been used for model development. Where data was not available, reasonable assumptions have been made and are documented here. Your assistance in ensuring the accuracy of the data and appropriateness of assumptions in this document and the accompanying map will enhance the value and utility of the regional model for all participating agencies. The accompanying map indicates the location of facilities referenced in this document.

Pressure Zones and Water Demand

WFA receives and treats imported water from IEUA for delivery to the cities of Chino, Chino Hills, Upland, and Ontario, and the Monte Vista Water District (MVWD). Pressure Zones are labeled as follows: “PZ-AGENCY-PRESSURE ZONE NAME OR NUMBER”. As a wholesale supplier, WFA does not have pressure zones in the same sense as retail agencies. WFA interconnections deliver treated water to various member agency pressure zones. Sources for the member agency pressure zones include 2015 Urban Water Management Plans (UWMPs), Master Plans, and other documents. Interconnections are addressed later in this document. Sources used for WFA include the 2015 UWMP, treatment plant site plan, 2016 pipeline map, and meeting notes.

WFA’s Agua de Lejos WTP has the capacity to treat 81 million gallons per day (mgd). In FY 2014-15, WFA delivered a total of 27,606 acre-feet (af) of treated water to agencies. The 2020 baseline model represents 2020 average demand for Potable and Raw Water for each member agency, as reported in IEUA’s Integrated Resource Plan (IRP) of 2016.

Wells

WFA does not have wells.

Intakes

WFA does not have surface water intakes.

Treatment Plants

Treatment plants are labeled as follows: “WP-AGENCY-PRESSURE ZONE-WTP NAME”. Sources used for treatment plant data include the 2015 UWMP, treatment plant site plan, and meeting notes. The 2015 UWMP notes that the historical production of the WTP has averaged 30-40 mgd, and can be as low as 12 mgd during the winter months. In meeting notes, WFA indicated that production of the plant at the maximum capacity of 81 mgd is limited to 2-3 weeks due to solids handling constraints. It was also noted that the typical production rate is 40-60 mgd during the summer and 20-25 mgd during the winter.

LABEL	ACTIVE	MAXIMUM CAPACITY (GPM)	NOTES
WP-WF-XX-ADL	Yes	56250	2015 UWMP, WFA_Pipeline.tiff

Distribution Storage

WFA has clearwell capacity at the Agua de Lejos WTP, but does not have distribution storage.

Pressure Reducing Stations

WFA shares a PRV Station with Chino for interconnections. The PRV is modeled separately, in conjunction with the interconnections. WFA does not have other pressure reducing stations.

Pump Stations

WFA does not have pump stations.

Interconnections

Interconnections between agencies are labeled numerically. Interconnections are noted as active if they are normally available for use, either routinely or in case of emergency, and inactive if they are indefinitely out of service. Sources used for Interconnection data include the 2015 UWMP, 2016 pipeline map, and meeting notes. Sources for member agencies were also used where applicable.

MAP ID	FLOW	DIAM	ACTIVE	AGENCY 1	AGENCY 2	CAP 1 TO 2 (GPM)	CAP 2 TO 1 (GPM)	WATER TYPE	NOTES
27	WF->ON	16"	Yes	WP-WF-XX-ADL	PZ-ON-1348	7500	n/a	Treated Water	WFA-Ontario 2; WFA #2; WFA_Pipeline.tiff, Ontario Master Plan
28	WF->ON	30"	Yes	WP-WF-XX-ADL	PZ-ON-1212	13350	n/a	Treated Water	WFA-Ontario 1; WFA #1; WFA_Pipeline.tiff, Ontario Master Plan
11	WF->CN	20"	Yes	WP-WF-XX-ADL	PZ-CN-980	8400	n/a	Treated Water	Location approximate; WFA_Pipeline.tiff, Chino meeting notes
25	WF->MV	30"	Yes	WP-WF-XX-ADL	PZ-MV-Z1	24305	n/a	Treated Water	WFA-MVWD 1; WFA_Pipeline.tiff
65	WF->MV	16"	No	WP-WF-XX-ADL	PZ-MV-Z1	?	n/a	Treated Water	WFA-MVWD 2; WFA_Pipeline.tiff; out of service >15 years
64	WF->UP	36"	Yes	WP-WF-XX-ADL	PZ-UP-III	11800	n/a	Treated Water	WFA-Upland 1; WFA_WTP.tiff, Upland Meeting Notes; free chlorine? 17 mgd per Upland.
66	WF->UP	20"	Yes	WP-WF-XX-ADL	PZ-UP-III	2100	n/a	Treated Water	WFA-Upland 2; WFA_WTP.tiff; chloramine? 3 mgd per Upland. Backup to I-64
35	SA->WF	12”	No	PZ-SA-Lower	WP-WF-XX-ADL	3500	n/a	Well water	Emergency; capacity is max of range given in mtg notes; Meeting notes
74	IE->WF	48”	Yes	IE	WP-WF-XX-ADL	56250	n/a	Raw Water	WFA_WTP.tiff; imported MWD water from Rialto Pipeline.

Revision Notes

5/9/2019: Revised to reflect comments received prior to update to 2020 Baseline

8/27/2018: Revised to reflect comments on original assumptions document received from WFA on 7/5/18, and corrections discovered during modeling.

APPENDIX B

Memo “IRP Model Scenarios – Revisions to Address member Agency Input on the Allocation of Water Facilities Authority (WFA) Supplies and Future Changes to Drinking Water Regulations
June 5, 2020

INTERA Incorporated
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To: Joshua Aguilar, PE

From: Abhishek Singh, PhD, PE; Dan Haddock, PE; Erick Fox

Date: June 5, 2020

Re: IRP Model Scenarios - Revisions to Address Member Agency Input on the Allocation of Water Facilities Authority (WFA) Supplies and Future Changes to Drinking Water Regulations

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Executive Summary

The Integrated Water Resources Plan (IRP) Regional Water Supply Infrastructure Model (Model) was developed through the collaboration of IEUA and its member agencies. The Model incorporates existing regional and local supplies, key local and regional infrastructure, interconnections between agencies, and current and projected annual potable water demands at the pressure zone scale. It simulates requirements for imported water or other sources to blend with and utilize wells with impaired groundwater quality. The Model was created to support the 2020 IRP by facilitating the assessment of water supply vulnerabilities and evaluation of infrastructure needs to address collaborative water resources management.

Draft Technical Memorandum 2 (TM-2), dated June 2019, presents the draft results of model scenarios representing current and future water supply vulnerabilities. The scenarios include loss of imported water, Water Supply Allocation Plan (WSAP) implementation, multi-year drought, and groundwater quality impairment and regulatory changes. The memo was provided to IEUA's member agencies and presented in a meeting on June 26, 2019.

Subsequently, IEUA met one-on-one with member agencies to solicit detailed feedback to ensure the accuracy of model parameters and the alignment of scenarios with member agency priorities. As a result, two aspects of the Model were revised to improve its accuracy. The first relates to the allocation of Tier 1 supplies from Water Facilities Authority (WFA). The second relates to refining the basis for scenarios that reflect the impact of future changes to drinking water regulations on groundwater availability.

Based on member agency feedback, the modeled allocation of Tier 1 WFA supplies was revised to represent the current method of allocation, which is based on the 10-Year Rolling Average (YRA) of historical deliveries. This method is more accurate for modeling current and future allocations in all scenarios. A potential future use of the Model will be to evaluate projects and management strategies, some of which may consider utilization of supplies in excess of Tier 1, as well as short-term inter-agency exchanges of WFA supplies.

The scenarios reflecting changes to drinking water regulations were refined and expanded from two scenarios to three representing the impacts of *Anticipated* and *Unknown* regulatory changes to drinking water quality standards in the near-term (2020) and long-term (2035). In the model, *Anticipated* regulatory changes are related to known contaminants perchlorate and per- and polyfluoroalkyl substances (PFAS). Well-specific water quality data from the Chino Basin Watermaster (CBWM) and information on member agency treatment facilities was used to model the impact of a reduced perchlorate maximum contaminant level (MCL), if implemented. Based on limited available information on the occurrence of PFAS, the impact of new MCL's for PFAS are modeled as a generalized partial impact on all wells without existing treatment appropriate for PFAS. *Unknown* regulatory changes represent future regulations for a yet-to-be identified contaminant of emerging concern (CEC) and are modeled as a generalized partial impact on all wells without existing treatment. The impacts of the regulatory changes are modeled as changes to the ability of existing infrastructure to blend or treat local groundwater supplies to drinking water standards.

Because of these changes, the Model will more accurately represent the actual allocation of Tier 1 WFA supplies, and it will better reflect the impact of future changes to drinking water regulations, enabling agencies to better anticipate the effect of these changes on local groundwater availability. A summary of the revised model parameters is provided in Figure 1. Draft TM-2 will be revised based on the revised model results and will be issued as Final TM-2.

