

MACKAY & SOMPS

CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING
1771 Tribute Road Suite E Sacramento, CA. 95815-4487
916-929-6092

PROJECT UPDATE

TO: Centex Homes
FROM: Ken Allred
RE: Vintara Park – Updated Conceptual Storm Drainage Plan
DATE: January 20, 2005 (Updated from 11/15/04)

This Project Update is provided for clarification of certain items noted in the 11/15/04 Project Memo, which provided a description of the proposed storm drainage facilities necessary for the development of the proposed Vintara Park (VP) subdivision in the City of Elk Grove, CA. It is divided into the following 5 sections to progress the reader from a basic understanding of the project's existing topographic and hydrologic condition to a familiarity with the facilities proposed to mitigate impacts coincident with its development into a residential subdivision. These sections are:

- Existing Site Topography and Storm Drainage Patterns
- Existing Floodplain Status
- Proposed Development Storm Drainage
- Proposed Detention/Stormwater Quality Facility Maintenance Requirements
- Downstream Hydromodification

Topography and Storm Drainage: Detailed 1' contour interval topography (November 2003) shows a high elevation of 71 feet along Waterman Road at the mid-eastern property line to a low of 39 feet at the southwest corner. However, the primary direction of fall and storm runoff for the onsite topography is from east to west. Small portions of the site do drain to the southwest corner (12± acres) and to the southeast corner (< 1 acre).

The project site is near the upstream limits of a small intermittent drainageway known as Whitehouse Creek (WCK), which begins at its recently constructed confluence (2001 – 2002) with Laguna Creek just east of Highway 99 approximately 2 miles west of the project site. Over the past 20 years the downstream 1¼ ± mile of WCK has been segmentally realigned in various trapezoidal channel configurations, from pure drainage conveyance to certain reaches designed to incorporate environmental mitigation areas. These formed trapezoidal segments, all designed to fully accommodate developed conditions runoff from the 100-year design storm event on the adjacent properties, end at the UPRR tracks 400' ± downstream of Elk Grove-Florin Road (EGFRd) just over ½ mile west of the site.

From the UPRR, WCK varies in shape as it continues upstream in altered alignments as follows:

- Easterly in a shallow and wide V-swale through a livestock grazing pasture from UPRR to EGFRd;
- Southeasterly in a U-shaped ditch/channel of varying size and depth with minimal vegetation through light industrial sites for about 550', including property access culvert crossings (Note: Sacramento County holds a drainage easement through these properties for WCK, although the drainageway is actually located outside of the easement);
- Easterly in a U-shaped ditch with minimal vegetation located along the south side of the closed Dixon Landfill for about 1,000' (Note: An approximately 100 acre southerly subshed of WCK also begins here, draining the Quail Ranch Estates RD-2 – 5 residential subdivision into WCK via a large diameter pipe);
- Easterly in a U-shaped ditch with minimal vegetation located along the south side of an unused 40-acre parcel (GR designated AR-2 land use) for about 800';
- Shallow V-swale 700'± southeasterly through 2 ~ AR-5 residential parcels, then continuing southeasterly under/across Campbell Road through another AR-5 parcel about 500' to its entry into the VP property's west property line. A privately owned "online pond" currently exists in the most northern of these AR-5 parcels, which interrupts lower-level storm runoff from proceeding downstream.

From its entry into the project site, WCK has been manipulated into a series of manmade (early 1950's) facilities, which detain varying levels of storm runoff behind check dams and berms. The swale connecting the primary facilities runs northeasterly through the site to a drainage ditch at the mid-point of the north property line. This ditch is the main drainage facility for approximately 110 acres of AR-2 "ranchette" development north of the site. The storm runoff for this AR-2 development, which extends about ½ mile north of the site, is carried southerly by both roadside and rear property line ditches to the above release point into the site. No detention or water quality treatment is provided from this AR-2 development prior to its storm runoff entering the site.

