CHINO BASIN WATER CONSERVATION DISTRICT

The Confluence Regional Water Resources Project

Presentation to:

Santa Ana Watershed Project Authority

MSAR TMDL Task Force

June 19, 2018

Our Team

Robert C. Wagner, P.E.

David P. Lounsbury, P.E.

WAGNER&BONSIGNORE

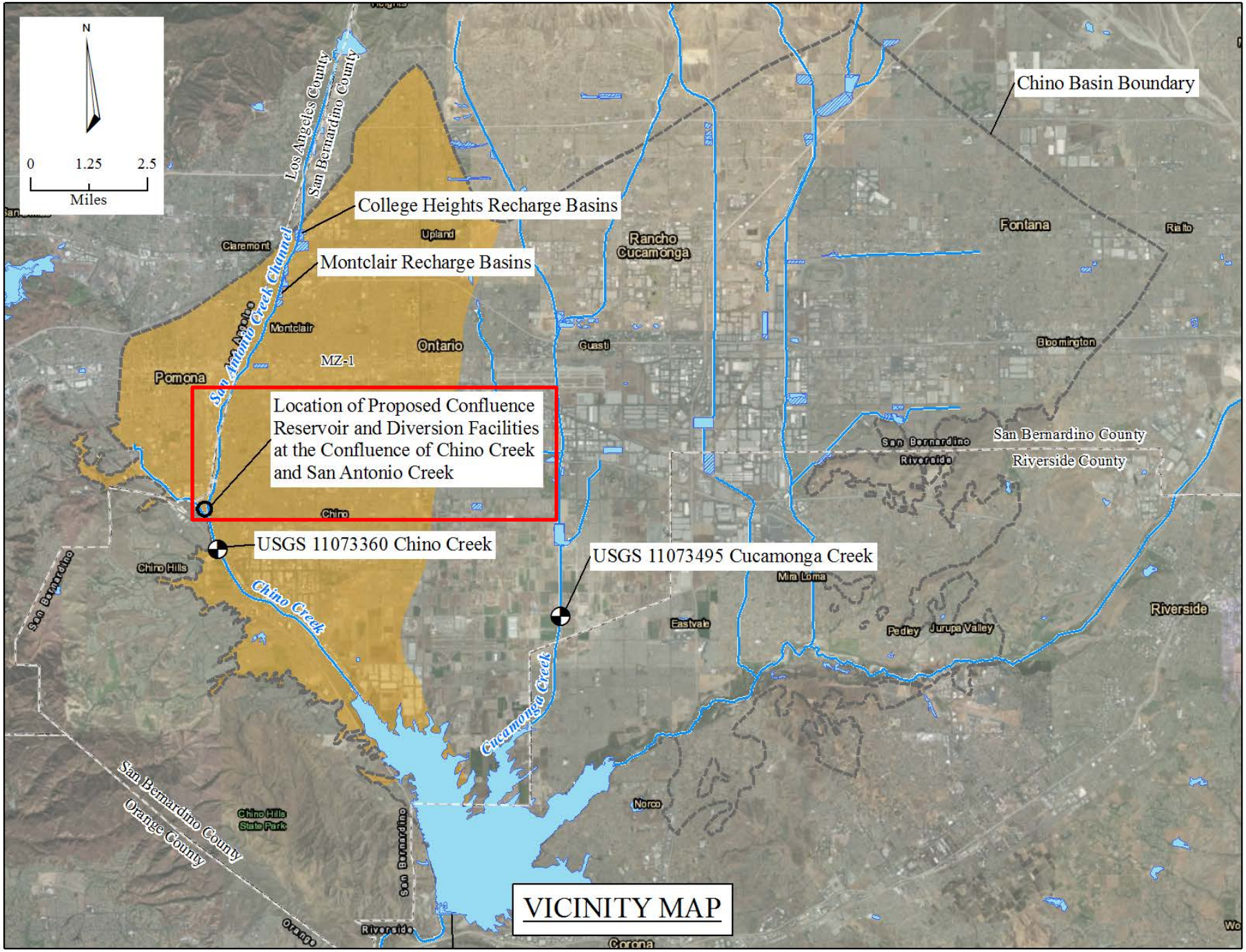
&

Roger Copp, P.E.

WATER SCIENCE ASSOCIATES

Water Science Associates

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation


N
0
1.25
2.5
Miles
Chino Basin Boundary
College Heights Recharge Basins
Montclair Recharge Basins
Location of Proposed Confluence Reservoir and Diversion Facilities at the Confluence of Chino Creek and San Antonio Creek
USGS 11073360 Chino Creek
USGS 11073495 Cucamonga Creek
MZ-1
Los Angeles County
San Bernardino County
San Antonio Creek Channel
Chino Creek
Cucamonga Creek
Claremont
Upland
Rancho Cucamonga
Fontana
Rialto
Montclair
Ontario
Pomona
Chino
Chino Hills
Guasti
Bloomington
San Bernardino
Riverside
San Bernardino County
Riverside County
Mira Loma
Eastvale
Pedley
Jurupa Valley
Riverside
Norco
Corona
Orange County
Chino Hills State Park
VICINITY MAP

Project Location

Existing Conditions

- Current state of diversions within Chino Basin
  - Average Recharge 11,000 af/yr
  - Watermaster Water Right Permit allows 68,500 af
- MZ-1 recharge operations & subsidence
- Water quality issues
- Maximize use of existing recharge facilities
- Recycled water supply vs. increased stormwater capture

Project Description

1. Construct Groundwater Recharge and Regulatory Storage Reservoir
2. Construct Diversion Facilities
3. Construct Regional Water Conveyance
4. Construct and Develop Water Quality Improvement Facilities and Features
5. Create Environmental Enhancement

