Domestic Water System General Plan: Overview

INDIAN WELLS VALLEY WATER DISTRICT

BOARD OF DIRECTORS MEETING

DECEMBER 9, 2020

BACKGROUND

- Previous Water System General Plans: 1977, 1985 (Addendum), 1990, 1997
- 1996 estimated service area population was 35,600. Current (2019) estimated service area population is 35,800
- 1996 yearly production was 8,500 AF. Current (2019) yearly production is 6,116 AF.
- 1996 unit production was 210 gpcd. Current (2019) unit production is 150 gpcd.
- 1996 average occupancy was 3.36 persons/connection. Current (2019) average occupancy is 2.84 persons per connection.

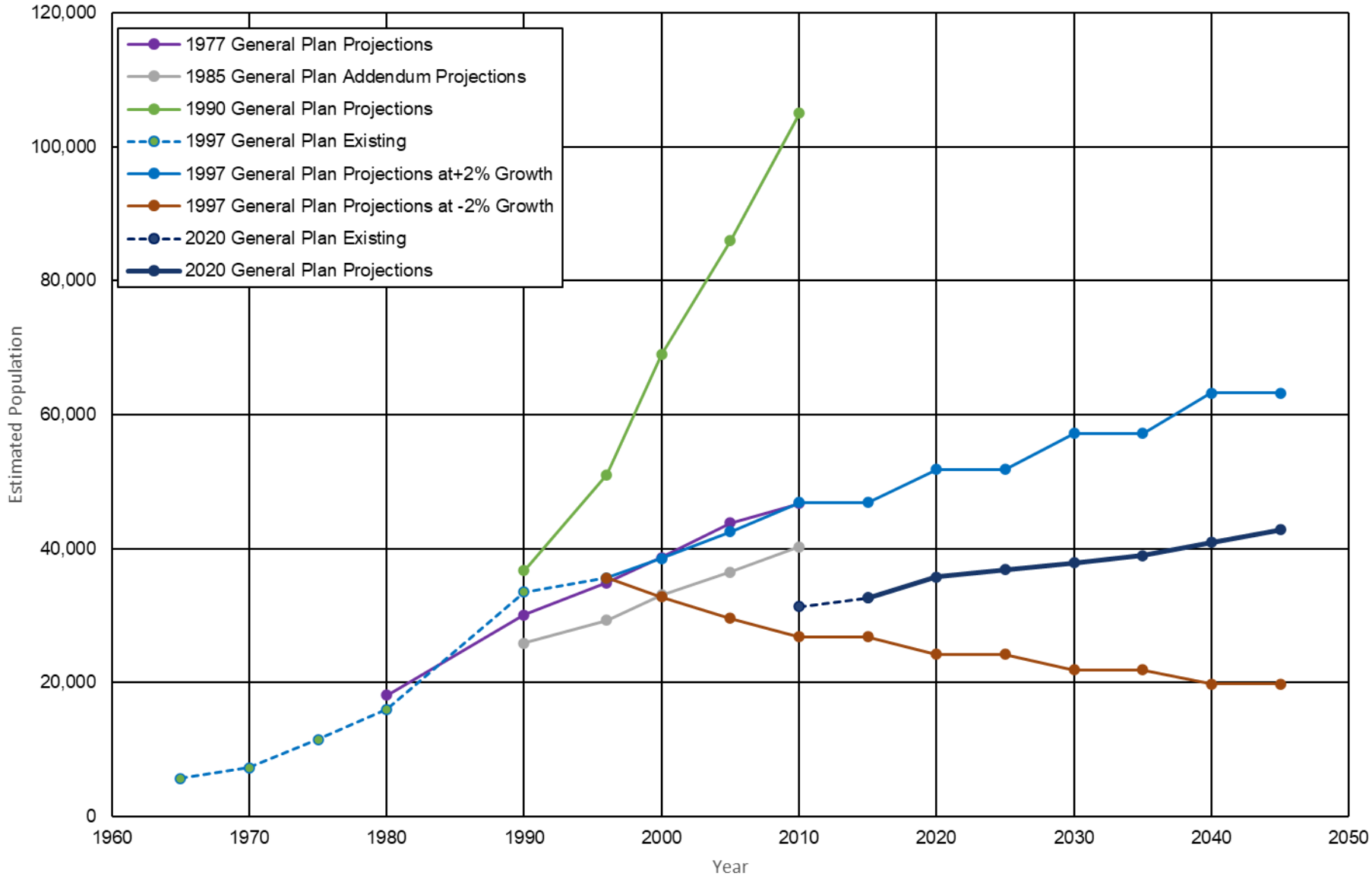
WATER DEMANDS

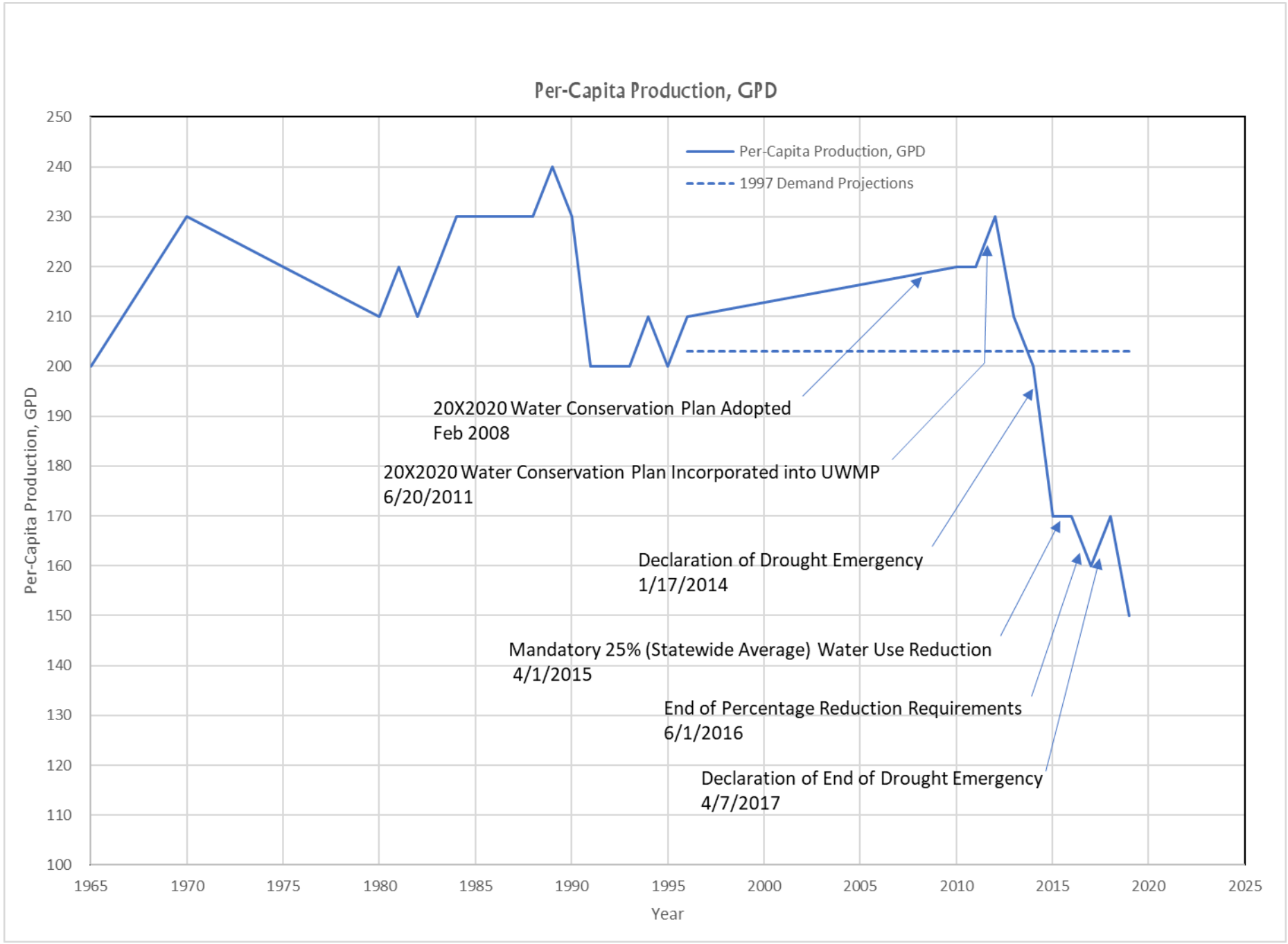
- Population Projections
- Water Use Per Capita
- Service Area Profile
- Production Requirements to Meet Projected Demands
- Demand Distribution
- Average and Maximum Day Demands
- Storage Components
- Fire Flow Requirements by Pressure Zone
- Production Requirements by Pressure Zone

POPULATION

- Population projections for Kern County portion of service area is based on KernCOG estimates for 2020, 2035, and 2042. Projected growth rate from 2020 forward is slightly less than 1%.
- Population estimates for San Bernardino County portion of service area is based on number of connections multiplied by persons/household from 2014-2018 census data (2.57 to 2.61 persons/household). Projected number of connections is assumed to be proportional to population increase in Kern County portion of service area.

GENERAL PLAN COMPARISON
PROJECTED POPULATION




Per-Capita Production, GPD
Per-Capita Production, GPD
1997 Demand Projections
Per-Capita Production, GPD
Year
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
20X2020 Water Conservation Plan Adopted
Feb 2008
20X2020 Water Conservation Plan Incorporated into UWMP
6/20/2011
Declaration of Drought Emergency
1/17/2014
Mandatory 25% (Statewide Average) Water Use Reduction
4/1/2015
End of Percentage Reduction Requirements
6/1/2016
Declaration of End of Drought Emergency
4/7/2017

INDIAN WELLS VALLEY WATER DISTRICT
DOMESTIC WATER SYSTEM
2018 SERVICE AREA PROFILE

CUSTOMER TYPE	SERVICES	% OF TOTAL SERVICES
Single Family	11,697	91.28%
Multi Family	350	2.73%
Commercial	638	4.98%
Other*	64	0.50%
Inactive connections	66	0.52%
Total:	12,815	100.00%

*Fire suppression, street cleaning, line flushing, construction meters and temporary meters.

INDIAN WELLS VALLEY WATER DISTRICT
DOMESTIC WATER SYSTEM
PROJECTED WATER PRODUCTION REQUIREMENTS AND SERVICE CONNECTIONS

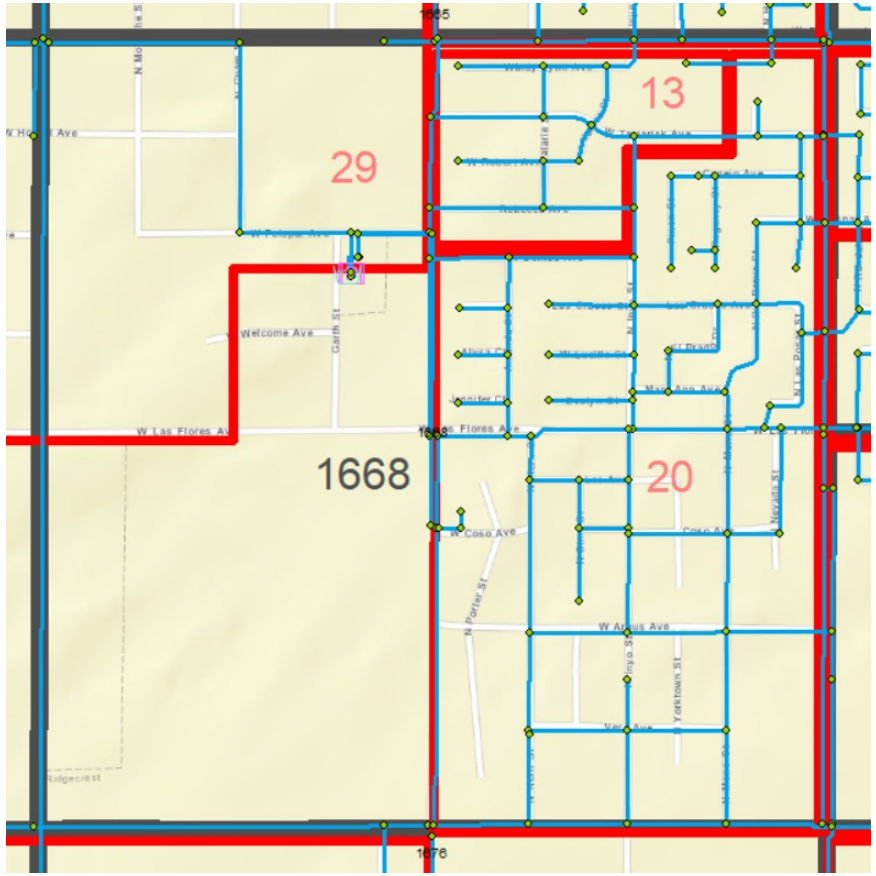
YEAR	PROJECTED WATER PRODUCTION REQUIREMENTS (AF)	PROJECTED SERVICE CONNECTIONS (EA)
2018	6,765 (1)	12,749 (1)
2020	6,730	12,602
2025	6,930	12,976
2030	7,130	13,347
2035	7,690	14,399
2040	7,830	14,671
2045	8,050	15,079

(1) Actual

DEMAND DISTRIBUTION

- Existing demands were set up using meter routes, distributed to system nodes
- Future demands were distributed using estimated ultimate population projections (2045) from KernCOG for Transportation Analysis Zones (TAZs) within District Service Area. Growth was distributed to nodes within each TAZ.

