DRAFT Memorandum

Date: September 27, 2006

To: City of Sacramento
Attn: Dave Schamber

From: Joy S. Holt, P.E.

Re: Fulton Avenue Development Project Infrastructure

Introduction

The purpose of this utility memorandum is to identify water, sewer and drain infrastructure considered to serve the future development of the Fulton Avenue Development Project. This review of infrastructure service is for the purpose of environmental documentation.

Location

The Fulton Avenue Development Project (project) is located in the north-east quadrant at the intersection of Fulton Avenue and Business 80. The project site will occupy approximately 20 acres adjacent to the existing 356 acres of an existing park. The site is surrounded on the north and east by the Haggin Oaks Golf Course, and will be located on the existing Sacramento Trapshoot Club grounds. Fulton Boulevard bounds the site to the west and Business 80 bounds the project to the south. Arcade Creek is located just north of the proposed Fulton Avenue Development Project. See **Exhibit A** for Vicinity Map. Existing drainage swales across the golf course convey flows from south to north into Arcade Creek.

Zoning of Fulton Avenue Development Project is currently is R-1, the proposed zoning for the 20 acre site is C-4.

Wastewater Collection and Treatment

The City of Sacramento is the local sewer service provider for the Fulton Avenue Development Project site. The City collects wastewater flows from its service area and conveys them through SRCSD facilities to the Sacramento Regional Wastewater Treatment Plant (SRWTP). Generally the City services flows up to 10 mgd and SRCSD services flows greater than 10 mgd. SRCSD is currently implementing large scale improvements to the interceptor system in anticipation of growth over the next 15 years as well as to relieve existing constraints and deficiencies. Future Planned Improvements are identified in the Sacramento Regional County Sanitation District Interceptor System Master Plan (Black and Veatch Corporation).

The Proposed Project is within the City of Sacramento urban services boundary. Flows will be conveyed to Sanitary Sump No. 6 located on Haggin Oaks Golf Course. Flows are then pumped from Sump No. 6 into a 33-inch diameter interceptor maintained by SRCSD.

The existing pumps located in Sump No. 6 are rated with a 110 gallons per minute (gpm) operating flow, a 5 hp motor with a speed of 1,750 rpm, and an electrical power of 460 Volts (specifically a Hydromatic SPGF-500 or equal). There is one pump for operations and one pump for redundancy. Due to the age of the pumps and their performance inefficiency, these pumps will require replacement.

Design Criteria

City of Sacramento Department of Public Works Design and Procedures Manual and Improvement Standards dated September 1, 1990 was used as the basis for design of on-site flows. The flows for the proposed project were generated using the guidelines found in Section 9. Flows were based on the Table in Section 9.1.2 to establish equivalent single family dwelling units (ESD's) per floor area. Average flows were computed by multiplying 400 gallons per day (gpd) by the ESD's for the site. Average flows were then multiplied by a peaking factor obtained from Plate 9-2 in the Appendix of Section 9. This criteria was used to size the on site flows to the Sump pump and force main.

The flows generated from Haggin Oaks Golf Course were calculated based on the number of comfort stops located on the golf course. These 8 comfort stops are equivalent to 8 ESD's. The flows generated for the proposed project were calculated based on the total square footage of the buildings. The proposed project is limited to a maximum of 180,000 square feet of commercial space. This maximum area of 180,000 square feet of commercial building space was used for calculating flows and is equivalent to 18 ESD's. This was calculated using 0.2 ESD per 1000 square feet of commercial building space. Assuming an average of 1,200 gpd of Inflow & Infiltration (I&I), a peak flow of approximately 0.1 mgd was calculated using the appropriate peaking factors (**Exhibit B**).

The Sump Pump was sized based on the 0.1 mgd Peak Wet Weather Flow (PWWF), with maximum flow rate of 0.2 mgd PWWF. The pump must convey flows through the existing 4" force main (approximately 2,900 ft) to a 33-inch gravity sewer. The 4-inch force main has a discharge elevation at the pump of El. 49.80'and an outlet elevation of El. 44.80' (NGVD 1929)

at the connection point with the gravity sewer. With these low flows, a small pump should be selected. Based on the design flows, a Flygt NP3102.181 Model pump has been selected. This pump shall have an impeller diameter of 172 mm with 5 hp motor rated at a speed 1,745 rpm. This information was confirmed through the Flygt Pump sizing program. See **Exhibit E** for the pump curve used to select the pump.