Confluence Regional Water Resource Project

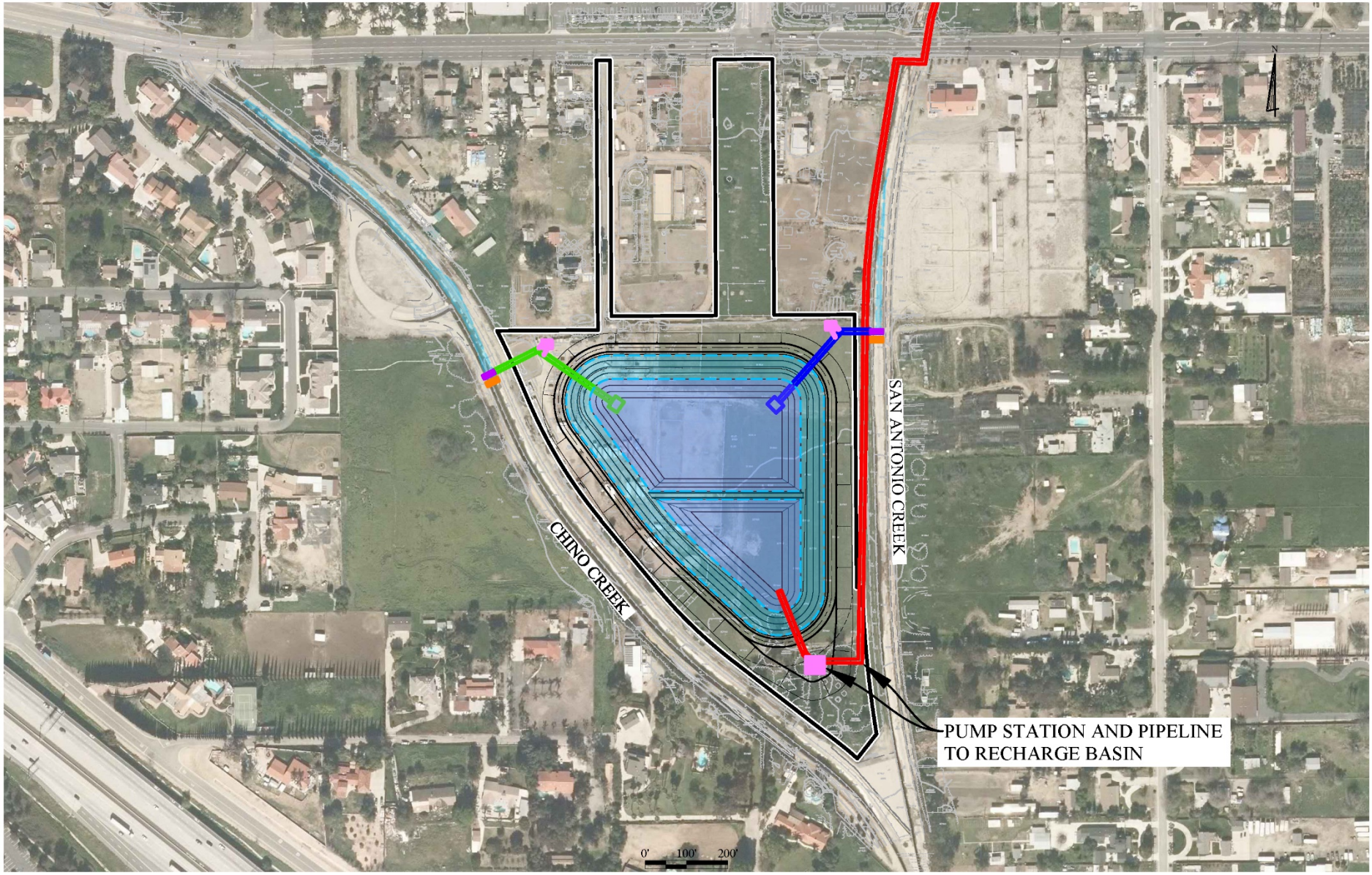
Project Benefits

- Capture and treat water that would otherwise leave the basin
- Improve water quality
- Reduce subsidence in MZ-1
- Scientific research and development
  - Develop higher academic learning center
- Public education and recreation
- Open space and connection of communities

