APPENDICES

APPENDIX 1 : SITE HYDROLOGY AND HYDRAULICS REPORT

Appendix 1: Site Hydrology & Hydraulics Report for East Downtown Visalia Parks and Infrastructure Master Plan, Technical Memorandum A1-1

Prepard by Moffatt & Nichol
February 2008

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TECHNICAL MEMORANDUM

To: Alma Du Solier, EDAW

From: Dilip Trivedi & Christopher Devick

Date: March 27, 2008

Subj: Draft Report – Site Hydrology & Hydraulics
East Downtown Visalia Parks and Infrastructure Master Plan
M&N File No: 6225

Described in this Technical Memorandum are existing site hydrologic and hydraulic conditions, potential opportunities and constraints, and a description of the proposed concept for achieving a year round *water feature* within Jennings Ditch.

1.0 EXISTING CONDITIONS

The site is bounded by the Goshen and Murry Avenue to the north, Center Avenue to the south, Ben Maddox Way to the east, and Tipton Street to the west. The entire area is about 85 acres. Figure 1 shows the project site and its vicinity. The majority of the project site is undeveloped rural open space. There are some parcels that were developed for industrial and commercial usage.

Mill Creek runs from east to west and Jennings Ditch runs from the northeast through the proposed open space. Mill Creek is an open channel with unprotected channel banks and some oak trees along the banks. Downstream of Tipton, Mill Creek goes through the City downtown area underground and then daylights again to the west. The project site is relatively flat with elevations between 332 and 333 ft NGVD, with a gentle slope towards the Mill Creek and Jennings Ditch drainages. The soil type in the project area was identified as "Nord fine sandy loam", which consists of very deep and well-drained soils that have moderate surface permeability[1].

1.1 Site Hydrology

Precipitation

The general climate in Visalia is Mediterranean type, with hot, dry summers and cool, relatively wet winters. The average summer daytime temperatures usually exceed 90° Fahrenheit, and the average winter daytime temperatures are rarely above 60° Fahrenheit. The average annual precipitation in the vicinity of the site is approximately 10 inches, with 90% of the rainfall between November and April.

[1] Natural Resource Conservation Service, Soil Survey for Tulare, Western Part, California, 2003.

Table 1 - Summary of Precipitation in Visalia (Station 049367 Visalia)

	Mean (in)	High (in)	Year	Low (in)	Year	1 Day Max (in)	>=0.01 in (day)	>=0.1 in (day)	>=0.5 in (day)	>=1.0 in (day)
January	1.94	7.72	1969	0.00	1948	3.22	7	5	1	0
February	1.88	6.57	1936	0.05	1953	2.19	7	5	1	0
March	1.72	7.43	1991	0.00	1956	1.60	6	4	1	0
April	0.98	4.81	1967	0.00	1934	1.37	4	2	1	0
May	0.33	2.23	1971	0.00	1929	1.25	2	1	0	0
June	0.09	1.25	1998	0.00	1928	0.95	0	0	0	0
July	0.01	0.25	1982	0.00	1928	0.25	0	0	0	0
August	0.01	0.23	1961	0.00	1928	0.19	0	0	0	0
September	0.13	1.53	1976	0.00	1928	1.40	1	0	0	0
October	0.51	4.67	1974	0.00	1928	3.70	2	1	0	0
November	1.03	3.56	1970	0.00	1929	1.73	4	3	1	0
December	1.62	6.06	1955	0.00	1930	2.41	6	4	1	0
Annual	10.26	19.94	1998	4.27	1959	3.70	40	25	6	1

Note: Based on data from 1927 to 2005[2].

Surface Water

As part of the lower Kaweah River distribution network system (Figure 2), Mill Creek provides two fundamental functions:

A. Irrigation

The Mill Creek is used for irrigation by the Watson Ditch Company and Persian Ditch Company to deliver surface water from the Terminus Dam and Kaweah Reservoir. The City also uses the Mill Creek to deliver irrigation water for the City's golf course.

Kaweah Delta Water Conservation District (KDWCD) has been maintaining a flow gage in Mill Creek just down stream of the Evans Ditch. A flow duration analysis was conducted based on recent data from 1992 to 2003. The results show that approximately 50% of the time the creek is dry, 42% of the time the flow is greater than 20 cfs, 30% of the time the flow is greater than 50 cfs, 7% of the time the flow is greater than 100 cfs, and only 0.35% of the time flow is greater than 200 cfs. The maximum daily average flow in the 12-year period is recorded as 220 cfs (Figure 3).

B. Flood Control

Historically the City of Visalia has experienced several major floods. These occurred in November 1950, December 1955, December 1966 and January 1969[3]. The December 1955 flood resulted in an estimated peak discharge at Mckays Point (see Figure 2) of

[2] Provost & Pritchard Engineering Group, Inc., Jennings Ditch – Mill Creek Water Feature, December 2006.

[3] Federal Emergency Management Agency (FEMA), Flood Insurance Study, City of Visalia,California, October, 1998.

87,000 cubic feet per second (cfs), and caused a shallow flooding in Visalia of about 1 to 3 feet and extensive damage.

In 1962, the Terminus Dam and Kaweah Reservoir were constructed by the USACE to provide flood control and water conservation with a reservoir storage volume of approximately 150,000 acre-feet. Since then the flood potential was greatly reduced. The 1966 and 1969 floods only caused peak discharges at Mckays Point of 15,600 cfs and 6,800 cfs respectively. Historical record shows that the maximum winter flow in Mill Creek is about 260 cfs since 1962[4].

During 2003 and 2004, the dam spillway was further raised 21 feet to store more water and as a result the flood possibility was further reduced, although not eliminated. The FEMA Flood Insurance Rate Map (FIRM)[5] shows that the project area is under Special Flood Hazard Area (SFHA) Zone A or AH. The Base Flood Elevation (BFE)[6] is approximately 337 ft near the east end of the project limit, and 335 ft near the west end of the project limit, which indicates about 1 to 3 feet of flooding under a 100-yr storm.

Besides the flood water from the Terminus Dam, the creek is also used to convey urban storm water runoff from local rainfall events. It is understood that the existing creek capacity is limited due to the narrowed channel and is unable to handle additional runoff from the City.

Figure 4 shows a schematic of the City's storm drain system in the project vicinity. Jennings Ditch is currently used as a drainage ditch, conveying storm flows from as far as Houston Avenue (see Figure 4) which drains into Mill Creek.

Groundwater

Fugro West, Inc. has completed an investigation of available water resources for the KDWCD. The existing ground water elevation varies seasonally from 50 ft to 100 ft below the ground elevation. Groundwater is the only source of the City's drinking water supply.

1.2 Hydraulic Modeling

A one-dimensional numerical model was developed for the Mill Creek and Jennings Ditch within the project boundary. Data obtained from the existing topographic survey in 2007 was used to construct the model geometry. Mill Creek is about 2000 feet long from Center Avenue at it upstream end to Tipton Street at its downstream end. Jennings Ditch is about 1100 feet long from Goshen Avenue at its north end to Mill Creek at its south end. The existing channel gradients for Mill Creek and Jennings Ditch are 0.0021 and 0.004, respectively. A channel Manning's number of 0.035 was assumed in the model.

A Total 5 flows were simulated: 20, 50, 100, 200 and 500 cfs, the simulated water surface profile along the channel is provided on Figure 5. It can be seen from the results that it requires approximately 20 cfs continuous flow to maintain 1 ft depth of flowing water in the Mill

[4] Boyle Engineering Corporation, City of Visalia Storm Water Master Plan and Management Program, Vol. 1: Storm Water Master Plan, September 1994.
[5] FEMA, FIRM, City of Visalia, California, Tulare County, Panel 10 of 10, January 6, 1994.
[6] BFE = 100-year flood elevation.

