

MEMORANDUM

To: Ike Njoku, City of Davis
Bob Clarke, City of Davis
Will Marshall, City of Davis
Nick Pappani, Raney Management and Planning

Via Email

From: Wes Owens, Martin Lewis and Chuck Cunningham, Cunningham Engineering

Date: 13 March 2007

Subject: Parlin Wildhorse Ranch – Water, Sanitary Sewer and Storm Drain Conceptual Improvements

CEC Project Number: 799.01

The purpose of this memo is to describe the conceptual water, sanitary sewer and storm drain improvements for the Parlin Ranch project. All design is conceptual and is based on the Current Site Plan for EIR exhibit dated 2/6/2007. See attached memo regarding water and sewer demand for the EIR alternative directed by the City Council. A more detailed engineering study of utilities is not warranted at this time, given the evolving nature of the Site Plan.

Water Distribution System

The site will require a looped water distribution system per City of Davis design standards. In order to maintain a looped water distribution system the project will require two points of connection. There are currently no water stubs feeding into the project site, so the proposed system will need to connect to the existing system at multiple locations. One at the intersection of Carvaggio Drive and Bonnard Street to an existing 8" main and another to the 12" main on the south side of Covell Boulevard. All proposed water distribution facilities will be designed and constructed per City of Davis Standards. The water distribution system internal to the project will also be looped per City of Davis standards. See attached Exhibit A.

Sanitary Sewer System

There are four preliminary options for sanitary sewer service to the proposed site:

1. Option 1 - Gravity system connecting to the existing Wildhorse Subdivision sewer system. With this option there are two possible points of connection. The 6" SS main at the end of Carvaggio Place and the 6" SS main at the intersection of Carvaggio/Bonnard. See Option 1 in attached Exhibit B. The 6" line in Carvaggio increases in size to an 8" line at the intersection of Carvaggio and Bellows Street. Capacity of the downstream pipelines and connection point elevations would need to be confirmed to determine the feasibility of either of the options. However, given the shallow depths of these connection points, large quantities of fill would be required to allow gravity discharge. Given the cost and design challenges of elevating the site, this Option is not considered viable.
2. Option 2 - Gravity drain to the existing 42" sewer trunk to the north of the Wildhorse Golf Course. See Option 2 in attached Exhibit B. The 42" line is a primary conveyance leading directly to the Davis Wastewater Treatment Plant and City Public Works staff has previously indicated excess capacity is available in this line.
3. Option 3 - Construct on-site central lift station and force main to the 42" sewer trunk to the north of Wildhorse Golf Course. See Option 3 in attached Exhibit B. Given the cost to construct a sewer pump station to current City standards, Option 3 is likely more expensive than Options 2 and 4.
4. Option 4 - Gravity to sewer in Monarch Drive. This option involves collecting Parlin Ranch wastewater at the south end of the property, then running a connecting line across Covell Blvd to an existing 8" line in Monarch Drive. The capacity of these downstream lines, as well as the capacity of the Manzanita Sewer Lift Station would need to be confirmed.

Note that these alternatives have only been reviewed as preliminary and more detailed analysis of costs, grading and constructability will be performed during the tentative map stage. However, at least two alternatives – Options 2 and 4 above – appear viable.

Storm Water Management

The project site comprises a drainage area of about 25 acres. It is located within the Covell Drain watershed, near the downstream end of that drainage basin.

The existing site generally drains from south to north, discharging to an inlet near the site's northeast corner. The inlet drains to an existing 36" storm drain pipe, which outfalls into Channel A near the northeast corner of the adjacent Wildhorse residential development. The 36" pipe was originally sized to convey the project site's 10-year peak discharge, assuming agricultural use (Wildhorse Units 2 & 3, 10-Year Storm Drainage Calculations, Psomas, 1-25-99). The pipe's design discharge was 6.2 cubic feet per second (cfs).



Ike Njoku, City of Davis
13 March 2007
Page 3

The proposed site drainage conditions are depicted in Exhibit C. Upon development of the project site for residential use, it is proposed that the existing outlet pipe continue to be used as the site's outlet conveyance to Channel A. The conversion of agricultural land to residential use will increase the stormwater runoff generated onsite. Specifically, the 10-year post-developed peak flow will exceed the existing 36" outlet pipe's design discharge of 6.2 cfs. In order to mitigate for the increase in peak discharge, distributed stormwater detention will be incorporated into the project site. It is proposed that sufficient detention ponding volume be provided to reduce the project site's post-development 100-year 24-hour peak flow to a maximum of 6.2 cfs. Using the HEC-HMS computer program, preliminary hydrologic calculations for the project site indicate a 100-year 24-hour post-development peak flow of 54 cfs. This will be attenuated to 6.2 cfs by the provision of approximately 3 acre-feet (ac-ft) of onsite detention storage.

