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HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section presents an evaluation of potential impacts related to hydrology and water quality. The discussion is based on:

(1) July 2010 West Landing Specific Plan, prepared by Wood Rodgers;

(2) June 3, 2009 Water Supply Assessment, City of Ceres, West Ceres [Landing] Specific Plan, prepared by Tim Durbin and Claire Velayas; and

(3) October 2008 administrative draft City of Ceres Municipal Service Review / Sphere of Influence Plan, prepared by PMC.

EXISTING CONDITIONS

CLIMATE AND TOPOGRAPHY

The Plan area is located in a relatively flat agricultural area near the City of Ceres in the eastern portion of Stanislaus County, California. The Plan area is essentially flat, with an average slope across the Plan area of approximately 0.15 percent. On-site elevations range from 83 feet above mean sea level (msl) near Whitmore to 77 feet msl near Service Road, and surface flows move in roughly a south easterly direction.

The regional climate is typical of the San Joaquin Valley, and is characterized by dry, hot summers and moist, cool winters, with occasional tule fog. Almost 90 percent of the total annual precipitation occurs during the months of November through April, with an average annual precipitation of 13.12 inches. Average monthly temperatures range from a high of about 93 degrees Fahrenheit in the summer to a low of 47 degrees Fahrenheit in the winter.[1]

SITE AND REGIONAL HYDROLOGY

The Plan area is located approximately one mile south of the Tuolumne River, which runs in a mostly east to west direction. The Tuolumne River is the largest of the three tributaries of the San Joaquin River. From its headwaters at Mount Lyell the Tuolumne River runs as a somewhat wavy line from east to west. The river eventually reaches the Pacific Ocean via the San Joaquin Delta. The Tuolumne meanders through gorges and canyons making its way through Hetch Hetchy Valley welcoming waters from other creeks and rivers as it continues its path to its final destination. Further downstream the river flows into Don Pedro Dam and Lake Don Pedro. Downstream the Tuolumne continues its

[1] Western Regional Climate Data Center. Modesto, California NCDC 1971-2000 Monthly Normals. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5738, accessed April 29, 2009.

journey towards the San Joaquin River where it flows through the Delta on its way to the ocean near San Francisco.[2]

Two Turlock Irrigation District (TID) laterals run in the vicinity. Lower Lateral Number 2, runs east-west approximately ½ mile south of the Plan area, between Service and Grayson Roads. Lateral Number 1 runs northeast-southwest in the vicinity of the Plan area, nearing the corner of Whitmore Ave and South Carpenter.[3] There are no perennial streams or surface irrigation channels in the Plan area, though a network of underground public and private irrigation lines serve the Plan area.

SOILS

The U.S. Department of Agriculture soil survey maps have classified soil in the Plan area as Young Alluvial Fans. These soils are generally found adjacent to the floodplains and basin lands on both sides of the San Joaquin River. Erosion hazard is estimated to be low.[4]

The NRCS classifies soils into four hydrologic soil groups based on infiltration rate and runoff potential. Soils within the study area range consist of:

26 percent Group A: sand, loamy sand or sandy loam types of soils with low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

46 percent Group B: silt loam or loam. These soils have a moderate infiltration rate when thoroughly wetted and primarily consist of moderately drained soils with moderately fine to moderately coarse textures.

28 percent Group C: sandy clay loam. These soils have low infiltration rates when thoroughly wetted and primarily consist of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.

Erosion potential (K_w and K_f) for the site soils range from 0.20 to 0.43.[5] Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. K factor in the Plan area ranges from 0.02 to 0.62. The higher the K value, the more susceptible the soil is to sheet and rill erosion by water. Because the site is entirely flat, soil loss from the site is considered to be very low. However, sheet and rill erosion can occur on-site where slopes exist, such from the channel walls of the irrigation canal or on any planned or temporary fill slopes such as adjacent to roadways, drainage features, building pads, or temporary fill stockpiles.

GROUNDWATER

The Plan area is located within the Turlock Sub basin of the San Joaquin Valley Groundwater Basin, the primary hydrogeologic units of which include both consolidated and unconsolidated sedimentary

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[2] Turlock Irrigation District, http://www.tid.org/TIDWater/TuolumneRiver/index.htm , accessed April 29, 2009.

[3] US Geographic database, http://www.us-geographic.com/us-states/california/stanislaus-county/streams-lakes/all/ , accessed April 29, 2009.

