4.3 Water Resources

This section provides an assessment of the potential impacts to water resources that could result from implementing the Proposed Action or alternatives. Impact categories discussed in this section include potential changes in surface and groundwater hydrology and water quality, changes in runoff patterns, and the potential effects of flooding within the project site. Measures to avoid, minimize, or mitigate potential adverse effects are contained in **Section 5.3**. Indirect and cumulative impacts are discussed in **Sections 4.15** and **4.16**, respectively.

This impact analysis addresses effects on surface water resources, groundwater resources, and flooding. Within this framework, each alternative has been analyzed to determine the level of environmental change that would occur, in terms of changes to surface water hydrology or quality, groundwater hydrology or quality, or flooding and drainage, as a result of construction and operation of each alternative. In addition, potential effects associated with water supply and wastewater treatment capacity are also addressed. A summary of the water supply and wastewater service needs of each alternative is provided below.

Water Supply

Implementation of the Proposed Action and alternatives would require additional water demand to support each proposed use. As discussed in **Section 2.0**, water would be supplied via either on-site groundwater pumping or municipal water supply from the City of Cloverdale. **Section 2.0** provides an overview of the total annual volume and peak daily water demands associated with each of the alternatives. Additional discussion of methodologies for determining these results, as well as details concerning calculations behind this analysis, are provided in the Water Supply Report, contained in **Appendix I**.

Wastewater Service

Implementation of each alternative would result in the generation of wastewater that would need to be treated and properly disposed of. As discussed in **Section 2.0**, raw wastewater would be either treated on-site or piped to the City of Cloverdale's existing wastewater treatment plant for treatment and disposal. During the winter storm season (for the on-site treatment option), wastewater discharge would be stored in an on-site pond until disposal could occur. **Section 2.0** provides an overview of the volume of wastewater that would be generated under each alternative. Additional details regarding these calculations are provided in **Appendix J**.

4.3.1 Alternative A – Proposed Action

Impact 4.3.1-1: Changes to Existing Drainage Patterns (Potentially Significant)

Implementation of Alternative A would result in changes to existing drainage patterns, both on-site and off-site, including the addition of up to 17 acres of new impervious or semi-pervious surfaces. Impervious surfaces, such as roads, cement walkways, buildings, parking lots, and similar, prevent the infiltration of stormwater into underlying sediments. Stormwater that cannot infiltrate remains on the ground surface and either pools, runs into adjacent areas, or becomes channeled into available drainage control facilities.

Additionally, construction activities such as grading, scraping, earth-moving, import or export of fill, and installation of structures, parking lots, landscaping, storage ponds, and other proposed features, would result in changes to the grade and slope of existing surfaces in the project site. Such changes would be anticipated to alter the existing drainage patterns located on-site, and could result in unintended pooling, ponding, flooding, or discharge of stormwater to areas not suited to convey, hold, or retain storm flows.

Increased stormwater flows could result in increased discharge of stormwater to downstream areas, potentially resulting in increased incidence of flooding or erosion off-site. However, several drainage features have been incorporated into the design of Alternative A that would retain stormwater on-site and lessen discharge of storm flows to downstream areas. As discussed in **Section 2.0**, the Preliminary Drainage Study, **Appendix B**, and the preliminary Stormwater Quality Management Plan (SQMP), **Appendix Q** these include

- Installation of a subterranean stormwater detention system, sized to contain a 10-year storm event (60,100 cubic-foot capacity);
- Inclusion of pervious concrete surfaces for most driveway and parking surfaces;
- Source control methods;
- Minimization of impervious areas and inclusion of pervious features in site design (landscaping, wetland area, grassy swales, etc.); and
- Discharge to an upland drainage release system.
- Bio-retention features;
- Flow-through planters

The SQMP proposes BMPs to manage stormwater quality and flow control focus on three tiers of application. In order of effectiveness, these are: limiting directly-connected impervious area, controlling the sources of pollutants, and treating stormwater. This tiered approach to stormwater management has been shown to be most effective in controlling non-point source pollution, and is the approach advocated by the California Stormwater Quality Association, the Bay Area Stormwater Management Agencies Association, and the Regional Water Quality Control Board (RWQCB).

Incorporation of these measures into the design of Alternative A would reduce stormwater flows discharged from the site for a 10-year storm event to less than significant levels. However, during storm events of greater intensity than a 10-year storm event, only the amount of water equivalent to that of a 10-year storm event would be retained. Sizing factors for the treatment and flow BMPs meet the following objectives:

- To meet the water quality treatment guideline, the treatment area is sized to treat the 85th percentile mean annual 24-hour rainfall intensity (0.21 in/hr).
- Where required to meet the peak flow control guideline, the storage volume will be sized to limit the post-project two-year, 24-hour peak flow rate to pre-development conditions.