DEMAND DISTRIBUTION: EXAMPLE METER ROUTE AND TAZ



AVERAGE AND MAXIMUM DAY DEMANDS

- Factors used for sizing facilities
- Average Day Demand (ADD)
  - Current: 6.0 MGD
  - Ultimate: 7.2 MGD
- Maximum Day Demand (MDD) = 2.0 X ADD
  - Current: 12.0 MGD
  - Ultimate: 14.4 MGD

RESERVOIR STORAGE COMPONENTS

- Operational Storage (to even out the daily demands and provide adequate system pressure) = 0.2 X MDD
- Emergency Storage (to provide additional storage in the case of a temporary power or service outage)
  - Minimum =1.0 X ADD (24 hours of ADD)
  - Optimum = 1.0 X MDD (24 hours of MDD)
- Off-Peak Power (OPP) Storage = 5 hrs/24 hrs (0.21) X MDD
- Fire Flow Storage varies by pressure zone

FIRE FLOW REQUIREMENTS BY PRESSURE ZONE

Zone Designation		Fire Flow (gpm)	Duration (hours)	Storage Requirements (gallons)
Elevation	Name			
2,455	A	4,000	4	960,000
2,555	B	2,000	4	480,000
2,660	C	2,000	2	240,000
2,775	D	1,500	2	180,000
2,885	E	3,000	3	540,000

PROJECTED PRODUCTION REQUIREMENTS BY PRESSURE ZONE IN GALLONS PER MINUTE (NORMAL OPERATION)

Pressure Zone	Production Demand	2018	2025	2030	2035	2040	2045	Existing
A Zone	Average Day	3,112	3,217	3,343	3,471	3,680	3,893	
(2455)	Maximum Day	6,225	6,434	6,686	6,942	7,361	7,786	8,500
B Zone	Average Day	739	742	744	745	746	749	
(2555)	Maximum Day	1,478	1,483	1,487	1,490	1,492	1,498	4,400 (2)
C Zone	Average Day	201	201	201	201	201	201	
(2660)	Maximum Day	402	402	402	402	402	402	(2)
D Zone	Average Day	43	43	43	43	43	43	
(2775)	Maximum Day	86	86	86	86	86	86	(2)
E Zone	Average Day	99	99	99	99	99	99	
(2885)	Maximum Day	198	198	198	198	198	198	(2)
SYSTEM TOTAL	**Average Day**	**4,194**	**4,301**	**4,429**	**4,559**	**4,769**	**4,985**	
	Maximum Day	**8,388**	**8,603**	**8,859**	**9,118**	**9,538**	**9,969**	**12,900** (3)

Notes:

(1) Not including Well 35.

(2) B Zone production supplies C, D and E Zones

(3) Not accounting for any necessary future well replacements.

PROJECTED PRODUCTION REQUIREMENTS BY PRESSURE ZONE IN GALLONS PER MINUTE (OFF PEAK POWER) (4)

Pressure Zone	Production Demand	2018	2025	2030	2035	2040	2045	Existing Production (1)
A Zone	Average Day	3,931	4,064	4,223	4,385	4,649	4,917	
(2455)	Maximum Day	7,863	8,127	8,446	8,769	9,297	9,835	8,500 (3)
B Zone	Average Day	934	937	939	941	943	946	
(2555)	Maximum Day	1,867	1,874	1,879	1,882	1,885	1,893	4,400 (2)
C Zone	Average Day	254	254	254	254	254	254	
(2660)	Maximum Day	507	507	507	507	507	507	(2)
D Zone	Average Day	54	54	54	54	54	54	
(2775)	Maximum Day	109	109	109	109	109	109	(2)
E Zone	Average Day	125	125	125	125	125	125	
(2885)	Maximum Day	250	250	250	250	250	250	(2)
SYSTEM TOTAL	**Average Day**	**5,298**	**5,433**	**5,595**	**5,759**	**6,024**	**6,296**	
	Maximum Day	**10,595**	**10,867**	**11,190**	**11,517**	**12,048**	**12,593**	**12,900** (5)

Notes:

(1) Not including Wells 35 and 36.

(2) B Zone production supplies C, D and E Zones

(3) B Zone production supplements A Zone demand requirements.

(4) Requires Maximum Day Production over a 19 hour period (no production between 4:00 pm and 9:00 pm).

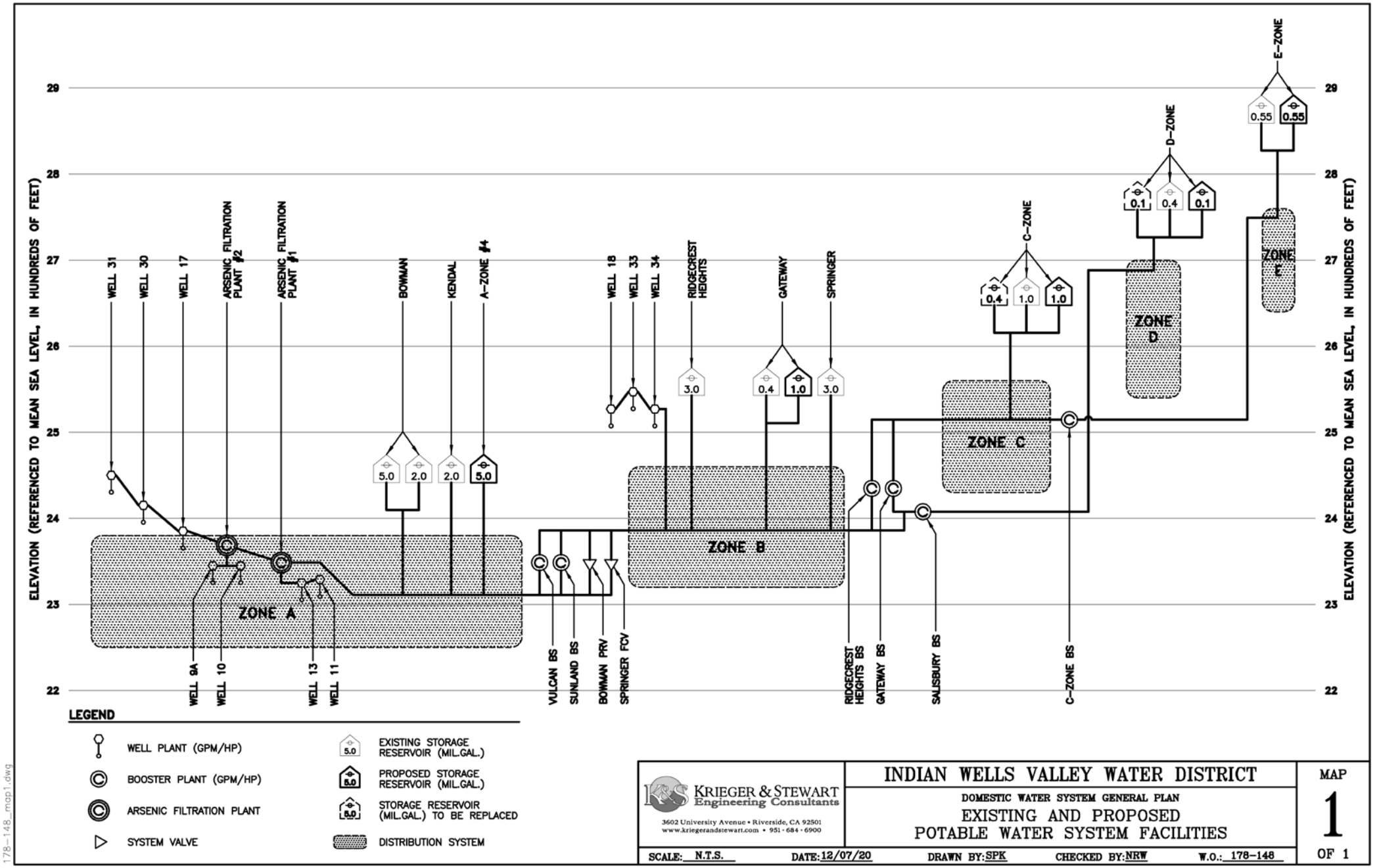
(5) Not accounting for any necessary future well replacements.

WATER SUPPLY

- Existing Sources of Water Supply
  - Groundwater
- Potential Sources of Future Water Supply
  - Groundwater (including brackish groundwater)
  - Importation of Surface Water – Groundwater Replenishment
  - Recycled Water (City of Ridgecrest) – Groundwater Replenishment
- Groundwater Management
  - GSA: minimum 5,000 AF/Yr must be imported, to be financed by IWVWD and SVM.

EXISTING SYSTEM

- System Schematic
- System Map
- Potential Annexations
- System Model
- System Issues
- Proposed Resolution of System Issues



178-148_map1.dwg

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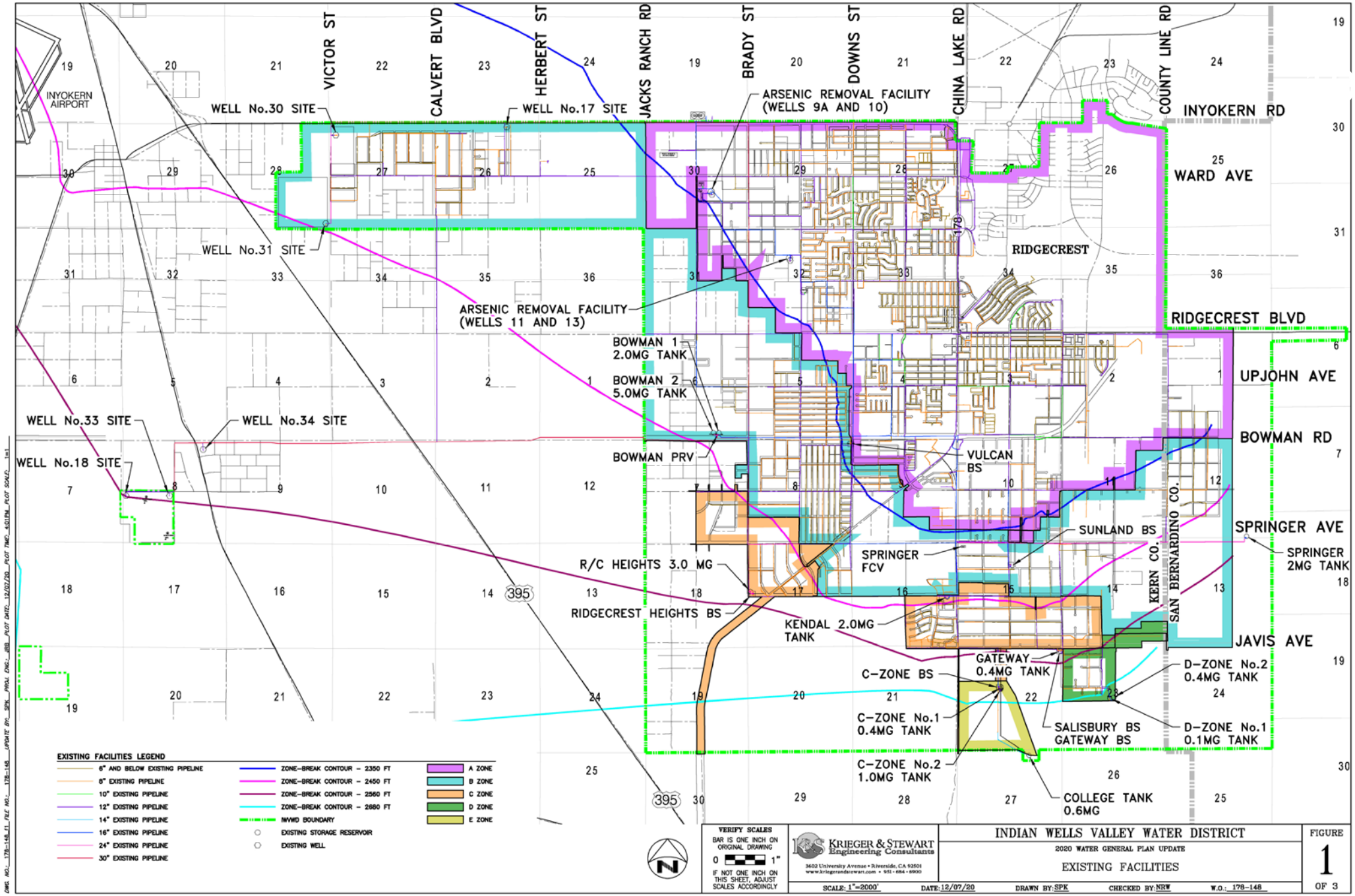
INDIAN WELLS VALLEY WATER DISTRICT