Creek. To obtain 2, 3 and 4 ft of flowing water, it requires 50, 100 and 200 cfs continuous discharges respectively. The corresponding water surface elevation, for the 20cfs and 200cfs flows, in two typical cross sections of Mill Creek between Tipton St. and Burke St. are provided in figure 6.

1.3 City Water Rights and Water Usage

The City of Visalia holds 1850 shares of Persian Ditch Company stock, 79 shares of Watson Ditch Company stock, and 2 shares of St. Johns Ditch Company stock. The average surface water delivery through Mill Creek and the City entitlement through these stock holdings are summarized in Table 2.

Ditch Company	Total Number of Shares	City Holding / Percent of Total	Average Annual Delivery to Ditch Company, (1962-2005) (acre-ft)	Potential Average Annual Delivery to City (acre-ft)	Dry Year Delivery to Ditch Company (using 1992 data) (acre-ft)	Potential Dry Year Delivery to City (acre-ft)
Persian	13,760	1,850 / 13.4%	10,711	1,443	3,327	444
Watson	572	79 / 13.8%	4,742	655	1,041	144
St. John's	87.5	2 / 2.3%	2,268	52	765	18

Source: Provost & Pritchard Engineering Group, Inc., Jennings Ditch – Mill Creek Water Feature, December 2006.

In addition, the City holds rights to a portion of water from the Central Valley Project (CVP) that is currently involved in a four-entity exchange program. Through this exchange the City receives an average annual quantity of about 282 acre-feet from the Kaweah River for the City's golf course irrigation needs.

1.4 Site Constraints

In addition to local hydrology and hydraulic conditions as described above, a proposed year-round water feature within the Park will also be affected by existing riparian vegetation, existing infrastructure, roads and streets, and has to conform to the potential future downtown development requirement. In 2005, the City adopted the East Downtown Visalia Strategic Plan for 2025. According to the Plan, the project area will be developed into a downtown area which includes parks and open space, residential and office buildings, shopping plaza, etc. Figure 6 shows the development program summary and the open space concept from the Strategic Plan.

The following challenges have been identified in prior studies, which we concur with :

- Limited water supply
- High seepage rate for soil
- Limited channel capacity to convey additional storm water runoff
- Limited space in conformance to the 2025 Strategic Plan
- Stream water quality requirement
- Preservation of the existing oak trees that are along the Mill Creek and Jennings Ditch

2.0 DESIGN BASIS AND PRELIMINARY CONCEPTS

In the East downtown Visalia Strategic Plan for 2025 the area identified as the Civic Center is designated as a pedestrian–oriented environment with multi modal connectivity of East downtown to the rest of the community. Within the Civic Center area the Parks and Infrastructure Master Plan identifies the development of the open space around Mill Creek as outdoor spaces for public events and activities that connect downtown neighborhoods and as an amenity for commercial, residential, and civic development. The water feature and open space development of Mill Creek and Jennings Ditch were originally presented in two different layouts to match the different styles of the future Civic Center area. One layout provided natural creeks for the portion east of Burke St. and a large L shaped fountain west of Burke St. The second layout provided larger creeks and a more winding alignment east of Burke St. that continued downstream to a large pond in front of City Hall Plaza. The preliminary layout is a slow winding feature that follows the current alignment of Jennings Ditch and Mill Creek east of Burke St. that moves north away from the current alignment of Mill Creek, providing a natural pond in front of the new City Hall Plaza, west of Burke St.

The basic concept for maintaining year round water in specific segments of Jennings Ditch and Mill Creek was developed from several workshops involving the City of Visalia staff, the development team and other impacted groups. Several concepts were presented to create a year round water feature within Jennings Ditch and Mill Creek. One concept was to supply additional water that was not present during the dry season, and allow for the water to flow downstream unrestricted. A second concept involved incorporating an in stream structure to retain water in the creek, providing concrete channel lining to eliminate seepage, recirculation to provide flow and replenishing and/or flushing the creek for water quality purposes. The second concept was refined further to maximize storage volume and reduce loss of water due to seepage and evaporation with out the use of concrete. The concepts described below represent the outcome of the discussions.

2.1 Preliminary Concepts

Two options were considered to maintain year round water in Mill Creek and Jennings Ditch, while addressing the challenges described above. In both options Jennings Ditch and Mill Creek require the construction of several new in-stream hydraulic structures to pond water during the dry periods of the year. These in-stream structures would also by-pass flood flows to prevent loss of channel capacity. The channel bed also requires some form of impermeable lining to prevent seepage and reduce the required additional water needed to maintain the year round water feature. The capacity and modifications to Mill Creek and Jennings Ditch are discussed below.

2.2 Jennings Ditch

Within the segment between Goshen and the confluence with Mill Creek, the existing oak trees remain in their current location and the alignment of Jennings ditch would be left unaltered. One weir would be built in Jennings Ditch approximately 500 feet upstream of the confluence, and will be 4' in height. This weir, along with the proposed Bradley weir, will create a two pond channel ranging in depth from 1-4'. The Jennings ditch channel will have an impermeable, flexible liner added to it to eliminate seepage of water from the channel bed and reduce the need for additional water contributions. The impermeable liner will extend the length of Jennings Ditch from E Goshen Ave. to the confluence with Mill Creek (approximately

1150'). The liner would cover the channel bottom and the existing channel slopes up to the elevation of desired ponding within the channel, and be covered with cobble up to 4" in diameter to keep the liner in place.

To assess the feasibility of this proposed system, the storage volume and surface area were estimated. Assuming a minimum ponded depth of about 1' at the upstream end, the water depth at the weir separating the two ponds would be about 4'. A continuous flow can be provided by using a circulation pump to move water from the deeper downstream section to the shallower upstream section. The depth of the second pond is a nearly constant 2'. The top width of the two ponds ranges from 20' to 50' providing a combined storage volume and surface area of 1.14 acre-feet and 0.65 acres respectively. Based on a pan evaporation rate of 71 inches per year, the expected annual evaporation is 3.85 acre-feet. Assuming no water loss due to seepage occurs with the use of the impermeable liner, the ponds would be completely dry in 3 to 4 months, unless recharged from other sources.

2.3 Mill Creek Upstream

This area is defined as the portion of Mill Creek running from the culvert under E Center Ave. at the east end of the site and ending at the culvert under N. Burke St. This area will maintain the current alignment of Mill Creek and be ponded by the addition of pressure sensitive valves to the culverts under N. Burke St. and E. Center Ave. The pressure sensitive valves allow water to pass when a specific upstream water level has been reached and will allow for the culvert to function properly and convey necessary storm flows during wet weather periods. This portion of Mill Creek will be lined in a similar manner as Jennings Ditch to prevent water loss due to ground seepage. The total length of impermeable liner will be approximately 1000'.

In the Mill Creek Upstream section an average depth of 2' with a top width ranging from 14'-40' was obtained through out the channel. The storage volume produced by this water depth was 0.89 acre-feet with a surface area of 0.51 acres. Based on a pan evaporation of 71 inches per year, the expected annual evaporation is 3 acre-feet. Assuming no water loss due to seepage occurs with the use of the impermeable liner, the ponds would be completely dry in 3 to 4 months, unless recharged from other sources.

A second option for this area is to create a geomorphic area by creating three ponds with bioengineered banks. This area could include information centers/stations about the natural ecology and wildlife in the area. Around the ponds, benches and picnic tables could be included to create a nature park along the banks. The ponds would be created using weirs with gate structures or other hydraulic structures to retain the water and maintain flood capacity. The channels of Mill Creek that connect the three ponds would be seasonal. The ponds would be lined with a clay liner to minimize seepage and river cobble to prevent erosion of the clay liner.

This scheme would provide more storage volume over less surface area resulting in less required additional water from an outside source. The three ponds would have an average depth of 5' with an approximate storage volume and surface area of 1.5 acre-feet and 0.5 acres respectively. An annual evaporation of 2.9 acre-feet is expected, with the smallest of the three ponds going dry in about 4 to 5 months, unless recharged from other sources.