Additional water would be discharged to the upland drainage release system, where it could potentially result in additional inundation, increased stream or drainage flows, erosion, or flooding. During a 100-year storm event, the stormwater flows released to the upland drainage system could contribute to additional flooding. Implementation of **Mitigation Measure 5.3-1**, would ensure that Alternative A would not contribute to off-site flooding, including flooding during a 100-year storm event, and would reduce this impact to a less than significant level.

Significance after Mitigation: Less than Significant

Impact 4.3.1-2: Location in a Delineated Floodplain (Potentially Significant)

The northeastern parcels are located within a FEMA-defined 100-year flood zone. As discussed in greater detail in **Section 3.3**, flooding on-site is created primarily by run-on to the project site associated with the Russian River. As a result, all of the facilities proposed for the northeastern parcels under Alternative A, including a groundwater well, water treatment plant, water supply tanks and pipelines, wastewater treatment plant, wastewater storage pond, wastewater sprayfields, and drainage ditches, would be located within a 100-year flood zone.

As discussed in Section 2.0 and **Appendix B**, the proposed water treatment plant, wastewater treatment plant, and wastewater storage pond would be surrounded by flood control levees. These levees would be designed to reach a minimum height of the FEMA-defined 100-year flood height plus at least 3 feet of freeboard above the 100-year flood height.

Installation of these levees would remove approximately 32.2 acres of area from the existing FEMA-defined 100-year floodplain. As a result, flood water that would have been stored in this area would be displaced into surrounding areas during a 100-year flood event, and could potentially increase flood heights in adjacent areas. To estimate the magnitude of this potential increase, flood height was modeled for Alternative A using a mass balance calculation. The flood height determination used fine-scale topographic survey data completed for the site in 2009, along with FEMA-defined 100-year flood heights (see **Figure 3.3-3**) and the proposed footprint and elevation of the leveed wastewater facilities. The total volume of flood water that would be displaced by installing the proposed levees was then calculated. It was then assumed that the calculated displaced flood water volume would disperse evenly within the parcel where the facility would be located, as well as hydrologically connected parcels located immediately adjacent to the project site.

Results from the flood height model indicated that flood heights in affected areas would increase by a maximum of 0.67 foot as a result of implementing Alternative A. However, based on the methodology used for the calculation, a conservative estimate of flood height increase is approximately 1 foot. A 100-year flood height increase of this magnitude would remain within existing available freeboard for the levees along the City's wastewater treatment plant to the north, as well as other levees or berms located to the east and west of the affected parcel. This magnitude of water level increase on the parcel immediately south of the project site is not anticipated to significantly increase 100-year flood heights, and due to existing retaining features, would not result in significant encroachment of flood waters onto adjacent parcels or other areas where flooding does not presently occur. No additional mitigation for the water treatment plant, wastewater treatment plant, or the wastewater storage pond would be required. To protect the proposed groundwater well (if selected as a water supply source) from flooding, **Mitigation Measure 5.3-2a** would be required to reduce this impact to a less than significant level.

It should be noted that the increase in flood height due to the project was estimated for the purposes of determining the magnitude of change for this analysis under NEPA. Additional analysis in accordance with Executive Order 11988 would be still be required by FEMA before the Tribe constructs facilities on the floodplain. Development on the floodplain would not be permitted to begin until the Tribe has demonstrated to FEMA that the proposed facilities and properties upstream and downstream would not be adversely affected by the proposed activities on the floodplain and the Conditional Letter of Map Revision is completed and approved (See Regulatory Setting, Section 3.3, *Water Resources*). In consultation with FEMA, **Mitigation Measures 5.3-2b** through **d** are included to ensure that the project conforms with FEMA standards throughout the design process. The Tribe would prepare a hydraulic model in accordance with FEMA floodplain hydraulic modeling requirements, seek participation in the National Flood Insurance Program, and establish a Tribal Mitigation Plan per FEMA guidance.

Significance after Mitigation: Less than Significant

Impact 4.3.1-3: Water Quality during Construction (Less than Significant)

Construction of Alternative A would involve the use of heavy machinery for grading, earth-moving, import of building materials, and construction of the proposed facilities. The use of heavy machinery for these activities could result in the release of sediment, as well as construction-related oils, greases, fuels, antifreeze, and other fluids associated with the use of heavy machinery. These potential water pollutants could become entrained in stormwater flows and could degrade water quality of natural waterways off-site, and potentially contribute to water quality impairments along the Russian River, as discussed in **Section 3.3**.

