4.3 HYDROLOGY AND WATER QUALITY

4.3 HYDROLOGY AND WATER QUALITY

This section describes the current hydrologic conditions at the site, including drainage patterns, and the regulatory framework for management of drainage and storm water quality. Several investigations on the drainage features of the project site and its vicinity have been conducted by the City and the applicant; the results of these investigations are summarized in this section. This section also assesses potential hydrologic impacts of the proposed project and anticipated future development impacts, including potential impacts to surface water quality, and presents mitigation measures to reduce the identified impacts.

SETTING

The climate of the Dixon area is characterized by hot dry summers and cold wet winters. Seasonal rainfall occurs from November through March. Rainfall originates from moisture collected over the Pacific Ocean, then delivered by frontal storms that move to the east. Mean annual precipitation is 19 inches at the project site.

Summer afternoon temperatures can exceed 100 degrees F, but nights are mostly cooled by delta breezes. Winter temperatures can fall below freezing, but normally vary from the high 30s to the 50s. Fog is common in the winter, especially a day or two after rainfall.

Groundwater

Groundwater underlying the project site has historically been near the ground surface and varied seasonally with rainfall. Pumping for irrigation generally lowered the water table to depths of 50 to 200 feet below the ground surface. With irrigation water provided by Monticello Dam, pumping decreased and the water table rose. Today, water levels are 20 to 100 feet below ground surfaces and now vary seasonally based on both rainfall and irrigation. Higher water levels are generally the result of perched water sitting on low-permeable soil lenses.

Regional Drainage

The project site is within the alluvial fan formed by Putah Creek. The historical drainage pattern was generally from northwest to southeast along several meandering creeks that traversed the flat farm land. Farther downstream, these creeks became sinks and marshes. Rainfall-runoff slowly drained from the fields, ponded in low areas, and infiltrated. Heavier storms produced runoff that eventually discharged to the Delta sloughs.

Over the past 50 years, natural drainage patterns have been significantly altered as agricultural practices have intensified. Prior to the 1950s, farming was mostly dryland pasture and seasonal grains. When irrigation water became more readily available as a result of the construction of Monticello Dam, farming practices changed to irrigated

pasture, orchards, row crops, and alfalfa. Lands were leveled and creeks and small drainageways were filled.

The site is not mapped as being within the 100-year flood area, as mapped by the Federal Emergency Management Agency Flood Insurance Rate Maps.

Today, the region is under intensive farming. Most fields have been laser-leveled and fields are prepared in the fall for early spring planting of row crops. Many of these fields are devoid of winter vegetation. Fields are graded to drain quickly to mostly small ditches configured in a grid pattern along local farm roads. The site drainage flows through City and private property, the Dixon Resource Conservation District (DRCD) drainage service area, and Reclamation District 2068 (RD 2068). The site is within the Tremont 3 watershed. The drainage eventually discharges to the Yolo Bypass, unless it infiltrates, evaporates, or is recycled prior to reaching the Yolo Bypass.