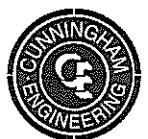
Onsite runoff will be conveyed to distributed local detention areas via overland drainage and underground piping. A portion of the required 3 ac-ft of detention storage will be within the proposed on-site neighborhood greenbelt, and the remainder in the western part of the expanded 200' Davis Greenbelt, abutting the east edge of the site. In addition to accommodating detention for the 100-year event, these open areas may include stormwater Best Management Practice (BMP) facilities in combination with other BMP's throughout the site. It is not envisioned that dedicated, stormwater detention 'ponds' will be required, rather current designs emphasizing Low Impact Development such as vegetative swales, rain gardens and pervious pavements will be incorporated into the site design. We note that City of Davis General Plan policies specifically allows for stormwater detention within ag buffer areas.

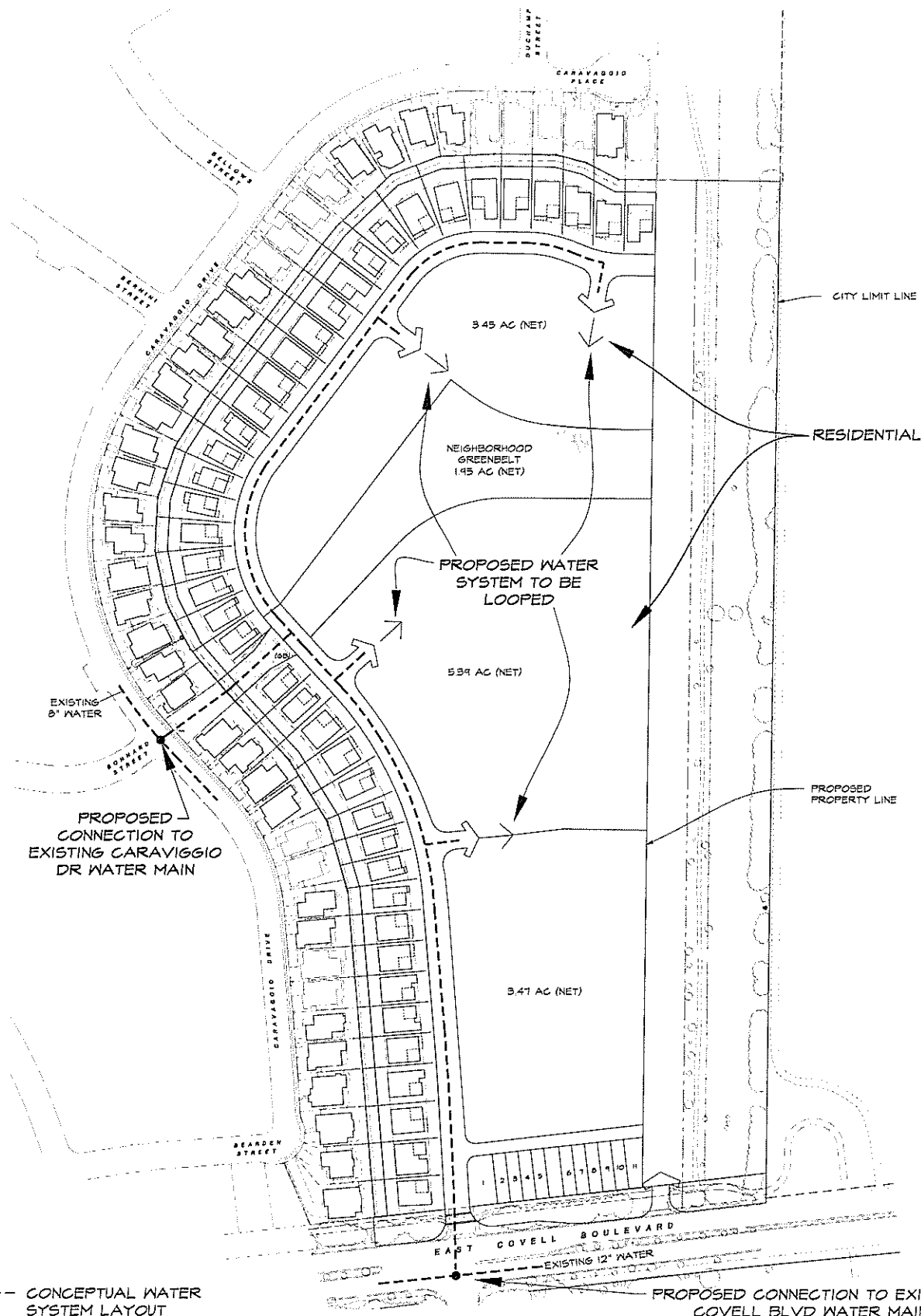
In order to assess the potential effects of the post-development 100-year peak flows on the flows in Channel A, the estimated timing of the project site's peak outflow was compared with Channel A's peak flow timing. This was accomplished by referring to a previously-completed hydraulic analysis for Channel A (Covell Village Master Drainage Plan, Mead & Hunt, December 2004).