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			Scenarios					
			1	2	3	4	5	6
	Baseline Model	Updated Baseline	Loss of Imported Water	WSAP	Multi-Year Drought	Anticipated Regulatory Changes (Current)	Anticipated Regulatory Changes (Future)	Anticipated & Unknown Regulatory Changes
	2015	2020	Current (2020)	Future (2035)	Future (2035)	Current (2020)	Future (2035)	Future (2035)
Water Supply Infrastructure	2015 Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)	Current Infrastructure (Member Agency Master Plans, other documents)
Member Agency Demand	2015 Demand (2015 IRP, Member Agency 2015 UWMP's)	2020 Demand (2015 IRP)	2020 Demand (2015 IRP)	2035 Demand (2015 IRP)	2035 Demand (2015 IRP)	2020 Demand (2015 IRP)	2035 Demand (2015 IRP)	2035 Demand (2015 IRP)
MWD Imported Water Supply	2015 Demand (2015 IRP, Member Agency 2015 UWMP's)	2020 Supply (2015 IRP)	No Imported Water	WSAP 62.5% (MWD Regional Shortage Level 5)	WSAP 32.5% (MWD Regional Shortage Level 9)	2020 Supply (2015 IRP)	2035 Supply (2015 IRP)	2035 Supply (2015 IRP)
Local Supply Availability - Groundwater	2015 Supplies (Member Agency 2015 UWMP's)	Current Capacities for Active Wells*	Current Capacities for Active Wells*	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP)	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP)	Current Capacities for Active Wells*	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP)	Current Capacities for Active Wells* + Projected Additional 2035 Supplies (2015 UWMP)
Local Supply Availability - Surface Water	2015 Supplies (Member Agency 2015 UWMP's)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected Multiple Dry Year 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2020 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)	Projected 2035 Supplies (Member Agency 2015 UWMP's, Master Plans)
Local Groundwater Impairment	Specific Wells (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Current conditions for Specific Wells with Blending Requirements (Sources: CBWM, Member Agencies)	Anticipated changes to drinking water regulations: perchlorate and PFAS	Anticipated changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS	Anticipated changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS	Anticipated and Unknown changes to drinking water regulations: reduced MCL for perchlorate and new MCLs for PFAS and other contaminants
Model Output	Simulation of 2015 supplies and demands	Simulation of current supplies and 2020 demands	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity	Supply deficits by pressure zone, identification of infrastructure constraints, identification of underutilized supply capacity
Questions Addressed	Verify that baseline model is representative of member agency infrastructure constraints, supplies, amd demands	Base current scenario for comparison with modeled scenarios	How does loss of imported water used for blending impact water supply availability? Where do deficits and surpluses occur at the pressure zone level?	How does reduction of imported water used for blending impact water supply availability in the future? Where do deficits and surpluses occur at the pressure zone level?	How does reduction of local water supplies and reduction of imported water used for blending impact water supply availability in the future? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?	How do anticipated and future unknown changes to drinking water regulations limit the use of local groundwater? Where do deficits and surpluses occur at the pressure zone level?

*2020 Baseline Assumptions Document (5/9/2019)

Figure 1. Revised Primary Characteristics of Modeled Scenarios

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Revised Modeling of Allocation of Water Facilities Authority (WFA) Tier 1 Supplies

For all scenarios, the Model previously allocated Tier 1 water provided by WFA based on member agency ownership of WFA treatment capacity. Based on feedback received from member agencies, and additional information obtained from WFA, the Model has been revised to reflect the allocation of supplies based on WFA's method based on the 10-Year Rolling Average (10-YRA) of member agency usage over the prior 10 fiscal years. The method establishes a percentage allocation of the Tier 1 supply equal to each agencies 10-YRA as a percentage of the sum of all agencies 10-YRA's. Table 1 and Figure 1 below both show the WFA Tier 1 allocations from 2011-2020. Note that prior to 2017, the allocation for Chino Hills and Monte Vista Water District (MVWD) was combined.

Table 1. WFA Tier 1 Allocations 2011-2020

Agency	Tier 1 Allocations per Agency by Calendar Year (based on 10-YRA ending in the previous year)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Chino	4,629	4,362	4,096	3,918	3,946	3,765	3,706	3,954	4,016	4,382
Chino Hills	*Tier 1 allocations for Chino Hills and MVWD are combined for these years*						755	1,290	1,453	1,816
MVWD							8,079	7,884	8,121	7,504
Chino Hills + MVWD	9,023	8,662	8,485	8,302	8,287	8,589	8,834	9,174	9,574	9,320
Ontario	12,020	12,585	13,044	13,448	13,559	13,218	12,571	11,587	10,904	10,087
Upland	5,712	5,775	5,759	5,716	5,592	5,813	6,273	6,669	6,890	7,595
Total Tier 1 Allocation	31,384	31,384	31,384	31,384	31,384	31,385	31,384	31,384	31,384	31,384

Note: all quantities in acre-feet/year

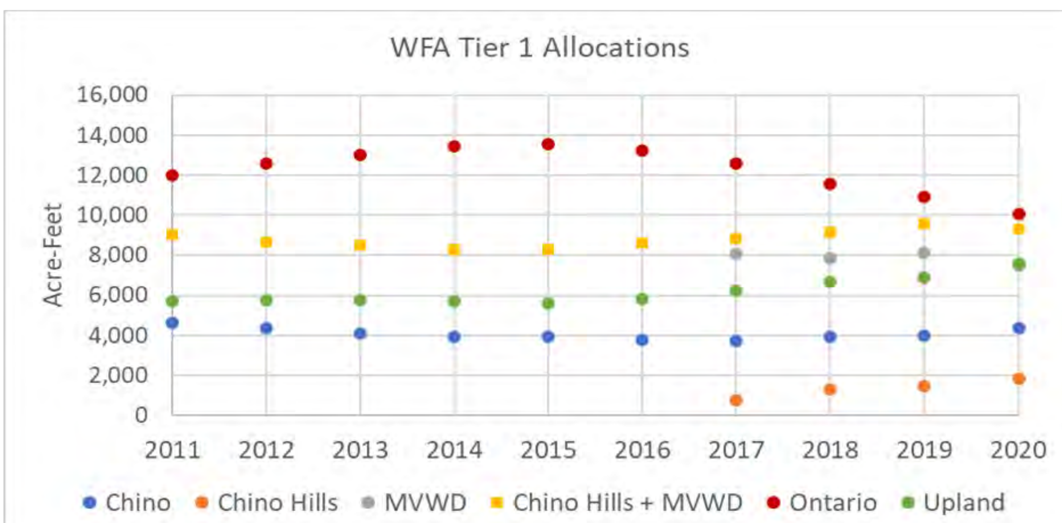


Figure 2. WFA Tier 1 Allocations 2011-2020

The Model has been revised to allocate WFA supplies to member agencies based on the most recent WFA Tier 1 Allocation (2020), which is calculated using actual deliveries from FY2010 to FY2019 (July 1, 2009 through June 30, 2019). This allocation is considered representative of future allocations within the period considered in the model (2020 and 2035). Table 2 summarizes the modeled allocations based on ownership of WFA capacity (previous modeling method) and WFA Tier 1 Allocation (actual).

Table 2. Change in Modeled WFA Tier 1 Allocations

Agency	Tier 1 Allocations by Ownership of WFA Capacity		WFA 2020 Tier 1 Allocations		Change in Modeled Tier 1 Allocations
	Percent	Acre-feet	Percent	Acre-feet	Acre-feet
Chino	5.9%	1,852	14.0%	4,382	2,530
Chino Hills	15.7%	4,927	5.8%	1,816	-3,111
MVWD	24.0%	7,532	23.9%	7,504	-28
Ontario	31.4%	9,855	32.1%	10,087	232
Upland	23.0%	7,218	24.2%	7,595	377
Total	100%	31,384	100%	31,384	0

With this change resulting from member agency feedback, the Model more accurately represents the actual allocation of Tier 1 WFA supplies. Note that although WFA supplies are limited to the Tier 1 Allocation in the modeling of scenarios, future modeling of regional projects and management responses will consider possible utilization by individual member agencies of WFA supplies in excess of Tier 1 allocations, within infrastructure capacity constraints.

Revised Modeling of Future Changes to Drinking Water Regulations

As described in Draft TM-2, scenarios were developed to reflect the impact of new or revised drinking water regulations on the availability of local groundwater supplies. Because the scale of the IRP Model is regional, it is not designed to represent detailed information on groundwater flow and water quality. Groundwater quality-related data used for the model includes well-specific impairments identified through review of member agency-provided documents and meetings, and water quality information available from the Chino Basin Watermaster (CBWM). In the Model, wells with blending requirements must have adequate imported or other sources of drinking water to allow their use. Based on feedback from member agencies, the scenarios addressing regulatory changes have been revised to be specific in terms of contaminants of concern to the member agencies and, to the extent possible with available data, they reflect the varying impacts to member agencies.

The revised approach is based on well-specific information provided by member agencies, CBWM reports pertaining to groundwater quality in the Chino Basin, and member agency priorities and concerns expressed in one-on-one meetings. Regulatory changes with the potential to impact groundwater availability are characterized as *Anticipated*, based on expected pending changes, and *Unknown*, based on a future change for a hypothetical, yet to be identified contaminant of emerging concern (CEC).

The following general observations about groundwater quality and drinking water regulations are made based on review of information reported in the 2020 Optimum Basin Management Program (OBMP) Update and comments and input received from member agencies during model development and subsequent one-on-one meetings. The 2020 OBMP Update notes that most member agencies identified preparation for new drinking water quality regulations to be an important issue. Existing model parameters are are described in detail in Draft TM-2.

Total Dissolved Solids (TDS). Detectable levels of TDS are widely present across the Basin, but the vast majority of wells with the highest concentrations of TDS are located south of Highway 60 in historically agricultural areas. Although there are potential challenges with TDS in recycled water used for recharge, the member agencies did not identify TDS as having a large, unmanaged impact on their ability to utilize local groundwater supplies. As a result, the existing model accurately reflects the impact of TDS on groundwater availability.