DOMESTIC WATER SYSTEM GENERAL PLAN

EXISTING AND PROPOSED POTABLE WATER SYSTEM FACILITIES

MAP 1 OF 1

SCALE: N.T.S. DATE: 12/07/20 DRAWN BY: SPK CHECKED BY: NRW W.O.: 178-148


INYOKERN AIRPORT
VICTOR ST
CALVERT BLVD
HERBERT ST
JACKS RANCH RD
BRADY ST
DOWNS ST
CHINA LAKE RD
COUNTY LINE RD
INYOKERN RD
WARD AVE
RIDGECREST
RIDGECREST BLVD
UPJOHN AVE
BOWMAN RD
SPRINGER AVE
JAVIS AVE
KERN CO.
SAN BERNARDINO CO.
178
395
WELL No.30 SITE
WELL No.17 SITE
WELL No.31 SITE
WELL No.33 SITE
WELL No.34 SITE
WELL No.18 SITE
ARSENIC REMOVAL FACILITY (WELLS 9A AND 10)
ARSENIC REMOVAL FACILITY (WELLS 11 AND 13)
BOWMAN 1 2.0MG TANK
BOWMAN 2 5.0MG TANK
BOWMAN PRV
VULCAN BS
SUNLAND BS
SPRINGER FCV
SPRINGER 2MG TANK
R/C HEIGHTS 3.0 MG
RIDGECREST HEIGHTS BS
KENDAL 2.0MG TANK
GATEWAY 0.4MG TANK
C-ZONE BS
D-ZONE No.2 0.4MG TANK
C-ZONE No.1 0.4MG TANK
SALISBURY BS
GATEWAY BS
D-ZONE No.1 0.1MG TANK
C-ZONE No.2 1.0MG TANK
COLLEGE TANK 0.6MG
EXISTING FACILITIES LEGEND
6" AND BELOW EXISTING PIPELINE
8" EXISTING PIPELINE
10" EXISTING PIPELINE
12" EXISTING PIPELINE
14" EXISTING PIPELINE
16" EXISTING PIPELINE
24" EXISTING PIPELINE
30" EXISTING PIPELINE
ZONE-BREAK CONTOUR - 2350 FT
ZONE-BREAK CONTOUR - 2450 FT
ZONE-BREAK CONTOUR - 2560 FT
ZONE-BREAK CONTOUR - 2680 FT
IWVWD BOUNDARY
EXISTING STORAGE RESERVOIR
EXISTING WELL
A ZONE
B ZONE
C ZONE
D ZONE
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VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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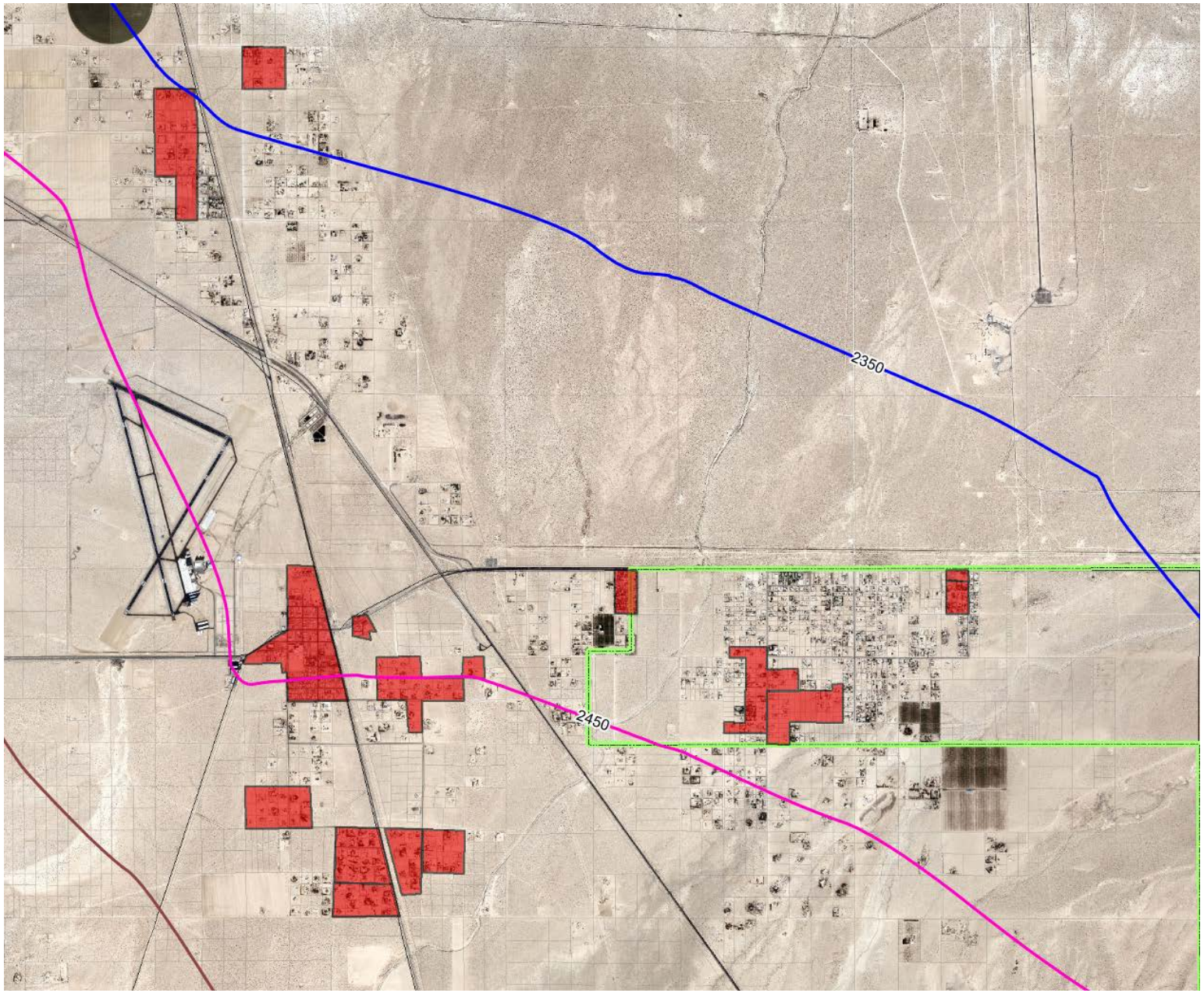
INDIAN WELLS VALLEY WATER DISTRICT
2020 WATER GENERAL PLAN UPDATE
EXISTING FACILITIES
FIGURE 1 OF 3
SCALE: 1"=2000'
DATE: 12/07/20
DRAWN BY: SPK
CHECKED BY: NRW
W.O.: 178-148

EXISTING SYSTEM: Potential Annexations

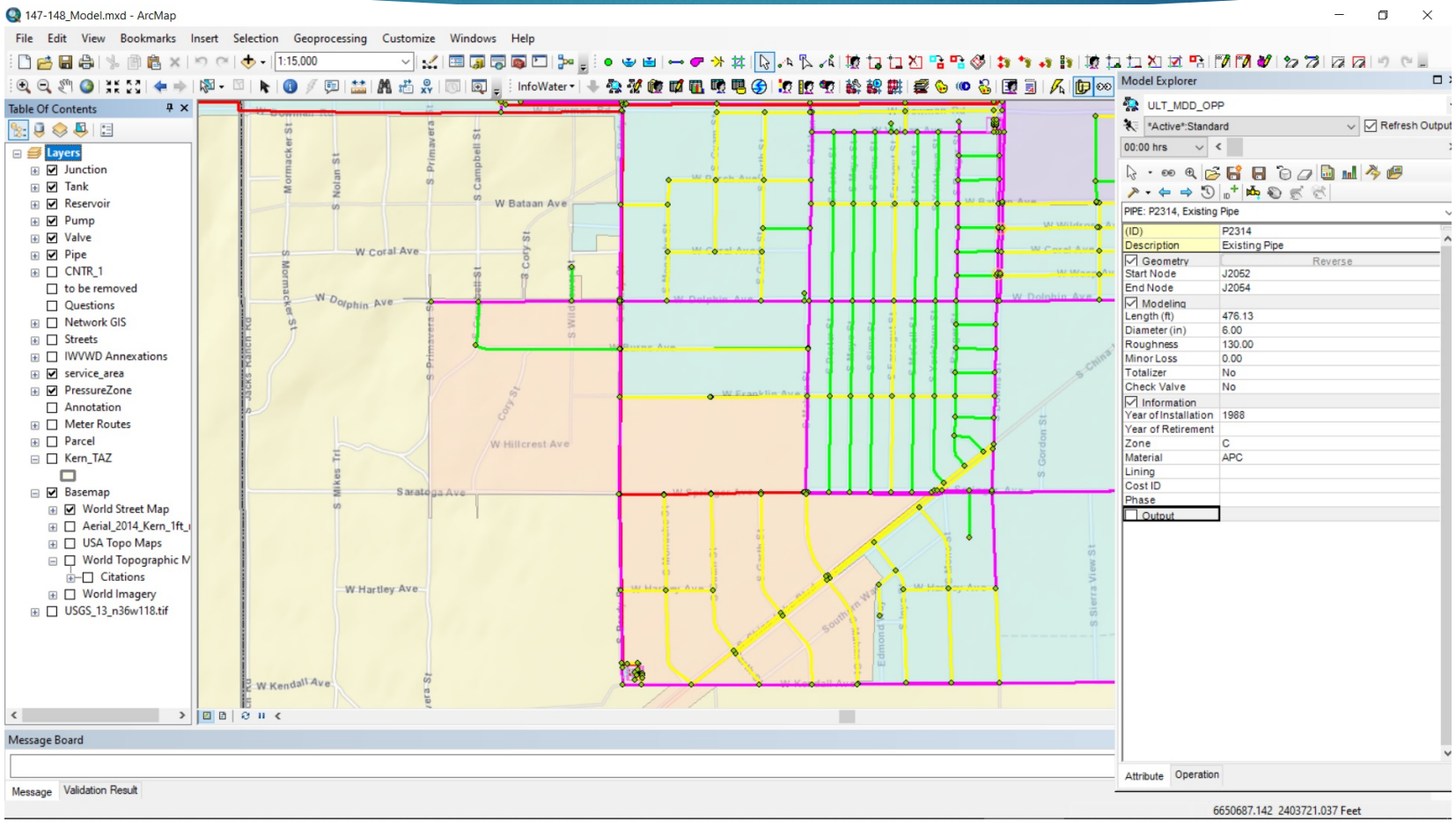
- The State Water Resources Control Board, Division of Drinking Water, has requested that the District consider annexing several small water systems:
  - Small Systems in the China Lake Area (covered by KernCOG population estimates—connections not included)
    - Dune III Mutual Water Company (population 119, 36 residential connections)
    - China Lake Acres Mutual Water Company (population 198, 60 residential connections)
    - Buttermilk Acres Water System (2 commercial connections)
    - Hometown Water Association (population 25, 12 residential connections)
    - Sierra Breeze Mutual Water Company (population 150, 60 residential connections)