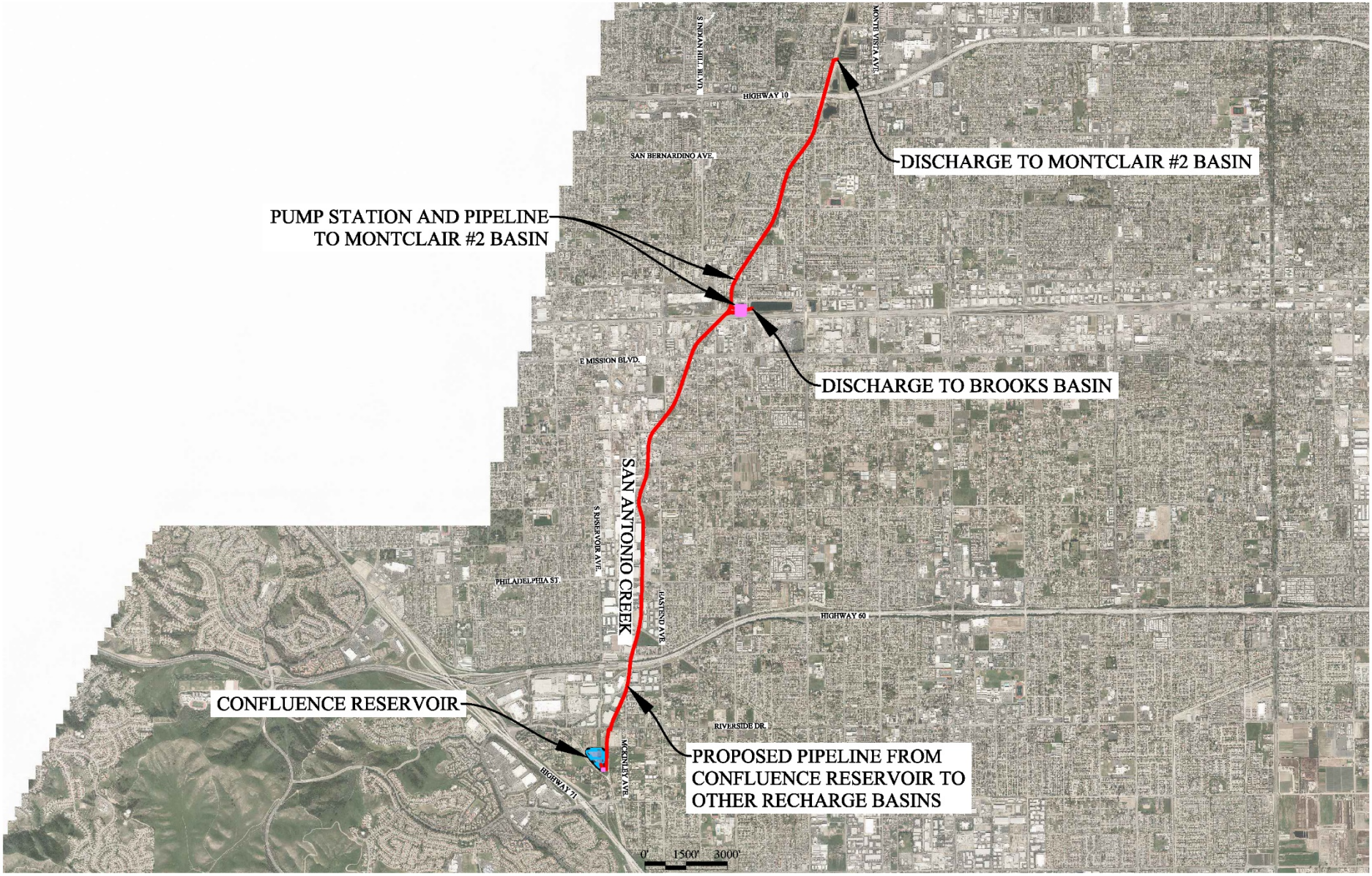
Confluence Reservoir

Diversion Facilities

Pumping Facility and Conveyance System



Pipeline to Recharge Basins



Estimated Annual Recharge

- Conservation storage at the Confluence Reservoir
  - Average annual recharge of about 60 to 80 af/yr
- Conservation storage developed from pumping to other recharge facilities
  - Estimated to develop between about 1,770 to 2,430 af/yr
- Total conservation storage developed by the project
  - Estimated to be about 1,830 to 2,490 af/yr

Educational and Public Benefits

- Project can support scientific research and testing of various means and methods of improving water quality.
- Education outreach opportunities for various public and scientific communities.
- Habitat enhancement and bioremediation treatments consistent with recreational opportunities for the public.

Water Quality Benefits

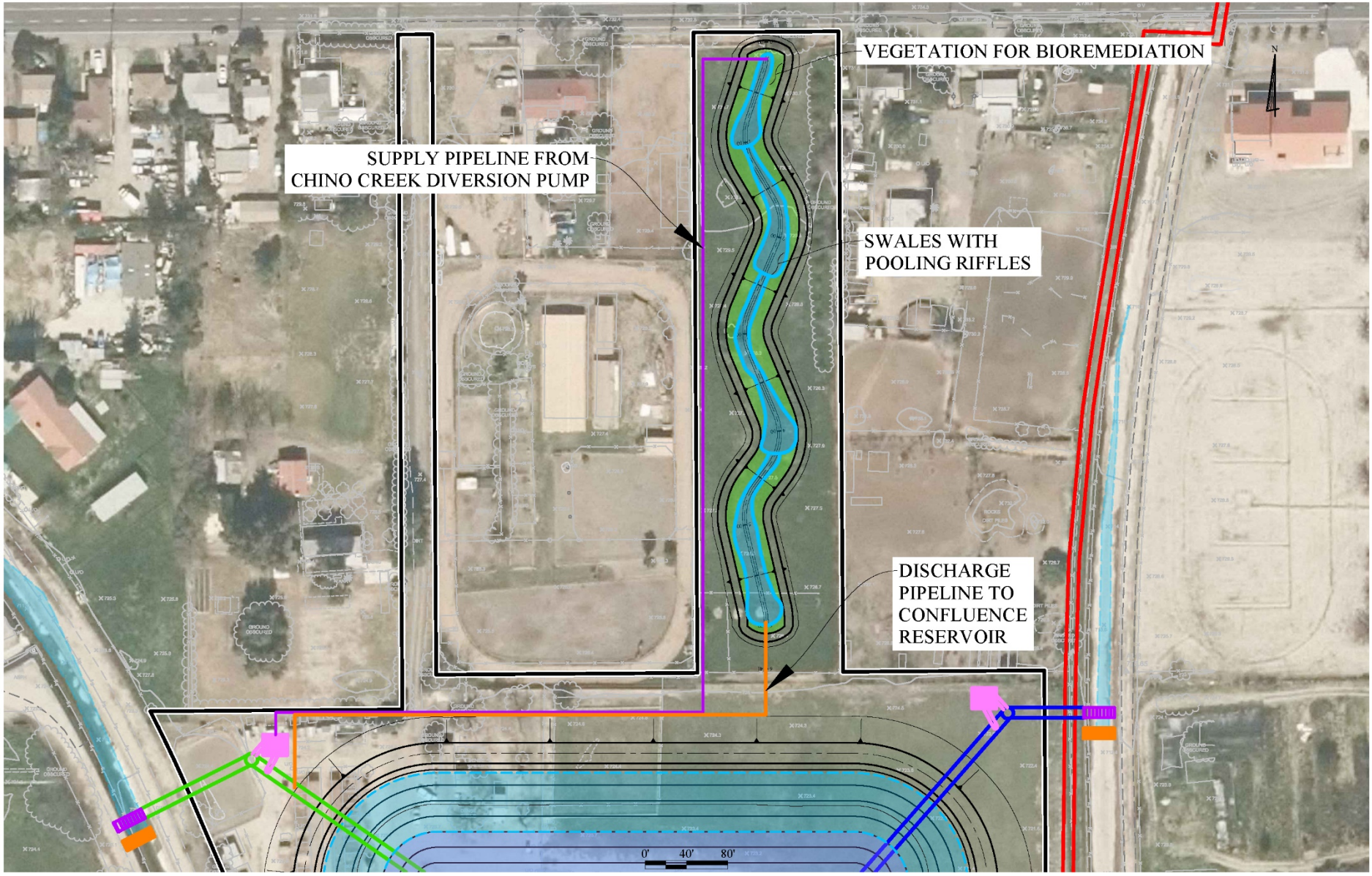
The Confluence Project will capture approximately 37% of the annual runoff that passes the Project site

- Captured Nitrate-N load could be approx.17 tons/yr.
- Captured TSS load could be approx. 32 tons/yr.
- E. coli bacteria loads from Chino Creek could be reduced by 1 billion CFU/day, a 3% reduction of the TMDL
- Opportunities to send cleaner water south to Prado

