Technical Memorandum

January 27, 2026

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Project Name	Arcata Wastewater Treatment Facility Sea Level Rise Adaptation Feasibility Study		
Subject	Preliminary Environmental Review of Alternatives – **DRAFT for partner review**		

1. Introduction

The City of Arcata's (City) existing wastewater treatment system is adjacent to Humboldt Bay and will become more at risk of flooding due to sea level rise (Figure 1). The City is evaluating strategies for adapting, protecting, or relocating (retreating) the City's wastewater treatment system to maintain safety and regulatory compliance. To support this evaluation, a feasibility study[1] ("Feasibility Study") is being developed that evaluates various wastewater treatment system adaptation, protection, and retreat alternatives. Following is a preliminary assessment of the environmental effects and permitting pathways for the alternatives identified as potentially feasible in the Feasibility Study. The alternatives considered are at an early design level and, therefore, assumptions are made regarding each alternative's design components. As design advances for alternative(s), it is expected that project details, related environmental effects, and regulatory requirements may change. Hence, the information presented in this memo should be considered conceptual and subject to change. To support the analysis, case studies are summarized for similar projects that required hazard protection or relocation of essential public infrastructure.

[1] Rural Community Assistance Corp. and City of Arcata. 2025. Arcata Wastewater Treatment Facility Sea Level Rise Adaptation Feasibility Study. Draft.

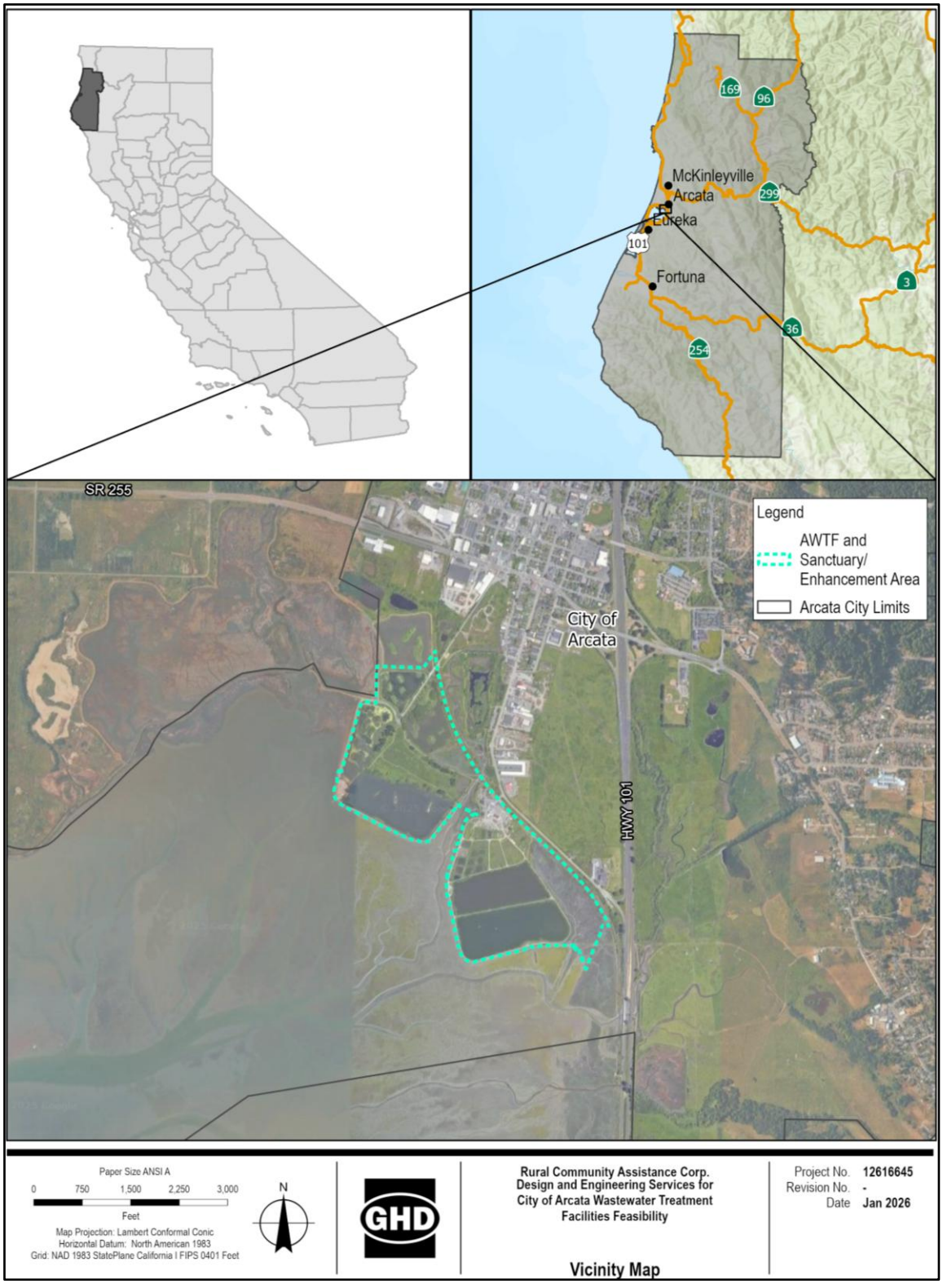

Figure 1. Existing Arcata wastewater treatment system location.

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1.1 Purpose and Organization of the Memo

This Preliminary Environmental Review of Alternatives memo provides an initial environmental review of the alternatives described in the Feasibility Study. It is expected that readers of this memo have also reviewed the Feasibility Study. No field studies (e.g., biological or cultural/historic investigations) were completed to inform this memo. All information was sourced from past studies, reports, and online database resources.

This memo is organized into the following sections:

- **Section 1** introduces the project and the purpose of the memo.
- **Section 2** outlines alternatives included in the Feasibility Study analysis and those that were considered infeasible.
- **Section 3** describes possible project elements and summarizes which elements are relevant to each alternative.
- **Section 4** presents an overview of existing conditions in the two study areas (existing site and Retreat Study Area (Figure 2)) and reviews potential environmental effects for project elements.
- **Section 5** identifies potential permits and authorizations likely needed for each alternative and summarizes relevant case studies.
- **Section 6** describes technical information needed to develop California Environmental Quality Act (CEQA) documentation and permit application packages for the alternatives.

2. Alternatives Considered

The major components of the existing Arcata wastewater system include the:

- Arcata Wastewater Treatment Facility (AWTF)
- Enhancement Marshes
- Collection System
- Final Wastewater Discharge Outfall

Following is a summary of how these components would be modified, retreated or abandoned under eight alternatives. These alternatives are further described in the Feasibility Study. Possible project elements of each alternative are described in Section 3. Details of each alternative would require further study and design prior to CEQA documentation and permitting.

Alternative 1. Augment AWTF Levees and Maintain and Adaptive Management of the Enhancement Marshes

a. AWTF: The AWTF levees would be raised to 15 feet NAVD88.
b. Enhancement Marshes: The Enhancement Marshes' levees would be maintained to bring vulnerable low sections up to 11.5 feet NAVD88. Adaptive management would monitor the marshes and their capacity to accommodate salinity increases from overtopping events to inform future flood resiliency planning.
c. Collection System: Wastewater would continue to be routed through the existing collection system to the AWTF site for treatment.
d. Final Wastewater Discharge: The existing bay discharge would not be modified.

Alternative 2. Augment AWTF Levees and Augment Enhancement Marshes' Levees

a. AWTF: The AWTF levees would be raised to 15 feet NAVD88.
b. Enhancement Marshes: The Enhancement Marshes' levees would be raised to 15 feet NAVD88.

c. Collection System: Wastewater would continue to be routed through the existing collection system to the AWTF site for treatment.

d. Final Wastewater Discharge: The existing bay discharge would not be modified.

Alternative 3. Augment AWTF Levees and New Enhancement

a. AWTF: The AWTF levees would be raised to 15 feet NAVD88.

b. Enhancement Marshes: A new enhancement project would be developed within the Retreat Study Area (Figure 2). Because a specific enhancement project has not been defined, for the purposes of this memo, it is assumed that new Enhancement Marshes would be constructed. Because design, permitting, and construction of new Enhancement Marshes would likely take 20-30 years to complete, the existing enhancement marsh levee would need to be maintained in the near term. Once the new Enhancement Marshes are operational, the current site would be restored.

c. Collection System: Wastewater would continue to be routed to the AWTF site for treatment.

d. Final Wastewater Discharge: Wastewater would continue to be discharged to Humboldt Bay at the current location after being routed through a new enhancement marsh. Additional piping and pumping would be needed to transfer effluent from the AWTF to the new Enhancement Marshes and then to the existing discharge point.

Alternative 4: Augment AWTF Levees and Ocean Discharge

a. AWTF: The AWTF levees would be raised to 15 feet NAVD88.

b. Enhancement Marshes: The Enhancement Marshes would no longer be used, and the site would be restored.

c. Collection System: Wastewater would continue to be routed to the AWTF site for treatment.

d. Final Wastewater Discharge: Wastewater would be pumped from the existing AWTF site to the existing Redwood Marine Terminal II (RMT II) Ocean Outfall and then discharged to the ocean.

Alternative 5. Retreat AWTF and Maintain and Adaptive Management of the Enhancement Marshes

a. AWTF: The AWTF would be retreated to a site within the Retreat Study Area. The existing AWTF location would be restored.

b. Enhancement Marshes: The Enhancement Marshes' levees would be maintained to bring low sections up to 11.5 feet NAVD88. Adaptive management would monitor the marshes and their capacity to accommodate salinity increases from overtopping events to inform future flood resiliency planning.

c. Collection System: The existing collection system would be modified. The collection system would continue to route effluent to the current AWTF site and a new pump station at the AWTF site would be constructed to pump effluent through a new transmission line to the relocated treatment facility.

d. Final Wastewater Discharge: Wastewater would be pumped from the retreated treatment facility site to the existing bay discharge.

Alternative 6. Retreat AWTF and Augment Enhancement Marshes' Levees

a. AWTF: The AWTF would be retreated to a site within the Retreat Study Area. The existing AWTF location would be restored.

b. Enhancement Marshes: The Enhancement Marshes' levees would be raised to 15 feet NAVD88.

c. Collection System: The existing collection system would be modified. The collection system would continue to route effluent to the current AWTF and a new pump station would be constructed at the AWTF to pump effluent through a new transmission line to the relocated treatment facility.

d. Final Wastewater Discharge: Wastewater would be pumped from the new treatment facility to the Enhancement Marshes prior to bay discharge. The existing bay discharge would not be modified.

