Initial Study and Draft Mitigated Negative Declaration

Hambro Family Entertainment Center
Coastal Development Permit

December 2020

Prepared By
Del Norte County
Community Development Department
Planning Division
981 H Street, Suite 110
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Project Information Summary

1. Project Title: Hambro Family Entertainment Center
Coastal Development Permit

2. Lead Agency Name and Address: Del Norte County
Planning Commission
981 H Street, Suite 110
Crescent City, CA 95531

3. Contact Person and Phone Number: Taylor Carsley
(707) 464-7254
tcarsley@co.del-norte.ca.us

4. Project Location and APN: US Highway 101 South (South Beach)
Crescent City, CA 95531
APN 115-020-042

5. Project Sponsor's Name and Address: Planwest Partners
Vanessa Blodgett, Senior Planner
1125 16th Street
Arcata, CA 95521

6. County Land Use: General Industrial

7. County Zoning: Manufacturing and Industrial

8. Description of Project:

Hambro Group is proposing use of the former 'tank farm' site as a Family Entertainment Center (Center). The site is located south of the Crescent City Harbor, on the inland side of US Highway 101 across from South Beach. Previously, the site was used as a fuel depot for the surrounding area which required the storage of large amounts of hazards materials. The current 22-acre property was created from a 132-acre land purchase by the State of California in 2018. It is currently developed with a watchman's quarters (residence under conditional use permit), an art shop, and wood carving shop. The applicant proposes to utilize an approximately 2.8-acre project area to develop the Center in two phases. Phase 1 would consist of an 18-hole miniature golf course, parking improvements, restroom facilities, and other low-impact outdoor activities such as axe throwing, batting cages, and/or picnic areas. Several existing structures would need to be removed including storage conex boxes. Phase 2 would consist of a "family road course" go-kart track as well as further parking improvements. Construction activities would include grading and paving, development of small structures, landscaping, lighting, and fencing. An on-site sewage disposal system will be developed, and the project would be served by an existing well. A previously proposed third phase of development has been eliminated from consideration.

The Center would provide facilities including food, water, restrooms, and other commercial recreational facilities described above that would feasibly attract diverse types of users including locals, travelers, beach-users, and cyclists. The number of accessory Center users, which are those who primarily intended to use South Beach, would likely be large due to the fact that no restroom or concessions facilities currently exist at South Beach but would be developed across the highway. The amount of solid and human waste disposed of on the beach is

becoming increasingly problematic and it is not unreasonable to assume restroom use at this facility would occur.

The parcel is accessible directly from Highway 101, a north-south two-lane highway with shoulders and the Pacific Coast Bike Route maintained by the state. There is no designated turn lane in either direction in the vicinity of the project site access. Vehicles regularly cross the opposite travel lane in both directions due to user parking at South Beach directly across the road from the proposed Center and nearest pedestrian crosswalk is at Citizens Dock Road approximately 0.4 miles north. No signed, striped, or otherwise designated beach parking exists across the highway from the proposed Center. A transportation impact study was completed (W-Trans, July 9, 2020) which discusses the project's transportation setting, capacity analysis, trip generation, vehicle miles traveled, alternative modes, and access and circulation.

A biological assessment and wetland delineation, and supplemental mitigations document were completed (Galea Biological Consulting, July 2020 and October 28, 2020) and Mitigation Supplement. Biological resources exist in and around the project site, including western lily (*Lilium occiendale*) in the surrounding marshlands, although no sensitive plant species were found to exist on the site of the proposed Center. The only sensitive wildlife species mapped near the project area was the northern red-legged frog (*Rana aurora*). None were found on-site. Both one- and three-parameter wetlands are located to the north, east, and south of the proposed Center. An existing dike separates the previous tank farm storage area from the larger marsh area to the north. Wetlands on the project side of the dike would be buffered from proposed development by an area not to be disturbed. Noise and lighting disturbances posed to wildlife are discussed in detail within biological materials.

The proposed Center is located within the Crescent City urban services boundary and within the County Service Area #1 (CSA) sphere of influences, although no public water and sewer infrastructure serves the parcel. The nearest water and sewer lines are approximately 1,000 feet north of the project site at Anchor Way. An on-site sewage disposal system is proposed to serve both Phases 1 and 2 and well water would be utilized from an existing well already serving the watchman's quarters.

The project will create some amount of noise and lighting above current ambient levels. Temporary construction noise from heavy equipment would be created during the development of Phase 1 and 2 of the Center. According to a noise analysis (Galea Biological Consulting, July 2020 and October 28, 2020), actual operational noise of both phases is expected to be less substantial when incorporating the existing ambient noise levels from the highway than would otherwise be. Operational noises would include but are not limited to music, sounds from attractions, visitors, and most importantly, use of go-karts. The limited hours of operation would provide for a minimal amount of necessary lighting. Overhead lighting would be used for security outside of the proposed operating hours, but otherwise would not be necessary for operations.

The development of the project is not expected to create air quality issues and construction activities are proposed to follow all relevant rules and regulations within the North Coast Air Basin. The use of gasoline-powered go-karts would increase emissions over the use of electric go-karts. Similarly, energy use of the facility is expected to be low given the types of outdoor attractions, the lack of HVAC systems, and large amounts of lighting. Greenhouse gas (GHG) emissions are tied to other types of associated emissions, energy use, and vehicle miles traveled which are all shown to be relatively low.

Erosion and stormwater control will be subject to the general provisions of a Construction General Permit because there will be over two acres of ground disturbance associated with construction of the Center. Important wetland habitat and drainages exist adjacent to the project site so it is important to maintain control of soil erosion and stormwater. The site is flat and buffered on one side (northeast) by an existing earth dike.

The project site is located well within a tsunami inundation zone. Potential inundation could travel inland over a half-mile. The site is also subject to the strong seismic activity that can occur. These ever-present hazards are the reality of living, traveling through, or visiting amenities in coastal areas of Del Norte County. Due to the flat project site, the proposed Center would not be subject to hazards associated with steep slopes such as landslides and other mass wasting events that are not locally uncommon.

Historical or cultural resources are not known to exist on-site. The proposed Center is proposed on the location of an old petroleum tank farm, a highly disturbed area. Native American tribes culturally affiliated with this area include the Tolowa Dee-ni' Nation and Elk Valley Rancheria. These tribes were invited to consult with the County prior to the circulation of this environmental document.

9. Surrounding Land Uses and Settings:

The project is surrounded by open space. To the north, northwest, and east, the Crescent City Marsh Wildlife Area and associated wetland areas surround the proposed Center. To the south, southwest, and southeast, Highway 101 separates the proposed project from South Beach, a 3.25-mile-long publically-accessible beach. Existing development on the project site includes a watchman's quarters and an art shop.

10. Required Approvals: Coastal Development Permit (Del Norte County Planning Commission)

11. Other Approval (Public Agencies): California Department of Transportation, North Coast Regional Water Quality Control Board, Del Norte County Environmental Health Division

12. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?

Native American tribes, traditionally and culturally affiliated with the project area have been notified of the project application completion and the beginning of the AB 52 consultation period pursuant to PRC §21080.3.1. Notification of the beginning of the AB 52 consultation period was provided September 1, 2020. No requests for consultation pursuant to PRC §21080.3.1 were not received.

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" without mitigation as indicated by the checklist on the following pages. All mitigation measures are provided in the Mitigation Monitoring and Reporting Program.

☒	Aesthetics	☐	Agriculture and Forestry Resources	☐	Air Quality
☒	Biological Resources	☐	Cultural Resources	☐	Energy
☐	Geology/Soils	☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials
☐	Hydrology / Water Quality	☐	Land Use / Planning	☐	Mineral Resources
☒	Noise	☐	Population / Housing	☐	Public Services
☐	Recreation	☒	Transportation	☐	Tribal Cultural Resources
☐	Utilities / Service Systems	☐	Wildfire	☐	Mandatory Findings of Significance

Determination

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Taylor Carsley

Taylor Carsley

Planner

01/07/2021

Date

Environmental Checklist

1. Aesthetics

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or public views of the site and its surroundings? (Public views are those that are experienced from publically accessible vantage points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

Discussion of Impacts

a. This project would have less than significant impacts on a scenic vista. South Beach, located across the highway from the project site as well as the spruce stand and wetland behind the project site are identified in the County's certified Local Coastal Program as scenic features, however these features can be viewed and enjoyed from public vantage points (including the highway, Redwood National Park, and other county roads) for two miles south of the project site before seeing the proposed development itself. The visual resources inventory also identifies US Highway 101 and Enderts Beach Road as designated view corridors. This project would develop the very northern edge of this corridor as entry into Crescent City and the Harbor area occurs and location of the development would largely feel connected with the series of visitor serving commercial uses that occur north of the project site.

b. This project would have no foreseeable impact on specific scenic resources.

c. Existing development on-site such as brightly-painted and stacked conex boxes would be removed to facilitate development of the parking area. Other existing cluttered characteristics of the property frontage would likely be cleaned up and removed as part of the project implementation. These actions would likely increase the quality of visual character in the area. Future development activities have the potential offset some improvements made to the visual character of the area but these would be considered less than significant.

   As discussed, the project will involve development of a mini-golf course, a parking lot, a go-kart track, several structures for bathrooms, storage, etc. Accessory disturbance such as landscaping, fencing, signage, and lighting is proposed or at least expected to be included as part of the development process. The location of the project site is part of a view corridor designated in the County Local Coastal Program, and the scenic quality of the surrounding South Beach, spruce grove, and wetlands is unique to that of the southern gateway to Crescent City. The view in this area is relatively uninterrupted as the southern portion of the coastal plain stretches out toward the forested mountains east and south of the site. South Beach and the ocean act to compliment the uninterrupted natural view

of the area. Future development could detract from the visual quality of the area if degrade public views of that portion of the corridor if it substantially interrupts the natural surrounding characteristics, such as the wide-open views. For example, excessive/large signage, bright objects, tall improvements, or ground clutter could make significant detractions from public views. Under the current Manufacturing zone, County Code allows for up to 300 square feet of total signage and would allow for up to 200 square feet per sign and signs up to 25 feet in total height. Because these any future signage would necessarily comply with these limits established in County Code, these aesthetics impacts would be considered less than significant.

d. The project proposes to install four overhead security lights as part of the project implementation. Night operations are not proposed as part of this approval so lighting is expected to be minimal for security purposes. South Beach and the surrounding area south of Anchor Way generally maintains a dark atmosphere at night in comparison to the harbor and greater Crescent City to the north. Lighting that is installed too high has the potential to affect nighttime views in the South Beach area and further add to impacts already created by lights at the harbor's inner boat basin. Further, although nighttime operations are not proposed, activity on-site during dusk or the early evening could produce excess glare that would affect nighttime views in the area. Mitigation Measure AES-1 ensures that the project will not create significant impacts due to excessive light or glare as a result of implementation.

Mitigation Measure AES-1
A condition shall be placed on the coastal development permit restricting on-site lighting be designed to minimize light pollution including specific requirements that all lighting on the project site be fully shielded and pointed downward. Lighting shall be LED with color temperatures less than 3,000 Kelvins.

Timing/Implementation: Prior to final inspection on the Building Permit
Enforcement: County Community Development Department
Monitoring: Building Permit inspection

2. Agriculture and Forest Resources

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in	☐	☐	☐	☒

conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				

Discussion of Impacts

a. No prime farmland exists on-site.
b. No agricultural zoning exists on-site.
c. No Timber Production zones exist on-site or adjacent to the property
d. The project would not result in the loss of forestland.
e. The project does not involve any other changes in the existing environment that could adversely affect farmland or timberlands.

3. Air Quality

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☐	☒
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors or dust) adversely affecting a substantial number of people?	☐	☐	☐	☒

Discussion of Impacts

a. This project would have no foreseeable impacts on the implementation of an air quality plan.
b. This project would have no foreseeable impacts on increasing criteria pollutants in the region.
c. This project would not expose receptors to pollutant concentrations.
d. This project would have no foreseeable impacts in increasing any emissions.

4. Biological Resources

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☐	☒

Discussion of Impacts

a. The project site does not appear to contain candidate, sensitive, or special status species or their habitat as addressed in the biological assessment prepared by Galea Biological Consulting (*Biological Assessment for Proposed Hambro Family Entertainment Center Project, Crescent City, CA. APN 115-020-042. January 2020, amended July 2020*). The only threatened or endangered species noted in proximity to the proposed project area through a California Natural Diversity Database (CNDDB) query is the western lily (*Lilium occidentale*), which is known to occur in marshlands located around the project site, but not in it. Botanical surveys were conducted for other sensitive species and no other listed botanical species were located in the project area. The only Species of Special Concern that potentially occurs on site is the northern red-legged frog (*Rana aurora*). While the biological assessment did not locate any amphibians, mowed grass fields at the project site can provide a forage area for the species coming out of adjacent wetland areas. The assessment has recommended amphibian surveys be conducted in construction areas prior to construction activities, which will be incorporated into the project approval.

b. This project would have no impact on riparian habitat or other sensitive natural community. The project site is located on a disturbed and regularly mowed field at the site of a petroleum tank farm.

c. The project is located in close proximity to state and federally-protected wetlands. The project site is directly adjacent to the Crescent City Marsh Wildlife Area. Wetlands are located around the project area, to the north, west and east. The USFWS National Wetland Inventory shows freshwater forested/shrub wetlands adjacent to the site, and freshwater emergent wetlands farther to the north. A small dike separates the previous tank storage site from the larger marsh area to the north. A wetland delineation completed in April 2019 using routine methods described in US Army Corps of Engineers manuals was included in the biological assessment. The delineation involved seven sample plots that were representative of the variation in vegetation and topography of the parcel. Approximately 10.3 total acres of wetland were identified on the parcel, with 7.9 acres being three-parameter wetland and 2.4 acres of one-parameter wetland. The inventory identified potential one-parameter wetlands along the southwestern edge of the dike (nearest the proposed development) and in some

southeast portions of the parcel. Three-parameter wetlands were also identified along the northeast portion of the parcel which is not being proposed for development at this time. A drainage ditch exists along the southeast edge of the parcel. This drainage allows water to flow from the marsh area to the beach under Highway 101. The wetland nearest the project site includes those one-parameter features on the dike itself separating the grassy field from the adjacent marsh area. There is also a drainage dip on extending approximately five feet from the western toe of the dike that has one- to three-parameter wetland characteristics. On the northwest extent of the project site, wetlands exist on the dike and extend off toward the highway. Approximately 1.4 acres of ruderal area have been shown near the highway side of the project site that encompasses the redwood carving site, residential flat, and a number of old existing buildings and conex boxes.

The Marine & Water Resources Chapter of the Del Norte County certified Local Coastal Program (LCP) recognizes wetlands as environmentally sensitive habitat areas (ESHA) that shall be protected against any significant disruption of habitat values and that development in areas adjacent to ESHA shall be sited and designed to prevent impacts which would significantly degrade such areas. Further, the primary tool to prevent development-related impacts to ESHA is a buffer of 100 feet, with reduced buffers being utilized where it can be determined that there is no adverse impact to ESHA (Section VII.D). When a reduced buffer is being proposed, the County is required to cooperate with the California Department of Fish and Wildlife and generate findings as to the adequacy of the proposed buffer to protect ESHA.

The applicant has proposed two alternative buffers: 25 feet and 50 feet from the edge of wetlands, which roughly follow the toe of the dike on-site. The applicant does not propose to develop any wetland through this coastal development permit. The biological assessment supports both buffers, although the preferred alternative is 25 feet. The biological assessment states that the willow-covered dike and drainage channel at its base provides an excellent sound and visual barrier between the project site and the greater marsh area behind the project site, which constitute three-parameter wetlands. The dike also prevents sediments and contaminants from reaching the marsh area. The assessment states that wildlife utilizing the marsh would be adequately buffered from sound and visual disturbance by the dike and associated vegetation. Further, the drainage channel on the project-side of the dike is mowed up to its edge, which provide little to no habitat value for wetland animals or plants. A 25-foot buffer is proposed to constitute a mowed strip and storm drainage channel between the fence line of the project site and the drainage at the toe of the dike, and a larger buffer imposed would only constitute a larger mowed area between storm drain channel and drainage, not providing further habitat value. A 50-foot buffer is not discussed in great detail within the biological assessment but states "having a wider buffer provides a small decrease in sound and visual disturbance; however these are already substantially voided by the presence of the dike". Analysis made for both reduced buffer alternatives highlights the relative importance in habitat values of the wetlands located behind the dike, as opposed to those located on the dike and at the drainage on the nearside of the dike. The applicant has also proposed construction of a stormwater retention channel on the project side of the drainage on the nearside of the dike. This would be located within the prescribed development buffer but would be expected to potentially increase the amount of wetland habitat on the property while allowing for stormwater levels to be properly managed.

Preliminary comments received from California Department of Fish and Wildlife, solicited for compliance with Section VII.D of the Marine & Water Resources Chapter of the LCP, indicate that a reduced buffer may be acceptable if 1) project related noise levels at the ESHA boundary do not exceed 65 dB, 2) water quality is not affected at the wetland, 3) project-related light does not transmit glare onto the ESHA and light temperatures of less than 3,000 Kelvins are used, 4) the project area, habitat buffer, and ESHA are maintained with no trash or refuse, and 5) the project proposes and implements habitat restoration or enhancement within the habitat area adjacent to the project (e.g. invasive species removal). Based on these comments and the results of the noise study, discussed separately in the Noise Impacts section, the ESHA buffer and the distance necessary to dissipate noise levels to an acceptable level are highly related. The results of the noise study and related improvements (slatted fence) suggest that the suggested noise levels would be met at a distance of 50 feet, or 25 feet with

silent mufflers used on go-karts. Potentially significant impacts could occur to the adjacent ESHA if noise levels exceed these amounts, and the best method to reduce impacts is through use of a buffer between noise sources and ESHA. Mitigation Measure BIO-1 (and AES-1) addresses lighting and light-related glare impacts and Mitigation Measure BIO-2 addresses the reduced ESHA buffer.

Mitigation Measure BIO-1

Lighting and light-related glare impacts are fully mitigated by fulfillment of Mitigation Measure AES-1.

Mitigation Measure BIO- 2

Refer to Mitigation Measure NSE-1. A condition shall be placed on the coastal development permit establishing at least a 25-foot buffer between entertainment facility development activities, not including a stormwater retention basin, and the edge of environmentally sensitive habitat area (ESHA). This ESHA includes, but is not limited to the wetlands delineated in the document entitled *Wetland Delineation, Hambro Forest Products (APN 115-020-042), Del Norte County, CA (April 2019)* prepared by Kyle Wear. The buffer shall be delineated in the field with flagging or other means and left undisturbed during construction activities. A fence or wall not less than 6 feet in total height shall be installed around the entire perimeter of the facility (encompassing both Phase 1 and 2 areas) prior to the first day of opening of Phase 1 for commercial use and maintained in acceptable condition for perpetuity of its operation. The fence shall be slatted with plastic or wood at minimum for the purpose of realizing the reduction in noise generation at the edge of ESHA.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day. Inspection during regular operation of Phase 2.

d. The project would have less than significant impacts on interfering with native or resident migratory fish or wildlife species. Roosevelt elk (*Cervus elaphus rososevelti*) sometimes travel to the project site from the Martin Ranch property, approximately 1.5 miles east of the project site. The development of the project would eliminate some forage ground for elk in an area where forage ground is plentiful in pastures and forested areas east of the property. The project would also potentially discourage elk from foraging on a site in close proximity to the highway where automobile accidents and collisions are common. Black-tailed deer (*Odicoileus hemionus*), black bear (*Ursus americanus*), and other non-sensitive wildlife are present in the area however tend to avoid the area due to the proximity to the highway. Due to the fact that a wetland buffer will be incorporated into the project, wildlife species would continue to have a corridor through the property parallel with the highway, not to mention other large areas that will remain undeveloped, such as the marsh area to the east and the one-parameter wetlands to the south of the project site. The Crescent City marsh is not known for any highly sensitive bird or wildlife species. There are no listed bird or wildlife species which utilize this marsh. Common birds species found here are great blue heron, cattle egret, snowy egret and black-backed night herons. The first three species commonly fly into developed areas (the harbor, front-street park, for example) to forage, where they are exposed to more noise than would be generated from this venture. Waterfowl commonly use the Crescent City marsh during the fall and winter migration, but not in great numbers, such as those found on Lake Earl, as the marsh is limited in open waters, and does not provide the food base as the lake does. Open waters within the marsh which would be used by waterfowl are at least 400 feet away from the project boundary, with dense vegetation in between. Therefore, it is highly unlikely that sufficient noise from the family park would reach levels at that distance which would disturb resting waterfowl. Migratory birds looking to nest would have 640 acres of preferable habitat to nest in, therefore it is less likely they would choose to nest in proximity to the highway.

e. This project would not conflict with any local policies or ordinances protecting biological resources. All sensitive resources will be protected according to the policies of the Local Coastal Program.

f. This project would not conflict with any Habitat Conservation Plans, etc.

5. Cultural Resources

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☒	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☒
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☒

Discussion of Impacts

a-c. No cultural resources are known to exist on-site. The County records were searched for known cultural sites in the general project vicinity, and none were identified. The project is located on a previously heavily disturbed site. Notice was provided to the two tribes traditionally culturally affiliated with the project area and no comment was given with regard to cultural resources. Additionally, cultural staff from the Tolowa-Dee-ni' Nation is a voting member of the County Environmental Review Committee which reviews projects and makes CEQA recommendations. While resources are not known to exist on-site, the possibility of an inadvertent discovery is always possible during construction or other implementation activities associated with the project. In this case, mitigation measures included as CULT-1 assigned to the project will ensure that any resources located on-site will be properly treated as to not cause a significant impact.

Mitigation Measure CULT-1

An inadvertent discovery condition shall be added to the Coastal Development Permit stating that in the event of archeological or cultural resources are encountered during construction, work shall be temporarily halted and a qualified archaeologist, local tribes, and the County shall be immediately contacted. Workers shall avoid altering the materials and their context until a qualified professional archaeologist, in collaboration with the locat tribes has evaluated the situation and provided appropriate recommendations. Project personnel shall not collect any resources.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: N/A

6. Energy

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation**	**Less Than Significant Impact**	**No Impact**

		Incorporated		
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Discussion of Impacts

a. The project would have no foreseeable impacts on increasing wasteful, inefficient, or unnecessary energy use since no development is proposed as part of this application. The project will use minimal amounts of fuel and energy for Phase 1. Primary uses of fuel and energy will be for operation of heavy equipment during construction. Operational energy will include lighting and office equipment at the existing entrance building and outdoor security lights at night. Phase 2 of the project will include gas powered go-karts which will require fuel to operate and maintain, however will not be expected to use excessive amounts of energy or be significantly wasteful.
b. This project does not conflict with nor obstruct a state or local plan for renewable energy or energy efficiency.

7. Geology and Soils

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Discussion of Impacts

a. The project is not anticipated to cause potentially significant adverse effects including the reisk of loss, injury, or death related to soils impacts. The site is flat and has no potential for landsides. Seismic ground shaking and liquefaction could occur however the potential impacts would be considered less than significant as structural development will be limited and constructed to current building codes.

b. The project would not result in substantial soil erosion or loss of topsoil. The site is flat and has little ability to transport soil due to topography. Fill soil will likely be necessary to properly facilitate site drainage.

c. The project will be predominantly located on Talawa series soils, 0 to 2 percent slopes. These are typically deep, poorly to very poorly drained soils formed in fluviomarine deposits derived from mixed sources. This series is not considered to be unstable currently or as a result of a project and would not result in a significant impact by way of landslides, lateral spreading, subsidence, liquefaction, or collapse.

d. This project is not located on expansive soil as defined in Table 18-1-B.

e. The soils on the project site will support the use of a wastewater disposal system. The project site is currently served by an on-site wastewater system associated with the existing residential unit. A new on-site sewage dispsosal system is proposed to serve Phases 1 and 2 of the project. According to the soils analysis (*On Site Sewage Disposal Evaluation, APN 115-020-42, Lee Tromble Engineering, March 2, 2020*), an alternative wastewater disposal system (Wisconsin mound) is recommended due to high groundwater levels at the site (2.5 feet below ground surface). Actual daily wastewater flow to the mound system (pump system data collection) will be collected and analyzed to ensure performance capacity. It is anticpated that Phase 1 will generate approximately 200 gallons per day and Phase 1 plus Phase 2 will generate 460 gallons per day. According to the report, an 1,800 square foot area (30' x 60') will likely be adequate to serve both phases. In the event that collected wastewater flow data indicates higher volumes than anticipated, the mound can be enlarged toward the highway as shown in the report and on the project site plan.

f. No known paleontological resource or unique geologic features exist on-site.

8. Greenhouse Gas Emissions

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Discussion of Impacts

a-b. In 2002, the California legislature declared that global climate change was a matter of increasing concern for the state's public health and environment, and enacted a law requiring the state Air Resource Board (ARB) to control GHG emission from motor vehicles (Health and Safety Code §32018.5 et seq.). CEQA Guidelines define GHG to include carbon dioxide (CO2), nitrous oxide (N2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

The California Global Warming Solutions Act of 2006 (AB 32) definitively established the state's climate change policy and set GHG reduction targets (Health and Safety Code §38500 et seq.). The state has set its target at reducing greenhouse gases to 1990 levels by the year 2020.

Construction of the project may generate GHG emissions as a result of combustion of fossil fuels used in construction equipment. Use of variety of construction materials would contribute indirectly to GHG emissions because of the emissions associated with their manufacture. The construction-related GHG emissions would be minor and short-term and would not constitute a significant impact based on established thresholds.

After construction of the entertainment center facilities, it is anticipated that customers will be mostly from existing travelers or those that would be recreating locally off Highway 101, creating no significant increase in emissions.

The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing GHG emissions.

9. Hazards and Hazardous Materials

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☒
g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

Discussion of Impacts

a. The project would not create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials. Fuel would be transported to the site using fuel trucks from off-site local vendors. No other routine use, transport, or disposal of hazardous materials is anticipated.

b. The project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The project operation will involve gas-powered go-karts during Phase 2. The operation would utilize a fueling truck from nearby business operations to deliver fuel on an as-needed basis. As such, no storage of fuel is proposed for storage on-site, which reduces the risk to the public and the environment related a large concentration of fuels on-site. On-site fueling will be located away from drainage features within a bermed area designed to hold the tank volume. Secondary containment, such as a drain pan or drop cloth, will be used to catch spills or leaks when removing or changing fluids. Any spill of fuel will be reported as required to the Del Norte County Environmental Health Division and immediately cleaned up with the on-site spill kit.

c. The project site is not within one quarter mile of an existing or proposed school.

d. The project is not located on a hazardous materials site compiled pursuant to Gov Code 65962.5. The California Department of Toxic Substances Control's EnviroStor database was queried and no sites.

e. The project is not within an airport land use plan or within two miles of an airport.

f. The project would not impair with or physically interfere with an adopted emergency response or evacuation plan. The project would however, facilitate increased activity within a tsunami inundation zone. Advanced notice of a tsunami event would require evacuation of all persons on-site. The risk for evacuation cannot be known with any certainty and development within a tsunami evacuation zone inherently increases the risk to members of the public employed or using the facilities. The nearest assembly point is the Oceanview Baptist Church to the east. On-site signage is proposed which would direct evacuees to the designated assembly point, however the failure of proper signage and notification to occur could result in significant impacts to the emergency evacuation of the public in the event of a tsunami, if left unmitigated. Mitigation Measure HAZ-1 addresses this hazard to a less than significant level.

Mitigation Measure HAZ-1

A condition shall be placed on the coastal development permit requiring at least one permanent, weatherproof tsunami evacuation sign be placed on all structures, at the facility entrance, and in the parking lot. The standard signage shall provide information on the warning signs of a tsunami and evacuation directions at minimum. The facility shall prepare a tsunami response plan detailing operational protocol in the event of a tsunami.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day.

g. The project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. The project site is within the State Responsibility Area marked with a moderate fire hazard. The site is close to the coast and experiences frequent wet, foggy, or rainy conditions with proposed development to be set back well away from surrounding fuels and vegetation.

10. Hydrology and Water Quality

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☐	☒
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on-or off-site?	☐	☐	☐	☒
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	☒	☐
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional source of polluted runoff; or	☐	☐	☒	☐
iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable ground water management plan?	☐	☐	☐	☒

Discussion of Impacts

a-c. The existing project area is relatively flat and slopes gently towards the east. Currently any surface water runoff emanating from the development area discharges in an easterly direction towards the existing ground depression/swale adjacent to the edge of the dike. Flow from the swale then tends in a southerly direction. Project development will require ground disturbance and grading as necessary to provide adequate drainage for the development area. Grading will be designed for minimal disturbance consisting generally of sod removal and minor contouring of surface soils. The proposed project would not substantially alter the existing elevations at the project site. Based on the preliminary grading report provided for the project, the site will be graded to accommodate gentle slopes to the east that promote drainage patterns similar to existing conditions. The project proposes to develop approximately 2.8 acres of the approx. 22-acre project parcel. The project includes finished impermeable surfaces such as concrete and asphalt which will cover approximately 30% of the total approximately 2.8-acre project area in Phase 1 and 78% in Phase 2. The project will result in modifications to site coverage and drainage within the defined development area; however, the overall site drainage patterns and absorption rate is not expected to significantly change. It is expected that sod removal and minor recontouring of surface soils could be done so as to minimize surface disturbances. Some fill material will need to be imported in addition to surface finish base materials such as aggregate in order to elevate the development area as necessary for surface drainage. Finish site grades would need to be at or above the existing site elevations to allow for surface water to leave the development area toward the dike swale to the northeast. All areas within the development area not covered with hard surfaces will be landscaped; landscaping will be designed to promote infiltration and adequate drainage to protect surrounding wetlands. The development area is currently vegetated with well-established grasses.

According to the Storm Drainage Technical Memorandum (*Stover Engineering, 25 November 2020*), the site slopes downward toward the northwest and northeast at approximately 0.3%. There is a shallow grassy swale that flows to the northeast and runs along the northwest face of the property, separated from the soil berm by an existing fence. A drainage ditch, previously discussed as a wetland area at the foot of the dike runs parallel to the northeast face of the property that collects to the northerly corner of the site. Both swale and ditch are located on the southerly or "inner" side of the berm. The westerly edge of the existing ditch is the boundary of the wetland area. Permanent treatment of stormwater runoff will be achieved via settling and infiltration on-site in a retention basin designed to allow for storage and treatment of the "first flush" 85th percentile, 24-hour storm event. The storm event was calculated to generate 6, 411.2 cubic feet of runoff in the fully developed site. The applicant's preferred design alternative is to enlarge the existing drainage ditch at the foot of the dike to create a basin 10 feet wide, 2 feet deep, and 540 feet long with 2:1 sloped banks. This design would involve at least the temporary disturbance of the existing wetland feature. The alternative is construction of a new retention basin in the form of a parallel ditch on the project side of the existing ditch. This alternative avoids permanent or temporary disturbances to the existing wetland feature. Best management practices listed in the memo will be adhered to during construction and post-construction activities associated with the stormwater retention basin which will reduce any impacts to water quality to a less than significant level. Since the project would result in over one acre of disturbance and it will be subject to the provisions of the SWRCB Construction General Permit, a Stormwater Pollution Prevention Plan (SWPPP) to be reviewed and approved by the North Coast Regional Water Quality Control Board.

Water would be supplied via an on-site well. Water use is expected to be minimal and largely needed for use of a single restroom facility. The project site is not within a Special Flood Hazard Area according the FEMA Flood Map Service Center and the site is designated as a Zone X (area of minimal flood hazard). Tsunami risk is ever-present at the project site, however the amount of pollutants and other hazardous materials stored on site will be very minimal, so as to constitute a less than significant impact. The project would not conflict with or obstruct implementation of a water quality control plan or sustainable ground water management plan.

11. Land Use and Planning

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation of an agency adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion of Impacts

a-b. This project does not divide an established community nor does it cause a conflict with any land use plan in the County. The proposed project substantially will substantially conform to the County Local Coastal Program as well as other applicable ordinances and code. The coastal development permit to be approved will contain conditions of approval to ensure no impacts will occur as a result of environmental impacts not being mitigated.

12. Mineral Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion of Impacts

a-b. No mineral resources are known to exist on site.