2.4 Mill Creek Downstream

This area is defined as the portion of Mill Creek beginning at the culvert under N. Burke St. and ending at the culvert under N Tipton St. The alignment of Mill creek is modified in this section to allow for the creek to run in front of the proposed City Hall Plaza. This portion of the Creek will be ponded by adding pressure sensitive vales to the culvert under N. Tipton St. The downstream portion of Mill Creek will be lined in the same manner as Jennings Ditch described above except for the area in front of the proposed City Hall Plaza. In this area the channel will be lined on the south side of the channel in the same manner as the Jennings Ditch and the north side of the Mill Creek channel will be concrete lined up to the proposed waterfall feature. The concrete lining and impermeable liner should overlap to ensure protection against water loss due to seepage.

In the Mill Creek Downstream section, a depth of 4.5 feet was maintained resulting in a storage volume of 2.93 acre-feet and a surface area of 0.9 acres. The top width of this feature would range from 45' to 80' in front of City Hall Plaza and 18' to 30' in the creek sections to the east and west of City Hall Plaza. Based on an evaporation rate of 71 inches per year, the expected annual evaporation is 5.3 acre-feet, which would have to be replenished from other sources.

Table 3 shows the average water depth, storage volume, surface area, evaporation time and the replenishment interval for the different concepts.

Table 3: Summary Table

	Jennings Ditch		Mill Creek Upstream		Mill Creek Downstream
	upstream pond	downstream pond	Existing	3 ponds	
Average Water Depth (feet)	2.5	2	2	5	4.5
Storage Volume (acre-feet)	0.87	0.27	0.89	1.49	2.93
Surface Area (acres)	0.45	0.2	0.51	0.49	0.9
Time Until Dry (months)	3-4	2-3	3-4	5-6	6-7

3.0 PREFERRED ALTERNATIVE

The preferred water feature alternative is made up of two different areas, Mill Creek and Jennings Ditch. The Mill Creek area is now defined by Mill Creek from the culvert under E. Center Ave. at the upstream end to the culvert under N. Tipton St. at the downstream end. This portion of the feature will remain a seasonal water feature with modified slopes on the north bank to provide additional riparian habitat and flood capacity. The south bank will remain to provide flood protection to existing buildings and be used as a flood wall in future planned development. To facilitate the development of the north bank riparian terraces the seasonal water level variance is provided in figure 6.

The Jennings Ditch area is described in this preferred alternative as the area starting at the culvert under Goshen Ave at the upstream end and ending at the junction of Mill Creek and Jennings Ditch at the downstream end. The preferred water feature layout provides a 4' deep pond at the downstream end of Jennings Ditch along with three weirs placed in the existing

channel alignment to create smaller ponds up stream, a plan and profile of the dry season condition are provided in Figure 8 and 9. Jennings Ditch will be connected to Mill Creek by four arch culverts or other culverts similar to existing which will convey storm flows from Jennings Ditch into Mill Creek. This preferred alternative for Jennings Ditch can use either the clay or geomembrane liner to eliminate water loss from seepage. The use of a compacted clay liner will provide a natural looking impermeable barrier that will avoid any possible impacts to the native oak trees that could be caused by the placement of the geomembrane liners. This preferred layout increases the storage capacity of Jennings Ditch, reducing the additional water needed to maintain the water feature, without damaging native vegetation or making major alterations to the channel alignment.

Based on this preferred alternative layout Jennings Ditch is the only portion of the natural waterway that will be maintained as a year round water feature. The total surface area of the year round water feature was determined to be approximately 0.84 acres. The annual evaporation is about 3.3 acre-feet which would be offset by additional water provided by the city. This demand can be partially offset by using the storage volume of the downstream pond. The downstream pond provides an additional 0.6 to 1 acre-feet of water depending on the allowable loss of depth in the pond. Assuming that the downstream pond is allowed to go lower, the required water from other sources would be approximately 2.3 to 2.7 acre-feet. This turns out to be approximately 750,000 to 880,000 gallons a year, or the equivalent of the domestic use of two to three households.

To maintain water quality, a circulation pump will be needed to maintain a system residence time of approximately 7 days. The pump can be placed at the downstream end of Jennings ditch, and will draw water from the downstream pond and send it to the upstream end at Goshen Ave. The size of the circulation pump is mainly dependent on the flow rate and delivery pipe size. To reduce the runtime of the circulation pump a flow rate of 1000 gal/min pumping through a 12" PVC delivery pipe. The pipe could be placed along the banks of the Ditch. This flow rate requires approximately a 10 HP circulation pump. A conceptual cost estimate of the preferred alternative is provided in table 5 below.

Table: 5: Jennings Ditch Water Feature Conceptual Costs (DRAFT)

Item	Bid Description	Qty	Units	Unit Cost	Total
1	Weir (Concrete)	63	CY	$350	$22,000
2	Overflow Culvert (Arch)	120	LF	$375	$45,000
3	Excavation	12,600	CY	$8	$100,000
4	Clay Liner	52,300	SF	$5	$260,000
5	Circulation Pump (10 HP)	1	No.	$6,000	$16,000
6	Delivery Pipe (12" PVC)	1,200	LF	$20	$24,000
				Total:	**$500,000**
For Reference only					
7	Geomembrane Liner	52,300	SF	$2.50	$131,000

Notes:
1. Costs given are conceptual based upon plan layout of major project elements.
2. Cost does not include the cost of site grading or site preparation.
3. Clay Liner cost assumes $3.75 purchase cost and does not include cost of hauling to site.
4. Cost does not include Design, Construction Management or Contingency
5. Cost in 2008 dollars rounded to the nearest $100,000

The price given above is heavily dependant on the availability and cost of clay. The purchase cost for clay can run as high as $5.00 a square foot and the availability of large enough quantities may require long hauling distances. The purchase cost of geomembrane is approximately $0.50 a square foot and can be acquired from and installed by companies within the southern California region.

4.0 CONSTRUCTABLITY

The construction activity required for the water feature includes the placement of clay liner, site preparation, excavation, grading, construction of weirs and culverts, and installation of pump and pipeline. The material for the clay liner would have to be hauled in from off site and compacted during the dry season. In the immediate vicinity of the weirs, a rock scour apron would be used to protect the liner from erosion. Clay liners are susceptible to cracking and damage due to drying or freezing and thawing.

The existing culvert where Jennings Ditch meets Mill Creek would have to be replaced and new would need to be installed to provide the necessary storm flow conveyance. Arch culverts could be installed which could include an aesthetic façade to match the character of the park for times when it would be visible. The culverts would need to be free of trash and debris to function properly.

4.1 Operations and Maintenance (O&M)

O&M operations associated with the water feature include inspection and necessary repairs of the pumps and repair of any liner damage. For the circulation pumps, the operation duration could be designed to be about 4 hours a day, for 3 days a week. Additional well pumps or gates would have to be operated for the replenishment pumps, when evaporation has exceeded the minimum allowable water depths in the Ditch. Assuming a 4 month wet weather period when no additional water will be needed to replenish the water feature, and that a 3-inch loss in ponded depth is the threshold before replenishment, then it would be necessary to pump water to the Mill Creek-Jennings Ditch system approximately every 10 days over the 8 month dry period. Repairs to the clay liners require that the pond be drained so that work can be completed in dry conditions. The liner may require patches to be placed on any failed areas. Maintenance of the culvert would require removal of trash from the channel and ponds that could block the flow of water into the culverts.

5.0 SUMMARY

The preferred alternative water feature layout draws on several different portions of the conceptual designs presented earlier and addresses many of the site constraints while requiring a minimal amount of water to maintain the water feature. The preferred alternative maintains a natural design in the use of clay liners to prevent water loss due to seepage, preserves the existing oak trees along both Jennings Ditch and Mill Creek, and maintains the natural alignment of the two waterways. The new year round water feature will require an additional 750,000 to 880,000 gallons be budgeted for, the equivalent to the domestic water use of 2 to 3 new households. The Cost will depend heavily on the location and price of available clay, geomembrane with river cobble or washed pea gravel should be considered as a more cost effective alternative.