Alternative 7. Retreat AWTF and New Enhancement

a. AWTF: The AWTF would be retreated to a site within the Retreat Study Area. The existing AWTF location would be restored.

b. Enhancement Marshes: New enhancement marsh(es) would be developed within the Retreat Study Area. Assuming design, permitting, and construction of the new treatment facility Enhancement Marshes would take 20-30 years, the existing enhancement marsh levee would need to be maintained in the near term. Once the new Enhancement Marshes and treatment facility are operational, the current Enhancement Marshes site would be restored.

c. Collection System: The existing collection system would be modified. The collection system would continue to route effluent to the current AWTF site and a new pump station at the AWTF would be constructed to pump effluent through a new transmission line to the relocated treatment facility.

d. Final Wastewater Discharge: Wastewater would continue to be discharged to Humboldt Bay at the current location. New piping and pumping would be constructed to transfer effluent from the new treatment facility to the new Enhancement Marshes and then to the existing discharge point.

Alternative 8. Retreat AWTF and Ocean Discharge

a. AWTF: The AWTF would be retreated to a site within the Retreat Study Area (Figure 2). The existing AWTF location would be restored.

b. Enhancement Marshes: The existing enhancement marsh levee would be maintained in the near term, and the site would be restored once the ocean outfall connection is completed.

c. Collection System: The existing collection system would be modified. The collection system would continue to route effluent to the current AWTF and a new pump station would be constructed at the AWTF site to pump effluent through a new transmission line to the retreated treatment facility.

d. Final Wastewater Discharge: Wastewater would be pumped from the retreated treatment facility site to the existing RMT-II Ocean Outfall and then discharged to the ocean.

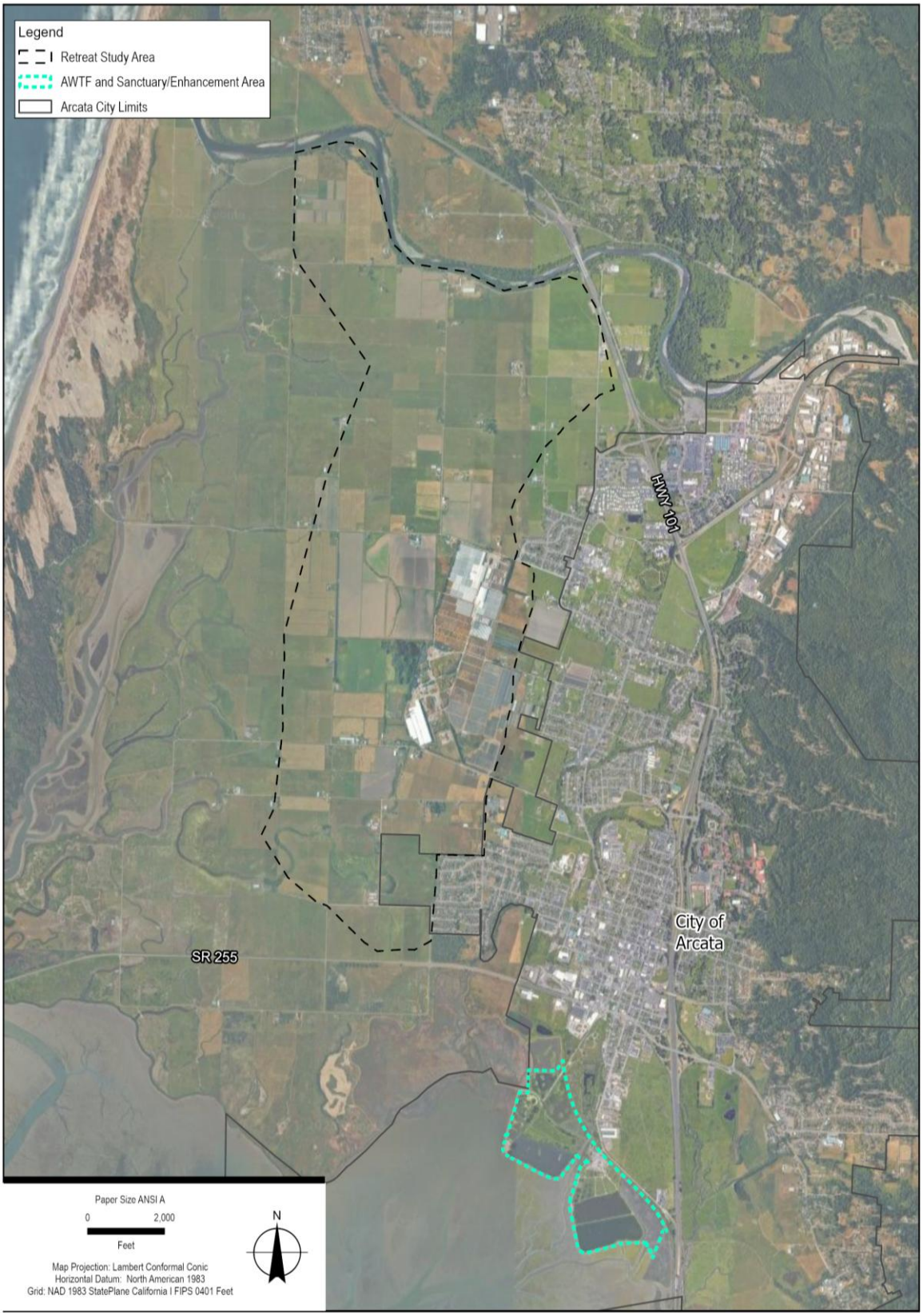

Figure 2. Retreat Study Area.

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2.1 Alternatives Not Evaluated

According to the Feasibility Study, the following alternatives were determined to be infeasible or did not align with the goals of the wastewater system adaptation project and, therefore, are not considered in this memo:

- Consolidation with McKinleyville Community Services District Wastewater System
- Consolidation with City of Eureka Wastewater System
- New Ocean Outfall Discharge
- Part-time surface Water Discharge and Summertime Land Application
- Year-Round Surface Water Discharge
- Year-Round Land Application
- Groundwater Injection and Indirect Potable Reuse
- Nature-Based Only Solutions

In addition to the alternatives listed above, several other adaptation strategies discussed in the Feasibility Study are not evaluated further in this document. They include collection system adaptations for raising electrical equipment and continued collection systems upgrades. These adaptation strategies are being implemented as part of the City's capital improvement program. Also, decentralized treatment, including small scale recycling and composting toilets, could be implemented by the City but would not eliminate the need for adaptations to the treatment or collection system and, therefore, these actions are also not further evaluated in this memo.

3. Adaptation Project Elements

Each alternative described in Section 1 consists of multiple project elements. The various elements are summarized below. The specific designs, intent, and assumptions for each element are further detailed in the Feasibility Study. Sea level rise vulnerabilities described below are based on the OPC Intermediate Sea Level Rise emission scenario (OPC 2024[2]) if not stated otherwise. If emissions follow the Intermediate-High or High Sea Level Rise scenarios, impacts from flooding would occur sooner. Section 3.3**Error! Reference source not found.** summarizes which project elements are part of each alternative and the estimated level of protection.

3.1 Treatment System

The following project elements are parts of potential adaptation alternatives for the treatment system.

3.1.1 AWTF Levee Augmentation

Select locations of the perimeter levee around the AWTF are currently vulnerable at elevations between 10 and 11 feet. Levee Augmentation would elevate and fortify approximately 7,600 linear feet of perimeter levee around the core treatment facilities to 15 feet NAVD88 in elevation. These features would protect to a 2105 100-year tidal water surface elevation of 14 feet with one foot of freeboard (see sea level rise discussion in the Feasibility Study). Under Ocean Protection Council (OPC 2024) predicted Intermediate-High and High sea level rise scenarios, this duration is reduced to 2085 and 2075, respectively.

[2] **California Ocean Protection Council & California Ocean Science Trust. (2024).** ***State of California Sea Level Rise Guidance: 2024 Science and Policy Update.***
Sacramento, CA: California Ocean Protection Council.
Available at: **https://opc.ca.gov/wp-content/uploads/2024/05/California-Sea-Level-Rise-Guidance-2024-508.pdf**

The proposed augmentation would provide enhanced flood protection for the AWTF core infrastructure, which includes the headworks, primary clarifiers, treatment wetlands, disinfection, and corporation yard. Project features (Figure 3) would include:

– Construct a 162 LF concrete flood wall, a maximum of five feet tall, along the edge of the trail at the northern edge of the facility. This method would reduce potential impacts to underground pipes from sheet piling and maintain the trail footprint.
– Install a 20 LF floodgate at the entrance of the facility. The floodgate would prevent flooding down the driveway into the facility.
– Augment 4,400 LF of existing armored levee with a sheet pile wall and rock slope protection (RSP) features. This would prevent overtopping and reduce wave impacts to the shoreline.
    - RSP would be placed on top of existing RSP and would not extend into the marsh or mudflats.
    - The sheet pile wall would be a maximum of five feet tall, to protect from SLR, maintain treatment capacity, and preserve the public access trail. The wall would be installed exterior to the trail to maintain functionality and access to all roads and trails within the facility.
– Install a 3,000 LF sheet pile wall along existing earthen levees in areas with limited space (i.e., near the trail or slough) that are not subject to wave-wind action requiring additional protection. This would prevent overtopping from stillwater events in nearby marsh/slough areas. The sheet pile wall would maintain the public access trail in its current location, be installed exterior to the trail, and be a maximum of five feet tall.
– All trails that exist prior to the project would remain.

3.1.1.1 Living Shoreline Option

As an alternative to placing RSP, 4,400 LF of existing armored levee could be augmented by developing a living shoreline for protection (Figure 3). Conceptually, the living shoreline would be constructed at an average 10:1 slope, starting at 15 feet in elevation, which would total approximately 7.7 acres, extending into the bay. A three- to five-foot tall sheet pile wall on top of the levee would still be required to protect from SLR, maintain treatment capacity, and preserve public trail access.