13. Noise

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☒
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion of Impacts

a-b. The project has the potential to generate substantial temporary and permanent increase in ambient noise levels in the vicinity of the project without mitigation, but not necessarily when measured against established standards or thresholds. The certified Local Coastal Program does not contain noise standards or thresholds, and the County does not have codified noise standards. Noise levels established in the General Plan require a noise analysis be submitted for proposed stationary daytime commercial sources exceeding 62 decibels (dB). According to the noise analysis prepared as part of the biological assessment, ambient noise levels near the edge of the project site at the existing wetland boundary (312 feet from the highway edge) were approximately 55 db. When a chainsaw was used at the edge of the highway, to approximate ambient conditions (a wood-carving shop currently exists near the highway), the ambient noise levels did not change, meaning that increased noise near the highway is not necessarily additive to baseline conditions. Much of the chainsaw carving occurs 150 feet from the wetland edge to the north. A typical chainsaw produces between 50-70 dB at 50 feet and chainsaw operations are proposed to be eliminated with development of this project. The gas-powered go-karts are likely to generate approximately 75 dB measured at a distance of 50 feet. In assessing noise reduction measures, a digital game caller with pre-recorded spotted owl calls was measured with and without placing it behind a slatted fence. A 10 dB reduction was realized with the caller placed behind the fence, with no other variables changed. Assuming the go-karts produce 75 dB at 50 feet, a slatted fence placed between the track and the edge of

wetland would equate to approximately 65 dB of noise generated at 50 feet. This is value substantially similar to the threshold established in the General Plan for exposure to stationary commercial uses. The project will create some temporary increase in ambient noise levels during the development of Phases 1 and 2, which will involve the use of heavy equipment. Due to their intermittent and temporary nature and the lack of sensitive noise receptors in the area, construction-related noise increases are anticipated to be less than significant.

A supplemental mitigations report dated October 28, 2020 proposes several changes to the project in light of concerns about potential noise impacts created by the project. One alternative proposed is the trading of locations for Phase 1, the mini-golf course would be moved to the south side of the project site while Phase 2, the go-kart track would be moved to the north side of the project site. The intention is to utilize the dike to the fullest extent to buffer the greater wildlife area behind the dike from noise created by go-kart activities. According to the applicant, go-karts installed with silent mufflers create approximately 75 dB at 21 feet, as opposed the 75 dB at 50 feet generated by go-karts without silent mufflers. With incorporation of the slatted fence, sound levels would likely be reduced to approximately the threshold established in the General Plan. Because the project site is immediately adjacent to a highway and wood carving activities with similarly high ambient noise levels, the sounds produced specifically from this project site are not expected to increase noise levels significantly beyond ambient levels with mitigation incorporated. Mitigation Measure NSE-1 will ensure noise impacts are less than significant.

Mitigation Measure NSE-1

Refer to Mitigation Measure BIO-2. A condition shall be placed on the coastal development permit to ensure noise levels are kept at or below acceptable thresholds during operation. Specifically peak and average noise levels shall be no higher than 65 dB as measured 25 feet outside the perimeter fence line during operation hours of the go-kart track. As required in Mitigation Measure BIO-2 a fence or wall not less than 6 feet in total height shall be installed around the perimeter of the facility prior to the first day of opening for and maintained in acceptable condition for perpetuity of the operation. The fence shall be slatted to reduce sound levels to those required above.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day. Inspection during regular operation of Phase 2.

14. Population and Housing

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion of Impacts

a. The project would not create the ability to allow for substantial population growth in the area, either directly or indirectly.

b. The project would not displace any number of existing people or housing. The site is zoned for residential development nor does it contain residential development.

15. Public Services

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Discussion of Impacts

a. The project would not result in substantial adverse impacts associated with the need for new or altered governmental facilities and/or public services. The proposed use of the site would not increase local population levels to any degree. Fire and police protection would likely be utilized by the project when developed, however any impacts to service ratios, response times, or other performance objectives of these public services are expected to be less than significant.

16. Recreation

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion of Impacts

a-b. The project provides alternative recreational facilities for the community and does not impact existing recreational areas nor does it increase the need for additional recreational facilities.

17. Transportation

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☒	☐	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision(b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion of Impacts

a. The project is accessed entirely by US Highway 101, a route in the state highway system. The Del Norte County General Plan, Transportation and Circulation Element (2003) addresses the state highway system in Goal 8.A: "*To plan for the long-range planning and development of Del Norte County's State Highway System to ensure the safe and efficient movement of people and goods*". Policies 8.A.1 – 8.A.19 further address this goal. The Del Norte Local Transportation Commission has also adopted the Del Norte Regional Transportation Plan (2016) which serves as a guide to the development of a coordinated and balanced multi-modal regional transportation system and the Del Norte Active Transportation Plan (2017) which provides a vision for the future active transportation network in the Del Norte region with strategies built on previous studies and plans. The Traffic Impact Study submitted by W-Trans discusses the project's transportation setting, capacity analysis, trip generation, vehicle miles traveled, alternative modes, and access and circulation covering many of the programs, plans, ordinances, and policies addressing the circulation system. The California Department of Transportation (Caltrans) also has the responsibility to implement programs and plans that regulate the development of the state highway system. Because of this, Caltrans plays an important role in determining how projects will impact the Highway 101 corridor and what types of mitigation are employed to offset any impacts to a less than significant level. Preliminary Caltrans comments suggest that in order to meet consistency with state and Caltrans goals to encourage walking and bicycling, pedestrian and bicycling facilities should be installed along the entire project parcel frontage. The improvements recommended are 6-foot sidewalks with curb and gutter along the property frontage with the back of the sidewalk coinciding with the Caltrans right of way line on the northbound side of the highway. The nearest pedestrian facilities on the northbound side of the highway are approximately 2,000 feet away across from Citizens Dock Road. And approximately 900 feet on the southbound side of the highway from Anchor Way. Since there is no recommendation, plan, or project proposed to connect the suggested pedestrian improvements to existing facilities off site, the recommendation to construct sidewalk would be an isolated improvement providing minimal benefit to pedestrians. Pedestrian traffic on the full northbound frontage of the project parcel, as a result of the project is anticipated to be low according to the Traffic Impact Study given its semi-rural location, and lack of connectivity. The lack of designated pedestrian facilities on the parcel does not appear to significantly conflict with any specific program, plan, ordinance, or policy.

   Caltrans also recommends the applicant provide secure bicycle parking facilities at the project site to encourage bicycle trips. The project does not propose the installation of bicycle parking facilities and as such, discourages employees and patrons from this mode of transportation. Existing highway shoulders serve as bicycle lanes for both directions of travel along and outside the entire property frontage. The Pacific Coast Bicycle Route also serves the area with connectivity to the California Coastal Trail, signed as near as the Crescent City Harbor

approximately 1,000 feet away. Since bicycle facilities exist off site to serve the project a significant deterrent to bicycle use would occur if the project failed to provide secure bicycle parking. Mitigation Measures TRANS-1 requires the improvement of bicycle storage facilities.

Mitigation Measure TRANS-1

A condition shall be placed on the coastal development permit requiring the installation of secure bicycle parking facilities prior to the opening of the facility to the public or any other operation of Phase 1, whichever is first. Parking for at least two bicycles shall be provided for.

Timing/Implementation: Prior to opening of facility to public
Enforcement: Community Development Department
Monitoring: Inspection

b. The project is consistent with Section 15064.3 of the CEQA Guidelines. While the County has not adopted a standard of significance for evaluating Vehicle Miles Traveled (VMT), guidance provided by the County in the *Del Norte Region SB 743 Implementation Plan* and the *California Governor's Office of Planning and Research (OPR) publication Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory, 2018* was considered. Caltrans has also published guidance regarding VMT in the *Vehicle Miles Traveled – Focused Transportation Impact Study Guide, May 2020*. All guidance addresses significance thresholds for projects in rural counties that are not under the jurisdiction of a Metropolitan Planning Organization (MPO) such as Del Norte County, indicating that the potential VMT impacts of projects in these areas may be best determined on a case-by-case basis. VMT associated with recreational uses are not categorized in any of the guidance materials, though it is reasonable to assume that shifts to automobile travel patterns are similar to those seen with retail uses. Research cited by OPR has shown that adding local-serving retail land uses typically redistribute shopping trips rather than creating new trips, improving destination proximity and thereby reducing trip lengths and total VMT. Translating this concept to a local-serving recreational use, adding a new recreation facility would not necessarily change the total number of people using recreational facilities in the region.

c. The proposed project would not directly create dangerous design features, however an associated increase in pedestrian traffic across a two-lane highway from South Beach would have the potential to create some impacts to public safety. Currently, pedestrian traffic is concentrated on the west side of the highway, in and around the informal parking area that serves South Beach. If an increase in pedestrian traffic occurs, it has the potential to be generated in several different ways from buildout of the project. First, beach users could elect to cross the highway to use the proposed entertainment center for but not limited to recreation, restroom facilities, and/or concessions. The traffic impact study (W-Trans, 2020) assesses trip generated and suggests the facility would attract some patrons already driving by or visiting the beach and other nearby recreation accommodations. Second, some amount of project facility users could elect to cross the highway to use the beach. The fact that beach access is located only 125 feet from the proposed parking facility could suggest not all potential beach-users would be deterred from crossing the highway in lieu of driving to a different parking space across the highway.

The traffic study addresses this public safety concern by including the fact that a lack of pedestrian trips is likely to be generated. The study states "*Though there may be some demand from the beach across from the site, it is likely those initial trips would have been made via bicycle or automobile. Additionally, due to the high speeds along US 101 and lack of pedestrian facilities surrounding the site, there does not appear to be any need to provide pedestrian facilities along the project frontage. To discourage pedestrians from crossing US 101 between the beach and the proposed project, the project parking lot should include signage for project only use. Additionally, the lot should be gated and locked when the site is closed*" (Page 18, W-Trans). This assessment was used to support the finding that pedestrian facilities serving the project site are expected to be adequate

given the rural location, and appears to assume that most automobile users of either the beach or the facility would drive across the highway to re-park if using the adjacent recreation amenity across the highway. This assessment also appears to assume that pedestrians will not use the highway due to the high speeds of vehicular traffic. Signage for project-only parking use in the facility will help deter facility users from leaving vehicles parked to walk to the beach.

The proposed project would also require southbound (SB) traffic to turn left against northbound (NB) traffic on the two-lane highway to enter into the facility parking lot. If any NB traffic is present, SB traffic is forced to queue in the only travel lane to wait to turn left. According to the traffic impact study in the study segment between Anchor Way and Humboldt Road, weekend PM peak hour volumes are 445 for both SB traffic and NB traffic (Figure 2 – Existing plus Approved Project Traffic Volumes). The need for a dedicated left-turn lane into the project site from US 101 was assessed using the methodology from the Intersection Channelization Design Guide, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985. Based on the scenario with the highest volumes, which was Existing plus Approved Projects, with project traffic added, a left-turn lane is warranted during both the weekday and weekend p.m. peak periods at full build out. This is proposed in the project prior to Phase 2, but after the implementation of Phase 1. Caltrans comments suggest that four collisions have been reported in the area of the project, and that those alone do not meet a safety warrant for a left turn lane, prior to Phase 1. One SB rear-end collision was caused by a driver-at-fault being distracted by the view of the ocean. According to Caltrans, "*Casual observations in the area reveal there is a significant amount of activity associated with the proximity of the ocean, beach, and a large turnout directly across from the project site. Any one of these items can pose a distraction to drivers, which could lead to rear-end collisions with SB vehicles waiting to turn left into the project site*" (Comments dated 10/5/2020). The area of concern also has a posted speed limit of 50 miles-per-hour which is a dangerous rate of speed for potential rear-end SB collisions. Due to the creation of a potentially significant hazard created by SB traffic ingress, Mitigation Measure TRANS-2 is incorporated to reduce this hazard to a less than significant level.

Mitigation Measure TRANS-2

condition shall be placed on the coastal development permit to require the installation of a left-turn lane to facilitate southbound access to the project site on US Highway 101 prior to the development of Phase 2 or of any development in excess of that expressly permitted in Phase 1.

Timing/Implementation: Prior to development of Phase 2
Enforcement: Caltrans; Community Development Department
Monitoring: N/A

d. Development of the project will not result in any kind of inadequate emergency access. Access would be located directly off Highway 101, the main north-south route through Del Norte County. Emergency responders could utilize the parking lot for direct access or park off the highway and have ease of access into the proposed facility.

18. Tribal Cultural Resources

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☒
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☒

Discussion of Impacts

No cultural resources are known to exist on-site. The County records were searched for known cultural sites in the general project vicinity, and none were identified. The project is located on a previously heavily disturbed site. Notice was provided to the two tribes traditionally culturally affiliated with the project area and no comment was given with regard to cultural resources. Additionally, cultural staff from the Tolowa-Dee-ni' Nation is a voting member of the County Environmental Review Committee which reviews projects and makes CEQA recommendations. While resources are not known to exist on-site, the possibility of an inadvertent discovery is always possible during construction or other implementation activities associated with the project. In this case, mitigation measures included as CULT-1 assigned to the project will ensure that any resources located on-site will be properly treated as to not cause a significant impact.

19. Utilities and Service Systems

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion of Impacts

a-e. The project would not have any impact on utilities and service systems. On-site sewage disposal and wells would serve the property. The project

20. Wildfire

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

Discussion of Impacts

a-d. The project site is located in a State Responsibility Area for fire management and in a Moderate Fire Hazard Area. The subdivision is not growth-inducing and would thus have no impact on wildfire hazards and introduction of additional development in the Wildland Urban Interface.

21. Mandatory Findings of Significance

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

The project does not have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife species to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. Additionally, the project does not have impacts that are individually limited but cumulatively considerable and does not have environmental effects which will cause substantial adverse effects on human beings directly nor directly.

Mitigation Monitoring Plan

Aesthetics

Mitigation Measure AES-1

A condition shall be placed on the coastal development permit restricting on-site lighting be designed to minimize light pollution including specific requirements that all lighting on the project site be fully shielded and pointed downward. Lighting shall be LED with color temperatures less than 3,000 Kelvins.

Timing/Implementation: Prior to final inspection on the Building Permit
Enforcement: County Community Development Department
Monitoring: Building Permit inspection

Biological Resources

Mitigation Measure BIO-1

Lighting and light-related glare impacts are fully mitigated by fulfillment of Mitigation Measure AES-1.

Mitigation Measure BIO- 2

Refer to Mitigation Measure NSE-1. A condition shall be placed on the coastal development permit establishing at least a 25-foot buffer between entertainment facility development activities, not including a stormwater retention basin, and the edge of environmentally sensitive habitat area (ESHA). This ESHA includes, but is not limited to the wetlands delineated in the document entitled *Wetland Delineation, Hambro Forest Products (APN 115-020-042), Del Norte County, CA (April 2019)* prepared by Kyle Wear. The buffer shall be delineated in the field with flagging or other means and left undisturbed during construction activities. A fence or wall not less than 6 feet in total height shall be installed around the entire perimeter of the facility (encompassing both Phase 1 and 2 areas) prior to the first day of opening of Phase 1 for commercial use and maintained in acceptable condition for perpetuity of its operation. The fence shall be slatted with plastic or wood at minimum for the purpose of realizing the reduction in noise generation at the edge of ESHA.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day. Inspection during regular operation of Phase 2.

Cultural Resources

Mitigation Measure CULT-1

An inadvertent discovery condition shall be added to the Coastal Development Permit stating that in the event of archeological or cultural resources are encountered during construction, work shall be temporarily halted and a qualified archaeologist, local tribes, and the County shall be immediately contacted. Workers shall avoid altering the materials and their context until a qualified professional archaeologist, in collaboration with the locat tribes has evaluated the situation and provided appropriate recommendations. Project personnel shall not collect any resources.

Hazards

Mitigation Measure HAZ-1

A condition shall be placed on the coastal development permit requiring at least one permanent, weatherproof tsunami evacuation sign be placed on all structures, at the facility entrance, and in the parking lot. The standard signage shall provide information on the warning signs of a tsunami and evacuation directions at minimum. The facility shall prepare a tsunami response plan detailing operational protocol in the event of a tsunami.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day. Inspection during regular operation of Phase 2.

Noise

Mitigation Measure NSE-1

Refer to Mitigation Measure BIO-2. A condition shall be placed on the coastal development permit to ensure noise levels are kept at or below acceptable thresholds during operation. Specifically peak and average noise levels shall be no higher than 65 dB as measured 25 feet outside the perimeter fence line during operation hours of the go-kart track. As required in Mitigation Measure BIO-2 a fence or wall not less than 6 feet in total height shall be installed around the perimeter of the facility prior to the first day of opening for and maintained in acceptable condition for perpetuity of the operation. The fence shall be slatted to reduce sound levels to those required above.

Timing/Implementation: Prior to facility opening for public use
Enforcement: County Community Development Department
Monitoring: Inspection prior to opening day. Inspection during regular operation of Phase 2.

Mitigation Measure NSE-2

A condition shall be placed on the coastal development permit to prohibit public address (PA) systems, loudspeakers, or other similar amplifiers for all sounds loader than 65 dB as measured from the edge of the wetland or 25 feet from the edge of the property, whichever is greater, except to alert patrons of emergencies (e.g. tsunami alerts or associated evacuation orders).

Timing/Implementation: Compliance through project life
Enforcement: County Community Development Department
Monitoring: N/A

Transportation

Mitigation Measure TRANS-1

A condition shall be placed on the coastal development permit requiring the installation of secure bicycle parking facilities prior to the opening of the facility to the public or any other operation of Phase 1, whichever is first. Parking for at least two bicycles shall be provided for.

Timing/Implementation: Prior to opening of facility to public
Enforcement: Community Development Department
Monitoring: Inspection

Mitigation Measure TRANS-2

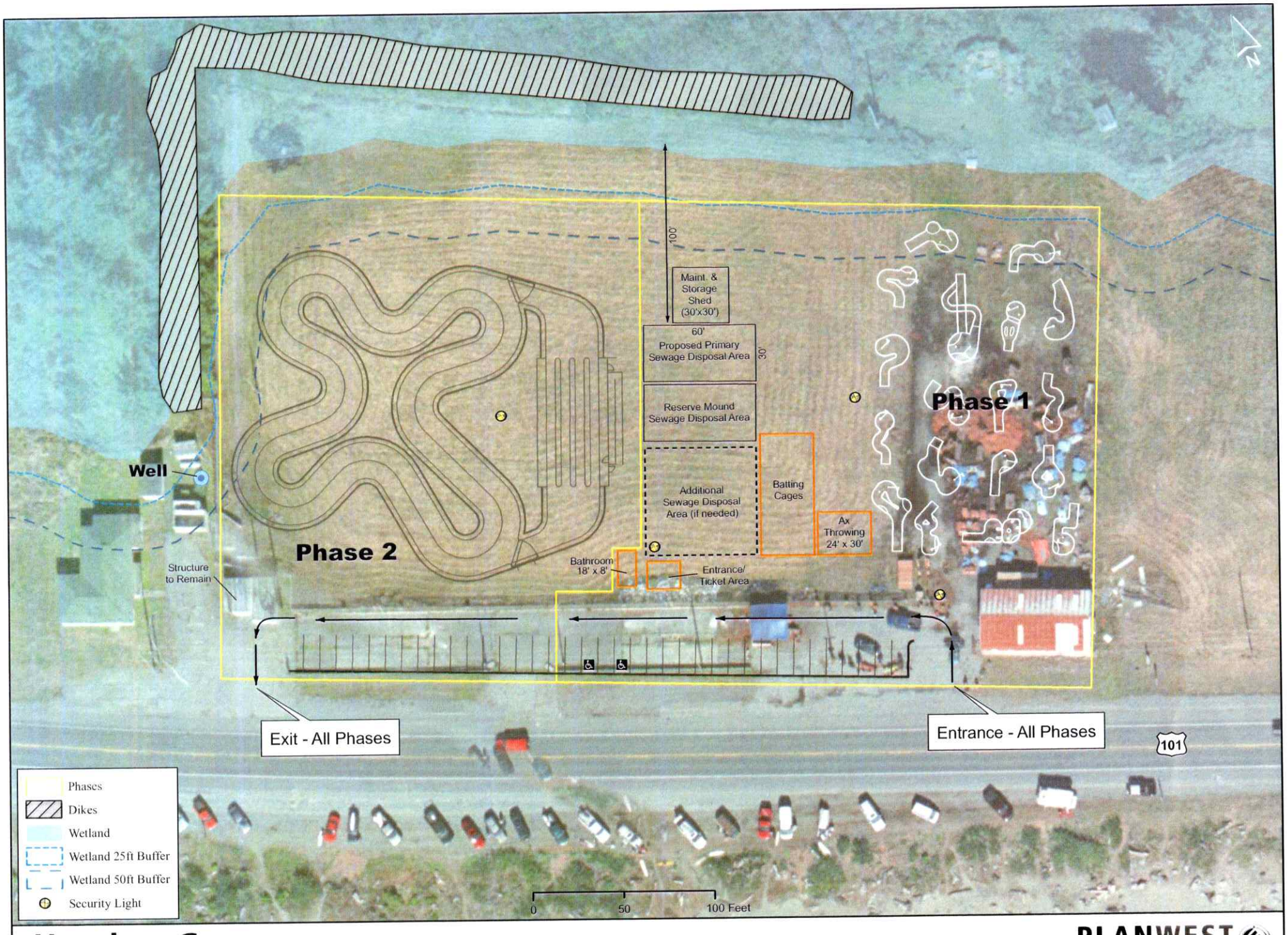
A condition shall be placed on the coastal development permit to require the installation of a left-turn lane to facilitate southbound access to the project site on US Highway 101 prior to the development of Phase 2 or of any development in excess of that expressly permitted in Phase 1.

Timing/Implementation: Prior to development of Phase 2
Enforcement: Caltrans; Community Development Department
Monitoring: N/A

Tribal Cultural Resources

Potential impacts to tribal cultural resources are mitigated under Mitigation Measure CULT-1.

Project Plot Plan
November 4, 2020



Hambro Group

Family Entertainment Project Phases Alternative

PLANWEST PARTNERS, INC.

Date: 10/29/2020

Biological Assessment
Galea Biological Consulting, July 2020

GALEA BIOLOGICAL CONSULTING

200 Raccoon Court Crescent City California 95531
Tel: 707-218-6039 E-mail: frankgalea@charter.net

Amended Biological Assessment for Proposed Hambro Family Entertainment Center Project, Crescent City, CA. APN # 115-020-042. July 2020.

Submitted to:

David Slagel, CEO
Hambro Forest Products, Inc.
PO Box 159
Crescent City, CA 95531

Prepared by: Frank Galea, Certified Wildlife Biologist

Galea Biological Consulting
200 Raccoon Court
Crescent City, CA 95531
E-mail: frankgalea@charter.net

Submitted: July 2020

By: _____

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1.0 SUMMARY

The Hambro Forest Products, Inc. (Applicant) owned a 159-acre parcel at the location of a historic "tank farm" on Highway 101, at the south end of Crescent City (Figure 1). In 2018 the California Department of Fish and Wildlife (CDFW) purchased 132 acres of a spruce grove and wetlands of the property. The remaining property included where large fuel storage tanks were located, serving the fuel needs for the entire county. The tanks are long-since removed and a lengthy rehabilitation program was completed. The property is vacant except for a watchmen's quarters and several small retail leases.

The Applicant is currently proposing development of a Family Entertainment Center (Center) for the property in three phases. This biological assessment was prepared by Galea Biological Consulting (GBC) to determine the potential impacts of the project on sensitive wildlife and plant species, including federally or state listed species, and species of special concern. Additionally, GBC conducted a review of habitats within and adjacent to the project area to determine the scope of wetlands and riparian habitats present. A wetland delineation had previously been completed for the project.

The only threatened or endangered species noted in proximity to the proposed project area is the western lily (*Lilium occidentale*). The western lily is known to occur in marshlands located around the project site, but not in it. Botanical surveys were conducted for other sensitive species and no other listed botanical species were located in the project area.

2.0 INTRODUCTION

2.1 Project Description

The Applicant proposes to develop the property into a family fun center, with a miniature golf center plus a go-kart track. Approximately 6 acres out of the total 22 remaining acres of the entire property would be developed. Phase 1 would entail the building of a miniature golf center and possibly other outdoor low impact activities (axe throwing, batting cage, picnic area). Phase 2 would be the construction of a go-kart track. Phase 3 would be the construction of a Family Fun Center to include laser tag and a variety of indoor activities and food service.

The property can be thought of as consisting of 3 separate sections, based on historic use and current condition. Section A is the 2.8 acres where the fuel storage tanks used to be housed, which is now a mowed field of grass, .4 acres of which is used for surplus wood storage by the current lessee. Section A contains 1-parameter wetlands on the north edge (see wetland delineation, Appendix A). Immediately adjacent to Section A, on the north edge, is a tall dike, now covered with a dense stand of willow.

Section B is .9 acres of paved parking and buildings located immediately adjacent to Highway 101. Section B is completely paved and contains no trees or other natural resources.

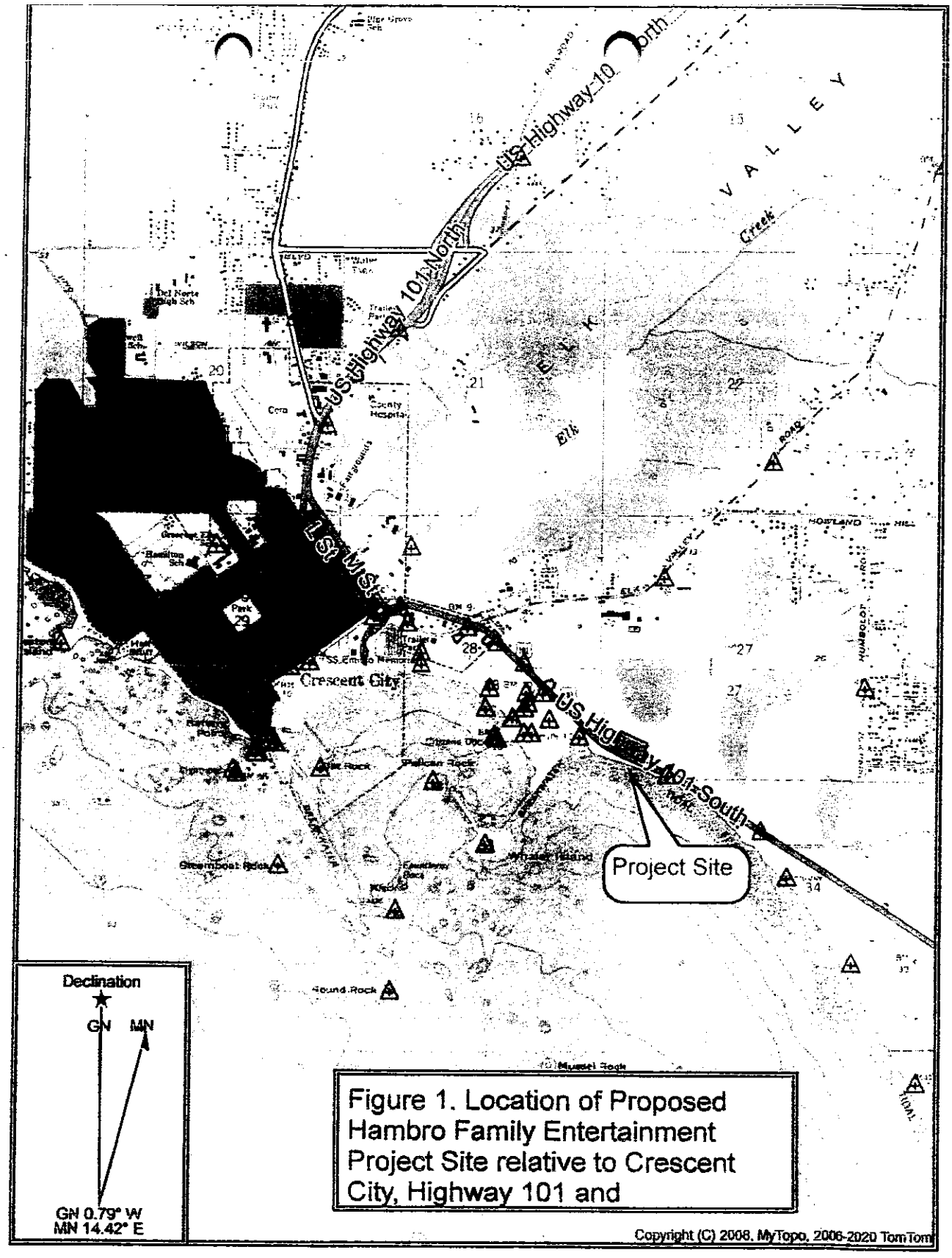


Figure 1. Location of Proposed Hambro Family Entertainment Project Site relative to Crescent City, Highway 101 and

SCALE 1:34285

0 1

Mile

Section C of the property is approximately 2.4 acres, located at the southeast end, and is currently maintained as a mowed field. Section C contains upland habitat adjacent to the highway, with 1-parameter and 3-parameter wetlands within the balance, primarily long the north edge.

2.2 Environmental Setting

The project property is located on the north side of Highway 101, on the south end of Crescent City. Approximately 6 acres of a previously developed portion of the property would be used for the proposed project.

The proposed project is at the far south end of town, where commercial business ends and non-developed areas begin. North and east of the proposed project is the Crescent City marsh, 339 acres of coastal freshwater marsh and Sitka spruce (*Picea sitchensis*) forest. Along with many species of sensitive plants, the marsh also supports the largest known population of the federally endangered western lily.

Directly across Highway 101 is the southern edge of the same property owned by the Applicant, (eight acres of the 22 acres of the remaining parcel) consisting of coastal dunes and beach along the ocean, which is not a part of this development plan.

2.3 Physical Environment

The climate of northern California is characterized as Mediterranean, with cool, wet winters and warm, dry summers with frequent fog. Along the coastline, proximity to the Pacific Ocean produces high levels of humidity and results in abundant fog and fog drip precipitation. The maritime influence diminishes with distance from the coast, resulting in lesser amounts of fog, drier summer conditions and more variable temperatures. Annual precipitation in the project watershed ranges from 60 - 150 inches occurring primarily as rain during the winter months. Air temperatures measured in the Crescent City area vary from 41°F to 67°F annually.

3.0 METHODS

3.1 Records Search

A records search of the CDF&W Natural Diversity Data Base (2019) was conducted to determine if any additional special-status plant or animal species had been previously reported within or near the project area. Listed and sensitive wildlife species potentially occurring within one mile of the project area are presented in Table 1.

Additionally, the U.S. Fish and Wildlife Service (USFWS) IPaC (Information and Planning Center) web pages was queried which provided a list of federally-protected species potentially found near the project area (Appendix A). These lists tend to be very comprehensive and list all

Federally-listed species within Del Norte County. The USFWS National Wetland Inventory web page was also queried for source information regarding potential wetlands in the vicinity of the project (Appendix B).

Special-Status Species and Significant Natural Communities.

The following special-status species and sensitive community types are considered in this evaluation:
• Species that are listed, or designated as candidates for listing, as threatened or endangered under the federal Endangered Species Act;
• Species that are listed, or designated as candidates for listing as rare (plants), threatened, or endangered under the California Endangered Species Act;
• Wildlife species listed by the CDF&G as species of special concern or fully protected species;
• Communities designated by the CDFG to be "significant" natural communities;
• Plant species on List 1A, List 1B, and List 2, in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California;
• Species that meet the definition of rare or endangered under the California Environmental Quality Act (under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria" for listing); and
• Taxa of special concern by local agencies.

3.2 Regulatory Context

The project is located within the geographic range of several special- status plant and wildlife species. Biological resources on the site may be subject to agency jurisdictions and regulations.

(a) U.S. Fish and Wildlife Service (USFWS). The USFWS has jurisdiction over species listed as threatened or endangered under the federal Endangered Species Act (ESA). The ESA protects listed species from "take," broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An activity is defined as a "take" even if unintentional or accidental. An endangered plant or wildlife species is one that is considered in danger of becoming extinct throughout all, or a significant portion of its range. A threatened species is one that is likely to become endangered within the foreseeable future.

In addition, the USFWS has a list of candidate species which the USFWS currently has enough information to support a proposal for listing. Section 9 of the ESA and its applicable regulations restrict activities with respect to endangered and threatened plants. However, these restrictions are less stringent than those applicable to fish and wildlife species. These provisions prohibit the removal of, malicious damage to, or destruction of any listed plant species "from areas under federal jurisdiction." Listed plants may not be cut, dug up, damaged or destroyed, or removed from any other area (including private lands) in knowing violation of a State law or regulation.

(b) Raptors & Migratory Bird Treaty Act (MBTA). The MBTA (16 United States Code [USC] 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorized the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. The MBTA sets seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10).

(c) U.S. Army Corps of Engineers. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers is responsible for regulating the discharge of fill material into waters of the U.S. Waters of the U.S. and their lateral limits are defined in 33 CFR (Code of Federal Regulations) Part 328.3 (a) and include streams that are tributary to navigable waters and their adjacent wetlands. Wetlands that are not adjacent to waters of the U.S. are termed "isolated wetlands" and may be subject to U.S. Army Corps of Engineers jurisdiction.