EXISTING SYSTEM: Potential Annexations (continued)

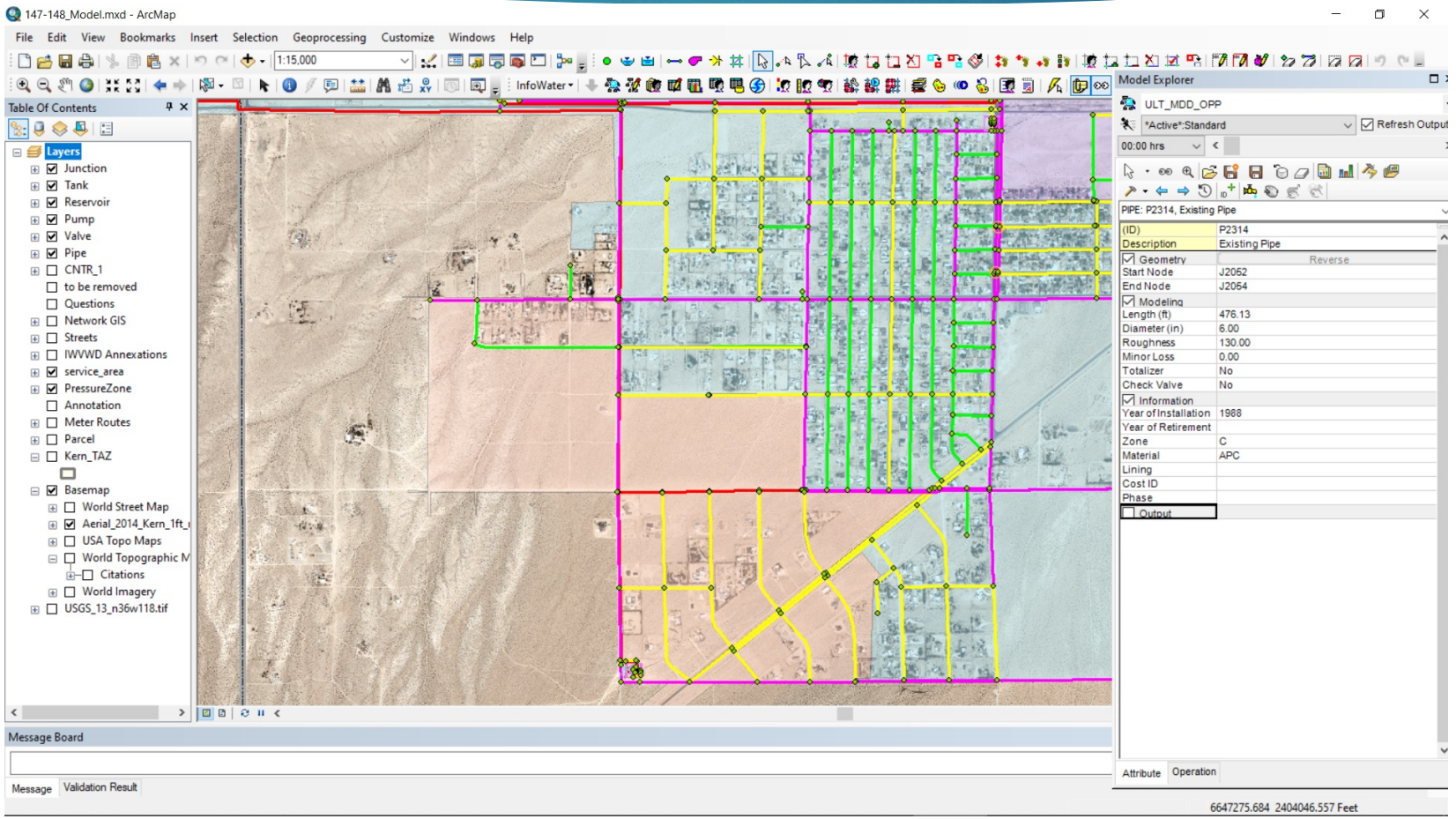
- Inyokern Area (not included)
  - Inyokern CSD (ICSD) (population 1002, 244 residential connections, 20 commercial connections, 1 irrigation connection)
  - East Inyokern Mutual Water Company (population 87, 28 residential connections)
  - Gateway Market Water System (2 commercial connections)
- South Inyokern Area (not included)
  - Life Water Co-op (population 27, 18 residential connections)
  - Owens Peak West (population 60, 24 residential connections)
  - 148 East Water System (population 35, 13 residential connections)
  - South Desert Mutual Water Company (population 26, 13 residential connections)
  - Owens Peak South (population 40, 17 residential connections)
- North Inyokern Area (not included)
  - West Valley Mutual Water Company (population 70, 41 residential connections)
  - Sweet Water Co-op (population 47, 15 residential connections)


2350
2450

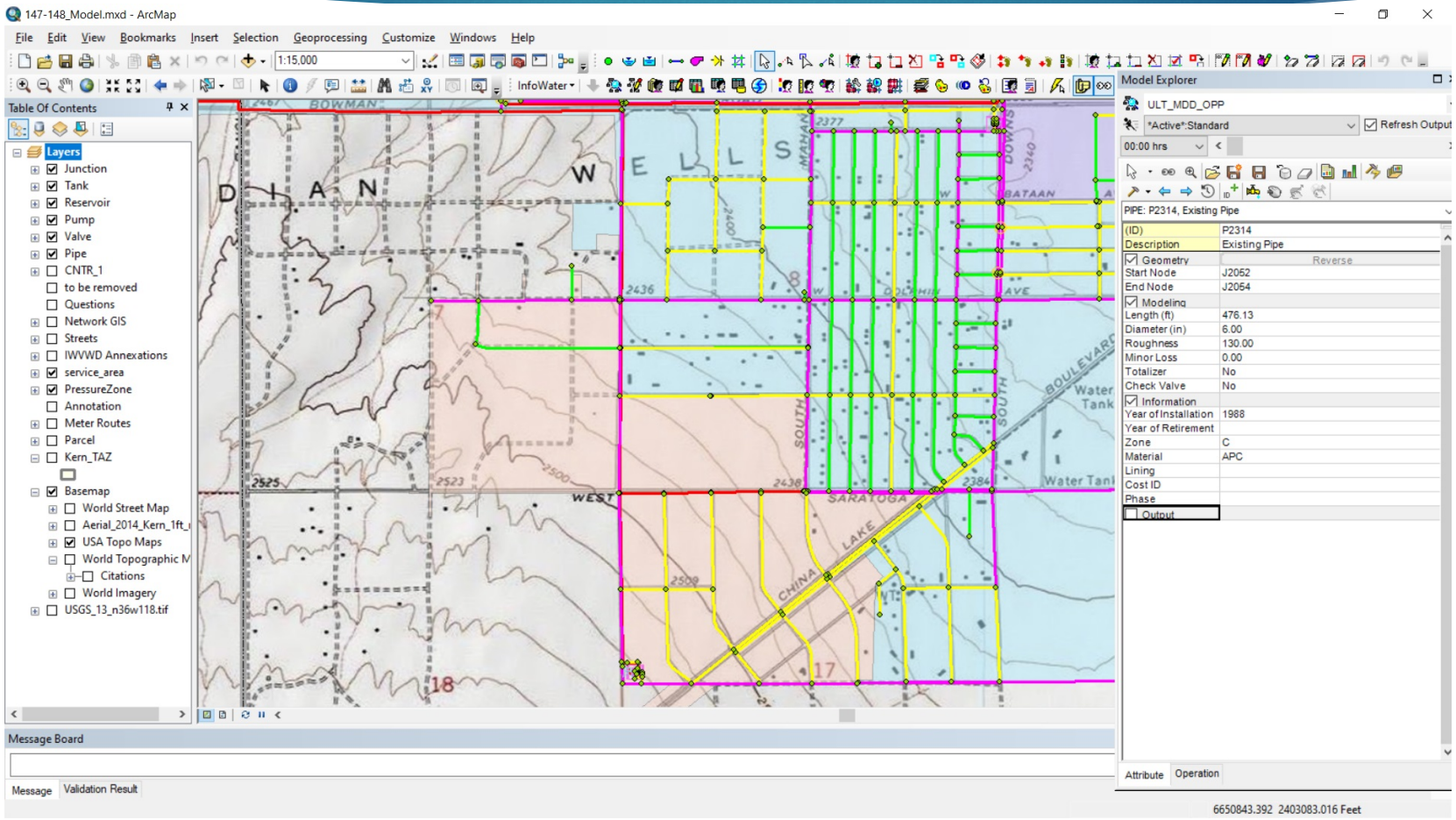
EXISTING SYSTEM: System Model (Street Map Background)



EXISTING SYSTEM: System Model (Aerial Photo Background)



EXISTING SYSTEM: System Model (USGS Topo Background)

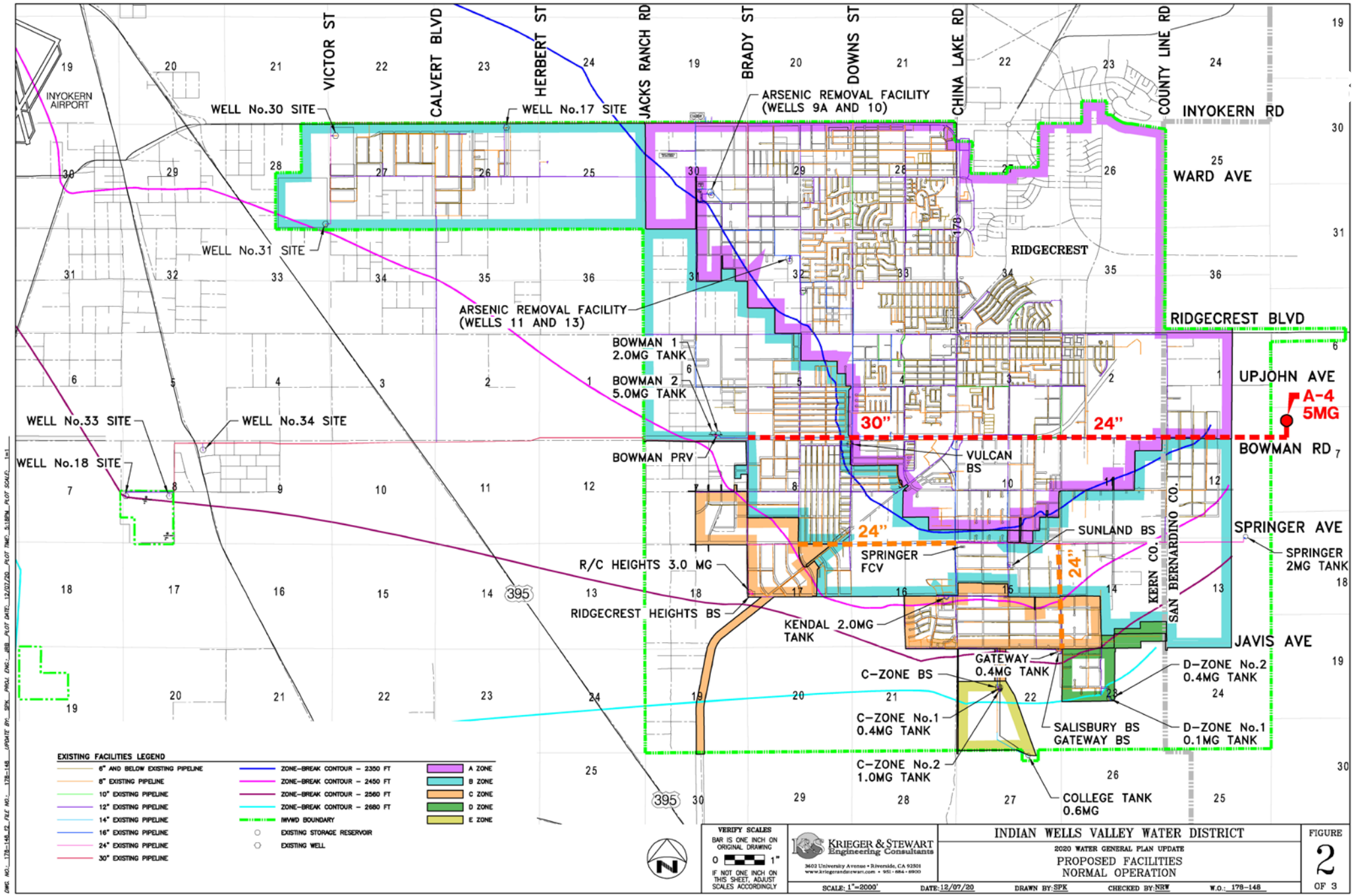


System Issues

- Maintaining consistent reservoir levels without impacting fire-flow and emergency storage
- High-pressure area in Zone B when Ridgecrest Heights and Springer Reservoirs are full, and Gateway Reservoir is filling. High pressures are sufficient to cause pipe failures.
- Summary: Undersized East-West and North-South Arteries
- These problems will increase in severity under future conditions without system improvements.