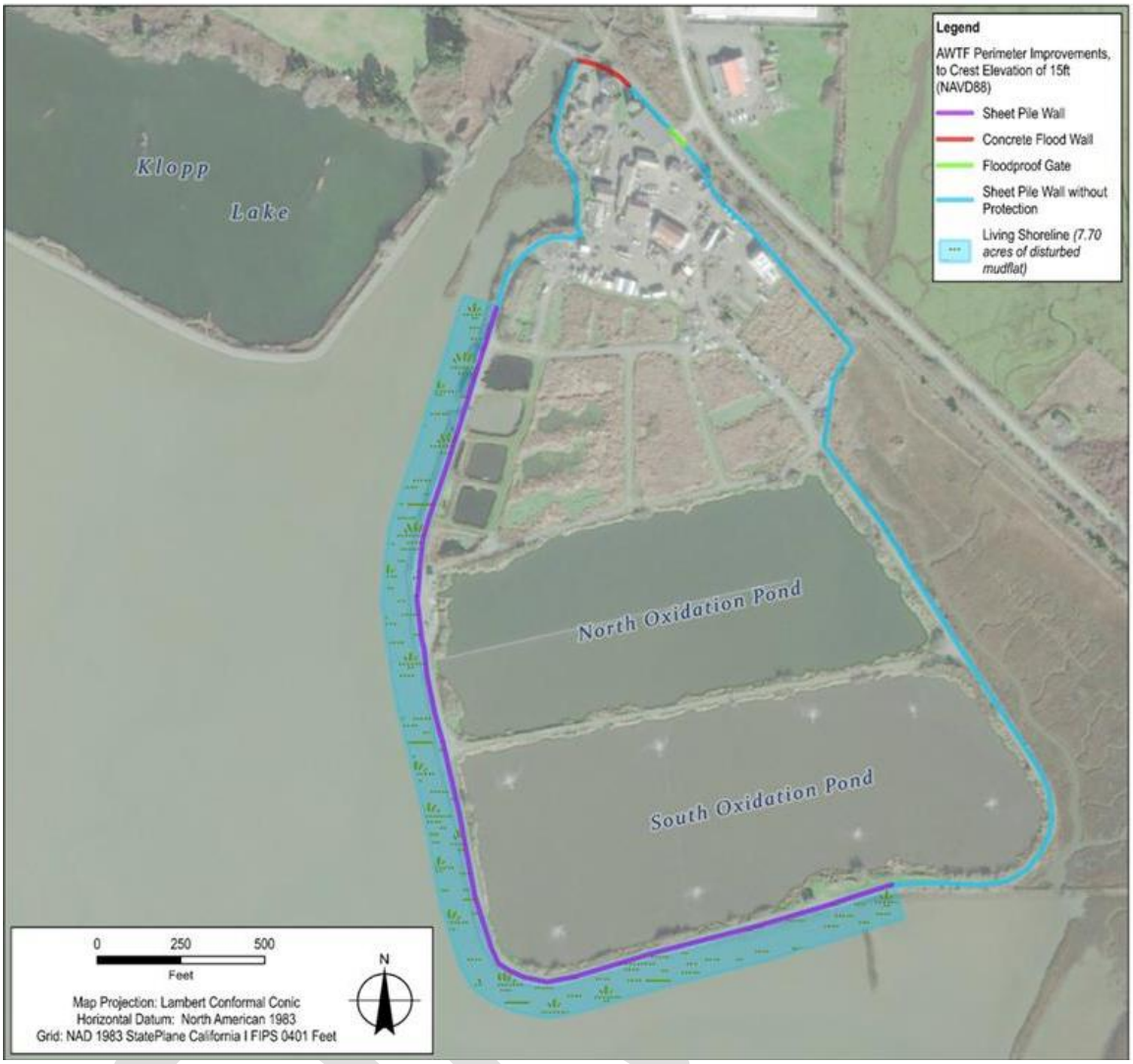

Figure 3. Conceptual levee augmentation components.

3.1.2 AWTF Relocation

Figure 2 shows the current area being evaluated for retreat (the “Retreat Study Area”). This area was identified based on appropriate elevations outside of the 2105 flood hazard zone established in the Feasibility Study (approximately 14 feet) and further refined based on other factors such as minimum area and compatibility of other land uses. If the City pursues relocation, a more formal siting study would need to be conducted, including landowner outreach. At this time, no specific location for a new treatment facility has been identified.

3.1.2.1 Land Use Conversion

As part of AWTF relocation, an existing land use (likely agriculture) would be converted to the new use. The facility would range in size from 7 to 148 acres depending on the type of treatment. For this analysis, it is assumed that conventional activated sludge, extended aeration, or oxidation ditch technology would be used and approximately 25 acres would be needed for the new facility.

3.1.2.2 Reroute Collection System for AWTF Relocation

As presented in Section 5.2.2.2 of the Feasibility Study, the collection system will need to be rerouted to deliver influent to the new facility. There are potential opportunities to intercept flows higher up in the system to divert to the new site, but for the purposes of this study it was assumed that a new pump station at the current site and transfer pipeline to the new location would be needed. Conceptual routing of the new transfer pipeline estimated that it would be approximately 3.7 miles in length using the most direct alignment, northbound along South G Street and Alliance Road, and westbound along Spear Avenue and Upper Bay Road to the approximate center of the Retreat Study Area identified in Figure 2.

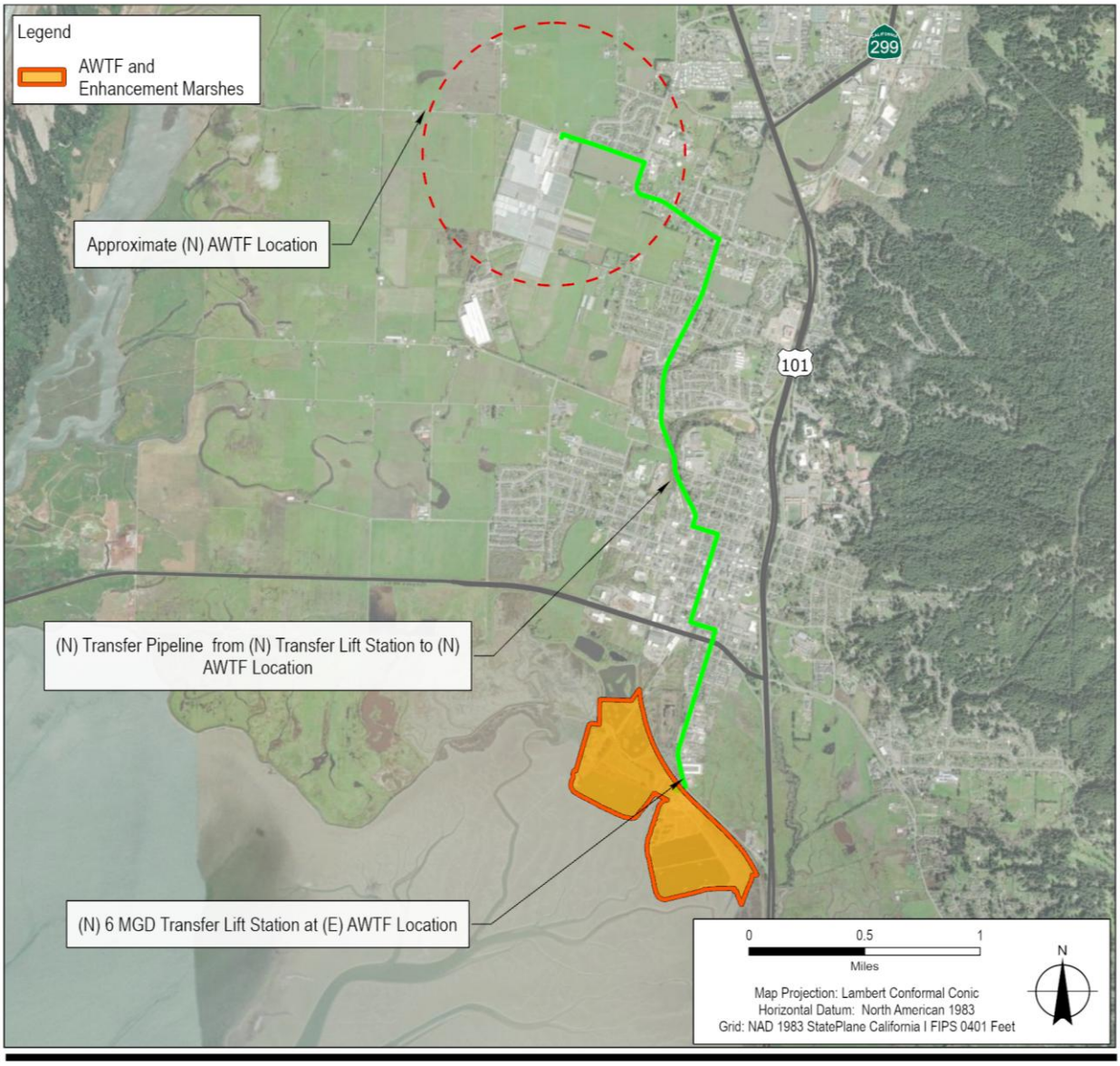

Figure 4. Conceptual Design for Influent Transfer Pump Station and Pipeline to New AWTF Location

3.1.2.3 Near-term AWTF Levee Maintenance

Based on the risk assessment presented in Feasibility Study Section 3.6.4, the AWTF headworks and generator building are at risk of nuisance flooding (less than 6 inches) during the current 100-year tidal flood event along the northeast side of the facility. This levee section is comprised of paved and dirt trails and is not exposed to wind waves. Therefore, this section would not benefit from living shoreline protection. The estimated timeline for the retreated facility to be operational is 20-30 years (Feasibility Study Section 5.3.3.3); therefore, temporary maintenance actions to AWTF protection structures would be needed to address increasing vulnerabilities. While flooding disruptive to treatment operations is not anticipated until 2055, if the timing for relocation is delayed or sea level rise rates accelerate, temporary maintenance up to 4,500 LF of low-lying sections would be elevated to 11.5 feet NAVD88 to protect the site for 20-30 years as the new facility is designed, permitted, and constructed (Table 1, Figure 5). This elevation was selected to match the existing typical crest elevation of the existing levees.

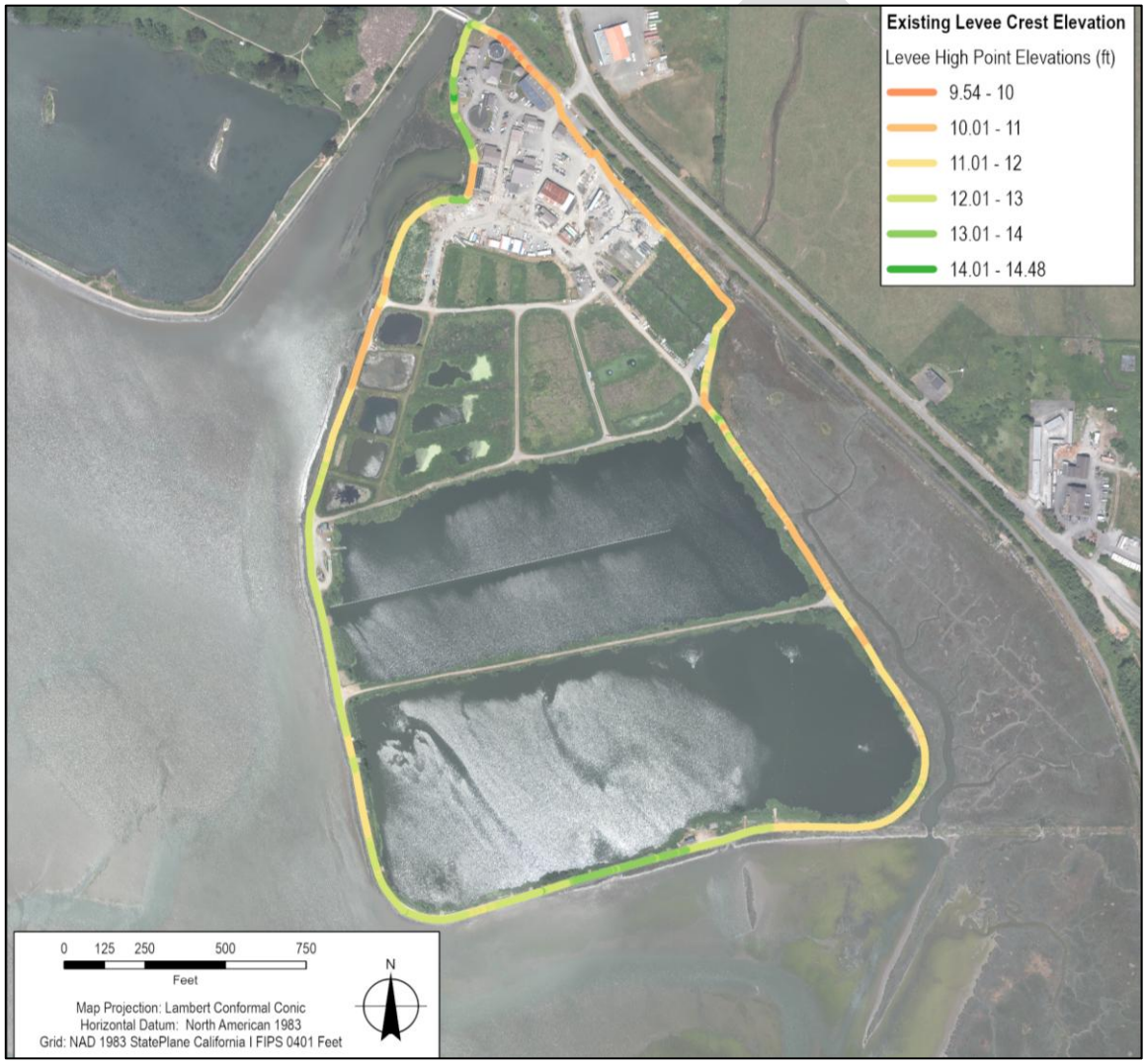

Figure 5. Current AWTF levee elevations.