Local Drainage and Flooding

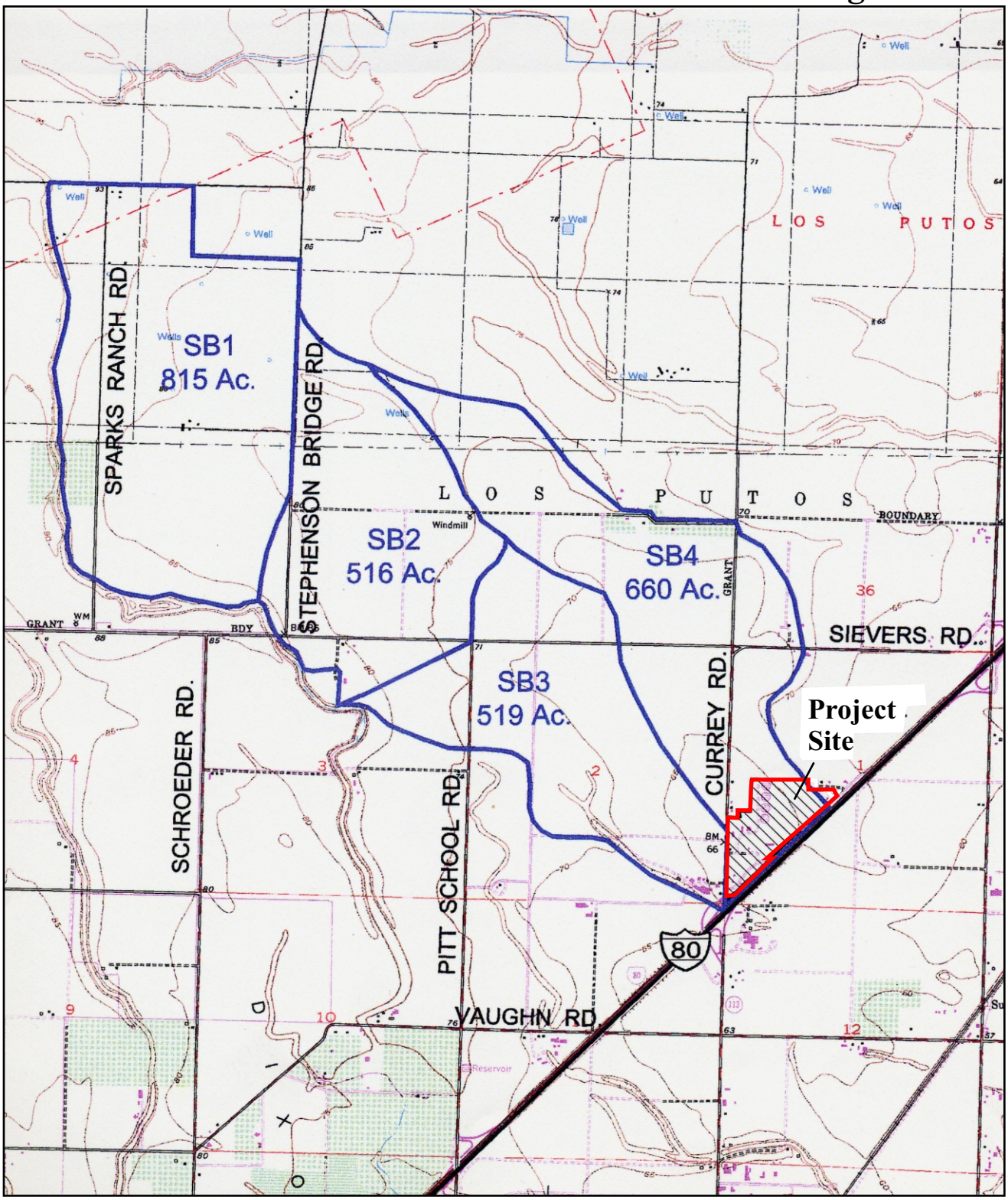
The project site has been subjected to ponding for many years and two changed conditions have worsened the ponding problems over time. Since 1962, the tributary area that drains through the project site has increased from 400 to about 2,690 acres. Nearly the entire enlarged tributary watershed is located west of Currey Road. The current subbasin of the 2,690-acre watershed in which the project site is located is about 660 acres (Figure 4.3-1). Because of several man-made changes upstream and along Currey Road, and because the configuration of the drainage facilities in the vicinity of the Currey Road and Milk Farm Road intersection, runoff from large storms quickly crosses Currey Road and ponds at the project site. Much of the watershed that drained to a large culvert under the freeway now is diverted through the project site before it slowly drains to the freeway culvert.

The watershed that includes the project site eventually drains through RD 2068. Established in 1928, RD 2068 constructed facilities for water supply and drainage. The facilities were designed to serve lands within the service area and had little additional capacity for upstream runoff (such as the project site).

In 1958 the DRCD, with assistance from the U.S. Conservation Service, constructed the Tremont 3 Drain to drain lands downstream of the project site. The Tremont 3 Drain was designed for a runoff rate of 11 cfs per square mile of land within its service area. The Tremont 3 Drain service area included no lands west of Pedrick Road because none of these property owners contributed to the initial cost of the Tremont 3 Drain nor have they paid the DRCD Operation and Maintenance Drainage fee for the Tremont 3 Drain. Consequently, the project site is not in the Tremont 3 Drain service area although it is in

DRAINAGE AREA MAP

Figure 4.3-1



Milk Farm
Dixon, California

Source: MBK Engineers, 2000.

Approximate
0 3000 Feet

BASELINE

Y1263-B0.00017.Fig4.3-1.cdr-5/5/05

the Tremont 3 watershed. The Tremont 3 Drain provided a positive drainage for lands within its service area, but was not designed to handle runoff from large storms.

Portions of the DRCD facilities were improved in 1965 in accordance with an Agreement among four landowners, the City of Dixon, and DRCD to provide better drainage for four farms and the "lands of the City" south of the project site drainage area. An exhibit of the 1965 Agreement showed the City lands to be about 1,535 acres, including the oldest part of Dixon. The agreement was silent concerning runoff from lands north of Interstate 80 and upstream of the "lands of the City," and did not include the project site.