System Issues: Proposed Resolution

- A-Zone Improvements
  - Construction of A-4 Reservoir
  - Construction of 30” Pipeline in Bowman Rd. from Brady St. to China Lake Blvd.
  - Construction of 24” Pipeline (30” for OPP – nominal cost difference) in Bowman Road from China Lake Blvd. to Proposed A-4 Reservoir
  - (For OPP only) Construction of 30" Pipeline in College Heights Blvd. from Bowman Rd. to Kendal Reservoir
  - (For OPP only) Utilization of Springer PRV
- B-Zone Improvements
  - Construction of 24” Pipeline in Springer Ave. from Mahan St. to College Heights Blvd.
  - Construction of 24” Pipeline in Gateway Blvd. from Springer Ave. to Gateway Reservoirs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ARSENIC REMOVAL FACILITY (WELLS 9A AND 10)
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RIDGECREST
ARSENIC REMOVAL FACILITY (WELLS 11 AND 13)
RIDGECREST BLVD
BOWMAN 1 2.0MG TANK
BOWMAN 2 5.0MG TANK
UPJOHN AVE
A-4 5MG
30"
24"
WELL No.33 SITE
WELL No.34 SITE
BOWMAN PRV
VULCAN BS
BOWMAN RD
WELL No.18 SITE
SUNLAND BS
SPRINGER AVE
SPRINGER FCV
SPRINGER 2MG TANK
R/C HEIGHTS 3.0 MG
RIDGECREST HEIGHTS BS
KENDAL 2.0MG TANK
KERN CO.
SAN BERNARDINO CO.
JAVIS AVE
GATEWAY 0.4MG TANK
C-ZONE BS
D-ZONE No.2 0.4MG TANK
C-ZONE No.1 0.4MG TANK
SALISBURY BS
GATEWAY BS
D-ZONE No.1 0.1MG TANK
C-ZONE No.2 1.0MG TANK
COLLEGE TANK 0.6MG
395
178
EXISTING FACILITIES LEGEND
6" AND BELOW EXISTING PIPELINE
8" EXISTING PIPELINE
10" EXISTING PIPELINE
12" EXISTING PIPELINE
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2020 WATER GENERAL PLAN UPDATE
PROPOSED FACILITIES
NORMAL OPERATION
FIGURE 2 OF 3
SCALE: 1"=2000'
DATE: 12/07/20
DRAWN BY: SPK
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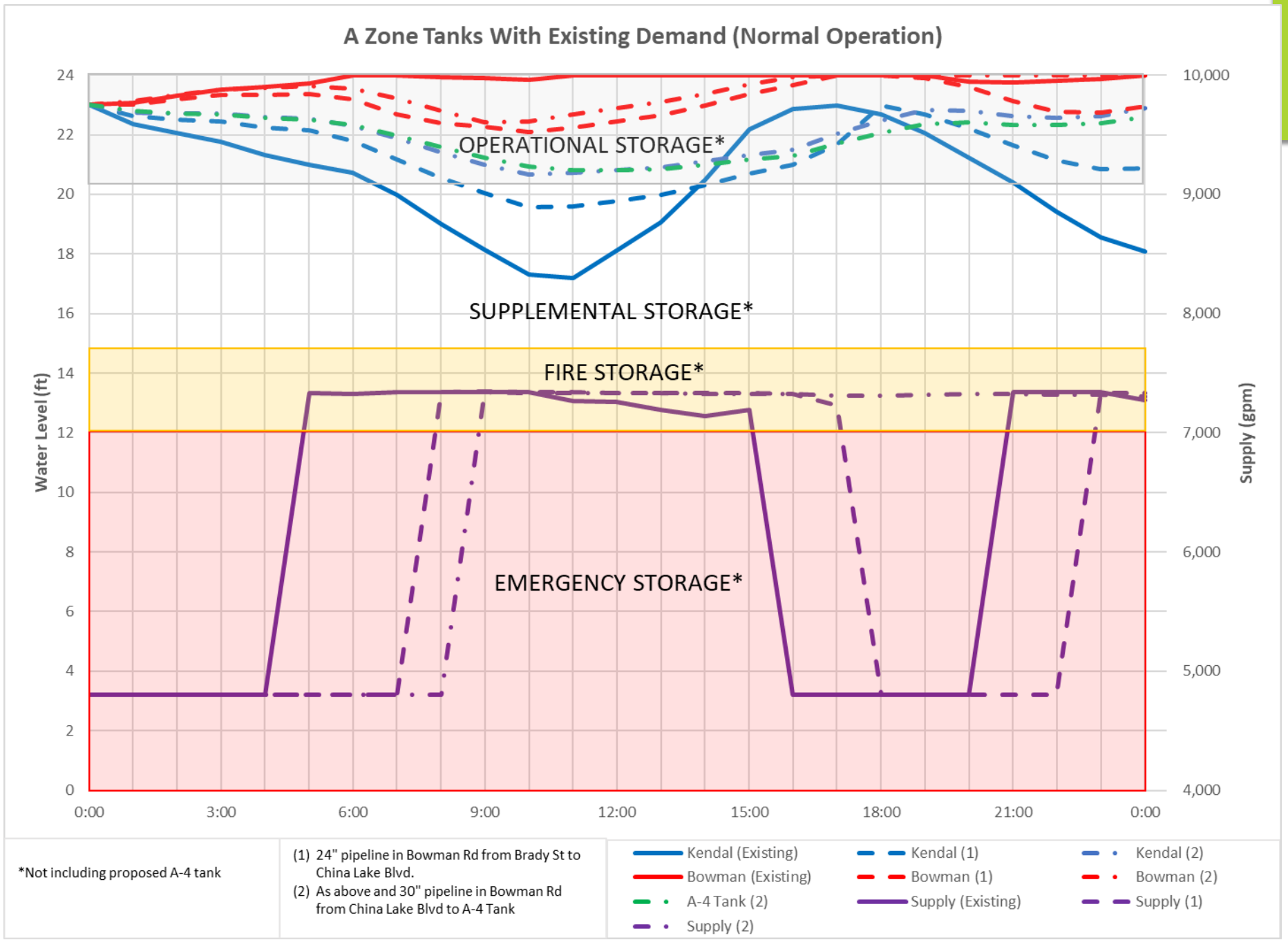
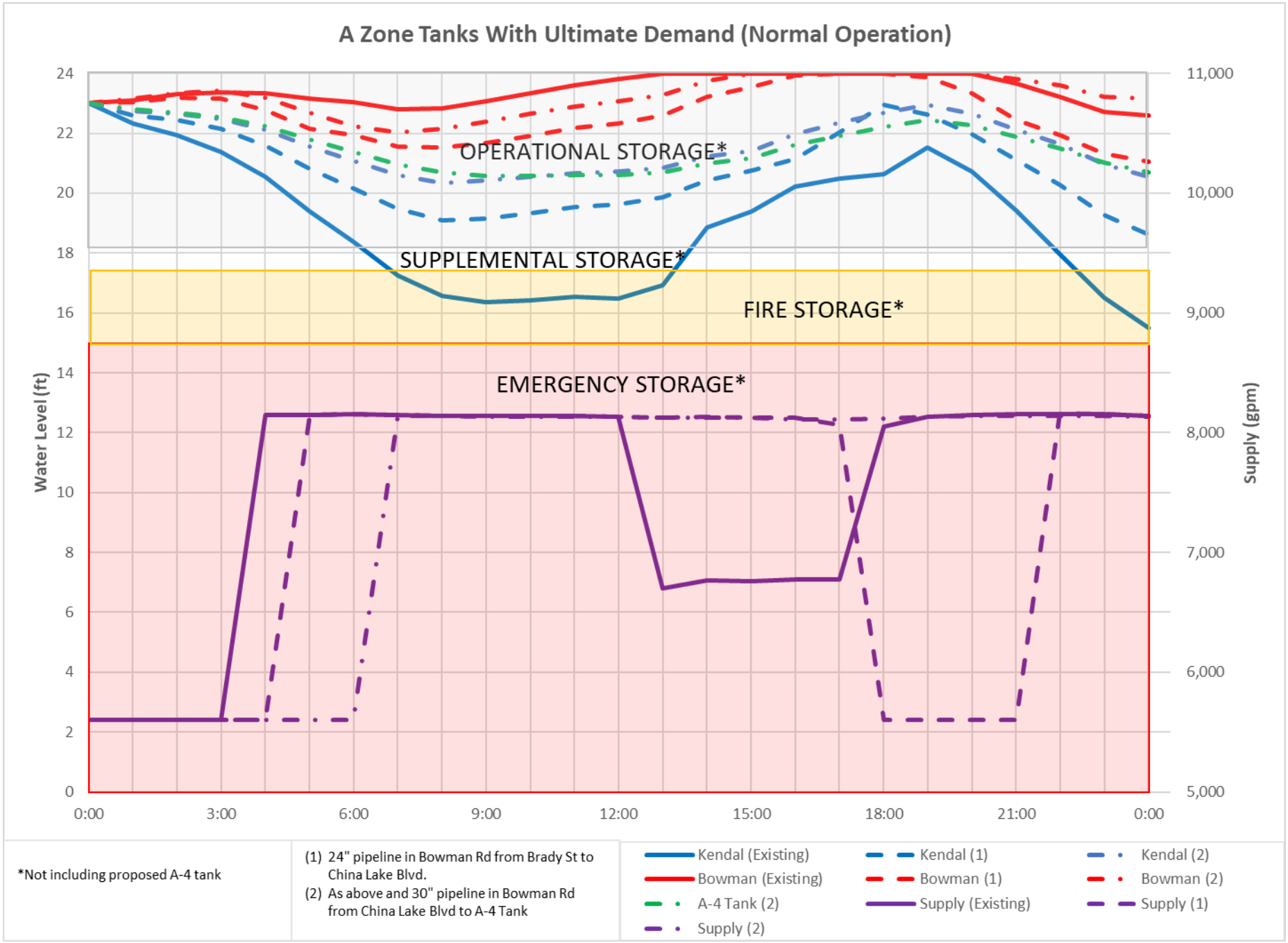
W.O.: 178-148