In comparing the timing of peaks for the 100-year 10-day storm, the site's peak outflow (nominally 6 cfs) preceded Channel A's peak flow (over 1000 cfs) by about 6 hours. By the time Channel A's peak flow was attained, the site's outflow had receded by almost 50%. As such, the site's post-development flow is not expected to have a material effect on 100-year peak flows in Channel A.

Enclosures: Exhibits A through C; Water and Sewer Demand Memo

cc: Masud Monfared

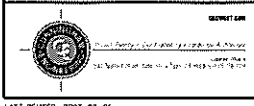




--- CONCEPTUAL WATER SYSTEM LAYOUT

PROPOSED CONNECTION TO EXISTING COVELL BLVD WATER MAIN

NOTE: WATER MAIN LAYOUT AS SHOWN IS CONCEPTUAL. ACTUAL LAYOUT AND MAIN SIZES TO BE DEFINED DURING THE DESIGN PROCESS.



DAVIS
 PARLIN RANCH
 CONCEPTUAL WATER SYSTEM LAYOUT
 EXHIBIT A
 CALIFORNIA

DATE: MARCH 5, 2007
 PROJECT#: 7494.01

OPTION 1B: POINT OF CONNECTION (EXISTING 6" SS)

OPTION 2: POINT OF CONNECTION (GRAVITY TO EXIST 42")