The 1965 Agreement remains in effect but numerous changes have occurred in the past 40 years. The City of Dixon pays a higher maintenance fee based on the assumption of higher runoff compared to agricultural lands. The City of Dixon has also constructed detention basins to attenuate runoff and limit the rate of runoff from the City. The target rate of runoff is 0.02 cfs per acre. In contrast, intensive agricultural practices now generate runoff rates three to eight times higher compared to the 1950s and farmers are not obligated to attenuate runoff. In addition, the large tributary area upstream or north of Interstate 80 does not pay a maintenance fee to DRCD.

The City of Dixon, DRCD, RD 2068, and the Maine Prairie Water District recently formed a Joint Powers Authority (JPA) to cooperatively manage drainage in the Dixon Regional Watershed. One portion of the 57-square mile watershed is the Northeast Quadrant, which is south of Interstate 80, downstream of the project site. The Northeast Quadrant is planned to be developed as Dixon Downs. That planned development and several other planned developments within the watershed have been the catalyst for the formation of the JPA.

The JPA has defined current flow rates at the railroad embankment, about two miles east and downstream of the Milk Farm, and plans to increase conveyance downstream of this control point. Upstream flows reaching this point will be regulated by upstream detention storage provided as part of developments. The most cost-effective and feasible combination of detention and downstream conveyance will be determined as development proceeds. The project site and the watershed upstream of the project site are tributary and will be part of the ultimate drainage plan.

In 1996, the City of Dixon and DRCD began negotiating a Memorandum of Understanding that would define discharge points and maximum rates of flow from the City.

Contributing to the flooding problem at the project site is the drainage barrier represented by Interstate 80. The highway essentially acts as a low detention dam for upstream

drainage. There are several existing drainage structures under the highway that are significant at the project site. These structures include twin 36-inch concrete culverts at the westerly Currey Road/Interstate 80 intersection, twin 29-inch by 18-inch culverts at the old Milk Farm restaurant, and an existing 72-inch metal culvert. Figure 4.3-2 shows the location of each of these structures at the project site. These structures were either newly installed or modified when Interstate 80 was constructed in the early 1960s (MBK Engineers, 2000).

Prior to construction of Interstate 80, Highway 40 was located on the Interstate 80 alignment. As-built construction plans show that the twin 36-inch culverts (shown on 1963 as-built plans from Caltrans) were extensions to a 4- by 8-foot box culvert under Highway 40. The 36-inch culverts reduced the ability to drain the basin above Interstate 80 by approximately 40 percent. The flow reduction has been compounded downstream of Interstate 80. The box culvert transitions to a single 36-inch culvert, then to twin 24-inch culverts before discharging to a small open ditch. The twin 29-inch by 18-inch metal culverts, referred to above, are also extensions from the old Highway 40 drainage (MBK Engineers, 2000).