*Not including proposed A-4 tank

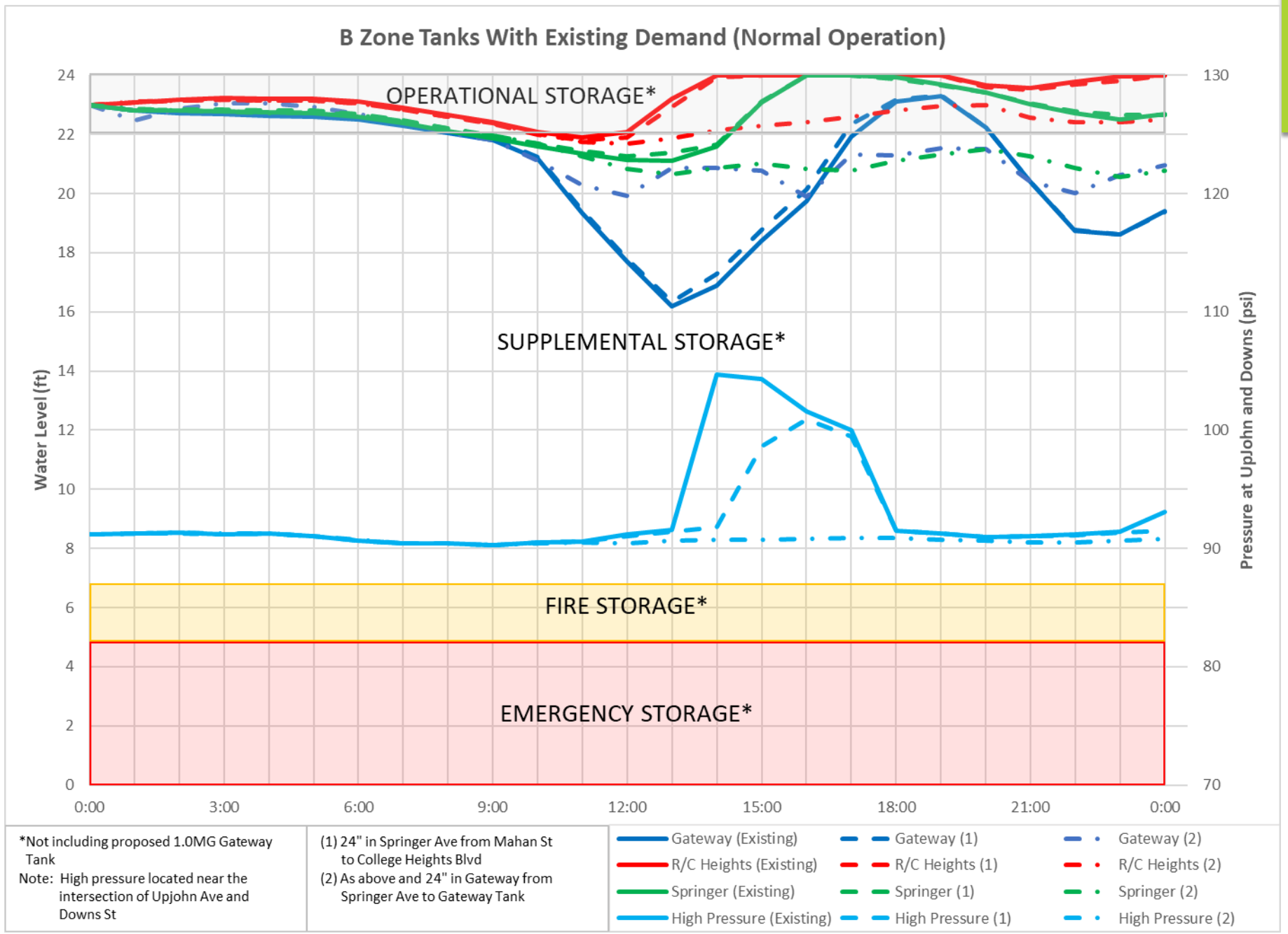
(1) 24" pipeline in Bowman Rd from Brady St to China Lake Blvd.
(2) As above and 30" pipeline in Bowman Rd from China Lake Blvd to A-4 Tank



*Not including proposed A-4 tank

(1) 24" pipeline in Bowman Rd from Brady St to China Lake Blvd.
(2) As above and 30" pipeline in Bowman Rd from China Lake Blvd to A-4 Tank

System Issues (Continued): B-Zone High-Pressure Area

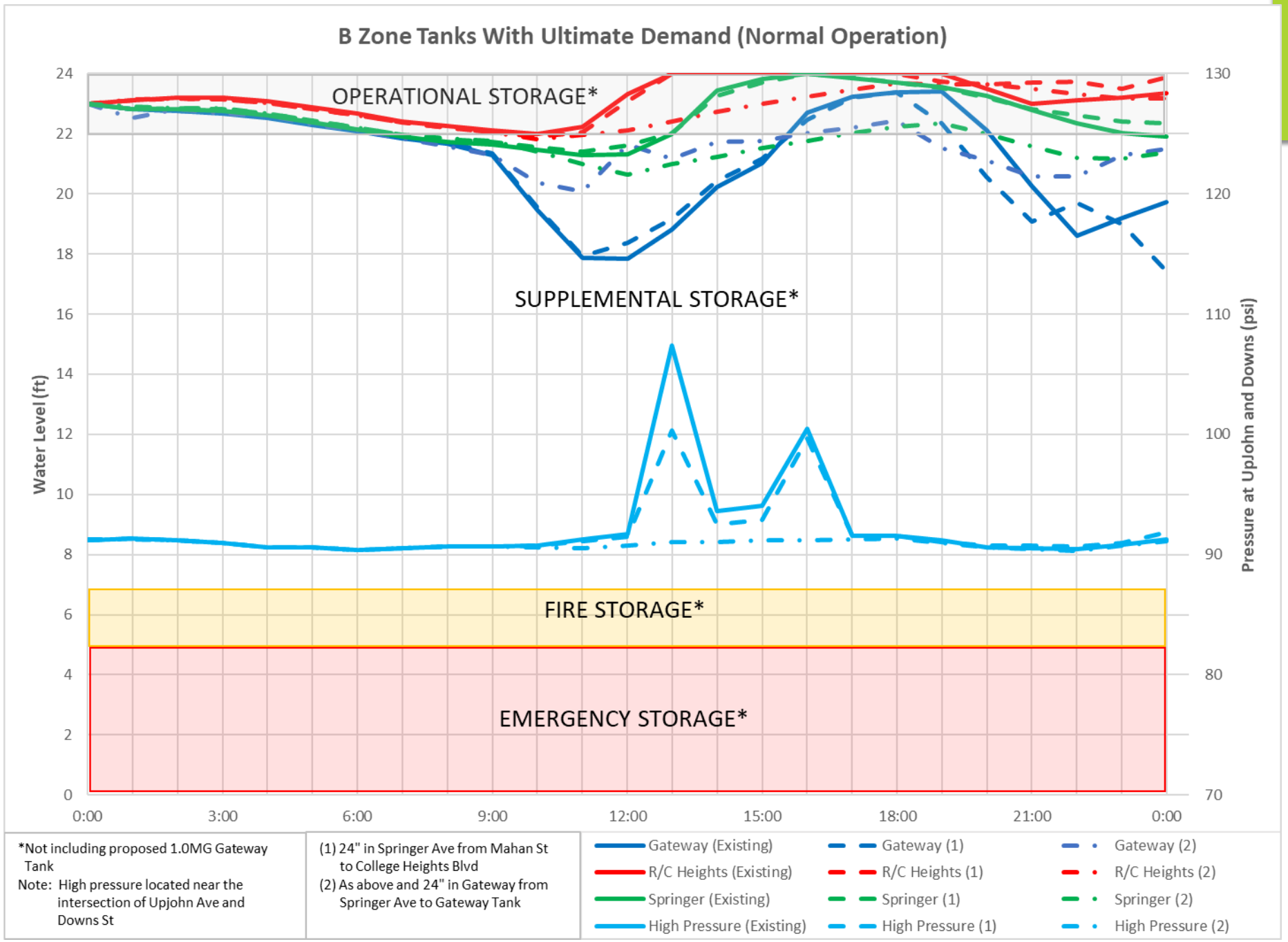


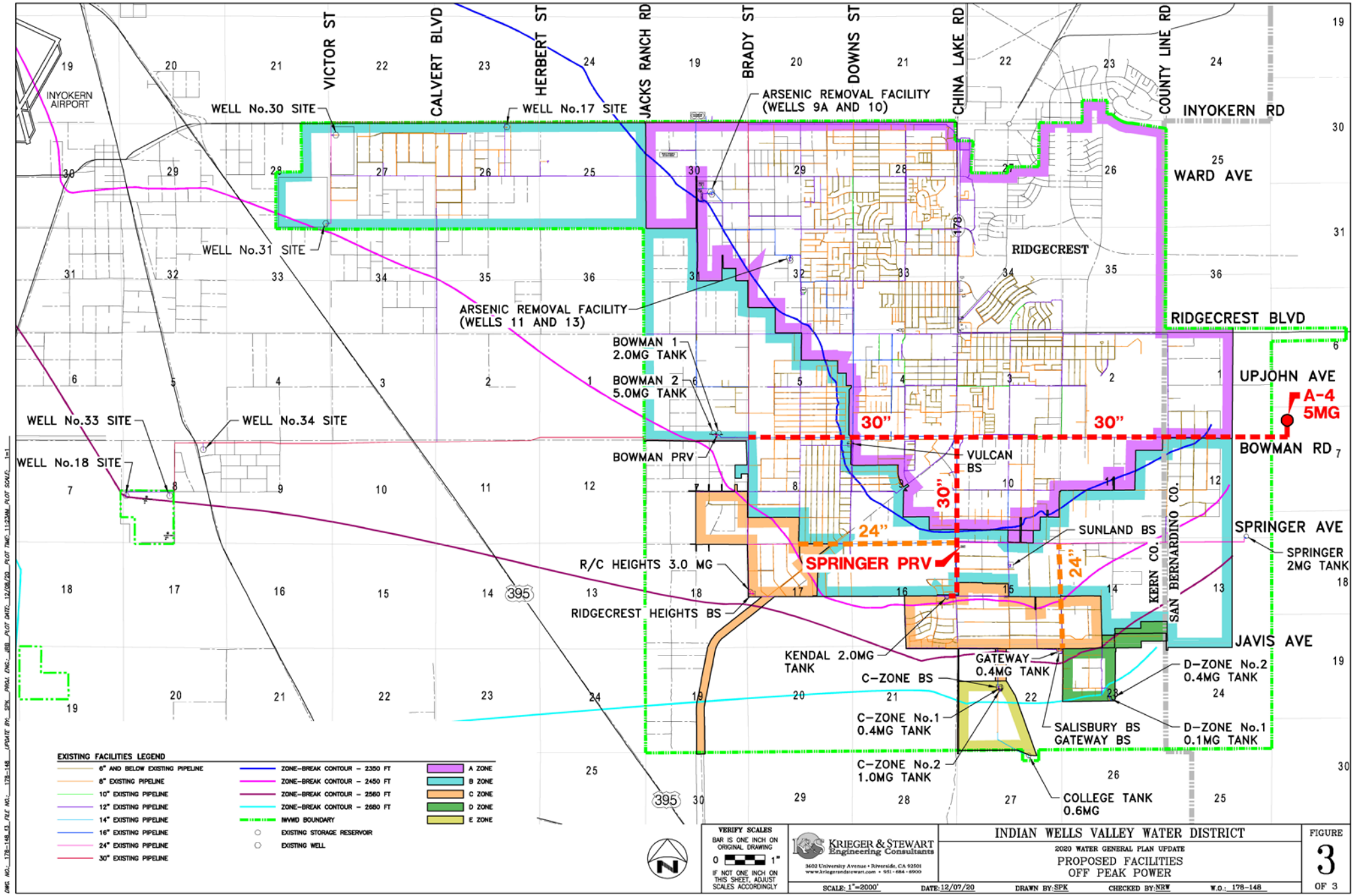
*Not including proposed 1.0MG Gateway Tank