[4] U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) database for the Eastern Stanislaus Area, California, December 2007. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

[5] Ibid

deposits. The consolidated deposits lie in the eastern portion of the sub basin and generally yield small quantities of water to wells. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits. Groundwater levels in the Modesto-Ceres area were generally declining until the Modesto Regional Water Treatment Plant began surface water deliveries in 1995. Groundwater levels appear to have stabilized and recovered somewhat since then, but would be expected to fluctuate in response to seasonal and long-term balances in pumping and recharge.[6]

This current trend in groundwater levels suggests the Turlock groundwater basin is in a quasi-equilibrium state. While groundwater levels fluctuate seasonally and interannually, groundwater levels display no long-term change. Groundwater elevations in intermediate-depth monitoring wells in the vicinity of Ceres were approximately 60 feet in December of 1960, 55 feet in November of 1977 reflecting the 1976-1977 drought, 60 feet in November of 1986 reflecting quick recovery after a prolonged drought, and 60 feet in November of 1998. This means the average discharge from the groundwater basin is roughly in balance with the average recharge to the basin.[7]

The City of Ceres owns, and the Public Works Department, Water Division operates, and maintains a public water-supply system as Ceres Municipal Utility District (CMUD). The CMUD water supply is currently obtained entirely from groundwater pumping from the underlying Turlock groundwater basin. The Turlock groundwater basin has not been adjudicated, is not currently in overdraft, and is not otherwise regulated with respect to groundwater use. Ceres, as a municipality overlying the groundwater basin, has the right to pump groundwater for reasonable use.[8]

STORM DRAINAGE

The Plan area is essentially flat, with an average slope across the Plan area of approximately 0.15 percent. Onsite elevations range from 83 feet above mean sea level (msl) near Whitmore to 77 feet msl near Service Road, and surface flows move in roughly a south easterly direction. Most of the natural drainage courses in the area have been altered by agricultural activities, and surface water flows are directed into agricultural and roadside ditches.

The Industrial and County Facility areas east of Crows Landing Road in the Plan area are currently served by existing onsite retention basins that are located within the developed areas. The existing collection system contains a series of gravity drainage pipes as well as appropriately sized retention basins. Adjacent properties have self contained detention facilities within each developed parcel.

FLOODING

Flooding has been a recurring problem throughout the history of Stanislaus County. Three major floods have taken place in the last 30 years. The biggest flood in the county's history occurred in 1861, and covered the valley with a body of water 250 to 300 miles long and 20 to 60 miles wide. Today, the potential for such major flooding in Ceres is quite remote, due to the construction of the Don Pedro Dam on the Tuolumne River. Smaller, localized flooding occurs occasionally in the city of Ceres if local storage and/or pipe capacity is exceeded. Limited areas immediately adjacent to the

[6] California Department of Water Resources, *DWR Bulletin 118*, January 2006.

[7] Tim Durbin and Claire Velayas, *Water Supply Assessment, City of Ceres, West Ceres [Landing] Specific Plan*, February 11, 2010, p.5.

[8] Ibid.

Tuolumne River and below the bluffs in the northern portion of the Planning Area can also experience flooding during severe flood events.[9]

The National Resources Conservation Service ranks sites according to flood frequency on a scale of ranging from none, very rare, rare, occasional, frequent, to very frequent, the Plan area is classified as "None," meaning that flooding is not probable. The chance of flooding is nearly 0 percent in any year and flooding occurs less than once in 500 years.[10]

The 100-year flood is the flood event that has a one percent chance of occurring in any given year. This is considered to be a severe flood, but one with a reasonable possibility of occurrence for purposes of land use planning, property protection, and human safety. The Federal Emergency Management Agency (FEMA) prepares maps showing areas which are likely to flood during a 100-year flood event. Figure 9-2 in the General Plan Background Report shows a 100-year floodplain located in the northernmost part of the study area, adjacent to the Tuolumne River.[11] The Plan area is not in a 100-year floodplain.