(d) California Department of Fish and Wildlife (CDF&W). The CDF&W has jurisdiction over threatened or endangered species that are formally listed by the State under the California Endangered Species Act (CESA). The CESA is similar to the federal Endangered Species Act both in process and substance; it is intended to provide additional protection to threatened and endangered species in California.

The CESA does not supersede the federal Endangered Species Act, but operates in conjunction with it. Species may be listed as threatened or endangered under both acts (in which case the provisions of both State and federal laws would apply) or under only one act.

The California endangered species laws prohibit the taking of any plant listed as threatened, endangered, or rare. In California, an activity on private lands (such as development) will violate Section 9 of the Endangered Species Act if a plant species, listed under both State and federal endangered species laws, is intentionally removed, damaged, or destroyed. Under the State Fish and Game Code, the CDF&W also has jurisdiction over species that are designated as "fully protected". These species are protected against direct impacts. The CDF&W maintains informal lists of species of special concern, which are broadly defined as plants and wildlife that are of concern to CDF&W because of population declines and restricted distributions, and/or they are associated with habitats that are declining in California.

These species, as well as threatened and endangered species, are inventoried in the California Natural Diversity Database. The CDF&W also exerts jurisdiction over the bed and banks of watercourses according to the provisions of Section 1600 to 1616 of the Fish and Game Code. The Department will require a Streambed Alteration Permit for the fill or removal of any material from any natural drainage. CDF&W's jurisdiction extends to the top of banks and may include the outer edge of riparian vegetation canopy cover.

(e) California Native Plant Society (CNPS). The CNPS has developed lists of plants of special concern in California. A CNPS List IA plant is a species, subspecies, or variety that is considered to be extinct. A List 1B plant is considered rare, threatened, or endangered in California and elsewhere. A List 2 plant is considered rare, threatened, or endangered in California, but is more common elsewhere. A List 3 plant is a species for which California Native Plant Society lacks necessary information to determine if it should be assigned to a list or not. A List 4 plant has a limited distribution in California. All List 1 and List 2 plant species meet the requirements of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the CDF&G Code, and are eligible for State listing. Therefore, List 1 and 2 species should be considered under CEQA. Very few List 3 and List 4 plants are eligible for listing, but may be locally important, and their listing status could be elevated if conditions change.

(f) CEQA Guidelines, Section 15380. Although threatened and endangered species are protected by specific federal and State statutes, the CEQA Guidelines in Section 15380(b) provide that a species not included on the federal or State lists of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria.

These criteria have been modeled after the definitions in the federal Endangered Species Act and the CDFG Code. This section was included in the CEQA Guidelines primarily to deal with situations in which a public lead agency is reviewing a project that may have a significant effect on a species that has not yet been listed by either the U.S. Fish and Wildlife Service or CDF&W. Thus, CEQA provides a lead agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

(g) Regional Water Quality Control Board. Pursuant to Section 401 of the Clean Water Act, projects that apply for a U.S. Army Corps of Engineers permit for discharge of dredge or fill material, and projects that qualify for a Nationwide Permit, must obtain water quality certification from the Regional Water Quality Control Board (RWQCB) that the project will uphold State water quality standards. Alternatively, the RWQCB may elect to notify an applicant that the State may issue Waste Discharge Requirements in lieu of a Section 401 certification.

3.3 Field Investigation

A field investigation of the project area was conducted in October of 2019. All potential wildlife habitats within and in proximity to the project area were assessed for their potential for listed wildlife species. Wildlife biologist Frank Galea conducted the field review for wildlife species while botanist Kyle Wear conducted the wetland delineation and field review for sensitive plant species. For wildlife an assessment area included habitats out to one mile around the actual project area. Trees in and adjacent to the project site were searched with high-power binoculars for nests, cavities or other potential nest sites for raptors or other large birds.

4.0 RESULTS AND POTENTIAL IMPACTS

4.1 Records Search

The CDF&W Natural Diversity Data Base (CNDDB, 2019) and the U.S. Fish and Wildlife Service IPaC web page (Appendix A) provided a summary of those federal and state-listed and sensitive wildlife species potentially occurring at or near the project site and, for the CNDDB, their mapped locations (Figure 2).

The IPaC web page provided a comprehensive list of federally-protected species potentially found within Del Norte County. The list includes the fisher (*Pekania pennant*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), western snowy plover (*Charadrius nivosus nivosus*), yellow-billed cuckoo (*Coccyzus americanus*), tidewater goby (*Eucyclogobius newberryi*), Oregon silverspot butterfly (*Speyeria zerene hippolyta*) and western lily (*Lilium occidentale*). The CNDDB did not have records for any of these species within one mile of the project site, except for the western lily. The only sensitive wildlife species mapped near the project area was the northern red-legged frog (*Rana aurora*). The CNDDB did show a number of sensitive plants having been recorded southeast of the project site, including the federally-listed western lily. Habitat for the fisher, marbled murrelet, northern spotted owl, yellow-billed cuckoo and tidewater goby does not exist on or near the project site, therefore these species were not assessed for impacts.

A list of those sensitive or listed animal species potentially occurring in the vicinity of the project area is presented in Table 1, including their common and Latin names. The listing status of each species and if potential habitat (as determined by GBC, based upon a review of habitat available within the assessment area) was located within the project area is also indicated in Table 1.

4.2 Field Investigation

A field review of the entire proposed project area was conducted in October of 2019. Habitats within and near the project area are Sitka spruce forest, freshwater marsh and beach dunes.

4.3 Habitat Analysis and Impact Assessment for Fish and Wildlife

4.3a State or Federally-Listed Threatened or Endangered Species: Table 1 shows the lack of threatened or endangered species in or near the project area. The bald eagle is listed as two bald eagles were recently photographed (December, 2019) in the immediate vicinity of the project site.

Map of Project Area

Spotted Owl Observations [ds704]

- Nest
- Young
- Pair
- Other Positive Observation
- Negative Observation
- Activity Center
- Abandoned Activity Center
- Not Valid Activity Center

California Natural Diversity Database (CNDDB) Commercial [ds85]

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terrestrial Comm. (80m)
- Terrestrial Comm. (specific)
- Terrestrial Comm. (non-specific)
- Terrestrial Comm. (circular)
- Aquatic Comm. (80m)
- Aquatic Comm. (specific)

1:18,056

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

November 21, 2019

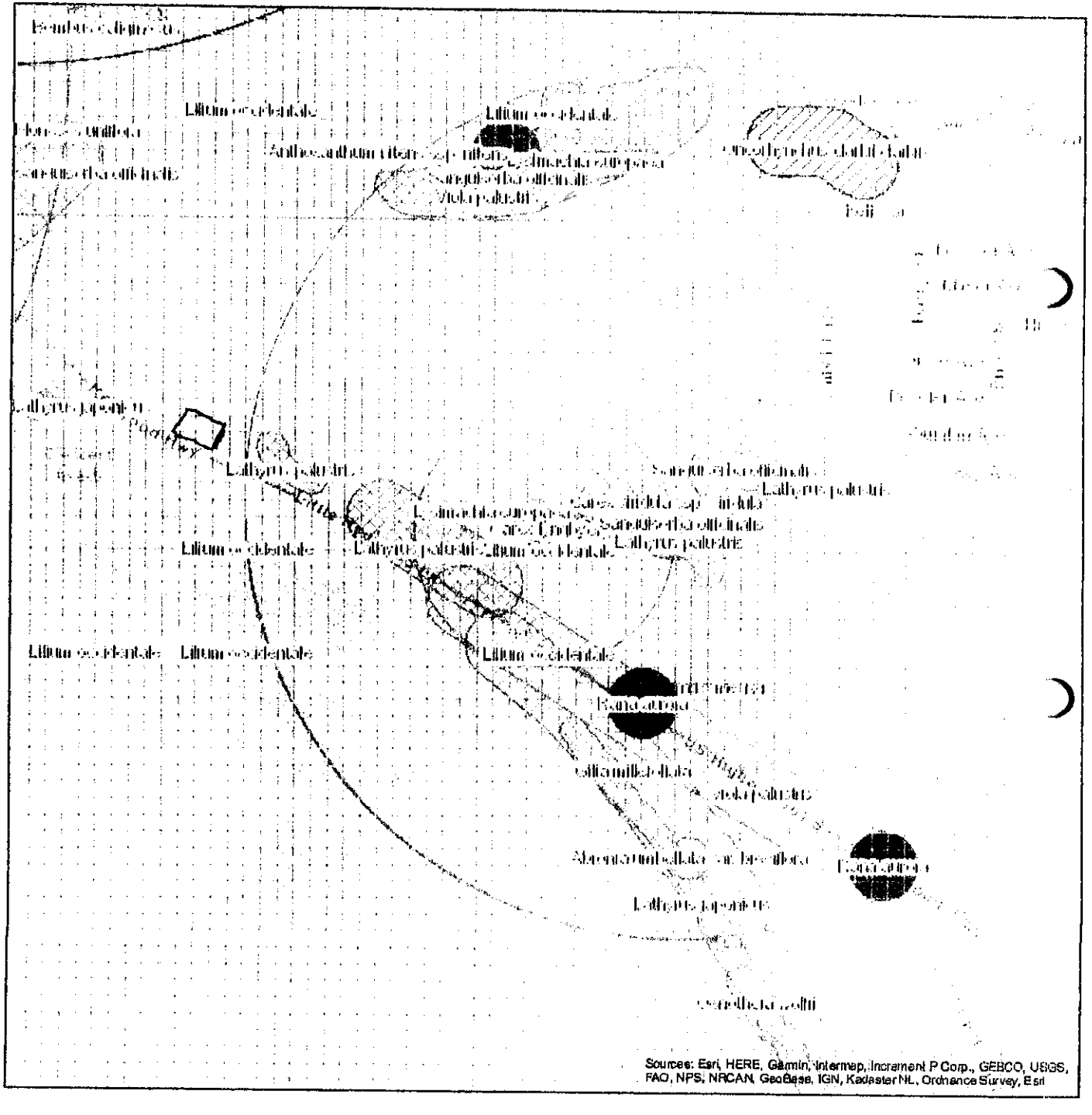


Table 1. Sensitive Wildlife Species Occurring or with Potential to Occur near the Project Area
(From CNDDB 2019 Quad search and GBC sources)

Common Name	Latin Name	Federal Status	State Status	Breeding Habitat in Project Area?	Forage Habitat in Project Area?
BIRDS					
Great egret	*Ardea alba*	NL	CSC	No	Yes
Great blue heron	*Ardea herodius*	NL	CSC	No	Yes
Bald Eagle	*Haliaeetus leucocephalus*	FSC	CSC	No	No
AMPHIBIANS					
Northern red-legged frog	*Rana aurora aurora*	None	CSC	No	Yes

Codes:

Federal Status
- FE Federally endangered
- FT Federally threatened
- FSC Federal species of concern
- FPE Federally proposed for endangered listing
- FPT Federally proposed for threatened listing

State Status
- CE California endangered
- CT California threatened
- CSC California species of concern (CDFW)
- CFP California fully protected

Bald eagles are no longer listed as threatened or endangered, but are still a federally protected species. A few bald eagles' nest in Del Norte County, and seasonal migrants often come to the area due to high waterfowl numbers at Lake Earl, where the eagles can forage. No bald eagle nests are known of in the vicinity of the project. The pair observed in December of 2019 likely were roosting in the large spruce trees found north of the project site between fishing forages in the nearby ocean. This project would have no impacts on bald eagles or bald eagle nest sites.

The following is a discussion of other sensitive species potentially present, and an assessment of their potential to be impacted by this project.

4.3b Migratory Bird Treaty Act

Potential nesting habitat for birds covered by the Migratory Bird Treaty Act occurs around the project area in the form of thickets of willow (*Salix spp.*) along the north edge of Section A, plus Spruce/alder/willow thickets located to the northeast.

It is therefore recommended that, if construction is to occur during the migratory bird breeding season, February 1 to August 15th, surveys for nesting migratory birds should occur by a qualified

biologist in the weeks before the onset of construction. If nesting birds are located adjacent to the construction zone, construction within 300 feet of a nest site should be postponed until the young fledge the nest and are mobile.

4.3c Crescent City Marsh Wildlife Area (CCMWA)

The extensive freshwater marsh system found north and northeast of the project site contains breeding and forage habitats for a variety of avian species. There is no recreational access to this marsh, with no terrestrial or aquatic trails running through it, and no boat launch sites. Therefore, the marsh is very isolated and relatively remote from human disturbance, except for that portion of the marsh directly adjacent to Highway 101.

As the marsh is remote and not well explored, the list of avian species using the marsh for nesting, roosting or foraging is unknown, but can be assumed based on knowledge of local species. Various species of wading birds, herons, and seasonally, migratory waterfowl, utilize the marsh. Songbirds can nest and forage in the spruce forests and willow/alder thickets. Raptors, including osprey, can potentially nest in the spruce stands located around the margins of the marsh, as are heron and egret nests or rookeries.

Roosevelt elk (*Cervus elaphus roosevelti*) move through the marsh as they travel from open forage pastures to the east and thermal cover and isolation under the higher elevation spruce stands. Elk also move through the subject property and forage on the mowed grass.

The CNDDB did not note heron rookeries in the area. However, with the proximity of the marsh and contiguous large spruce stands, the presence of heron or egret nests near the project site is a possibility. Surveys by a qualified biologist for these species should also be conducted a month to two weeks prior to construction, if construction is to occur during the breeding season, February 1 to August 15th.

4.3d Non-sensitive Wildlife

Black-tailed deer (*Odicoileus hemionus*), black bear (*Ursus americanus*) and other local species are known in the area, however as the project is in proximity to Highway 101 these species tend to avoid the project area.

Roosevelt elk are common in the area, as the population has greatly increased in the past 20 years. These elk are not migratory as elk from inland areas are, but tend to remain within one area, as they do not have to move from deep snow in winter.

A large herd (close to 100 elk) occupy the pastures and woodlands located 1.5 miles to the east on Elk Valley Rancheria property (the Martin Ranch) and these elk sometimes wander as far west as

this property. Single individuals, especially lone bulls, likely occupy the natural areas between the Martin Ranch and this property. It would be preferable to not have elk utilize any portion of the project area, as this brings them closer to the highway and conflict with vehicles.

This project will have no long-term impacts on local elk populations, as the project would impact a minimal amount of forage habitat in an area where forage for elk is plentiful. The project would likely deter elk from continuing to use the area as there will be less forage, and disturbance from the project will hopefully push them further away from the highway.

4.3e Amphibians

Table 1 lists the northern red-legged frog (*Rana aurora*) as potentially occurring in the area. The northern red legged frog was relatively common in wetlands, riparian areas and ponds in northern California. Loss of habitat and predation by non-native frogs has reduced or eliminated populations of a close relative, the California red-legged frog (*Rana draytonii*), in southern and central California.

In Del Norte County the northern red-legged frog this is a very common species in a wide range of habitats. This species breeds in moist areas, requiring standing water. It feeds on a variety of invertebrates, and can forage in wet fields, backyards, and in woodlots. It is designated as a Species of Special Concern by the California Department of Fish and Wildlife. Although this species is not a protected species in Del Norte County and is locally relatively abundant, population levels are not doing well in the remainder of its range.

Northern red-legged frogs can utilize a variety of habitats for foraging and they are never found far from available, standing water. There is no standing water in the project area, however mowed grass fields can provide a forage area for these frogs, coming out of the wetlands. Due to the proximity of the marsh, it is recommended that a qualified biologist survey for this species immediately before construction of any given area to remove any amphibians which might be in harm's way.

4.3f Sensitive Plants

The plants on the California Native Plant Society Inventory list 1B and 2 are considered rare, endangered, and threatened plants pursuant to Section 15380 of the California Environmental Quality Act (CEQA). The plants on these lists meet the definitions under the Native Plant Protection Act and/or the California Endangered Species Act of the California Department of Fish and Game Code and are eligible for state listing.

Botanist Kyle Wear conducted a botanical survey of the project and potential habitats during the proper bloom survey season in June and July of 2019. No sensitive plant species were located within the project area. The botanical survey is included as a separate report (Appendix B).

4.3g Wetlands

Wetlands are located around the project area, to the north, west and east. The USFWS National Wetland Inventory shows freshwater forested/shrub wetlands adjacent to the site, and freshwater emergent wetlands farther to the north. Botanist Kyle Wear conducted wetland delineation for the project and found 3-parameter wetlands to the west and north. Section C contained uplands plus 3 and 1-paramenter wetlands.

The USFWS wetland inventory does not show Section C as being wetlands, and the CDFW does not identify Section C as being wetlands. The California Department of Transportation (CalTrans) recently improved a drainage and culvert located at the east end of Section C. This improvement has increased the flow of water exiting the marshlands east of the property, and appears to be improving drainage of groundwater in Section C.

5.0 POTENTIAL IMPACTS FROM PROPOSED DEVELOPMENT

The proposed family fun center is to be located in property which had previously been used as a fuel storage depot. The entire area of the depot had been cleared, earthen berms placed around portions of it, and large light poles erected to provide nighttime security lighting. Historically, trucks drove in and out of the facility constantly, as this fuel depot provided all the diesel and gas for the Brookings and Crescent City area, down to Klamath.

The proposed family fun center may cause impacts to surrounding natural resources due to sound levels from go karts, from increased nighttime lighting and potentially from run-off pollutants.

5.1 Sound Levels

The logarithmic decibel (dB) scale is how sound (noise) levels found in the environment are measured and quantified. An interesting property of the logarithmic scale is that the sound pressure levels of two distinct sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total sound level is only a three-decibel increase (to 53 dB), not a doubling to 100 dB. Thus, every three-dB change in sound level represents a doubling or halving of sound energy. A change in sound level of less than three dB is generally considered imperceptible to the human ear.

Another property of the decibel scale is that if one source of noise is 10 dB (or more) louder than another source, then the quieter source does not contribute significantly to the overall sound level which remains the same as that of the louder source. For example, a source of sound at 60 dB plus another source of sound at 47 dB is simply 60 dB.

Pre- Project Ambient Conditions

Ambient noise at the site was measured by GBC in November of 2019 using a digital sound meter (VLIKE brand, range 30dB-30dB). Measured at 312 feet from the edge of Highway 101, average traffic noise at this point (near the edge of the marsh) was in the mid 50's dB.

Currently, there is a wood-carving shop located along the highway on the premises, where chainsaws are used to create carvings for sale to tourists. GBC had the carver run a chainsaw at the edge of the highway, and the resulting noise was not additive to the highway noise (mid 50s dB).

Based on the sawdust piles, much of the chainsaw carving occurs 150 feet from the wetland edge to the north. A typical chain saw produces 106 dB of noise, and records between 50 and 70 dB at 50 feet. As decibel levels drop 6 dB for every doubling of distance, chainsaw noise from the wood-carving area 150 feet from the wetland edge should not be much greater than the average traffic noise from the highway.

Potential Project Sound Levels

The highest sound levels which could potentially be produced at the Family Fun Center would be from go-karts. Sound levels from go-karts would be dependent upon whether electric or gas go-karts are used, with the latter being the noisier.

Gas go-karts range in decibel noise levels, with quieter models producing only 75 decibels (dB) measured at a distance of 50 feet.

Electric go-karts are much quieter, with an average of 81 dB measured directly adjacent to the go-kart, which translates to quieter go-kart than a gas go-kart at 50 feet.

Regardless of whether gas or electric go-karts are used, sound from the project area would be reduced by both a chain link fence with woven slats, plus a distance buffer of at least 25 feet between the project and wetlands.

GBC conducted a sound test, using slatted fencing found around the transfer station on Elk Valley Road. A digital sound meter (VLIKE brand, range 30dB-30dB) was used to record decibel readings produced by a "Foxpro Inferno"-brand digital game caller with pre-recorded spotted owl calls. A 10 dB reduction in sound was noted when placing the game caller was placed behind the slatted fence, versus not using the slatted fence. A ten decibel reduction in sound level using a slatted fence would be significant.

Assuming go-karts produce a sound level of 75 decibels, the slatted fencing would reduce the decibel level to 65 dB, plus any distance buffer between the project and natural resources would reduce sound levels even further. As a comparison, OSHA cites dB levels of 60 as a conversation, or a dishwasher, and levels of 70 dB as a vacuum cleaner.

As there are no sensitive species which are known to frequent the area around the proposed project area, and the project is located immediately adjacent to a major highway with relatively high ambient noise levels, the sound levels to be produced by this project should not have any impacts on sensitive wildlife species.

5.2 Lighting

Historically, the tank farm had several high poles (20-30 feet in height) for lighting located around its perimeter. These have not been in use since the removal of the fuel storage tanks, therefore the site has been relatively dark at night for the past few decades.

Having outdoor lights is mandatory for human visibility, security and safety. However, artificially manufactured light can be a disturbance and even a threat to wildlife. Many animals use the presence or absence of natural light (often the moon) as a reference for their movement. Researchers into effective wildlife lighting suggest the following: "Keep it long, keep it low, and keep it shielded."

To date some of the best lighting for wildlife has been LED lights are set to a specific wavelength of 590 nanometers. This range is a critical element in wildlife friendly lighting because it is not visible to animals. If possible, lighting around the family fun center should utilize lights of this wavelength, as well as being as low as possible, and shielded to prevent light from shining into the marsh as much as possible.

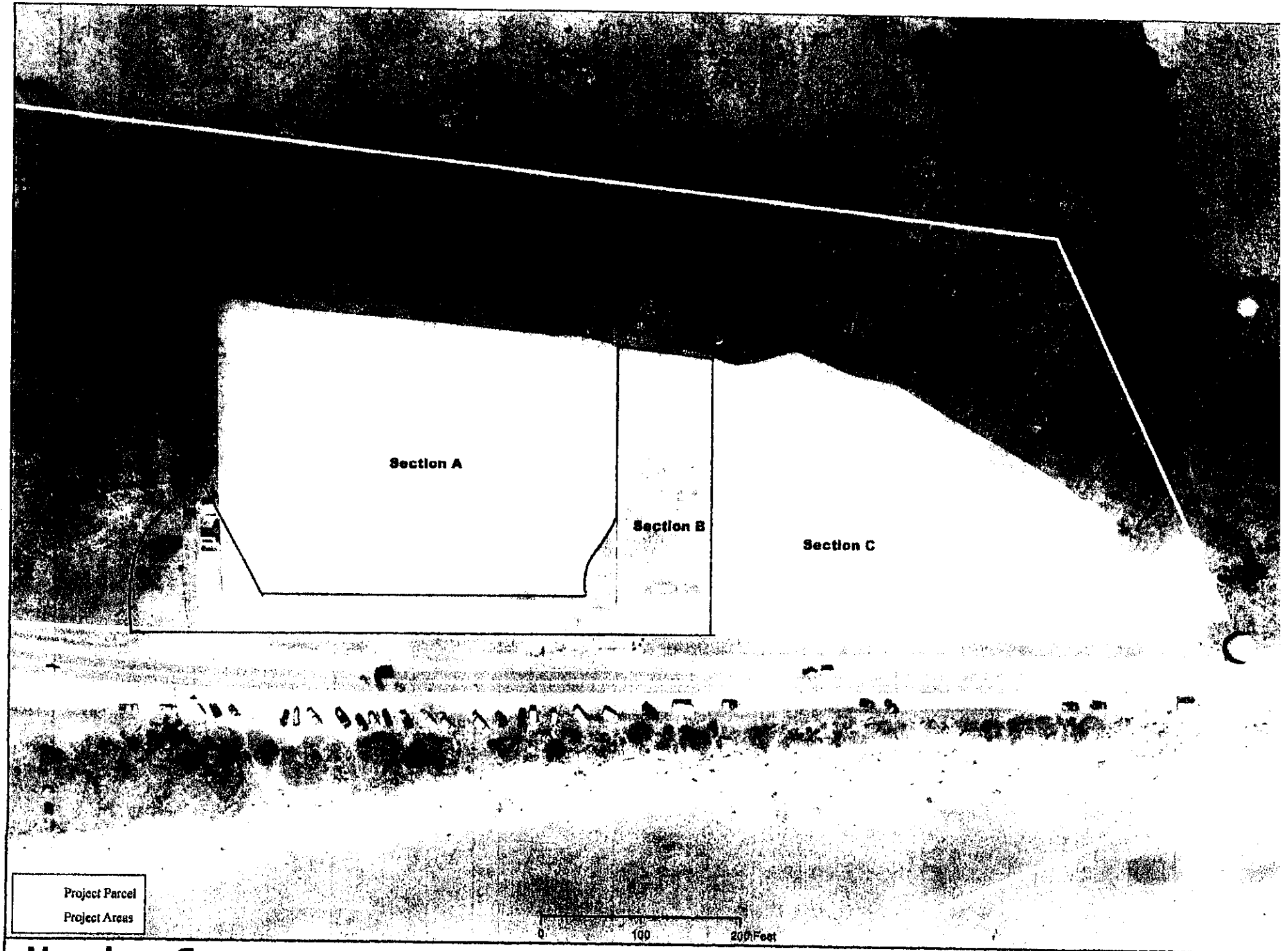
If lighting of the project area is constructed as recommended, night lighting of this project should have no detrimental impacts on wildlife. The project is located immediately adjacent to a major highway, where headlights are already prevalent. A chain link fence with woven slats, plus dense brush growing between the project area and the marsh, should significantly reduce any light pollution which might occur even after using specified light sources.

6.0 PROPOSED ALTERNATIVES FOR DEVELOPMENT

The Applicant originally had developed five possible alternatives for land use on the property. After initial consultation with the California Coastal Commission (CCC), the Applicant has dropped three alternatives and now proposes two possible alternatives, including the Applicant's Preferred Alternative. These two alternatives are essentially the same but propose different buffers to Environmentally Sensitive Habitat Areas (ESHA) within the project proposal area.

The following is a description of the 3 sections of land (Figure 3) where the proposed development would take place:

Section A - Section A is the 2.8 acres where the fuel storage tanks used to be housed, which is now a mowed field of grass, .4 acres of which is used for surplus wood storage by the current lessee.



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Section B - Section B is .9 acres of paved parking and buildings located immediately adjacent to Highway 101. Section B is completely paved and contains no trees or other natural resources.

Section C - Section C of the property is approximately 2.4 acres, located at the southeast end, and is currently maintained as a mowed field. Section C contains upland habitat adjacent to the highway, with 1-parameter and 3-parameter wetlands within the balance, primarily long the north edge.

The following are two alternatives for land use at the proposed development site:

6.1 Alternative #1 – Preferred Alternative

- 25-foot buffer to 3-parameter wetlands around Section A.
- Leave the dike in Section A in place.

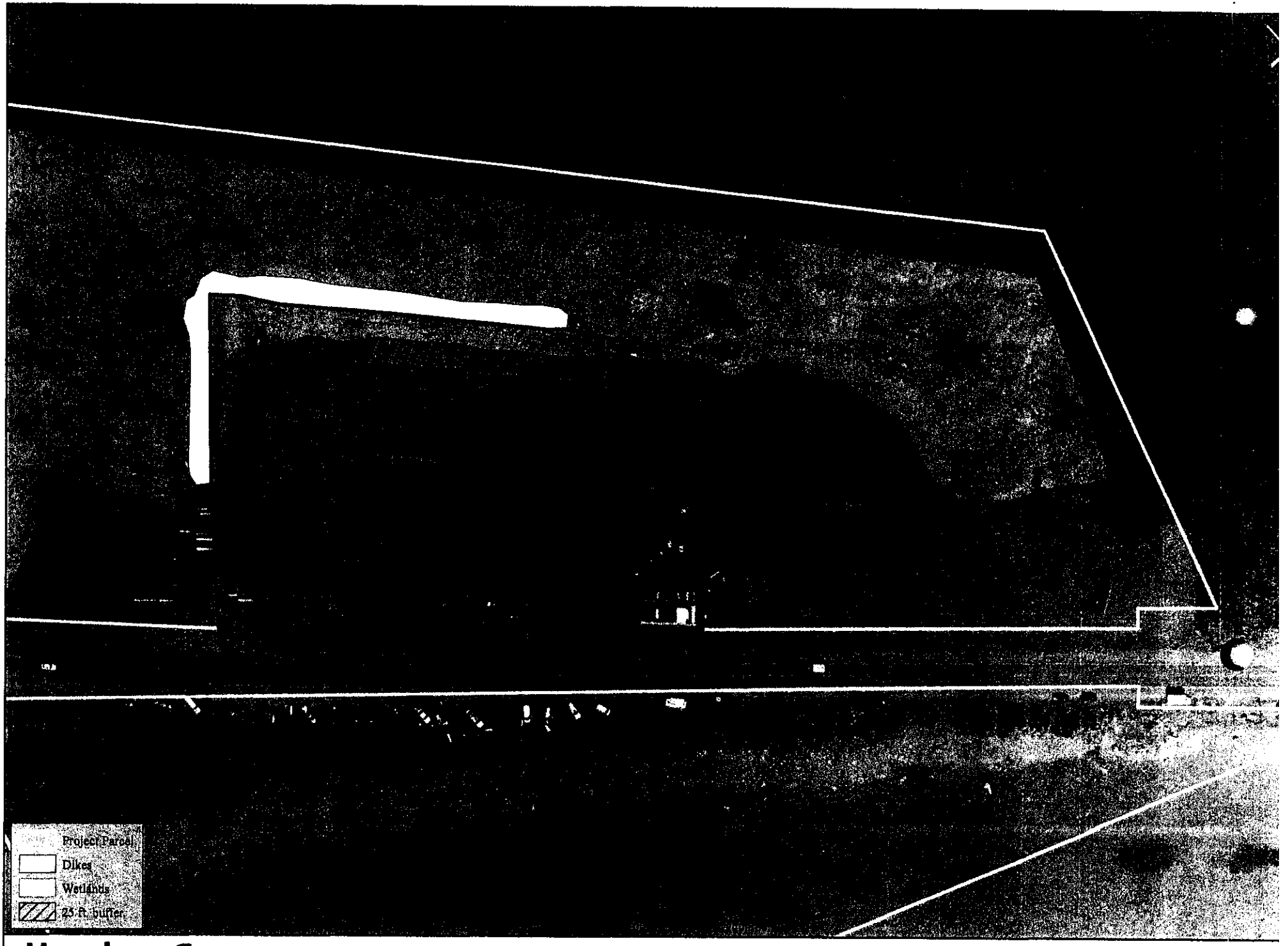
Alternative #1 is now the preferred alternative. The dike in Section A would be retained, and a 25-foot buffer of mowed grass would be kept between the development project and the edge of the wetlands at the foot of the dike.

Justification for a reduced 25-foot buffer is as follows:

1. The dike and associated vegetation already act to block visual and noise disturbance.
2. The closest wetlands delineated are the drainage channel, which is mowed right up against its edge, therefore there is little or no value of this wetland strip, as it does not provide habitat for animals or plants which prefer wetland habitats.
3. A buffer larger than 25-feet would only result in a grassy, mowed area between development and wetlands, providing no additional buffer to wetlands except a greater distance.
4. Having only 25 feet of mowed grass habitat will greatly reduce the amount that elk utilize the site for grazing. Currently, elk forage at the site and are close to Highway 101 and traffic, a situation which should be avoided as much as possible. Having a larger buffer would entice elk to enter and utilize the buffer strip.

As a mitigation to a reduced buffer, the Applicant proposes to

1. Construct a fence between the project area and natural resources to the west, north and east. off the east.
2. The fence would include a barrier feature to reduce sound, block visibility between the project and natural resources, and prevent wildlife from entering the park area.
3. Allow for a 25-foot buffer between the project and natural resources. The buffer area would be maintained as mowed grass in order to prevent damage to the fence from encroaching vegetation.



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4. It should be noted that the purchase and management of the 335 acre Crescent City marsh by the State of California is a previous mitigation to development in the Crescent City area. As was the purchase of the Elk Creek Wetland Wildlife Area (160 acres) and the Lake Earl Wildlife Area (5,600 acres). These purchases were made to offset the impacts of future developments to natural resources in the Crescent City area, and should be taken into consideration for this project.

6.2 Alternative #2

- 50-foot buffer to 3-parameter wetlands around Section A.
- Leave the dike in Section A in place.

In this the dike in Section A would be retained, and a 50-foot buffer of mowed grass would be kept between the development project and the edge of the dike. This alternative does not work well for the Applicant as it greatly reduces the amount of property available to incorporate into the family fun center.