Construction of Alternative A would be subject to regulation under the Federal Clean Water Act. As such, the applicant would be required to acquire an NPDES general permit for construction activities prior to the initiation of construction activities on site. Conditions for the NPDES permit would include completion and adherence to the recommendations of a Stormwater Pollution Prevention Plan (SWPPP), which in turn would implement a series of Best Management Practices (BMPs). BMPs would include measures to reduce the loading of sediment and other construction-related pollutants during the construction period, and would include measures such as stormwater retention ponds, settling basins, slope stabilization, temporary erosion control measures (fiber rolls, staked straw bales, temporary revegetation), mechanical stormwater filtration measures, and use and containment requirements for hazardous construction materials (fuels, solvents, lubricants, concrete wash-out, and similar). Adherence to the conditions of the NPDES general permit for construction activities would therefore ensure that the potential for discharge of contaminated waters from the project site during construction would be less than significant.

Impact 4.3.1-4: Water Quality during Operation (Less than Significant)

Effects to water quality during operation of Alternative A could occur due to discharge of stormwater containing elevated levels of pollutants. Specifically, operation of Alternative A would involve additional use of the project site by automobiles, buses, delivery trucks, and other uses associated with daily operations of the proposed facilities. Additionally, landscaping activities would be anticipated to include the use of pesticides, herbicides, and fertilizers. During storm events, pollutants associated with these uses, including oils, greases, brake dust, sediments, trash, fertilizers, herbicides, and pesticides, may become entrained in stormwater flow and result in discharge of these constituents outside of the project site, causing degraded water quality off-site.

As discussed in **Section 2.0,** the preliminary Drainage Study, **Appendix B**, and the SQMP, **Appendix Q**, Alternative A would incorporate design measures that would reduce the intensity of pollutant discharges associated with stormwater runoff during operation. The SQMP proposes BMPs to manage stormwater quality and flow control focus on three tiers of application. In order of effectiveness, these are: limiting directly-connected impervious area, controlling the sources of pollutants, and treating stormwater. Specifically, the use of slope protection practices would reduce erosion and sediment loading of stormwater, the use of landscaped swales/bioswales, bioretention areas and flow-through planters would filter and reduce pollutant loads from impervious surfaces prior to storm drain transport, the use of porous concrete and other porous hardscape surfaces to promote stormwater infiltration and reduce polluted runoff, overland discharge of storm flows to prevent discharge of polluted stormwater directly into local streams and the Russian River, and the incorporation of Integrated Pest Management principles and techniques for design and maintenance of landscaping, which would reduce fertilizer, herbicide and pesticide use and associated potential for runoff during storm events. Sizing factors for the treatment and flow BMPs meet the following objectives:

- To meet the water quality treatment guideline the treatment area is sized to treat the 85th percentile mean annual 24-hour rainfall intensity (0.21 in/hr).
- Where required to meet the peak flow control guideline, the storage volume will be sized to limit the post-project two-year, 24-hour peak flow rate to pre-development conditions

Incorporation of these measures into the design of Alternative A would ensure that water quality impacts during operation would be less than significant.

Impact 4.3.1-5: Groundwater Levels and Effects on the Russian River from Groundwater Pumping (Less than Significant)

As discussed in detail in **Appendix I**, implementation of Alternative A would result in the use of up to 74.6 acre-feet of groundwater per year (af/yr), taking into account the use of recycled water. Under the private option, groundwater would be drawn from a groundwater supply well near the southeast corner of the project site. Groundwater pumping from the supply well could lower groundwater levels in onsite and neighboring wells, including the active South Cloverdale Water District supply well and impact flows from the Russian River.

The effects of project-related groundwater extraction were analyzed using an analytical element model, which simulated the groundwater response to the proposed supply well (Hydrometrics LLC, 2009). The first analysis completed in August 2009, modeled a simulation well. The analysis assumed that the simulation well would be located in the southern corner of the site. The input data for the model were obtained from available project site and vicinity hydrogeologic information developed during previous well installations, available pump tests, water level measurements, and ongoing groundwater pumping. For the 2009 analysis, the simulation groundwater supply well was assumed to operate continuously and pump 45 gallons per minute (gpm). This rate was based on an annual project water demand of 74.6 acre feet per year, as presented in the Water Supply Report, **Appendix I**.

In July 2010, a water supply well was installed about 500 feet east of the simulation well used in the 2009 analysis. The well is deeper and closer to the Russian River than what was simulated. Subsequent to the original simulated well analysis, a supplemental analysis was conducted that reflects the characteristics of the existing well and included an increased pumping rate. The increased pumping rate was used to represent the rate that the proposed project may require if recycled water was not available for irrigation and toilet flushing.