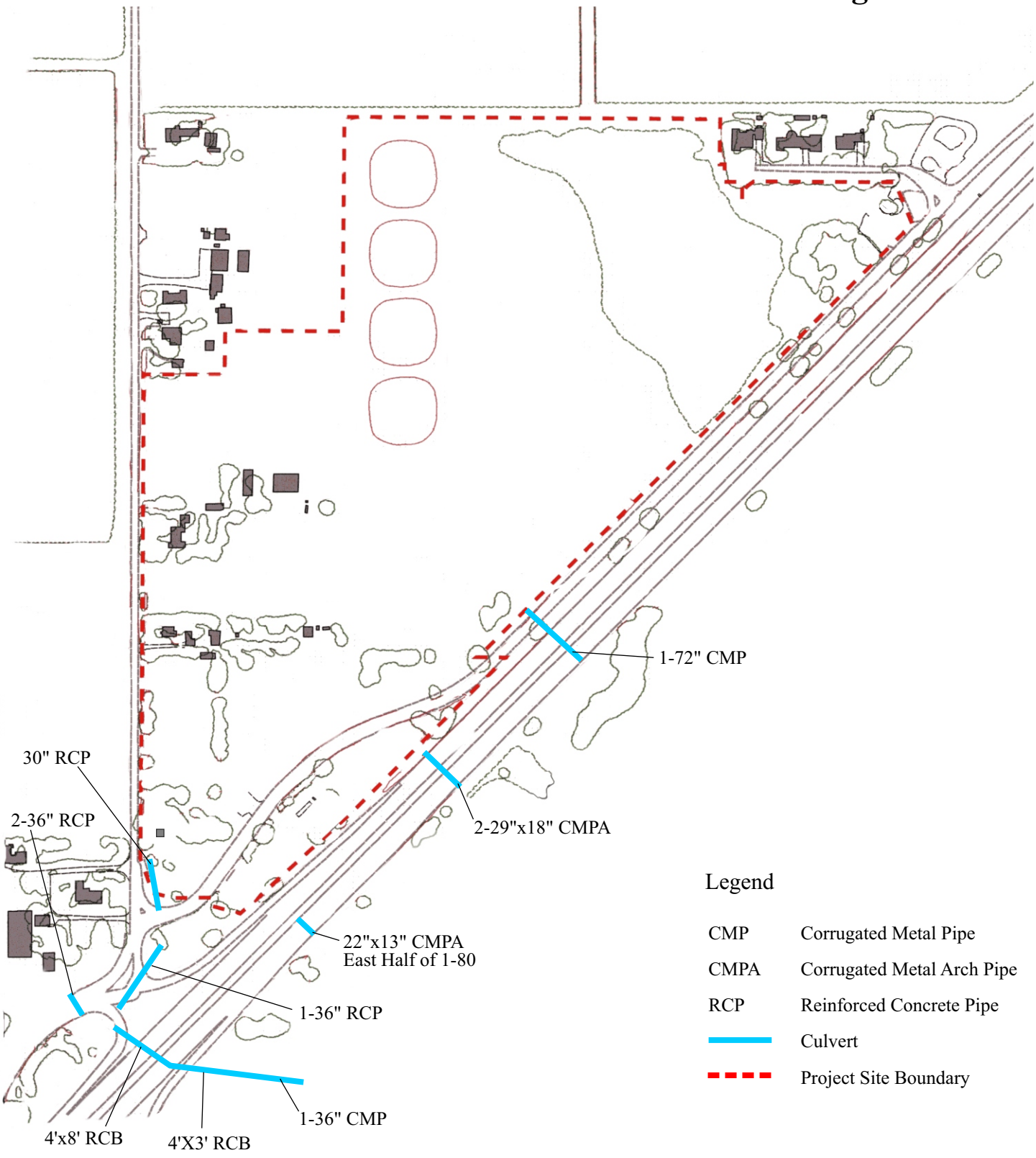
It appears from review of correspondence that the 72-inch metal culvert existed under Highway 40 prior to construction of Interstate 80. Several letters from 1962 to 1963 between the Dixon Soil Conservation District (DSCD) and California Division of Highways shows the culvert was considered important for upstream drainage and a planned drainage project. The drainage project was not constructed; however, the structure is still present under Interstate 80. In February 1996, two of the westbound lanes of Interstate 80 were closed due to flooding. To relieve the flooding, the 72-inch culvert was cleared and the flood water receded (MBK Engineers, 2000). Currently the 72-inch culvert entrance is blocked.

The City of Dixon prepared a Storm Drain Report (March 1999) for the Dixon area. The Storm Drain Report identified the following flooding concerns (MBK Engineers, 2000).

- There is a double 36-inch pipe/box culvert under Interstate 80, which is reduced to a single 36-inch pipe. The historic drainage to the two 36-inch pipes has been largely diverted to the east into the vicinity of the project site.
- East of Currey Road and north of Interstate 80, there is a 72-inch corrugated metal pipe animal passage and two 29- by 18-inch corrugated metal arch pipes that drain the project site. The 72-inch corrugated metal pipe is apparently not maintained by Caltrans. The two 29- by 18-inch corrugated metal arch pipes have limited capacity.

LOCAL DRAINAGE FACILITIES MAP

Figure 4.3-2



Milk Farm
Dixon, California

Source: MBK Engineers, 2000.

Y1263-BO.00017.Fig4.3-2.cdr-5/4/05

- Downstream of Interstate 80 from the project site is the Northeast Quadrant Specific Plan for the City of Dixon. This area also has chronic flooding problems that progress downstream. Additional upstream water could impact the area.

Previous Drainage Studies

There have been several studies of the project site and vicinity, including the Dixon Storm Drainage Master Plan Update (Master Plan update) by West Yost & Associates (1998), an Evaluation of the Watershed Affecting Milk Farm by Moorhead Engineering (Moorhead Study) (1998), and a Hydraulic Analysis by MBK Engineers (MBK Study) (MBK, 2000). These studies are summarized below.

Master Plan Update

The Master Plan Update evaluated eight separate watersheds within the City or within the area expected to be developed in the near future. The watersheds analyses included areas north of Interstate 80.