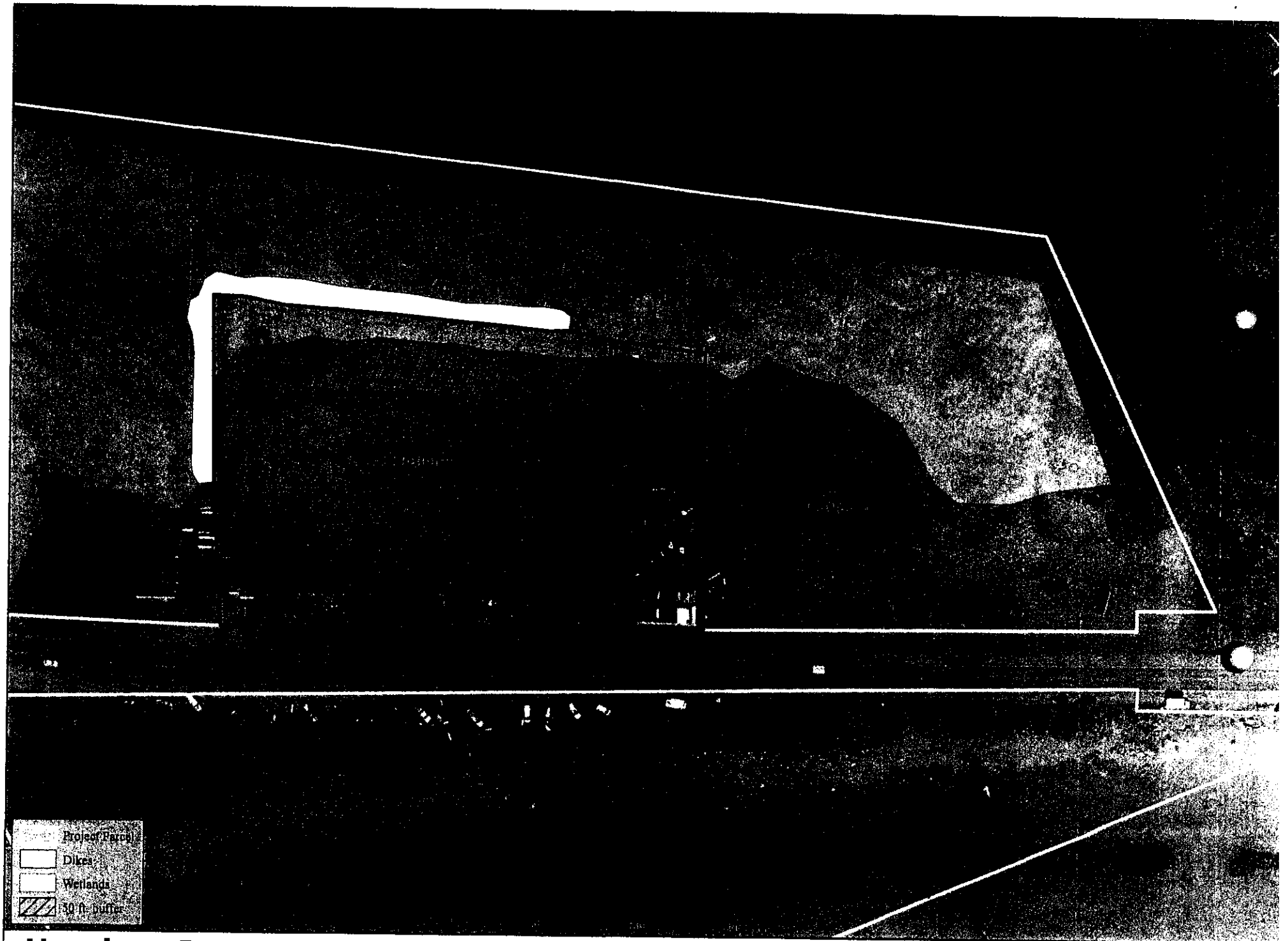
Results from a 50-foot buffer are as follows:

1. The dike and associated vegetation already act to block visual and noise disturbance, plus there would be a fence, therefore going from a 25 foot buffer of mowed grass versus 50 feet would have no increased value in buffering biological resources in the marsh.
2. The closest wetlands delineated are the drainage channel, which is mowed right up against its edge, therefore there is little or no value of this wetland strip, as it does not provide habitat for animals or plants which prefer wetland habitats.
3. Having 50 feet of mowed grass between the family fun center and wetland boundary will likely result in the elk herd using the strip for grazing. Enticing an elk herd into proximity to Highway 101 and traffic is a situation which should be avoided as much as possible.

6.3 Justification for Reduced ESHA Buffers

The Del Norte County Land Use Plan allows for reduced buffers to ESGA within the Coastal Zone with proper justification. The following is an analysis and justification for a reduced buffer to the ESHA, using these criteria:

1). Biological significance of adjacent lands: The proposed project is at the far south end of town, where commercial business ends and non-developed areas begin. Immediately north of the proposed project is the Crescent City marsh, 339 acres of coastal freshwater marsh and Sitka spruce (*Picea sitchensis*) forest managed by the California Department of Fish and Wildlife (CDFW). This marsh complex harbors a significant population of the western lily (*Lilium occidentale*), a federally-threatened species.



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While there is biological significance to the Crescent City marsh, the project is separated from the marsh by an artificial dike. The dike provides an excellent sound and visual barrier between the proposed development and the 3-parameter wetlands located on the other side of the dike. The dense thicket of willows growing on the dike also provides an additional visual and sound barrier. The dikes additionally form a barrier to prevent sediments or contaminants from reaching the 3-parameter wetlands located on the other side of the dike. Therefore, wildlife utilizing wetland habitats in the 3-parameter wetlands located on the other side of the dike are well "buffered" from sound and visual disturbance by the dike and associated vegetation.

East of the proposed project is 2.5 acres of mowed field, owned by the Applicant. Immediately south of the proposed site is Highway 101, the largest thoroughfare in Del Norte County.

2). Sensitivity of species to disturbance: The Crescent City marsh is 640 acres in size. This project, if allowed at the preferred Alternative, would be exposing approximately 3 acres to noise disturbance. Sight disturbance would not be an issue as the plan is to have the area fenced off, plus there is a high dike separating the project from the marsh, plus dense vegetation along the edge of the project acts as an excellent buffer to reduce noise infiltration.

Birds, or wildlife in general, have 640 acres of excellent habitat, away from Highway 101 noise, in which to forage, nest and shelter. This project would minimally disturb 3 acres around the edge of the project. These three acres are 300 feet from Highway 101, which creates a fair amount of noise disturbance on its own. Therefore, the ambient noise level for those 3 acres is already significant. Birds and other wildlife would likely utilize the other 637 acres of quiet, preferable habitat to the 3 acres next to the project already. Thereby, this project likely would have no significant impacts on birds or other wildlife.

The Crescent City marsh is not known for any highly sensitive bird or wildlife species. There are no listed bird or wildlife species which utilizes this marsh. Common bird species found here are great blue heron, cattle egret, snowy egret and black-backed night herons. The first three species commonly fly into developed areas (the harbor, front-street park, for example) to forage, where they are exposed to more noise than would be generated from this venture.

3). Susceptibility of parcel to erosion: The proposed project site is located on flat ground with little or no potential for erosion.

Any erosion or sediment movement from construction would be controlled using best management practices (BMP's). A silt-retention fence between any ESHA and the project site, to be erected during any and all construction activities.

4). Use of natural topographic features to located development. No natural topographic features are available to minimize impacts. An artificial dike separates the project site from the Crescent City marsh. This dike helps to reduce noise, light and visual disturbance to the Crescent City marsh.

5). Use of existing cultural features to locate buffer zones: No cultural features are available to buffer the ESHA.

6). Lot Configuration: The property is contained with the Crescent City marsh to the north, wetlands to the east and west and Highway 101 to the south. There is no other way to utilize the property. As the property is an old fuel storage tank site which has been cleared, with a few residual structures remaining, the project will utilize the lot to the best ability possible.

7). Type and scale of development proposed: The proposed family fun center project is consistent with local zoning. The parcel is zoned M-C(H) (Manufacturing and Industrial with a Coastal Hazard Area Combining District) with a land use designation of General Industrial. South of the highway, the zoning is HDR (Harbor Dependent Recreational) with a Harbor Dependent land use. The proposed Family Entertainment Center is a commercial recreation facility that qualifies as a principal permitted use in the M-C(H) zone pursuant to Del Norte County Code Title 21 Coastal Zoning, Chapters 30 and 31, Section 2.

The scale of the project fits within the 3 acres available. This area of Crescent City is primarily recreational, due to the proximity of the beach and harbor, therefore this recreational project as proposed would fit will into local developments.

7.0 RECCOMENDATIONS FOR RESOURCE PROTECTION

1. Lighting around the family fun center should utilize lights of 590 nanometers where practical, as well as being as low as possible, and shielded to prevent light from shining into the marsh as much as possible.
2. All construction activities should be bordered with a properly installed, sediment-drift fence located between construction and any wetlands, to prevent sediments or pollutants from entering wetland habitats. No spoils shall be placed or stored within 50 feet of the top of bank.
3. All construction vehicles will be maintained to prevent oil or other fluid leaks. A regular inspection for leaks and any necessary repairs will be performed on all vehicles.
4. Vehicles and equipment will be kept clean to prevent excessive build-up of oil and grease. Clean-up materials will be kept nearby in the case of any leak or spill.
5. If fueling must occur on-site, designated areas away from wetlands will be used. On-site fuel storage tanks will be located with a berm area designed to hold the tank volume. Secondary containment, such as a drain pan or drop cloth, will be used to catch spills or leaks when removing or changing fluids.
6. Construction vehicles will be stored at least 100 feet away from wetlands during non-work hours.
7. Construction should occur outside of the migratory bird breeding season (February 1st to August 15th) unless surveys for migratory bird nests are completed prior to construction and no migratory bird nests are located in proximity to construction.

8. No vegetation removal or ground disturbing work should occur during any rainfall events, nor afterwards until the ground is dry.
9. Surveys for amphibians should be conducted by a biologist at the proposed construction area. If amphibians are found, they should be collected and moved to suitable habitats by the biologist.
10. A minimum 25 foot buffer should be placed between construction and any wetland habitat.
11. Fencing between the center and surrounding marshlands should be of chain link with plastic fence slats woven in, thus creating a fence you cannot see through, would also provide light and sound-blocking qualities. Fencing should be impervious to small animals such as the red-legged frog.

8.0 STAFF QUALIFICATIONS

Habitat assessment and report writing for this project was conducted by Principal Biologist, Frank Galea. Frank is the primary Biological Consultant for Galea Biological Consulting, established in 1989. Frank is certified as a Wildlife Biologist through the Wildlife Society and has a Master of Science Degree in Wildlife Management from Humboldt State University plus a Bachelor of Science in Zoology from San Diego State University. Frank has been assessing habitat and conducting field surveys for Threatened and Endangered species for over 30 years. Frank has taken an accredited class on wetland delineation through the Wetland Training Institute, and has successfully completed a Watershed Assessment and Erosion Treatment course through the Salmonid Restoration Federation.

Botanical surveys and wetland assessments were conducted by botanist Kyle Wear. Kyle has a Master of Science Degree in Botany from Humboldt State University and has conducted botanical surveys as a consultant for over twelve years. Kyle is recognized as a highly qualified botanist for sensitive species surveys and assessment by the California Department of Fish and Wildlife. Kyle has also taken an accredited class on wetland delineation through the Wetland Training Institute.

APPENDIX A

List of Federally-listed species provided by the IPaC Website of the U.S. Fish and Wildlife Service

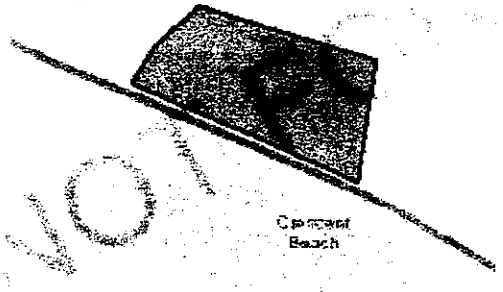
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Del Norte County, California



Local office

Arcata Fish And Wildlife Office

(707) 822-7201
(707) 822-8411

1655 Heindon Road
Arcata, CA 95521-4573

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Fisher Pekania pennanti — Proposed Threatened

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3651

Birds

NAME	STATUS
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Northern Spotted Owl Strix occidentalis caurina There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **proposed** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Oregon Silverspot Butterfly Speyeria zerene hippolyta There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6930	Threatened

Flowering Plants

NAME	STATUS

Western Lily Lilium occidentale — Endangered

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/998

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pd

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

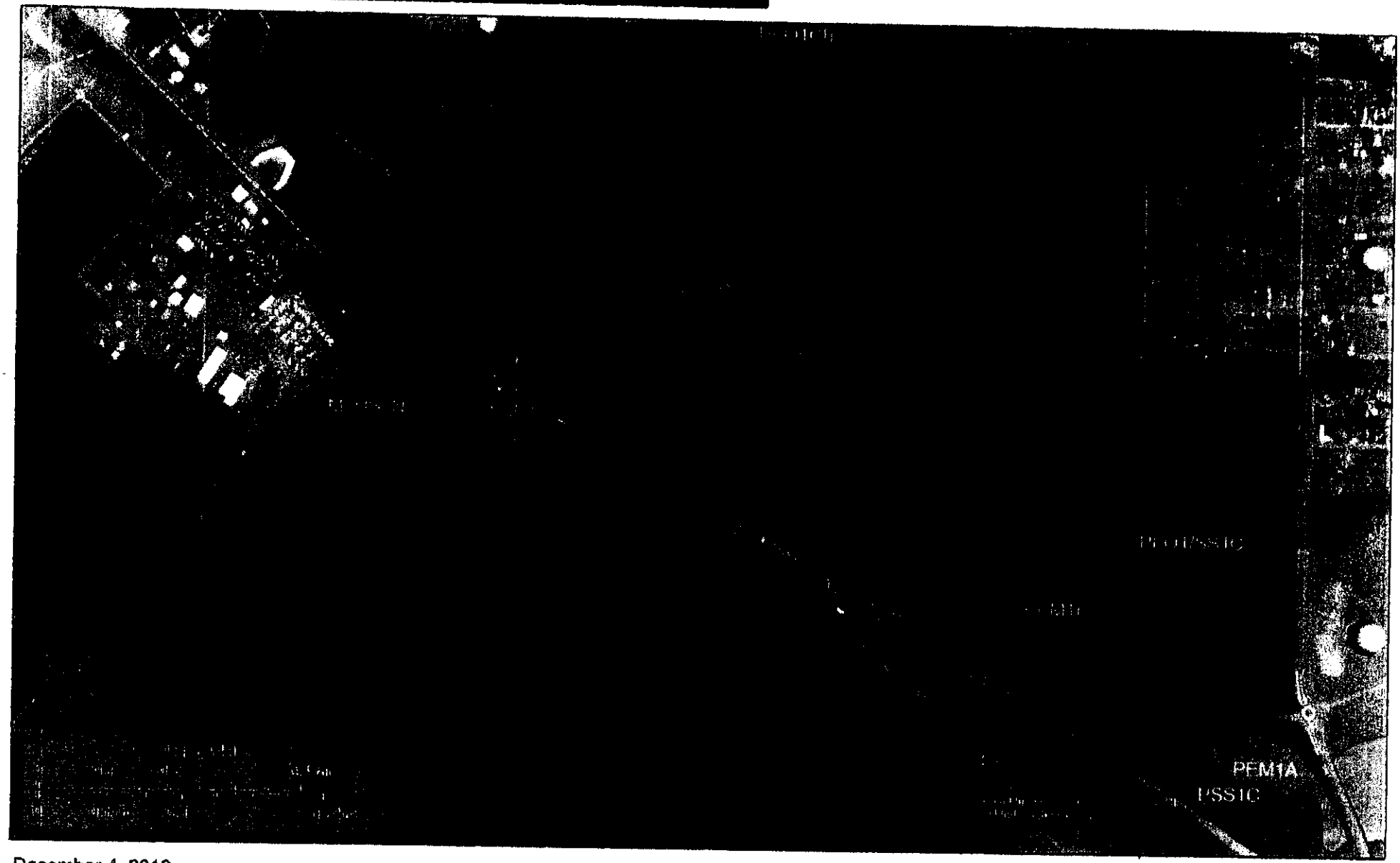
APPENDIX B

Maps of Potential Wetland Habitats associated with project area from the U.S. Fish and Wildlife Service National Wetland Inventory

U.S. Fish and Wildlife Service

National Wetlands Inventory

Hambro Family Fun Center



December 4, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

APPENDIX C

Wetland Delineation by consultant Kyle Wear

Wetland Delineation

Hambro Forest Products (APN: 115-020-042)

DEL NORTE COUNTY, CA

Prepared by:

Kyle S. Wear
Botanical Consultant
(707) 826-1398
kyle_wear@suddenlink.net

Prepared for:

Hambro Forest Products
445 Elk Valley Road
Crescent City, CA 95531

Date:

April 2019

1. INTRODUCTION

This report presents the results of a wetland delineation on APN: 115-020-042 in Crescent City. The purpose of the study was to identify and delineate wetlands on the parcel to determine potential constrains for development on the property.

Because the project area is in the coastal zone, the California Coastal Commission (CCC) and Army Corps of Engineers (Army Corps) wetland definitions were considered when making the wetland determination.

The CCC defines wetlands broadly as:

> *"Wetland means lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens."*

CCC Administrative Regulations (Section 13577 (b)) provides a more specific definition:

> *"Wetlands are lands where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deepwater habitats."*

The CCC considers this definition as requiring the observation of only one indicator from any one wetland parameter such as hydrophytic vegetation, hydric soil, or wetland hydrology to make a positive wetland determination.

The Army Corps defines wetlands as:

> *"...areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

The Army Corps definition requires at least one indicator of each of the three wetland parameters to make a positive wetland determination.

Wetlands are defined as Environmental Sensitive Habitat Areas (ESHA) by the Del Norte County LCP (Del Norte County 1983) and the California Coastal Act.

2. PROJECT AREA DESCRIPTION

Location

The 41-acre parcel is located on along Highway 101 just south of the Crescent City Harbor in Crescent City, California (Figure 1).

Soil, Topography, and Hydrology

Three soil types are mapped on the parcel (USDA, NRCS 2019). The eastern edge of the parcel and the adjacent marsh are mapped as Fluvaquents, which is a hydric soil derived from alluvium from mixed sources. Most of the parcel east of Highway 101 is mapped as Talawa. This soil is composed of Fluviomarine deposits derived from mixed sources. Most of the area west of Highway 101 is mapped as Oxiaquic Udipsamments-Samoa complex which is composed of beach sand and gravel. The parcel is dissected by Highway 101.

The majority of the parcel is relatively flat and ranges in elevation from approximately 15 to 20 feet above sea level. The portion of the parcel that includes Crescent Beach drops gradually in elevation to approximately 6 feet above sea level. The eastern portion of the parcel includes the western edge of the Crescent City Marsh.

3. METHODS

Wetlands in the project area were delineated on April 10, 2019 using routine methods described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Western Mountains, Valleys, and Coast Region (Version 2.0)* (ACOE 2010) and the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Seven sample plots that were representative of the variation in vegetation and topography on the parcel were evaluated for hydrophytic vegetation, hydric soil, and wetland hydrology (Appendix A).

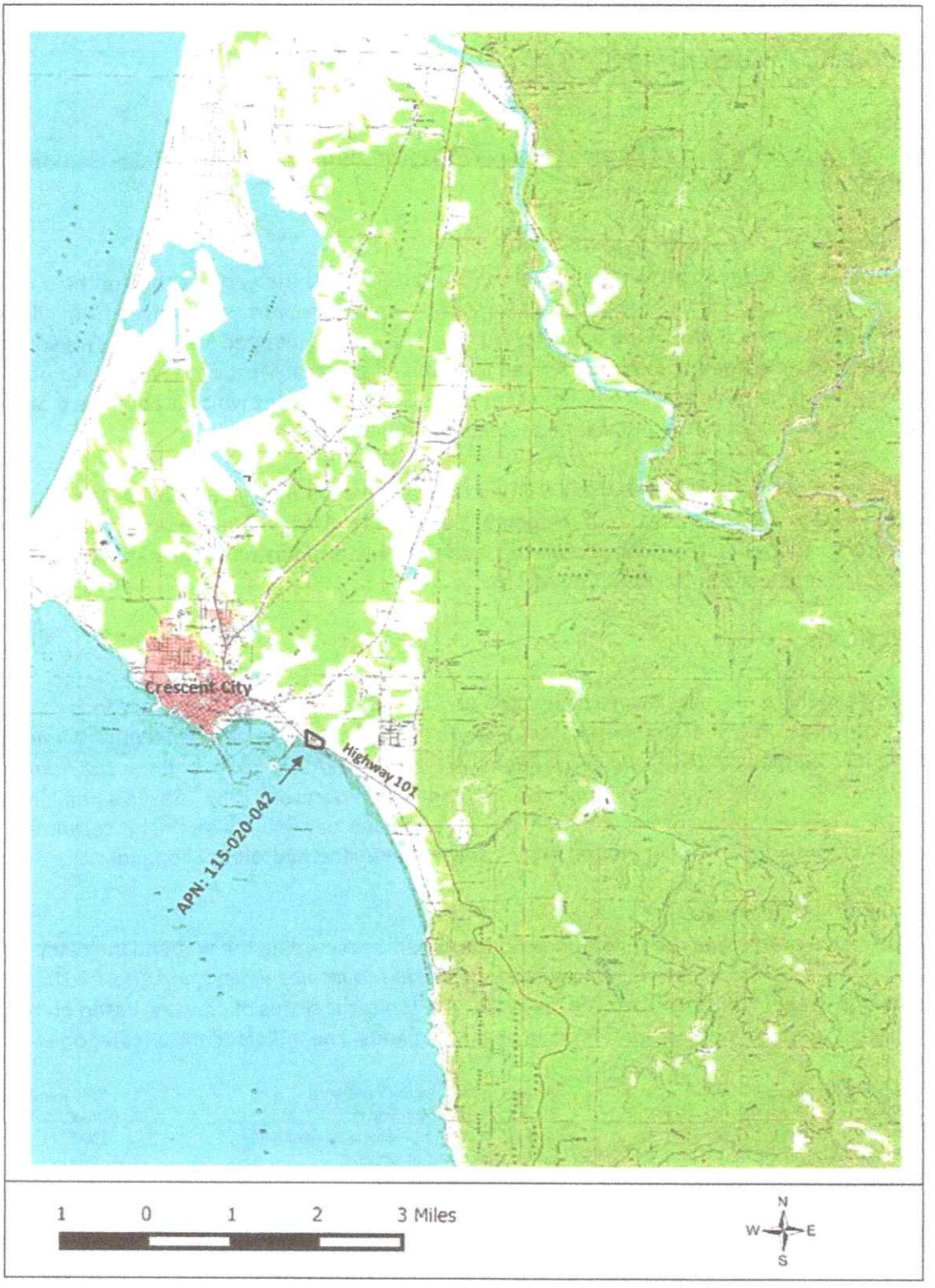
Hydrophytic Vegetation

The presence of hydrophytic vegetation in determined by recording the wetland indicator status of each plant species present using the *Western Mountains Valleys and Coast 2016 Regional Wetland Plant List* (Army Corps 2016). The indicator status of plants is based on the estimated probability of the species occurring in wetlands. The indicator status categories are:

Obligate Wetland Plants (OBL)	Almost always occur in wetlands	>99% frequency
Facultative Wetland Plants (FACW)	Usually occur in wetlands	67%-99%
Facultative Plants (FAC)	Equally occur wetlands and non-wetlands	33%-67%
Facultative Upland Plants (FACU)	Sometimes occur in wetlands	1%-33%
Obligate Upland Plants (UPL)	Rarely occur in wetlands	<1%

If more than 50% of the dominant plants across all vegetation strata (i.e. trees, shrubs, herbs) are OBL, FACW, or FAC, the vegetation is hydrophytic. Dominance of plants within the plots is

Figure 1. Project Location Map.



plant in each vegetation stratum. Dominant plants include the plants with the highest cover that collectively, or individually account for 50% of the total vegetation cover. Additional plants are considered dominant if their cover is at least 20% of the total cover.

Hydric Soil
Indicators of hydric soil include, but are not limited to, a strong hydrogen sulfide (rotten egg) odor, redox concentrations, depleted matrix, and high organic matter content. Soil colors were determined by using a Munsell soil color chart (Gretag Macbeth 2000).

Wetland Hydrology
Indicators of wetland hydrology include, but are not limited to, surface water, high water table, soil saturation, sediment deposits, soil cracks, and oxidized root channels along living roots.

4. RESULTS AND DISCUSSION

Approximately 10.3 acres of wetland were identified on the parcel (Figure 2). This includes 2.4 acres of wetland that meets the CCC wetland definition; these areas have hydrophytic vegetation but lack indicators of hydric soil or wetland hydrology. An additional 7.9 acres is predominantly three parameter wetland. However, this area includes dikes and some slightly higher elevation areas within that may meet one or two of the wetland parameters. The wetlands are considered ESHA by the CCC and Del Norte County LCP. Additional areas identified as ESHA include the stabilized coastal dunes and Crescent Beach west of Highway 101. The parcel includes approximately 1.4 acres of ruderal area that includes an area used to store and cut redwood burl, several old buildings, and a residence.

Vegetation
The areas mapped as 1-3 parameter wetland often include a canopy of Arroyo willow (*Salix lasiolepis* [FACW]). There are also stands of Sitka spruce (*Picea sitchensis* [FACW]). Common understory plants include slough sedge (*Carex obnupta* [OBL]), Pacific water parsley (*Oenanthe sarmentosa* [OBL]), lady fern (*Athyrium filix-femina* [FAC]), and California blackberry (*Rubus ursinus* [FACU]). The one parameter wetlands are often dominated by salt rush (*Juncus lecurii* [FACW]), velvet grass (*Holcus lanatus* [FAC]), and scouring rush (*Equisetum hymale* [FACW]).

The upland areas are dominated by non-native grasses and forbs including tall fescue (*Festuca arundinacea* [FAC]), burclover (*Medicago polymorpha* [FACU]), geranium (*Geranium dissectum* [UPL]), wild radish (*Raphanus sativus* [UPL]), and English plantain (*Plantago lanceolata* [FACU]).

Soil
The soil observed in the three-parameter wetland was 10yr 2/2 with 7.5yr 5/6 redox concentrations, which meets hydric soil indicator F6 (Redox Dark Surface). Because the presence of standing water it was only feasible to collect samples near the margins of the wetland.

Figure 2. Wetland Map.

Soil in the one parameter wetlands and upland was generally 10yr 2/2 without redox concentrations. Likely fill material was observed in several of the upland and wetland sample plots. The soil texture and color were often different and there was often angular rock.

5. REFERENCES

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U.S. Army Corps of Engineers (Army Corps). 2016. *Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List*. Lichvar, R.W., D.L. Banks, and N.C. Melvin. The National Wetland Plant List: 2016 Update of Wetland Ratings. Phytoneuron 2016-30: 1-17.

U.S. Army Corps of Engineers (Army Corps). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual. Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/El TR-10-3. Vicksburg, MS. Army Corps of Engineer Research and Development Center.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS). 2019. *Web Soil Survey*

Appendix A.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hambro State: CA Sampling Point: 1

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A Lat: 4022286.7 Long: 4622201.0 Datum: NAD 83

Soil Map Unit Name: Talawa NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X (1) No ____
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (1) Meets CCC wetland definition

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 10'-radius)			
1. Juncus lescurii	20	Y	FACW
2. Holcus lanatus	60	Y	FAC
3. Equisetum hymale	10	N	FACW
4. Rubus ursinus	10	N	FACW
5. Festuca arundinacea	5	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10yr 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hambro State: CA Sampling Point: 2

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR): A Lat: 402291.2 Long: 4622235.5 Datum: NAD83

Soil Map Unit Name: Talawa NWI classification: PSSIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Salix lasiolepis	20	Y	FACW
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10'-radius)			
1. Carex obnupta	70	Y	OBL
2. Oenanthe sarmentosa	70	Y	OBL
3. Athyrium filix-femina	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10yr2/2	70	7.5yr5/6	30	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4 11

Water Table Present? Yes ___ No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19
Applicant/Owner: Hambro State: CA Sampling Point: 3
Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): A Lat: 402327.0 Long: 4622199.4 Datum: NAD83
Soil Map Unit Name: Talawa NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. mowed grass, looks like	50	Y	FAC-FACU
2. Festuca arundinacea (FAC)			
3. Vulpia myuros (FACU) +			
4. Anthoxanthum odoratum			
5. (FACU)			
6.			
7. Medicago polymorpha	20	Y	FACU
8. Raphanus sativus	10	N	UPL
9. Achillea millefolium	10	N	FACU
10. Poa annua	10	N	FAC
11. Fragaria chiloensis	5	N	FACU
	105 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0-1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: <25% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: Mowed area, difficult to ID grasses

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10yr 4/3	50						
	10yr 2/2	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: looks like fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hambro State: CA Sampling Point: 4

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): A Lat: 402386.3 Long: 4622250.3 Datum: NAD83

Soil Map Unit Name: Fluvaquents NWI classification: PSSIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Sample is at base of dike soil is hard grazelly fill

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 10'-radius)			
1. Salix lasiolepis	80	Y	FACW
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 10'-radius)			
1. Oenathe sarmentosa	20	Y	OBL
2. Rumex crispus	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
~~0-6~~								
0-6	10YR/2/2	100						Fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: gravel & rocks

Depth (inches): 6"

Hydric Soil Present? Yes ? No ___

Remarks:

likely hydric soil under fill, area is mapped as hydric soil type

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 3"

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hambro State: CA Sampling Point: 5

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A Lat: 402382.3 Long: 4622220.3 Datum: NAD 83

Soil Map Unit Name: Talawa NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 10' - radius)			
1. Festuca arund. naeva	20	Y	FAC
2. Geranium dissectum	20	Y	UPL
3. Plantago lanceolata	10	N	FACW
4. Cerastum glomeratum	5	N	FACW
5. Raphanus sativus	5	N	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10yr 2/2	100					Scl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hamboro State: CA Sampling Point: 6

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A E: 402497.2 N: 4622150.9 Datum: NAD 83

Soil Map Unit Name: Talawa NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Meets at least CCC wetland definition

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 10'-rad)			
1. Salix lasiolepis	20	Y	FACW
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10'-rad)			
1. Carex obnupta	20	Y	OBL
2. Equisetum hymale	20	Y	FACW
3. Festuca arundinacea	10	N	FAC
4. ~~Holcus~~			
5. Medicago polymorpha	5	N	FACW
6. Hypochaeris radicata	5	N	FACW
7. Plantago lanceolata	5	N	FACW
8. Daucus carota	5	N	FACW
9.			
10.			
11.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10yr 3/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ? No ___

Remarks:

Sample on hard gravelly fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2"

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area likely ponded due to compacted fill material restricting drainge

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 115-020-042 City/County: Del Norte Sampling Date: 4-10-19

Applicant/Owner: Hambro State: CA Sampling Point: 7

Investigator(s): K. Wear Section, Township, Range: 27, T16N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): A Lat: 402504.4 Long: 4622188.3 Datum: NAD 83

Soil Map Unit Name: Fluvaquents NWI classification: PSSIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes ? No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 20'-radius)			
1. Salix lasiolepis	40	Y	FACW
2.			
3.			
4.			
5.			
	40 = Total Cover		
Herb Stratum (Plot size: 20' radius)			
1. Carex obnupta	50	Y	OBL
2. Athyrium filix-femina	5	N	FAC
3. Vicia gigantea	5	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Nuphar polysepala (OBL) in wetland, just outside plot

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ? No _____

Remarks: Standing water too deep to get sample, assumed hydric

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 12 feet

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Supplement to Biological Assessment
Galea Biological Consulting, October 28, 2020

Mitigations for Proposed Hambro Family Fun Center, Crescent City. October 28, 2020

The Applicant (Hambro Forest Products, Inc.) proposes to develop a family fun center, including a miniature golf center plus a go-kart track. The location of this proposed development is on a commercial property (previously impacted by a fuel storage facility) located between Highway 101 and the Crescent City Marsh. The 13.5 acre property, located on both sides of Highway 101, contains wetlands along the north and east sides, and a spruce forest on the west side which includes wetlands along its north edge.

The Crescent City Marsh (the Marsh) is 470 acres of wetlands and wet spruce forest owned and managed by the California Department of Fish and Wildlife (CDF&W). This includes a 2018 purchase of 133 acres of wetlands located immediately north of this project parcel. The State of California purchased the original Marsh and the new acquisition as mitigations to offset the impacts of future development in Crescent City, and to protect the wetlands, forest and listed species, especially the western lily, which is found within the Marsh, but not on the project site.

Currently, 80 percent of coastal Del Norte County is in public ownership, and 78 percent of the entire county is in public ownership, leaving only a small percentage of the county available for development and to provide an economic base.