Onsite / Offsite Design Flow

The proposed project is approximately 20 acres for the intended purpose of an auto dealership. The site will have to have two buildings, not to exceed 180,000 square feet (gross). Using City of Sacramento Design Procedures, flows from the 20 acre site are 0.0275 mgd (PDWF). This would be added to the estimated flow from the golf course of 0.0411 mgd (PDWF) and the estimated I&I flow of 0.024 mgd for a total of 0.0926 mgd (PWWF). Calculations are provided in **Exhibit B**.

Pump upgrades will be made to the existing lift station. The existing 4-inch force main will adequately convey the 0.1 mgd, including the golf course flows, proposed project flows, and I&I flows. Additionally, if the adjacent 40 acres of future commercial is developed, the pump and force main will adequately handle these flows as well.

Table 2 – Design Flows

Point of Connection Location	Size of pipe	Ave Flow		I&I	PWWF
		mgd	PF	mgd	mgd
Sump No. 6 (City of Sacramento Standards)	4-inch force main	0.018	3.90	0.024	0.10

Summary

The Fulton Avenue Development Project is within the City of Sacramento service area. The City collects flows and discharges into CSD-1 trunk facilities that convey flows to the SRWTP. The flows from the site were analyzed using the City of Sacramento guidelines and minimum design standards. Upgrades to Sump No. 6 on the Haggin Oaks Golf Course will be needed in order to adequately serve the additional flows from the project site and potential future flows. See **Exhibit C** for utility layout.

Water

Existing facilities

The City of Sacramento is water purveyor for the Fulton Avenue Development Project. Currently, domestic and irrigation demands at the golf course are supplied by on-site wells.

Design Criteria

The City's Water Distribution System Criteria were used to determine water use demands. Maximum Day Demands (MDD) were developed by applying an MDD factor of 1.8 to the Average Day Demand (ADD) estimates. The Peak Hour Demands (PHD) were developed by applying a PHD factor of 1.3 to the Maximum Day Demands (MDD). The demands were then increased by 7.5% to account for system losses per City criteria. **Table 3** shows the ADD, MDD and PHD estimated demands.

The City of Sacramento's Department of Utilities has indicated that emergency storage is not necessary within the project.

As discussed above, the City does not have water facilities nearby that can serve the project. The City has developed an agreement with the Sacramento Suburban Water District to deliver water to the project site. The agreement requires a minimum pressure of 40 psi at the meter and domestic water demands of approximately 250 acre-ft per year, with a peak hour demand of 250 gallons per minute. The fire flow for the site is estimated to be 3,000 gpm which is consistent with Uniform Fire Code requirements.

Water will be delivered from a 12-inch District transmission main to a metering station, located on District Property. A 16-inch transmission main will extend from the metering station, under Business 80, to the project. On-site project pipe diameters will be 12-inches and 8-inches.

Design criteria for the project is located in **Table 4**.

Table 3 – Fulton Avenue Development Project Water Demands

Demand Scenario	Fulton Ave Project Demand (gpm)	Fulton Ave Project Demand Ac-ft/yr
Average Day	43	170
Maximum Day	77	N/A
Peak Hour	101	N/A

Table 4 - Water Distribution System Design Criteria.

Condition	Criteria
Minimum residual pressure at PHD	30 psi
Minimum residual pressure at MDD plus fire flow	20 psi
Maximum residual pressure	40 psi
Maximum velocity for 8 to 12-inch mains at PHD	5 ft/sec
Maximum velocity for 6 to 12-inch mains at MDD plus fire flow	10 ft/sec
Maximum velocity for 18-inch mains and above at MDD plus fire flow	6 ft/sec
Hazen-Williams Coefficient	130
Fire Flow for Commercial and Schools	3,000 gpm

The average annual demand for the project is approximately 170 acre-ft per year. The golf course clubhouse will also be utilizing the new water facilities for its potable water needs. Average annual demand of the Golf Course Clubhouse and Pro Shop are estimated at 9.4 gpm or 15.2 acre-ft per year.