The project site is within Basin D of the Master Plan Update. The proposed facilities for Basin D included detention within the NQSP with four alternatives to release flow to the northeast, to the east or to the south. No decisions or agreements were made to define the flow from the north under Interstate 80, the volume of detention storage, or the amount or direction of an outfall.

Moorhead Study

The Moorhead study provided a detailed history of the changes to the project site upstream watershed and changes in agricultural practices. Changes by adjacent and upstream landowners, by Solano Irrigation District (SID), by Solano County, and by Caltrans have generally increased both the frequency and depth of ponding at the project site. In addition, intensified agricultural practices have increased peak runoff by up to 12 times and runoff volume by up to 2.5 times.

The recommendations presented in the Moorhead study were to:

- Provide detention storage north of Interstate 80;
- Provide an outlet channel to Tremont #3, and also improve the DRCD channel, located several miles to the east;
- Have greater responsibility by the landowners for their drainage work;
- Provide better conveyance to the twin 36-inch culverts and the twin 29- by 18-inch culverts that cross under Interstate 80; and

- Ensure that the Milk Farm Project meets runoff standards recommended by DRCD.

To date, none of the recommendations has been completed

MBK Study

The purpose of the MBK study was to determine drainage facilities that would provide flood protection for the project site and would mitigate impacts as a result of site development. The study included a review of existing information, and a HEC-1 rainfall-runoff and routing model for existing and proposed conditions. The MBK study also presented information that related to recent rainstorms that caused ponding at the project site and a comparison of rainfall amounts from those storms to statistical storms, such as the 2-, 5-, 10-, and 100-year rainfall.

The report provided the following recommendations:

- Provide 46-acre feet of on-site detention;
- Provide through drainage for the historic 660 ± acre drainage area upstream of the project site;
- Set minimum finish floor elevations at 68.1 feet [National Geodetic Vertical Datum (NGVD) 1929]; one foot above the 100-year flood under existing conditions;
- Set the minimum elevations of drop inlets at 65.9 feet (NGVD 1929); and
- Participate in resolving drainage issues with City of Dixon, Solano County, Caltrans, DRCD, and adjacent property owners

The most significant aspects of the MBK Study are that it quantified runoff volumes and ponding elevations at the project site, provided specific measures to protect the development from flooding, and recommended facilities to mitigate drainage impacts as a result of the development. The analysis was based on the entire 2,690 acres that currently drain to the Milk Farm area. The report also had recommendations to participate in regional solutions.

The MBK study provided an approach that would allow the proposed project to proceed without a regional solution. The proposed approach by MBK would not alleviate regional drainage problems, but the developed portion of the project site would be protected from flooding and no off-site runoff increases would occur.

Elevating the finished floors above the elevation of Interstate 80 would be the key for flood protection. The Interstate 80 roadway, coupled with upstream conveyances that are circuitous and limited, act as a dam and cause ponding at the project site. Ponding

upstream of the highway embankment can reach the elevation of the embankment but not much more. Once the flow begins to overtop the roadways, the water level would not be expected to rise much more than an estimated 0.5 foot above the highway embankment level. Structures with finished floors above this elevation would have a high level of protection, regardless of the conveyance under the freeway.

REGULATORY FRAMEWORK

The project site is currently used for agricultural and rural residential uses. These land uses generally have minimal regulatory constraints. Farmers are generally free to cultivate their lands and grow a variety of crops. There are no drainage regulations specifically applicable to the project site. Historically, drainage improvements downstream of the City of Dixon and within the City have not addressed contributions from agricultural lands north of the Interstate 80 freeway.

Water quality in surface and groundwater bodies is regulated by the State Water Resources Control Board (SWRCB) through its Regional Water Quality Control Boards. The project site is under the jurisdiction of the Central Valley Regional Water Quality Control Board (RWQCB), which is responsible for implementation of state and federal water quality protection guidelines in the region. The RWQCB implements the Water Quality Control Plan (Basin Plan), a master policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

Storm water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Nonpoint Source Program (established through the Clean Water Act); the NPDES program objective is to control and reduce pollutants to water bodies from nonpoint discharges. The Program is administered by the California Regional Water Quality Control Boards. Compliance with the NPDES Permit is mandated by state and federal statutes and regulations.

The City of Dixon in conjunction with the City of Vacaville has prepared a Storm Water Management Plan (SWMP) to comply with the NPDES General Permit requirement. Under the General Permit, the cities are mandated to implement specific types of urban runoff pollutant control measures and submit reports to the RWQCB. Urban runoff includes storm water that is discharged to municipal storm drainage systems and other water that flows, is discharged, or infiltrates into the storm drainage system.