Results from August 2009 Groundwater Pumping Analysis

The model results reflect a groundwater flow gradient beneath the site that is generally perpendicular to the Russian River but also accounts for a component of down-valley groundwater flow. Therefore, the groundwater extracted from the proposed well would be made up of water that, if not extracted, would eventually flow down-gradient and enter the Russian River. At a pumping rate of 45 gpm, the model output indicated that the well would produce a steady state drawdown of about 2 feet and result in the withdrawal of about 42 gpm of groundwater flowing that would otherwise flow to the Russian River. The model simulation of the pumping resulted in an ovate capture zone with its long axis parallel to groundwater flow (and perpendicular to the river). At the 45 gpm pumping rate, the capture zone does not extend far enough to intersect the flow of the Russian River; that finding is important and indicates that the proposed pumping well would not be drawing flow away from the surface flows of the river. Rather, the well would intercept and draw groundwater that is flowing down-gradient from the adjacent uplands towards the river and that would reach the river under current conditions.

The removal of 42 gpm of groundwater from the "gaining" river system of the Russian River equates to about 0.09 cubic feet per second (cfs). As discussed in **Section 3.3**, the flow of the Russian River between November and April is, on average, 1,763 cfs and during the months of May through October, averages 286 cfs. Therefore, it is reasonable to predict that the proposed continuous groundwater pumping of 45 gpm from the project site would indirectly diminish Russian River flows (through removal of groundwater inflow to the river) about 0.005 percent during the winter months and 0.03 percent during the summer months. The Biological Opinion issued by the National Marine Fisheries Service on Water Supply, Flood Control Operations, and Channel Maintenance in the Russian River watershed[1] requires instream flow requirements for the upper Russian River from 150/185 cfs to 125 cfs under normal conditions. As a result, the estimated reduction caused by groundwater pumping by the proposed project of 0.03 percent of the 286 cubic feet per second (cfs) summer flow would increase to 0.07 percent under the 125 cfs flow dictated by the BO. Based on this evaluation, the reduction of less than 0.1 percent of available flow to the Russian River caused by the proposed groundwater pumping would be very small and not observable or measurable and would not negatively impact the hydrology of the river or aquatic habitats. Groundwater pumping proposed by the project would have a less than significant effect on the Russian River.

According to the analysis, groundwater pumping at 45 gpm from the proposed groundwater well would establish a drawdown at the well of about 2 feet. Based on the modeling exercise, this drawdown would be localized and would decrease with distance from the well. Resultant drawdown in the neighboring wells would be less than 2 feet but most likely, would not be observable or distinguishable from seasonal or monthly groundwater fluctuation. The small drawdown attributable to the proposed well would not negatively impact the operation, condition, or yield in other onsite or neighboring wells. The proposed project would have a less than significant impact on other local groundwater production.

Results from April 2010 Supplemental Groundwater Analysis

The supplemental groundwater pumping analysis differed from the 2009 analysis in the following ways:

- It evaluated the parameters from an existing groundwater supply well, not a simulation well.
- The supply well is located about 500 feet closer the Russian River.
- The depth of the supply well was 50 feet deeper than the simulation well.
- The modeled pumping rate was 64 gallons per minute (gpm) to reflect pumping without the recycled water compared to the 45 gpm used in the analysis of the simulation well.

The results of the supplemental analysis were generally similar to the original analysis. However, in this analysis, the deep capture zone does not intercept the Russian River; while the shallow capture zone does intercept the Russian River. This indicates that some water is extracted directly from the Russian River and some water is intercepted before it gets to the Russian River because the well is

[1] Biological opinion regarding activities conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency and the Mendocino County Russian River Flood Control and Water Conservation Improvement District

closer to the river and the pumping rate is higher. The model calculates that Russian River flow is diminished by approximately 60 gpm, or 0.13 cubic feet per second (cfs) due to pumping the new supply well. Over 94 percent of the water captured by the production well is therefore water that is either extracted from the Russian River, or would otherwise discharge into the Russian River.

The important finding between the 2009 and 2011 supplemental analysis is that the estimated amount that the Russian River flows are diminished by groundwater pumping is roughly the same and as previously determined; this amount of flow reduction is small and not observable and would not negatively impact the hydrology of the river or aquatic habitats. Considering the recent Biological Opinion issued by the National Marine Fisheries Service, a reduction of 0.13 cfs is 0.1 percent under the 125 cfs flow dictated by the BO. Similar to the results of the 2009 analysis for the simulated well, this additional analysis indicates that groundwater pumping from the existing supply well would have a less than significant effect on the Russian River.