Table 1. Vulnerable AWTF levee to be raised.

Existing Crest Elevation	Total LF to be modified	Proposed feet raised above existing elevation
9 - 10 ft	117	2.5
10 - 11 ft	1,945	1.5
11 - 12 ft	2,454	0.5
TOTAL	4,516	NA

3.1.2.4 Site Restoration

With relocation of the AWTF, the existing site would require restoration. The details of this have not been evaluated yet, but it is assumed that at least portions of the site, up to approximately 150 acres, would be graded/filled to prepare for breaching to bay water and then breached. Restoration would not exacerbate flooding vulnerabilities to the South G Street community. Future retreat planning efforts will need to evaluate options for restoring the site.

3.2 Discharge / Enhancement System

The following project elements could be considered as adaptation strategies for the enhancement and discharge systems.

3.2.1 Enhancement Marshes Levee Maintenance[3]

Based on the risk assessment presented in Feasibility Study Section 3.6.4, the Enhancement Marshes are at risk of flooding during the current 100-year tidal flood event. The critical flood paths for overtopping the Enhancement Marshes are along South I Street into the northwest corner of Hauser Marsh, along South I Street from the north into the Gearhart Marsh, and along the eastern edge of Allen Marsh.

In these locations, approximately 5,100 LF of low-lying sections would be elevated to 11.5 feet NAVD88 (Table 2, Figure 6). This elevation was selected to match the existing typical crest elevation of the existing levees protecting the marshes in order to maintain a barrier between the marshes and the surrounding bay/waterways, enabling these wetlands to continue providing treatment for the effluent before it is discharged to the bay in compliance with the California State Water Board's Enclosed Bays and Estuaries Policy. This project element would also enable the Arcata Marsh and Wildlife Sanctuary (AMWS) to continue functioning as a wetland ecosystem and allow the community to continue using the roads and trails through the AMWS. The increased levee size would encroach approximately 0.5 acres into the 27 acres of existing enhancement marshes.

All trails that exist prior to the project would remain.

Table 2. Approximate vulnerable areas to be raised.

Existing Crest Elevation	Linear Feet (LF)	LF Paved Roads (20 ft width)	LF Trails (gravel, 10ft width)	LF Dirt/Gravel Access Road (12 ft width)	Raise Levee ~ (ft)
7 - 8 ft	380	155	225	0	4.5
8 - 9 ft	316	160	100	56	3.5
9 - 10 ft	187	20	167	0	2.5
10 - 11 ft	1,070	400	620	50	1.5
11 - 12 ft	3,186	800	686	1,700	0.5

[3] The term maintenance in this context may not reflect how "maintenance" is defined by various regulatory guidelines.

Existing Crest Elevation	Linear Feet (LF)	LF Paved Roads (20 ft width)	LF Trails (gravel, 10ft width)	LF Dirt/Gravel Access Road (12 ft width)	Raise Levee ~ (ft)
Total	5,139	1,535	1,798	1,806	NA

3.2.1.1 Living Shoreline Option

On the southwest facing levees which are exposed to wind wave action, additional protection could be provided with living shorelines and marsh restoration. At South I Street, the living shoreline could extend from roadside berms into mudflats. South of Klopp Lake, the living shoreline could extend from the trail into the mudflats. The existing levee location would be maintained as it contains pumping and electrical equipment. Conceptually, if both of these areas were to include a living shoreline constructed at an average 10:1 slope, starting at 11.5 feet in elevation, the living shoreline would extend into the bay approximately 70 feet and would cover approximately 4.5 acres. The increased levee size would also encroach approximately 0.5 acres into the 27 acres of existing enhancement marshes.

3.2.1.2 Adaptive Management Studies

In conjunction with the Enhancement Marsh protection structures maintenance element described above, the City would also begin studies to determine the adaptive capacity of the Enhancement Marshes to saltwater intrusion from limited overtopping during extreme high water level events. The Adaptive Management Plan would include investigations into impacts of saltwater on Enhancement Marsh functions, including salt concentration thresholds and overtopping volumes, and would define thresholds for water levels and frequencies of inundation that trigger the need for alternative discharge/treatment methods.

Figure 6. Current enhancement marsh levee elevations and conceptual living shoreline.

3.2.2 Enhancement Marshes Levee Augmentation

To protect the Enhancement Marshes in place, approximately 6,000 LF of the 7,000 LF berm complex would need to be elevated to 15 feet to provide the same level of protection as AWTF Levee Augmentation (~1000 LF already exceeds 15 feet elevation). Design of the enhancement marsh levee augmentation has not been completed. For the purposes of this memo, it is assumed that the same combination of sheet piles, concrete floodwalls and shoreline protection (RSP and/or living shoreline) considered for AWTF Levee Augmentation would be implemented at the Enhancement Marshes.

3.2.2.1 Living Shoreline Option

Approximately 3,100 LF of the Enhancement Marshes levee with southwest exposure are impacted by wind waves. This stretch of levee could benefit from implementing a living shoreline. The living shoreline would drop from the levee crest at approximately 15 feet to approximately five feet at the toe of the levee. With an assumed 10:1 slope down to the mudflat, the shoreline would extend 100 feet out from the existing levee toe, impacting approximately 7.2 acres of existing mudflats surrounding the marshes.

3.2.3 New Enhancement Marshes

This element would involve construction and operation of new Enhancement Marshes within the Retreat Study Area (Figure 2), which is less vulnerable to sea level rise than the existing site. Alternate enhancement projects could be developed based on recent guidance from the North Coast Regional Water Quality Control Board[4].

3.2.3.1 Land Use Conversion

The new Enhancement Marshes would require approximately 40 acres of converted land based on the size of the existing system. Potential locations should be as low in elevation as possible to minimize energy required for pumping, while being above sea level rise inundation water levels (or the site elevation can be raised during construction).

3.2.3.2 Site Restoration

With the creation of new Enhancement Marshes, the existing enhancement marsh area would require a restoration plan. The details of this have not been evaluated yet, but it is assumed that the restoration plan would include decommissioning and capping/removal of site piping and the site would be restored. Trails would not be maintained in their current location and new recreation opportunities would be created elsewhere in less vulnerable areas. The site would be restored to appropriate habitats, as determined by future studies.

3.2.3.3 Bay Discharge Location

This memo assumes that discharge to the bay would remain from the Brackish Marsh at the current tidal flushing location.

3.2.3.4 Enhancement Marsh Levee Maintenance

The Enhancement Marsh Levee Maintenance described in Section 3.2.1 would be required to protect the marshes in the interim period before the new marshes are operational.

3.2.4 Ocean Outfall Discharge

Connecting with the Humboldt Bay Harbor, Recreation, and Conservation District (HBHRCD) existing ocean outfall at RMT II on the Samoa Peninsula would require a connection to the existing outfall pipeline and a pump station and transmission pipeline from the treatment facility to the HBHRCD Ocean Outfall pipe.

3.2.4.1 HBHRCD Ocean Outfall Pipe

Currently, the RMT II ocean outfall pipe has sufficient capacity for the City's effluent volume. The City's use of the RMT II outfall would reduce available capacity and could constrain future coastal dependent industrial uses on the Samoa Peninsula, potentially conflicting with existing economic and land use development planning underway by the Economic Development Division of Humboldt County and the HBHRCD. These improvements and considerations are not addressed or considered in this memo.

[4] North Coast Regional Water Quality Control Board. November 7 2025. Resolution No. R1-2026-0005 Project Criteria for an Exception to the Enclosed Bays and Estuaries Policy Prohibiting Waste Discharges to Humboldt Bay.

3.2.4.2 Transmission Pipeline to HBHRCD RMT II Outfall

Piping and pumping infrastructure would be required to transmit effluent from the treatment facility to the RMT II ocean outfall location (Figure 7**Error! Reference source not found.**). Design and hydraulic modelling have not been conducted to select the best alignment, pipe size, and pumping requirements for the transfer pipeline. However, the most likely route would follow State Route 255 (SR 255; under Mad River Slough) to the outfall, and for this assessment that route is assumed. The alignment would be approximately 7.5 miles from the existing AWTF. To serve the discharge pipeline, a discharge pump station at the AWTF facility would be required. The transmission pipeline would extend from either the existing AWTF or a relocated treatment facility to the ocean outfall pipeline.