Water Quality Cost Benefit

- Equivalent Annual Cost over 20 years for Nitrate treatment cost is $55/lb N
- Cost for TSS treatment cost is $29/lb
  - Virginia & Maryland studies indicate removal cost ranges from $500 to $4,600/lb N
  - Virginia TSS cost is $44/lb
- Treatment costs are significantly less than published costs from Virginia and Maryland

Habitat and Bioremediation Channel



Summary

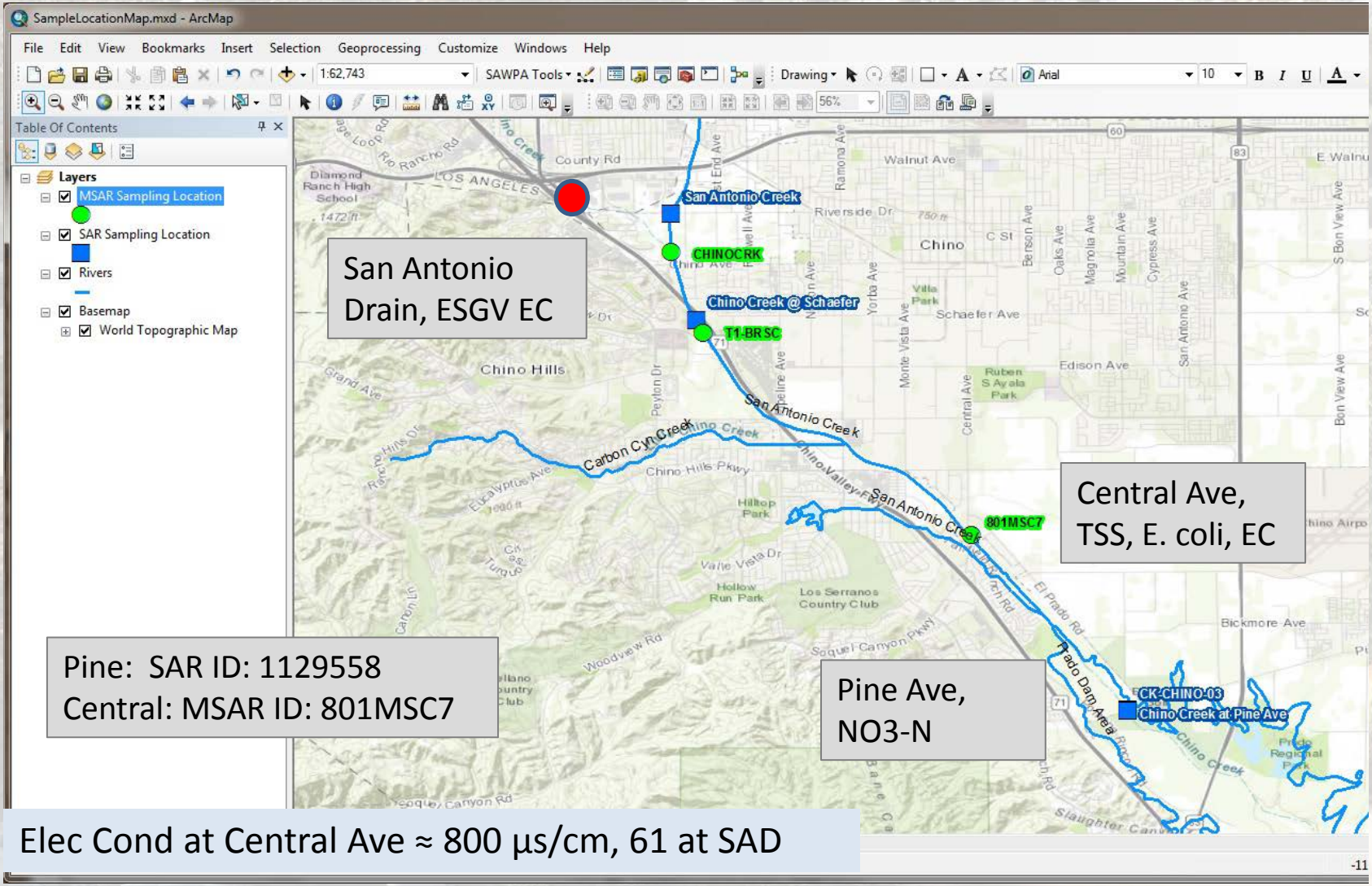
- Stormwater and low-flow recharge is obtainable at $650 - $685 per af.
- Water quality improvements are obtainable at a rate as little as one-tenth the cost of comparable systems.
- Educational, Scientific and Recreational opportunities can be developed.
- Concept is “portable”
- Chino Basin does not have a water supply problem as much as a water distribution problem.

Why Conduct Stormwater Sampling?

- Water quality benefits are likely with Confluence Project, and a sampling program will help during the project design
- Water quality treatment in Confluence will assist in meeting bacterial TMDL, therefore conduct sampling to know what can be achieved
- Limited data upstream of Central Ave, and Central Ave bacteria data are lower than typically expected in stormwater runoff
- Runoff during wet weather events may be more desirable for recharge
  - Initial sampling results of San Antonio Storm drain from Fiscus Avenue indicates much lower TDS levels than in Chino Creek at Central Ave
- Water quality data will be useful for design of water quality treatment components within the Confluence Project
- Data will be shared