Proposed groundwater pumping at 64 gpm from the supply well would establish a maximum drawdown of about 0.5 feet, which would be localized and would decrease with distance from the well. Resultant drawdown in the neighboring wells would be less than 0.5 feet, but most likely would not be observable or distinguishable from seasonal or monthly groundwater fluctuation. As predicted with the simulation well in the 2009 analysis, the small drawdown attributable to the supply well would not negatively impact the operation, condition, or yield in other onsite or neighboring wells. The proposed project would have a less than significant impact on other local groundwater production.

Alternatively, if the municipal water supply option is selected, Alternative A would rely on water supplied by the City of Cloverdale. The City of Cloverdale is a surface water source with a water right (Statement SO 1423 7) and maintains four groundwater wells for water supply, which pump the underflow of the Russian River. As discussed in **Section 3.3**, groundwater levels in the vicinity of the project site and the City of Cloverdale are generally stable, although some seasonal fluctuation does occur. In terms of demand, the amount of water required by the proposed Action would be equivalent to roughly 2.8 percent of the City of Cloverdale's annual water use (2.4 million gallons per day (mgd), or 2,688 af/yr; see **Section 3.3**). The City is currently expanding its well capacity, and plans to install a fifth groundwater well in 2009. A less than significant impact would occur.

Impact 4.3.1-6: Treated Effluent Sprayfields and Water Quality (Potentially Significant)

Implementation of Alternative A could include construction and operation of sprayfields for the disposal of treated effluent generated by the proposed facilities. As discussed in **Section 2.0**, sprayfields would only be needed under the on-site wastewater option and would be used for the discharge of treated effluent during dry periods; no discharge would occur from October 1 to May 14. Additionally, effluent would be treated to the level mandated by the EPA, and as further described as "tertiary disinfected" in the California Code of Regulations, Title 22, Section 60301.230, including the use of a constant flow membrane bioreactor, chlorination, and an aerated storage pond.

The spray field area would be a cultivated crop field of approximately 14.6 acres. The 14.6 acre area was determined considering the required 50-foot protective buffer around onsite and neighboring groundwater wells (ESA, 2009). Considering the size of the field, soil percolation rates, soil holding capacity, depth to groundwater, and evapotranspiration of the chosen crop, the spray field should provide adequate application area for treated effluent, ensuring that surface ponding and runoff would not occur and the underlying soil can accommodate the applied water. Based on the water balance evaluation and subsequent alterations made to the proposed effluent application scenario, the majority of the water applied to the sprayfield would remain in the soil or be taken up as evapotranspiration. In certain months a fraction of the applied water may percolate to the water table but that water would be mixed and diluted in the aquifer.

However, if improperly managed, treated effluent discharged during sprayfield operation could pool and run off-site, resulting in co-mingling of treated effluent and surface waters. Because treated effluent would meet Title 22 standards, no significant reduction in the quality of affected surface water or of drinking water quality is anticipated. To ensure that no significant and adverse effects to surface water quality or groundwater quality occur **Mitigation Measure 5.3-3** is recommended for management of sprayfield operation.

Significance after Mitigation: Less than Significant

4.3.2 Alternative B – Reduced Hotel and Casino

Impact 4.3.2-1: Changes to Existing Drainage Patterns (Potentially Significant)

Implementation of Alternative B would result in similar changes to existing drainage patterns as discussed for Alternative A, including up to 17 acres of additional impervious features. These additional impervious surfaces, along with changes to drainage patterns associated with construction activities (as discussed in detail under Alternative A), could result in the generation of polluted stormwater, which could be carried off-site and affect downstream water quality. In addition to the stormwater retention, infiltration, and dispersion indicated in **Section 2.0**, **Appendix B**, and as discussed above for Alternative A, **Mitigation Measure 5.3-1** would be required to ensure that Alternative B would not contribute to off-site flooding, including flooding during a 100-year storm event.

Significance after Mitigation: Less than Significant

Impact 4.3.2-2: Location in a Delineated Floodplain (Potentially Significant)

Implementation of Alternative B would result in construction of facilities within a FEMA-defined 100-year flood zone, as described under Alternative A. Installation of flood control levees to protect these improvements would result in an increase in 100-year flood height of less than 1 foot. In addition to the flood control levees noted in **Section 2.0**, **Appendix B**, and the discussion for Alternative A above, implementation of **Mitigation Measures 5.3-2a-d** would reduce this impact to a less than significant level.

Significance after Mitigation: Less than Significant

Impact 4.3.2-3: Water Quality during Construction (Less than Significant)

Construction of Alternative B would involve the use of heavy machinery for grading, earth-moving, import of building materials, and construction of the proposed facilities, and would result in similar potential for degradation of water quality as discussed for Alternative A. Construction of Alternative B would be subject to regulation under the Federal Clean Water Act, and similar BMPs would be required for the implementation of Alternative B as discussed for Alternative A. Therefore, this impact would be less than significant.