Nitrate. Almost all IEUA member agencies have identified nitrate as a water quality concern, though blending or treatment has been widely implemented. As a result, the existing model accurately reflects the impact of nitrate on groundwater availability.

Volatile Organic Compounds (VOC’s). VOC’s are predominantly associated with known point-source locations. The member agencies did not identify VOC’s as having a large, unmanaged impact on their ability to utilize local groundwater supplies. As a result, the existing model accurately reflects the impact of VOC’s on groundwater availability.

1,2,3-Trichloropropane (1,2,3-TCP). The Maximum Contaminant Level (MCL) of 5 parts per trillion (ppt) for 1,2,3-TCP was adopted by the Division of Drinking Water (DDW) in December 2017. Member agencies were immediately required to remove wells from service or implement blending or treatment to comply with the MCL. The model reflects these measures. As a result, the existing model accurately reflects the impact of 1,2,3-TCP on groundwater availability.

Hexavalent chromium. In 2014, DDW established an MCL of 10 parts per billion (ppb) for hexavalent chromium. In 2017, the court invalidated the MCL and required that DDW conduct an economic evaluation and adopt a new MCL. The 2020 OBMP Update notes that hexavalent chromium was not a widespread compliance issue based on the old MCL. The member agencies did not identify hexavalent chromium as having a large, unmanaged impact on their ability to utilize local groundwater supplies. As a result, the existing model accurately reflects the impact of hexavalent chromium on groundwater availability.

1,4-Dioxane. While there is no MCL for 1,4-dioxane, the Notification Level (NL) is 1 ppb. Because monitoring is not required, there is limited data. The member agencies did not identify 1,4-dioxane as having a large, unmanaged impact on their ability to utilize local groundwater supplies. As a result, the existing model accurately reflects the impact of 1,4-dioxane on groundwater availability.

Perchlorate. In 2007, DDW established an MCL of 6 ppb for perchlorate. In 2015, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) Public Health Goal (PHG) for perchlorate was revised from 6 ppb to 1 ppb, prompting the current review by DDW of the MCL. Information presented in the 2020 OBMP Update notes that perchlorate concentrations above 1 ppb are widespread. About half of the member agencies identified perchlorate as having a potentially significant impact on their ability to utilize local groundwater supplies. As a result, anticipated regulatory changes for perchlorate are considered in the modeling scenarios.

Per- and polyfluoroalkyl substances (PFAS). In August 2019, DDW established NL's for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) of 5.1 ppt and 6.5 ppt, respectively. In February 2020, DDW announced that the Response Levels (RLs) for PFOA and PFOS were lowered to 10 ppt and 40 ppt, respectively, based on health recommendations from the OEHHA. The State of California and the USEPA are both evaluating potential MCL's for PFOA and PFOS. While the occurrence of PFOA and PFOS is not well characterized at the NL's, based on observed occurrences elsewhere it is assumed to be widespread. Regulation of PFOA and PFOS is expected to have a potentially significant impact on the ability of member agencies to utilize local groundwater supplies. As a result, anticipated regulatory changes for PFOA and PFOS are considered in the modeling scenarios.

Scenarios

As previously described, the revised model scenarios are based on *Anticipated* and *Unknown* regulatory changes representing, respectively, expected changes for known contaminants and potential future changes for a hypothetical, yet to be identified contaminant of emerging concern (CEC). Original Scenarios 4 and 5 as described in TM-2 have been expanded and replaced with Scenarios 4, 5 and 6 representing the following:

- Scenario 4: *Anticipated* regulatory changes, current (2020) demands and supply capacity
- Scenario 5: *Anticipated* regulatory changes, future (2035) demands and supply capacity
- Scenario 6: *Anticipated* and *Unknown* regulatory changes, future (2035) demands and supply capacity

The basis for each Draft TM-2 will be revised and finalized based on the revised model scenarios.

Anticipated Regulatory Changes

Model scenarios based on *Anticipated* regulatory changes consider the impact of revised and new regulations for perchlorate, PFOA and PFOS on the ability of member agencies to utilize local groundwater supplies. The following parameters will be used for modeling these impacts.

Perchlorate

- DDW will revise the MCL for perchlorate from 6 ppb to 1 ppb.
- This significant reduction in MCL will generally require treatment and blending will not be practical for effectively achieving compliance.

- Water quality data obtained from the CBWM was used to identify wells for which reported perchlorate levels have previously exceeded 1 ppb. All wells with a reported level of 1 ppb or greater are assumed affected.
- Wells that already have ion exchange (IX) or reverse osmosis (RO) treatment for any purpose are assumed to be presently capable or efficiently modified to provide effective perchlorate removal, and as a result their use is modeled as unimpacted.
- All impacted wells without existing IX or RO treatment are assumed to be removed from service.

PFOA and PFOS

- MCL's for both PFOA and PFOS will be established by DDW
- The new MCL's will generally require treatment and blending will not be practical for effectively achieving compliance.
- Because little PFOA and PFOS occurrence data is available, general assumptions about occurence among IEUA member agency wells are required. Statewide, of priority wells sampled and reported to DDW between July and September 2019, PFOA and PFOS were detected in 47% and 51%, respectively. Priority wells are those identified by DDW to be at greater risk of PFAS contamination. Because IEUA member agency wells include both priority and non-priority wells, it is inferred that the percentage of detections among the member agency wells will be lower than the statewide percentage of detections among higher-risk priority wells. Accordingly, it is assumed that 25% of all member agency wells will be affected.
- Wells that already have granular activated carbon (GAC), IX or RO treatment for any purpose are assumed to be presently capable or efficiently modified to provide effective removal of PFOA and PFOS, and as a result their use is modeled as unimpacted.
- Because well-specific information is not available the impact is generalized and modeled as a reduction in capacity for impacted wells. All wells without appropriate treatment are assumed to have a 25% reduction in capacity, equivalent to the estimated percentage of affected wells.

Unknown Regulatory Changes

Model scenarios based on *Unknown* regulatory changes consider the impact on the ability of member agencies to utilize local groundwater supplies from an unknown, yet to be identified change in drinking water regulations. The following parameters will be used for modeling these impacts.

- MCL's will be established by DDW for one or more currently unregulated contaminants.
- The new MCL's will generally require treatment and blending will not be practical for effectively achieving compliance.
- Because contaminant-specific and well-specific information is not available the impact is generalized and modeled as a reduction in capacity for all affected wells.
- Wells that already have treatment other than blending for any purpose are assumed to be presently capable or efficiently modified to provide effective removal of the unidentified contaminant, and as a result their use is modeled as unimpacted.

- All wells without treatment are assumed to have a 25% reduction in capacity, equivalent to the estimated percentage of impacted wells.

The aggregate impact to each well from *Anticipated* and *Unknown* regulatory changes is modeled as the accumulation of impacts of all regulatory changes affecting the well, up to it's available capacity. Table 3 summarizes the basis for modeling Scenarios 4, 5, and 6.

Because of these changes, the model better reflects the impact of new and revised drinking water regulations, enabling agencies to better anticipate the effect of these changes on local groundwater availability.

Table 3. Summary of Modeled Scenarios Representing Changes to Drinking Water Regulations

Scenario	Supply & Demand Capacity	Modeled Regulatory Change[2]			Modeled Impact of Regulatory Change
		Perchlorate	PFOA & PFOS	Future CEC	
4 Anticipated Regulatory Changes	Current (2020)	✓	✓	-	Perchlorate: All *affected wells*[1] without specified *existing treatment*[3] removed from service PFOA & PFOS: Generalized 25% capacity reduction for all wells without specified *existing treatment*[3]
5 Anticipated Regulatory Changes	Future (2035)	✓	✓	-	Perchlorate: All *affected wells*[1] without *specified existing treatment*[3] removed from service PFOA & PFOS: Generalized 25% capacity reduction for all wells without specified *existing treatment*[3]
6 Anticipated and Unknown Regulatory Changes	Future (2035)	✓	✓	✓	Perchlorate: All *affected wells*[1] without specified *existing treatment*[3] removed from service PFOA & PFOS: Generalized 25% capacity reduction for all wells without specified *existing treatment*[3] Future CEC: Generalized 25% capacity reduction for all wells without *any* treatment

Parameters for Modeling Regulatory Changes[2]

Contaminant	Affected Wells[1]	Regulatory Change[2]	Existing Treatment Assumed to be Currently Effective or Efficiently Modified[3]
Perchlorate	All wells that have reported perchlorate of 1 ppb or greater[1]	MCL for perchlorate reduced from 6 ppb to 1 ppb	IX or RO
PFOA & PFOS	All wells	New MCL's for PFOA and PFOS	GAC, IX or RO
Future CEC	All wells	New MCL for future CEC	Any

Notes: (1) for perchlorate, *affected wells* are identified based on reported water quality data from Chino Basin Watermaster, for PFOA, PFOS, and the future CEC all wells are assumed to be affected; (2) modeled regulatory changes include *anticipated* changes with reduced or new MCLs for specific contaminants known to be consequential to utilization of local groundwater, and *unknown* changes with a new MCL for a future contaminant of emerging concern; (3) for each contaminant, specified *existing treatment* processes identified in the lower table are assumed to be either currently capable of or efficiently modified for providing treatment that will meet drinking water standards; CEC – Contaminant of Emerging Concern; MCL - Maximum Contaminant Level; ppb - parts per billion; IX – ion exchange; RO – reverse osmosis; GAC – granular activated carbon; PFOA - perfluorooctanoic acid; PFOS - perfluorooctanesulfonic acid