The SWMP provides a schedule for how the cities of Dixon and Vacaville will provide public education and outreach, public involvement, methods for control of illicit

discharges, control of construction site storm water runoff, post-construction storm water management, and general pollution prevention and good housekeeping practices.

An integral part of reducing pollutants in storm water runoff is implementation of Best Management Practices (BMPs). These include methods to be employed during and after construction to prevent sediments and chemicals from entering the storm water. The BMPs are technology based and must reduce pollutants to the Maximum Extent Practicable.

Dixon General Plan Policies

The Dixon General Plan includes several policies relevant to flooding, hydrology, and water quality. The policies are:

Dixon General Plan Policies	Project Consistency
NATURAL ENVIRONMENT	
8: The City shall strive to reduce the risks to life and property arising from flooding to an acceptable level, consistent with the City's Master Drainage Plan.	Future site development would be consistent with City design standards for providing flood protection.
10: The City shall ensure that measures to reduce flood damage to individual properties will only be undertaken where the potential for hazard due to flood erosion is not increased on other properties.	Future site development would occur in accordance with the requirements of the JPA.
PUBLIC SERVICES	
15: The City shall ensure that improvements in drainage facilities and services will be financed from impact fees levied on new development.	The applicant would participate in payment of fees as part of site development.
16: The City shall ensure that development provides the drainage improvements necessary to accommodate peak flows.	The drainage improvement for the site would be developed in coordination with JPA at the time of site development.

IMPACTS AND MITIGATION MEASURES

Significance Criteria

Based on the Environmental Checklist in Appendix G of the CEQA Guidelines, a proposed project could be considered to have a significant hydrological or water quality impact if it would result in:

- Substantial alteration of the existing drainage patterns of the site or area that could exacerbate flooding problems.
- An increase in the frequency and/or magnitude of flooding events at the site or in the region.
- Exposure of life and property to increased flood hazards as defined by the Federal Emergency Management Agency (FEMA).
- Substantial alteration of the existing drainage patterns 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.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Substantial degradation of water quality, including violation of applicable water quality standards.
- Substantial interference with groundwater recharge or depletion of groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

Impacts Determined to Be Less than Significant

- **Substantial interference with groundwater recharge or depletion of groundwater supplies.**

Future development of the project site would slightly reduce groundwater recharge due to construction of impervious surfaces, but the applicant has committed to use eco paving or similar surfaces that promote infiltration. Groundwater extraction is not proposed as part of future site development.

Impacts Determined to Be Potentially Significant

- Alteration of the existing drainage patterns, causing flooding problems or erosion and siltation;
- Increase in the frequency and/or magnitude of flooding events;
- Exposure of life and property to increased flood hazards;
- Creation of increased runoff water that would exceed the capacity of existing or planned storm water drainage systems;
- Substantial degradation of water quality.

Anticipated Future Impact 4.3-1

Increased drainage runoff resulting from alteration of drainage patterns and creation of new impervious surfaces, potentially increasing on-site and downstream flooding hazards during and following future site development. This is a potentially significant impact.

Future development of approximately one-half of the project site, particularly areas proposed for commercial building and parking lots, would result in increased runoff due to the amount of impervious surfaces (buildings, paved roadways and driveways, parking lots). The increases in runoff would add to the existing flooding problems at the project site and downstream.

The conceptual site plan has addressed the issue of existing on-site flooding and increases in runoff volumes by designating about five acres for Agricultural in the Highway Commercial area. These five acres would be used in the future to construct a pond with a capacity of approximately 46 acre feet. The pond would act as a detention basin to accommodate drainage from both on-site and from the 660-acre drainage subbasin upstream from the project site. The runoff from the 660-acre subbasin would be intercepted at Currey Road at the northwestern project boundary and transported in a 48- by 24-inch pipe to the detention basin where a pump would activate when the water elevation in the pond reaches 56 feet NGVD 1929. The water would be discharged to the twin 29- by 18-inch pipes under Interstate 80.

The 46 acre-feet of storage in the proposed pond appears conservative for a 60-acre site. The 46 acre-feet of storage is equivalent to 9.2 inches of runoff from the entire site, more than double the 100-year 24-hour rainfall based on nearby rain gauge data. The City's design criteria are to provide detention volume for the 100-year, four-day storm. The four-day rainfall is 7.25 inches (Goodridge, 1993), so the proposed storage volume is greater than the design criteria. However, with routing and significant runoff from off-site, the MBK modeling (MBK, 2000) shows no off-site impacts using this storage. While the modeling concludes no significant impacts to downstream peak runoff volumes, the duration of runoff may increase and contributions of runoff to downstream flows would exceed the capacity of existing and planned storm water drainage systems.