Impact 4.3.2-4: Water Quality during Operation (Less than Significant)

Operation of Alternative B would involve additional use of the project site by automobiles, buses, delivery trucks, and other uses associated with daily operations of the proposed facilities. Although the intensity of use would be somewhat reduced in comparison to Alternative A, potential changes in water quality would remain similar to those discussed for Alternative A. Additionally, Alternative B would incorporate similar design measures to those discussed for Alternative A, that would reduce potential stormwater pollution. Therefore, this impact would be less than significant.

Impact 4.3.2-5: Groundwater Levels and Effects on the Russian River from Groundwater Pumping (Less than Significant)

As discussed in detail in **Appendix I**, implementation of Alternative B would result in the use of up to 54.6 af/yr. Groundwater would be drawn from a proposed well or via municipal supply, as indicated for Alternative A, above. In terms of demand, the amount of water required by Alternative B would be equivalent to roughly 2.0 percent of the City of Cloverdale's annual water use (2.4 mgd, or 2,688 af/yr; see **Section 3.3**). Other potential impacts to groundwater levels (including effects to neighboring wells) and the Russian River would be similar to Alternative A, except reduced in intensity concurrent with reduced water use. Thus, a less than significant impact would occur.

Impact 4.3.2-6: Treated Effluent Sprayfields and Water Quality (Potentially Significant)

Implementation of Alternative B could include construction and operation of sprayfields for the disposal of treated effluent generated by proposed facilities, as discussed for Alternative A. Alternative B would result in a lower intensity of use of sprayfields, as compared to Alternative A, but would otherwise potentially result in similar effects on water quality. To ensure that no significant and adverse effects to surface water quality or groundwater quality occur **Mitigation Measure 5.3-3** is recommended for management of sprayfield operation.

Significance after Mitigation: Less than Significant

4.3.3 Alternative C – Reduced Casino

Impact 4.3.3-1: Changes to Existing Drainage Patterns (Potentially Significant)

Implementation of Alternative C would result in similar changes to existing drainage patterns as discussed for Alternative A, including up to 17 acres of additional impervious features. These additional impervious surfaces, along with changes to drainage patterns associated with construction activities (as discussed in detail under Alternative A), could result in the generation of polluted stormwater, which could be carried off-site and affect downstream water quality. In addition to the stormwater retention, infiltration, and dispersion indicated in **Section 2.0**, **Appendix B**, and as discussed above for Alternative A, **Mitigation Measure 5.3-1** would be required to ensure that Alternative C would not contribute to off-site flooding, including flooding during a 100-year storm event.

Significance after Mitigation: Less than Significant

Impact 4.3.3-2: Location in a Delineated Floodplain (Potentially Significant)

Implementation of Alternative B would result in construction of facilities within a FEMA-defined 100-year flood zone, as described under Alternative A. Installation of flood control levees would result in an increase in 100-year flood height of less than 1 foot. In addition to the flood control levees noted in **Section 2.0**, **Appendix B**, and the discussion for Alternative A above, implementation of **Mitigation Measures 5.3-2a-d** would reduce this impact to a less than significant level.

Significance after Mitigation: Less than Significant

Impact 4.3.3-3: Water Quality During Construction (Less than Significant)

Construction of Alternative C would involve the use of heavy machinery for grading, earth-moving, import of building materials, and construction of the proposed facilities, and would result in similar potential for degradation of water quality as discussed for Alternative A. Construction of Alternative C would be subject to regulation under the Federal Clean Water Act, and similar BMPs would be required for the implementation of Alternative C as discussed for Alternative A. Therefore, this impact would be less than significant.

Impact 4.3.3-4: Water Quality during Operation (Less than Significant)

Operation of Alternative C would involve additional use of the project site by automobiles, buses, delivery trucks, and other uses associated with daily operations of the proposed facilities. Although the intensity of use would be somewhat reduced in comparison to Alternative A, potential changes in water quality would remain similar to those discussed for Alternative A. Additionally, Alternative C would incorporate similar design measures to those discussed for Alternative A, that would reduce potential stormwater pollution. Therefore, this impact would be less than significant.