Dam Failure Inundation

The risk of dam failure is remote. Dam failure can occur under three general conditions: earthquake, structural instability, or an intense rainfall in excess of a dam's holding capacity. According to the Stanislaus County General Plan, Ceres is not within the inundation areas for New Melones or Tulloch Dams. Widespread flooding would occur along both sides of the Tuolumne River in the event of the failure of the dam on the Don Pedro Reservoir, but would not affect the Plan area.[12]

REGULATORY SETTING

The proposed Project must be constructed in accordance with several regulatory programs, laws, and regulations that aim to protect surface water resources. In some cases, federal laws are administered and enforced by state and local government. In other cases, state and local regulations in California are stricter than those imposed by federal law. This section summarizes relevant regulatory programs, laws, and regulations with respect to hydrology and water quality and how they relate to the proposed Project.

FEDERAL LAWS AND REGULATIONS

Clean Water Act

The Clean Water Act (CWA) was enacted by Congress in 1972 and amended several times since inception. It is the primary federal law regulating water quality in the United States, and forms the

[9] J. Laurence Mintier & Associates, *City of Ceres General Plan Final Environmental Impact Report*, November 12, 1996.

[10] U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) database for the Eastern Stanislaus Area, California, December 2007, at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx , accessed April 30, 2009.

[11] J. Laurence Mintier & Associates, *City of Ceres General Plan Final Environmental Impact Report*, November 12, 1996.

[12] J. Laurence Mintier & Associates, *City of Ceres General Plan Final Environmental Impact Report*, November 12, 1996.

basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The CWA prescribes the basic federal laws for regulating discharges of pollutants, and sets minimum water quality standards for all waters of the United States. Several mechanisms are employed to control domestic, industrial, and agricultural pollution under the CWA. At the federal level, the CWA is administered by the U.S. Environmental Protection Agency (EPA). At the state and regional level, the CWA is administered and enforced by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs). The State of California has developed a number of water quality laws, rules, and regulations, in part to assist in the implementation of the CWA and related federally-mandated water quality requirements. In many cases, the federal requirements set minimum standards and policies and the laws, rules, and regulations adopted by the state and regional boards exceed them.

CALIFORNIA LAWS AND REGULATIONS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act establishes the SWRCB and the RWQCB as the principal state agencies having primary responsibility for coordinating and controlling water quality in California. The Porter-Cologne Act establishes the responsibility of the RWQCBs for adopting, implementing, and enforcing water quality control plans (Basin Plans), which set forth the state's water quality standards (i.e., beneficial uses of surface waters and groundwater) and the objectives or criteria necessary to protect those beneficial uses. The NPDES permits must be consistent with the Basin Plans.

NPDES Permit Requirements

The CWA has regulated the discharge of pollutants to the waters of the U.S. from any point source nationally since 1972. In 1987, amendments to the CWA added section 402(p), which established a framework for regulating non-point source (NPS) storm water discharges under the National Pollutant Discharge Elimination System (NPDES). The Phase I NPDES storm water program regulates storm water discharges from industrial facilities, large and medium-sized municipal separate storm sewer systems (those serving more than 100,000 persons), and construction sites that disturb five or more acres of land. The Phase II NPDES storm water program regulates storm water discharges from Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas serving populations greater than 25,000 and less than 100,000, and operators of small construction sites disturbing 1 acre or more. Therefore, the MS4 requirements under Phase II will be enforced through the City of Ceres (see City of Ceres Regulations discussion, below). Under the program, any applicant for development will be required to comply with two NPDES permit requirements:

1) The NPDES General Construction Permit Requirements apply to clearing, grading, and disturbances to the ground, such as excavation. A project applicant is required to submit a Notice of Intent (NOI) with the State Water Resource Control Board's (SWRCB) Division of Water Quality. The NOI includes general information on the types of construction activities that will occur on the site.

2) The applicant will also be required to submit a site-specific plan called the Stormwater Pollution Prevention Plan (SWPPP) for construction and post construction activities. The SWPPP will include a description of Best Management Practices (BMPs) to minimize the discharge of pollutants from the site during construction. The SWPPP must satisfy design, maintenance, and plans for iterative evaluation of BMP performance, including Supplemental Provisions contained

in Attachment 4. It is the responsibility of the property owner to obtain coverage under the permit prior to site construction.