Supporting Calculations for Modeling of Anticipated and Unknown Future Regulatory Changes

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend	Reported Pumping Capacity	Avg Annual Available Capacity (75%)	Max Perchlorate (CBWM)	Anticipated Regulatory Change - Perchlorate MCL Impact	Anticipated Regulatory Change - Effective Perchlorate Treatment	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity	Anticipated Regulatory Change - Effective PFAS Treatment	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity	Unknown Regulatory Change - Effective Treatment	Unknown Regulatory Change - Loss of Available Well Capacity	Available Well Capacity - Anticipated Regulatory Changes	Available Well Capacity - Anticipated & Unknown Regulatory Changes
							% of total	gpm	gpm	ppb	1 = no impact	IX, RO 1 = yes	gpm	GAC, IX, RO 1 = yes	25% gpm	Any 1 = yes	25% gpm	Scenarios 3,4 and 6 gpm	Scenario 5 gpm
CDA	PZ-CD-I	WP-CD-I-RO/IX	IX/RO	**WL-CD-I-10**	Yes	TDS|Nitrate	100%	1,336	1,002	8	0	1	0	1	0	1	0	1,002	1,002
			IX/RO	**WL-CD-I-11**	Yes	TDS|Nitrate	100%	525	394		1	1	0	1	0	1	0	394	394
			IX/RO	**WL-CD-I-13**	Yes	TDS|Nitrate	100%	1,290	968	3.3	0	1	0	1	0	1	0	968	968
			IX/RO	**WL-CD-I-14**	Yes	TDS|Nitrate	100%	2,290	1,718	1.8	0	1	0	1	0	1	0	1,718	1,718
			IX/RO	**WL-CD-I-15**	Yes	TDS|Nitrate	100%	2,350	1,763	6	0	1	0	1	0	1	0	1,763	1,763
			IX/RO	**WL-CD-I-16**	Yes	TDS|Nitrate	100%	227	170		1	1	0	1	0	1	0	170	170
			IX/RO	**WL-CD-I-17**	No	TDS|Nitrate|TCP?	100%	0	0		1	1	0	1	0	1	0	0	0
			IX/RO	**WL-CD-I-18**	No	TDS|Nitrate|TCP?	100%	0	0		1	1	0	1	0	1	0	0	0
			IX/RO	**WL-CD-I-20**	Yes	TDS|Nitrate	100%	430	323	3	0	1	0	1	0	1	0	323	323
			IX/RO	**WL-CD-I-21**	Yes	TDS|Nitrate	100%	361	271		1	1	0	1	0	1	0	271	271
			IX/RO	**WL-CD-I-4**	No	TDS|Nitrate	100%	335	0	2.6	0	1	0	1	0	1	0	0	0
			IX/RO	**WL-CD-I-5**	Yes	TDS|Nitrate	100%	1,261	946		1	1	0	1	0	1	0	946	946
			IX/RO	**WL-CD-I-6**	Yes	TDS|Nitrate	100%	993	745		1	1	0	1	0	1	0	745	745
			IX/RO	**WL-CD-I-7**	Yes	TDS|Nitrate	100%	1,251	938		1	1	0	1	0	1	0	938	938
			IX/RO	**WL-CD-I-8**	Yes	TDS|Nitrate	100%	1,120	840		1	1	0	1	0	1	0	840	840
			IX/RO	**WL-CD-I-9**	Yes	TDS|Nitrate	100%	1,183	887		1	1	0	1	0	1	0	887	887
		WP-CD-I-VOC	VOC	**WL-CD-I-1**	No	TDS|Nitrate	100%	385	0	5.4	0	0	0	0	0	1	0	0	0
			VOC	**WL-CD-I-2**	No	TDS|Nitrate|VOC	100%	150	0	6	0	0	0	0	0	1	0	0	0
			VOC	**WL-CD-I-3**	No	TDS|Nitrate|VOC|TCP	100%	950	0	11	0	0	0	0	0	1	0	0	0
	PZ-CD-II	WP-CD-II	IX/RO	**WL-CD-II-1**	Yes	TDS|Nitrate	100%	1,800	1,350		1	1	0	1	0	1	0	1,350	1,350
			IX/RO	**WL-CD-II-10**	Yes	TDS|Nitrate	100%	2,750	2,063		1	1	0	1	0	1	0	2,063	2,063
			IX/RO	**WL-CD-II-11**	Yes	TDS|Nitrate	100%	3,000	2,250	6.8	0	1	0	1	0	1	0	2,250	2,250
			IX/RO	**WL-CD-II-12**	Yes	TDS|Nitrate	100%	2,000	1,500		1	1	0	1	0	1	0	1,500	1,500
			IX/RO	**WL-CD-II-2**	Yes	TDS|Nitrate	100%	1,800	1,350	5	0	1	0	1	0	1	0	1,350	1,350
			IX/RO	**WL-CD-II-3**	Yes	TDS|Nitrate	100%	1,800	1,350	1.5	0	1	0	1	0	1	0	1,350	1,350
			IX/RO	**WL-CD-II-4**	Yes	TDS|Nitrate	100%	1,700	1,275	8.4	0	1	0	1	0	1	0	1,275	1,275
			IX/RO	**WL-CD-II-6**	Yes	TDS|Nitrate	100%	1,600	1,200		1	1	0	1	0	1	0	1,200	1,200
			IX/RO	**WL-CD-II-7**	Yes	TDS|Nitrate	100%	900	675	0.78	1	1	0	1	0	1	0	675	675
			IX/RO	**WL-CD-II-8**	Yes	TDS|Nitrate	100%	1,100	825	2.1	0	1	0	1	0	1	0	825	825
			IX/RO	**WL-CD-II-9a**	Yes	TDS|Nitrate	100%	1,800	1,350	0.86	1	1	0	1	0	1	0	1,350	1,350
		Totals							26,150				0		0		0	26,150	26,150
		Percentage of Capacity Impacted											0.0%		0.0%		0.0%	**0.0%**	**0.0%**

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend % of total	Reported Pumping Capacity gpm	Avg Annual Available Capacity (75%) gpm	Max Perchlorate (CBWM) ppb	Anticipated Regulatory Change - Perchlorate MCL Impact 1 = no impact	Anticipated Regulatory Change - Effective Perchlorate Treatment IX, RO 1 = yes	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity gpm	Anticipated Regulatory Change - Effective PFAS Treatment GAC, IX, RO 1 = yes	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity 25% gpm	Unknown Regulatory Change - Effective Treatment Any 1 = yes	Unknown Regulatory Change - Loss of Available Well Capacity 25% gpm	Available Well Capacity - Anticipated Regulatory Changes Scenarios 3,4 and 6 gpm	Available Well Capacity - Anticipated & Unknown Regulatory Changes Scenario 5 gpm
Chino	PZ-CN-890	None		**WL-CN-890-4**	No	Nitrate|Perchlorate|TCP|CrVI	100%	700	0		1	0	0	0	0	0	0	0	0
				WL-CN-890-6	No	Nitrate|Perchlorate|TCP|CrVI	100%	1,000	0		1	0	0	0	0	0	0	0	0
		WP-CN-890-EAST	IX, GAC	**WL-CN-890-13**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	1,650	1,238		1	1	0	1	0	1	0	1,238	1,238
			IX, GAC	**WL-CN-890-16**	No	Nitrate|Perchlorate|TCP|CrVI	50%	600	0		1	1	0	1	0	1	0	0	0
			IX, GAC	**WL-CN-890-18**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	1,450	1,088	3.8	0	1	0	1	0	1	0	1,088	1,088
			IX, GAC	**WL-CN-890-19**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	600	450		1	1	0	1	0	1	0	450	450
	PZ-CN-980	None		**WL-CN-980-11**	No	Perchlorate|TCP|CrVI	100%	1,800	0		1	0	0	0	0	0	0	0	0
				WL-CN-980-12	Yes	Nitrate|Perchlorate|TCP|CrVI	50%	600	450	1.4	0	0	450	0	113	0	113	0	0
				WL-CN-980-14	No	Nitrate|Perchlorate|TCP|CrVI	100%	2,000	0		1	0	0	0	0	0	0	0	0
		WP-CN-980-BENS	IX, GAC	**WL-CN-980-10**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	1,200	900		1	1	0	1	0	1	0	900	900
			IX, GAC	**WL-CN-980-5**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	1,200	900		1	1	0	1	0	1	0	900	900
			IX, GAC	**WL-CN-980-9**	Yes	Nitrate|Perchlorate|TCP|CrVI	100%	1,900	1,425		1	1	0	1	0	1	0	1,425	1,425
		Totals							6,450				450		113		113	6,000	6,000
		Percentage of Capacity Impacted											7.0%		1.7%		1.7%	**7.0%**	**7.0%**
Chino HIlls	PZ-CH-L	None		**WL-CH-L-13**	No	Arsenic|TCP	100%	800	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-14	No	Nitrate	100%	0	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-15A	No	Arsenic|TCP	100%	1,400	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-17	No	Arsenic|TCP	100%	1,200	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-18	No	Other|TCP	100%	0	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-19	No	Arsenic|TCP	100%	1,400	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-1A	No	Nitrate|TCP	100%	800	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-1B	No	Nitrate|TCP	100%	1,000	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-5	No	Nitrate|TCP	100%	800	0	0.85	1	0	0	0	0	0	0	0	0
				WL-CH-L-7A	No	Nitrate|Perchlorate|TCP	100%	400	0	4.5	0	0	0	0	0	0	0	0	0
				WL-CH-L-7B	No	Nitrate|Perchlorate|TCP	100%	600	0		1	0	0	0	0	0	0	0	0
				WL-CH-L-W-16	No	Other|TCP	100%	800	0		1	0	0	0	0	0	0	0	0
		WP-CH-L-15B	IX	**WL-CH-L-15B**	No	Nitrate|TCP	100%	0	0		1	1	0	1	0	1	0	0	0
		Totals							0				0		0		0	0	0
		Percentage of Capacity Impacted											0.0%		0.0%		0.0%	**0.0%**	**0.0%**