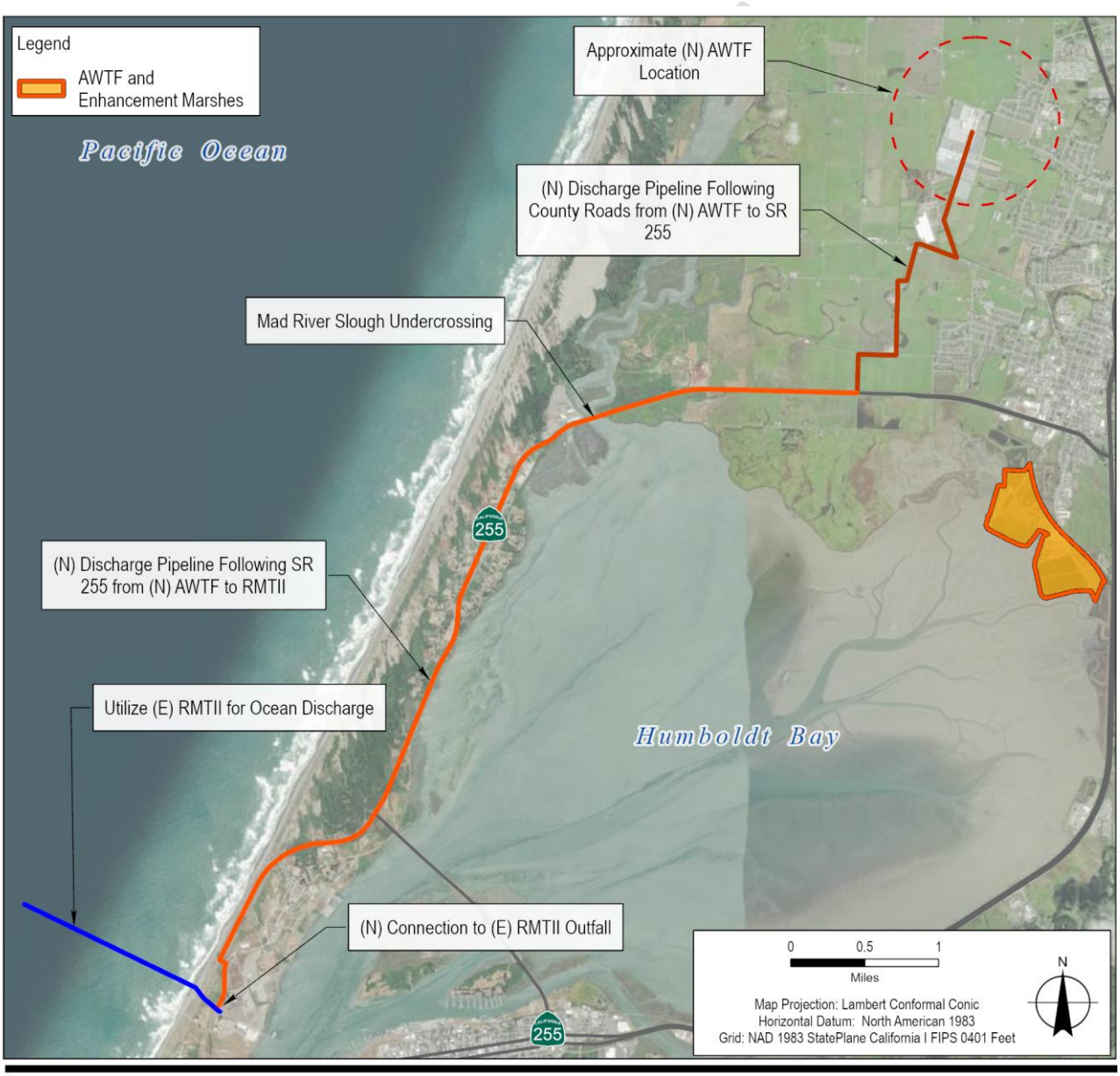

Figure 7 *Conceptual Design for Pipeline to RMTII*

3.2.5 Site Restoration

If the Enhancement Marshes and/or AWTF are retreated, then the existing site of these facilities would be restored. Restoration details have not yet been identified. Trails would not be maintained in their current location and new recreation opportunities could be created elsewhere in less vulnerable areas. The site would be restored to appropriate habitats, as determined by future studies.

3.3 Summary of Project Elements in each Alternative

Table 3 shows which project elements are included within each project alternative.

Table 3. Summary of project elements in each alternative.

Alternatives	AWTF Levee Augmentation	AWTF Relocation	Enhancement Marshes Levee Maintenance	Enhancement Marshes Levee Augmentation	New Enhancement Marshes	Ocean Outfall Discharge	Site Restoration
1. Augment AWTF Levees and Maintain / Adaptive Management of the Enhancement Marshes	X		X				
2. Augment AWTF Levees and Augment Enhancement Marshes' Levees	X			X			
3. Augment AWTF Levees and New Enhancement Marsh	X				X		X
4. Augment AWTF Levees and Ocean Outfall Discharge	X					X	X
5. Retreat AWTF and Maintain / Adaptive Management of the Enhancement Marshes		X	X				X
6. Retreat AWTF and Augment Enhancement Marshes' Levees		X		X			X
7. Retreat AWTF and New Enhancement Marsh		X			X		X
8. Retreat AWTF and Ocean Outfall Discharge		X				X	X

4. Environmental Effects of Project Elements

Regulatory requirements are primarily based on environmental effects and existing regulations, including under environmental laws (e.g., the Clean Water Act, Endangered Species Act, and Coastal Act), and local zoning. The existing facilities are in the City of Arcata and planning within the City is guided by the City's General Plan and Local Coastal Plan. Some of the alternatives' project elements are located within the County of Humboldt; therefore, the County General Plan and Humboldt Bay Area Local Coastal Plan are also guiding documents.

Topics considered under the CEQA checklist are a useful starting point to assess environmental effects and related regulations. As a first screening step, different CEQA checklist topics were reviewed to identify which are most pertinent for assessing feasibility of the various alternatives (Table 4).

Table 4. Resource topics and descriptions.

CEQA Topic	Pertinence for Assessing Alternatives
Aesthetics	Maintenance actions to elevate portions of existing levees would generally have a low profile that would not block coastal or scenic views. However, augmentation alternatives include a sheet pile wall that has the potential to impact views. Underground project elements (e.g., pipelines, outfall) would have little to no aesthetic impact. Retreat alternatives are the most likely to have greater aesthetic change, however, they cannot be well understood until design proceeds. Although there will be mitigation to reduce aesthetic impacts of any alternative, aesthetics is a primary consideration.
Agriculture / Forestry Resources	Relocation of the AWTF and/or new Enhancement Marshes could displace agriculturally zoned lands and uses. Agricultural impacts are a primary consideration. Forestry resources are unlikely to be impacted due to their distance from the AWTF and Retreat Study Area; therefore, forestry resources are not a primary consideration.
Air Quality / Energy / Greenhouse Gas Emissions	The alternatives will vary in their air quality impacts, energy use, and greenhouse gas emission levels. These are primary considerations.
Biological Resources	Effects to sensitive species and habitats is a key consideration as all alternatives will have varying degrees of biological effects due to new construction and operations.
Cultural Resources	Although cultural resources are a consideration for development of all alternatives, information is not available to assess specific or general cultural resource impacts of any of the alternatives. Cultural resources would need to be assessed in detail once design is advanced for any alternative, but it is not a primary consideration that can be evaluated in this memo.
Geology / Soils	The alternatives' impacts to geology and soils are not a key driver for prioritization of an alternative because any potential impacts can likely be mitigated through design considerations. Hence, geology / soils is not a primary consideration.
Hazards and Hazardous Materials	Existing information regarding known hazardous material locations can be reviewed, however, these locations can likely be avoided or cleaned as part of project implementation. Hence, hazards and hazardous materials are not a primary consideration.
Hydrology / Water Quality	Water quality is a primary consideration due to differences in treated wastewater discharge locations and sea level rise vulnerability between the alternatives.
Land Use / Planning	Existing land uses and zoning are primary considerations, especially with regards to relocation of the AWTF and/or Enhancement Marshes.
Mineral Resources	None of the alternatives are expected to have a substantial impact to mineral resources and, therefore, mineral resources are not a primary consideration.
Noise	Noise is a consideration during construction of some alternatives, but noise impacts can be mitigated through implementation of best management practices (e.g., construction timing and methods). As such, noise is not a primary consideration.
Population / Housing	Although there are some residences within the Retreat Study Area, it is assumed that they would be avoided by relocation of the AWTF and/or Enhancement Marshes. This memo assumes capacity of the facility will be maintained and will not be increased. None of the alternatives are expected to have a substantial impact to populations or housing and, therefore, population / housing is not a primary consideration.
Public Services	None of the alternatives are expected to have a substantial impact to public services and, therefore, public services are not a primary consideration.
Recreation	Coastal access for recreation is a primary consideration because the area around the existing Enhancement Marshes provides substantial recreational opportunities.
Transportation	None of the alternatives are expected to have a substantial impact to transportation and therefore transportation is not a primary consideration.

CEQA Topic	Pertinence for Assessing Alternatives
Tribal Cultural Resources	Although tribal cultural resources are a consideration for development of all alternatives, information is not available to assess the specific or general tribal cultural resource impacts of any of the alternatives. Tribal cultural resources would need to be assessed in detail once design is advanced for any alternative, but it is not a primary consideration that can be evaluated in this memo.
Utilities / Service Systems	None of the alternatives are expected to have a substantial impact to utilities and service systems. It is possible that a retreated treatment facility could add service within currently unserved areas. However, to make reasonable assumptions regarding the service area, a location would need to be identified and design would need to be more advanced. Hence, utilities and service systems are not a primary consideration.
Wildfire	None of the alternatives would have a considerable effect with regards to wildfire risk and therefore wildfire is not a primary consideration.

***Bold items are primary considerations for comparative analysis of the alternatives.**

Based on the results presented in Table 4, the following environmental effects were assessed for each element and alternative:

– Aesthetics
– Agriculture
– Air Quality / Energy / Greenhouse Gas Emissions
– Biological Resources
– Hydrology / Water Quality
– Land Use / Planning
– Recreation

All alternatives involve construction that would have temporary effects on biology and other resource categories. However, construction related impacts can be minimized through best management practices and are not a differentiator for selection of an alternative. Hence, this assessment focuses more on the alternatives' land use / land cover changes and long-term operational effects than construction effects, but construction effects are noted where they seem most relevant.

4.1 Aesthetics

The City General Plan and Land Use Plan designate Arcata Bay tideland and water areas as well as the Agriculture Exclusive zoned lands within the Retreat Study Area as Coastal Scenic Areas and consider SR 255 a scenic route. While many project elements are underground or would have a low profile and, therefore, would not impede coastal and scenic views, some levee modification elements and retreat strategies have the potential for greater aesthetic impacts.

4.1.1 AWTF Levee Augmentation

Raising of the AWTF levees (RSP and/or living shoreline) would generally have a low profile that would not block coastal or scenic views. However, to protect the AWTF to 2105 under the Intermediate sea level rise scenario, the sheet pile wall may be up to five feet above the current levee in some places and external to the trail to preserve the trail and roadway network within and around the AWTF. This project element could impact coastal views from public spaces, such as adjacent trails.

4.1.2 AWTF Relocation

Retreat of the AWTF could produce a major aesthetic change; however, impacts cannot be well understood until a location is chosen and the design proceeds. The City General Plan includes policies to protect views of

farmland and open countryside and maintain open and natural characteristics of scenic routes (i.e., SR 255); this project element has the potential to conflict with these policies.

4.1.3 Enhancement Marsh Levee Maintenance

Levee maintenance would generally have a low profile that would not block coastal or scenic views. While views may be slightly altered, they would be consistent with the surrounding mudflat, marsh, and existing RSP.

4.1.4 Enhancement Marsh Levee Augmentation

Enhancement Marsh levee augmentation (RSP and/or living shoreline) would generally have a low profile that would not block coastal or scenic views. However, to protect the Enhancement Marshes to 2105 under the Intermediate sea level rise scenario, the sheet pile wall may be up to five feet taller than the existing levee and external to the trail to preserve the trail and roadway network within and around the AWTF. This project element could impact coastal views from public spaces, such as adjacent trails.