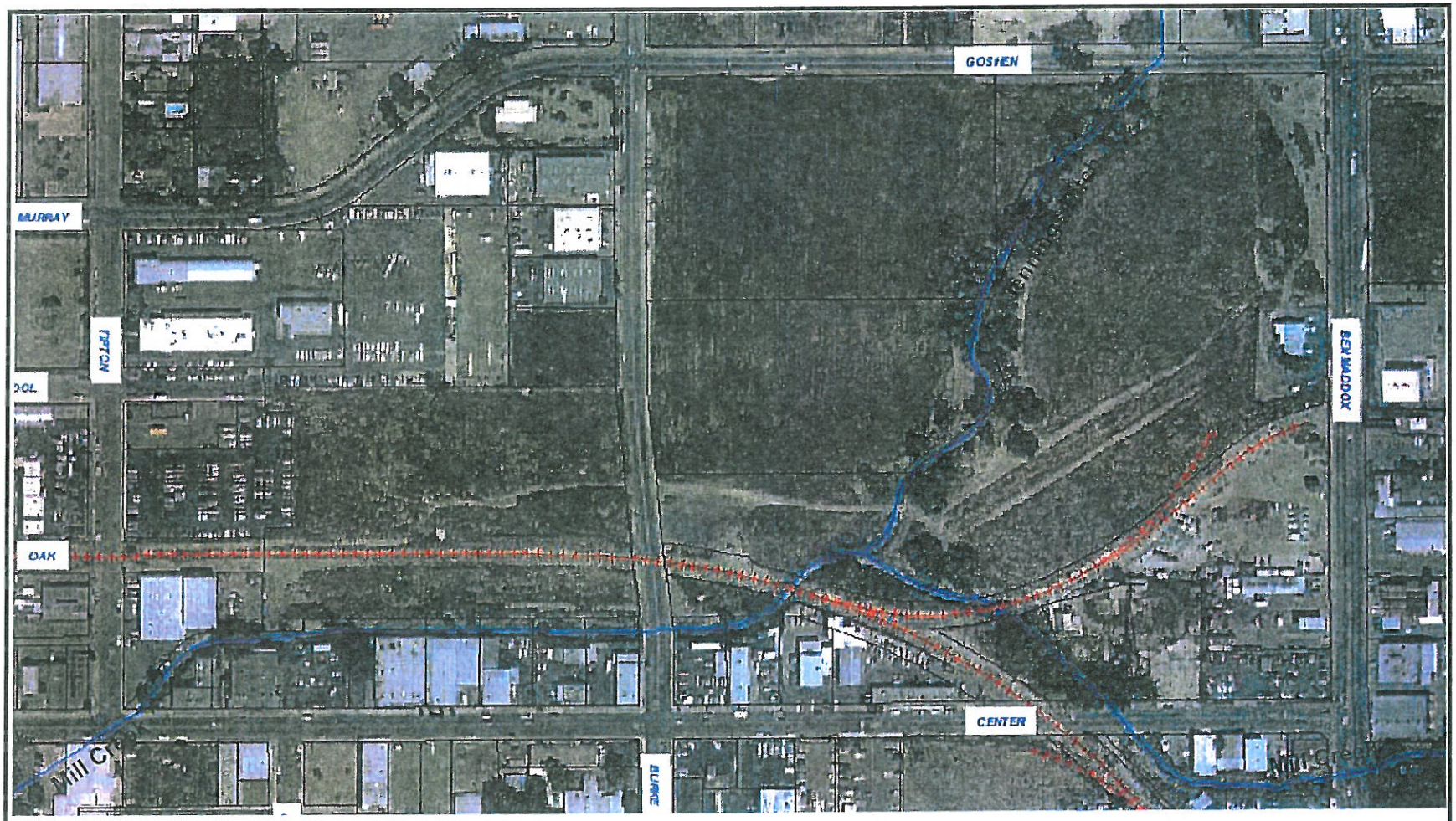
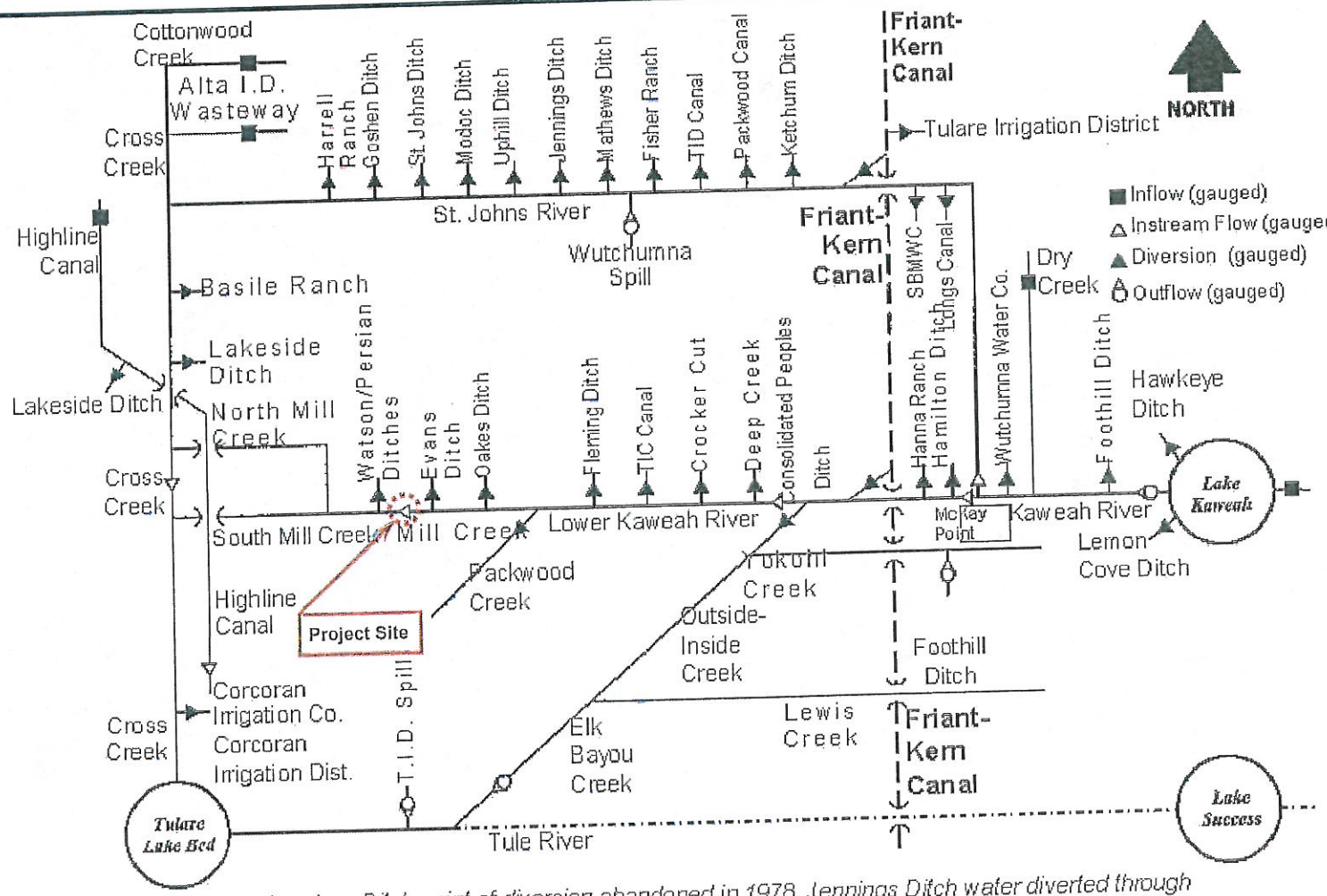


Figure 1
Site Map

MOFFATT & NICHOL

East Downtown Visalia
Parks and Infrastructure Master Plan



Note: *Jennings Ditch point of diversion abandoned in 1978. Jennings Ditch water diverted through Modoc and/or Goshen Ditches from 1974 to current.*

Source: Fugro West, Inc., Water Resources Investigation of the Kaweah Delta Water Conservation District, Final Report, Prepared for kaweah Delta Water Conservation District, December 2003.