CDF&W, Del Norte County and other agencies have concerns with potential impacts from the proposed development to the Marsh and the wildlife which occupies it. Regulatory agencies with the State of California suggest a 100-foot, non-development buffer between any wetlands and development. For this project, a 100-foot buffer to wetlands is not feasible, as a buffer of such magnitude would reduce the amount of developable property to the point of making the project totally infeasible. The Del Norte County Land Use Plan allows for reduced buffers to ESHA within the Coastal Zone with proper justification. Analysis and justification for the proposed reduced buffer is described in the Project's Amended Biological Assessment dated July 2020 (section 6.3, pg. 18).

Regulatory agencies are concerned with the potential impacts of noise and lighting impacts from the proposed project on wildlife within the Marsh, as the Applicant is proposing a reduced buffer to wetland habitats from development. There are two areas of concern regarding noise and lighting; these are the 0.2 acres of wetlands directly adjacent to the project (comprised of a strip of willows and a drainage channel which only contains standing water during high rainfall events) and the Marsh area to the north of the project site. An artificial 6-foot berm, remaining from when the property was first developed as a fuel storage facility, separates the project site and the drainage channel from the primary Marsh area located north of the berm. The drainage channel and the willows growing on the berm are considered wetlands as well.

Concerns include noise and light disturbance which might impact nesting, foraging and other behaviors of wildlife within the Marsh.

Galea Biological Consulting (GBC) conducted several sound tests to determine the effects of various mitigations. A digital sound meter (VLIKE brand, range 30dB-130dB) was used to record decibel readings, either to determine ambient background sound levels, or those produced by a "Foxpro Inferno"-brand digital game caller with pre-recorded spotted owl calls.

The Applicant is reiterating a number of mitigations to this project, and suggesting numerous additional mitigations to decrease negative impacts to wildlife and natural resources.

1. The Crescent City Marsh is 472 acres of non-impacted wetlands located immediately adjacent to the project. These lands were purchased by the State of California as protections for natural resources, and as mitigation for further development in the area. Yet, in spite of these purchases of large tracts of wetland, State agencies are further requesting that 100 feet of buffer (approximately 0.4 acres) be further condemned from development for additional resource protection.

2. Regulatory agencies are primarily concerned with the potential impacts of noise and lighting impacts from the proposed project as the Applicant is requesting a reduced buffer. The 6-foot berm is positioned between the project and the Marsh, which would greatly decrease the impacts of noise and light, especially as the berm is covered with willows. Based on sound level testing, GBC determined that the berm reduced noise levels (using traffic noise on Highway 101) by 10 decibels. The berm and associated willows would also obviously reduce light pollution by mere physical presence.

3. The Applicant proposes as another mitigation to separate the project from natural resources by means of using slatted, chain-link fencing. GBC conducted a sound test, using slatted fencing found around the transfer station on Elk Valley Road. A 10 dB reduction in sound levels was noted when placing the game caller behind the slatted fence, versus not using the slatted fence. A ten-decibel reduction in sound level using a slatted fence would be a significant reduction, as decibel levels are measured logarithmically. It should also be noted that the fence, located on both the north and south sides of the project, would also greatly reduce the amount of ambient traffic noise from Highway 101.

   In addition, having the proposed development site fenced would greatly reduce the amount of homeless people's trash and destruction within the Marsh area, which currently is an ongoing occurrence. While not stopping homeless use of the entire Marsh area, this project would significantly decrease homeless use of the area at and around the project site, which should also be accounted for as a mitigation for this project.

4. The Applicant is further proposing as mitigation to impacts to allow willows to encroach a distance of 25 feet into the project site from the current willow line at the drainage channel.

An additional 5-feet of buffer between the willows and the project fence would be mowed to prevent vegetative damage to the fence, however the total buffer would then be 30 feet from the project to wetlands, with 25 of the 30 feet comprised of new, dense willow habitat.

The addition of 25 feet of willow habitat would greatly decrease the levels of sound and light disturbance toward resources. GBC conducted a sound test using pre-recorded spotted owl calls with and without 25 feet of willows as a barrier, and found a 5 decibel decrease in sound levels when 25 feet of willows was blocking the source.

5. Development of the family fun center will entail the closure of the chain saw carving shop located on the premises. Currently, chain saws are run on the premises at a level of 80-90 dB at 50 feet, therefore natural resources located along the border with the Marsh are currently exposed to sound levels higher than that anticipated from the go-kart track, after mitigations as proposed.

6. The Applicant is willing to change the preferred layout of the park so that the go-kart track is located on the west side of the property, where it has berm surroundings on both the north and west side. While this is more costly to engineer, this location for the go-kart track will reduce sound more than the original location, as the berm surrounds the track on two sides.

7. The CDF&W has suggested methods for reduced impacts from lighting, as has recommendations within the biological assessment prepared for this project. The Applicant is willing to utilize lighting which best reduces impacts on natural resources located north and west of the project.

8. As an additional mitigation, the Applicant is willing to control the level of invasive English ivy on this property by using hand crews to girdle the ivy where it is found climbing trees, thereby preventing the ivy from seeding and spreading by birds eating and dispersing it's berry's.

To summarize, eight mitigations to offset potential noise and light impacts to natural resources have been proposed by the Applicant. Using the slatted fence, the existing berm and by further allowing 25 feet of willow encroachment, a reduction in sound level disturbance of approximately 25 decibels is anticipated between the project and the Marsh if a 30-foot buffer were allowed.

As modern go-karts with "silent mufflers" create approximately 75 dB at 21 feet, then the addition of a slatted fence and 25 feet of encroachment willows, should reduce the dB level to approximately 60dB at the drainage channel location. Currently, decibel levels from the highway at the drainage channel were recorded by GBC at 50-55 dB. As a comparison, OSHA cites dB levels of 60 as a conversation, or a dishwasher, and levels of 70 dB as a vacuum cleaner. Therefore,

0.2 acres of habitat (between the drainage channel and the top of the berm) would be subjected to 60 dB from the proposed park, versus 55 dB currently occurring from the highway, and up to 90 dB intermittently occurring from the chain saw carving enterprise.

The berm, however, further reduces sound levels by an additional 10 dB. Therefore, from the berm northwards, which is the balance of the Marsh, sound levels from go-karts would be reduced to approximately 50 dB, which is less than the sound levels of a normal conversation.

There are eight points of mitigation the Applicant has described and proposed for this project. These mitigations make this project a relatively benign one, allowing a much-needed boost in the economic base for the Applicant as well as for the County of Del Norte, while having almost no impacts on natural resources.

On-Site Sewage Disposal Evaluation
Lee Tromble Engineering, March 2, 2020

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

March 2, 2020

David Slagle
Hambro Forest Products
445 Elk Valley Road
Crescent City, CA 95531

re: On Site Sewage Disposal Evaluation
APN 115-020-42

Dear Mr. Slagle;

This is to report on my on site sewage disposal evaluation of Assessor Parcel 115-020-42, Del Norte County. Specifically, this evaluation is related to development of a portion of this 26 acre parcel for a Family Entertainment Center (FEC). Phase One of the FEC includes an 18-hole handicap accessible miniature golf course. Phase Two will further develop the site with a 650 foot go-cart track. The third phase of the FEC, if constructed, would further develop the site with a 7000 square foot attraction building. This evaluation is for on-site disposal of waste water generated from Phase One, and, depending on actual (recorded) waste water flows, from Phase Two as well. Phase 3 of the development will require connection to the Crescent City sewer collection system. It is further my understanding that the water supply will be from a private well.

As a basis for estimating waste water discharge from Phases One & Two, I used information from the "Feasibility Snapshot Study Phase One & Phase Two Proposed Family Entertainment Center Crescent City, California" dated October 21, 2019 prepared by Entertainment Concepts, Inc. The waste water discharge estimates are based on 2 gallons per day per visitor and 15 gallons per day per staff person. Based on this and the above referenced study, this report assumes a proposed on-site waste water discharge of 200 gallons per day for Phase One, and 460 gallons per day for Phase One plus Phase Two. My waste water discharge estimates are attached.

The evaluation consisted of a site inspection, the examination of two (2) backhoe excavated exploratory pits, the visual categorization of the site soils, and the review of data and reports for nearby properties which I have previously evaluated. Attached for your information is an evaluation summary, location map, the exploratory logs and the aforementioned waste water discharge estimates.

The textural qualities of the upper horizon soil (topsoil) indicate soil percolation qualities suitable for on site disposal of septic tank quality effluent. A visual inspection of the textural qualities of the soils immediately below the topsoil indicates that these soils are also likely suitable for disposal of septic tank quality effluent. However, my evaluation revealed a high seasonal ground water condition at the site which precludes the use of conventional leach trenches for on-site sewage disposal on this property.

Groundwater was encountered at a depth 2.5 feet below the ground surface. These were "wet weather" groundwater observations and are indicative of "highest anticipated groundwater" levels. Soil on the site has in excess of 15% silt and clay which requires a 5 foot separation between the bottom of the leaching trenches and the "highest anticipated ground water". With groundwater at 2.5 feet below the ground surface, this requirement cannot be met. As a result, it is my opinion that the parcel is not suitable for use of conventional leach trenches. However, based on my evaluation, the property does meet the criteria necessary for use of a "Wisconsin Mound" on-site sewage disposal system.

A Wisconsin Mound is essentially a raised leaching bed constructed on the prepared ground surface. A pumping system is required to convey the septic tank effluent to the "mound". The plans and specifications for the mound system are not included as a part of this evaluation. Certain site specific drainage improvements may also be necessary and should be included as a part of the mound plans. The primary "mound" must be located in the area of Hole #1 or Hole #2 as shown on the location map.

A 30 foot x 60 foot area is sufficient in size to accommodate a "mound" system receiving waste water discharge of 450 gallons per day (which is typical design criteria for a (3) bedroom residence). It is important that the actual guest visits and corresponding waste water discharge be tabulated and records maintained as a basis for the use and/or modification of the system for Phase One plus Phase Two.

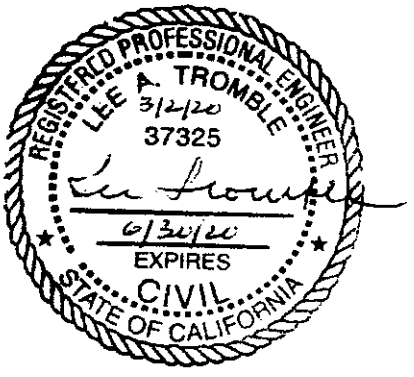
Based on my field work and analysis, it is my opinion that the subject property is not suitable for a conventional on site sewage disposal system (septic tank/leach field system) but is suitable for a Wisconsin Mound on site sewage disposal system within specified limitations and subject to system specifications.

As stated above, it is my opinion that the subject property is suitable for a Wisconsin Mound on site sewage disposal system within some specified limitations and subject to certain system specifications. If a change in conditions occurs such as a change in the size of the project, change in the location of the disposal field, change in the disposal system specifications, a substantial physical change to the property or other similar change, it will be necessary to review this report and the data herein in the context of those changes. This could require additional field and laboratory work to confirm site suitability.

If you need any additional information on this matter, or if I can be of further assistance, please feel free to call.

Very truly yours,

Lee Tromble



LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

SITE EVALUATION SUMMARY

OWNER: HAMBRO FOREST PRODUCTS DATE: 2/27/20

ADDRESS: 445 ELK VALLEY ROAD

CRESCENT CITY CA APN 115-020.42

LOCATION: EAST SIDE HWY 101, ACROSS FROM SOUTH BEACH

LOT SIZE: ± 26 AC WATER SYSTEM: PRIVATE WELL

GROUND SLOPE: NEAR LEVEL

SETBACKS	SEPTIC TANK	LEACH FIELD
Well	100'	100'
Stream	100'	100'
Drainage Channel	50'	50'
Ocean, Lake, etc.	100'	100'
Bluff or Cutbank	25'	25'

EXCAVATION PRIMARY AREA: HOLE #1

EXCAVATION REPLACEMENT AREA: HOLE #2

OTHER EXCAVATIONS: NONE

DEPTH TO HARDPAN, BEDROCK, ETC.: NONE TO 3'-4'

DEPTH TO GROUNDWATER: 2.5' → 2.7'

DEPTH TO MOTTLING: WET SEASON OBSERVATION

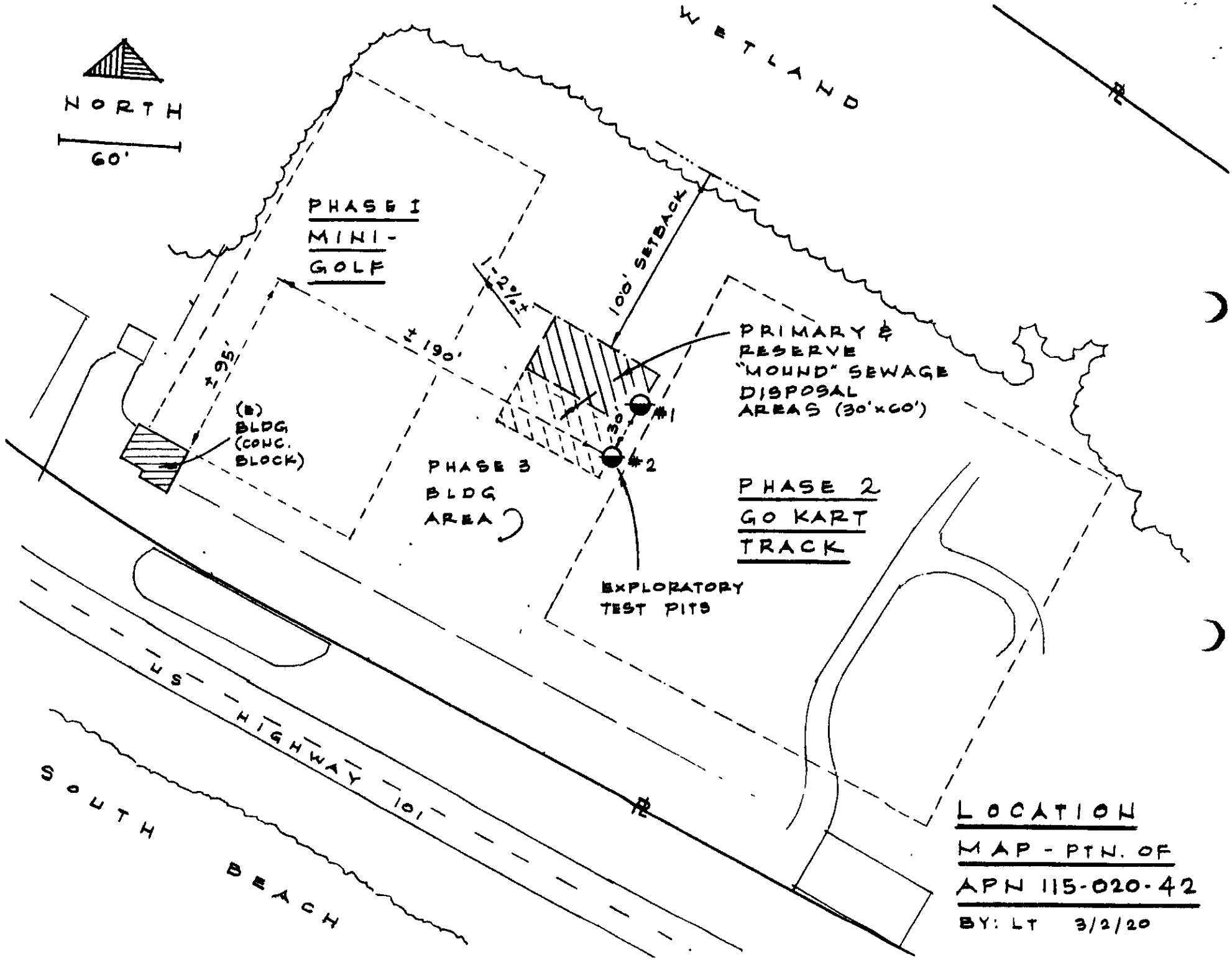
OTHER FACTORS: HIGH GROUNDWATER PRECLUDES USE OF CONVENTIONAL LEACH TRENCHES, SITE IS SUITABLE FOR WISCONSIN MOUND SYSTEM

SOILS ANALYSIS ZONE: PERCOLATION RATE:

DEPTH OF SOIL UNDER LEACH FIELD REQUIRED: 3' ACTUAL: 3' W/ "MOUND"

REPLACEMENT AREA AVAILABLE: YES - "MOUND"

ADEQUATE: YES - "MOUND"


NORTH
60'
WETLAND
PHASE I
MINI-
GOLF
±95'
±190'
±2%±
10'0' SETBACK
PRIMARY &
RESERVE
"MOUND" SEWAGE
DISPOSAL
AREAS (30'x60')
#1
#2
30'
(E)
BLDG
(CONC.
BLOCK)
PHASE 3
BLDG
AREA
PHASE 2
GO KART
TRACK
EXPLORATORY
TEST PITS
US HIGHWAY 101
SOUTH
BEACH
LOCATION
MAP - PTN. OF
APN 115-020-42
BY: LT 3/2/20

WASTEWATER FLOW ESTIMATE — BY: CT
FAMILY ENTERTAINMENT CENTER — 2/27/20
APN 115-020-42

PROJECTED ANNUAL ATTENDANCE FROM "FEASIBILITY SNAP SHOT STUDY FOR PHASE I & PHASE II ... OCT 21, 2019 BY ENTERTAINMENT CONCEPTS, INC

PHASE I - MINI GOLF

PROJECTED ANNUAL GUESTS = 15,600 (16,900 YR 4)

AVE MONTHLY GUESTS = 1300

MAX MONTHLY GUESTS = $\frac{9300}{12} + \frac{3500}{3} = 1942$

$P.F = \frac{1942}{1300} = 1.5$

PHASE II - MINI GOLF + GO-KART TRACK

PROJECTED ANNUAL GUESTS = 40,300 (YR 1) (43,600 - YR 4)

AVE MONTHLY GUESTS = 3358

MAX MONTHLY GUESTS = $\frac{22300}{12} + \frac{10,000}{3} = 5192$

$P.F. = \frac{5192}{3358} = 1.55$

ASSUME 2 GPD/VISITOR

PHASE I w/ STAFF OF (4)

$Q_1 \cong \frac{1942}{30}\left(\frac{16900}{15,600}\right)2 + 4(15) = 200$ GPD

PHASE I + II w/ STAFF OF (6)

$Q_{1+2} = \frac{5192}{30}\left(\frac{43,600}{40,300}\right)2 + 6(15) = 464$ GPD

- TYPICAL MOUND DISPOSAL SYSTEM DESIGN FLOW = 450 GPD FOR A SINGLE FAMILY RESIDENCE
- ACTUAL WASTEWATER DISCHARGE LIKELY CLOSER TO 150 → 250 GPD FOR A SINGLE FAMILY RESIDENCE

CONCLUSION / RECOMMENDATION

- CONSTRUCT STD SIZE (30' x 60' BASE AREA) WISCONSIN MOUND TO SERVE PHASE I ONLY.
- RECORD DAILY WASTEWATER FLOW TO MOUND SYSTEM (PUMP SYSTEM DATA COLLECTION) & ANALYZE RESULTS FOR ON-SITE SYSTEM REQUIREMENTS FOR PHASE I + II.

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

EXPLORATION LOG

OWNER HAMBRO FOREST PRODUCTS
ADDRESS 445 ELK VALLEY ROAD
CRESCENT CITY, CA
JOB NO. 20015
REMARKS BACKHOE EXCAVATION

APN 115-020-42
DATE 2/7/20
LOG BY LT
HOLE NO. 1

DEPTH (FT.)	DESCRIPTION / REMARKS	COLOR	MOIST.	SAMPLE
0				
1	SANDY LOAM / LOAM SOFT, FRIABLE, GRANULAR	MED DK. BRN	DAMP	No
2	2.3'			
3	GRAVEL (1"-), FINES GRANULAR, FIRM, WEAK	MED GRAY	MOIST/ SAT	No
4	GROUNDWATER @ 2.7'			
5	BOTTOM OF EXCAVATION			
6				

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

EXPLORATION LOG

OWNER HAMBRO FOREST PRODUCTS
ADDRESS 445 ELK VALLEY ROAD
CRESCENT CITY, CA
JOB NO. 20015
REMARKS BACKHOE EXCAVATION

APN 115-020-42
DATE 2/7/20
LOG BY LT
HOLE NO. 2

DEPTH (FT.)	DESCRIPTION / REMARKS	COLOR	MOIST.	SAMPLE
0				
1	SANDY LOAM / LOAM SOFT, FRIABLE, GRANULAR	MED DK. BRN	DAMP	No
2				
3	GRAVEL (1"-), FINES GRANULAR, FIRM, WEAK	MED GRAY	MOIST/ SAT	No
4	GROUNDWATER @ 2.5'			
5	BOTTOM OF EXCAVATION			
6				

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

September 1, 2020

David Slagle
Hambro Forest Products
445 Elk Valley Road
Crescent City, CA 95531

re: On Site Sewage Disposal APN 115-020-42

Dear Mr. Slagle;

This is to provide you with clarification of conclusions set forth in my March 2, 2020 on-site sewage disposal evaluation of APN 115-020-42 for Phases One and Two of your proposed Family Entertainment Center (FEC).

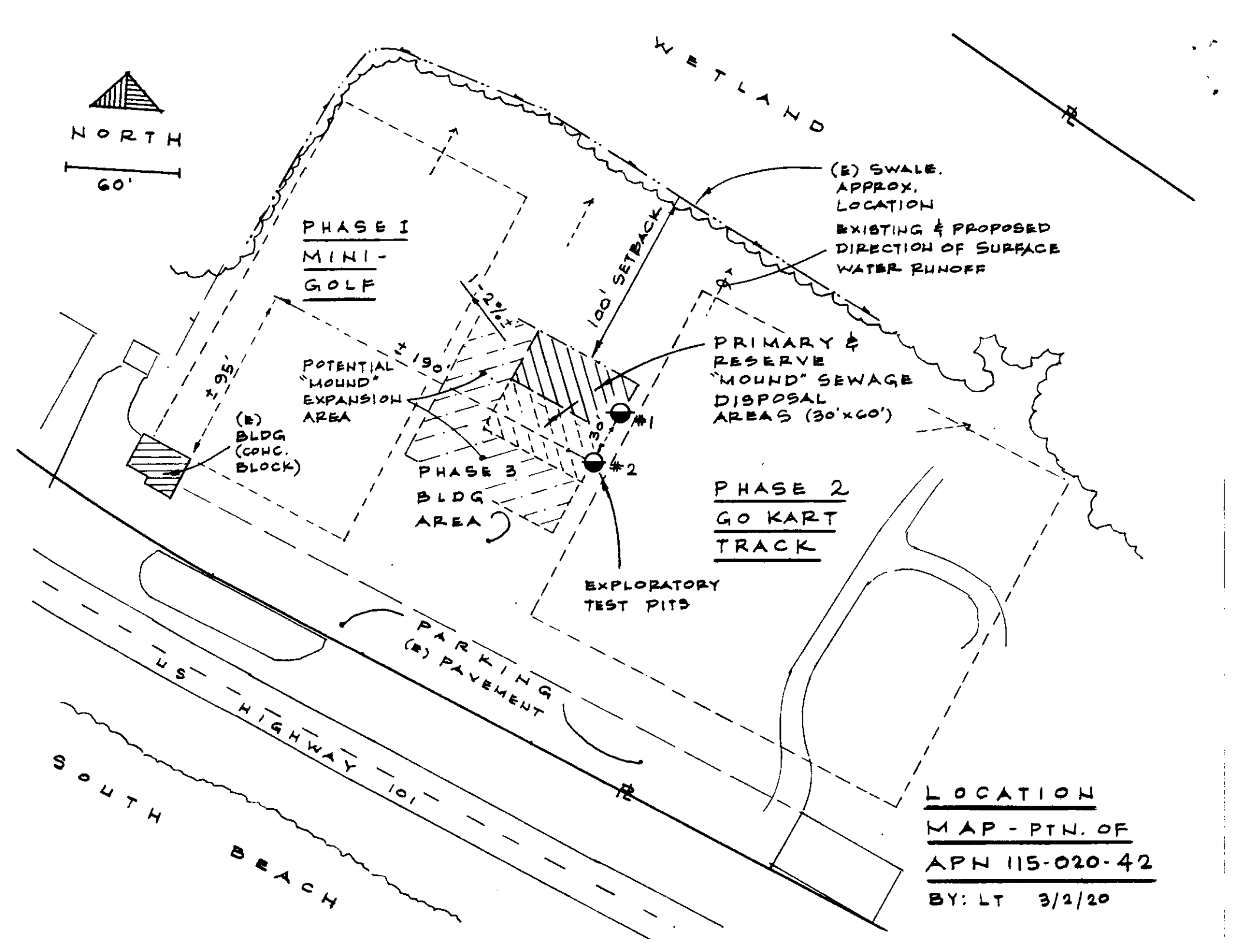
As outlined in the evaluation, I concluded that the delineated 30 ft x 60 ft "mound" primary area was sufficient for on-site disposal of wastewater generated by Phase One of the proposed project. Furthjermore, based on data provided to me regarding estimated visitation, I concluded that is also likely sufficiently sized for Phase One plus Phase Two of the FEC project. Whether or not the 30 ft x 60 ft mound can serve the Phase One plus Phase Two depends on actual visitation and corresponding wastewater discharge volumes. Wastewater discharge volumes can be easily tabulated by reviewing data collected from the effluent pumping system control panel in conjunction with visitation records.

In the event that the data indicates higher wastewater volumes than anticipated, then the Phase One mound can be enlarged in a westerly direction into the Phase Three building area (see attached map). If Phase Three is constructed, the entire project will be served by connection to the Crescent City sewer system, thereby allowing for demolition of the mound for utilization as Phase Three building area.

If you have any questions, or need any additional information on this matter, please feel free to call.

Very truly yours,

Lee Tromble


NORTH
60'
WETLAND
(E) SWALE. APPROX. LOCATION
EXISTING & PROPOSED DIRECTION OF SURFACE WATER RUNOFF
PHASE 1 MINI-GOLF
100' SETBACK
2%±
95'±
POTENTIAL "MOUND" EXPANSION AREA
90'±
PRIMARY & RESERVE "MOUND" SEWAGE DISPOSAL AREAS (30'x60')
(E) BLDG (CONC. BLOCK)
PHASE 3 BLDG AREA
#1
#2
30'
PHASE 2 GO KART TRACK
EXPLORATORY TEST PITS
PARKING (E) PAVEMENT
US HIGHWAY 101
SOUTH BEACH
LOCATION MAP - PTN. OF APN 115-020-42
BY: LT 3/2/20

Storm Drainage Technical Memorandum
Stover Engineering, November 25, 2020

STOVER ENGINEERING

Civil Engineers and Consultants

PO Box 783 - 711 H Street
Crescent City CA 95531
Tel: 707.465.6742
Fax: 707.465.5922

TECHNICAL MEMORANDUM Job Number: 4719

To: David Slagle, Hambro Group

From: Grant Goddard, EIT

Reviewed By: Ward Stover, PE WLS

Date: 25 November 2020

Subject: Hambro Family Fun Project – Storm Drainage APN 115-020-042-000

This memorandum supersedes the previous memorandum dated 3 November 2020.

Storm Drainage Narrative:

The proposed Hambro Family Entertainment Project rehabilitates the former site of fuel storage tanks owned by Hambro. The current state of the property is an open field and commercial retail near US Highway 101. This tech memo supplements a grading and drainage report prepared by Lee Tromble dated 25 March 2020.

We understand the Family Entertainment Project is comprised of two phases. Phase one consists of a miniature golf course along with a ticket office, restrooms, batting cages, axe throwing facilities, and parking area. Phase two consists of a go-kart track and expanded parking area. This memo assumes the development of both phases.

The site is adjacent to a wetland area to the northwest and northeast. The site slopes downward toward the northwest and northeast at approximately 0.3%. The site is also bordered by US 101 on the southwesterly side and private property to the northwest and southeast. Public parking for Crescent Beach exists on the westerly side of the highway opposite from the project site.

An existing soil berm with a height of 3 or more feet is situated along the northern edges of the site. There is a shallow grassy swale that flows to the northeast and runs along the northwest face of the property, separated from the soil berm by an existing fence. There is also a well-defined drainage ditch parallel to the northeast face of the property that collects to the northerly corner of the site. Both the swale and ditch are located on the southerly or "inner" side of the soil berm. The westerly edge of the existing ditch is the effective boundary of the wetland area in its present state.

Permanent treatment of stormwater runoff will be achieved via settling and infiltration on-site in a retention basin. The retention basin is designed to allow for storage and treatment of the "first flush" 85th percentile, 24-hour storm event. The storm event was calculated to generate 6,411.2 cu ft of runoff in the fully developed site. The proposed retention basin is 10 feet wide, 2 feet deep, and 540 feet long, with 2:1 sloped banks. The proposed basin has a total storage volume of 6,480.0 cu ft. Calculations for the storm event and retention basin size are attached with this memo.

The preferred alternative is to enlarge the existing shallow swale and ditch located on the southerly side of the existing soil berm to serve as the retention basin as indicated on Exhibit 1. The retention basin would become an enhancement of the existing wetland.

The secondary alternative is to construct a new retention basin in the form of a ditch adhering to the design dimensions, running approximately parallel to the northwest and northeast faces of the property, and located within the proposed 25-foot wetland setbacks as shown on Exhibit 1.

Additional Items for Construction and Post-Construction Stormwater Management:

The site developer will implement good site management by keeping construction materials, stockpiles and wastes properly covered or stored.

Non-Storm water discharges will be minimized by the site developer by limiting vehicle washing or maintenance and minimizing flushing activities.

The site developer will minimize erosion by covering or stabilizing disturbed soils in a timely manner.

The site developer will implement sediment control measures at the perimeter of disturbed areas and at drainage inlets.

Run-on to the site will be directed away from disturbed areas.

The site developer will regularly inspect erosion and sediment controls and repair them when deficiencies are noted. All controls will be inspected weekly and before, during and after rain events.

Throughout construction, the contractor or contractors shall sweep adjacent paved areas sufficient to keep any visible soil material and/or sand from the construction activities from accumulating on the adjacent paved areas.

All trucks hauling graded or excavated material offsite, if any, shall be required to cover their loads as required by the California Vehicle Code Sec. 23114, with special attention to preventing spills onto public streets, roads, or highways.

Construction equipment shall be properly muffled and shrouded to minimize noise levels and maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, or grease.