The pond is proposed to have a bottom elevation of 54.5 feet NGVD 1929 (about 12 feet below ground surface); thus, the pump would be activated when there is about 1.5-foot depth of water in the pond prior to pumping. With this configuration, much of the pond storage would be used during the early part of the runoff period and not be available later

if and when inflow to the area exceeds outflow capacity. Detention storage is needed only when inflow exceeds outflow.

The MBK study recommended in-line storage, which means that runoff would pass through the detention basin. Off-line storage is often more efficient than in-line storage. Off-line storage means that low volumes of runoff, up to the maximum conveyance, passes through an area unimpeded. Detention storage is used only when inflow to the area exceeds the outflow capacity. The advantage is that little or none of the detention storage is used before it is needed. An XP-SWMM dynamic model can be used to evaluate and optimize the configuration of in-line and off-line detention storage.

During the summer, when there is no precipitation, the inflows to the pond would be landscaping irrigation from the project site and, to a limited extent, upstream irrigation activities. The depth of the permanent pool may be too shallow. At 1+ foot deep, tules would fill the entire bottom and the water may not sustain even mosquito fish, which should be considered as a minimum for this basin. Water depths of up to eight feet would provide open water free of vegetation and maintain a suitable temperature gradient.

The presence of shallow groundwater and/or permeable soils under the pond may affect the operation and effectiveness of the pond. Local high groundwater may infiltrate into the basin and require additional pumping to maintain design water levels. Conversely, a low water table and permeable soils would allow the detention basin to lose the permanent pool water and possibly become dry in the summer, thereby eliminating mosquito fish habitat. The detention basin may need a layer of clayey material to minimize exfiltration.

Future finished floor elevations are proposed to be constructed one foot above the calculated 100-year flood elevation (67.1 feet NGVD 1929), or at 68.1 feet NGVD 1929. However, the City's design criteria require that building pads are a minimum of one foot above the 100-year hydraulic grade line (water level of the 100-year storm). To compensate for reduced on-site storage from the construction of structures, future site development would include "skimming" of the site; this would involve grading the agricultural areas of the site and using the extra soil for raising the building elevations to one foot above the 100-year flood elevation.

The conceptual site plan suggests setting the future minimum drop inlet grate elevations at 65.9 feet NGVD 1929, which is above the off-site two-year peak stage. However, City requirements are one foot above the 10-year hydraulic grade line (water level of the 10-year storm).

Anticipated Future Mitigation Measure 4.3-1a

Prior to obtaining development permits for the site, and as part of subsequent CEQA analyses, the following assessments shall be completed:

- *Perform modeling of the drainage at the project site and the upstream 2,690-acre drainage subbasin using the XP-SWMM dynamic model for the area downstream and upstream to include the conveyance facilities and storage within and around the project site. The two main purposes of this analysis would be to better define the outflow hydrographs past Interstate 80 and to better evaluate alternative conveyance and storage alternatives. The modeling shall take into consideration exfiltration from the pond and/or infiltration from shallow, perched groundwater, if present, and preparing the site to an elevation that would allow the drain inlets to be one foot above the 10-year storm water level. The results of the modeling will be used to design storage facilities and will be presented to the City with the Improvement Plan for City review and approval.*

- *Prepare a Pond Operation and Maintenance Plan that addresses: maintenance of a base water level in the pond (up to eight feet of water depth) to ensure suitable temperature gradients; excessive plant growth; excessive nutrient loading from runoff containing fertilizers; safe bank slopes; vegetation palettes; hazards from accidental falls into the pond; and, if a clay liner is installed to prevent exfiltration from the pond, identify the source of clay and the geotechnical requirements for liner installation and slope maintenance. If water needs to be imported to maintain an adequate water level in the pond, the Plan must identify the volume and source of water. The Plan must also address removal of dead vegetation, dredging of accumulated sediments, and a need for aeration to maintain sufficient oxygen demand. The Plan must be submitted to the City for review and approval as part of future development application(s).*

Anticipated Future Mitigation Measure 4.3-1b

The applicant shall pay the fair share of storm drainage facilities impact fees for use by the City and JPA to plan, design, and construct regional drainage facilities.