Summary

The City of Sacramento Water Distribution Design Criteria requirements appear to be adequately met by the distribution system proposed. There are several assumptions on which the water demands were based. Future modeling and modifications could be required in order to provide additional detail.

drainage

General

The proposed Fulton Avenue Development Project is located within the City of Sacramento acting as the local regulating agency for storm water discharge. This project will utilize Volume 2 of the City/County of Sacramento Drainage Manual dated December 1996.

Existing Drainage Facilities

Fulton Avenue Development Project, which includes the Sacramento Trapshoot Club Site, is located within the Arcade Creek watershed. Arcade Creek flows in an east to west direction into the Natomas East Main Drain (Steelhead Creek) which discharges into the American River. The project site consisting of approximately 20.0 acres ranges in elevation from El. 69.0' to El. 55.0' (NGVD 1929). Majority of the existing site topography drains in a northeast direction to an existing grassy swale where the shooting range is currently located. The grassy swale continues north, crosses a golf cart path in front of the Golf Course Club House into Arcade Creek. The existing terrain drops in elevation approximate five feet from the shooting tees to the target area.

Majority of the existing Trapshoot Club impervious surfaces, approximately 5.0 acres, includes approximately 100 parking spaces and several buildings located in the southwest corner. There are trees located along the southern and western project boundaries of the site with additional trees along the fairway to the east.

The existing Trapshoot Club parking lot lacks adequate drainage facilities, therefore, the parking lot sheet flows to the west across Fulton Avenue and to the Haggin Oaks Golf Course parking lot into the same grassy swale as mentioned above.

Fulton Avenue currently terminates at the Haggin Oaks Golf Course Parking Lot. The planned extension will continue along the western and northern boundaries of the Trapshoot Club Site, terminating in a cul-de-sac in the northeast corner of the property.

Proposed Drainage Design Criteria

The proposed 20.0-acre site will be developed creating an almost entirely impervious surface site. The on-site parking lot site will be designed to sheet flow and captured in an on-site drainage system designed to accommodate Sacramento Method 10-year frequency peak flows. The preliminary drainage system layout as shown on **Exhibit D** will be finalized with future detailed analysis.

Based on the proposed project location within the Arcade Creek watershed, determination of the project site to require onsite detention mitigation will require a hydrologic and hydraulic analysis of the Arcade Creek watershed for pre- and post-development conditions. If detention is required, the basin will be utilized as a combined water quality/detention basin designed to mitigate post-development peak flows to existing conditions for the 100-, 25-, 10-, and 2-year frequency storm events and will also provide a buffer zone between the golf course and the proposed project. If detention mitigation is determined not to be required, the basin will only

provide the required volume to satisfy the water quality standards set forth in the city standards manual.

The effective 100-year floodplain for Arcade Creek is located outside the proposed project site. The Arcade Creek hydrologic and hydraulic watershed analysis will determine if the project peak flows will coincide with the overall Arcade Creek watershed peak flow in turn having a negative impact to floodplain elevations. Optimizing the basin volume and the project peak flow timing in the overall watershed will allow the project to have no drainage impacts to the floodplain elevations. The goal with onsite detention would allow peak flows to meter at a rate into Arcade Creek after the overall watershed upstream peak flows have accelerated passed the project site.

The proposed 3.4 acre-ft water quality/detention basin will have a low flow culvert (18-inch diameter) that conveys flows across the Golf Course to a point just upstream of an existing culvert/outfall at the cart crossing. Minimal improvements to the grade around the existing culvert/cart crossing will be required. No improvements are proposed for the outfall into Arcade Creek, which is located approximately 65 feet northwest of the cart crossing. Overland release from the basin spillway for peak flow events will sheet flow through the grassy swale in front of the Haggin Oaks Club House and into Arcade Creek.