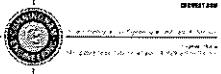
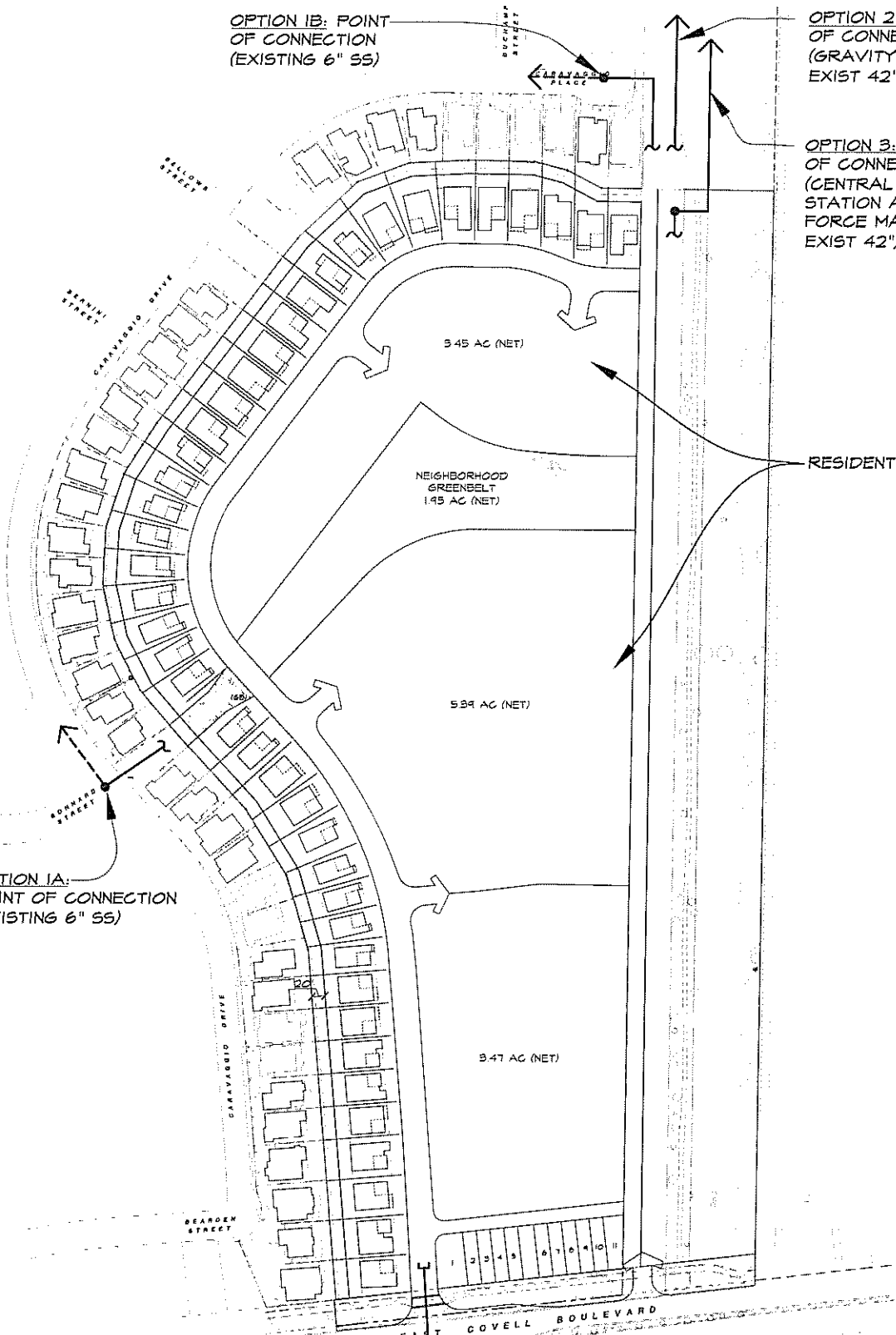
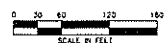
OPTION 3: POINT OF CONNECTION (CENTRAL LIFT STATION AND FORCE MAIN TO EXIST 42")

OPTION 1A: POINT OF CONNECTION (EXISTING 6" SS)

RESIDENTIAL

OPTION 4: POINT OF CONNECTION (MONARCH LANE)

NOTE: SANITARY SEWER LAYOUT AS SHOWN IS CONCEPTUAL. ACTUAL LAYOUT AND PIPE SIZES TO BE DEFINED DURING THE DESIGN PROCESS.