No records of the intent of the series of manmade facilities within the site have been located at the local storm drainage agencies of either Sacramento County or Elk Grove, at the previous owner County Sanitation District No. 1, or with the Corps of Engineers. The single source of information to-date was a Spring 2004 conversation with Mr. Merwin Rose, a retired prominent local engineer and surveyor (Rose's Engineering). Mr. Rose recalled working for the Corps of Engineers in 1949 – 50 and doing soil testing on this site for the purpose of constructing flood-prevention facilities. He did not recall if the current check dams and berms were the results of that testing. It is possible these facilities are actually illegal, and from recent (Spring 2004) geotechnical evaluation, appear to be inadequate structures per today's standards.

However, whether illegal, structurally inadequate or not, these manmade features do act as flood control by detaining significant portions of large storm events.

The small sheds noted at the end of Paragraph 1 of this section drain as follows: SW Corner) – drains into an existing storm drain in Bond Road, then into the aforementioned Quail Ranch pipe system; SE Corner) – joins another 2± acres of land draining into a roadside culvert along Bond Road then into Laguna Creek at the just south of the Bond Road/Waterman Road intersection.

Floodplain Status: Current FEMA flood mapping (FIRM Panel 060262 0340 D, July 6, 1998) shows the bulk of the site in White Zone X – “areas determined to be outside 500-year floodplain.” A portion of the onsite WCK which runs easterly is noted as being in Shaded Zone X – “areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.” There is a small portion of the southwest corner of the project in Zone AE – “base flood elevations have been determined.”

This FEMA map also shows a continuous Zone AE adjacent to the project on both the Quail Ranch Estates subdivision and along the WCK alignment west of the site. Further research with Sacramento County revealed a Letter of Map Revision (LOMR) was submitted and approved in the late 1990’s, thus removing the adjacent subdivision (Quail Ranch Estates) from Zone AE. This LOMR did not address the VP property; therefore a new LOMR will eventually have to be submitted to remove that designation.

Proposed Development Storm Drainage: In accordance with current Elk Grove and Sacramento County storm drainage design criteria, the VP project is required to detain storm runoff rates to “at or below” existing conditions for the 2-, 10- and 100-year design storm events. Additionally, stormwater quality facilities must be provided in accordance with the State Permit held by Sacramento County (of which Elk Grove is a party) to mitigate the impacts to stormwater quality coincident with residential suburban development.

For Storm Runoff Detention, the project proposes the use of the majority of 2 of the existing manmade facilities, both of which have been determined by the Corps of Engineers to now be jurisdictional waters. Development of the proposed subdivisions will incorporate a buffer between the “wetland preserve” areas and adjacent roads and houses. As there are no records of the check dam/berm design or construction, it is necessary to reconstruct these to current design standards and to incorporate appropriate controlled-release structures.

From preliminary hydrologic and hydraulic calculations, additional earthen berming along the perimeter of these 2 designated wetland preserves will provide adequate volume for the project’s detention requirements, and actually increase the surface ponding area during the major storm event by approximately 1 acre. Therefore, no excavation of the wetland preserves is necessary to achieve the project’s detention requirements. The proposed controlled-release structures will be set to approximate the existing release elevations for both minor and major runoff events; therefore, the proposed detention ponding elevation will also approximate the existing detention ponding elevation.

Here it is important to note that Sacramento County’s master drainage plan for WCK (1993 – 1994) discounted the existence of the various manmade features on the VP site and provided design for release of the entire “pre-1950” condition 100-year design storm runoff. Use of this stormflow quantity is further evidenced by the existence of the large Zone AE on the current FEMA maps. However, field review of the immediate downstream portion of the WCK swale does not show evidence of that level of stormflow, indicating significant attenuation of the existing condition flows within the manmade features. As such, it may be necessary for VP’s proposed development to accommodate “over-detention” within its 2 facilities to reduce storm-release levels similar to actual existing conditions. In this case, it may be necessary to utilize a portion of the proposed park facilities for detention of the 50- to 100-year design storm event in order to achieve adequate storage volume.