California Well Standards

Given that existing water wells are located on the site, standards for preservation, use, or destruction of a well require conformance with State of California Well Standards Bulletin 74-90. These standards govern the protection of water supply and ground water quality by assuring that proper methods are followed for monitoring wells and water wells, even if an existing well is to be destroyed. Contamination of groundwater poses serious public health and economic problems for many areas of California. Improperly constructed and abandoned water wells, cathodic protection wells, groundwater monitoring wells, and geothermal heat exchange wells can contaminate the usable groundwater. This can occur by allowing contaminated water on the surface to flow down the well casing, or by allowing unusable or low quality groundwater from one groundwater level to flow along the well casing to usable groundwater levels.[13] Work must be conducted by a C-57 Licensed Water Well Contractor and a report must be filed with State of California Department of Water Resources.

LOCAL PROGRAMS AND REGULATIONS

Water Quality Control Plan for the San Joaquin River Basin (Basin Plan)

The Central Valley Regional Water Quality Control Board (RWQCB) is responsible for the development, adoption, and implementation of the Water Quality Control Plan for Region 5, the Central Valley Region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the Central Valley Region. The Basin Plan identifies beneficial uses of surface waters and groundwater within its region and specifies water quality objectives to maintain the continued beneficial uses of these waters. The proposed Project is required to adhere to all water quality objectives identified in the Basin Plan.

Beneficial Uses of Surface Waters and Groundwater

The Basin Plan defines beneficial uses for surface waters and groundwater in its corresponding jurisdiction. The beneficial uses of surface waters in the San Joaquin River Basin include municipal and domestic supply, agricultural supply, and industrial service and process supply.[14]

City of Ceres General Plan

The following policies of the City of Ceres General Plan address hydrology and water quality considerations, particularly as they affect new development:

Groundwater and Water Quality

6.B.3. The City shall help protect groundwater resources from overdraft by promoting water conservation and groundwater recharge efforts.

[13] California Department of Water Resources, 2003. California Laws for Water Wells, Monitoring Wells, Cathodic Protection Wells, Geothermal Heat Exchange Wells. Division of Planning and Local Assistance.

[14] California Regional Water Quality Control Board Central Valley Region, *The Water Quality Control Plan (Basin Plan), the Sacramento River Basin and the San Joaquin River Basin*, revised October 2007.

6.B.4. The City shall continue to require the use of feasible and practical best management practices (BMPs) to protect receiving waters from the adverse effects of construction activities and urban runoff.

4.C.5. The City shall promote aquifer and wellhead protection programs to limit infiltation of pollutants that might contaminate the groundwater supply.

4.C.6. The City shall participate in a groundwater management program to preserve existing groundwater quality and quantity and to ensure future supplies.

Storm Water Drainage

4.E.1 The City shall require new development to adequately mitigate increases in stormwater peak flows and/or volume. Mitigation measures should take into consideration impacts on adjoining lands in the in the city and immediately adjacent to the city in unincorporated Stanislaus County.

4.E.2. All drainage designs shall be in accordance with the accepted principles of civil engineering, the Stanislaus County Storm Drainage Design Manual, and City improvement standards.

4.E.3. New development shall have surface drainage disposal accommodated in one of the following ways:

a. Positive drainage—positive drainage to a river, stream, creek, or other natural water course.

b. Irrigation facility—drainage into an irrigation district facility, either by gravity or pumping, pursuant to the City - Turlock Irrigation District agreement.

c. Drainage ponds—ponds, either in individual lots within a subdivision or in the case of larger developments, within a depressed portion of a common area.

d. Drainage unit—use of french drains within depressed areas of the street right-of-way for those subdivisions or portions of subdivisions of such size that one of the solutions in subsections a, b, or c is not feasible, as determined by the City Engineer

e. On-site drainage—drainage retained on-site within the development. Commercial development shall accommodate drainage on-site unless method described in subsections a or b above is available and the development participates in a system to address on-site drainage as approved by the City Engineer. All on-site industrial drainage shall remain on-site. The City shall encourage commercial and industrial development to integrate on-site storm drainage facilities with landscaping.

4.E.4. The City shall encourage project designs that minimize drainage concentrations and impervious coverage.

4.E.5. The City shall require appropriate mitigation for grading activities during the rainy season to avoid sedimentation of storm drainage facilities.

4.E.6. The City shall require projects that have significant impacts on the quality of surface water runoff to incorporate mitigation measures for water quality impacts related to urban runoff.

4.E.7. Future drainage system requirements shall comply with applicable state and federal pollutant discharge requirements.

4.E.8. The City shall seek to minimize operational complexities and maintenance requirements of the storm drainage system.