Locations of Water Quality Sampling Stations

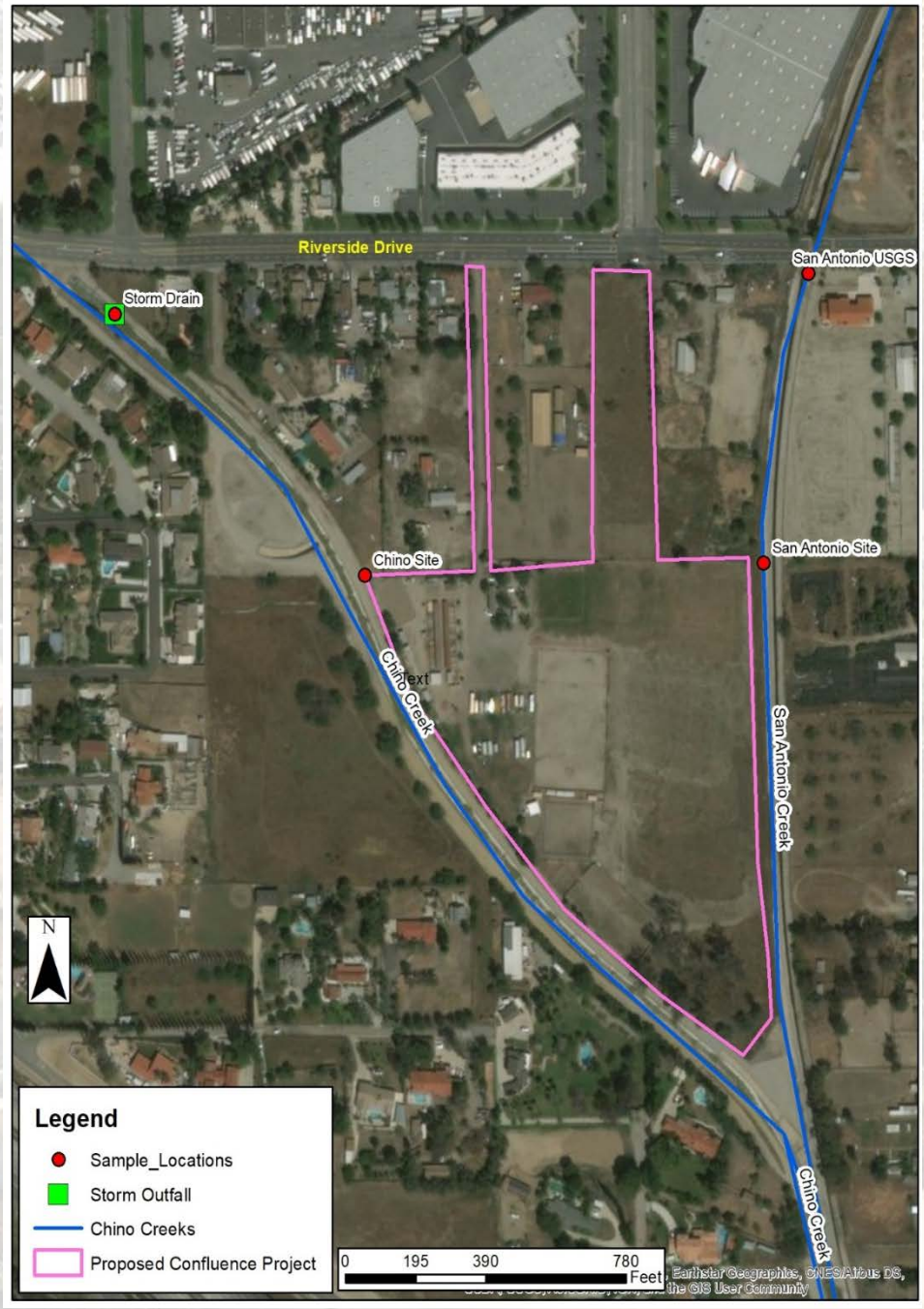
Data from SAWPA and East San Gabriel Valley Watershed Management Group



Proposed Sampling at Confluence Site

- Sample all wet weather events for two years
- Measure flows during events
- Continuous recording TDS probe
- Sample during dry season using temporary flumes

Parameter	Sample Type
TDS	5X/storm
TSS	5X/storm
NO3-N	5X/storm
TKN	5X/storm
TP	5X/storm
Fecal coliform	Grab – Sterile
E. coli	Grab – Sterile



The Regional Water Resource Confluence Project

QUESTIONS ?

Total Estimated Project Costs, Alternative A

Confluence Reservoir and Diversion Facilities with Pumping Directly to Montclair #2 Basin from Confluence Reservoir

- Total Direct Construction, Alternative A $14.7 - $18.5 M
- Engineering and Administration at 15% $2.2 - $2.8 M

Total Cost, Alterative A: $16.9 - $21.3 M

Total Estimated Project Costs, Alternative B

<u>Confluence Reservoir and Diversion Facilities with Pumping to Brooks Basin thence Montclair #2 Basin</u>

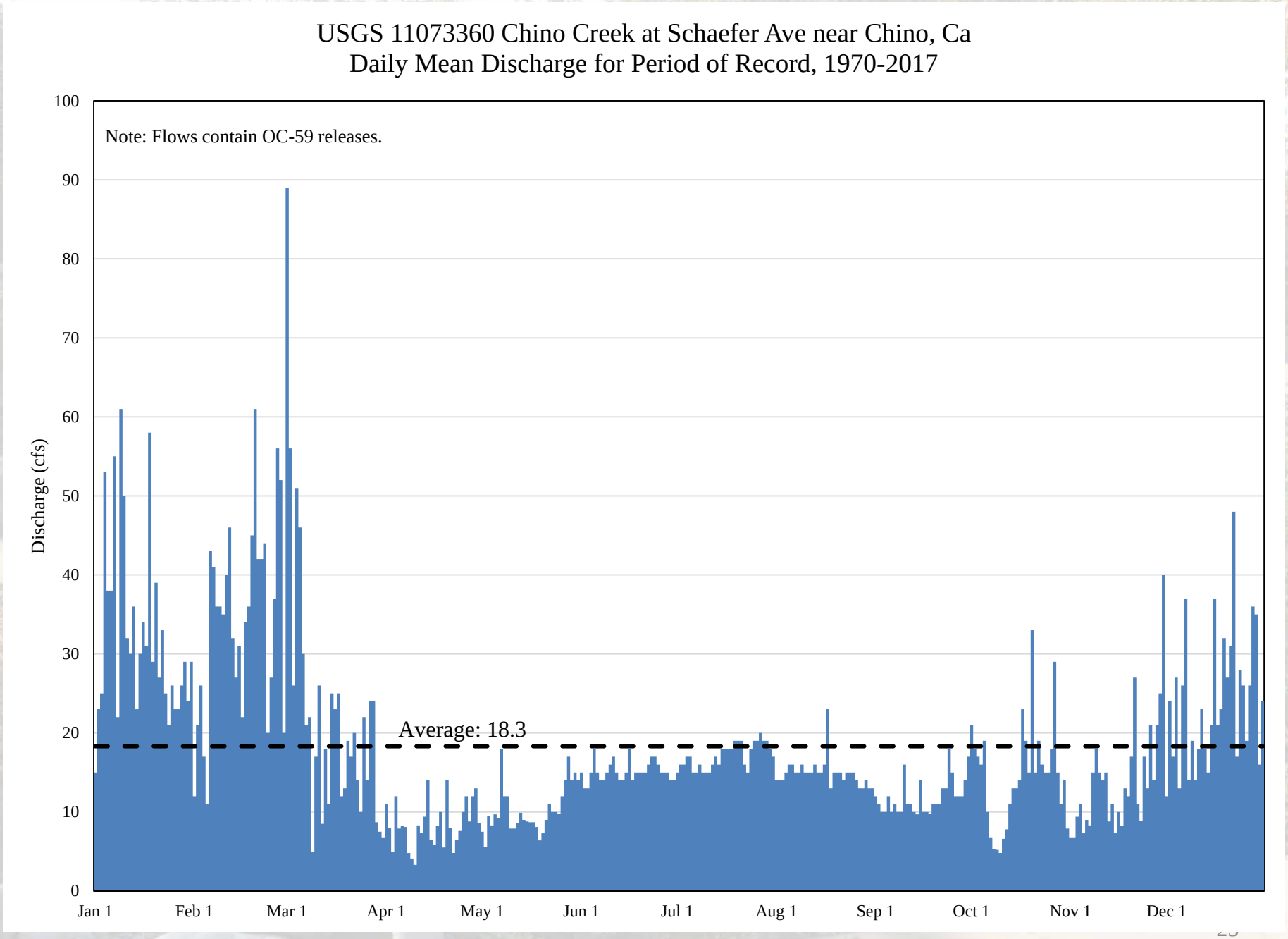
- Total Direct Construction, Alternative B $15.2 – $20.0 M
- Engineering and Administration at 15% <u>$2.3 - $ 3.0 M</u>