STOVER ENGINEERING
711 H Street
Crescent City, CA 95531
(707) 465-6742 Fax (707) 465-5922

JOB 1719
SHEET NO. 1 OF 3
CALCULATED BY GBG DATE 10/27/20
CHECKED BY MS DATE 10/ /20
SCALE

HAMBRO FAMILY ENTERTAINMENT PROJECT
STORMWATER QUALITY TREATMENT DESIGN

85TH PERCENTILE RUNOFF SIZING CRITERIA

DETERMINE SIZE OF BMP FACILITIES FOR DETENTION/INFILTRATION POND (VOLUME-BASED BMP)
BASED ON IMPERVIOUS AREA. FLOW CAN BE MODIFIED BY INFILTRATION - USE 24-HR DESIGN GOAL TO BE CONSERVATIVE

$Q = i \cdot A_I \cdot C$ | FROM COASTAL COMMISSION (ATTACHED)

WHERE:
Q = STORMWATER RUNOFF IN 85TH PERCENTILE 24-HR STORM EVENT (FT^3)
i = PRECIPITATION IN 85TH PERCENTILE 24-HR STORM EVENT (IN)
A_I = TOTAL IMPERVIOUS AREA AFTER DEVELOPMENT (FT^2)
C = COMPOSITE AREA RUNOFF COEFFICIENT (SEE BELOW)

DETERMINE COMPOSITE RUNOFF COEFFICIENT "C"

$C = C_I \cdot I + C_P \cdot P$ | FROM COASTAL COMMISSION (ATTACHED)

WHERE
C_I = COEFFICIENT FOR IMPERVIOUS AREA USE 0.95 (ROOF/PAVING)
C_P = COEFFICIENT FOR PERVIOUS AREA USE 0.30 (PARKS)
F_I = FRACTIONAL AREA IMPERVIOUS USE 0.37 FROM SITE PLAN
F_P = FRACTIONAL AREA PERVIOUS USE 0.63 FROM SITE PLAN

$C = (0.95)(0.37) + (0.30)(0.63)$
$= 0.54$ COMPOSITE RUNOFF COEFFICIENT

DETERMINE RUNOFF FOR 85TH PERCENTILE 24-HR EVENT

- CRESCENT CITY LID APPENDIX A

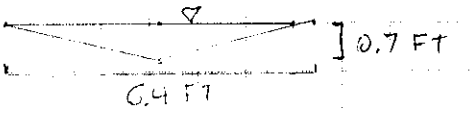
$Q = (1.1\ IN)\left(\frac{1\ FT}{12\ IN}\right)(129519\ SF)(0.54)$
$= 6,411.2$ CF / 24 HR

STOVER ENGINEERING
711 H Street
Crescent City, CA 95531
(707) 465-6742 Fax (707) 465-5922

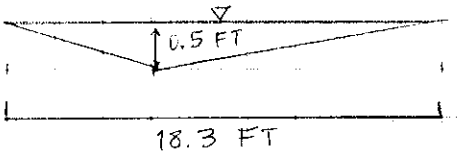
JOB 1471
SHEET NO. 2 OF 3
CALCULATED BY GBG DATE 10/28/20
CHECKED BY WLS DATE 10/ /20
SCALE

CHECK EXISTING STORAGE AND INFILTRATION CAPACITY

- EAST SIDE DITCH
  - AVERAGE WIDTH OF DITCH = 6.4 FT
  - LENGTH OF DITCH = 340 FT
  - AVERAGE DEPTH OF DITCH = 0.7 FT
  - STORAGE VOLUME = 761.6 FT^3
  - INFILTRATION AREA = 2176 FT^2



- NORTH SIDE SWALE
  - AVERAGE WIDTH OF SWALE = 18.3 FT
  - LENGTH OF SWALE = 125 FT
  - AVERAGE DEPTH OF SWALE = 0.5 FT
  - STORAGE VOLUME = 571.2 FT^3
  - INFILTRATION AREA = 2287.5 FT^2



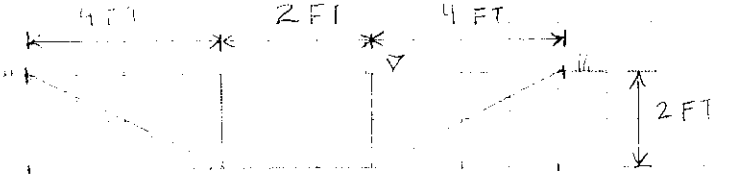
TOTAL STORAGE = 1,332.8 FT^3 NOT SUFFICIENT
A TOTAL = 2176 + 2287.5 = 4463.5 FT^2
TOTAL INFILTRATION CAPACITY OVER 24-HOURS
- SANDY LOAM SOIL PROVIDES 0.6 IN/HR INFILTRATION RATE
0.6 - 0.7 BASIN PLAN

$$Q_{INFILTRATION} = (A_{TOTAL})(R_{INF})\left(\frac{1\,FT}{12\,IN}\right)(24\ HOURS)$$
$$= (4463.5\ FT^2)(0.6\ IN/HR)\left(\frac{1}{12}\right)(24\ HR)$$
$$= 5356.2\ FT^3 \quad \text{NOT SUFFICIENT}$$

DESIGN EXPANDED DETENTION BASIN

ASSUMPTIONS:
- TOTAL LENGTH 510 FT BASED ON SITE PLAN
- DEPTH OF BASIN 2 FT MAX. LIMITED BY GROUNDWATER
- SANDY LOAM SOIL PROVIDES 0.6 IN/HR INFILTRATION RATE
- BASIN MUST STORE AND INFILTRATE THE 85TH PERCENTILE 24-HOUR STORM EVENT WITHIN 36 HOURS

BASIN WIDTH = 10.0 FT



BASIN VOLUME = $\left(\frac{4\ FT}{2}\right)(2\ FT)(510\ FT) + (2\ FT)(2\ FT)(510\ FT)$ = 6180.0 FT^3

BASIN INFILTRATION = $(11.1\ FT)(510\ FT)(0.6\ IN/HR)\left(\frac{1\,FT}{12\,IN}\right)(36\ HR)$ = 9720.0 FT^3

- EXPANDED BASIN [illegible]

APPENDIX A

Surface water runoff shall be determined using the "Rational Method" with runoff coefficients and rainfall intensities as set forth herein. The runoff formula shall be

$Q = CiA$ where Q = flow (cubic feet/second)
C = runoff coefficient (dimensionless)
I = rainfall intensity (inches/hour)

The following shall be used as the runoff coefficient (C) in the design of drainage facilities and structures:

For impervious areas (roofs, pavement, etc)	1.00
For pervious areas	0.40

The rainfall intensity for a "10-year storm" shall be determined from the following formula:

$\log I = 0.83 - 0.46(\log t)$, where t = the time of concentration

The "25-year storm" is 29 percent larger than the "10-year storm" and the "100-year storm" is 61 percent larger than the "10-year storm."

The time of concentration shall be determined by assuming that overland runoff travels at 1 foot/second on pervious surfaces and 2 feet/second on impervious surfaces. The runoff travel rate for flow in streets, storm drains, and other drainage structures shall be as determined by calculation.

For design of water quality related structures the "85th percentile 24-hour storm" shall be 1.1 inches and the "85th percentile one-hour storm" shall be 0.2 inches.

Water Quality Lesson o' the Month

Volume 2, Issue 2 **"Topic 12: The 85th Percentile Standard"** **February 2003**

Deciphering 85th Percentile Numeric Design Criteria

Many CDPs now require structural BMPs to be sized to accommodate the 85th percentile storm—but what exactly does this mean? How can one determine if a proposed BMP meets this criteria?

Brought to you by the Water Quality Unit

In August 2000, the Coastal Commission adopted the 85th percentile numeric sizing criteria for structural BMPs. At about the same time, the Los Angeles Regional Water Quality Control Board established the 85th percentile requirement as their structural BMP numeric sizing criteria, and most Regional Boards have followed suit or are planning to do so in the near future.

"Numeric sizing criteria" describe how much water a structural BMP should be able to treat. In adopting the 85th percentile numeric sizing criteria, the Commission essentially established a goal for pollutant removal efficiency of structural BMPs. Ultimately, the Commission decides whether structural BMPs that meet the 85th percentile design goal are necessary to address the water quality impacts of individual developments. It is free to decide that a different approach for limiting water quality impacts is appropriate in any specific instance."

Since the 85th percentile requirement is fairly technical and abstruse, this Lo'M details exactly what the requirement means and how it can be applied.

Applying the 85th Percentile Numeric Sizing Criteria

In the most basic sense, when reviewing a development, an analyst should look at the size of the BMP—if it's a filter, make sure the model chosen is large enough to treat the 85th percentile storm event. If it's a detention pond or vegetated system, for instance, make sure that its dimensions can hold that amount of water for the time in which it takes hold or treat the 85th% runoff. The 85th percentile design goal only applies to structural BMPs designed to treat stormwater runoff after construction is completed. It does not apply to BMPs implemented to prevent or control runoff during construction. Post construction non-structural BMPs such as safe storage of chemicals or sweeping should always be considered and implemented as appropriate but do not count toward fulfilling the numeric design goal. Analysts should consider encouraging local governments to incorporate the design goal into their LCPs and to apply the goal to new and re-developments on a case-by-case basis.

Not every development needs post-construction structural BMPs. And, not every post-construction structural BMP (or suite of BMPs) needs to be sized according to the design goal. Where site-specific factors appear to make the 85th percentile design goal inappropriate, for example, the site doesn't appear to be large enough to accommodate structural BMPs, consult with Water Quality Unit staff. Analysts should consider applying the design goal to developments that change the amount, rate, or quality of surface runoff after construction. Consult other sources (e.g., BMP fact sheets and the monthly NPS lessons) for additional considerations applicable to agricultural developments.

85th percentile design goal considerations typically are not necessary in single family residence developments and any other small-scale developments limited in land disturbance. 85th percentile is generally not necessary where development meets criteria such as the following: (These conditions are more likely to be true for small developments in a rural setting.)

- No post-construction stormwater runoff discharges directly into any surface water bodies or stormwater conveyance structures;
- The intervening pervious areas between any impervious areas on-site and surface water bodies/stormwater conveyance structures are at least half the size of the impervious areas generating runoff and at least half the width of the widest part of the impervious draining surface; and
- The intervening pervious areas between any impervious areas and surface water bodies or stormwater conveyance structures are of appropriate location, slope and design. (i.e., a grassy area on a steep slope does not offer the same degree of pollutant settling and filtration during a storm due to an increased runoff velocity.)

Inside This Issue

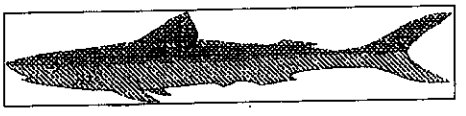
Defining the 85th Percentile Storm in Your Region

A discussion of the connections between rainfall, the 85th percentile storm, and structural BMP designs.

What is the 85th percentile storm event?

Considering the long-term historical records of local storm events in a 24-hour period, **the rainfall of the 85th percentile event is larger than or equal to that of 85% of storms that have occurred in that locale.** Reviewing local precipitation data or relying on estimates by other regulatory agencies can determine the 85th percentile storm. For example, the Los Angeles Regional Water Quality Control Board has determined that 0.75-inch is an adequate estimate of the 85th percentile, 24-hour storm event for typical municipal land uses within its jurisdiction.

Those of you savvy hydrologists or engineers may recognize that 85th percentile method departs from traditional means of describing storms. Typically, one might refer to a two-year or ten-year storm event (i.e. that amount of rainfall has the probability of occurring once every two or ten years, respectively). Applicants claim that they are more accustomed to dealing with design storms in terms of two-year or ten-year storm events (common in flood control approaches) and that storm events vary in duration and cannot be confined to a certain established time period such as 24 hours. Nevertheless, published rainfall data is often based on precipitation over the 24-hour period from midnight to midnight, and the CCC and RBs used this data to develop design standards. In fact in many areas, the 85th percentile, 24-hour storm event is equivalent to the six-month, 24-hour storm event.



Taking this alternative approach is reasonable because it's directly applicable to designing structural BMPs. Instead of treating storms as discrete and independent events with various recurrence frequencies, the 85th percentile design goal defines distinct time frames in order to rank storm events to determine a desired treatment volume. Runoff volume during a particular period of time relates directly to the size of a treatment BMP, and thus the level of pollutant removal.

For instance, one inch of rain can fall within a day or three days. A BMP sized to accommodate the resulting runoff in three days may not treat adequately the same amount of runoff passing through in just one day. Furthermore, the 85th percentile is chosen, rather than 70th or 90th percentile, because treatment of the 85th percentile storm event is relatively equivalent to the point of diminishing returns. In other words, treatment of larger storms (e.g. sizing the BMP to capture the runoff from the 90th % storm) would result in insignificant increases in pollutant removal relative to the additional costs.

Where to find 85th percentile data

The Water Quality Unit has compiled two lists of weather data, available on its Intranet site. The shorter list, titled "Hourly and Daily Rainfall Data in California," has the 85th percentile daily and hourly precipitation data from 238 rain stations across the state. Analysts can locate a rain station of interest by county or latitude and longitude. The second list, entitled "Extensive Daily Precipitation Data", contains data from 782 stations; however, only the 85th percentile, 24-hour precipitation data are available. On both lists the relevant numbers for analysts' use are highlighted.

The project proponents should be responsible for proposing an appropriate precipitation amount for sizing the BMPs. The analysts should then confirm the proposed figure with that from the closest rain station using either of the two lists. When doing so, analysts should take into account any elevation difference between the proposed project site and the rain station. A significant variation can lead to vastly different precipitation figures, as areas at a higher elevation tend to receive more rain.

If applicants do not have the 85th percentile storm event precipitation information for a particular location, they should try to acquire raw daily or hourly rainfall data from the Western Regional Climate Center. The data can then be sorted to arrive at the 85th percentile storm event. Since this can be a time-consuming and costly process, CCC analysts are not encouraged to undertake such a task.

Analysts may encounter opposition to application of this design in certain areas. The most frequent objection expressed concern that it is neither fair nor feasible to implement such a numeric design target statewide, because while Los Angeles may receive annually a measly 11.6" of precipitation, northern California locations such as Eureka and Crescent City average 37.53 and 65.21" per year, respectively. However, such an argument ignores that fact that the overwhelming majority of storm events are relatively small in most areas. The 85th percentile, 24-hour storm events for Los Angeles, Eureka, and Crescent City are, in fact, 0.75, 0.66, and 1.13 inches, respectively! The differences are not as significant as one would expect. Certain areas may be wetter overall mostly because of a higher frequency of rain events, even if the majority of the storms are small.

The formula!

The "85th percentile, 24-hr" design goal is applicable to volume-based BMPs such as detention and infiltration basins, wet ponds, and constructed wetlands. The "85th percentile, 1-hr" design goal (with an appropriate safety factor[1]) is applicable to flow-based BMPs that remove pollutants primarily through filtering and limited settling. These include media filters such as filter inserts in catch basins, oil/water separators, and biofilters such as vegetated filter strips and grassy swales. However, if swales are constructed primarily to contain and then induce infiltration, they should be subject to the "85th percentile, 24-hr" design goal.

Only stormwater runoff generated from man-made impervious areas, but NOT that from the undisturbed or pervious areas, in a development should be considered when calculating runoff volume for treatment pursuant to the design goal. This means applying the following formula or its equivalent:

$$Q = i \cdot A_I \cdot C_I \cdot (\text{Safety factor of 2 } \textit{for flow-through BMPs only})$$

Q: Stormwater runoff generated from the 85th percentile, 24-hr (or 1-hr) storm event. *This is the runoff volume that the BMPs (suites of BMPs) are expected to handle.* [**ft^3/24hours** or **ft^3/hour**]
i: Precipitation from the 85th percentile, 24-hr (or 1-hr) storm event [**inches/24-hrs** or **inches/hour**]
A_I: Total impervious area after development [ft^2]
C_I: Impervious area runoff coefficient (~ 0.9)[2]

EXAMPLE: Volume-based BMPs
Development on a Previously Undeveloped Lot

Total lot size = 4,000 ft^2
A_I = 2,500 ft^2
i = 0.6 in/24 hrs

Q = (0.6 in/24 hrs)(1 ft/12 in)(2,500 ft^2)(0.9) = **112.5 ft^3/24 hrs**

*** The structural BMPs implemented should be capable of handling 112.5 cubic feet of runoff in 24 hours***

EXAMPLE: Flow-based BMPs
Development on a Previously Undeveloped Lot

Total lot size = 4,000 ft^2
A_I = 2,500 ft^2
i = 0.1 in/hr Safety Factor = 2

Q = (0.1 in/hr)(1 ft/12 in)(2,500 ft^2)(0.9)(2) = **37.5 ft^3/hr**

*** The structural BMPs implemented should be capable of handling 37.5 cubic feet of runoff in one hour***

Where one wishes to treat runoff from the entire site, including pervious and impervious areas, the equation would become: $Q=iA_IC$ and $C=C_IF_I+C_pF_p$ [Where A_I=Total area of the development; C= Composite runoff coefficient for the entire development; F_I= Fraction of the development that is impervious; F_p= Fraction of the development that is pervious; C_p: Pervious area's runoff coefficient] In this case, the total runoff volume to be treated would be larger than when only runoff from impervious areas is considered. An approximate composite runoff coefficient, C, can also be obtained from readily available literature without going through the calculations for "C" above. This is the standard runoff coefficient for impervious surface but may vary depending on hydrology, topography, precipitation, and the exact surface type. The same applies for pervious surfaces. See table below.

[1] The San Diego RWQCB has adopted a safety factor of "2" for their flow-based BMP design standard. This means doubling the runoff treatment capacity necessary to handle the local 85th percentile hourly rainfall intensity. The safety factor is meant to deal with the reduced efficiency that occurs with flow-through BMPs that are not adequately maintained.

More Info about Runoff Coefficient ("C") and Checking for 85th % Condition Compliance

The Runoff Coefficient ("C") is one of the variables considered in the 85th percentile formula and represents a numerical means of expressing particular characteristics of a project site's ground surfaces. Values for runoff coefficients for a particular location take into account such factors as surface covers, soil permeability, ground surface slope, and rainfall intensities, all of which can make a significant difference in the ratio of rainfall that will infiltrate or will flow by sheet-flow across the ground surface.

This table presents some of the commonly used runoff coefficients. Keep in mind that the coefficient for a specific development type needs to be applied to the entire development area, including both pervious and impervious areas. The reason is that the number has already considered the average proportions of the different surface types in that particular type of development. For a more full discussion of when to pick numbers from the table, please discuss with a water quality analyst.

Type of Area or Development	"C"
TYPE OF DEVELOPMENT	
Urban business	0.70—0.95
Commercial office	0.50—0.70
Residential development	
Single-family homes	0.30—0.50
Condominiums	0.40—0.60
Apartments	0.60—0.80
Suburban residential	0.25—0.40
Industrial development	
Light industry	0.50—0.80
Heavy industry	0.60—0.90
Parks, greenbelts, cemeteries	0.10—0.30
Railroad yards, playgrounds	0.20—0.40
Unimproved grassland or pasture	0.10—0.30
TYPE OF SURFACE AREAS	
Asphalt or concrete pavement	0.70—0.95
Brick paving	0.70—0.80
Roofs of buildings	0.80—0.95
Grass-covered sandy soil	
Slopes 2% or less	0.05—0.10
Slopes 2% to 8%	0.10—0.16
Slopes over 8%	0.16—0.20
Grass-covered clay soils	
Slopes 2% or less	0.10—0.16
Slopes 2% to 8%	0.17—0.25
Slopes over 8%	0.26—0.36

85th Percentile Condition Compliance

First, ensure all information has been submitted. Information should include: (1) project plans illustrating location of structural BMPs and any necessary details, (2) hydrology calculations determining stormwater runoff from developed project site from the 85th percentile storm and (3) proof demonstrating BMPs were sized to meet 85th percentile requirements. It is the project proponent's responsibility to determine the appropriate precipitation amount and runoff coefficient to arrive at a runoff volume for treatment. The analysts should evaluate the validity of the arrived figure using available information provided in this fact sheet and other relevant sources.

Only on a conceptual level should analysts attempt the involved process of assessing exactly whether or not the proposed BMPs or suites of BMPs are designed to the desired capacities. Items to double check: (1) ensure rainfall numbers used are correct for that area, (2) ensure a safety factor of 2 was used for flow through BMPs, (3) make a rough estimate of the percent impervious surface on the development and ensure it meshes with the surface area numbers used in applicant's calculations, and (4) cross-check that the BMPs are sized large enough to accommodate the stormwater runoff from the 85th percentile storm. In addition to other compliance questions (maintenance, etc.) determine whether or not the BMPs are strategically located to receive the runoff and that the BMPs will treat the particular pollutants generated by this development.

Grading and Drainage Memoradum
Lee Tromble Engineering, March 25, 2020

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

March 25, 2020

David Slagle
Hambro Forest Products
445 Elk Valley Road
Crescent City, CA 95531

re: Grading and Drainage
Family Entertainment Center
APN 115-020-42

Dear Mr. Slagle;

At your request, this is to provide you with my recommendations for grading and drainage mitigations related to development of a portion of APN115-020-42 for a Family Entertainment Center. This is specifically related to development of Phases 1 and 2 of your proposed project which includes construction of a mini-golf course and a go-cart track on roughly 1.5 acres of this 26 acre parcel. The project site is located along Highway 101 just south of the Crescent City Harbor.

The proposed site fronts on the northeast side of Highway 101. The frontage is developed with several buildings and paving which I understand will be utilized as a parking lot to serve the development. The area proposed for mini golf and go cart tracks (herein referred to as the development area) is relatively flat and is bounded to the northeast by a wetland and dike, to the southeast by a wood storage/processing area, and to the west and southwest by the aforementioned pavements, buildings and a residence. Attached are my location map and a conceptual layout of the proposed development.

The development area is vegetated with well-established grasses and slopes gently to nearly level towards the north and northeast. Surface soils are well-drained but are underlain by seasonally saturated gravels. Currently, any surface water runoff emanating from the 1.5 acre development area discharges in a north/northeasterly direction towards the ground depression/ swale adjacent to the edge of a dike which is located primarily within a designated wetland. Flow from the swale then tends in a southeasterly direction ultimately combining with the wetland waters.

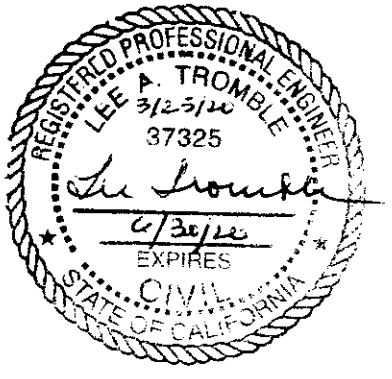
Site development will, of course, require ground disturbance including modifications to ground contours as necessary to provide for adequate drainage of the development area. The project will also include placement of surface materials specific to the fun center, e.g. mini golf and go-cart surface finishes. Grading should be designed for minimal disturbance consisting generally of sod removal and minor contouring of the surface soils. It is also likely that soils will need to be imported to the site (in addition to surface finish base materials such as aggregate base) in order to elevate the development area as necessary for surface drainage. In any case, finish site grades must be at or above the existing site elevations. This will allow for surface water to leave the development area much as is presently the case, directed towards the dike-swale area to the northeast.

Drainage improvements to the Phase 1 and 2 areas should include finished grading for gently sloping ground surface grades, primarily directed to the northeast. In some areas surface water catch basins with minimal grade tight-line pipes discharging to the aforementioned dike-swale will have to be installed. All areas not covered with finishes must be landscaped with lawn or other approved plantings/materials as necessary to prevent sedimentation of the swale/wetland. Construction should only occur during the dry season with all erosion control improvements in place and established prior to the upcoming wet season.

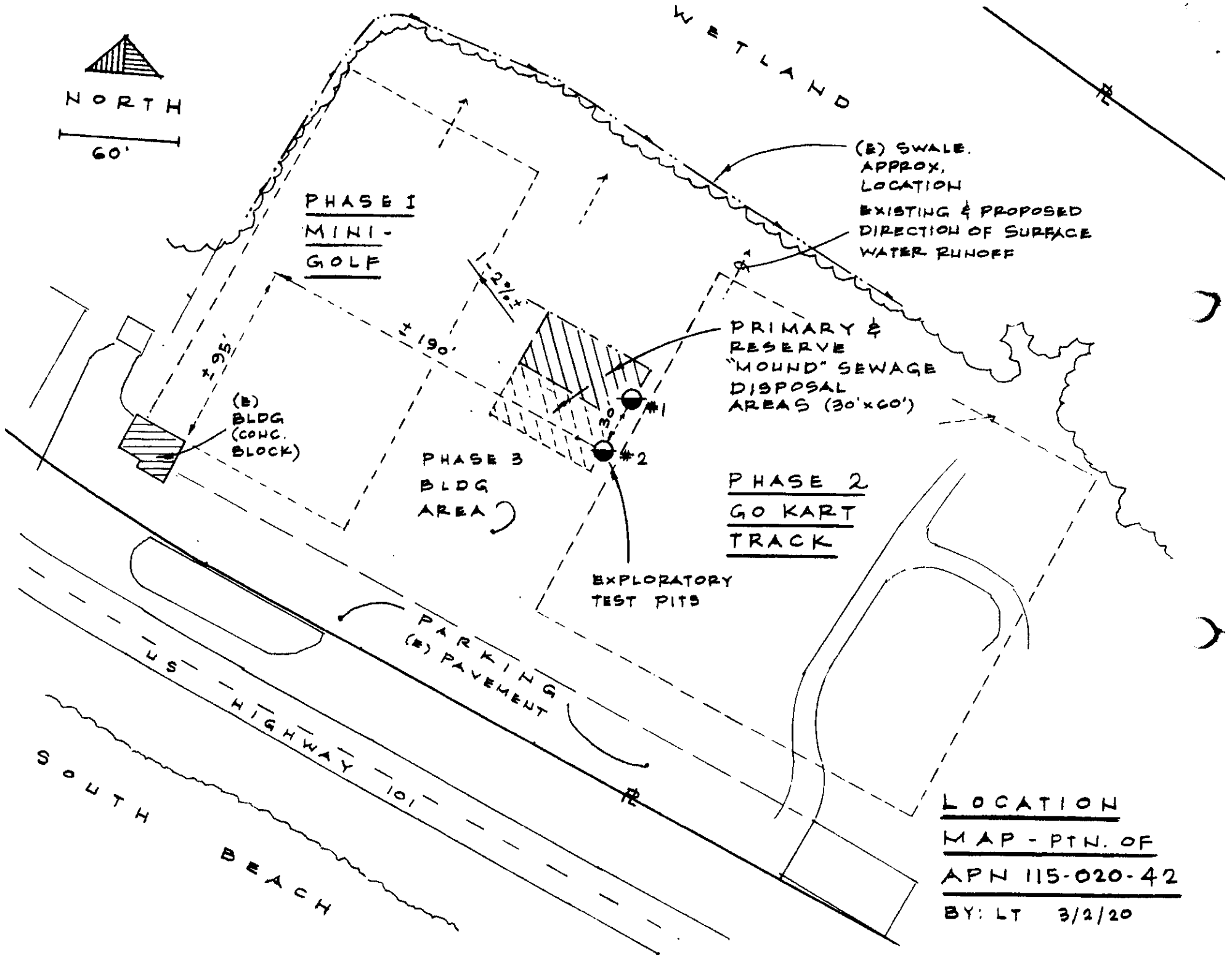
This is intended to supplement your development application with conceptual recommendations which may assist in the conditional approval of your project. Obviously, when and if this project is conditionally approved, a project specific grading and drainage will have to be prepared and approved by the jurisdictional agencies.

If you need any additional information on this matter, or if I can be of further assistance, please feel free to call.

Very truly yours,



Lee Tromble


NORTH
60'
WETLAND
(E) SWALE. APPROX. LOCATION
EXISTING & PROPOSED DIRECTION OF SURFACE WATER RUNOFF
PHASE I MINI-GOLF
±95'
±190'
±2%
PRIMARY & RESERVE "MOUND" SEWAGE DISPOSAL AREAS (30'x60')
#1
#2
30'
(E) BLDG (CONC. BLOCK)
PHASE 3 BLDG AREA
PHASE 2 GO KART TRACK
EXPLORATORY TEST PITS
PARKING (E) PAVEMENT
US HIGHWAY 101
SOUTH BEACH
LOCATION MAP - PTN. OF APN 115-020-42
BY: LT 3/2/20

Water Supply Memorandum
Lee Tromble Engineering, March 26, 2020

LEE TROMBLE ENGINEERING
240 Douglas Park Drive
Crescent City, CA 95531
Phone (707) 464-1293

March 26, 2020

David Slagle
Hambro Forest Products
445 Elk Valley Road
Crescent City, CA 95531

re: Water Supply
Family Entertainment Center
APN 115-020-42

Dear Mr. Slagle;

At your request, this is to provide you with my recommendations for water supply for your Family Entertainment Center proposed for development on a portion of APN 115-020-42, Del Norte County. This is specifically related to development of Phases 1 and 2 of the project which includes construction of a mini-golf course and a go-cart track on roughly 1.5 acres of this 26 acre parcel. The project site is located along Highway 101 just south of the Crescent City Harbor.

As a basis for estimating water use for Phases 1 and 2, I used information from the "Feasibility Snapshot Study Phase One & Phase Two Proposed Family Entertainment Center Crescent City, California" dated October 21, 2019 prepared by Entertainment Concepts, Inc. The use estimates are based on 2 gallons per day per visitor and 15 gallons per day per staff person. Based on this and the above referenced study, this report assumes a proposed water use of 200 gallons per day for Phase One and about 460 gallons per day for Phase One plus Phase Two. These water demands, which basically represent water demands for the restroom serving Phases 1 & 2, equate roughly to the water demands for one, or possibly two, single family residences and do not include any demands for fire suppression or irrigation. It is assumed that bottled drinking water would be made available for visitors and staff.

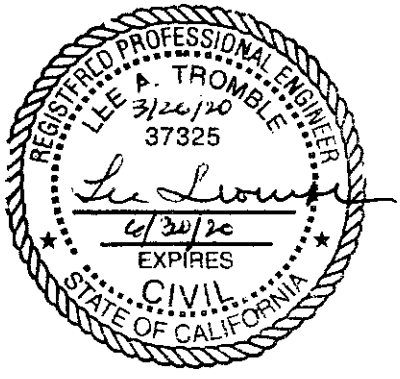
It is proposed that this water supply for the initial development phases will be from an on-site well or wells. There is an existing on-site well which serves the existing residence on the property. Also, the Crescent Beach Motel just southeast of the site is served from an on-site well. The Crescent Beach Motel water use far exceeds the demands for the Phase 1 & 2 Family

Entertainment Center. This is evidence that on-site wells in this area can be used as a water supply for the initial development phases. If instantaneous demands exceed the well source capacity, than those needs can be met with on site water storage. Water treatment would likely be necessary.

If you need any additional information on this matter, or if I can be of further assistance, please feel free to call.

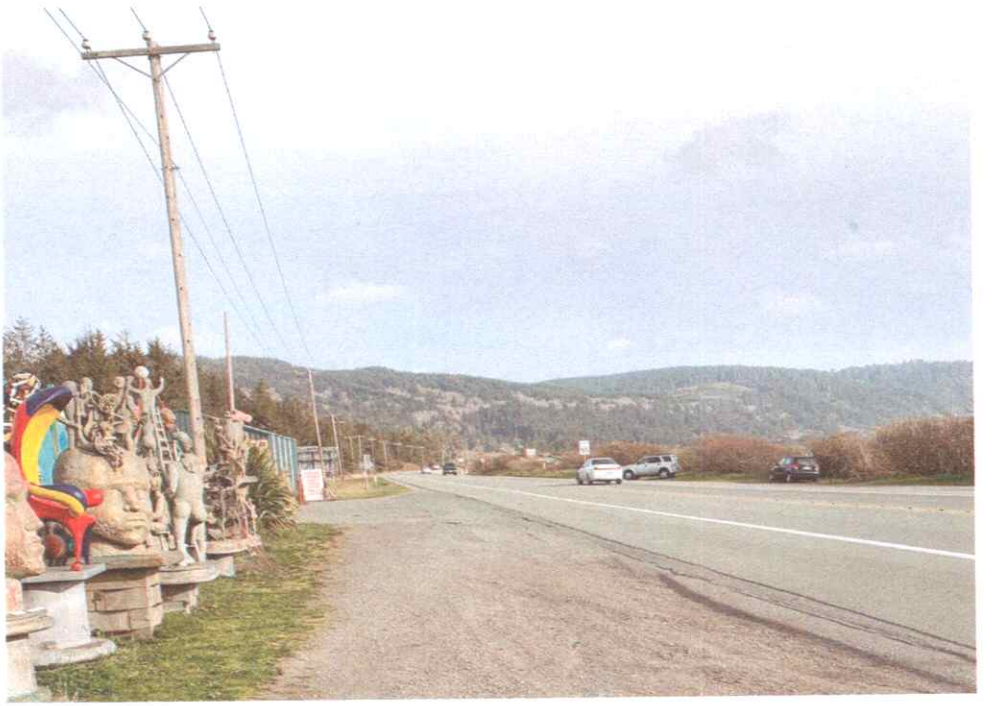
Very truly yours,

Lee Tromble



Traffic Impact Study
W-Trans, July 9, 2020

Traffic Impact Study for the Hambro Family Fun Center Project



Prepared for the County of Del Norte

Submitted by
W-Trans

July 9, 2020

TRAFFIC ENGINEERING
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Table of Contents

Executive Summary

The proposed project is a family fun center which includes an 18-hole mini-golf course, a 35,000 square foot go-kart track, and a 7,000 square foot arcade that would be built in three phases. The project would be located at 1100 US 101 in the County of Del Norte and would replace an existing art shop. Based on the assumptions of the proposed project, it is estimated that 174 new trips would be generated daily compared to the existing use, including 87 new trips during the weekday and weekend p.m. peak hours. The project is estimated to generate a VMT of 684 miles per day and have a less-than-significant impact in terms of its VMT, though incorporation of measures to reduce travel by employees is recommended.

Analyzing collision records for the most recent five-year period available, the segment of US 101 fronting the project site experienced a lower collision rate than the statewide average for similar facilities. Based on existing volumes, US 101 within the vicinity of the project site is operating acceptably at LOS C in both directions. With volumes from nearby pending projects added to existing volumes, the roadway segment would degrade in operation from LOS C to LOS D during both peak hours studied. Under volumes derived by applying a 20-year growth rate to existing volumes along the segment fronting the project site, the roadway would be expected to continue operating acceptably at LOS C. With project volumes added, the roadway would continue operating at the same Levels of Service as without during both peak periods for all three volume scenarios.

Given the semi-rural location of the project, the existing transit and bicycle facilities as well as a lack of pedestrian facilities are considered adequate.