Note: High pressure located near the intersection of Upjohn Ave and Downs St

(1) 24" in Springer Ave from Mahan St to College Heights Blvd

(2) As above and 24" in Gateway from Springer Ave to Gateway Tank


B Zone Tanks With Ultimate Demand (Normal Operation)
OPERATIONAL STORAGE*
SUPPLEMENTAL STORAGE*
FIRE STORAGE*
EMERGENCY STORAGE*
Water Level (ft)
Pressure at UpJohn and Downs (psi)
0
2
4
6
8
10
12
14
16
18
20
22
24
70
80
90
100
110
120
130
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
*Not including proposed 1.0MG Gateway Tank
Note: High pressure located near the intersection of Upjohn Ave and Downs St
(1) 24" in Springer Ave from Mahan St to College Heights Blvd
(2) As above and 24" in Gateway from Springer Ave to Gateway Tank
Gateway (Existing)
Gateway (1)
Gateway (2)
R/C Heights (Existing)
R/C Heights (1)
R/C Heights (2)
Springer (Existing)
Springer (1)
Springer (2)
High Pressure (Existing)
High Pressure (1)
High Pressure (2)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JACKS RANCH RD
BRADY ST
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CHINA LAKE RD
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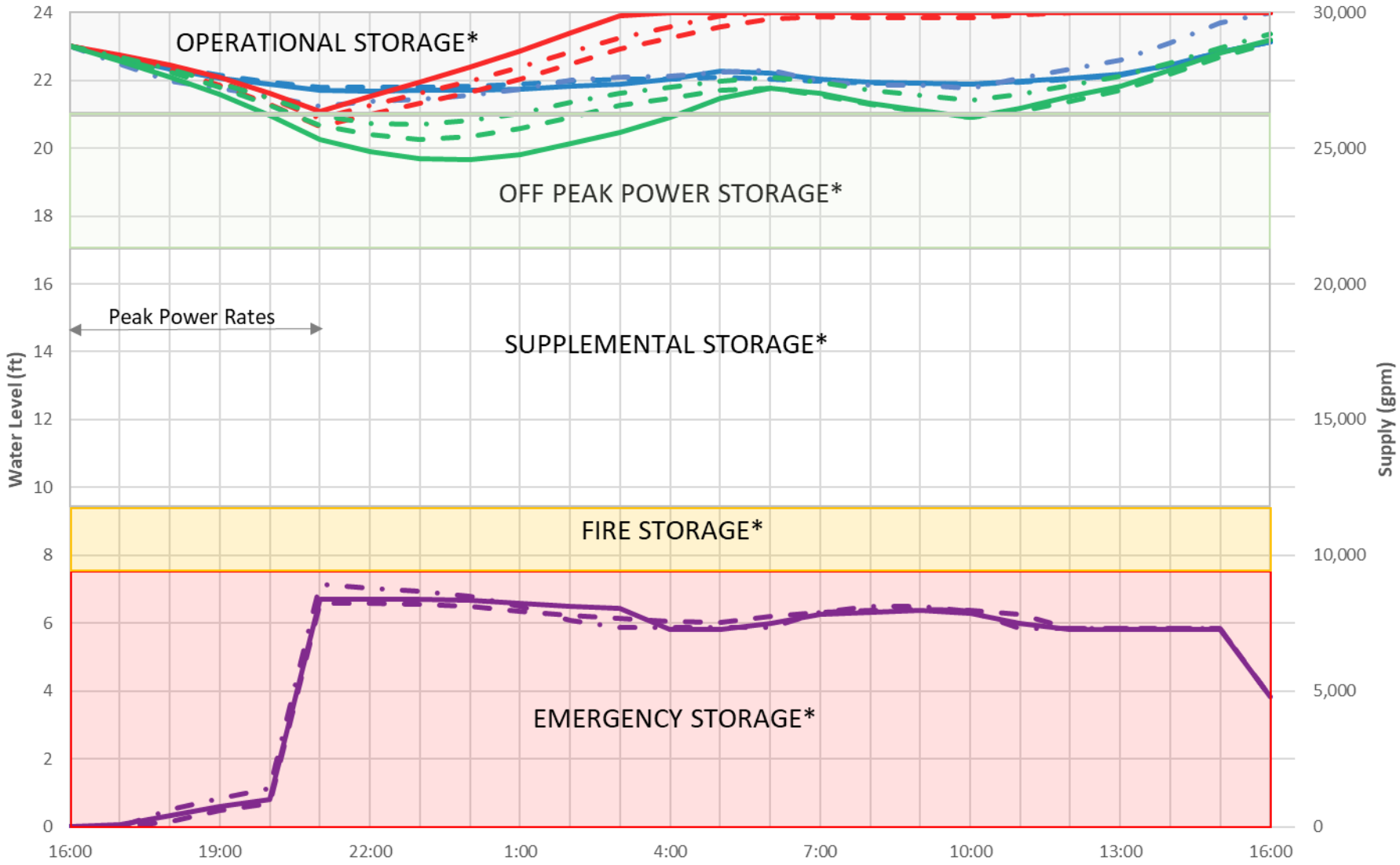
24"
VULCAN BS
SUNLAND BS
SPRINGER PRV
SPRINGER 2MG TANK
R/C HEIGHTS 3.0 MG
RIDGECREST HEIGHTS BS
KENDAL 2.0MG TANK
GATEWAY 0.4MG TANK
C-ZONE BS
C-ZONE No.1 0.4MG TANK
C-ZONE No.2 1.0MG TANK
SALISBURY BS
GATEWAY BS
D-ZONE No.2 0.4MG TANK
D-ZONE No.1 0.1MG TANK
COLLEGE TANK 0.6MG
KERN CO.
SAN BERNARDINO CO.
395
178
EXISTING FACILITIES LEGEND
6" AND BELOW EXISTING PIPELINE
8" EXISTING PIPELINE
10" EXISTING PIPELINE
12" EXISTING PIPELINE
14" EXISTING PIPELINE
16" EXISTING PIPELINE
24" EXISTING PIPELINE
30" EXISTING PIPELINE
ZONE-BREAK CONTOUR - 2350 FT
ZONE-BREAK CONTOUR - 2450 FT
ZONE-BREAK CONTOUR - 2560 FT
ZONE-BREAK CONTOUR - 2680 FT
NVWD BOUNDARY
EXISTING STORAGE RESERVOIR
EXISTING WELL
A ZONE
B ZONE
C ZONE
D ZONE
E ZONE
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY
KRIEGER & STEWART Engineering Consultants
3602 University Avenue • Riverside, CA 92501
www.kriegerandstewart.com • 951 • 684 • 6900
INDIAN WELLS VALLEY WATER DISTRICT
2020 WATER GENERAL PLAN UPDATE
PROPOSED FACILITIES
OFF PEAK POWER
FIGURE 3 OF 3
SCALE: 1"=2000'
DATE: 12/07/20
DRAWN BY: SPK
CHECKED BY: NRW
W.O.: 178-148

A Zone Tanks With Existing Demand (Off Peak Power)

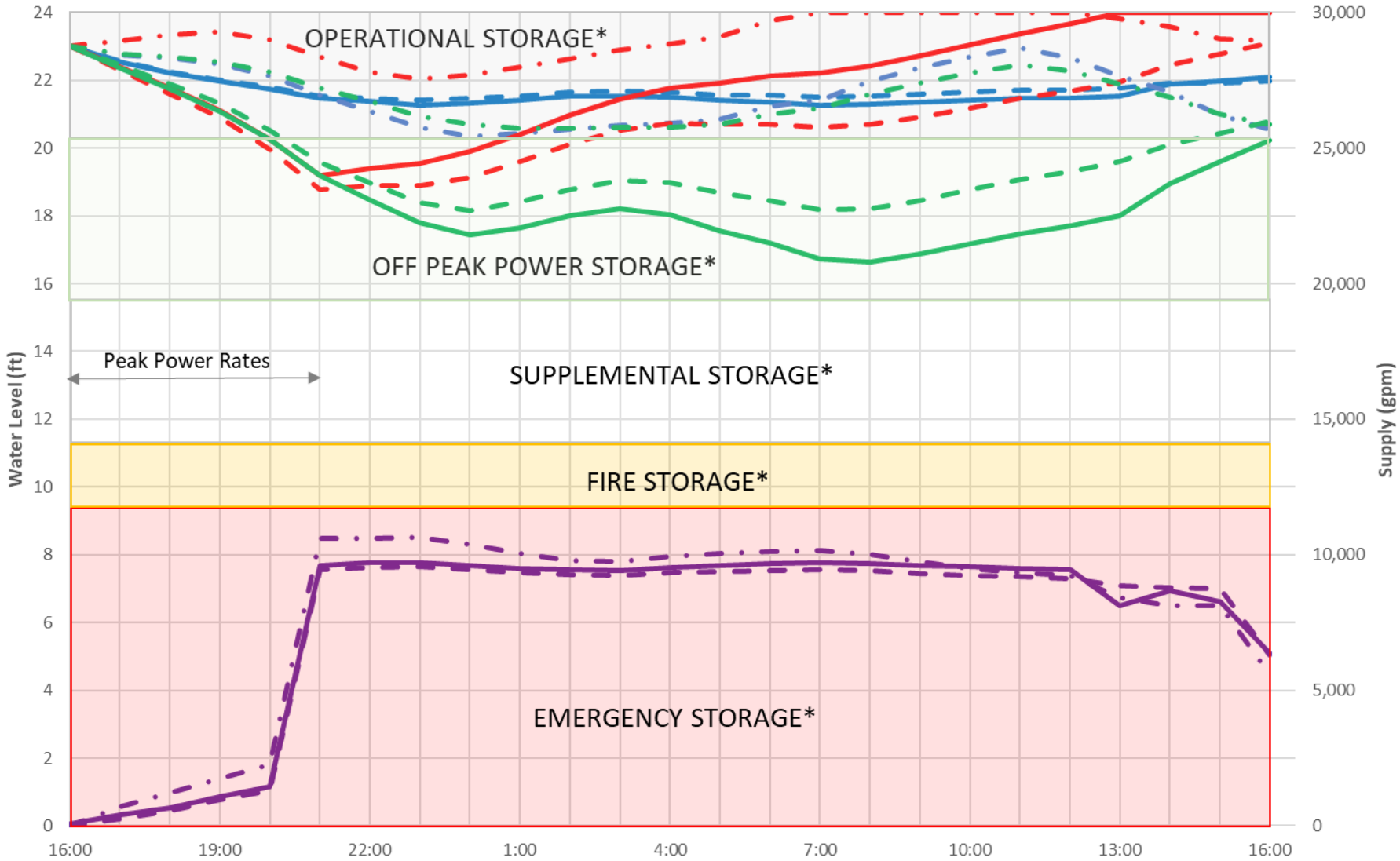


*Including future A-4 Tank (5.0 MG)

Note: All B Zone improvements assumed to be constructed, and Springer PRV is active.

(1) 30" pipeline in Bowman Rd from China Lake Blvd to A-4 Tank.
(2) As above and 30" pipeline in Bowman Rd from Brady St to China Lake Blvd.
(3) As above and 30" pipeline in College Heights Blvd from Bowman Rd to Kendal Tank.