4.1.5 New Enhancement Marshes

New marshes would generally have a low profile that would not block coastal or scenic views. Views may be altered, however, and would be consistent with the surrounding open and natural characteristics within the Retreat Study Area.

4.1.6 Ocean Outfall Discharge

Underwater project elements (e.g., pipelines, outfall) would have little or no aesthetic impact.

4.1.7 Site Restoration

Site restoration actions have not been defined well enough to assess visual resource impacts. It is assumed that the visual character of the site would not be substantially altered.

4.2 Agriculture

The existing facilities are not located within prime agricultural lands or soils. However, the majority of the Retreat Study Area is located within prime agricultural lands (Figure 8). The City's and County's General Plan and Local Coastal Plan policies support maximum prime agricultural land retention and reduction of conflict between agricultural and urban land uses. The existing treatment site and Retreat Study Area do not contain parcels with Williamson Act contracts.

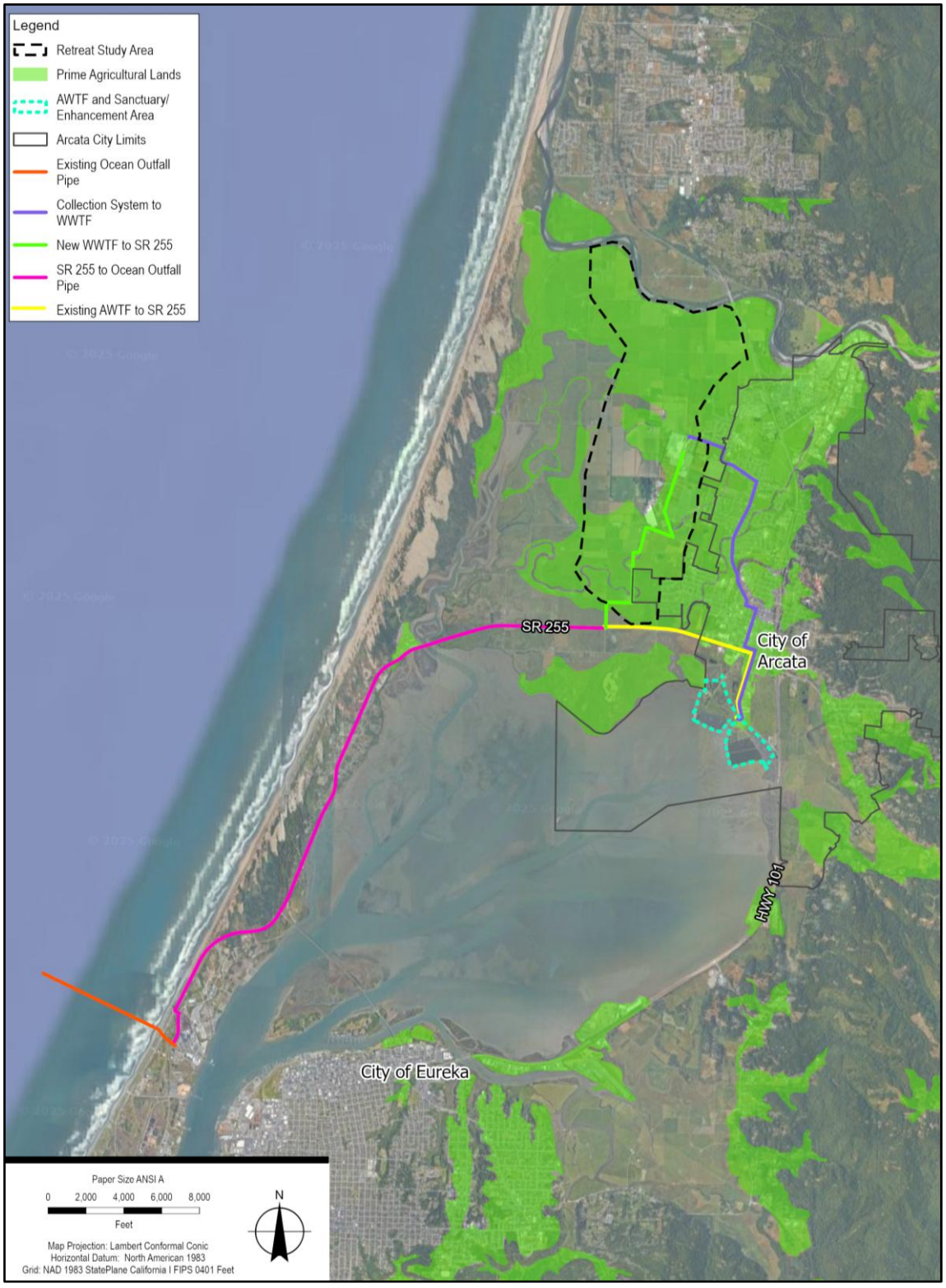

Figure 8. Prime agricultural lands.

4.2.1 AWTF Levee Augmentation

No agricultural resources are present at the AWTF facility and, therefore, there would be no impact to agriculture resources.

4.2.2 AWTF Relocation

Most of the potential area for retreat of the AWTF (the Retreat Study Area) is Prime Agricultural land (Figure 8) and is in agricultural production. Relocation of the AWTF is likely to impact Prime Agricultural land and displace agricultural production. This project element could conflict with agricultural protection policies.

4.2.3 Enhancement Marshes Levee Maintenance

No agricultural resources are present at the enhancement marsh levees and, therefore, there would be no impact to agriculture resources.

4.2.4 Enhancement Marshes Levee Augmentation

No agricultural resources are present at the enhancement marsh levees and, therefore, there would be no impact to agriculture resources.

4.2.5 New Enhancement Marshes

Most of the potential area for retreat of the Enhancement Marshes (the Retreat Study Area) is Prime Agricultural land (Figure 8) and is in agricultural production. Relocation of the Enhancement Marshes is likely to impact Prime Agricultural land and displace agricultural production. This project element could conflict with agricultural protection policies.

4.2.6 Ocean Outfall Discharge

No agricultural resources are present at the existing ocean discharge; therefore, there would be no impact to agriculture resources.

Some aspects (e.g., piping and/or new lift/pump station(s)) of a new transmission system could potentially affect agricultural resources. However, these are likely to be placed within or near existing roadways, the overall footprint would be relatively small and any agricultural resource impacts would be minimal.

4.2.7 Site Restoration

No agricultural resources are present at the AWTF or Enhancement Marshes and, therefore, there would be no impact to agriculture resources.

4.3 Air Quality / Energy / Greenhouse Gas Emissions

Sensitive receptors are people who are particularly susceptible to the adverse effects of air pollution, including children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases. Sensitive receptor locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. The current AWTF is over 0.3 miles from residences, the closest sensitive receptor location. Portions of the Retreat Study Area are immediately adjacent to sensitive receptor locations; impacts related to odor, toxic air contaminants (TACs), and California Air Resource Board (CARB) and the U.S. Environmental Protection Agency (EPA) criteria air pollutants would be site specific and further evaluation would be needed after a location is confirmed.

The City of Arcata and the State of California have plans and regulations that apply to any proposed project related to energy resources and greenhouse gas emissions, including uses of renewable energy, building decarbonization, and energy efficiency standards. Any new development would comply with these standards.

During construction activities (equipment, transport, etc.) all project elements are expected to result in varying levels of decreased air quality, increased greenhouse gas emissions, and additional energy needs. Larger and more complex construction projects (i.e., facility relocation) would create larger impacts. However, impacts would likely be below significance thresholds for CEQA impacts and/or utilize mitigation measures or best practices to reduce the impacts to less than significant.

4.3.1 AWTF Levee Augmentation

Levee augmentation would have minimal air quality, greenhouse gases, and energy impacts during construction activities. Once operational, the levees would require no energy and would not degrade air quality or increase greenhouse gas emissions.

Compared to RSP, the construction of a living shoreline could have increased impacts during construction due to additional materials and equipment needs. However, after construction, the living shoreline could potentially sequester more carbon than other levee augmentation methods.

4.3.2 AWTF Relocation

Compared to other project elements, facility relocation would have high air quality, energy and greenhouse gas impacts during construction due to its size, construction duration, and complexity. Once operational, the new facility would have similar energy needs as the existing facility, though energy efficient design upgrades would provide an opportunity to reduce usage. Effluent would need to be pumped from the existing collection system to the relocated treatment system and back to the existing bay discharge point, which would have air quality, energy and greenhouse gas impacts.

4.3.3 Enhancement Marshes Levee Maintenance

Levee maintenance would have minimal air quality, energy and greenhouse gas impacts during construction activities. Once operational, the levees would require no energy and would not degrade air quality or increase greenhouse gas emissions.

4.3.4 Enhancement Marshes Levee Augmentation

Levee augmentation would have minimal air quality, energy and greenhouse gas impacts during construction activities. Once operational, the levees would require no energy and would not degrade air quality or increase greenhouse gas emissions.

Compared to RSP, the construction of a living shoreline could have increased impacts during construction due to additional materials and equipment usage but could increase carbon sequestration after construction.

4.3.5 New Enhancement Marshes

New enhancement marsh construction would have moderate air quality, energy and greenhouse gas impacts.

This project element may increase carbon sequestration after construction. No energy would be required except for pumping to transport effluent from the AWTF to the Enhancement Marshes and back to the existing bay discharge point.

4.3.6 Ocean Outfall Discharge

Pumping to the ocean outfall and into the ocean would be required which would have air quality, energy and greenhouse gas impacts.

Transmission pipe construction would have minimal air quality, energy and greenhouse gas impacts.

This project element would have one of the greatest increases in operational energy usage due to additional pump requirements to transport the effluent to the ocean discharge location.

4.3.7 Site Restoration

Compared to other project elements, existing site restoration would have moderate air quality, energy and greenhouse gas impacts during construction due to its size, construction duration, and complexity.

Depending on the type of restoration, the site could provide carbon sequestration benefits after construction.

4.4 Biological Resources

Both the existing AMWS and the Retreat Study Area contain sensitive habitats and special status species that require consideration. These resources include wetlands (as defined by the Clean Water Act and Coastal Act), Environmentally Sensitive Habitat Areas (as defined by the Coastal Act and City Local Coastal Plan) and species requiring consideration under local, state and federal regulations – including the state and federal Endangered Species Acts. In general, the “non-retreat” elements have less new development and, therefore, less potential to impact biological resources. All elements would have some biological impacts during construction (e.g., from noise) but the discussion below is focused more on long-term impacts of the land type conversions associated with the elements.

4.4.1 AWTF Levee Augmentation

Levee augmentation will increase levee heights, which would not have a substantial biological effect. As currently proposed, there would be no change in the AWTF levee footprint.

A living shoreline option would encroach into bay mudflats, potentially impacting sensitive eelgrass (*Zostera marina*) habitat as well as tidal channels, including Butcher Slough. Advanced design details may minimize these impacts, but some fill of mudflats and potential rerouting of channels is expected. Creation of salt marsh habitat, which has been substantially impacted around Humboldt Bay, is a potential benefit. The salt marsh habitat would be converted mudflat or eelgrass habitat and there was not historically salt marsh in the area where the living shoreline would be constructed.