DAVIS

PARLIN RANCH
CONCEPTUAL SEWER SYSTEM
EXHIBIT B

CALIFORNIA

DATE: MARCH 5, 2007
PROJECT#: 799.01

EXIST. 36" SD DISCHARGES TO CHANNEL A

PROPOSED CONNECTION TO EXISTING SD MAIN

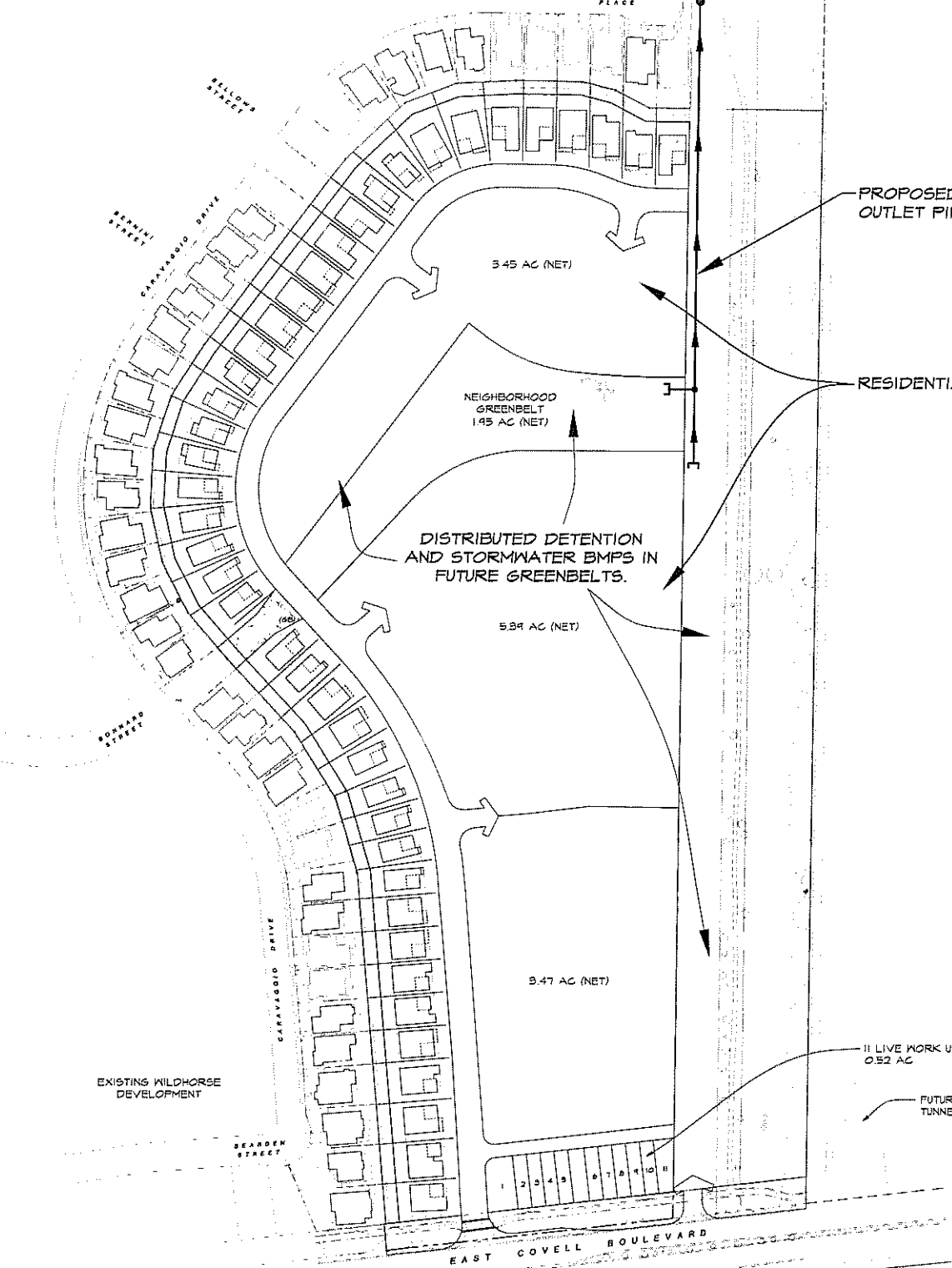
PROPOSED OUTLET PIPE

RESIDENTIAL

DISTRIBUTED DETENTION AND STORMWATER BMPs IN FUTURE GREENBELTS.

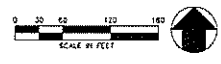
11 LIVE WORK UNITS
0.52 AC


FUTURE BIKE TUNNEL



CONCEPTUAL STORM DRAIN LAYOUT

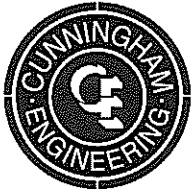
NOTE: STORM DRAIN LAYOUT AS SHOWN IS CONCEPTUAL. ACTUAL LAYOUT AND PIPE SIZES TO BE DEFINED DURING THE DESIGN PROCESS.




 DEPARTMENT OF PUBLIC WORKS
 1500 J STREET, DAVIS, CALIFORNIA 95618
 (530) 756-1000 FAX (530) 756-1001

DAVIS **PARLIN RANCH** CALIFORNIA
 EXHIBIT C: CONCEPTUAL STORM DRAIN SYSTEM
 EXHIBIT C

DATE: MARCH 5, 2007
 PROJECT#: 749.01



MEMORANDUM

To: Bob Clarke, City of Davis
Will Marshall, City of Davis
Ike Njoku, City of Davis
Nick Pappani, Raney Management and Planning

From: Chuck Cunningham, Cunningham Engineering

Date: 13 March 2007

Subject: Parlin Wildhorse Ranch – Water and Sanitary Sewer projected demands

The purpose of this memo is to provide an estimate for the water and sanitary sewer demand of the Parlin (Wildhorse) Ranch site. The calculations are based on the City Council selected plan for EIR analysis of up to 259 residential units. In compiling our estimates of demand, we referred to per capita demands identified by the City during the Covell Village EIR process, specifically Appendix I of Volume 2 of the DEIR and a June 8, 2005 memo from Bob Weir, Public Works Director, to Jim Antonen, City Manager. Applicable portions are attached.