4.E.9. The City shall allow stormwater detention facilities to mitigate drainage impacts and reduce storm drainage system costs. To the extent practical, stormwater detention facilities should be designed for multiple purposes, including recreational and/or stormwater quality improvement.

4.E.10. The City shall consider using stormwater of adequate quality to replenish the local groundwater basin, restore wetlands and riparian habitat, and irrigate agricultural lands, or as open space or recreational enhancements.

Flood Hazards

7.B.3. The City shall require flood-proofing of structures in areas subject to flooding (upon annexation).

City of Ceres Storm Drainage Master Plan

A 1995 Storm Drain Master Plan was adopted to evaluate the future demands of the City's Primary SOI areas. New residential developments will be required to use the 10-year frequency design storm criteria. A 100-year storm must be accommodated within the basin and local streets. Basin pumps are designed to dispose of water from a 10 year storm within approximately a 24-hour period. Detention and retention facilities are designed for a 50-year 24-hour storm. The City's design standard is based on the Rational Method and the Stanislaus County 1976 Storm Drain Design Manual. All future development will be required to fund and construct the necessary infrastructure.

IMPACT ANALYSIS

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring a project's hydrology and water quality impacts are based upon CEQA Guidelines thresholds:

1. Would the Project violate any water quality standards or waste discharge requirements?

2. Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

3. Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

4. Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?

5. Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

6. Would the Project otherwise substantially degrade water quality?

7. Would the Project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

8. Would the Project place within a 100-year flood hazard area structures, which would impede or redirect flood flows?

9. Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

10. Would the Project cause inundation by seiche, tsunami, or mudflow?

SOIL EROSION FROM GRADING AND CONSTRUCTION ACTIVITIES

Impact Hydro-1: **Soil Erosion.** Grading activities for development projects in the Plan area, including grading and the construction of the building pads, streets, commercial areas, residential areas and parks, could result in erosion and associated siltation/sedimentation impacts from runoff.

While a largely level site, development of the proposed Plan would require the excavation for installation of utilities lines and detention basins as well as clearing, fill, and grading of agricultural parcels. Vegetation that currently helps to stabilize site soils would be removed during construction. Site grading will occur over the majority of the Plan area. Site preparation and construction operations associated with the Plan would present a potential threat of soil erosion from soil disturbance by subjecting unprotected bare soil areas to the erosional forces of wind and runoff.

Eroded soil can contain nitrogen, phosphorus, and other nutrients that, when transported downstream, could increase pollution concentrations that reduce water quality and create odors. Eroded sediments could also interfere with the natural flow of storm waters or reduce the storage capacity of detention basins. Such interference could aggravate downstream conditions, cause flooding or accelerated erosion where it would not otherwise occur.

Mitigation Measure Hydro-1: **Preparation and Implementation of Project SWPPP.** Pursuant to NPDES requirements, development project applicants in the Plan area shall develop a SWPPP to protect water quality during and after construction. Prior to the issuance of a grading permit, the Applicant shall file with the State Water Resources Control Board a Notice of Intent to comply with the General Permit for Storm Water Discharges Associated with Construction Activities (General Permit) under the NPDES regulations, and comply with the requirements of the permit to minimize pollution to storm water discharge during construction activities. The SWPPP shall include, but is not limited to, the following mitigation measures for the construction period:

- All pollutant sources, including sources of sediment that may affect storm water quality associated with construction activity shall be identified;
- Non-stormwater discharges related to construction activity shall be identified;
- Best Management Practices (BMPs) shall be identified, constructed, implemented, and maintained in accordance with a time schedule. The

maintenance schedule shall also provide for maintenance of post-construction BMPs;

- Erosion control/soil stabilization techniques such as straw mulching, erosion control blankets, erosion control matting, and hydro-seeding, shall be utilized, in accordance with the regulations outlined in the California Stormwater BMP – Construction Handbook. Silt fences shall be installed down slope of all graded slopes. Hay bales shall be installed in the flow path of graded areas receiving concentrated flows and around permanent or temporary storm collection areas or drain inlets; and
- BMPs for preventing the discharge or other construction-related NPDES pollutants beside sediment (i.e. paint, concrete, etc) to downstream waters.
- After construction is completed, all drainage facilities shall be inspected for accumulated sediment, and these drainage structures shall be cleared of debris and sediment.