Figure 2
Schematic of Kaweah River Distributary Network System

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East Downtown Visalia
Parks and Infrastructure Master Plan

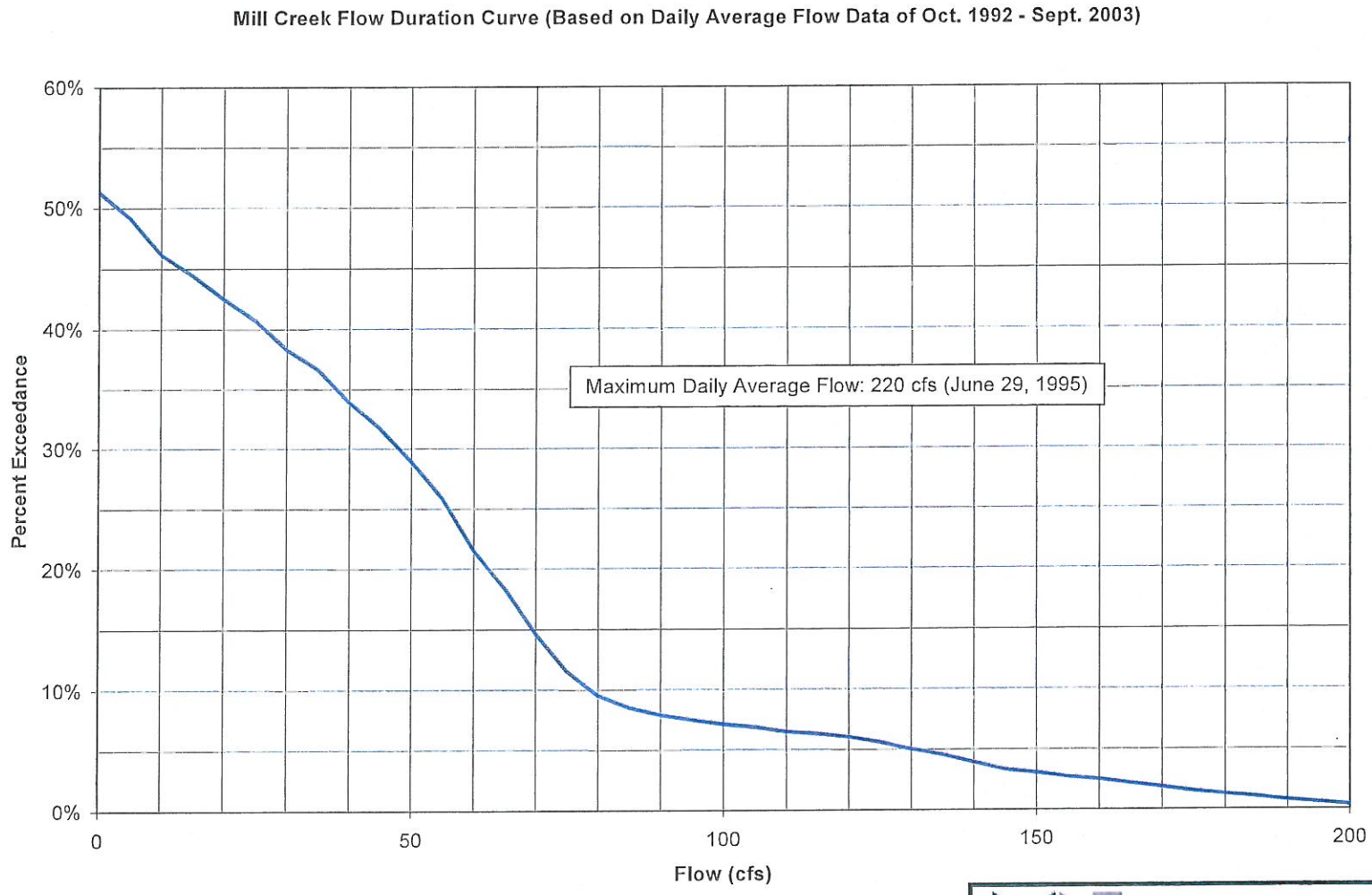

Figure 3
Mill Creek Flow Duration

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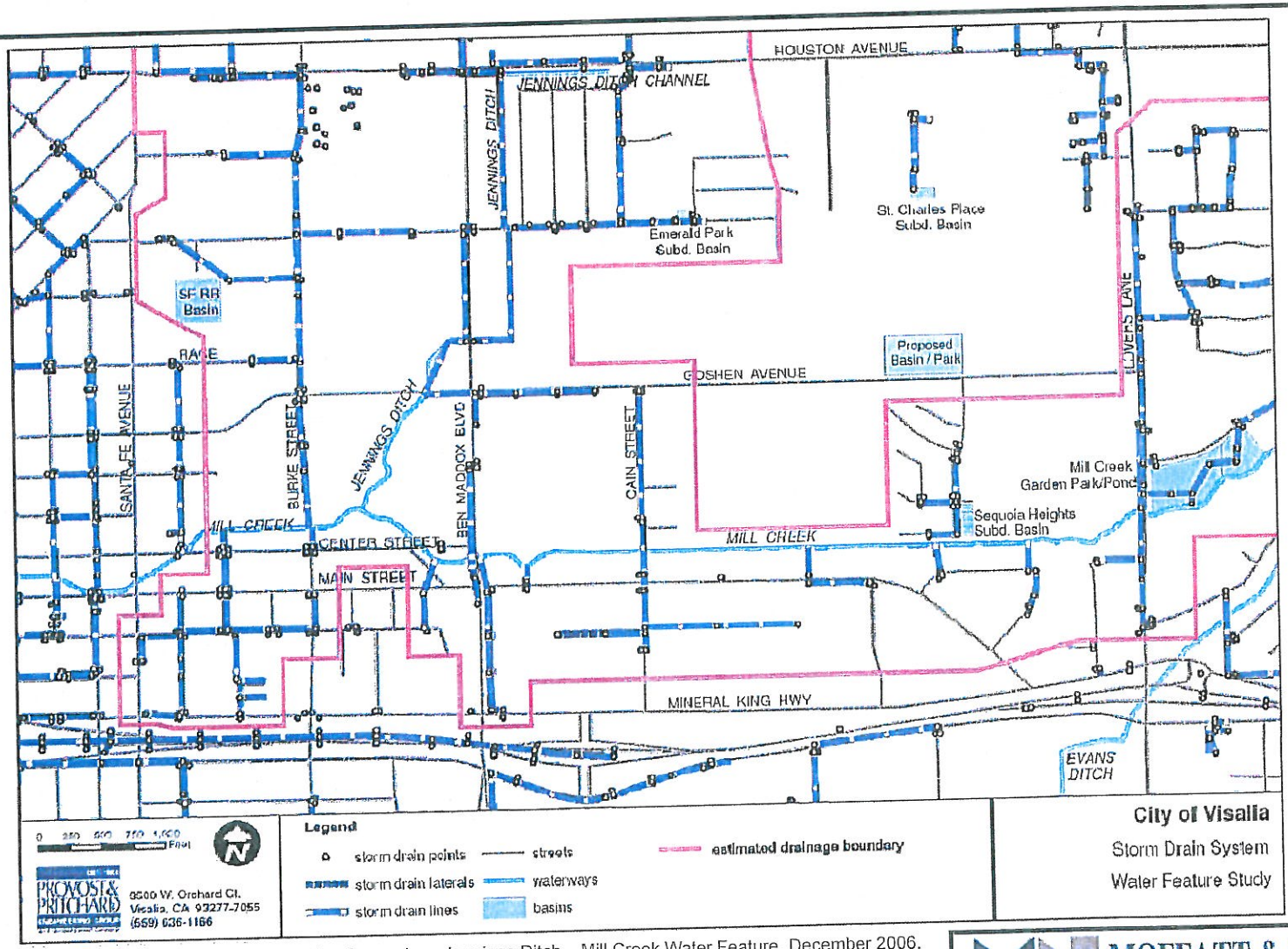
Parks and Infrastructure Master Plan



Source: Provost & Pritchard Engineering Group, Inc., Jennings Ditch – Mill Creek Water Feature, December 2006.