A separate memo is being prepared by our office addressing connection points for these utilities, as well as a conceptual stormwater management plan.

Water Demand

The above referenced documents set forth a per house population (MF and SF) of 2.5 people per unit, and a per capita average daily flow rate of 205 gpd. We believe the per capita rate is very conservative to Parlin Ranch, given the smaller house and yard size inherent in the higher density alternative identified by the City Council.

The estimated water demands are as follows:

PEOPLE PER UNIT	2.5 p/u
MAXIMUM UNITS	259
POPULATION	648 people
AVERAGE DAILY DEMAND (gallons per capita per day)	205 gpcd
AVERAGE DAILY DEMAND (millions of gallons per day)	0.133 mgd
TOTAL DEMAND (acre feet / year)	153 afy
PEAK DEMAND (avg. daily *3)	0.40 mgd or 278 gpm

Peak demand includes fire water requirements.

Recent deep wells in Davis have proven out at or above 2000 gpm. For example, Wells 30 and 31 tested out at over 2500 gpm. At a conservative capacity of 2000 gpm, Parlin Ranch demand reflects approximately 14% of a single well capacity.

Sanitary Sewer Demand

The above referenced documents set forth a per house population (MF and SF) of 2.5 people per unit, and a per capita average daily flow rate of 95 gpd.

Sanitary Sewer Demand = 259 units*(2.5people/unit)*(95gallons/capita-day) = 0.062 mgd

With respect to wastewater treatment plant capacity, Parlin Ranch is a relatively minor contributor to available capacity. During the Covell Village EIR process, it was estimated that current wastewater flows were 6.25 mgd, with a plant capacity of 7.50 mgd. The demand of 0.062 mgd for Parlin Ranch is less than 5% of remaining capacity. The above referenced June 2005 memo estimates that existing flows plus full build-out of the current General Plan will total less than 7.0 mgd. Again, the relative minor contribution of the Parlin Ranch project falls well within the available plant capacity.

Attachment: June 8, 2005 Staff Report



Memorandum

June 8, 2005

TO: Jim Antonen, City Manager

FROM: Bob Weir, Public Works Director

SUBJECT: Covell Village; Wastewater Treatment Plant Capacity and Upgrade Costs

The issue of the wastewater treatment plant capacity was discussed during the last two Planning Commission meetings and last night's Council meeting as part of the Covell Village project deliberations. During the Planning Commission meeting questions were raised regarding some assumptions used in the Final EIR regarding the population per multi-family dwelling unit. In summary: 1) The plant has sufficient capacity for general plan build out plus Covell Village. 2) The expensive plant upgrades are independent of the Covell Village project. The upgrades are mandated to meet new water quality requirements for the existing 7.5 mgd plant.

The treatment plant has sufficient capacity to accommodate the Covell Village project. Recent discussions have asked if the assumed occupancy value of 2.39 people per multi-family dwelling unit is an acceptable value. This was derived from the 2000 census data and subsequently used for the most recent impact fee analysis. However, as a separate check of plant capacity, we can use the 2.50 historical number for persons per dwelling unit and then calculate the needed plant capacity:

Occupancy Using Historical Population

Parameter	Year					
	1990	2000	2001	2002	2003	2004
Total Dwelling Units, du	18310	23617	24081	24503	24670	25072
Percent Vacant Dwelling Units, %	1.95	2.83	2.15	2.15	2.15	2.15
Occupied Dwelling Units, du	17953	22948	23564	23977	24140	24533
Total Population, City of Davis, persons	46322	60308	61801	63235	63776	64472
Persons Per Occupied Dwelling Unit	2.467	2.499	2.491	2.508	2.513	2.501

Source: Dept of Finance

Using 2.5 persons per dwelling unit for Covell Village indicates sufficient treatment plant capacity for general plan build out and the complete phasing of Covell Village, as shown here:

Treatment Plant Capacity	7.5 mgd
Existing city plus current general plan build out	7.0 mgd
Covell Village at 1864du x 2.5 persons/du x 95 gpcd	0.44 mgd
Remaining Plant Capacity	0.06 mgd