Impact 4.3.3-5: Groundwater Levels and Effects on the Russian River from Groundwater Pumping (Less than Significant)

As discussed in detail in **Appendix I**, implementation of Alternative C would result in the use of up to 49.1 af/yr. Groundwater would be drawn from a proposed well or via municipal supply, as indicated for Alternative A, above. In terms of demand, the amount of water required by Alternative C would be equivalent to roughly 1.8 percent of the City of Cloverdale's annual water use (2.4 mgd, or 2,688 af/yr; see **Section 3.3**). Other potential impacts to groundwater levels (including effects to neighboring wells) and the Russian River would be similar to Alternative A, except reduced in intensity concurrent with reduced water use. Thus, a less than significant impact would occur.

Impact 4.3.3-6: Treated Effluent Sprayfields and Water Quality (Potentially Significant)

Implementation of Alternative C could include construction and operation of sprayfields for the disposal of treated effluent generated by proposed facilities, as discussed for Alternative A. Alternative C would result in a lower intensity of use of sprayfields, as compared to Alternative A, but would otherwise potentially result in similar effects on water quality. To ensure that no significant and adverse effects to surface water quality or groundwater quality occur **Mitigation Measure 5.3-3** is recommended for management of sprayfield operation.

Significance after Mitigation: Less than Significant

4.3.4 Alternative D – Casino Only

Impact 4.3.4-1: Changes to Existing Drainage Patterns (Potentially Significant)

Implementation of Alternative D would result in similar changes to existing drainage patterns as discussed for Alternative A, including up to 12 acres of additional impervious features. These additional impervious surfaces, along with changes to drainage patterns associated with construction activities (as discussed in detail under Alternative A), could result in the generation of polluted stormwater, which could be carried off-site and affect downstream water quality. In addition to the stormwater retention, infiltration, and dispersion indicated in **Section 2.0**, **Appendix B**, and as discussed above for Alternative A, **Mitigation Measure 5.3-1** would be required to reduce this impact to a less than significant level. This mitigation measure would ensure that Alternative D would not contribute to off-site flooding, including flooding during a 100-year storm event.

Significance after Mitigation: Less than Significant

Impact 4.3.4-2: Location in a Delineated Floodplain (Potentially Significant)

Implementation of Alternative D would result in construction of facilities within a FEMA-defined 100-year flood zone, as described under Alternative A. Installation of flood control levees would result in an increase in 100-year flood height of less than 1 foot. In addition to the flood control levees noted in **Section 2.0**, **Appendix B**, and the discussion for Alternative A above, implementation of **Mitigation Measures 5.3-2a-d** would reduce this impact to a less than significant level.

Significance after Mitigation: Less than Significant

Impact 4.3.4-3: Water Quality during Construction (Less than Significant)

Construction of Alternative D would involve the use of heavy machinery for grading, earth-moving, import of building materials, and construction of the proposed facilities, and would result in similar potential for degradation of water quality as discussed for Alternative A. Construction of Alternative D would be subject to regulation under the Federal Clean Water Act, and similar BMPs would be required for the implementation of Alternative D as discussed for Alternative A. Therefore, this impact would be less than significant.

Impact 4.3.4-4: Water Quality during Operation (Less than Significant)

Operation of Alternative D would involve additional use of the project site by automobiles, buses, delivery trucks, and other uses associated with daily operations of the proposed facilities. Although the intensity of use would be somewhat reduced in comparison to Alternative A, potential changes in water quality would remain similar to those discussed for Alternative A. Additionally, Alternative

D would incorporate similar design measures to those discussed for Alternative A, that would reduce potential stormwater pollution. Therefore, this impact would be less than significant.

Impact 4.3.4-5: Groundwater Levels and Effects on the Russian River from Groundwater Pumping (Less than Significant)

As discussed in detail in **Appendix I**, implementation of Alternative D would result in the use of up to 28.4 af/yr. Groundwater would be drawn from a proposed well or via municipal supply, as indicated for Alternative A, above. In terms of demand, the amount of water required by Alternative D would be equivalent to roughly 1.1 percent of the City of Cloverdale's annual water use (2.4 mgd, or 2,688 af/yr; see **Section 3.3**). Other potential impacts to groundwater levels (including effects to neighboring wells) and the Russian River would be similar to Alternative A, except reduced in intensity concurrent with reduced water use. Thus, a less than significant impact would occur.

Impact 4.3.4-6: Treated Effluent Sprayfields and Water Quality (Potentially Significant)

Implementation of Alternative D could include construction and operation of sprayfields for the disposal of treated effluent generated by proposed facilities, as discussed for Alternative A. Alternative D would result in a lower intensity of use of sprayfields, as compared to Alternative A, but would otherwise potentially result in similar effects on water quality. To ensure that no significant and adverse effects to surface water quality or groundwater quality occur **Mitigation Measure 5.3-3** is recommended for management of sprayfield operation.