Figure 4
Existing Storm Drain System in the Project Vicinity

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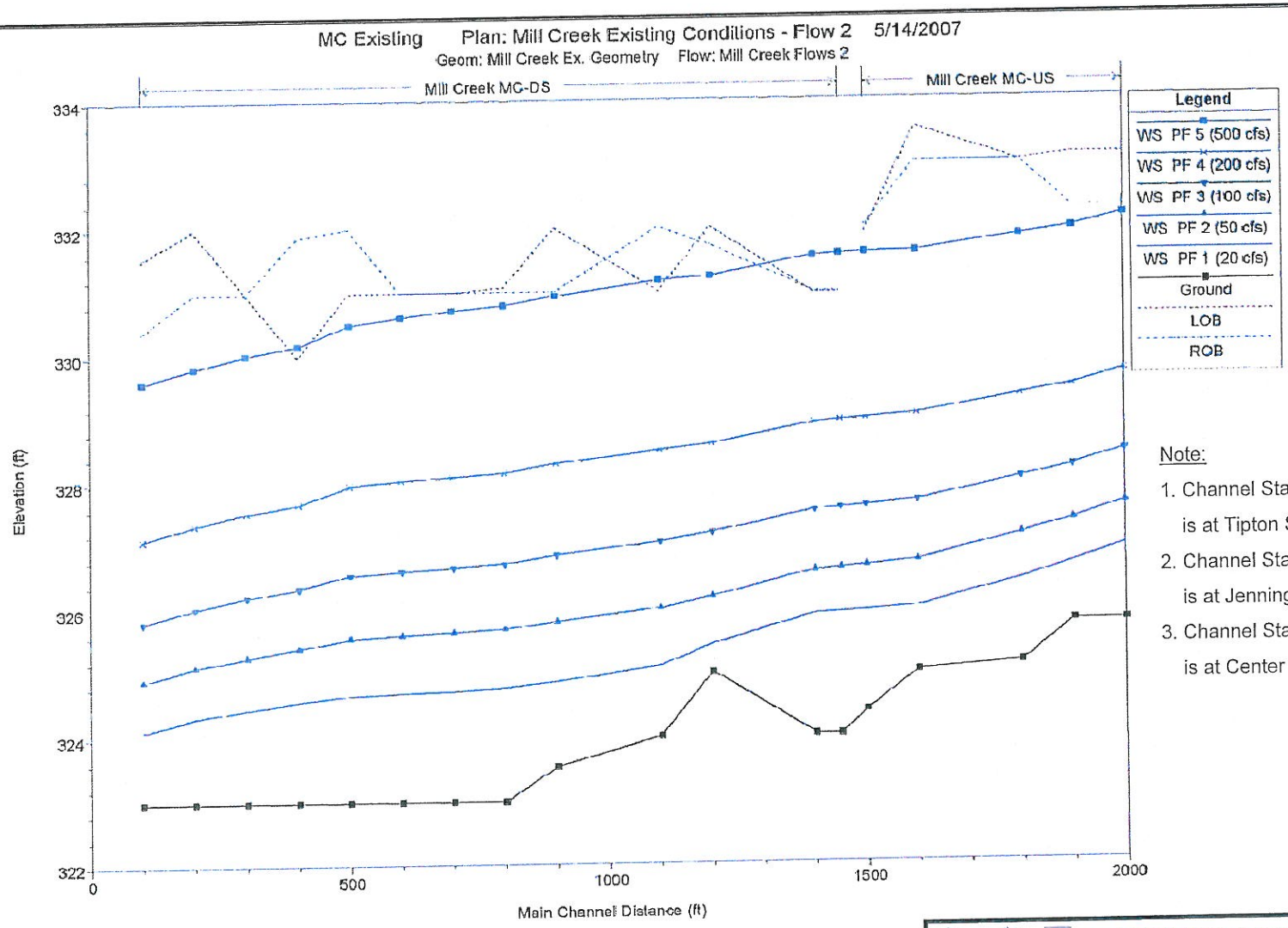
East Downtown Visalia
Parks and Infrastructure Master Plan



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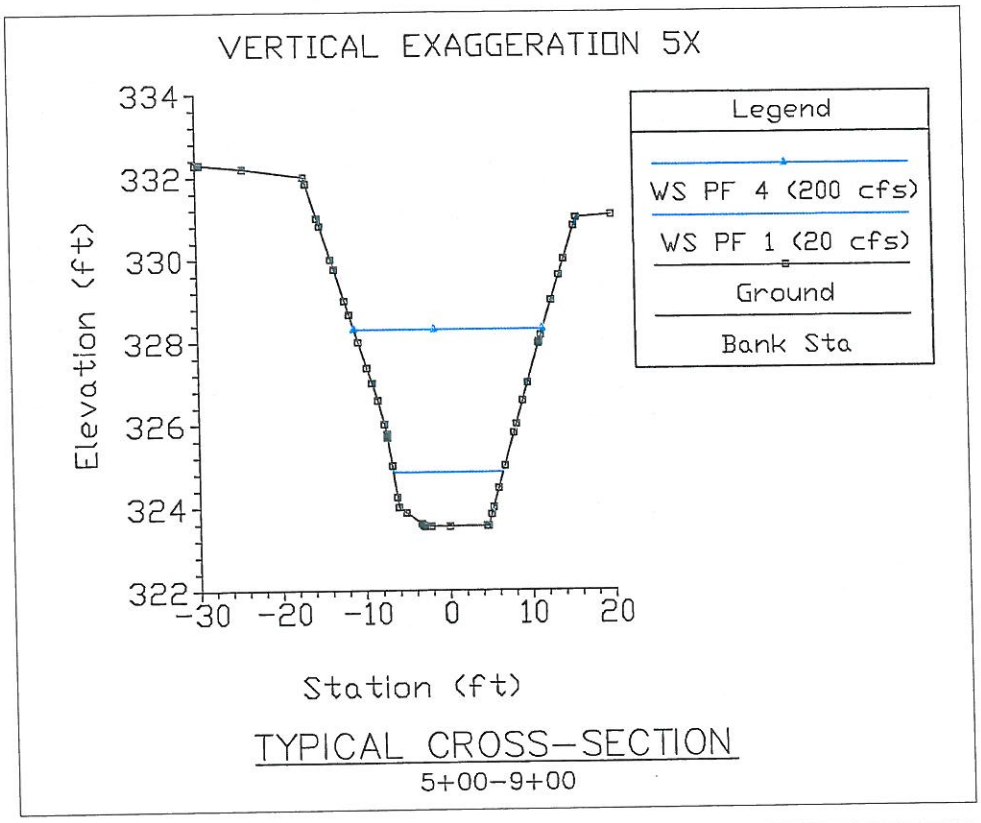
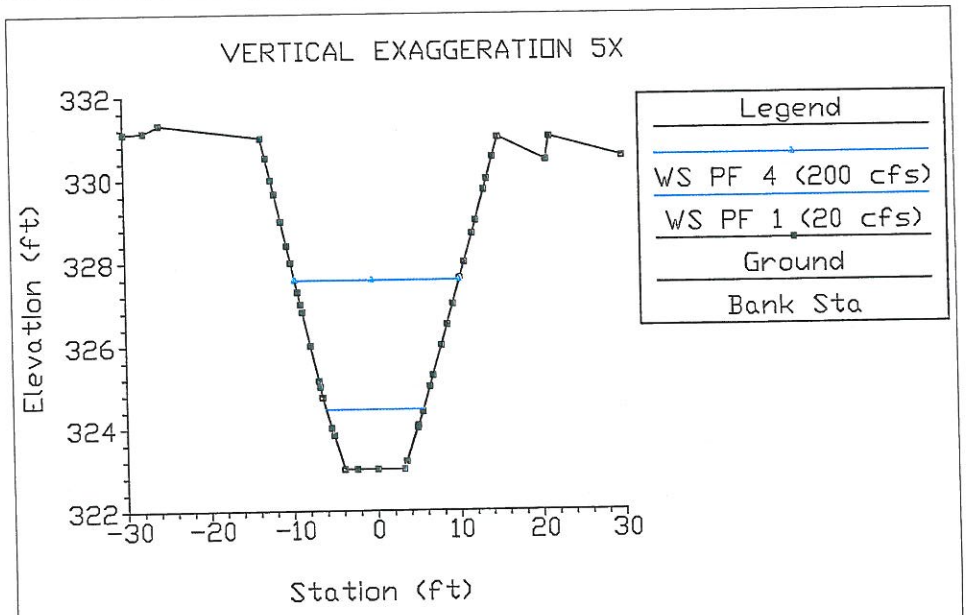
East Downtown Visalia
Parks and Infrastructure Master Plan