4.4.2 AWTF Relocation

It is assumed that relocation of the AWTF into the Retreat Study Area would convert existing agricultural lands into a wastewater treatment facility. The existing agricultural lands are primarily used for livestock grazing and hay production and are interspersed with wetlands. These agricultural lands are also integral to the Pacific Flyway, serving as a critical stopover and foraging ground for migratory birds traveling between overwintering areas in Mexico, Central America, and South America and breeding grounds in the Arctic, sub-Arctic regions of North America, and parts of Asia. The agricultural lands also provide important habitat for waterfowl species, particularly geese and ducks. The relocated AWTF could displace up to approximately 25 acres of this habitat. It may not be feasible to provide in-kind compensatory mitigation for the impact.

Some other aspects (e.g., piping, new lift station(s) of a relocated AWTF could potentially affect biological resources. However, the overall footprint would be relatively small and biological resource impact would be minimal.

4.4.3 Enhancement Marshes Levee Maintenance

Enhancement Marsh levee maintenance could include construction of a living shoreline on the exposed portions of the levees. Maintenance activities would have minor biological impacts during construction. A living shoreline would also convert mudflats, eelgrass and/or channel habitats that currently exists on the exterior of the levee to salt marsh. Creation of salt marsh habitat, which has been substantially impacted around Humboldt Bay, is a potential benefit. However, there was not historically salt marsh in the area where the living shoreline would be constructed. Levee marsh maintenance would also encroach 0.5 acres into the Enhancement Marshes, which are wetlands.

4.4.4 Enhancement Marshes Levee Augmentation

Levee augmentation will increase levee heights, which would not have a substantial biological effect. However, a living shoreline option would encroach into bay mudflats, potentially impacting sensitive eelgrass (*Zostera marina*) habitat as well as tidal channels. Advanced design details may minimize these impacts, but some fill of mudflats and potential rerouting of channels is expected. Creation of salt marsh habitat, which has been substantially impacted around Humboldt Bay, is a potential benefit. However, the salt marsh habitat would be converted mudflat or eelgrass habitat and there was not historically salt marsh in the area where the living shoreline would be constructed.

4.4.5 New Enhancement Marshes

It is assumed that relocation of the Enhancement Marshes into the Retreat Study Area would convert existing agricultural lands into Enhancement Marshes. As discussed above, the existing agricultural lands are primarily used for livestock grazing and hay production, are interspersed with wetlands, and provide important habitat for migrating birds and waterfowl. The Enhancement Marshes could potentially be designed to provide the same and greater habitat value as the existing agricultural lands.

Some aspects (e.g., piping and/or new lift station(s)) of relocated marshes could potentially affect biological resources. However, the overall footprint would be relatively small, and a biological resource impact would be minimal.

Additionally, temporary maintenance of the existing Enhancement Marshes' levees would be required for the interim period until new marshes are operational. This would involve new RSP or development of a living shoreline. A living shoreline would change bay habitats from mudflat, eelgrass and/or channels to salt marsh in areas that were not historically salt marsh.

4.4.6 Ocean Outfall Discharge

By meeting regulatory water quality requirements, it is expected that biological effects of using the existing ocean discharge would be minor.

Some aspects (e.g., piping and/or new lift station(s)) of a new transmission pipeline could potentially affect biological resources and wetlands. There are numerous wetlands, and Mad River Slough, that would need to be crossed. It is assumed that the slough could be crossed using horizontal directional drilling. The overall footprint of the pipeline would be relatively small and biological impacts minimal.

4.4.7 Site Restoration

A restoration plan would be needed if the current AWTF and/or Enhancement Marshes are abandoned and decommissioned. Developing a restoration plan was outside of the scope of this study. It's assumed the plan would fully mitigate impacts to biological resources and provide habitat benefits. The site area to be restored has established industrial uses, construction related disturbances to biological resources are anticipated to be greater than other project elements due to the larger area disturbed and adjacent habitats.

4.5 Hydrology / Water Quality

Key considerations for hydrology/water quality are sea level rise related flood risk and water quality effects of the wastewater discharge, which are discussed below followed by a discussion regarding each project element.

4.5.1 Sea Level Rise Related Flood Risk

As described in the Feasibility Study, the existing waste treatment facilities (i.e., AWTF, Enhancement Marshes, roads, and other infrastructure) will become more at risk to sea level rise related flooding. Retreat of the facilities would take 20-30 years and, therefore, some level of increased flood protection, whether temporary or permanent, will be required regardless of the selected alternative. It is assumed that retreated facilities and associated infrastructure (e.g., piping and pump stations) would be located and designed such that they are not vulnerable to sea level rise related flooding beyond 2105.

4.5.2 Wastewater Discharge Water Quality

It is assumed that all in-bay discharges will be treated to the same water quality standards regardless of the project element. Future bay discharges would need to remain in compliance with the Enclosed Bays and Estuary Policy (EBEP), Water Quality Control Plan for the North Coast Region (Basin Plan), and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). Ocean discharges are not subject to the EBEP or the SIP but are subject to the Basin Plan and Water Quality Control Plan for Ocean Waters of California (Ocean Plan) due to the differences between the bay and the open ocean related to water quality, biology, and hydrodynamics. Typically, effluent requirements would be less for protection of beneficial uses in the Ocean Plan.

Eliminating the bay discharge would potentially provide some water quality benefits beneficial for both native species and cultured shellfish. However, the ocean discharge would create a new impact that would require further study to be understood.

As discussed in detail in the Feasibility Study, the AWTF and its surrounding areas are vulnerable to flooding caused by current and future extreme tidal and fluvial water levels, as well as heavy precipitation. Flooding is expected to become more frequent and severe due to sea level rise and climate change.

4.5.3 AWTF Levee Augmentation

The Feasibility Study estimates that elevating protection structure(s) to 15 feet (NAVD88) would protect to a water surface elevation of 14 feet with one foot of freeboard. A levee with a crest elevation of 15 feet would provide protection to the 2105 intermediate scenario 100-year flood event. Under the Intermediate-High and High scenarios, protection is reduced to 2085 and 2075, respectively.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.4 AWTF Relocation

The relocated facility would be constructed in a place that is not vulnerable to sea level rise through approximately 2105 or beyond based on the OPC Intermediate Scenario.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.5 Enhancement Marsh Levees Maintenance

Maintenance to bring low spots in the levee up to approximately 11.5 feet would protect the Enhancement Marshes through 2055 under the OPC (2024) Intermediate scenario and 2040 under the Intermediate-High and

High scenarios. The Adaptive Management Study would inform the enhancement marsh tolerance to saltwater, which could see an extension of their useful life past 2055.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.6 Enhancement Marsh Levees Augmentation

At an elevation of 15 feet, this project element would protect the existing Enhancement Marshes to 2105 under the OPC (2024) Intermediate sea level rise scenario, under the Intermediate-High and High scenario, this duration is reduced to 2085 and 2075, respectively.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.7 New Enhancement Marshes

New Enhancement Marshes would be constructed in a location not vulnerable to sea level rise by 2105 or later.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.8 Ocean Outfall Discharge

The collection system pipelines would be underground, causing no impact on hydrology or water quality. Stream crossings (e.g., Mad River Slough) would occur via an existing bridge or directional drilling beneath the waterbody.

The new discharge would have biological effects, but these are expected to be minor because legal water quality standards would be followed and the effluent would rapidly dissipate and dilute in the ocean.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.5.9 Site Restoration

Site restoration design would need to account for sea level rise and potential flooding.

Minor water quality impacts could occur during construction that would be minimized by implementation of best management practices.

4.6 Land Use / Planning

Alternatives may be located with the City jurisdiction, County of Humboldt jurisdiction, or both (Figure 9). Most of the Retreat Study Area is located within the Coastal Zone (Figure 10). Planning within the City of Arcata is guided by the City's General Plan and Local Coastal Plan. Planning within most of the Retreat Study Area is guided by the County of Humboldt's General Plan and Humboldt Bay Area Local Coastal Plan. These documents provide goals and regulatory policies and inform land use and zoning regulations.

The City's General Plan recognizes "that public facilities are gathering places for social, cultural, political, educational, and entertainment events and celebrations, and that these facilities are important components of the community's identity." The AMWS is one of the area's most well-known local public facilities and the General Plan includes many policies related to the co-benefits that the facilities provide and the importance of balancing uses for the benefits of all users. The General Plan includes a goal to "Maintain the Arcata Marsh and Wildlife Sanctuary as an exemplary model of how natural systems can be effectively and efficiently used to treat and reclaim wastewater."

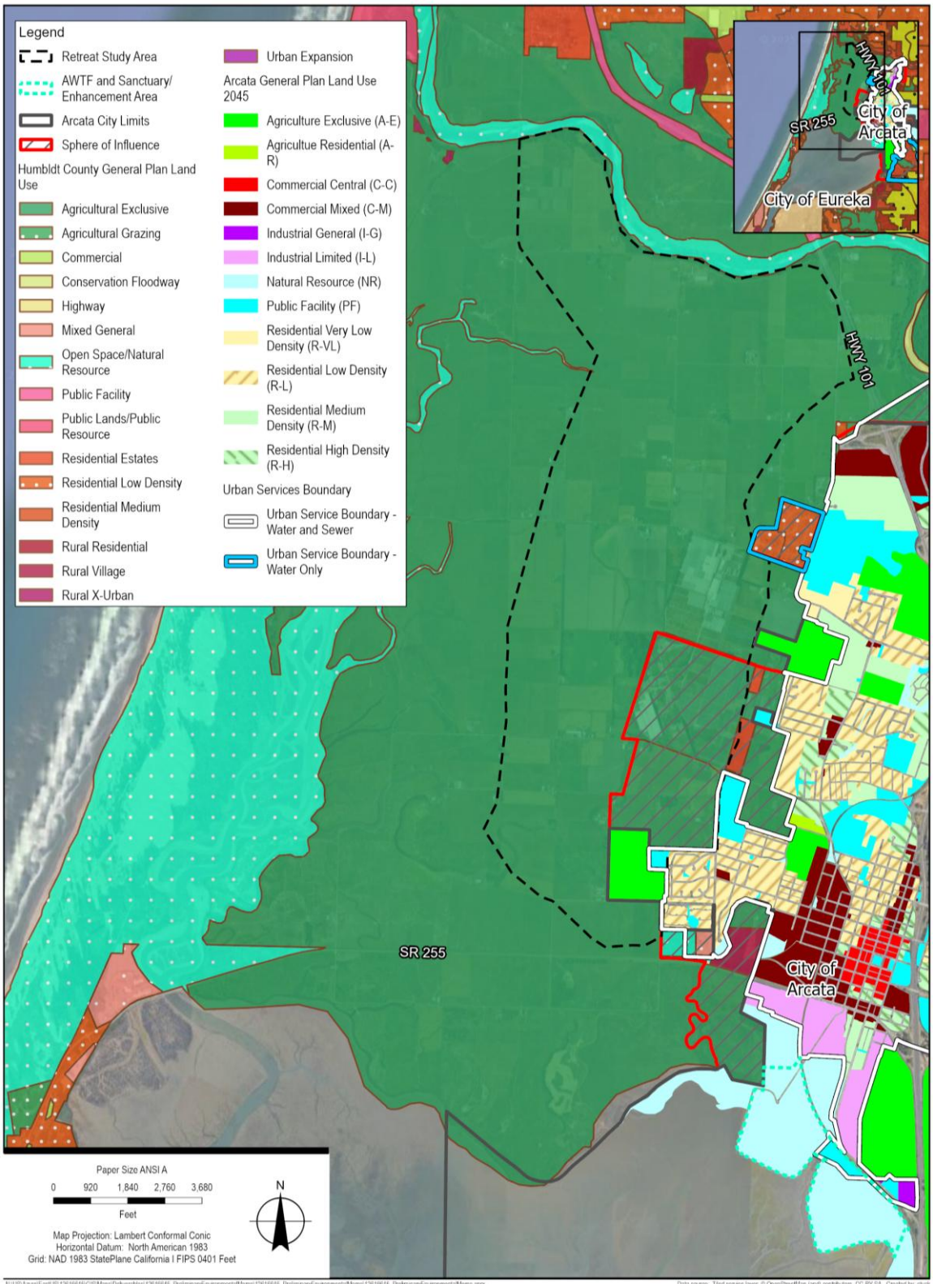

Figure 9. Arcata and surrounding area land use and planning boundaries.