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend	Reported Pumping Capacity	Avg Annual Available Capacity (75%)	Max Perchlorate (CBWM)	Anticipated Regulatory Change - Perchlorate MCL Impact	Anticipated Regulatory Change - Effective Perchlorate Treatment	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity	Anticipated Regulatory Change - Effective PFAS Treatment	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity	Unknown Regulatory Change - Effective Treatment	Unknown Regulatory Change - Loss of Available Well Capacity	Available Well Capacity - Anticipated Regulatory Changes	Available Well Capacity - Anticipated & Unknown Regulatory Changes
							% of total	gpm	gpm	ppb	1 = no impact	IX, RO 1 = yes	gpm	GAC, IX, RO 1 = yes	25% gpm	Any 1 = yes	25% gpm	Scenarios 3,4 and 6 gpm	Scenario 5 gpm
CVWD	PZ-CV-1	None		**WL-CV-1-1**	Yes	None	100%	1,480	1,110		1	0	0	0	278	0	278	833	555
				WL-CV-1-3	Yes	None	100%	1,141	856	8.6	0	0	856	0	214	0	214	0	0
				WL-CV-1-30	Yes	None	100%	2,356	1,767		1	0	0	0	442	0	442	1,325	884
				WL-CV-1-38	Yes	None	100%	2,699	2,024	10	0	0	2,024	0	506	0	506	0	0
				WL-CV-1-39	Yes	None	100%	2,985	2,239	8.7	0	0	2,239	0	560	0	560	0	0
				WL-CV-1-4	Yes	None	100%	1,530	1,148		1	0	0	0	287	0	287	861	574
				WL-CV-1-40	Yes	None	100%	2,122	1,592	4.6	0	0	1,592	0	398	0	398	0	0
				WL-CV-1-41	Yes	None	100%	2,714	2,036	1.6	0	0	2,036	0	509	0	509	0	0
				WL-CV-1-42	Yes	None	100%	2,780	2,085	2.2	0	0	2,085	0	521	0	521	0	0
				WL-CV-1-43	Yes	None	100%	2,565	1,924		1	0	0	0	481	0	481	1,443	962
				WL-CV-1-46	Yes	None	100%	2,500	1,875		1	0	0	0	469	0	469	1,406	938
				WL-CV-1-5	Yes	None	100%	2,145	1,609	3	0	0	1,609	0	402	0	402	0	0
	PZ-CV-2	None		**WL-CV-2-10**	No	Nitrate	100%	1,085	0		1	0	0	0	0	0	0	0	0
				WL-CV-2-12	No	Nitrate	100%	1,911	0		1	0	0	0	0	0	0	0	0
				WL-CV-2-20	No	Nitrate	100%	864	0	14	0	0	0	0	0	0	0	0	0
				WL-CV-2-22	No	Nitrate	100%	2,024	0		1	0	0	0	0	0	0	0	0
				WL-CV-2-8	No	Nitrate	100%	2,160	0	7.4	0	0	0	0	0	0	0	0	0
	PZ-CV-3	None		**WL-CV-3-13**	Yes	None	100%	475	356		1	0	0	0	89	0	89	267	178
				WL-CV-3-15	No	Nitrate	100%	1,420	0		1	0	0	0	0	0	0	0	0
				WL-CV-3-17	No	Nitrate	100%	814	0		1	0	0	0	0	0	0	0	0
				WL-CV-3-23	No	Nitrate	100%	860	0	4	0	0	0	0	0	0	0	0	0
				WL-CV-3-26	Yes	None	100%	1,436	1,077		1	0	0	0	269	0	269	808	539
				WL-CV-3-31	Yes	Nitrate	50%	1,131	848		1	0	0	0	212	0	212	636	424
				WL-CV-3-33	Yes	Nitrate	50%	528	396	7.2	0	0	396	0	99	0	99	0	0
	PZ-CV-3A	None		**WL-CV-3A-16**	Yes	None	100%	1,311	983		1	0	0	0	246	0	246	737	492
				WL-CV-3A-19	Yes	None	100%	1,083	812	14	0	0	812	0	203	0	203	0	0
				WL-CV-3A-21	No	Nitrate	100%	2,558	0	6.9	0	0	0	0	0	0	0	0	0
				WL-CV-3A-24	Yes	None	100%	2,749	2,062	21	0	0	2,062	0	515	0	515	0	0
				WL-CV-3A-34	No	Nitrate	100%	1,968	0	2.9	0	0	0	0	0	0	0	0	0
		Totals							26,798				15,710		6,699		6,699	8,316	5,544
		Percentage of Capacity Impacted											58.6%		25.0%		25.0%	**69.0%**	**79.3%**

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend	Reported Pumping Capacity	Avg Annual Available Capacity (75%)	Max Perchlorate (CBWM)	Anticipated Regulatory Change - Perchlorate MCL Impact	Anticipated Regulatory Change - Effective Perchlorate Treatment	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity	Anticipated Regulatory Change - Effective PFAS Treatment	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity	Unknown Regulatory Change - Effective Treatment	Unknown Regulatory Change - Loss of Available Well Capacity	Available Well Capacity - Anticipated Regulatory Changes	Available Well Capacity - Anticipated & Unknown Regulatory Changes
							% of total	gpm	gpm	ppb	1 = no impact	IX, RO 1 = yes	gpm	GAC, IX, RO 1 = yes	25% gpm	Any 1 = yes	25% gpm	Scenarios 3,4 and 6 gpm	Scenario 5 gpm
Fontana	PZ-FW-ALDR	None		**WL-FW-ALDR-F18A**	No	Nitrate|Perchlorate	100%	2,400	0		1	0	0	0	0	0	0	0	0
				WL-FW-ALDR-F24A	Yes	Nitrate|Perchlorate	100%	1,760	1,320		1	0	0	0	330	0	330	990	660
				WL-FW-ALDR-F26A	Yes	Perchlorate	100%	1,810	1,358	2.3	0	0	1,358	0	339	0	339	0	0
				WL-FW-ALDR-F31A	Yes	Nitrate|Perchlorate	100%	1,550	1,163	6	0	0	1,163	0	291	0	291	0	0
				WL-FW-ALDR-F44A	Yes	None	100%	2,230	1,673		1	0	0	0	418	0	418	1,254	836
				WL-FW-ALDR-F44B	No	Nitrate|Perchlorate	50%	2,080	1,560	5.2	0	0	1,560	0	390	0	390	0	0
				WL-FW-ALDR-F44C	Yes	None	100%	2,200	1,650	6	0	0	1,650	0	413	0	413	0	0
				WL-FW-ALDR-F54A	No	Other	100%	1,350	0		1	0	0	0	0	0	0	0	0
	PZ-FW-BASE	None		**WL-FW-BASE-F22A**	No	Perchlorate|Nitrate	100%	1,850	0		1	0	0	0	0	0	0	0	0
				WL-FW-BASE-F2A	No	Nitrate|Perchlorate	100%	1,400	0	4.4	0	0	0	0	0	0	0	0	0
				WL-FW-BASE-F30A	No	Nitrate|Perchlorate	100%	1,020	0		1	0	0	0	0	0	0	0	0
				WL-FW-BASE-F3A	No	Other	100%	1,850	0	4	0	0	0	0	0	0	0	0	0
				WL-FW-BASE-F7A	Yes	None	100%	2,390	1,793		1	0	0	0	448	0	448	1,344	896
				WL-FW-BASE-F7B	Yes	None	100%	2,370	1,778		1	0	0	0	444	0	444	1,333	889
	PZ-FW-F19	None		**WL-FW-F19-F15A**	Yes	None	100%	1,360	1,020	2.4	0	0	1,020	0	255	0	255	0	0
				WL-FW-F19-F27A	Yes	None	100%	206	155		1	0	0	0	39	0	39	116	77
				WL-FW-F19-F33A	Yes	None	100%	170	128		1	0	0	0	32	0	32	96	64
				WL-FW-F19-F42A	Yes	None	100%	400	300		1	0	0	0	75	0	75	225	150
	PZ-FW-HIGH	None		**WL-FW-HIGH-F13A**	Yes	None	100%	1,350	1,013	2.3	0	0	1,013	0	253	0	253	0	0
				WL-FW-HIGH-F13B	Yes	None	50%	1,980	1,485		1	0	0	0	371	0	371	1,114	743
				WL-FW-HIGH-F28A	Yes	Other	100%	408	306		1	0	0	0	77	0	77	230	153
				WL-FW-HIGH-F29A	Yes	Other	100%	454	341		1	0	0	0	85	0	85	255	170
				WL-FW-HIGH-F34A	Yes	Other	100%	0	0		1	0	0	0	0	0	0	0	0
				WL-FW-HIGH-F36A	Yes	Other	100%	0	0		1	0	0	0	0	0	0	0	0
				WL-FW-HIGH-F40A	Yes	Other	100%	371	278		1	0	0	0	70	0	70	209	139
				WL-FW-HIGH-F4A	No	Nitrate|Perchlorate	100%	1,900	0		1	0	0	0	0	0	0	0	0
		WP-FW-HIGH-F10	GAC	**WL-FW-HIGH-F10B**	Yes	PCE	100%	1,010	758		1	0	0	1	0	1	0	758	758
			GAC	**WL-FW-HIGH-F10C**	Yes	PCE	50%	520	390	7.4	0	0	390	1	0	1	0	0	0
			GAC	**WL-FW-HIGH-F10D**	Yes	None	100%	1,460	1,095		1	0	0	1	0	1	0	1,095	1,095
			GAC	**WL-FW-HIGH-F49A**	Yes	PCE	100%	1,620	1,215		1	0	0	1	0	1	0	1,215	1,215
		WP-FW-HIGH-F14	Conv	**WL-FW-HIGH-F32A**	Yes	Other	100%	650	488		1	0	0		122	1	0	366	366
	PZ-FW-JUNP	None		**WL-FW-JUNP-F21A**	No	Nitrate|Perchlorate	50%	1,400	0	4	0	0	0	0	0	0	0	0	0
				WL-FW-JUNP-F21B	Yes	None	100%	2,420	1,815		1	0	0	0	454	0	454	1,361	908
		WP-FW-HIGH-F17	IX	**WL-FW-JUNP-F17B**	Yes	Nitrate|Perchlorate	100%	2,150	1,613	4.7	0	1	0	1	0	1	0	1,613	1,613
			IX	**WL-FW-JUNP-F17C**	Yes	Nitrate|Perchlorate	100%	2,680	2,010		1	1	0	1	0	1	0	2,010	2,010
		WP-FW-JUNP-F23A	IX	**WL-FW-JUNP-F23A**	Yes	Nitrate|Perchlorate	50%	2,650	1,988	9.8	0	1	0	1	0	1	0	1,988	1,988
		Totals							28,687				8,153		4,905		4,783	17,570	14,728
		Percentage of Capacity Impacted											28.4%		17.1%		16.7%	**38.8%**	**48.7%**