Figure 5
Simulated Water Surface Elevation Profile along the Mill Creek



TYPICAL CROSS-SECTION
5+00-9+00

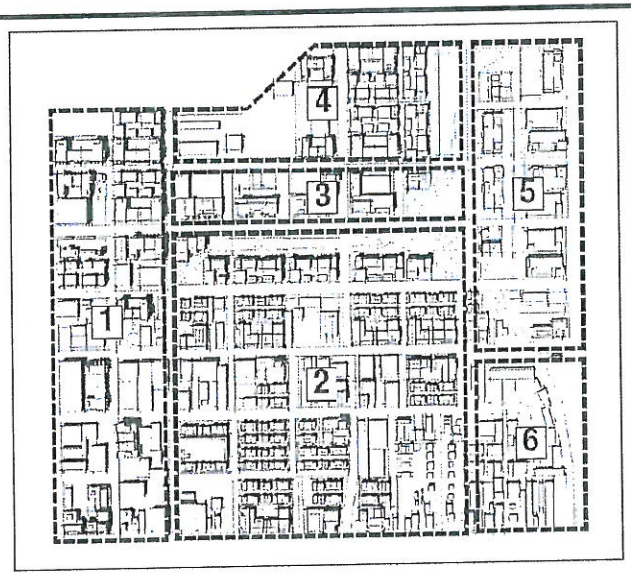


TYPICAL CROSS-SECTION
0+00-4+00

GRAPHIC SCALE
10 0 10 20 40
1"=20'

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA

MILL CREEK SEASONAL WATER LEVEL EXISTING CONDITIONS
FIGURE 6
EAST DOWNTOWN PARKS AND INFRASTRUCTURE MASTER PLAN



Estimate Development Program Summary

1. Santa Fe
Opp. Sites 10.52 acres
Residential 250 units
Commercial 206,000 SF

2. East Main
Opp. Sites 19.63 acres
Residential 350 units
Commercial 106,000 SF

3. Civic Center
Opp. Sites 10.00 acres
Office 280,000 sf

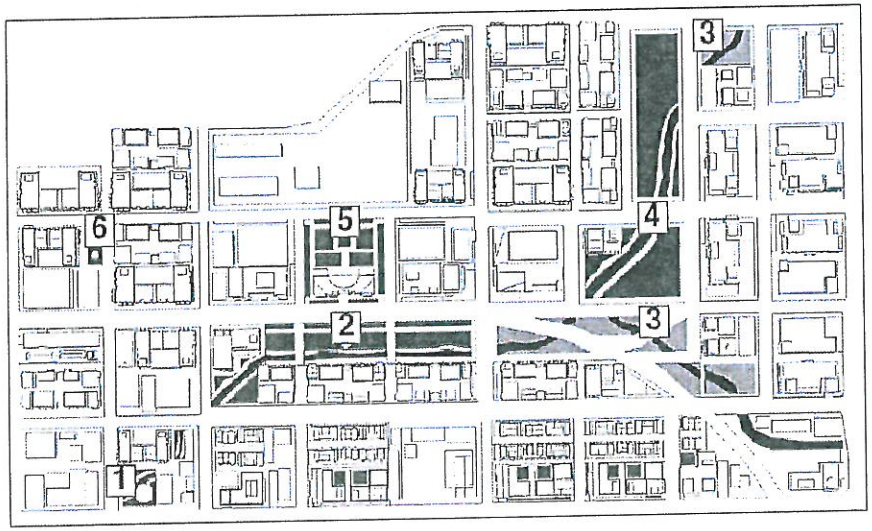
4. Central Park
Opp. Sites 10.00 acres
Residential 400 units
Commercial 20,000 SF

5. Ben Maddox Business Center
Opp. Sites 19.00 acres
Office 500,000 SF

6. East Acequia Service Commercial
Opp. Sites 3.59 acres
Serv. Commercial 40,000 SF

Open Space 15.66 acres

TOTAL
Opp. Sites 88.4 acres
Residential 1,000 units
Employment 1,152,000 SF



Open Space Concept

1. Mill Creek Market Hall Plaza
- Plaza for programmed events and farmers' market
- Trailhead for Mill Creek park system

2. Civic Center Park
- Formal civic park
- Mill Creek trail and mixed-use residential edge

3. Oak Woodlands
- Informal woodland and creek trail

4. Central Park
- Formal neighborhood park with creek trail

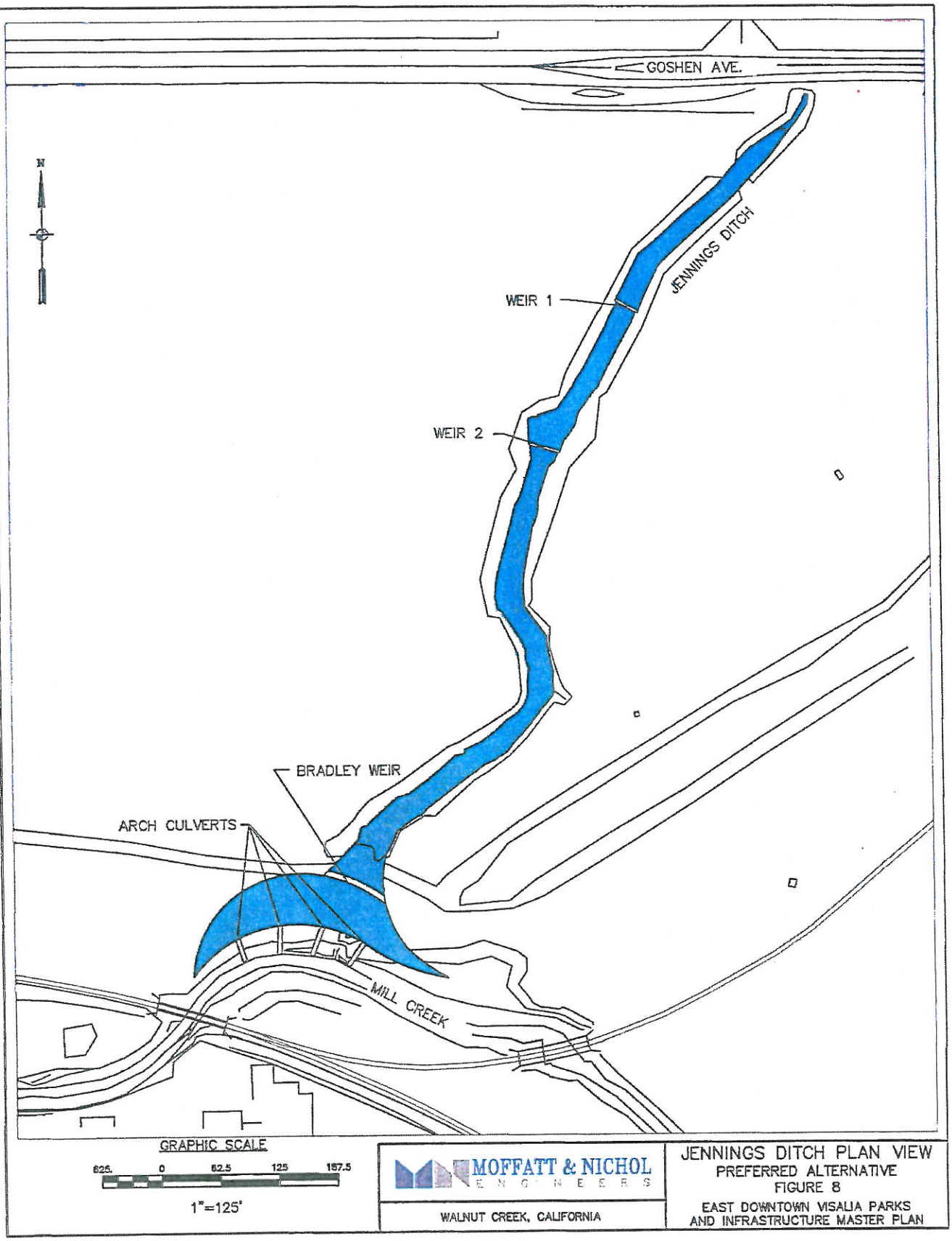
5. City Hall Plaza
- Formal special event plaza