Long-term mitigation measures to be included in the SWPPP shall include, but are not limited to, the following:

- Description of potential sources of erosion and sediment at the project site. Residential and commercial activities and significant materials and chemicals that could be used at the project site should be described. This will include a thorough assessment of existing and potential pollutant sources.
- Identification of BMPs to be implemented at the project site based on identified land uses, activities, and potential pollutant sources. Emphasis shall be placed on source control BMPs, with treatment controls used as needed.
- Development of a monitoring and implementation plan. Maintenance requirements and frequency shall be carefully described including vector control, clearing of clogged or obstructed inlet or outlet structures, vegetation/landscape maintenance, replacement of media filters, regular sweeping of parking lots and other paved areas, etc. Wastes removed from BMPs may be hazardous, therefore, maintenance costs should be budgeted to include disposal at a proper site.
- The monitoring and maintenance program shall be conducted at the frequency agreed upon by the RWQCB and/or City of Ceres. Monitoring and maintenance activities shall be recorded and reported annually to the RWQCB and the City of Ceres. The SWPPP shall be adjusted, as necessary, to address any performance inadequacies of the BMPs.
- For commercial/industrial developments, the Applicant shall prepare informational literature and guidance on commercial BMPs to minimize pollutant contributions from the proposed development. This information shall be distributed to all employers at the project site. At a minimum the information shall cover: a) proper disposal of commercial cleaning chemicals; b) proper use of landscaping chemicals; c) clean-up and appropriate disposal of hazardous materials and chemicals; and d) prohibition of any washing and dumping of materials and chemicals into stormdrains.

Implementation of these mitigation measures would reduce construction-related erosion and siltation/sedimentation impacts to a level of ***less than significant***.

CHANGES IN PEAK RUNOFF

Impact Hydro-2: **Increased Runoff.** Redevelopment of the existing agricultural land in the Plan area will increase the potential for runoff from the site.

The Industrial and County Facility areas east of Crows Landing Road will continue to be served by existing onsite retention basins that are located within those areas.

New development in Commercial, Office and Business Park areas within the Plan area will be also designed to drain internally to onsite drainage retention basins.

The remaining Plan area, including residential and school properties, as well as roadways, will drain to one of three retention basins in the Plan area, one each in the two Neighborhood parks and one in the Community Park, shown in Figure 3.4.

The following assumptions were used in the design of the storm water system: The Coefficient of Runoff (C) for single-family = 0.55, multi-family = .070 and backbone streets = 0.95. The Rainfall Intensity (I) for single-family = 1.30, multi-family = 1.30 and backbone streets = 1.83. Soil permeability ranging from 1.6x10-3 to 4.9x10-3 centimeters per second, conducive to percolation.

The storm drainage system has been designed to gravity drain into retention basins. Drainage pipes have been designed to convey the 10-year flow (18" up to 84" drainage mains). 100-year flows will be conveyed within the streets to the retention basins. The soil in the area is highly permeable and therefore conducive to relatively rapid percolation from the retention basins. The ultimate discharge from the retention basins will be through percolation and evapotranspiration directly from basins. No storm water is anticipated to leave the Plan area.

The proposed drainage system will provide sufficient drainage to keep the 10-year events from flooding the streets and 100-year events from flooding building pads. In addition, the system will provide water quality benefits to run-off leaving the developed sites. The overland release route in order to accommodate a drainage facility overload and failure of the drainage piping network shall be directed to the southwest portion of the project towards Ustick Road heading south.

Mitigation Measure
Hydro-2: **Demonstration of Stormwater Plan Area Conveyance and Retention Capacity.** It is assumed that stormwater conveyance and retention capacity will be implemented as the Plan area develops, but exact timing has yet to be proposed. Development project applicants within the Plan area shall demonstrate that the proposed routing of stormwater is compatible with the capacity of the ultimate drainage facilities as well as the portion that will be implemented upon project completion. If adequate stormwater capacity is not yet available though the Plan area facilities, interim stormwater facilities, such as "onsite" retention, may be proposed by a qualified engineer and will be subject to review and approval from the City of Ceres Development Services Department and City Engineer. If adequate capacity cannot be demonstrated or interim facilities approved, projects shall not proceed until capacity is available.

Development would not be allowed to proceed without coordinating with the City Engineer to ensure the availability of adequate stormwater conveyance and retention capacity (mitigation measure Hydro-2). This would prevent any potential temporary impacts that could result from development prior to planned Plan area conveyance and retention system. With implementation of mitigation measure Hydro-2, the project's impact related to increased runoff will be reduced to a level of ***less than significant***.