Total Cost, Alternative B: $17.5 - $23.0 M

Unit Costs

Including estimates for O&M and Energy, the cost per af of Total Conservation Storage is:

- Alternative A (Direct to Montclair #2): $650 - $670
- Alternative B (BB thence to Montclair #2): $670 - $685


USGS 11073360 Chino Creek at Schaefer Ave near Chino, Ca
Daily Mean Discharge for Period of Record, 1970-2017
Note: Flows contain OC-59 releases.
Discharge (cfs)
100
90
80
70
60
50
40
30
20
10
0
Average: 18.3
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1

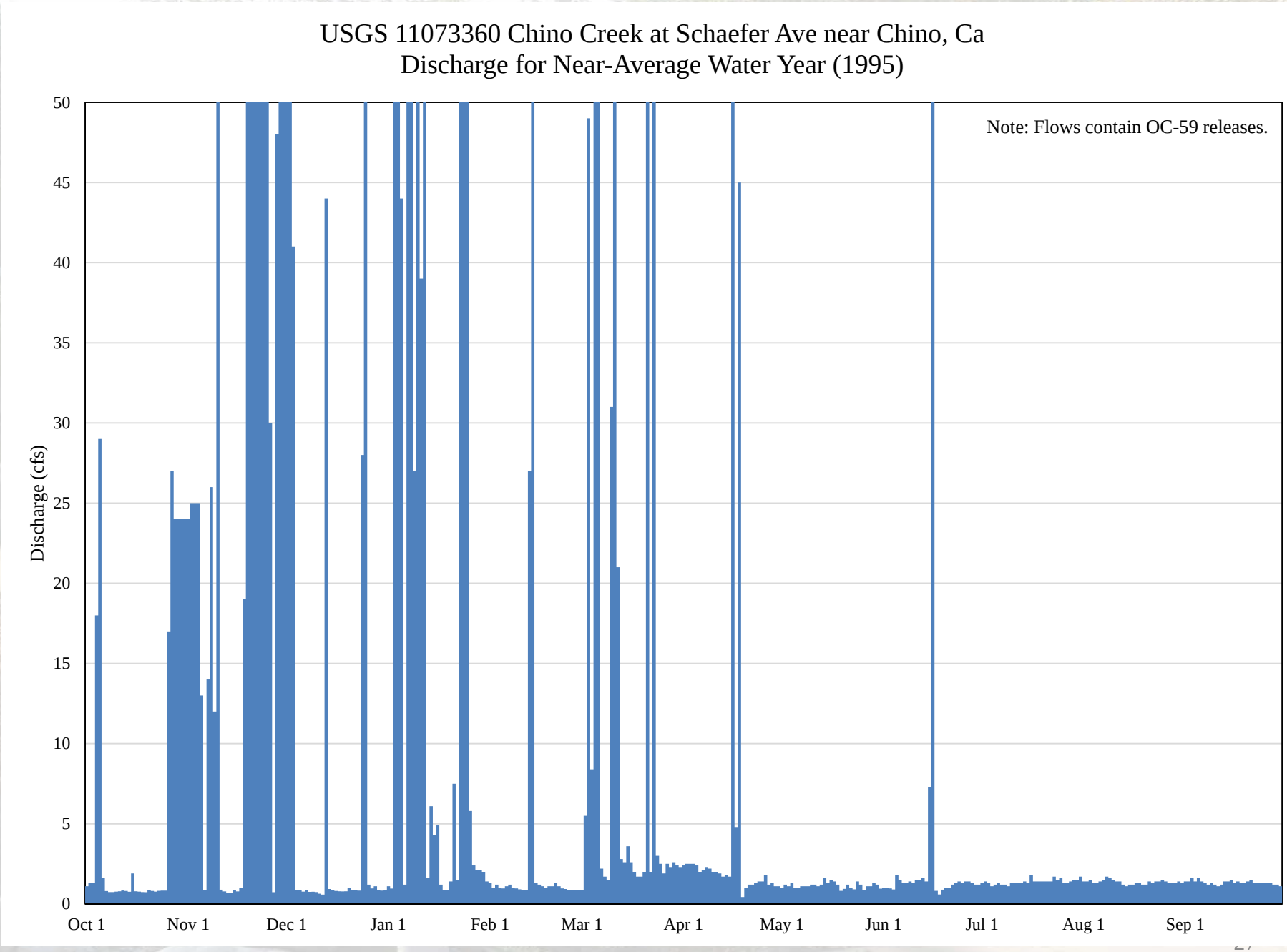
Estimated O&M and Energy Costs

Unit Costs for O&M, per af of Total Conservation Storage is:

- Alternative A (Direct to Montclair #2): $55 - $58
- Alternative B (BB thence to Montclair #2): $62 - $65

