November 2, 2017

Storm Water Summary for Indian Valley, Moraga, California

1. Introduction

The proposed Indian Valley project is a single family residential community of 71 homes situated on approximately 141 acres located in the Town of Moraga, California, southwest of Moraga Way and north of Canyon Road. The subject parcel fronts approximately one-half mile along Canyon Road. The proposed project is set back from Canyon Road nearly 300 feet and is nestled between two existing ridges in the lower valley of Indian Creek. The project is located above the north side of Indian Creek approximately one-half mile upstream from the confluence with San Leandro Creek. The existing project site is covered by grasslands, scattered trees, an abandoned walnut orchard and is used for cattle grazing. The site is an alluvial valley that drains naturally toward Indian Creek. The limits of the valley are defined by Gudde Ridge (Indian Ridge) to the northeast and an unnamed ridge to the southwest.

The details of the Indian Valley project site and the proposed development are shown on the sheets of the Conceptual Development Plan. The project site is situated upstream of Indian Creek, parallel to the creek. The project is designed with a series of detention and water quality basins. Proposed detention basins and water quality basins are strategically located though out the project site. These basins discharge to tributaries to Indian Creek and then eventually to Indian Creek itself near Canyon Road. The existing principal roadways serving the project are Moraga Way and Canyon Road. The site will be serviced by a new roadway system with a tee intersection at Canyon Road on the north side of Indian Creek.

The pre and post development watersheds cover an area of approximately 640 acres. The soil type across the site is predominately type D.

2. Existing Drainage Patterns

The existing project area consists of several small drainage tributaries that flow down from the two existing ridges, across the valley floor to Indian Creek. Indian Creek flows in a southwesterly direction toward Canyon Road, thence south along Canyon Road to its confluence with San Leandro Creek.

3. Proposed Drainage System

The storm drainage system for this project consists primarily of strategically placed detention basins and water quality basins throughout the development, grassy swales along the proposed emergency vehicle access and public trail, road side ditches with flush curb and vertical curbs along the main access road, closed conduit gravity pipe network (pipes, manholes and catch basins) with control and outfall structures discharging to the small tributaries which then drain down to existing Indian Creek. A small portion of the project drains towards Canyon Road discharging into an existing swale to the southeast of Canyon Road. The proposed improvements

to this area will consist of road widening to Canyon Road. Water quality treatment areas will be incorporated in the design at the new intersection of the main access road and Canyon Road.

The proposed storm drainage system for the project will be designed so that; (1) the existing drainage patterns remain essentially the same as pre development condition, (2) post development peak discharge rates will remain below historic levels as required by the Contra Costa County Flood Control District and the Town of Moraga, and (3) the proposed project will not cause or contribute to downstream erosion or hydromodification. The storm drainage system for the project will also be designed to bypass any natural tributary drainages that currently drain across the site and allow them to drain directly into Indian Creek, thus eliminating the need to have to detain or treat these natural drainage flows.

4. Proposed Stormwater Conveyance System/Flood Control

The flood control system for the project is to be designed to meet the requirements of the Contra Costa County Flood District and the Town of Moraga. The Town requires the closed conduit and channels for the storm drainage system to have sufficient capacity to contain the ten-year frequency storm runoff.

The Town also requires storm drainage facilities for residential development to meet the standards and requirements of the Contra Costa County Flood Control District. The detention basins have been sized to meet the County's primary design requirements which include; (1) detention basins for drainage areas less than one square mile, which is the case for the project site drainage areas, and to be sized for a 10-year frequency storm, (2) the 24-hour storm duration that has been used to determine storage of the basins and the pipe sizing, and (3) the basins will be designed to pass the historic 100-year frequency storm through the basin allowing for a depth of freeboard above the maximum water surface elevation in the basin as required by the county flood control district.

The Contra Costa County Hydro 6 program is used to compute hydrographs for (2, 10 & 100 year frequency 24- hour duration storms) for the conceptual plan of this project.

The project will also address any impact or necessary changes to the Federal Emergency Management Agency's Floodplain Mapping designation for Indian Creek.