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend % of total	Reported Pumping Capacity gpm	Avg Annual Available Capacity (75%) gpm	Max Perchlorate (CBWM) ppb	Anticipated Regulatory Change - Perchlorate MCL Impact 1 = no impact	Anticipated Regulatory Change - Effective Perchlorate Treatment IX, RO 1 = yes	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity gpm	Anticipated Regulatory Change - Effective PFAS Treatment GAC, IX, RO 1 = yes	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity 25% gpm	Unknown Regulatory Change - Effective Treatment Any 1 = yes	Unknown Regulatory Change - Loss of Available Well Capacity 25% gpm	Available Well Capacity - Anticipated Regulatory Changes Scenarios 3,4 and 6 gpm	Available Well Capacity - Anticipated & Unknown Regulatory Changes Scenario 5 gpm
MVWD	PZ-MV-Z1	None		**WL-MV-Z1-10**	Yes	Other	50%	800	600	7.8	0	0	600	0	150	0	150	0	0
				WL-MV-Z1-26	Yes	Other	70%	2,000	1,500	13	0	0	1,500	0	375	0	375	0	0
				WL-MV-Z1-27	Yes	Other	50%	1,950	1,463		1	0	0	0	366	0	366	1,097	731
				WL-MV-Z1-31	Yes	Other	70%	2,000	1,500		1	0	0	0	375	0	375	1,125	750
				WL-MV-Z1-4	Yes	Other	70%	800	600		1	0	0	0	150	0	150	450	300
				WL-MV-Z1-5	Yes	Other	70%	1,400	1,050	4	0	0	1,050	0	263	0	263	0	0
		WP-MV-Z2-PLT30	IX, GAC	**WL-MV-Z1-33**	Yes	Nitrate|Perchlorate|TCP|DBCP	100%	2,000	1,500		1	1	0	1	0	1	0	1,500	1,500
	PZ-MV-Z2		IX, GAC	**WL-MV-Z2-30**	Yes	Nitrate|Perchlorate|TCP|DBCP	70%	2,000	1,500		1	1	0	1	0	1	0	1,500	1,500
			IX, GAC	**WL-MV-Z2-32**	Yes	Nitrate|Perchlorate|TCP|DBCP	70%	2,000	1,500		1	1	0	1	0	1	0	1,500	1,500
		None		**WL-MV-Z2-19**	Yes	Other	50%	1,800	1,350	6.4	0	0	1,350	0	338	0	338	0	0
				WL-MV-Z2-28	Yes	Other	50%	1,800	1,350	4.7	0	0	1,350	0	338	0	338	0	0
				WL-MV-Z2-34	Yes	Other	50%	2,000	1,500		1	0	0	0	375	0	375	1,125	750
		Totals							15,413				5,850		2,728		2,728	8,297	7,031
		Percentage of Capacity Impacted											38.0%		17.7%		17.7%	**46.2%**	**54.4%**
Ontario	PZ-ON-1010	None		**WL-ON-1010-34**	No	Other	100%	1,572	0	4.6	0	0	0	0	0	0	0	0	0
				WL-ON-1010-39	No	Perchlorate	100%	2,195	0	1.2	0	0	0	0	0	0	0	0	0
				WL-ON-1010-50	No	Perchlorate|Color	100%	1,200	0		1	0	0	0	0	0	0	0	0
	PZ-ON-1074	None		**WL-ON-1074-17**	Yes	None	100%	1,274	956		1	0	0	0	239	0	239	717	478
				WL-ON-1074-35	Yes	None	100%	2,709	2,032	2	0	0	2,032	0	508	0	508	0	0
				WL-ON-1074-36	Yes	None	100%	1,666	1,250	5.9	0	0	1,250	0	312	0	312	0	0
				WL-ON-1074-40	Yes	Nitrate	50%	3,288	2,466		1	0	0	0	617	0	617	1,850	1,233
				WL-ON-1074-45	Yes	None	100%	2,500	1,875	73	0	0	1,875	0	469	0	469	0	0
		WP-ON-1074-GALV	IX	**WL-ON-1074-44**	Yes	Nitrate|Perchlorate	100%	2,500	1,875		1	1	0	1	0	1	0	1,875	1,875
			IX	**WL-ON-1074-52**	Yes	Nitrate|Perchlorate	100%	2,000	1,500		1	1	0	1	0	1	0	1,500	1,500
	PZ-ON-1212	None		**WL-ON-1212-20**	Yes	None	100%	775	581	5	0	0	581	0	145	0	145	0	0
				WL-ON-1212-24	Yes	None	100%	1,626	1,220		1	0	0	0	305	0	305	915	610
				WL-ON-1212-25	Yes	None	100%	1,407	1,055		1	0	0	0	264	0	264	791	528
				WL-ON-1212-26	No	None	100%	1,626	0	5	0	0	0	0	0	0	0	0	0
				WL-ON-1212-27	Yes	None	100%	1,097	823	21	0	0	823	0	206	0	206	0	0
				WL-ON-1212-29	Yes	Perchlorate	100%	2,625	1,969		1	0	0	0	492	0	492	1,477	984
				WL-ON-1212-30	Yes	None	100%	1,850	1,388		1	0	0	0	347	0	347	1,041	694
				WL-ON-1212-31	Yes	Perchlorate	100%	2,944	2,208	8	0	0	2,208	0	552	0	552	0	0
				WL-ON-1212-37	Yes	None	100%	2,925	2,194		1	0	0	0	548	0	548	1,645	1,097
				WL-ON-1212-38	Yes	None	100%	2,377	1,783		1	0	0	0	446	0	446	1,337	891
				WL-ON-1212-41	Yes	None	100%	2,676	2,007	0.99	1	0	0	0	502	0	502	1,505	1,004
				WL-ON-1212-43	Yes	None	100%	1,550	1,163		1	0	0	0	291	0	291	872	581
				WL-ON-1212-47	Yes	None	100%	2,500	1,875	1.3	0	0	1,875	0	469	0	469	0	0
	PZ-ON-1348	None		**WL-ON-1348-46**	Yes	None	100%	2,500	1,875		1	0	0	0	469	0	469	1,406	938
	PZ-ON-925	None		**WL-ON-925-49**	Yes	None	100%	1,800	1,350	6.9	0	0	1,350	0	338	0	338	0	0
		Totals							33,442				11,993		7,517		7,517	16,930	12,412
		Percentage of Capacity Impacted											35.9%		22.5%		22.5%	**49.4%**	**62.9%**