The 7.0 mgd flow at general plan build out is a very conservative estimate but even so, there is 0.06 mgd remaining capacity. The build out assumption includes Lewis Homes development of ConAgra as mixed use and assumes the development of all remaining vacant parcels using very conservative discharge estimates for various types of development (see the page 3 table for three examples comparing conservative discharge estimates with the actual expected discharge based upon a project specific). If the project specific calculations were substituted for all of the remaining vacant lands, then the **remaining plant capacity would be much greater than 0.06 mgd.**

As another check of the capacity assumptions for the existing treatment plant, the five-year average dry weather flow at the treatment plant as of May 2004 is 6.25 mgd. The proposed general plan growth rate of 1 percent per year, adjusted to account for exemptions and exceptions would be approximately 1.23 percent a year per the Community Development Department estimate. Using a composite growth rate of 1.23 percent per year applied to the 2004 flow would take existing plant capacity out to the year 2020.

The current discussions concerning the Covell Village project and the wastewater treatment plant capacity are taking place at the same time the city is in the middle of a master plan project for the upgrade of the existing wastewater treatment plant. This master planning effort was made necessary by the NPDES permit received by the city in 2001. The requirements included in the permit for the city's treatment plant are not attainable with the existing plant. The original permit was appealed and later remanded back to the Regional Water Quality Control Board for re-issuance. At the present time we anticipate a new permit in early 2006 that will be very similar to the 2001 permit. We again note here that the requirements of the new permit apply to the treatment plant discharge even if no additional connections are made to the system. Stated another way, the large costs for upgrading the wastewater treatment plant will exist whether Covell Village moves forward or not and are not caused by the Covell Village project. This is a water quality issue not a volume issue.

At the May 23 Natural Resource Commission meeting, an update on the Wastewater Master Plan process was given to the commission. An estimate of the project costs for an enhanced treatment plant to comply with anticipated new permit requirements is now in the range of \$125-\$140 million. This new estimate is calculated in 2010 dollars and will continue to be refined leading up to a September decision on alternatives to pursue for permit compliance. The anticipated project being discussed is a treatment plant with the same capacity as the existing plant, 7.5 mgd. The Council is scheduled to receive an update of the Master Plan process at the June 14 meeting.

Discussions concerning the capacity of the wastewater treatment plant are frequently confined to the average dry weather flow of the plant. This is an appropriate short-hand measure for discussion purposes and is also a critical measure of the state regulatory permitting process. However, as we have noted in the past the capacity and design of the plant to achieve that capacity is complex, and involves a great many other factors and considerations. The wastewater treatment plant master planning effort and subsequent design work will address in much greater detail estimates of population growth, flow assumptions to the plant and the design of the individual processes at the plant to accommodate the flow and loadings anticipated for the next 20 plus years.

Parcel & Land Use	Quantity	Assumed Conservative Unit Value	Conservative Discharge Estimate	Expected Discharge Based On Calculations for Specific Project
South Davis, general commercial/retail	6.4 acres (60,000 sq ft)	1,900 gal per acre	Estimated flow 12,160 gpd	Actual flow 1,350 gpd (building footprints 60,000 sq ft, FAR 22% and 1.5 employees per 1,000 sq ft and 15 gpd per employee)
South Davis, church site	10.2 acres (110,000 sq ft church & facilities)	1,900 gal per acre	Estimated flow 19,400 gpd	Actual flow 8,800 gpd (building footprints 110,000 sq ft FAR 25% and 1.0 parishioner per 100 sq ft and 8 gal per parishioner)
Mace Ranch, Target site	19.0 acres (Target 123,600 sq ft, restaurant 12,000 sq ft and retail 20,000 sq ft)	1,900 gal per acre	Estimated flow 36,100 gpd	Actual flow 9,000 gpd (Target 2 employees per 1000 sq ft and 15 gpd per employee, plus 100 meals per 1000 sq ft and 4gal per meal plus 20,000 retail and 1.5 employees per 1000 sq ft at 15 gpd per employee)
Totals for These Three Parcels			67,700 gpd	19,200 gpd

Calculating the expected discharges from the undeveloped city parcels as opposed to using flows per acre will yield significantly less discharges for every vacant parcel. Therefore, there is a significant cushion in the 7.0 mgd build out value shown on page 3. Almost every vacant parcel when developed will have actual discharges much smaller than the conservative assumptions. Therefore, the total flows at general plan build out plus the Covell Village project flows will not exceed the 7.5 mgd plant capacity.