Based on a field review, existing sight lines at the project's temporary Phase 1 and permanent driveways are adequate. To maintain existing sight distance, it is recommended that any landscaping or signage proposed at the project driveways should be designed outside of the driver's vision triangle. With the assumption all inbound project trips would make a left-turn southbound to access the site, a left-turn lane would not be warranted on US 101 under Phase 1 project volumes but would be warranted with the construction of Phase 2. The project site design should conform to the Del Norte County Code and any other applicable standards as determined by the County and Caltrans.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed family fun center to be located at 1100 Highway 101 in the County of Del Norte. The traffic study was completed in accordance with the criteria established by the County of Del Norte and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide County staff and policy makers with data they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to an acceptable level as defined by the County's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The project includes replacing an existing wood sculpture shop with a Family Fun Center, which would include an 18-hole mini golf course, go-kart track, and an arcade. The project site is located at 1100 Highway 101 in the County of Del Norte, as shown in Figure 1.

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Traffic Impact Study for the Hambro Family Fun Center Project

Figure 1 – Study Area, Existing Lane Configuration and Existing Traffic Volumes

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the segment of US 101 fronting the project site.

Operating conditions during the weekday p.m. and weekend midday peak periods were evaluated as these time periods reflect the highest traffic volumes areawide and for the proposed project. The evening peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion of the day during the homeward bound commute, while the weekend midday peak occurs between 2:00 p.m. and 4:00 p.m.

Study Roadway

US 101 is generally in a north-south direction that runs past the project site connecting between Olympia, Washington to Los Angeles, California. Near the project site the highway is an undivided two-lane road with a posted speed limit of 55 mph.

The study area and existing volumes are shown in Figure 1.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is November 1, 2014 through October 31, 2019.

The calculated collision rate for the study segment was compared to the average collision rate for similar facilities statewide, as indicated in *2016 Collision Data on California State Highways*, California Department of Transportation (Caltrans). For the five-year period evaluated the study roadway experienced a lower collision rate of 0.81 c/mvm (collisions per million vehicle miles) than the statewide average of 0.86 c/mvm for similar facilities. The collision rate calculation is provided in Appendix A.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. There are no pedestrian facilities along either side of US 101 in the vicinity of the project site. According to the *Del Norte Active Transportation Plan*, 2017, there are sidewalks proposed along US 101 between Sunset Circle and Anchor Way, which would end less than one-quarter mile from the project site. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories, three of which are used by Del Norte County:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, there is a trail that runs along the beach fronting the project site between Sunset Circle and Enders Beach Road. US 101 is classified as a bicycle route within the Del Norte County limits.

According to the *Del Norte Active Transportation Plan* there are 15 short-term bicycle spaces at the Crescent City Harbor, approximately one-half mile from the project site.

Transit Facilities

The Redwood Coast Transit (RCT) provides regional service in the County of Del Norte, with one stop within one-quarter mile walking distance of the project site. Routes 4 and 20 both serve this stop.

RCT Route 4 provides loop service between the Elk Valley Casino and the Cultural Center on Front Street. Route 4 operates Monday through Friday with one-hour headways between 7:30 a.m. and 6:30 p.m. Saturday and holiday operations are the same except starting an hour later at 8:30 a.m.

Route 20 is a regional route connecting the cities of Smith River and Arcata. The route operates Monday through Saturday with approximately two- to five-hour headways between 6:45 a.m. and 8:45 p.m.

Neither route operates on Sundays.

Two to three bicycles can be carried on most RCT buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on RCT buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability within the Crescent City. Dial-a-ride operates between 7:00 a.m. and 7:00 p.m. Monday through Friday, and between 8:00 a.m. and 7:00 p.m. on Saturdays. In areas outside Crescent City, Flex Stop is available within 0.75 miles of an RCT bus stop. All RCT buses are equipped with wheelchair lifts.

Capacity Analysis

Two-Lane Highway Segment Level of Service Methodology

The roadway segment Level of Service methodology found in Chapter 15, "Two-Lane Highways," of the *Highway Capacity Manual* is the basis of the automobile LOS analysis. The methodology considers traffic volumes, terrain, roadway cross-section, the proportion of heavy vehicles, and the availability of passing zones. The LOS criteria for two-lane highways differs depending on whether the highway is considered "Class I," "Class II," or "Class III." Class I highways are typically long-distance routes connecting major traffic generators or national highway networks where motorists expect to travel at high speeds, therefore the study segment was evaluated as a Class I roadway. The measure of effectiveness by which Level of Service is determined on Class I highways is average travel speed (ATS) and percent time spent following (PTSF), or the proportion of time that drivers on the highway are limited in their speed by a driver in front of them. A summary of the ATS and PTSF breakpoints is shown in Table 1.

Table 1 – Automobile Level of Service Criteria

LOS	Class I Highways	
	ATS (mi/h)	PTSF (%)
A	>55	≤35
B	>50-55	>35-50
C	>45-50	>50-65
D	>40-45	>65-80
E	≤40	>80

Notes: LOS = Level of Service; ATS = Average Travel Speed; PTSF = Percent Time Spent Following
Reference: *Highway Capacity Manual*, Transportation Research Board, 2010

Traffic Operation Standards

Although the study area is within Del Norte County limits, Caltrans has jurisdiction over the study segment because it is a state highway. Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS D.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday and weekend p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected when local schools were in session, and includes traffic associated with the Bertsch Oceanview tract.

Under existing conditions, the study roadway is operating acceptably during both study periods. A summary of the roadway segment level of service calculations is shown in Table 2, and volumes are shown in Figure 1. Copies of the Level of Service calculations are provided in Appendix B.

Table 2 – Existing Peak Hour Roadway Segment Levels of Service						
Study Segment Direction	**Weekday PM Peak**			**Weekend PM Peak**		
	PTSF (%)	**ATS (mph)**	**LOS**	**PTSF (%)**	**ATS (mph)**	**LOS**
US 101: Anchor Way to Humboldt Rd						
Northbound	62.3	49.0	C	56.7	49.3	C
Southbound	56.3	50.1	C	60.9	50.1	C

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service

Existing plus Approved Projects Conditions

Existing conditions with approved or pending nearby projects were analyzed. There are two nearby projects that would be likely to add traffic along the proposed project frontage, both located south of the project site. One project consists of a 3,500 square-foot convenience store and gas station with 16 vehicle fueling positions that would be located off Humboldt Road. At the time of the study the pending project was considering three alternative sites; however, all three sites would result in the same trip generation and distribution on the study segment. The second project is a proposed 56-room hotel with a restaurant and a 40,000 square foot casino and 20,000 square feet of conference facilities near the intersection of Humboldt Road and US 101. According to the *Elk Valley Rancheria Casino Relocation Traffic Study*, W-Trans, 2006, the project was assumed to generate 118 trips northbound and 105 trips southbound along US 101 during the weekday pm peak. Since the study did not analyze the weekend pm peak hour, the same trip rate used for the weekday pm peak was used for the purposes of the study.

Under the existing volumes with nearby approved or pending project volumes added, the roadway study segment is expected to operate unacceptably at LOS D in both directions during both the weekday and weekend p.m. peak hours. These results are summarized in Table 3, and volumes are shown in Figure 2.

Table 3 – Existing plus Approved Projects Peak Hour Roadway Segment Levels of Service						
Study Segment Direction	**Weekday PM Peak**			**Weekend PM Peak**		
	PTSF (%)	**ATS (mph)**	**LOS**	**PTSF (%)**	**ATS (mph)**	**LOS**
US 101: Anchor Way to Humboldt Rd						
Northbound	**70.6**	**47.3**	**D**	**69.4**	**47.3**	**D**
Southbound	**65.6**	**48.4**	**D**	**70.1**	**48.2**	**D**

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service; **bold** = operating unacceptably

Future Conditions

The Caltrans growth factor of 1.10 for US 101 within and near Crescent City for the horizon year of 2039 was applied to the study segment. Under the anticipated Future volumes, the roadway study segment is expected to operate acceptably at LOS C during both the weekday and weekend pm peak hour in both directions. The volumes are shown in Figure 3 and these results are summarized in Table 4.

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Traffic Impact Study for the Hambro Family Fun Center Project

Figure 2 – Existing plus Approved Project Traffic Volumes

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Traffic Impact Study for the Hambro Family Fun Center Project

Figure 3 – Future Traffic Volumes

Table 4 – Future Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Weekday PM Peak			Weekend PM Peak		
	PTSF (%)	ATS (mph)	LOS	PTSF (%)	ATS (mph)	LOS
US 101: Anchor Way to Humboldt Rd						
Northbound	62.2	49.0	C	58.3	49.1	C
Southbound	56.6	50.1	C	61.0	49.9	C

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service

It should be noted that due to the conservative approach applied for the Existing plus Approved Projects scenario wherein all trips associated with the other projects in the area were treated as new and added to the study segment, the Future scenario has lower projected volumes than were used for the Existing plus Approved Projects scenario, and therefore better projected operation.

Project Description

The proposed project would be located at 1100 Highway 101 in the County of Del Norte. The project as proposed includes a Family Entertainment Center with attractions such a miniature golf, a go-kart track, laser tag, etc. The project would be built in three phases, with the first phase including construction of an 18-hole miniature golf course. Phase 2 would include construction of a 35,000 square foot go-kart racetrack with 32 go-karts, and Phase 3 would include a 7,000 square foot arcade. At full buildout there would be 44 parking space, with 12 spaces built in Phase 1, 20 spaces added with Phase 2, and the remaining 12 spaces constructed with the third phase. The site would be accessible via one driveway off the east side of US 101. The proposed project site plan is shown in Figure 4.

Trip Generation

The trip generation potential of the existing site uses as well as the project as planned were developed using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 10th Edition, 2017. For the existing art gift shop, the land use "Arts and Crafts Store" (Land Use 879) was used. The square footage of the existing use was based on the size of the main gift shop on the south side of the site.

For the proposed project, the land use "Miniature Golf Course" (Land Use 431) was used for the 18-hole golf course and "Multipurpose Recreational Facility" (Land Use 435) was used for the 7,000 square foot arcade building. Since there is not a land use for the go-kart component, other land uses that would be assumed to have a similar time of day peak and trip generation as a go-kart track were explored and the land use "Batting Cage" (Land Use 433) was determined to be similar. The batting cage trip rate is based on the number of batting cages, which was equated to represent the 32 race karts.

None of the four land uses reviewed have data for the weekend peak hour, so similar land uses with weekday evening peak hour and weekend peak hour data were reviewed. The land uses varied as to whether the weekend peak hour rates were higher or lower than the weekday p.m. peak hour rates, so the trip rates for the weekday p.m. peak hour were also applied to the weekend peak hour. Based on application of these assumptions, the proposed project would be expected to generate an average of 174 new trips per day, including 87 weekday and weekend p.m. peak hour trips. These results are summarized in Table 5. Given the semi-rural location of the project site, and that the project access point is off a highway, it was assumed that all or nearly all trips to and from the site would be made by vehicle.

Source: Entertainment Concepts, Inc. 4/20

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Figure 4 – Site Plan

Table 5 – Trip Generation Summary							
Land Use	**Units**	**Daily**		**Weekday/Weekend PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**
Existing							
Art Shop	-2.4 ksf	56.55	-136	6.21	-15	-7	-8
Proposed							
Phase 1							
Miniature Golf	18 holes	3.30	59	0.33	6	2	4
Phase 2							
Batting Cages	32 cages	-	-	2.22	71	39	32
Phase 1&2 Sub-Total			*59*		*77*	*41*	*36*
Phase 3							
Arcade	7.0 ksf	35.80	251	3.58	25	14	11
Proposed Sub-Total			*310*		*102*	*55*	*47*
Net New Trips			**174**		**87**	**48**	**39**

Note: ksf = 1,000 square feet

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing where residents live in relation to the proposed project site and the surrounding area. Since the majority of residents live north of the project site in Crescent City, and there are no nearby cities or neighborhoods south of the project, all the project trips were assigned to and from the north via US 101.

Roadway Segment Operation

Existing plus Project Conditions

Under Existing plus Project volumes, the study roadway is expected to continue operating acceptably at LOS C in both directions during both of the peak hours studied. These results are summarized in Table 6 and project-only volumes routed along the study segment are shown in Figure 5.

Table 6 – Existing and Existing plus Project Peak Hour Roadway Segment Levels of Service								
Study Segment Direction	**Existing Conditions**				**Existing plus Project**			
	Weekday PM Peak		**Weekend PM Peak**		**Weekday PM Peak**		**Weekend PM Peak**	
	PTSF (%)/ ATS (mph)	**LOS**	**PTSF (%)/ ATS (mph)**	**LOS**	**PTSF (%)/ ATS (mph)**	**LOS**	**PTSF (%)/ ATS (mph)**	**LOS**
US 101: Anchor Way to Humboldt Rd								
Northbound	62.3/49.0	C	56.7/49.3	C	63.9/48.6	C	59.0/48.8	C
Southbound	56.3/50.1	C	60.9/50.1	C	60.7/49.6	C	62.9/49.6	C

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service

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Figure 5 – Project Traffic Volumes

Finding – The study roadway is expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic.

Existing plus Approved Projects plus Project Conditions

While the study roadway is expected to operate at LOS D with nearby approved or pending project volumes added to existing volumes, with project-generated traffic added, the US 101 study segment is expected to continue operating at the same levels of service with minor increases in time following and decreases in travel speed. The Existing plus Approved Project plus Project operating conditions are summarized in Table 7.

Table 7 – Existing plus Approved Projects and Existing plus Approved Projects plus Project Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Existing plus Approved Conditions				Existing plus Approved plus Project			
	Weekday PM Peak		Weekend PM Peak		Weekday PM Peak		Weekend PM Peak	
	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS
US 101: Anchor Way to Humboldt Rd								
Northbound	**70.6/47.3**	**D**	**69.4/47.3**	**D**	**72.8/46.8**	**D**	**71.3/46.8**	**D**
Southbound	**65.6/48.4**	**D**	**70.1/48.2**	**D**	**69.7/47.9**	**D**	**72.3/47.7**	**D**

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service; **bold** = operating unacceptably

Finding – the study roadway segments will continue operating at the same Levels of Service with project-generated traffic added as without it. Although LOS D operation is projected, no changes in service level would be expected as a result of adding project-generated traffic, indicating an acceptable change in conditions.

Future plus Project Conditions

With project-generated traffic added to the anticipated Future volumes, the study roadway is expected to continue operating at the same levels of service with minor changes to the operational metrics. As noted above, volumes in the Existing plus Approved Projects scenario were developed using overly conservative assumptions that resulted in higher volumes than are projected for the longer term, thus operation under the Future volumes is better. The Future plus Project operating conditions are summarized in Table 8.

Table 8 – Future and Future plus Project Peak Hour Roadway Segment Levels of Service

Study Segment Direction	Future Conditions				Future plus Project			
	Weekday PM Peak		Weekend PM Peak		Weekday PM Peak		Weekend PM Peak	
	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS	PTSF (%)/ ATS (mph)	LOS
US 101: Anchor Way to Humboldt Rd								
Northbound	62.2/49.0	C	58.3/49.1	C	63.9/48.6	C	60.3/48.8	C
Southbound	56.6/50.1	C	61.0/49.9	C	60.6/49.6	C	64.3/49.5	C

Notes: PTSF = Percent Time Spent Following; ATS = Average Travel Speed; LOS = Level of Service

Finding – The study roadway segments will continue operating at acceptable Levels of Service with the project traffic added to Future volumes. As noted for Future Conditions (without the Project), because of the conservative approach to developing the Existing plus Approved Projects volumes, that scenario is based on higher volumes than are projected for the Future scenario.

Vehicle Miles Traveled

Senate Bill (SB) 743 established a change in the metric to be applied when determining traffic impacts associated with development projects. Rather than the delay-based criteria associated with a Level of Service analysis, the increase in vehicle-miles-traveled (VMT) as a result of a project is the basis for determining environmental impacts. Because the County of Del Norte has not yet adopted a standard of significance for evaluating VMT, guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, was considered (referred to herein as the Technical Advisory). Caltrans has also published guidance regarding VMT in the *Vehicle Miles Traveled-Focused Transportation Impact Study Guide*, May 2020. Both the Technical Advisory and Caltrans address significance thresholds for projects in rural counties that are not under the jurisdiction of a Metropolitan Planning Organization (MPO) such as Del Norte County, indicating that the potential VMT impacts of projects in these areas may be best determined on a case-by-case basis.

Neither the Technical Advisory nor Caltrans provide specific guidance on how the VMT associated with recreational uses should be assessed, though these types of uses may result in shifts to automobile travel patterns that are similar to those seen with retail uses. Research including that cited by OPR in the Technical Advisory has shown that adding local-serving retail land uses typically redistribute shopping trips rather than creating new trips, improving destination proximity and thereby reducing trip lengths and total VMT. Translating this concept to a local-serving recreational use, adding a new recreation facility would not necessarily change the total number of people using recreational facilities in the region, but instead redistributes where people choose to visit.

Consideration must be given to the potential project's visitor base when determining if the use is local serving. "Fun Center" uses such as the proposed project typically draw customers from the nearby areas, which given this project's location, is likely to include residents from Crescent City and surrounding unincorporated areas as well as visitors staying in nearby tourism-based lodging. The proposed project is located two miles from downtown Crescent City and within four miles of most of the area's population, and many of the hotels and RV parks in the area are located within one mile of the proposed project. As such, vehicle travel distances associated with the project (or the "miles" in vehicle miles traveled) are anticipated to be very low. The project may also attract some patrons from people already driving by the site on US 101; there would be zero new VMT associated with these visits.

Del Norte County does not maintain a sophisticated regional travel demand model capable of estimating VMT. To obtain a coarse estimate of the project's VMT potential, projections from the Caltrans Statewide Travel Demand Model were used. For the Traffic Analysis Zone (TAZ) containing the project site, the statewide model indicates an average distance for home-based "other" trips (such as recreational) of 3.93 miles. This would generally be considered a short travel distance and corresponds well to the anticipated locations of the project's customers described above. Multiplying the 3.93-mile estimate by the project's estimated 174 daily trips results in an estimate of 684 daily vehicle miles traveled. Note that this projection does not include deductions for recreation-based trips that would have otherwise been made elsewhere if the project was not built. These results are shown in Table 9.

Table 9 – VMT Summary			
Land Use	**Daily Trips**	**Average Trip Length**	**Calculated Daily VMT**
Fun Center	174	3.93 mi	684 mi

Based on the qualitative and quantitative assessments described above, the proposed project is anticipated to be local-serving and produce low levels of VMT, particularly given the rural context of the site and Del Norte County. Given guidance provided by OPR and Caltrans, it is reasonable conclude that the project will result in a less-than-significant VMT impact. The following section identifies several strategies that could help to further reduce the potential for VMT impacts to occur.

VMT Reduction Strategies

Regional Strategies

In the Transportation Impact Study Guide, Caltrans indicates that in non-MPO rural areas, programmatic VMT mitigation implemented at a regional level can often be the most effective strategy. Examples of regional projects that could reduce VMT in the project area include expansion of existing transit services, construction of new paths to serve beaches and recreation areas on the southern side of Crescent City via walking and biking, and/or implementation of a visitor-focused shuttle system connecting Crescent City visitor lodging locations with attractions and recreation facilities. These types of VMT mitigation strategies typically require regional coordination and funding to implement. The Del Norte County Local Transportation Commission has taken the lead on projects that include VMT-reducing components such as the US Highway 101 Traffic Calming and Gateway Project in Crescent City, and is currently in the midst of preparing an update to the Del Norte Regional Transportation Plan that will identify and prioritize projects supporting multimodal transportation, thereby helping to reduce VMT in the region.

Transportation Demand Management

Travel Demand Management (TDM) strategies are often used to reduce VMT. While the vast majority of TDM measures are intended to be implemented in urbanized areas where non-auto networks are in place, there are several measures that could be implemented to reduce VMT in the more rural context of the project site.

Ridematching Program

Carpooling is one of the most common and cost-effective alternative modes of transportation and one which commuters can adopt part-time. There are numerous benefits to ridesharing. Carpooling can reduce peak-period vehicle trips and increase commuters' travel choices. Further, it reduces congestion, road and parking facility costs and pollution emissions. Carpooling tends to have the lowest cost per passenger-mile of any motorized mode of transportation as it makes use of a vehicle seat that would otherwise be empty. Carpooling also provides consumer financial savings by decreasing fuel and parking costs.

The greatest barrier to workplace carpooling is often simply being able to identify and travel with other nearby employees. The employer can act as a facilitator in suggesting carpools for employees who live close to one another or on the same route.

Guaranteed Ride Home Program

Guaranteed Ride Home (GRH) is a program that provides a "back-up" ride to employees who carpool, use transit, bike/walk, or use other alternatives as their commute mode. If an employee who does not drive their own vehicle needs to leave work for an emergency, such as a sick child or other unexpected need, they will be guaranteed a

ride home from their employer or reimbursement for the cost of a taxi ride to get them home. This is an important supportive measure to encourage employees not to drive alone to work.

On-Site Amenities

Although it is not a transportation program, on-site employee and visitor amenities serve to reduce vehicle trips. This can take many forms depending on the need. For example, providing lunch or food options on-site allows workers and visitors to forgo midday trips.

Finding – The proposed project is anticipated to be local-serving and result in less-than-significant VMT impacts given the rural context of Del Norte County.

Recommendation – The project should include ride matching and guaranteed ride home services for employees, as well as onsite amenities such as food options for employees and visitors, to help reduce VMT.

Alternative Modes

Pedestrian Facilities

Given the semi-rural location of the project site it is unlikely to attract a substantial number of pedestrian trips. Though there may be some demand from the beach across from the site, it is likely those initial trips would have been made via bicycle or automobile. Additionally, due to the high speeds along US 101 and lack of pedestrian facilities surrounding the site, there does not appear to be any need to provide pedestrian facilities along the project frontage. To discourage pedestrians from crossing US 101 between the beach and the proposed project, the project parking lot should include signage for project only use. Additionally, the lot should be gated and locked when the site is closed.

Finding – Pedestrian facilities serving the project site are expected to be adequate given the rural location.

Recommendation – Provide signage for private use and locked gates for the project parking lot to discourage pedestrians crossing US 101 between the beach and the project site.

Bicycle Facilities

Existing bicycle facilities, including a trail along the east side of US 101 fronting the project site, provide adequate access for bicyclists.

Finding – Bicycle facilities serving the project site are expected to be adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Existing stops are within an acceptable walking distance of the site.

Finding – Transit facilities serving the project site are expected to be adequate.

Access and Circulation

Site Access

During Phase 1 of the project, the site would be accessible from a temporary driveway on the northern side of the site. With construction of Phase 2, a permanent driveway would be built on the project frontage, and the temporary driveway would be closed. During both phases full access would be allowed at the single driveway.

Sight Distance

At driveways a substantially clear line of sight should be maintained between the driver of a vehicle waiting on the driveway and the driver of an approaching vehicle.

Sight distance along US 101 at the project driveway was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for a driveway is based on stopping sight distance together with the approach travel speeds. Additionally, the sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

Sight distance at the proposed driveways were field measured. A speed survey was conducted of vehicles traveling in both directions on US 101 near the project site and showed critical approach speeds of 53 and 54 mph in the southbound and northbound directions respectively. Based on a design speed of 55 mph, the minimum stopping sight distance needed is 500 feet. At the temporary driveway that would be open during Phase 1 of the project, sight lines extend 500 feet in the critical direction of vehicles traveling southbound, and approximately 1,000 feet of vehicles traveling northbound. Sight lines extend more than 500 feet in each direction from the permanent driveway that would be built during Phase 2 of the project, with sight distance of approximately 550 feet to the north and more than 600 feet to the south.

Because signing and landscaping placed near the driveway can impede sight lines, the design of such components should ensure that adequate sight lines are maintained.

Finding – Sight distance is more than adequate in both directions.

Recommendation – It is recommended that landscaping and signage installed as part of the proposed project be designed to avoid placement in the driver's vision triangle to maintain existing adequate sight lines.

Access Analysis

Left-Turn Lane Warrants

The need for a dedicated left-turn lane into the project site from US 101 was assessed using the methodology from the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985. Based on the scenario with the highest volumes, which was Existing plus Approved Projects, with project traffic added, a left-turn lane is warranted during both the weekday and weekend p.m. peak periods at full build out. Since the project is proposed to be built in three phases, each phase was analyzed to determine at what stage a left-turn pocket would need to be constructed. With anticipated project volumes related to Phase 1 added along US 101, a left-turn lane is not warranted during any scenario or studied peak hour; however, with the addition of Phase 2 volumes a left-turn lane is warranted. Since the location of the driveway would change from Phase 1 to Phase 2, it is recommended that the left-turn lane be installed with the construction of Phase 2 of the project. The left-turn lane warrant analysis is provided in Appendix C.

Emergency Vehicle Access

Per the Del Norte County Code, Title 19.08.100 Driveways:

- All driveways shall be constructed to provide a minimum of one ten-foot traffic lane and 14 feet unobstructed horizontal clearance and unobstructed vertical clearance of 15 feet.
- Driveways exceeding 150 feet in length, but less than 800 feet in length, shall provide a turnout near the midpoint of the driveway. Where the driveway exceeds 800 feet, turnouts shall be provided no more than 400 feet apart.
- A turnaround shall be provided to all building sites on driveways over 300 feet in length and shall be within 50 feet of the building.

Recommendation – To ensure that the proposed driveway operates acceptably, the design should conform to the Del Norte County Code Title 19.08 Emergency Access and Egress and any other applicable standards as determined by the County and Caltrans.

Conclusions and Recommendations

Conclusions

- Based on the assumptions applied to the proposed project, it is expected to generate 174 daily trips, including 87 trips during the weekday and weekend p.m. peak hours. The project is estimated to generate a VMT of 684 miles per day and could be considered to have a less-than-significant impact since it would be a local-serving project.

- For the five-year period evaluated the segment of US 101 fronting the project site experienced a lower collision rate than the statewide average for similar facilities.

- Under existing volumes US 101 is operating acceptably at LOS C. With the nearby pending project volumes added to existing volumes, the roadway would be expected to operate unacceptably at LOS D. With project trips added to both scenarios, operation would be expected to remain at the same Levels of Service as without.

- Under volumes derived by applying the Caltrans 20-year growth rate, and with project trips added to these future volumes, US 101 would be expected to operate acceptably at LOS C. It is noted that the volumes for the 20-year horizon are lower than those for the interim Existing plus Approved Projects, probably due to the conservative approach applied.

- Existing facilities for pedestrians, bicyclist, and transit users are adequate given the semi-rural location. It is assumed that most or all of the project trips would be made by motor vehicle. To discourage pedestrian from crossing US 101 at the project frontage, signage should be installed in the project parking lot for private parking and the gate should be locked when the site is not in operation.

- A left-turn lane on US 101 at the project driveway is not warranted under Phase 1 volumes; however, it is warranted with the construction of Phase 2 and 3.

- Existing sight distances at the Phase 1 temporary project driveway and Phase 2 permanent driveway are adequate.

Recommendations

- Any landscaping or signage proposed to be installed at the project driveways should be designed outside of the driver's vision triangle to maintain adequate sight lines.

- A left-turn lane should be constructed during Phase 2 of the proposed project.

- The project site design should conform to the Del Norte County Code and any other applicable standards as determined by the County and Caltrans.

- Transportation Demand Management (TDM) measures should be incorporated in the project to reduce any potential impacts associated with Vehicle Miles Traveled (VMT).

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Planner	Julia Walker
Graphics	Katia Wolfe
Editing/Formatting	Alex Scrobonia and Corinne Rasmussen
Quality Control	Dalene J. Whitlock, PE, PTOE

References

2016 Collision Data on California State Highways, California Department of Transportation, 2018
Del Norte Active Transportation Plan, Del Norte Local Transportation Commission, 2017
Del Norte County Code, 2016
Elk Valley Rancheria Casino Relocation Traffic Study, W-Trans, 2006
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Highway Design Manual, 6th Edition, California Department of Transportation, 2017
Intersection Channelization Design Guide, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985
Redwood Coast Transit,
Senate Bill No. 743, California Legislative Information,
Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2014-2019
Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory, California Governor's Office of Planning and Research (OPR), 2018
Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, 2017
Vehicle Miles Traveled-Focused Transportation Impact Study Guide, California Department of Transportation, 2020

Communications

Email detailing what should be included in a traffic study for a project with less than 100 peak hour trips; Taylor Carsley to Julia Walker; January 22, 2020

DNX032

Appendix A

Collision Rate Calculations

SEGMENT COLLISION RATE CALCULATIONS

TIS for the Hambro Family Fun Center Project

Location: US-101 between Anchor Way and Humboldt Rd

Date of Count: 9/12/19 (NB) & 9/30/19 (SB)
ADT: 5,300

Number of Collisions: 11
Number of Injuries: 4
Number of Fatalities: 0
Start Date: November 1, 2014
End Date: October 31, 2019
Number of Years: 5

Highway Type: Conventional 2 lanes or less
Area: Rural
Design Speed: ≤55
Terrain: Flat

Segment Length: 1.4 miles
Direction: North/South

$$\frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Segment Length x Number of Years}}$$

$$\frac{11 \times 1{,}000{,}000}{5{,}300 \times 365 \times 1.4 \times 5}$$

	Collision Rate		Fatality Rate	Injury Rate
Study Segment	**0.81**	**c/mvm**	**0.0%**	**36.4%**
Statewide Average*	**0.86**	**c/mvm**	**1.1%**	**39.5%**

ADT = average daily traffic volume
c/mvm = collisions per million vehicle miles
* 2016 Collision Data on California State Highways, Caltrans

Appendix B

Roadway Segment Level of Service Calculations

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	279	veh/h
Opposing direction volume, Vo	248	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	307	pc/h	273	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.5	mi/h
Average travel speed, ATSd	49.0	mi/h
Percent Free Flow Speed, PFFS	86.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	302	pc/h	268	pc/h
Base percent time-spent-following,(note-4) BPTSFd	32.9	%		
Adjustment for no-passing zones, fnp	55.4			
Percent time-spent-following, PTSFd	62.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	105	veh-mi
Peak-hour vehicle-miles of travel, VMT60	391	veh-mi
Peak 15-min total travel time, TT15	2.1	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.0	mi/h
Percent time-spent-following, PTSFd (from above)	62.3	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TTIS	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	300.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.34
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	248	veh/h
Opposing direction volume, Vo	279	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	273	pc/h	307	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.4	mi/h
Average travel speed, ATSd	50.1	mi/h
Percent Free Flow Speed, PFFS	86.4	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	268	pc/h	302	pc/h
Base percent time-spent-following,(note-4) BPTSFd	30.1	%		
Adjustment for no-passing zones, fnp	55.8			
Percent time-spent-following, PTSFd	56.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	93	veh-mi
Peak-hour vehicle-miles of travel, VMT60	347	veh-mi
Peak 15-min total travel time, TT15	1.9	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	50.1	mi/h
Percent time-spent-following, PTSFd (from above)	56.3	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	266.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.28
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	254	veh/h
Opposing direction volume, Vo	270	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	274	pc/h	291	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.4	mi/h
Average travel speed, ATSd	49.3	mi/h
Percent Free Flow Speed, PFFS	86.4	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	269	pc/h	286	pc/h

Base percent time-spent-following,(note-4) BPTSFd	29.4	%
Adjustment for no-passing zones, fnp	56.4	
Percent time-spent-following, PTSFd	56.7	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	94	veh-mi
Peak-hour vehicle-miles of travel, VMT60	356	veh-mi
Peak 15-min total travel time, TT15	1.9	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.3	mi/h
Percent time-spent-following, PTSFd (from above)	56.7	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	267.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.28
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
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Analysis Time Period	Weekend PM Peak
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	270	veh/h
Opposing direction volume, Vo	254	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	291	pc/h	274	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.6	mi/h
Average travel speed, ATSd	50.1	mi/h
Percent Free Flow Speed, PFFS	86.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	286	pc/h	269	pc/h
Base percent time-spent-following,(note-4) BPTSFd	31.6	%		
Adjustment for no-passing zones, fnp	56.8			
Percent time-spent-following, PTSFd	60.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	99	veh-mi
Peak-hour vehicle-miles of travel, VMT60	378	veh-mi
Peak 15-min total travel time, TT15	2.0	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	50.1	mi/h
Percent time-spent-following, PTSFd (from above)	60.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	284.2
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.31
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
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Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak + Approved
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	445	veh/h
Opposing direction volume, Vo	402	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.982	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	484	pc/h	440	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	47.3	mi/h
Percent Free Flow Speed, PFFS	83.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	478	pc/h	432	pc/h
Base percent time-spent-following,(note-4) BPTSFd	49.3	%		
Adjustment for no-passing zones, fnp	40.5			
Percent time-spent-following, PTSFd	70.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.28	
Peak 15-min vehicle-miles of travel, VMT15	167	veh-mi
Peak-hour vehicle-miles of travel, VMT60	623	veh-mi
Peak 15-min total travel time, TT15	3.5	veh-h
Capacity from ATS, CdATS	1669	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1669	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	47.3	mi/h
Percent time-spent-following, PTSFd (from above)	70.6	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	478.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.57
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak + Approved
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	402	veh/h
Opposing direction volume, Vo	445	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.982		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	440	pc/h	484	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	48.4	mi/h
Percent Free Flow Speed, PFFS	83.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	432	pc/h	478	pc/h
Base percent time-spent-following,(note-4) BPTSFd	46.2	%		
Adjustment for no-passing zones, fnp	40.8			
Percent time-spent-following, PTSFd	65.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.26	
Peak 15-min vehicle-miles of travel, VMT15	151	veh-mi
Peak-hour vehicle-miles of travel, VMT60	563	veh-mi
Peak 15-min total travel time, TT15	3.1	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.4	mi/h
Percent time-spent-following, PTSFd (from above)	65.6	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	432.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.52
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak + Approved
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	442	veh/h
Opposing direction volume, Vo	445	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	471	pc/h	474	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	47.3	mi/h
Percent Free Flow Speed, PFFS	83.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	465	pc/h	468	pc/h