Managed By	PRESSURE ZONE	Treatment Facility	Treatment Process	Well Name	Active	Reported Water Quality Impairment	Max Blend	Reported Pumping Capacity	Avg Annual Available Capacity (75%)	Max Perchlorate (CBWM)	Anticipated Regulatory Change - Perchlorate MCL Impact	Anticipated Regulatory Change - Effective Perchlorate Treatment	Anticipated Regulatory Change - Perchlorate - Loss of Available Well Capacity	Anticipated Regulatory Change - Effective PFAS Treatment	Anticipated Regulatory Change - PFAS - Loss of Available Well Capacity	Unknown Regulatory Change - Effective Treatment	Unknown Regulatory Change - Loss of Available Well Capacity	Available Well Capacity - Anticipated Regulatory Changes	Available Well Capacity - Anticipated & Unknown Regulatory Changes
							% of total	gpm	gpm	ppb	1 = no impact	IX, RO 1 = yes	gpm	GAC, IX, RO 1 = yes	25% gpm	Any 1 = yes	25% gpm	Scenarios 3,4 and 6 gpm	Scenario 5 gpm
SAWCo	PZ-SA-LOW	None		**WL-SA-LOW-32**	Yes	None	100%	354	266	5.6	0	0	266	0	66	0	66	0	0
	PZ-SA-UP	None		**WL-SA-UP-15**	Yes	None	100%	542	407	4.2	0	0	407	0	102	0	102	0	0
				WL-SA-UP-16	Yes	None	100%	923	692	23	0	0	692	0	173	0	173	0	0
	WP-WF-XX-ADL	WP-WF-XX-ADL	Conv	**WL-WF-XX-S35**	Yes	None	100%	638	479		1	0	0	0	120	1	0	359	359
		Totals							1,843				1,364		461		341	359	359
		Percentage of Capacity Impacted											74.0%		25.0%		18.5%	**80.5%**	**80.5%**
Upland	PZ-UP-I	None		**WL-UP-I-13**	No	Nitrate	50%	878	0	4.9	0	0	0	0	0	0	0	0	0
				WL-UP-I-21A	Yes	Nitrate|TCP|DBCP	50%	970	728		1	0	0	0	182	0	182	546	364
				WL-UP-I-3	Yes	Nitrate|DBCP	50%	878	659		1	0	0	0	165	0	165	494	329
				WL-UP-I-7A	Yes	None	100%	970	728		1	0	0	0	182	0	182	546	364
				WL-UP-I-8	Yes	Nitrate|DBCP	50%	600	450	7.7	0	0	450	0	113	0	113	0	0
				WL-UP-I-9	No	None	100%	0	0	6.2	0	0	0	0	0	0	0	0	0
				WL-UP-I-S2	Yes	Nitrate|DBCP	100%	882	662	17	0	0	662	0	165	0	165	0	0
				WL-UP-I-S22	Yes	None	100%	1,694	1,271	4	0	0	1,271	0	318	0	318	0	0
				WL-UP-I-S24	Yes	Nitrate|DBCP	100%	2,432	1,824		1	0	0	0	456	0	456	1,368	912
				WL-UP-I-S3	Yes	Nitrate|DBCP	100%	1,171	878	23	0	0	878	0	220	0	220	0	0
	PZ-UP-II	None		**WL-UP-II-15**	Yes	None	100%	1,850	1,388	6.4	0	0	1,388	0	347	0	347	0	0
				WL-UP-II-17	Yes	None	100%	1,065	799	4.8	0	0	799	0	200	0	200	0	0
				WL-UP-II-20	Yes	None	100%	350	263	2.1	0	0	263	0	66	0	66	0	0
				WL-UP-II-LH4	Yes	None	100%	800	600		1	0	0	0	150	0	150	450	300
				WL-UP-II-S25A	Yes	None	100%	500	375		1	0	0	0	94	0	94	281	188
				WL-UP-II-S26	Yes	None	100%	524	393		1	0	0	0	98	0	98	295	197
				WL-UP-II-S27A	Yes	None	100%	654	491		1	0	0	0	123	0	123	368	245
				WL-UP-II-WE3	Yes	TCP	100%	800	600		1	0	0	0	150	0	150	450	300
				WL-UP-II-WE4	Yes	TCP	100%	800	600		1	0	0	0	150	0	150	450	300
	PZ-UP-III	None		**WL-UP-III-5**	Yes	None	100%	1,070	803		1	0	0	0	201	0	201	602	401
				WL-UP-III-FTL3	Yes	None	100%	600	450		1	0	0	0	113	0	113	338	225
	PZ-UP-V	WP-UP-V-SACN	Conv	**WL-UP-V-1A**	Yes	Other	100%	1,050	788		1	0	0	0	197	1	0	591	591
			Conv	**WL-UP-V-2**	No	Manganese	100%	650	0		1	0	0	0	0	1	0	0	0
		Totals							14,745				5,709		3,686		3,489	6,777	4,715
		Percentage of Capacity Impacted											38.7%		25.0%		23.7%	**54.0%**	**68.0%**
Regional		Totals							153,527				49,229		26,108		25,670	90,399	76,939
		Percentage of Capacity Impacted											32.1%		17.0%		16.7%	**41.1%**	**49.9%**

Notes:

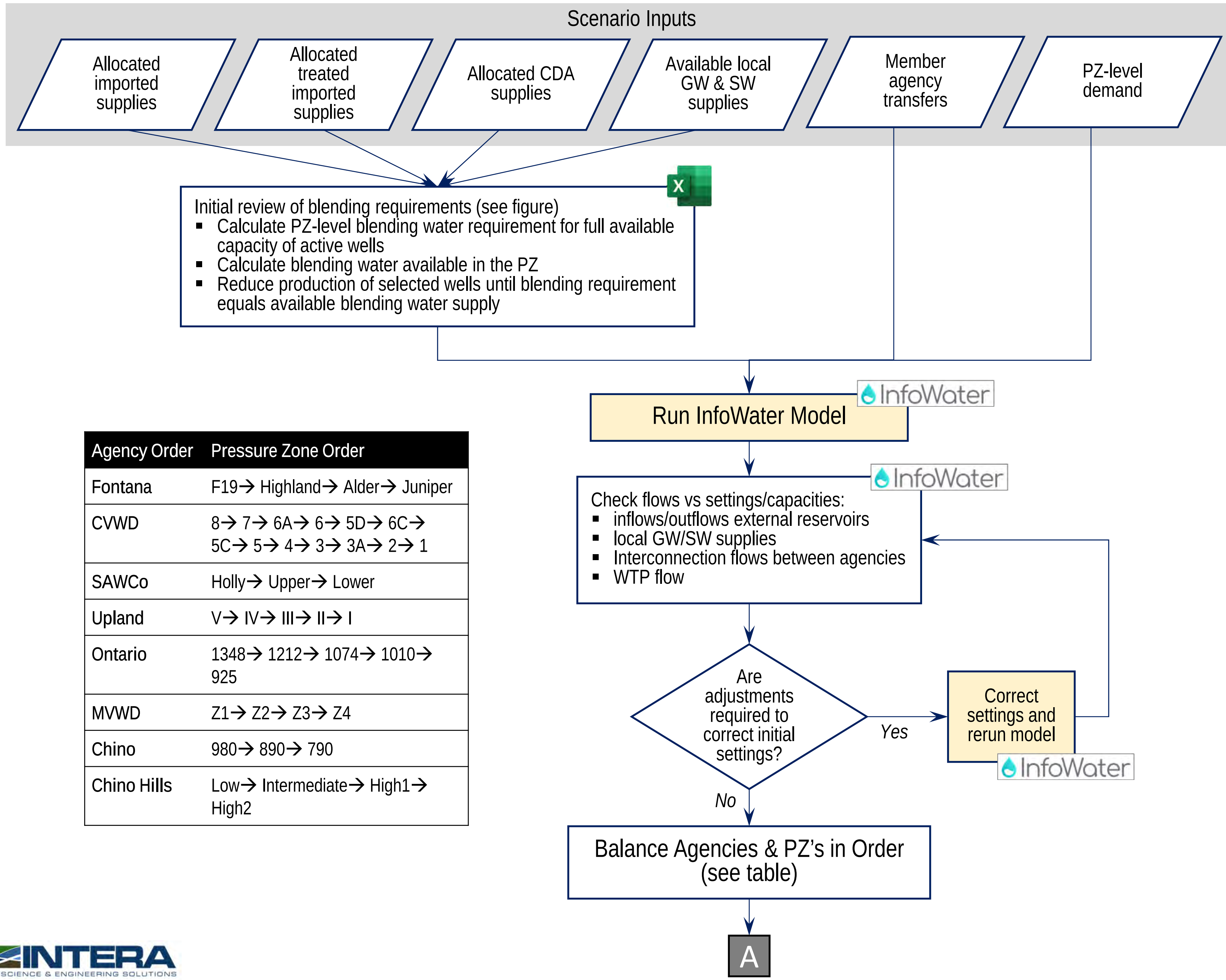
1) Anticipated Regulatory Changes include reduction of the MCL for perchlorate from 6 ppb to 1 ppb and new MCL's for PFOA and PFOS. Water quality data obtained from the Chino Basin Water Master (CBWM) was used to identify all wells with reported perchlorate concentrations of 1 ppb or greater. All wells with >1 ppb perchlorate and without existing ion exchange (IX) or reverse osmosis (RO) treatment are assumed to be unavailable. Well specific water quality data for PFOA and PFOS was not available from CBWM. All wells without granular activated carbon (GAC), IX, or RO treatment were reduced in capacity by 25% to simulate system wide impacts of PFOA and PFOS contamination. The reduction in capacity for each well resulting from Anticipated Regulatory Changes was calculated to be the maximum (not sum) of reductions resulting from perchlorate or PFOA & PFOS.

2) Unknown Regulatory Changes include a new future MCL for an as yet undetermined contaminant of emerging concern (CEC). All wells without treatment of any kind were reduced in capacity by 25% to simulate system wide impacts of the future CEC. The reduction in capacity for each well resulting from the combination of Anticipated and Unknown Regulatory Changes was calculated to be the maximum (not sum) of reductions resulting from perchlorate, PFOA & PFOS, and the future CEC.