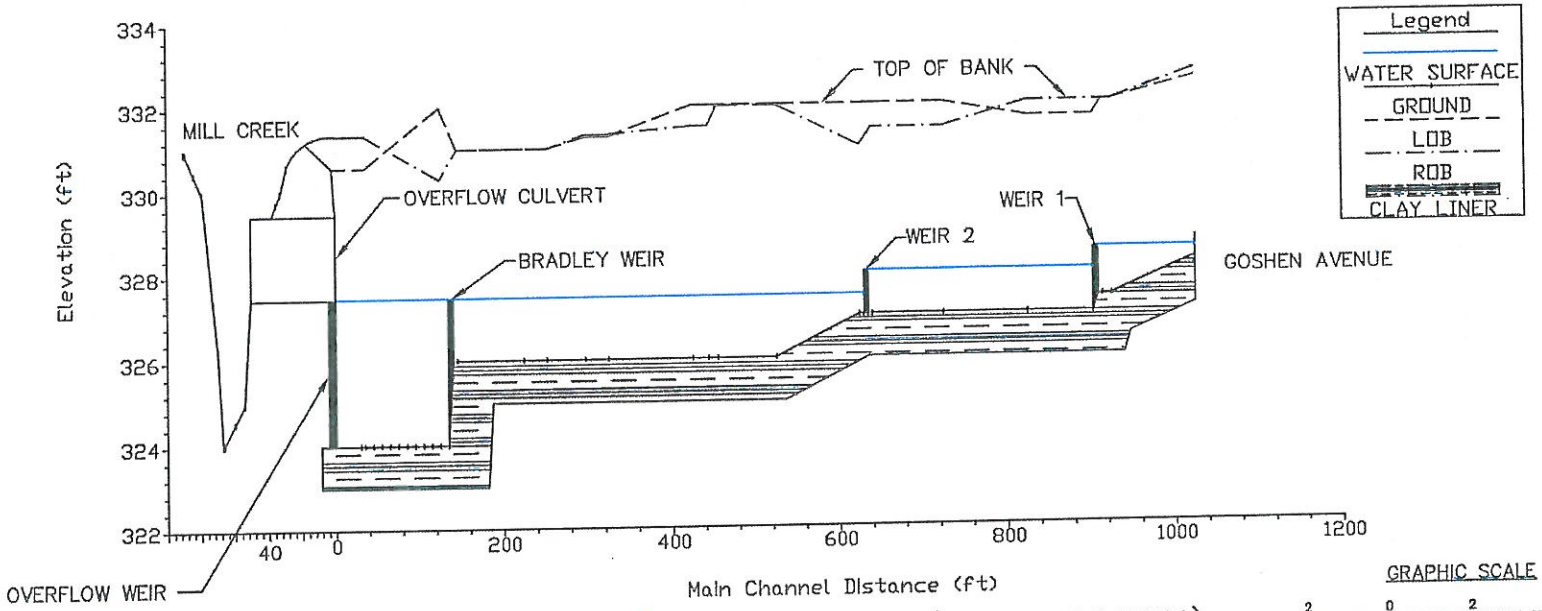
6. Santa Fe Plaza
- Urban plaza and cafe

Figure 7
East Downtown Visalia Strategic Plan for 2025

MOFFATT & NICHOL

East Downtown Visalia
Parks and Infrastructure Master Plan


GOSHEN AVE.
N
JENNINGS DITCH
WEIR 1
WEIR 2
BRADLEY WEIR
ARCH CULVERTS
MILL CREEK
GRAPHIC SCALE
625 0 62.5 125 187.5
1"=125'
MOFFATT & NICHOL
ENGINEERS
WALNUT CREEK, CALIFORNIA
JENNINGS DITCH PLAN VIEW
PREFERRED ALTERNATIVE
FIGURE 8
EAST DOWNTOWN VISALIA PARKS
AND INFRASTRUCTURE MASTER PLAN

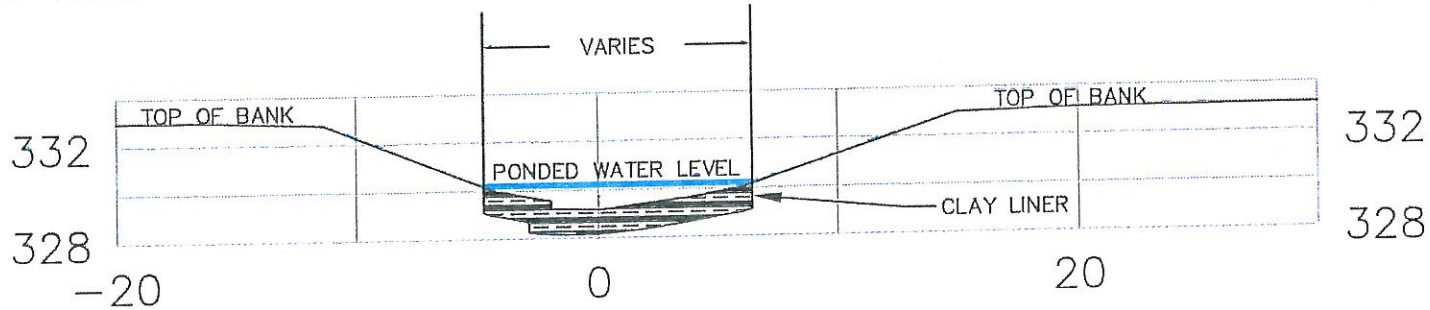


NOTES:
1. BRIDGE CROSSINGS AT BRADLEY WEIR AND WEIR 1 AND 2
2. MILL CREEK CROSS-SECTION AND OVERFLOW CULVERT NOT TO SCALE

WATER SURFACE PROFILE (DRY SEASON)

HORRIZONTAL EXAGGERATION: 1/50x

GRAPHIC SCALE
2 0 2 4 6
1"=4'



TYPICAL CROSS-SECTION

(LOOKING DOWNSTREAM)

GRAPHIC SCALE
10 0 10 20 40
1"=20'

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA

JENNINGS DITCH
PREFERRED ALTERNATIVE
FIGURE 9
EAST DOWNTOWN VISALIA PARKS AND INFRASTRUCTURE MASTER PLAN