A Zone Tanks With Ultimate Demand (Off Peak Power)



*Including future A-4 Tank (5.0 MG)

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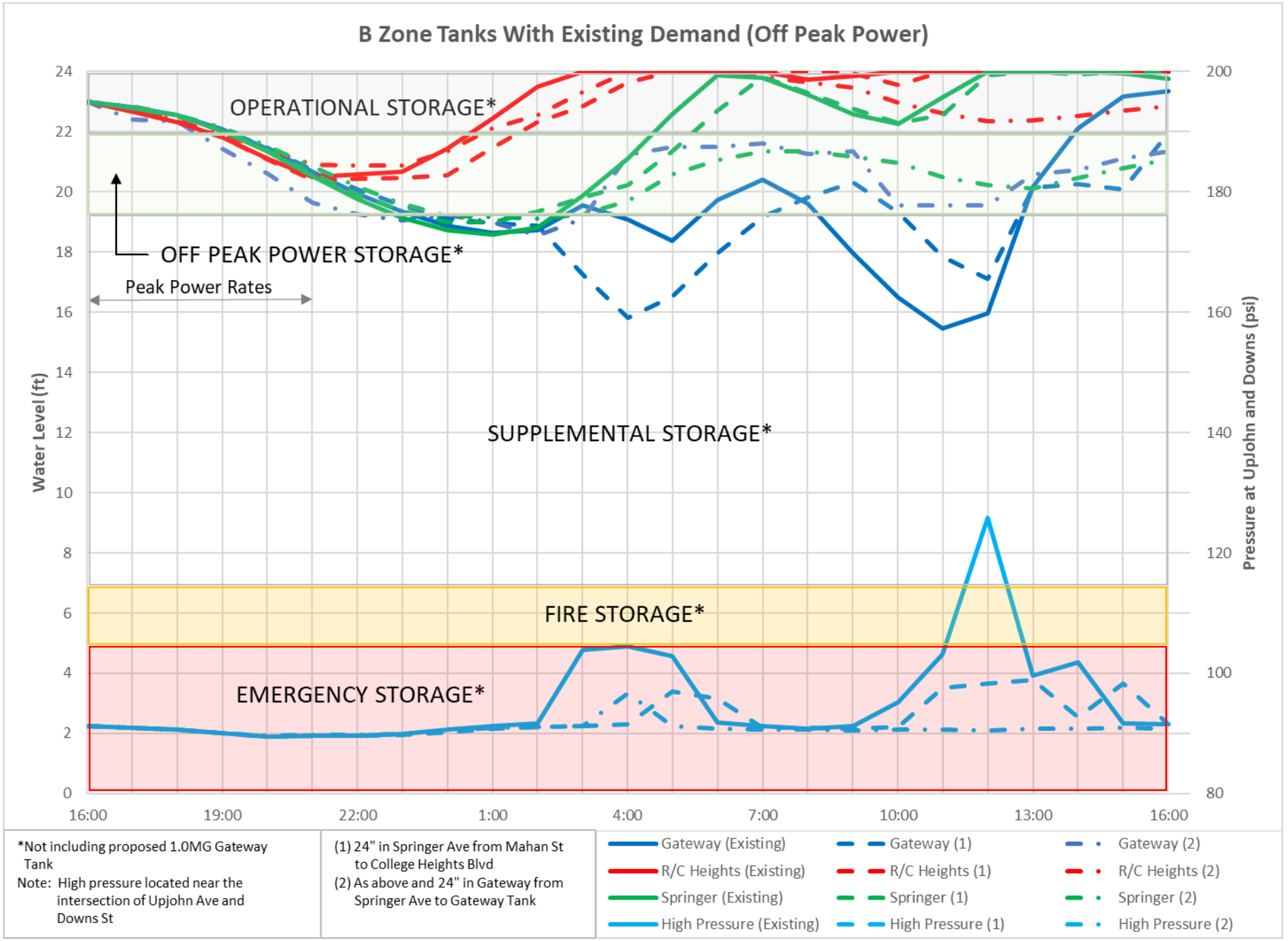
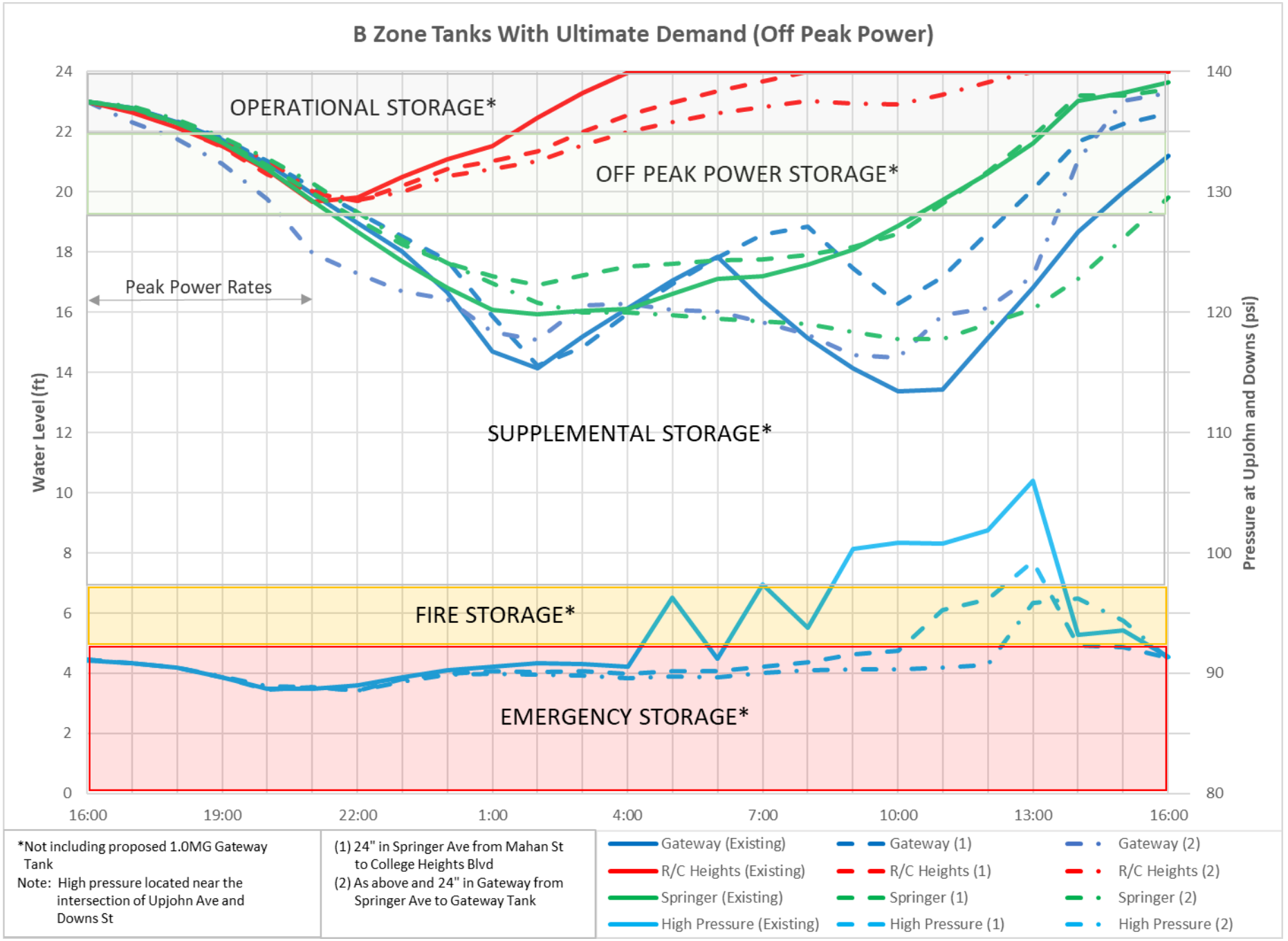

B Zone Tanks With Existing Demand (Off Peak Power)
OPERATIONAL STORAGE*
OFF PEAK POWER STORAGE*
Peak Power Rates
SUPPLEMENTAL STORAGE*
FIRE STORAGE*
EMERGENCY STORAGE*
Water Level (ft)
Pressure at UpJohn and Downs (psi)
24
22
20
18
16
14
12
10
8
6
4
2
0
200
180
160
140
120
100
80
16:00
19:00
22:00
1:00
4:00
7:00
10:00
13:00
16:00
*Not including proposed 1.0MG Gateway Tank
Note: High pressure located near the intersection of Upjohn Ave and Downs St
(1) 24" in Springer Ave from Mahan St to College Heights Blvd
(2) As above and 24" in Gateway from Springer Ave to Gateway Tank
Gateway (Existing)
Gateway (1)
Gateway (2)
R/C Heights (Existing)
R/C Heights (1)
R/C Heights (2)
Springer (Existing)
Springer (1)
Springer (2)
High Pressure (Existing)
High Pressure (1)
High Pressure (2)


B Zone Tanks With Ultimate Demand (Off Peak Power)
OPERATIONAL STORAGE*
OFF PEAK POWER STORAGE*
Peak Power Rates
SUPPLEMENTAL STORAGE*
FIRE STORAGE*
EMERGENCY STORAGE*
Water Level (ft)
Pressure at UpJohn and Downs (psi)
24
22
20
18
16
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12
10
8
6
4
2
0
140
130
120
110
100
90
80
16:00
19:00
22:00
1:00
4:00
7:00
10:00
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*Not including proposed 1.0MG Gateway Tank
Note: High pressure located near the intersection of Upjohn Ave and Downs St
(1) 24" in Springer Ave from Mahan St to College Heights Blvd
(2) As above and 24" in Gateway from Springer Ave to Gateway Tank
Gateway (Existing)
Gateway (1)
Gateway (2)
R/C Heights (Existing)
R/C Heights (1)
R/C Heights (2)
Springer (Existing)
Springer (1)
Springer (2)
High Pressure (Existing)
High Pressure (1)
High Pressure (2)

DISASTER PREPAREDNESS

- A disaster preparedness project, currently in the design phase, will replace damaged facilities and increase storage at four reservoir sites.
- Project will mitigate impacts of future power outages and earthquakes, will provide reserve storage for repair and maintenance activities, and may be used to provide supplemental storage for other zones.
- The project will add redundant storage capacity in B, C, and E Zones in excess of General Plan criteria:
  - **B Zone**: 1.0 MG new capacity (Gateway Reservoir)
  - **C Zone**: 0.6 MG net increase in capacity
  - **E Zone**: 0.55 MG new capacity (College Reservoir)

ULTIMATE STORAGE FACILITY REQUIREMENTS BY PRESSURE ZONE
IN MILLION GALLONS (MG)
COMPARED TO EXISTING STORAGE PLUS DISASTER PREPAREDNESS PROJECT

Zone	Storage Component	Required Storage				Existing Storage	Existing Storage With Disaster Preparedness
		Minimum	Minimum + Off-Peak	Optimum	Optimum + Off-Peak		
A-Zone	Operational	2.24	2.24	2.24	2.24		
(2455)	Fire	0.96	0.96	0.96	0.96		
	OPP	0.00	2.34	0.00	2.34		
	Emergency	5.61	5.61	11.21	11.21		
	Total	8.81	11.14	14.41	16.75	9.00	9.00
B-Zone	Operational	0.43	0.43	0.43	0.43		
(2555)	Fire	0.48	0.48	0.48	0.48		
	OPP	0.00	0.45	0.00	0.45		
	Emergency	1.08	1.08	2.16	2.16		
	Total	1.99	2.44	3.07	3.52	5.55	6.55
C-Zone	Operational	0.12	0.12	0.12	0.12		
(2660)	Fire	0.24	0.24	0.24	0.24		
	OPP	0.00	0.12	0.00	0.12		
	Emergency	0.29	0.29	0.58	0.58		
	Total	0.64	0.77	0.93	1.05	1.40	2.00
D-Zone	Operational	0.02	0.02	0.02	0.02		
(2775)	Fire	0.18	0.18	0.18	0.18		
	OPP	0.00	0.03	0.00	0.03		
	Emergency	0.06	0.06	0.12	0.12		
	Total	0.27	0.29	0.33	0.35	0.50	0.50
E-Zone	Operational	0.06	0.06	0.06	0.06		
(2885)	Fire	0.54	0.54	0.54	0.54		
	OPP	0.00	0.06	0.00	0.06		
	Emergency	0.14	0.14	0.28	0.28		
	Total	0.74	0.80	0.88	0.94	0.55	1.10
Totals	Operational	2.87	2.87	2.87	2.87		
	Fire	2.40	2.40	2.40	2.40		
	OPP	0.00	2.99	0.00	2.99		
	Emergency	7.18	7.18	14.36	14.36		
	TOTAL	12.45	15.44	19.63	22.62	17.00	19.15

DISASTER PREPAREDNESS: SUMMARY

- Zones B,C,D, and E will increase supplemental storage with implementation of Disaster Preparedness project.
- A-Zone, even with the addition of Reservoir A-4, will not have sufficient storage on its own to satisfy ultimate storage requirements with optimum emergency storage; but it would be possible to make use of B-Zone's excess storage in A-Zone.
- Consider policy question of whether Disaster Preparedness storage should be reserved exclusively for disaster preparedness, or used for other purposes such as Off-Peak Power storage in A-Zone.

Questions?

PRESENTED BY:

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