Anticipated Future Mitigation Measure 4.3-1c

The applicant shall install drop inlet grate elevations in accordance with City requirements, i.e., one foot above the 10-year hydraulic grade line. In addition, building pad (not finished floor) elevations shall be designed to be one foot above the 100-year hydraulic grade line as part of the future site development plans.

Implementation of these measures would reduce anticipated future impacts associated with drainage and flooding to a less-than-significant level.

Anticipated Future Impact 4.3-2

Construction activities and post-construction operation after the site has been developed could result in degradation of water quality in receiving waters by reducing the quality of storm water runoff. This is a potentially significant impact.

Anticipated Future Construction-Period Impacts. Construction and grading within the project site would require temporary disturbance of surface soils and removal of existing impervious surfaces and vegetative cover. Some of the soils at the site have been affected by petroleum hydrocarbons and other contaminants (see Section 4.4, Public Health and Safety, for details). During the construction period, grading and excavation activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. Soil stockpiles and excavated areas on the project site would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation in storm water.

The potential for chemical releases is present at most construction sites. Once released, substances such as fuels, oils, paints, and solvents could be transported to the waterways in storm water runoff, wash water, and dust control water, potentially reducing water quality.

Anticipated Future Operation-Period Impacts. New construction and intensified land uses at the project site would result in increased vehicle use and potential discharge of associated pollutants. Increased numbers of vehicles at the project site will likely result in leaks of fuel, lubricants, tire wear, and fallout from exhaust, which will contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from landscaped areas at the site may contain residual pesticides and nutrients, which would flow into the on-site detention pond.

Anticipated Future Mitigation Measure 4.3-2a

As part of future development projects/phases and prior to on-site construction, the project proponent shall prepare a SWPPP designed to reduce potential impacts to surface water quality through the construction period of the project to be submitted to the City for review and approval. It is not required that the SWPPP be submitted to the RWQCB, but the SWPPP must be maintained on-site and made available to RWQCB staff upon request. The SWPPP shall include specific and detailed Best Management Practices (BMPs) designed to mitigate construction-related pollutants. At minimum, BMPs shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with storm water and measures to prevent off-

site migration of sediments and pollutants. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain.

An important component of the storm water quality protection effort is the knowledge of the site supervisors and workers. To educate on-site personnel and maintain awareness of the importance of storm water quality protection, site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list shall be specified in the SWPPP.

The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, which must include both dry and wet weather inspections. In addition, in accordance with State Water Resources Control Board Resolution No. 2001-046 (SWRCB, 2001), monitoring would be required during the construction period for pollutants that may be present in the runoff that are "not visually detectable in runoff."[1] RWQCB personnel, who may make unannounced site inspections, are empowered to levy considerable fines if it is determined that the SWPPP has not been properly prepared and implemented.

BMPs designed to reduce erosion of exposed soil may include, but are not limited to: soil stabilization controls, watering for dust control, perimeter silt fences, placement of hay bales, and sediment basins. The potential for erosion is generally increased if grading is performed during the rainy season as disturbed soil can be exposed to rainfall and storm runoff. If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control, that is, keeping sediment on the site. End-of-pipe sediment control measures (e.g., basins and traps) shall be used only as secondary measures. If hydroseeding is selected as the primary soil stabilization method, then these areas shall be seeded by September 1 and irrigated as necessary to ensure that adequate root development has occurred prior to October 1. Entry and egress from the construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be designed to be accessible and functional during both dry and wet conditions.

Anticipated Future Mitigation Measure 4.3-2b

The future project design shall include features and operational BMPs to reduce potential impacts to surface water quality associated with operation of the project. These features shall be included in the project drainage plan and final development drawings. Specifically, the final design shall include measures designed to mitigate potential water quality degradation

[1] Construction materials and compounds that are not stored in water-tight containers under a water-tight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures.

of runoff from all portions of the completed development. The use of vegetated swales shall be considered as a water quality BMP instead of or in conjunction with sediment/grease traps. Storm drain signage shall be considered as a source control BMP. An Operations and Maintenance Plan shall be developed and implemented to inspect and maintain the proposed five-acre pond as required in Mitigation Measure 4.3-1.

The final design team for the development project shall review and incorporate as many concepts as practicable from Start at the Source, Design Guidance Manual for Stormwater Quality Protection *(BASM, 1999) and* Stormwater Best Management Practice Handbook, New Development and Redevelopment *(CSQA, 2003). Additional BMPs will likely be required in proposed parking areas at the project site.*

The City shall review and approve the SWPPP prior to approval of the future grading plan.

Implementation of these measures would reduce anticipated future impacts associated with water quality degradation to a less-than-significant level.