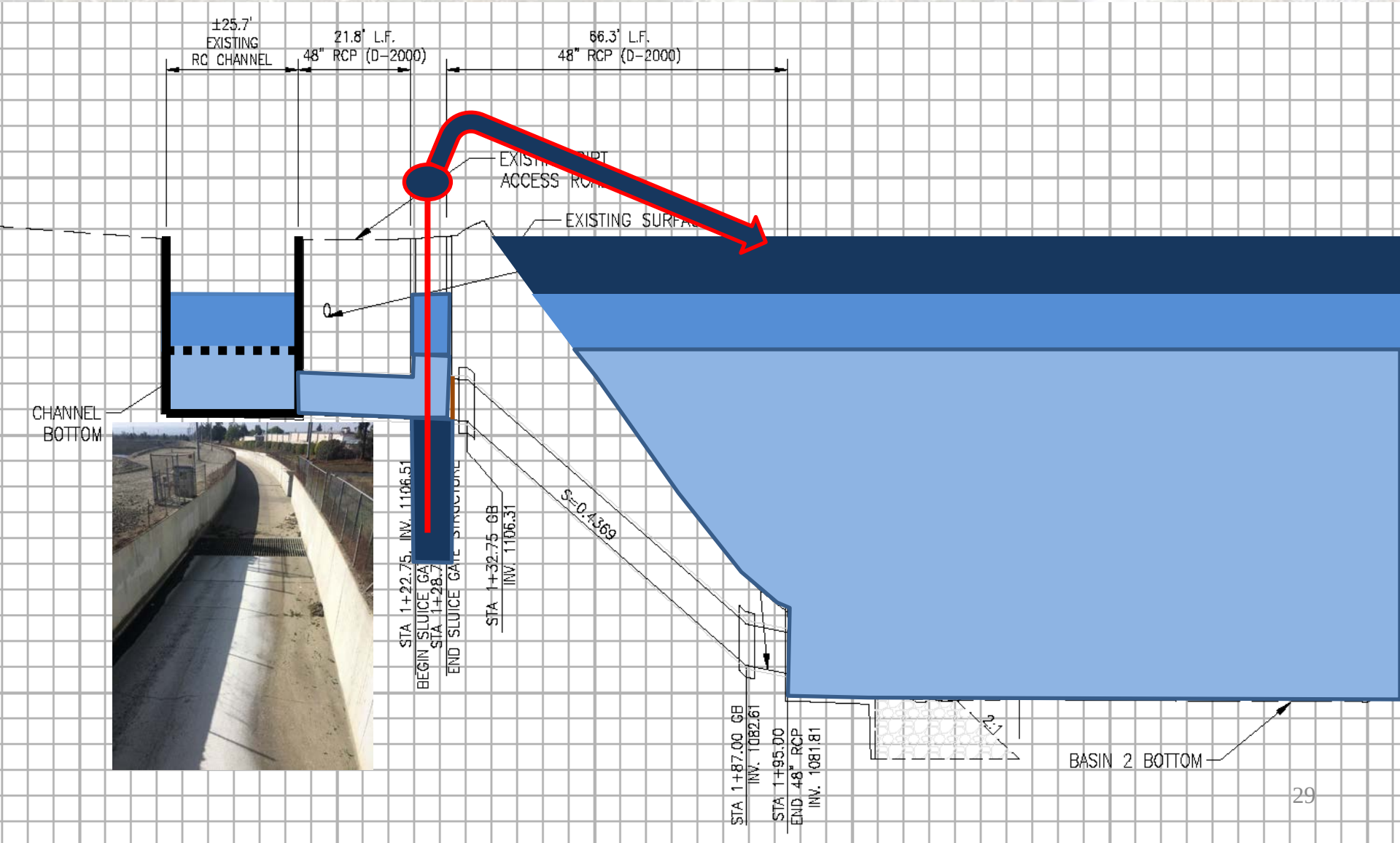
Unit Costs for Energy, per af of water pumped to Conservation Storage is:

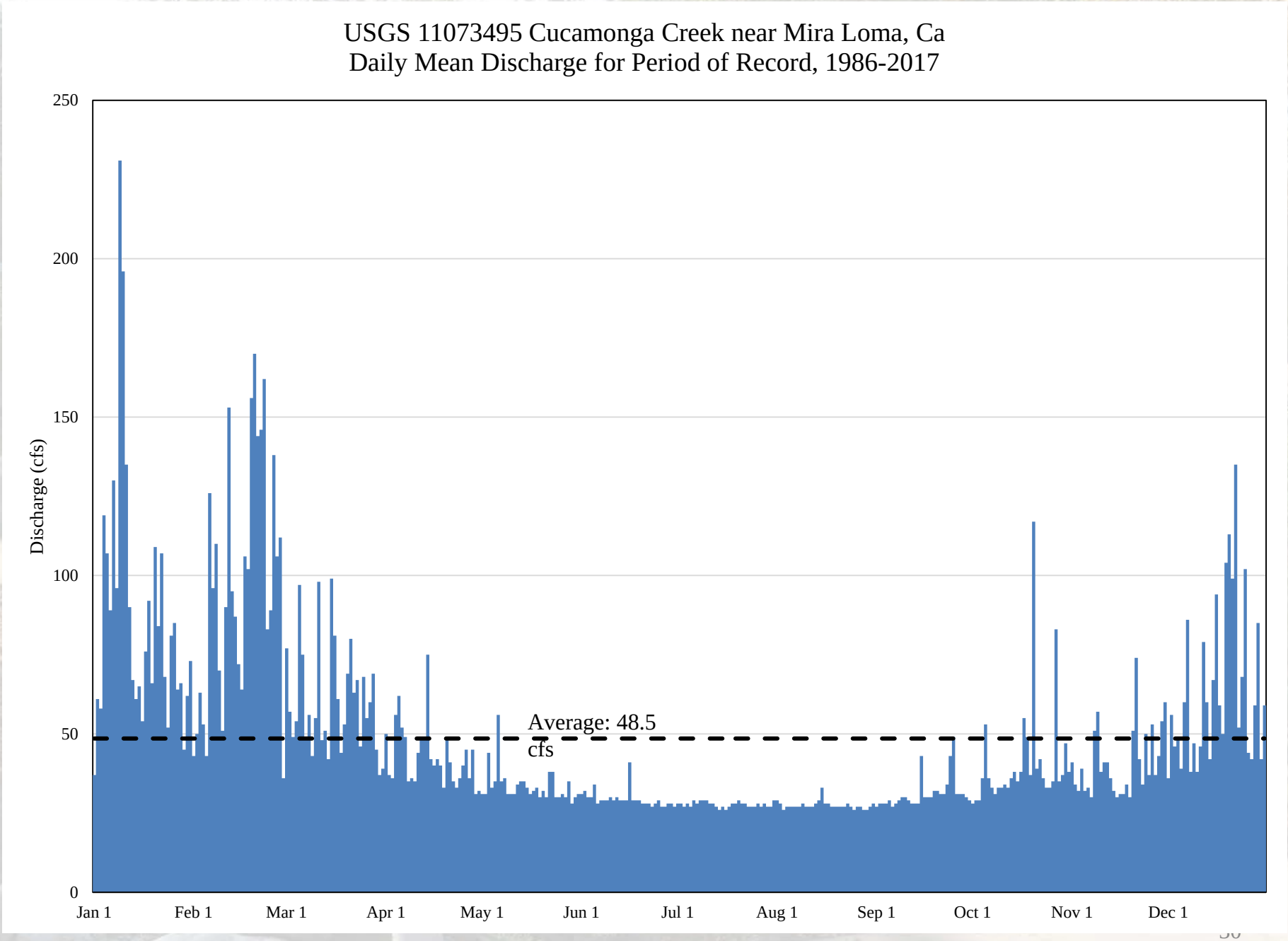
- Alternative A (Direct to Montclair #2): $105 - $140
- Alternative B (BB thence to Montclair #2): $130 - $160