Base percent time-spent-following,(note-4) BPTSFd	49.1	%
Adjustment for no-passing zones, fnp	40.8	
Percent time-spent-following, PTSFd	69.4	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.28	
Peak 15-min vehicle-miles of travel, VMT15	163	veh-mi
Peak-hour vehicle-miles of travel, VMT60	619	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	47.3	mi/h
Percent time-spent-following, PTSFd (from above)	69.4	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	465.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.56
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >- 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak + Approved
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1			Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft		% Trucks and buses	6	%
Lane width	12.0	ft		% Trucks crawling	0.0	%
Segment length	1.4	mi		Truck crawl speed	0.0	mi/hr
Terrain type	Level			% Recreational vehicles	4	%
Grade: Length	-	mi		% No-passing zones	83	%
Up/down	-	%		Access point density	8	/mi

Analysis direction volume, Vd	445	veh/h
Opposing direction volume, Vo	442	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	474	pc/h	471	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	48.2	mi/h
Percent Free Flow Speed, PFFS	83.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	468	pc/h	465	pc/h
Base percent time-spent-following,(note-4) BPTSFd	49.5	%		
Adjustment for no-passing zones, fnp	41.1			
Percent time-spent-following, PTSFd	70.1	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.28	
Peak 15-min vehicle-miles of travel, VMT15	164	veh-mi
Peak-hour vehicle-miles of travel, VMT60	623	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.2	mi/h
Percent time-spent-following, PTSFd (from above)	70.1	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	468.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.56
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	307	veh/h
Opposing direction volume, Vo	273	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	314	pc/h	279	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.4	mi/h
Average travel speed, ATSd	49.0	mi/h
Percent Free Flow Speed, PFFS	85.9	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	309	pc/h	275	pc/h
Base percent time-spent-following,(note-4) BPTSFd	33.2	%		
Adjustment for no-passing zones, fnp	54.9			
Percent time-spent-following, PTSFd	62.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	107	veh-mi
Peak-hour vehicle-miles of travel, VMT60	430	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.0	mi/h
Percent time-spent-following, PTSFd (from above)	62.2	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	307.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.38
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	273	veh/h
Opposing direction volume, Vo	307	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	279	pc/h	314	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.3	mi/h
Average travel speed, ATSd	50.1	mi/h
Percent Free Flow Speed, PFFS	86.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	275	pc/h	309	pc/h
Base percent time-spent-following,(note-4) BPTSFd	30.6	%		
Adjustment for no-passing zones, fnp	55.3			
Percent time-spent-following, PTSFd	56.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	96	veh-mi
Peak-hour vehicle-miles of travel, VMT60	382	veh-mi
Peak 15-min total travel time, TT15	1.9	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	50.1	mi/h
Percent time-spent-following, PTSFd (from above)	56.6	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	273.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.29
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	279	veh/h
Opposing direction volume, Vo	297	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	286	pc/h	304	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.3	mi/h
Average travel speed, ATSd	49.1	mi/h
Percent Free Flow Speed, PFFS	86.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	281	pc/h	299	pc/h
Base percent time-spent-following,(note-4) BPTSFd	31.4	%		
Adjustment for no-passing zones, fnp	55.5			
Percent time-spent-following, PTSFd	58.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	98	veh-mi
Peak-hour vehicle-miles of travel, VMT60	391	veh-mi
Peak 15-min total travel time, TT15	2.0	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.1	mi/h
Percent time-spent-following, PTSFd (from above)	58.3	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	279.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.33
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	297	veh/h
Opposing direction volume, Vo	279	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	304	pc/h	286	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.5	mi/h
Average travel speed, ATSd	49.9	mi/h
Percent Free Flow Speed, PFFS	86.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	299	pc/h	281	pc/h
Base percent time-spent-following,(note-4) BPTSFd	32.2	%		
Adjustment for no-passing zones, fnp	55.8			
Percent time-spent-following, PTSFd	61.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	104	veh-mi
Peak-hour vehicle-miles of travel, VMT60	416	veh-mi
Peak 15-min total travel time, TT15	2.1	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.9	mi/h
Percent time-spent-following, PTSFd (from above)	61.0	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	297.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.36
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak plus Project
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	318	veh/h
Opposing direction volume, Vo	296	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	350	pc/h	326	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.1	mi/h
Average travel speed, ATSd	48.6	mi/h
Percent Free Flow Speed, PFFS	85.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	344	pc/h	320	pc/h
Base percent time-spent-following,(note-4) BPTSFd	37.4	%		
Adjustment for no-passing zones, fnp	51.2			
Percent time-spent-following, PTSFd	63.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.21	
Peak 15-min vehicle-miles of travel, VMT15	120	veh-mi
Peak-hour vehicle-miles of travel, VMT60	445	veh-mi
Peak 15-min total travel time, TT15	2.5	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.6	mi/h
Percent time-spent-following, PTSFd (from above)	63.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	F	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	341.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.40
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak plus Project
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93		
Shoulder width	8.0	ft	% Trucks and buses	6	%	
Lane width	12.0	ft	% Trucks crawling	0.0	%	
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr	
Terrain type	Level		% Recreational vehicles	4	%	
Grade: Length	-	mi	% No-passing zones	83	%	
Up/down	-	%	Access point density	8	/mi	

Analysis direction volume, Vd	296	veh/h
Opposing direction volume, Vo	318	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	326	pc/h	350	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.1	mi/h
Average travel speed, ATSd	49.6	mi/h
Percent Free Flow Speed, PFFS	85.6	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	320	pc/h	344	pc/h
Base percent time-spent-following,(note-4) BPTSFd	35.9	%		
Adjustment for no-passing zones, fnp	51.5			
Percent time-spent-following, PTSFd	60.7	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	111	veh-mi
Peak-hour vehicle-miles of travel, VMT60	414	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.6	mi/h
Percent time-spent-following, PTSFd (from above)	60.7	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	318.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.37
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak plus Project
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd 293 veh/h
Opposing direction volume, Vo 318 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	316	pc/h	343	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.0	mi/h
Average travel speed, ATSd	48.8	mi/h
Percent Free Flow Speed, PFFS	85.7	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	310	pc/h	337	pc/h
Base percent time-spent-following,(note-4) BPTSFd	34.0	%		
Adjustment for no-passing zones, fnp	52.1			
Percent time-spent-following, PTSFd	59.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	108	veh-mi
Peak-hour vehicle-miles of travel, VMT60	410	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.8	mi/h
Percent time-spent-following, PTSFd (from above)	59.0	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	308.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.35
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak plus Project
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	318	veh/h
Opposing direction volume, Vo	293	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	343	pc/h	316	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.3	mi/h
Average travel speed, ATSd	49.6	mi/h
Percent Free Flow Speed, PFFS	85.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	337	pc/h	310	pc/h
Base percent time-spent-following,(note-4) BPTSFd	35.6	%		
Adjustment for no-passing zones, fnp	52.4			
Percent time-spent-following, PTSFd	62.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.20	
Peak 15-min vehicle-miles of travel, VMT15	117	veh-mi
Peak-hour vehicle-miles of travel, VMT60	445	veh-mi
Peak 15-min total travel time, TT15	2.4	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.6	mi/h
Percent time-spent-following, PTSFd (from above)	62.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	F	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	334.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.39
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak + A + P
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	484	veh/h
Opposing direction volume, Vo	450	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	527	pc/h	490	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	46.8	mi/h
Percent Free Flow Speed, PFFS	82.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	520	pc/h	484	pc/h
Base percent time-spent-following,(note-4) BPTSFd	53.0	%		
Adjustment for no-passing zones, fnp	38.2			
Percent time-spent-following, PTSFd	72.8	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.31	
Peak 15-min vehicle-miles of travel, VMT15	182	veh-mi
Peak-hour vehicle-miles of travel, VMT60	678	veh-mi
Peak 15-min total travel time, TT15	3.9	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	46.8	mi/h
Percent time-spent-following, PTSFd (from above)	72.8	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	520.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.62
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak + A + P
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	450	veh/h
Opposing direction volume, Vo	484	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	490	pc/h	527	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	47.9	mi/h
Percent Free Flow Speed, PFFS	82.6	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	484	pc/h	520	pc/h
Base percent time-spent-following,(note-4) BPTSFd	51.1	%		
Adjustment for no-passing zones, fnp	38.5			
Percent time-spent-following, PTSFd	69.7	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.29	
Peak 15-min vehicle-miles of travel, VMT15	169	veh-mi
Peak-hour vehicle-miles of travel, VMT60	630	veh-mi
Peak 15-min total travel time, TT15	3.5	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	47.9	mi/h
Percent time-spent-following, PTSFd (from above)	69.7	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	483.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.58
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone:
E-Mail:
Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak + A + P
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	481	veh/h
Opposing direction volume, Vo	493	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	512	pc/h	525	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	46.8	mi/h
Percent Free Flow Speed, PFFS	82.1	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, FT	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	506	pc/h	519	pc/h
Base percent time-spent-following,(note-4) BPTSFd	52.5	%		
Adjustment for no-passing zones, fnp	38.0			
Percent time-spent-following, PTSFd	71.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.30	
Peak 15-min vehicle-miles of travel, VMT15	177	veh-mi
Peak-hour vehicle-miles of travel, VMT60	673	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	46.8	mi/h
Percent time-spent-following, PTSFd (from above)	71.3	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	506.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.60
Bicycle LOS	C

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak + A + P
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2019
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.95	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	493	veh/h
Opposing direction volume, Vo	481	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.988		0.988	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	525	pc/h	512	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	47.7	mi/h
Percent Free Flow Speed, PFFS	82.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	519	pc/h	506	pc/h
Base percent time-spent-following,(note-4) BPTSFd	52.9	%		
Adjustment for no-passing zones, fnp	38.3			
Percent time-spent-following, PTSFd	72.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.31	
Peak 15-min vehicle-miles of travel, VMT15	182	veh-mi
Peak-hour vehicle-miles of travel, VMT60	690	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1680	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1680	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	47.7	mi/h
Percent time-spent-following, PTSFd (from above)	72.3	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	518.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.61
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak plus Project
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	346	veh/h
Opposing direction volume, Vo	321	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	354	pc/h	329	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.1	mi/h
Average travel speed, ATSd	48.6	mi/h
Percent Free Flow Speed, PFFS	85.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	348	pc/h	323	pc/h
Base percent time-spent-following,(note-4) BPTSFd	37.6	%		
Adjustment for no-passing zones, fnp	50.8			
Percent time-spent-following, PTSFd	63.9	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.21	
Peak 15-min vehicle-miles of travel, VMT15	121	veh-mi
Peak-hour vehicle-miles of travel, VMT60	484	veh-mi
Peak 15-min total travel time, TT15	2.5	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.6	mi/h
Percent time-spent-following, PTSFd (from above)	63.9	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TI15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	346.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.41
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekday PM Peak plus Project
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	321	veh/h
Opposing direction volume, Vo	346	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	329	pc/h	354	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.1	mi/h
Average travel speed, ATSd	49.6	mi/h
Percent Free Flow Speed, PFFS	85.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	323	pc/h	348	pc/h
Base percent time-spent-following,(note-4) BPTSFd	36.0	%		
Adjustment for no-passing zones, fnp	51.1			
Percent time-spent-following, PTSFd	60.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	112	veh-mi
Peak-hour vehicle-miles of travel, VMT60	449	veh-mi
Peak 15-min total travel time, TT15	2.3	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.6	mi/h
Percent time-spent-following, PTSFd (from above)	60.6	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	321.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.37
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.80

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak plus Project
Highway	US-101 - NB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	79	%
Up/down	-	%	Access point density	12	/mi

Analysis direction volume, Vd	318	veh/h
Opposing direction volume, Vo	345	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	325	pc/h	353	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	3.0	mi/h
Free-flow speed, FFSd	57.0	mi/h
Adjustment for no-passing zones, fnp	3.0	mi/h
Average travel speed, ATSd	48.8	mi/h
Percent Free Flow Speed, PFFS	85.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	320	pc/h	347	pc/h
Base percent time-spent-following,(note-4) BPTSFd	35.8	%		
Adjustment for no-passing zones, fnp	51.0			
Percent time-spent-following, PTSFd	60.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	111	veh-mi
Peak-hour vehicle-miles of travel, VMT60	445	veh-mi
Peak 15-min total travel time, TT15	2.3	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	48.8	mi/h
Percent time-spent-following, PTSFd (from above)	60.3	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi

Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	318.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.37
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Julia Walker
Agency/Co.	W-Trans
Date Performed	3/24/2020
Analysis Time Period	Weekend PM Peak plus Project
Highway	US-101 - SB
From/To	Anchor Way - Humboldt Rd
Jurisdiction	Del Norte County
Analysis Year	2039
Description	TIS - Hambro Family Fun Center

Input Data

Highway class	Class 1		Peak hour factor, PHF	1.00	
Shoulder width	8.0	ft	% Trucks and buses	6	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	83	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	345	veh/h
Opposing direction volume, Vo	318	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.977		0.977	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	353	pc/h	325	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h

Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	58.0	mi/h
Adjustment for no-passing zones, fnp	3.3	mi/h
Average travel speed, ATSd	49.5	mi/h
Percent Free Flow Speed, PFFS	85.3	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.994		0.994	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	347	pc/h	320	pc/h
Base percent time-spent-following,(note-4) BPTSFd	37.6	%		
Adjustment for no-passing zones, fnp	51.3			
Percent time-spent-following, PTSFd	64.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.21	
Peak 15-min vehicle-miles of travel, VMT15	121	veh-mi
Peak-hour vehicle-miles of travel, VMT60	483	veh-mi
Peak 15-min total travel time, TT15	2.4	veh-h
Capacity from ATS, CdATS	1661	veh/h
Capacity from PTSF, CdPTSF	1690	veh/h
Directional Capacity	1661	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	49.5	mi/h
Percent time-spent-following, PTSFd (from above)	64.3	
Level of service, LOSd (from above)	C	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	345.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.41
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Appendix C

Left-Turn Lane Warrant Spreadsheets

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekday PM Peak Period - Existing plus Project Volumes

Direction of Analysis Street: North/South
Cross Street Intersects: From the East

US-101

Northbound Volumes (veh/hr)
Through Volume = 279
Right Turn Volume = 0

Northbound Speed Limit: 55 mph
Northbound Configuration: 2 Lanes - Undivided

Project Driveway

US-101

Southbound Volumes (veh/hr)
248 = Through Volume
9 = Left Turn Volume

Southbound Speed Limit: 55 mph
Southbound Configuration: 2 Lanes - Undivided

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	279
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

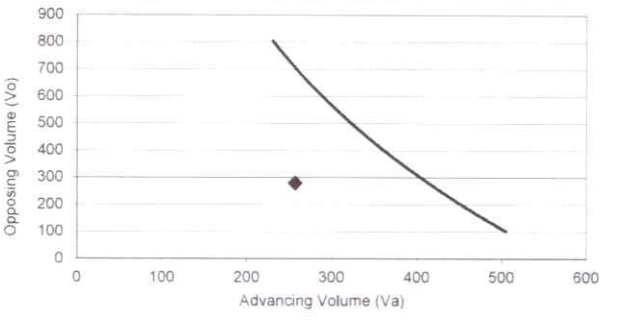
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	279
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 3.5 %



◆ Study Intersection
Two lane roadway warrant threshold for: 55 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

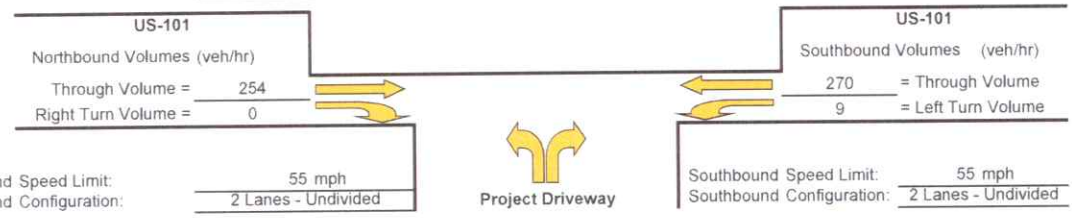
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekend PM Peak Period - Existing plus Project Volumes

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Speed Limit: 55 mph
Northbound Configuration: 2 Lanes - Undivided

Southbound Speed Limit: 55 mph
Southbound Configuration: 2 Lanes - Undivided

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	254
If AV<Va then warrant is met		-

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

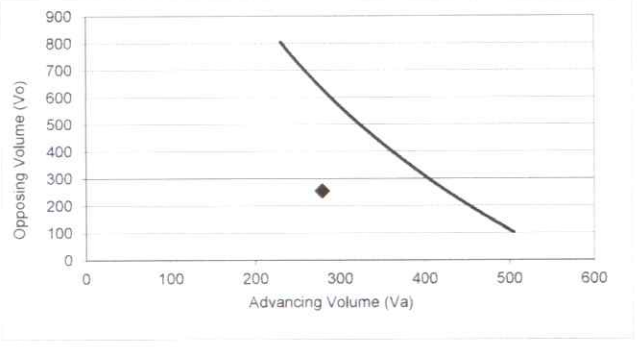
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	254
If AV<Va then warrant is met		-

Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 3.2 %



◆ Study Intersection
——— Two lane roadway warrant threshold for: 55 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekday PM Peak Period - Existing plus Approved plus Project Volumes

Direction of Analysis Street: North/South
Cross Street Intersects: From the East

US-101

Northbound Volumes (veh/hr)

Through Volume = 327
Right Turn Volume = 0

Northbound Speed Limit: 55 mph
Northbound Configuration: 2 Lanes - Undivided

Project Driveway

US-101

Southbound Volumes (veh/hr)

297 = Through Volume
9 = Left Turn Volume

Southbound Speed Limit: 55 mph
Southbound Configuration: 2 Lanes - Undivided

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	327
If AV<Va then warrant is met		-

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

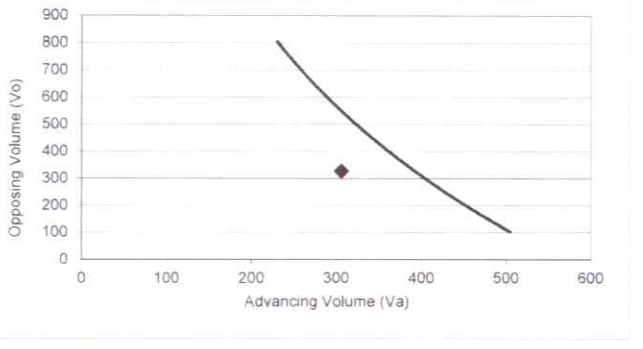
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	327
If AV<Va then warrant is met		-

Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 2.9 %



◆ Study Intersection
Two lane roadway warrant threshold for: 55 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekend PM Peak Period - Existing plus Approved plus Project Volumes

Direction of Analysis Street: North/South

Cross Street Intersects: From the East

US-101

Northbound Volumes (veh/hr)

Through Volume = 324

Right Turn Volume = 0

Northbound Speed Limit: 55 mph

Northbound Configuration: 2 Lanes - Undivided

US-101

Southbound Volumes (veh/hr)

340 = Through Volume

9 = Left Turn Volume

Southbound Speed Limit: 55 mph

Southbound Configuration: 2 Lanes - Undivided

Project Driveway

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	324
If AV<Va then warrant is met		-

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

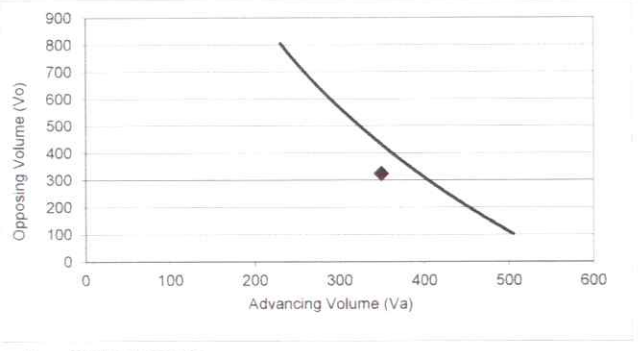
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	324
If AV<Va then warrant is met		-

Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 2.6 %



◆ Study Intersection

Two lane roadway warrant threshold for: 55 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekday PM Peak Period - Future plus Project Volumes

Direction of Analysis Street: North/South

Cross Street Intersects: From the East

US-101

Northbound Volumes (veh/hr)

Through Volume = 307

Right Turn Volume = 0

Northbound Speed Limit: 55 mph

Northbound Configuration: 2 Lanes - Undivided

Project Driveway

US-101

Southbound Volumes (veh/hr)

273 = Through Volume

9 = Left Turn Volume

Southbound Speed Limit: 55 mph

Southbound Configuration: 2 Lanes - Undivided

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	307
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

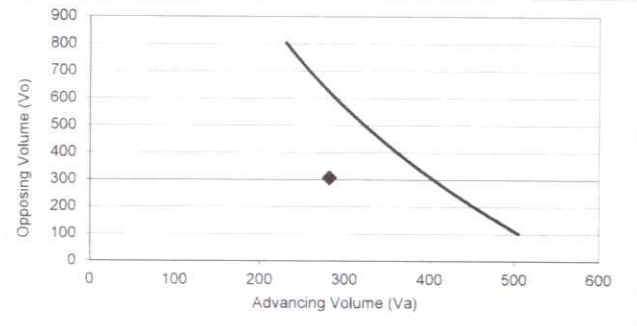
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	307
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 3.2 %



◆ Study Intersection

Two lane roadway warrant threshold for: 55 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: US-101/Project Driveway
Study Scenario: Weekend PM Peak Period - Future plus Project Volumes

Direction of Analysis Street: North/South

Cross Street Intersects: From the East

US-101

Northbound Volumes (veh/hr)

Through Volume = 279

Right Turn Volume = 0

Northbound Speed Limit: 55 mph

Northbound Configuration: 2 Lanes - Undivided

Project Driveway

US-101

Southbound Volumes (veh/hr)

297 = Through Volume

9 = Left Turn Volume

Southbound Speed Limit: 55 mph

Southbound Configuration: 2 Lanes - Undivided

Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	279
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Northbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

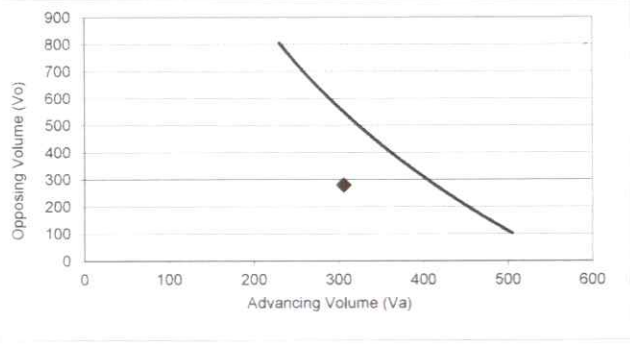
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	279
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 2.9 %



◆ Study Intersection

Two lane roadway warrant threshold for: 55 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, as adopted by AASHTO's "A Policy on Geometric Design of Highways and Streets", 6th Edition.

10/21/20 Responses to Caltrans Hambro Fun Center Project Comments

Hambro responses to Caltrans preliminary project comments are included below in *blue italic text*.

10/5/2020 Hambro Fun Center project comments

Comments on behalf of Permits, Traffic Operations, and Traffic Safety.

Traffic Operations and Traffic Safety generally agree with most of the TIS Conclusions and Recommendations, except for the following:

- **Caltrans comment:** We do not agree with the conclusion: *"Existing facilities for pedestrians, bicyclist, and transit users are adequate, given the semi-rural location. It is assumed that most or all of the project trips would be made by motor vehicle."* The nearest sidewalk is about 900 feet away, which is a walkable distance. To be consistent with the goals of the State and Caltrans to encourage bicycling and walking, we recommend a 6-foot-wide sidewalk with curb and gutter be included across the entire project parcel frontage. The back of the sidewalk should coincide with the Caltrans right of way line. The sidewalk and driveways shall be ADA and Accessibility compliant. Paved shoulder width shall be 8 feet minimum (10 feet preferred minimum), or wider. To encourage bicycle trips, separate and secure bicycle parking facilities should be provided for both customers and employees to encourage bicycle trips.
- ***Response:*** *The nearest sidewalk appears to be at the west side of U.S. 101 at Anchor Way; the proposed project is on the east side of U.S. 101. Development north of the project (on the east side of Highway 101) is unlikely. Therefore, there would be a large gap in the sidewalk that would likely never get built and would require crossing the highway to get to the existing sidewalk at Anchor Way. Additionally, sidewalks are an urban amenity and they seem quite out of place in this setting. Pedestrians are more likely to want to walk along the beach than along the highway where the speed limit is 50-55 mph. We understand the goal of encouraging bicycling and walking, however we do not agree that a sidewalk in this setting is the way to encourage those things. Pedestrian and bicycle connectivity in this area should be planned and coordinated on a regional level, not piecemealed together. Secure bicycle parking facilities can be provided on the project site.*
- We noticed the traffic volumes used for the left turn warrant appear to be from traffic surveys conducted in March 2020. Traffic volumes are seasonal in this area, driven by tourism, and are typically highest in July and early August. We recommend the left turn volume warrant be re-run with peak volumes from peak month(s) to account for tourist traffic.
- ***Response:*** *A review of the analysis indicates that volumes would need to be substantially higher to trigger the turn lane warrant, and seasonal variations typically don't exceed about 15%. It is further noted that because of COVID traffic volumes are down, so even had we done the counts in July they would likely have been less than what we got in March. Unless Caltrans has summertime data they can provide for our use, we don't have enough information to update our analysis as requested, but as noted above, we also don't think it would change the answer.*
- While the 4 collisions reported in the area of the project do not meet a safety warrant for a left turn lane, we do highly recommend the applicant consider constructing the left turn lane prior to opening day, phase 1 (rather than for phase 2). While reviewing collisions, we did discover a

southbound (SB) rear-end collision where the driver at-fault admitted to being distracted by the view of the ocean. Casual observations in the area reveal there is a significant amount of activity associated with the proximity of the ocean, beach and a large turnout directly across from the project site. Any one of these items can pose a distraction to drivers, which could lead to rear-end collisions with SB vehicles waiting to turn left into the project site.

- ***Response:*** *As noted above and shown in the traffic study, the left hand turn lane is not warranted until Phase 2. We request County approval of the proposed Phases, with the turn lane installed during Phase 2.*
- The applicant should consider installation of Electric Vehicle (EV) charging stations to reduce Green House Gas (GHG) emissions. There may be 3rd parties interested in co-location of EV charging stations, on the project site, at no or subsidized cost to the applicant. If the EV charging stations are available to the public for at least 16 hours a day, the applicant may request Caltrans consider placement of Electric Vehicle Charging Stations Signs (G66-21(CA)) to direct motorists to the project site.
- ***Response:*** *Hambro will consider installation of EV charging stations on the project site.*

Hambro will comply with required Caltrans Permit requirements as discussed below.

Permits comments:

Any improvements within Caltrans right of way will require an encroachment permit and must conform to Caltrans design standards and guidance, including the Highway Design Manual (HDM), Design Information Bulletins (DIB), Standard Plans and Specifications.

Depending on the complexity of the project and the dollar amount, it is possible that any work done within right of way will be considered an oversight project. Any permanent change to the pavement within our right of way (i.e. striping or additional pavement) will require a PEER (Permit Engineering Evaluation Report), the PEER is required to be filled out by the applicants engineer. Please refer to Chapter 200 of the Encroachment Perming Manual (EPM) regarding PEER and Oversight Projects, found here: https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/encroachment-permits/chapter-2-ada.pdf

Any features that deviate from the HDM will require a design exception. Design exceptions are covered in the PDPM in Appendix BB, found here: https://dot.ca.gov/programs/design/manual-project-development-procedures-manual-pdpm and possibly a DSDD may be needed. These documents are reviewed and approved by Design. Design needs to be involved with the IGR review.

The applicant will need to submit Caltrans form #TR-0405 with their application and this project will likely require a bond. The project also must be designed to conform with Design Information Bulletin (DIB) 82-06, Pedestrian Accessibility Guidelines for Highway Projects.

No advertising is allowed within Caltrans right of way. Any advertising displays visible from State Highways must comply with Caltrans Outdoor Advertising (ODA). This unit is based out of Sacramento

and operates independently of Caltrans District 1. For more information, please refer to their website: https://dot.ca.gov/programs/traffic-operations/oda

Encroachment permit applications are reviewed for consistency with State standards and are subject to Department approval. To streamline the permit application and review process, we require the applicant to schedule a pre application meeting with our Permit staff prior to submitting an application. Requests for permit applications can be sent to: Caltrans District 1 Permits Office, P.O. Box 3700, Eureka, CA 95502-3700, or requested by phone at (707) 498-5684. For additional information, the Caltrans Encroachment Permit Manual and Standard Application is available online at: https://dot.ca.gov/programs/traffic-operations/ep

Preliminary Comments Received

COUNTY OF DEL NORTE

Taylor Carsley <tcarsley@co.del-norte.ca.us>

Follow-up on Hambro

O'connell, Gregory@Wildlife <Gregory.OConnell@wildlife.ca.gov> Mon, Oct 19, 2020 at 12:37 PM
To: Taylor Carsley <tcarsley@co.del-norte.ca.us>
Cc: "Gedik, Tamara@Coastal" <Tamara.Gedik@coastal.ca.gov>, Frank Galea <frankgalea@charter.net>

Hi Taylor,

Thanks for meeting me on Sept 30, 2020, at the Hambro Group's proposed Family Entertainment Center site on Del Norte Co APN 115-020-042. We were joined by Coastal Commission staff, the project proponent and their biologist, Frank Galea. CDFW may agree to the applicant's request for a reduction of the 100-ft buffer from the coastal wetland environmentally sensitive habitat area (ESHA) if:

1. Project related noise levels at the ESHA do not exceed 65dB. CDFW would prefer project related noise levels not exceed 55-60db (see attached Barber paper) at the willow/Sitka spruce line, but at a maximum project related noise levels at this line should not exceed 65dB. Based on the project description and analyses from the July 2020 Biological Assessment report, it will be difficult to achieve this with a 25-ft buffer and possibly a 50-ft buffer. I recommend further analysis by the applicant that includes more precise analysis and fewer assumptions.
2. The project should not adversely affect water quality of the wetland. This includes discharge of stormwater runoff from the proposed development site into the wetland.
3. Project related light:
    a. uses LEDs with color temperatures less than 3000 Kelvins, and
    b. ensures avoidance of "trespass of light" (i.e., illumination outside of the target area). Trespass of light typically happens when lights are unshielded or light fixtures have an exposed bulb. To minimize the trespass of artificial light, fixtures need to be fully shielded and downward facing. Additional resources regarding dark sky friendly fixtures and where they can be purchased is available on the International Dark Sky Association webpage (https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/).
4. The project area, habitat buffer, and ESHA have no trash or refuse.
5. The project proposes and implements habitat restoration or enhancement within the habitat area adjacent to the project (e.g. invasive species removal).

Thanks again,

Greg O'Connell

Environmental Scientist

Coastal Conservation Planning

California Department of Fish and Wildlife

619 Second Street

Eureka, CA 95501

Gregory.OConnell@Wildlife.ca.gov

From: Taylor Carsley <tcarsley@co.del-norte.ca.us>
Sent: Wednesday, October 7, 2020 9:41 AM
To: O'connell, Gregory@Wildlife <Gregory.OConnell@Wildlife.ca.gov>
Subject: Follow-up on Hambro

[Quoted text hidden]

Barber_etAl_2009_Noise.pdf
1988K