Significance after Mitigation: Less than Significant

4.3.5 Alternative E – Commercial Retail-Office Space

Impact 4.3.5-1: Changes to Existing Drainage Patterns (Potentially Significant)

Implementation of Alternative E would result in the installation of different facilities than Alternative A, but the facilities would have, overall, a similar footprint, as discussed in **Section 2.0**. The total area of impervious surfaces included in Alternative E would be less than Alternative A, or approximately 7 acres. However, these additional impervious surfaces, along with changes to drainage patterns associated with construction activities that would be similar to those discussed in detail under Alternative A, could result in the generation of polluted stormwater. This polluted stormwater could then be carried off-site and affect downstream water quality. In addition to the stormwater retention, infiltration, and dispersion indicated in **Section 2.0**, **Appendix B**, and as discussed above for Alternative A, mitigation measure **Mitigation Measure 5.3-1** would be required to reduce this impact to a less than significant level. This mitigation measure would ensure that Alternative E would not contribute to off-site flooding, including flooding during a 100-year storm event.

Significance after Mitigation: Less than Significant.

Impact 4.3.5-2: Location in a Delineated Floodplain (Potentially Significant)

Implementation of Alternative E could result in construction of water supply, wastewater treatment, and wastewater disposal facilities within a FEMA-defined 100-year flood zone, similar to those proposed under Alternative A, but sized according to the requirements of Alternative E. Installation of flood control levees would result in an increase in 100-year flood height of less than one foot. In addition to the flood control levees noted in **Section 2.0**, **Appendix B**, and the discussion for Alternative A above, implementation of **Mitigation Measures 5.3-2a-d** would reduce this impact to a less than significant level.

Significance after Mitigation: Less than Significant.

Impact 4.3.5-3: Water Quality during Construction (Less than Significant)

Construction of Alternative E would involve the use of heavy machinery for grading, earth-moving, import of building materials, and construction of the proposed facilities, and would result in similar potential for degradation of water quality as discussed for Alternative A. Construction of Alternative E would be subject to regulation under the Federal Clean Water Act, and similar BMPs would be required for the implementation of Alternative E as discussed for Alternative A. Therefore, this impact would be less than significant.

Impact 4.3.5-4: Water Quality During Operation (Less than Significant)

Operation of Alternative E would involve additional use of the project site by automobiles, buses, delivery trucks, and other uses associated with daily operations of the proposed retail, office, and other facilities. Although the intensity of use would be somewhat reduced in comparison to Alternative A, potential changes in water quality would remain similar to those discussed for Alternative A. Additionally, Alternative E would incorporate similar design measures to those discussed for Alternative A, that would reduce potential stormwater pollution. Therefore, this impact would be less than significant.

Impact 4.3.5-5: Groundwater Levels and Effects on the Russian River from Groundwater Pumping (Less than Significant)

As discussed in detail in **Appendix I**, implementation of Alternative E would result in the use of up to 28.5 af/yr. Groundwater would be drawn from a proposed well or via municipal supply, as indicated for Alternative A, above. In terms of demand, the amount of water required by the proposed Action would be equivalent to roughly 1.1 percent of the City of Cloverdale's annual water use (2.4 mgd, or 2,688 af/yr; see **Section 3.3**). Other potential impacts to groundwater levels (including effects to neighboring wells) and the Russian River would be similar to Alternative A, except reduced in intensity concurrent with reduced water use. Thus, a less than significant impact would occur.

Impact 4.3.5-6: Treated Effluent Sprayfields and Water Quality (Potentially Significant)

Implementation of Alternative E could include construction and operation of sprayfields for the disposal of treated effluent generated by proposed facilities, as discussed for Alternative A. Alternative E would result in a lower intensity of use of sprayfields, as compared to Alternative A, but would otherwise potentially result in similar effects on water quality. To ensure that no significant and adverse effects to surface water quality or groundwater quality occur **Mitigation Measure 5.3-3** is recommended for management of sprayfield operation.

Significance after Mitigation: Less than Significant.

4.3.6 Alternative F – No Action

Implementation of Alternative F would have no impact upon existing drainage patterns, flooding, water quality, and water supply in the near term. In the long term, any proposed development would be subject to state and local environmental laws, thereby ensuring that a less than significant impact would occur to water resources.

4.3.7 References

ESA, 2009. Technical Memorandum Supplemental Evaluation of Dispersal by Spray Irrigation, Sirrah Property, Cloverdale Rancheria EIS Project, Coverdale, CA. July 30, 2009.

Hydrometrics LLC, 2009. Limited Groundwater Pumping Analysis, Amonos and Sirrah Sites, Cloverdale, CA. Correspondence to ESA dated August 18, 2009.