5. Hydromodification.

The project proposes to develop an outlet structure for the detention basins that will meet the hydromodification requirements of the C.3. Stormwater Control Plan required by the Contra Costa County Clean Water Program.

6. Dam Safety

All of the proposed detention basins for this project fall below the Jurisdictional Dam Size of the State of California, Department of Water Resources, Division of Safety of Dams. Therefore, the detention basins are not subject to these Dam Safety Regulations.

7. Stormwater Quality Management (Best Management Practices)

Separate water quality treatment basins will be utilized to provide water quality treatment for the project.

A Final C.3. Stormwater Control Plan as required by the County and the Town will be prepared during the final engineering design phase and a Water Quality Permit from the Regional Water Quality Control Board will also be required. The above two items will address the project's water quality design requirements in a comprehensive manner establishing Best Management Practices covering Site Design, Source Control and Treatment Control Measures.

The treatment controls measures of the Water Quality Basins will be installed in the project to remove or reduce pollutants that have been mobilized into the stormwater prior to the stormwater leaving the site. The stormwater system will be designed to ensure that storm water runoff from graded slopes and impervious areas from the proposed development will pass through a water quality basin prior to discharging to the detention basins. The Preliminary Stormwater Control Plan has been completed and was submitted to the Town with the Conceptual Development Plan on December 12, 2016.

8. Summer Nuisance Flows

The primary source of summer nuisance flow is expected to be minor runoff from irrigation water due to watering of private yards and landscaping, car washing and similar activities. The majority of the nuisance flows will be captured by the water quality basins. The expected amount of nuisance flow will be retained in the water quality basins and detention basins to maximize evaporation and infiltration.

The amount of summer nuisance flow generated on the project site is less than the evaporation rate for the project area, therefore, it is expected that the nuisance flow will be completely removed by evaporation.

9. Vector Control Considerations (Mosquito Breeding Prevention)

A Vector Control Plan will be prepared as part of the Project's Final Design Drainage Study/C.3. Stormwater Control Plan. This plan will incorporate the recommendations of the Contra Costa County Vector Control Agency, in part, to alleviate recently increased concerns centered on the West Nile Virus, which is transmitted by mosquitoes.

10. Operation & Maintenance, Monitoring & Funding

An Operation & Maintenance Plan including Operation & Maintenance Manual, Monitoring Requirements and Funding Mechanisms will be included in the Final Design Drainage Study/C.3. Stormwater Control Plan.

11. Conclusion

The project will provide a stormwater conveyance system, flood control measures, water quality treatment and hydromodification in compliance with Local, State and Federal jurisdictional

requirements. The items listed above will be addressed in the following studies; A Hydrology Study for the project to address storm drainage design, detention basin design and flood routing. A Stormwater Control Plan to address water quality design issues and hydromodification in conformance with the County's C.3 Water Quality Requirements. Prior to construction a Final Stormwater Pollution Prevention Plan (SWPPP) will be prepared to present the storm water pollution prevention best management practices to be implemented on the site during construction.

During the project design additional frequency and duration storm hydrographs will be developed and routing through the drainage and detention pond system to demonstrate the past development runoff is less than or equal to the existing or historic condition. In final design the detention basins will be modeled with the following storms, 2, 10, 25, 50 and 100 year frequency and 3, 6, 12 and 24 hour duration storms.

12. Storm Drainage Study Submittal Schedule:

- Preliminary Stormwater Control Plan (Previously submitted to the Town on December 12, 2016)
- Preliminary Drainage and Hydrology Study (to be submitted as requested by Town Staff). **P/A Design Resources, Inc. anticipates that "The Preliminary Drainage and Hydrology Study" will be available to the Town in approximately February, 2018.**

During Final Engineering Design

- Final Stormwater Control Plan and Operations and Maintenance Plan
- Final Drainage and Hydrology Study (including all - 2, 10, 25, 50 and 100 year frequency and 3, 6, 12 and 24 hour duration storm hydrographs)
- Final Stormdrain Design Study
- Stormwater Pollution Prevention Plan

This list does not exclude any future required agency storm drain related reports and studies.