INCREASE IN NON-POINT SOURCE POLLUTION (NPS)

Impact Hydro-3: **Increase in Non-Point Source Pollutants.** The Project would increase the potential to generate and spread non-point source pollutants by increasing impermeable surface area and potentially increasing runoff velocities. The impact of non-point source pollution could be significant. There would also be an increased demand for solid waste collection, on-site storage, and disposal. This would result in an increased risk of an accidental upset from a spill or leak that could contaminate area storm drains and waterways.

Non-point source pollutants (NPS) are washed by rainwater from roofs, landscape areas, streets and parking areas into the drainage network. Development of the proposed Project would contribute to the levels of NPS pollutants and litter downstream. An increase in NPS pollutants could have adverse effects on wildlife, vegetation, and human health. NPS pollutants could also concentrate and infiltrate into groundwater and degrade the quality of potential groundwater drinking sources. Under the NPDES 3.C provisions, development of the proposed Plan area is required to provide permanent treatment for site runoff.

To meet this requirement, the proposed Plan includes a system of retention basins and conveyance pipes. Details regarding the capacity, function, grading and the stormdrain network, or other complimentary water quality best management practices, would be provided for each development project in the Plan area.

Mitigation Measure Hydro-3: **Implement Water Quality BMPs for All Stormwater Discharge Areas.** The Project Applicant shall implement storm water quality BMPs as required under the NPDES permit at the time of development. Possible BMPs include, pervious pavement, infiltration swales, or other treatment controls to be included and described in the SWPPP under **Mitigation Measure Hydro-1**. To ensure that BMP design is appropriate for site soils, a design-level geotechnical investigation shall be performed as prescribed in **Mitigation Measure Geo-1** in the Geology and Soils chapter of the DEIR. Final designs and calculations for the treatment capacity and efficiency of any water quality BMP implementation shall be submitted to the City Development Services Department prior to permit approval.

Implementation of this mitigation measure would reduce impacts related to increases in non-point source pollution to a level of ***less than significant***.

GROUNDWATER DEPLETION

The Plan proposes to draw water via new wells in the Plan area from the Turlock groundwater sub-basin. Per the Water Supply Assessment completed for the West Landing Specific Plan (Durbin and Velayas, February 11, 2010), while groundwater levels fluctuate seasonally and inter-annually, groundwater levels display no long-term change, which could be considered a quasi-equilibrium state. Continued pumping in the central portion of the basin would continue to induce recharge into the basin from area rivers. As new groundwater pumping is imposed on the groundwater basin, the steady-state condition will be disturbed, but it is anticipated a new steady-state condition will be established. With all communities within the Turlock groundwater sub-basin growing at their current rates, changes to the groundwater budget are quite minor, only about 2 percent of the discharge/ recharge relationship basin-wide. Consequently, changes in groundwater levels likely will be a few

feet or less.[15] Properly designed wells are engineered to function despite variations in groundwater levels of several feet or more. Therefore, cumulative growth, including the Project, would not be anticipated to have a significant impact on groundwater users within the Turlock sub-basin.

The Plan would not substantially deplete groundwater supplies such that there would be a net deficit in aquifer volume or a significant lowering of the local groundwater table level (***less than significant***).

GROUNDWATER RECHARGE AND QUALITY

Impact Hydro-4: **Decrease in Groundwater Recharge or Quality.** Removal and grading of surface soils and an increase in impervious surface areas will reduce the rate and location of groundwater recharge for the site and could decrease the quality of the groundwater.

Much of the Plan area is currently covered in pervious soil surfaces. Grading and redevelopment of the site would result in removal of the more permeable surface soils, and a net increase in impervious surface areas such as rooftops, streets, sidewalks, and paved commercial and public parking areas. Existing pervious surfaces act to naturally filter storm water as it percolates to groundwater supplies.

Although the Plan includes retention basins, parks, and community and private landscaped areas that would serve to filter storm water runoff and recharge groundwater, site grading and drainage structures would be required to facilitate distributing runoff from precipitation to appropriate infiltration areas. Grading and drainage plans and Best Management Practice (BMP) designs have not yet been presented by the Project Applicant for review. Provided that grading, stormwater routing, water quality treatment, infiltration, other BMP design and calculations are included in the Project design and are approved by City of Ceres Public Works Department, groundwater recharge would be mitigated. Until such plans are submitted and approved, this represents a potentially significant impact.