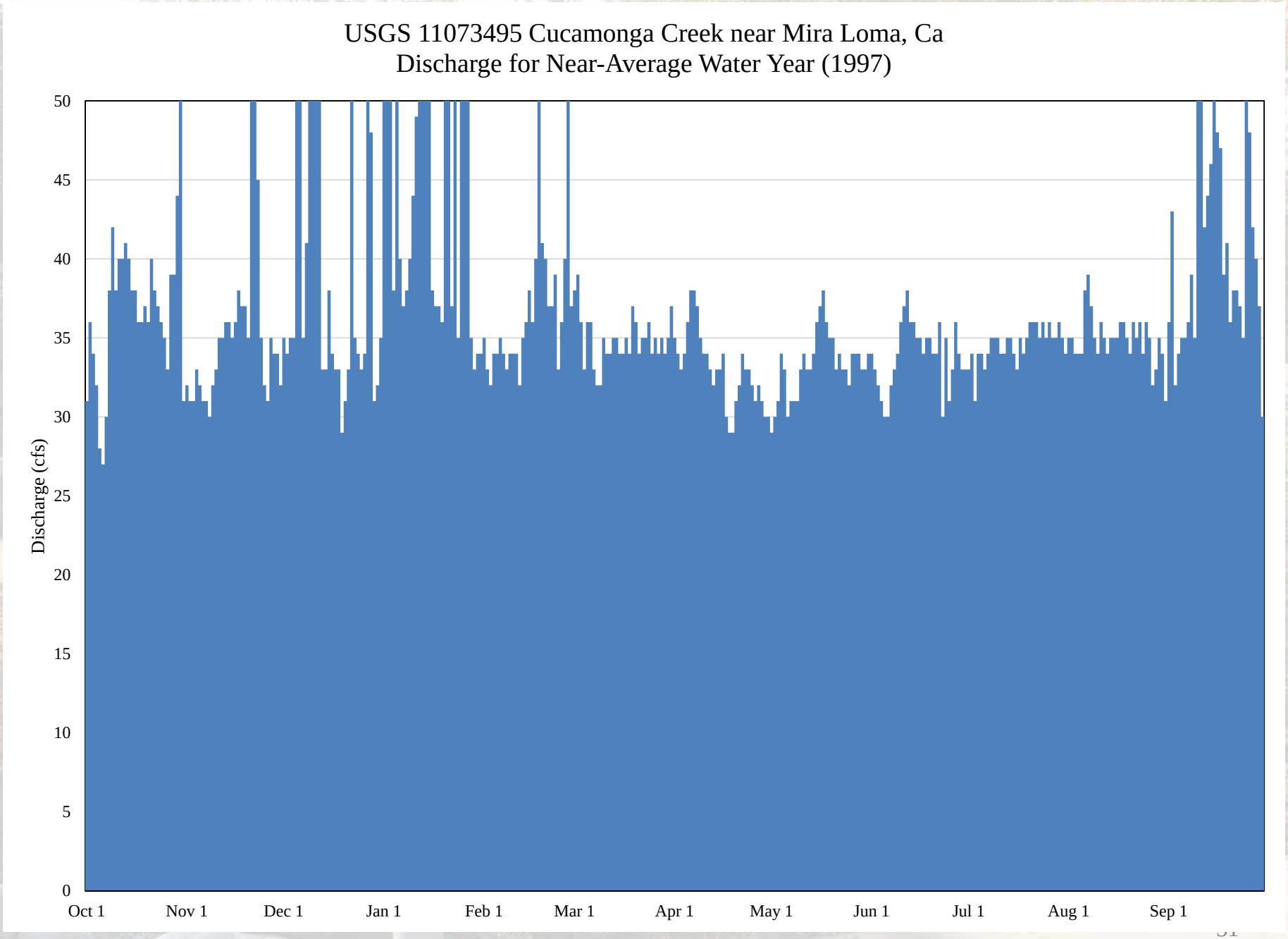

USGS 11073360 Chino Creek at Schaefer Ave near Chino, Ca
Discharge for Near-Average Water Year (1995)
Note: Flows contain OC-59 releases.
Discharge (cfs)
50
45
40
35
30
25
20
15
10
5
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1

Gravity Diversion Facility with Pneumatically Actuated Bladder Gate

Pumped Diversion Facility




USGS 11073495 Cucamonga Creek near Mira Loma, Ca
Daily Mean Discharge for Period of Record, 1986-2017
Discharge (cfs)
250
200
150
100
50
0
Average: 48.5 cfs
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1


USGS 11073495 Cucamonga Creek near Mira Loma, Ca
Discharge for Near-Average Water Year (1997)
Discharge (cfs)
50
45
40
35
30
25
20
15
10
5
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1