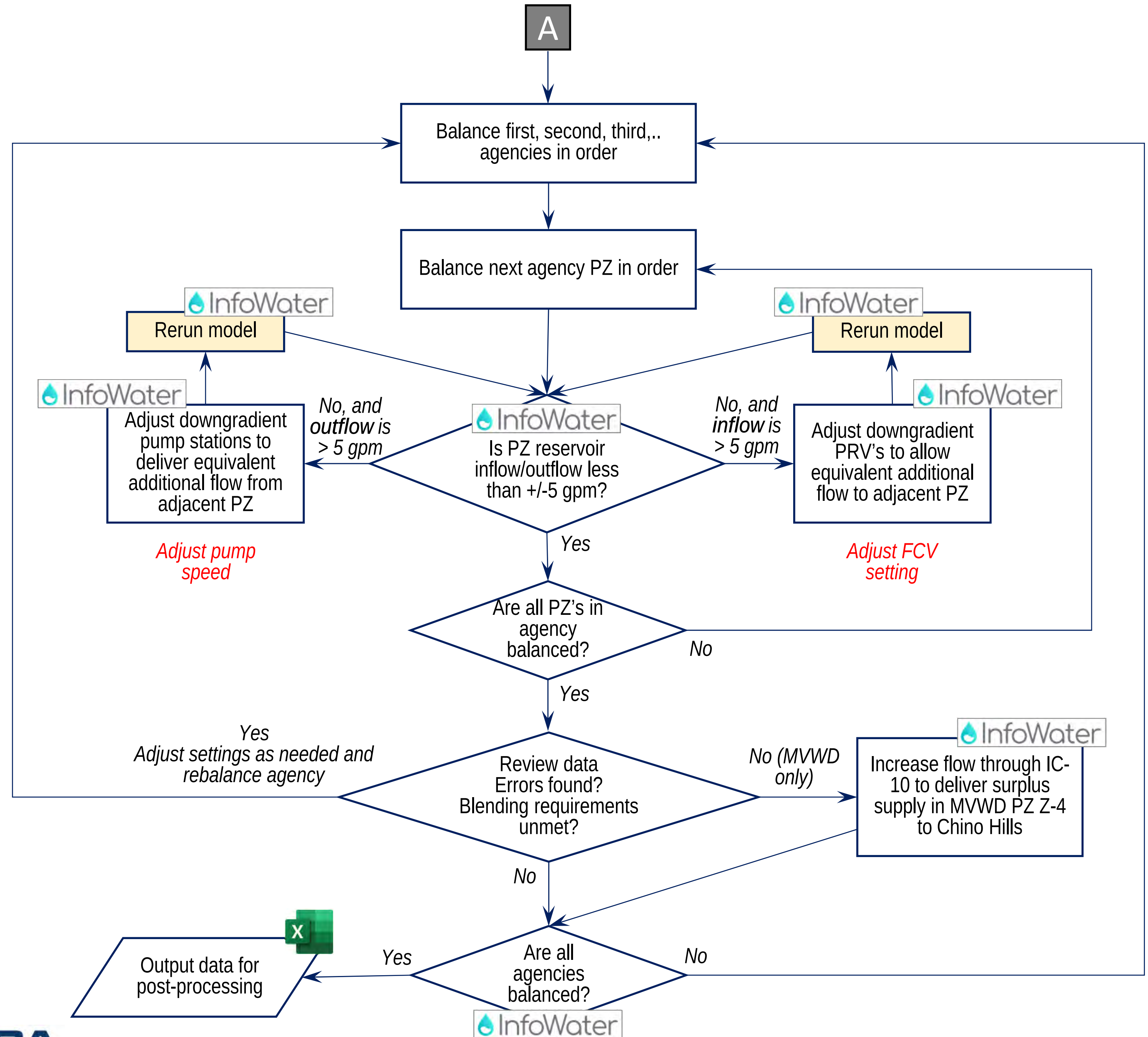
3) The available capacities and percentages of capacity impacted shown in this table reflect *pre-modeling analysis* for scenarios including Anticipated and Unknown Regulatory Changes, not modeled results. The predicted impacts to available capacity are determined by modeling of each scenario, based on these inputs. Because the distribution of available supplies to meet the demands of each pressure zone may be constrained by infrastructure capacity, the modeled impacts of Anticipated and Unknown Regulatory Changes may be greater than those shown in this table.

APPENDIX C

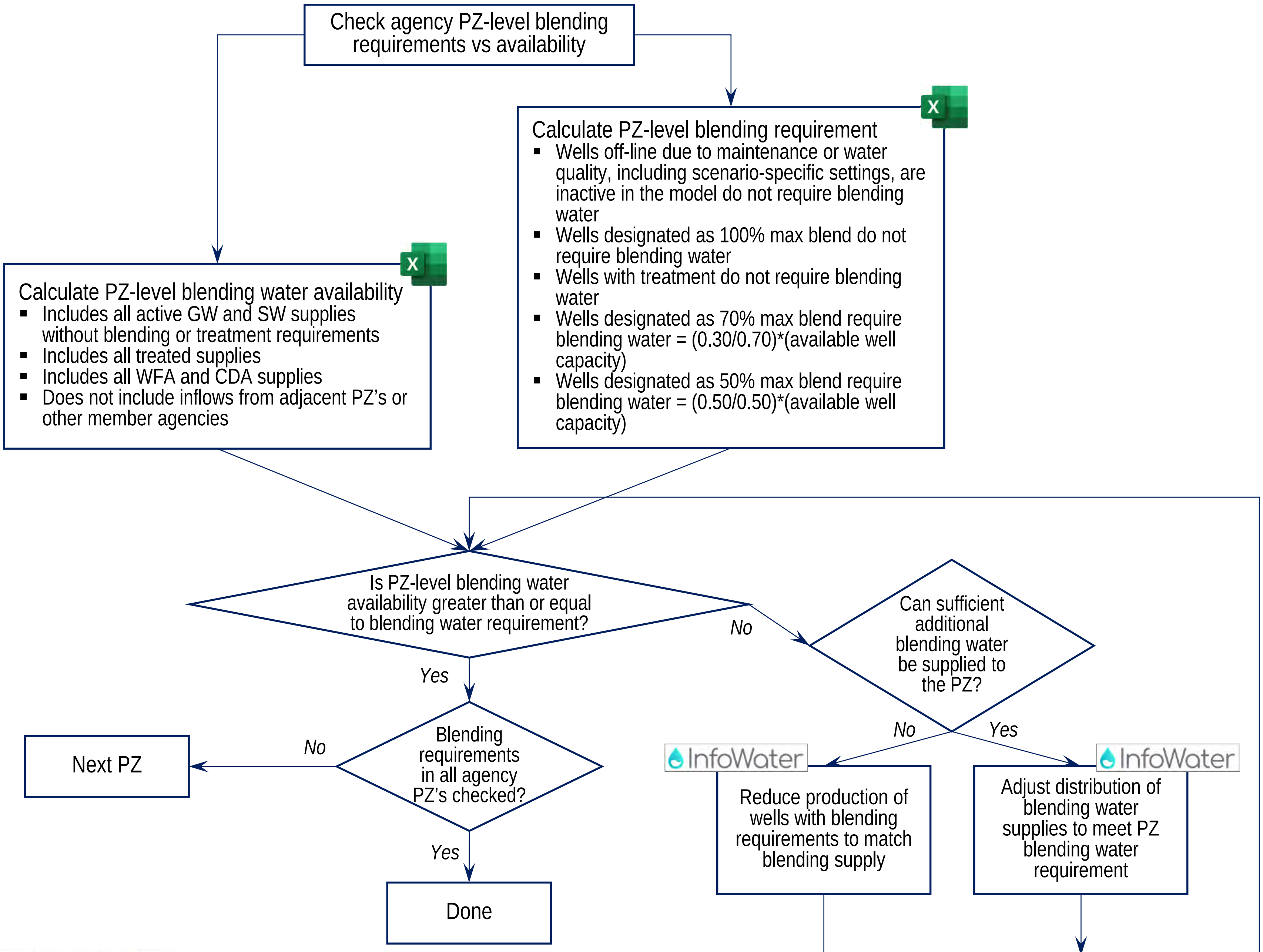
IRP Infrastructure Model Process Flow Charts



Agency Order	Pressure Zone Order
Fontana	F19→ Highland→ Alder→ Juniper
CVWD	8→ 7→ 6A→ 6→ 5D→ 6C→ 5C→ 5→ 4→ 3→ 3A→ 2→ 1
SAWCo	Holly→ Upper→ Lower
Upland	V→ IV→ III→ II→ I
Ontario	1348→ 1212→ 1074→ 1010→ 925
MVWD	Z1→ Z2→ Z3→ Z4
Chino	980→ 890→ 790
Chino Hills	Low→ Intermediate→ High1→ High2



A
Balance first, second, third,.. agencies in order
Balance next agency PZ in order
InfoWater
Rerun model
InfoWater
Rerun model
InfoWater
Adjust downgradient pump stations to deliver equivalent additional flow from adjacent PZ
No, and **outflow** is > 5 gpm
InfoWater
Is PZ reservoir inflow/outflow less than +/-5 gpm?
No, and **inflow** is > 5 gpm
InfoWater
Adjust downgradient PRV's to allow equivalent additional flow to adjacent PZ
Adjust pump speed
Yes
Adjust FCV setting
Are all PZ's in agency balanced?
No
Yes
Yes
Adjust settings as needed and rebalance agency
Review data
Errors found?
Blending requirements unmet?
No (MVWD only)
InfoWater
Increase flow through IC-10 to deliver surplus supply in MVWD PZ Z-4 to Chino Hills
No
Output data for post-processing
Yes
Are all agencies balanced?
No
InfoWater
INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS



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