Mitigation Measure Hydro-4: **Implement BMPs for Protection of Groundwater Quality and Supply.** New development in the Plan area shall provide storm water management measures to maximize on-site infiltration of runoff from commercial, public facility, residential areas, and open space areas. Possible measures include design and construction of pervious surface areas, and infiltration swales and basins. Storm water infiltration measures at the site shall be approved by the City's Public Works Department and should follow, to the maximum extent practicable, California Stormwater Quality Association guidelines, including TC-11 and TC-22 for infiltration and retention basins. The appropriateness of proposed stormwater infiltration measures for site soils shall be assessed through a design-level geotechnical investigation. (**Mitigation Measure Geo-1** in the Geology and Soils chapter of the DEIR.)

Implementation of this mitigation measure would ensure infiltration to groundwater is maximized utilizing methods that will protect the groundwater quality and therefore reduce impacts related to reductions in groundwater recharge and quality to a level of ***less than significant***.

[15] Tim Durbin and Claire Velayas, *Water Supply Assessment, City of Ceres, West Ceres [Landing] Specific Plan*, February 11, 2010, p.13.

ALTERATION OF THE EXISTING DRAINAGE PATTERN OF THE SITE

Most of the natural drainage courses in the area have already been altered by agricultural and roadside ditches. Relocating the ditches or underground pipes would neither increase flooding nor represent a significant source of erosion relative to current conditions. In terms of impacts related to flooding and erosion, relocating the existing agricultural and roadside ditches would represent a ***less than significant*** impact.

INCREASED RISK FROM FLOODING

FEMA flood maps show the Project area to be outside any designated flood zone. Although increases in pervious surface will increase stormflow accumulations locally, the incorporation of a required storm drain network and retention basins would minimize any potential for flooding locally or downstream. This is considered a ***less than significant*** impact.

INCREASED RISK FROM DAM INUNDATION

Dam failure can occur under three general conditions: earthquake, structural instability, or an intense rainfall in excess of a dam's holding capacity. According to the Stanislaus County General Plan, the City of Ceres is not within the inundation areas for New Melones or Tulloch Dams. While widespread flooding would occur along both sides of the Tuolumne River in the event of the failure of the dam on the Don Pedro Reservoir, it would not affect the Plan area.[16] The impact related to dam inundation would be considered a ***less than significant***.

SEICHE, TSUNAMI OR MUDFLOW

Development of the relatively level Plan area as proposed would not expose people or structures to hazards associated with seiche, tsunami or mudflow, given the distance from any bodies of water subject to tsunami or seiche and the flat terrain at the site (***no impact***).

CUMULATIVE HYDROLOGY IMPACT ANALYSIS

Assuming concurrent implementation of the Plan with other reasonably foreseeable future projects in the vicinity, adverse cumulative effects on hydrology and water quality could include construction impacts related to increases in stormwater runoff and pollutant loading and operational impacts related to decreases in water quality, and groundwater depletion and recharge.

Development under the Plan and other future projects in the city would be required to comply with drainage and grading ordinances intended to control runoff and regulate water quality at each development site both during the construction period and following development. New projects would be required to demonstrate that stormwater volumes could be managed by downstream conveyance facilities and would not induce flooding (mitigation measures Hydro-1, -3 and -2 respectively).

As discussed under the Groundwater Depletion subsection above, the Plan is in the Turlock groundwater sub-basin. With all communities in the sub-basin growing at their current rates, changes in groundwater levels should be within the engineered functioning variation of area wells and would not cause cumulatively considerable impacts.

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[16] J. Laurence Mintier & Associates, *City of Ceres General Plan Final Environmental Impact Report*, November 12, 1996.

Cumulative development within the region contributes to an overall increase in the area of impervious surfaces such as roadways, driveways, parking lots, and rooftops, resulting in increased runoff and associated urban pollutants. Development of the proposed project has the potential to contribute to this cumulative impact by paving a large portion of the project site for internal circulation and parking and by constructing several large structures with impervious rooftops. However, implementation of mitigation measure Hydro-4 will minimize decreases in groundwater recharge and quality.

Therefore, the Project's contribution to cumulative water quality and hydrology impacts is considered ***less than cumulatively considerable***.

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