The northerly manmade facilities, which pond storm runoff entering the VP project site from offsite properties to north, are to be left undisturbed and will continue their stormwater detention function. They are depicted on the accompanying Conceptual Stormwater Drainage Plan as Wetland Preserve & Historic Upstream Stormwater Detention.

The existing pipe system stubbed to the southwest corner of the site was designed by Sacramento County to accommodate developed conditions. No detention is required there. Developed conditions runoff from the very minor shed in the southeast corner will become part of a larger project encompassing the entire northwest quadrant of Bond/Waterman and will be detained in accordance with requirements of Elk Grove at that time.

For Stormwater Quality, the project proposes the use of a series of biofiltration swales. These will be designed to capture the 1st flush rainfall events and seasonal suburban irrigation runoff for developed areas draining into the wetland preserve/detention facilities (WP/DF). Larger rainfall events will drain directly into the WP/DF. Long and relatively flat, these bioswales are intended to increase the quality of minor event runoff and irrigation prior to the water entering the WP/DF. While not yet calculated, it is anticipated significant portions of the storm/irrigation runoff entering the bioswales will dissipate by infiltration and evaporation, minimizing the need for such water to enter the WP/DF.

Due to grading constraints of the proposed VP project, it is likely not possible for the small portions of developed areas west of the WP/DF to drain into it. Rather, they will release directly west into the WCK swale along the project's west property line.

Stormwater quality for the areas which do not drain into the WP/DF (west property line, southwest and southeast corners) will be handled in accordance with requirements of Elk Grove.

Proposed Facility Maintenance: The biofiltration swales will likely require annual maintenance to keep vegetation to levels which allow the slow flow of water. Such maintenance may include rough mowing, debris/sediment removal and selective plant removal. Where possible, these bioswales will be located outside the proposed 25' setback along the WR/DF.

The WP/DF will require the ability for "gross" maintenance. Such maintenance is rarely necessary on an annual basis, and will be done in conformance to a long-term management plan similar to those the federal agencies have entered into with Sacramento County in other drainageways. The cleaning of the actual outlet control structures is needed on an annual basis, and will also be done in conformance with a long-term management plan. It is also anticipated that maintaining use of the existing manmade upstream ponding facilities will provide excess stormwater detention, which may then reduce the overall frequency of maintenance.

Downstream Hydromodification: Coincident with suburban development, and in the event periodic climatic conditions and the project's final development configuration do not allow the infiltration/evaporation of 100% of the seasonal suburban irrigation runoff, the downstream portions of WCK may receive more frequent flows of water.

Additionally, even though the storm runoff release from the VP project will be less than the existing condition design flows calculated in the '93 – '94 Sacramento County master drainage plan for WCK, the increase in volume of storm runoff from pre- to post-development conditions will lengthen the "time of water" within the WCK swales and ditches. Depending on the design storm event, the duration of dispersal of the additional runoff volume may range from less than an hour in the 2-year ~ 24-hour event to 24- to 48-hours in the major storm events.

As noted in the bulleted items on Pages 2, the downstream ditch/channel has undergone significant alterations as properties have developed over the past 50+ years. It appears some degree of ditch/channel maintenance periodically occurs from observations made by MacKay & Soms personnel during field visits as part of our preliminary hydrologic/hydraulic calculations for this project. Storm runoff from the light industrial and residential properties appears to enter the ditch/channel unabated relative to rate, volume and stormwater quality. The degree of attenuation of flow rate and volume attributed to the existence of the private online pond on the AR-5 parcel approximately 900' downstream of the project has not been determined.

In discussions with Sacramento County and Elk Grove drainage staff during late '03 and early '04, it is MacKay & Soms understanding the local municipalities desire the completion of the upstream portions of WCK in accordance with the Sacramento County '93 – '94 drainage master plan, including relocation of the ditch/channel to within the existing easement where available. As is typical in this region, major storm drainage facilities are constructed as part of development projects to the degree the "offsite" lands are available for such work.