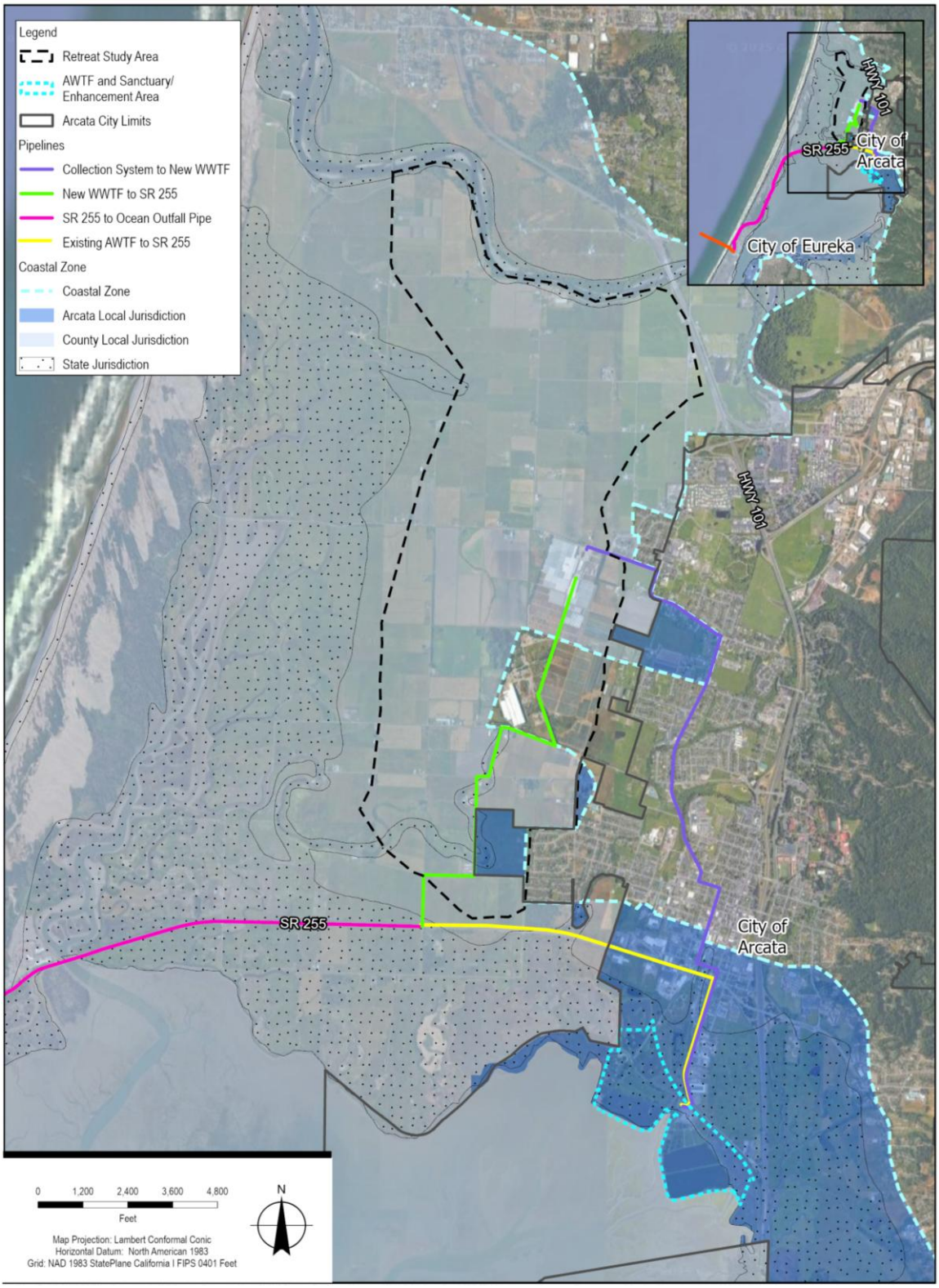

Figure 10. Coastal Zone Boundaries

4.6.1 AWTF Levee Augmentation

No City or County land use policies have been identified that would conflict with this project element.

The Coastal Commission would provide a higher priority to strategies that avoid the use of hard armoring.

4.6.2 AWTF Relocation

Much of the Retreat Study Area is outside the City's Urban Services Boundary and Sphere of Influence. The Retreat Study Area is zoned Ag Exclusive (AE-60), Flood Hazard Areas (F), and Transitional Agricultural Lands (T) (Figure 9). Wastewater treatment plants are considered "Extensive Impact Civic Use Type" by the County and not prohibited in Flood Hazard Areas but are not principally permitted in AE. The Hearing Officer would make a determination whether the proposed use is allowable. In the County's Humboldt Bay Area Plan (HBAP), the Retreat Study Area is also zoned for scenic protection of agricultural natural resources.

AWTF relocation into the Retreat Study Area could conflict with Coastal Act, County, and/or City land use and agricultural policies and would require special conditions before being considered for approval. Retreat of the facility may require an amendment/update to the City's Local Coastal Program (LCP) and General Plan, the County's HBAP, zoning amendments, and/or use permits.

4.6.3 Enhancement Marshes Levee Maintenance

No City or County land use policies have been identified that would conflict with this project element.

The Coastal Act provides a higher priority to strategies that avoid the use of hard armoring.

4.6.4 Enhancement Marshes Levee Augmentation

No City or County land use policies have been identified that would conflict with this project element.

The Coastal Act provides a higher priority to strategies that avoid the use of hard armoring.

4.6.5 New Enhancement Marshes

Much of the Retreat Study Area is outside the City's Urban Services Boundary and Sphere of Influence. The Retreat Study Area is zoned Ag Exclusive (AE-60), Flood Hazard Areas (F), and Transitional Agricultural Lands (T) (Figure 9). Wastewater treatment plants are considered "Extensive Impact Civic Use Type" by the County and not prohibited in Flood Hazard Areas but are not principally permitted in AE. The Hearing Officer would make a determination whether the proposed use is allowable. In the County's HBAP, the Retreat Study Area is also zoned for scenic protection of agricultural natural resources.

Enhancement marsh relocation into the Retreat Study Area could conflict with Coastal Act, County and/or City land use and agricultural policies and would likely require special conditions before being considered for approval. Retreat of the facility may require an amendment/update to the City's LCP and General Plan, the County's HBAP, zoning amendments, and/or use permits.

4.6.6 Ocean Outfall Discharge

No City or County land use policies have been identified that would conflict with or prohibit this project element.

4.6.7 Site Restoration

The City's General Plan references the importance of the AMWS in providing the community with multiple benefits, including recreation. It is expected that site restoration would be designed such that it is consistent with land use plans.

4.7 Recreation

The AMWS is an important regional natural and recreational area. Currently, public trails traverse around the existing AWTF and Enhancement Marshes. Additionally, a boat launch facility to Arcata Bay can be accessed through the AMWS. The area is used for scientific and educational studies, passive recreation, nature observation, small watercraft, and windsurfing.

4.7.1 AWTF Levee Augmentation

The sheet pile wall and shoreline protection feature would prevent overtopping and reduce wave impacts to the shoreline. In addition to protecting the AWTF, these features would preserve the public access trail in its current location and into the future. All trails that exist prior to the project would remain.

Temporary interruptions to trail access would likely occur during construction.

4.7.2 AWTF Relocation

Recreational opportunities in the Retreat Study Area are limited and include recreational hunting and coastal access along public roadways. Until the location is determined, impacts at the new location are uncertain. However, retreat has the potential to impact current recreational opportunities. The existing trails on the levees around the treatment facility would not be maintained in their current location. Adjacent trails currently protected by the facility (i.e. AMWS trails, Humboldt Bay Trail) could become more vulnerable. New recreation opportunities would be created elsewhere in less vulnerable areas.

4.7.3 Enhancement Marshes Levee Maintenance

Maintaining and elevating low-lying sections of the levee would reduce flooding and enable the community to continue using the roads and trails through the AMWS. All trails that exist prior to the project would remain.

Temporary interruptions to trail access would likely occur during construction.

4.7.4 Enhancement Marshes Levee Augmentation

Elevating the levee would reduce flooding and enable the community to continue using the roads and trails through the AMWS for a longer period of time. All trails that exist prior to the project would remain.

Temporary interruptions to trail access would likely occur during construction.

4.7.5 New Enhancement Marshes

Recreational opportunities in the Retreat Study Area are limited and include recreational hunting and coastal access along public roadways. Until the location is determined, impacts of new Enhancement Marshes on recreation is possible yet uncertain. The new Enhancement Marshes may provide an opportunity to develop recreational opportunities at the new site such as trails or bird watching. These new recreational facilities would require additional space and could increase impacts on other resources (e.g., agricultural, biological).

Trails at the existing Enhancement Marshes would not be maintained in their current location and new recreation opportunities would be created elsewhere in less vulnerable areas.

4.7.6 Ocean Outfall Discharge

Use of the existing ocean outfall is not likely to create new impacts to coastal recreation as the discharge location would not change, capacity would not be exceeded, and discharge would be designed to meet water quality requirements.

The transmission pipeline would be underground, causing no impact on recreation opportunities.

Temporary recreational interruptions may occur during construction.

4.7.7 Site Restoration

If the AWTF and/or marshes were demolished, the City would need to consider future planning for the existing trails. Trails would not be maintained in their current location and new recreation opportunities could be created elsewhere in less vulnerable areas.

4.8 Summary of Environmental Effects of Project Elements

Table 5 ranks the relative level of environmental impacts of the various alternatives. The following discussion provides an overview of potential environmental impacts of the various alternatives, as based on the above analysis of CEQA-related considerations.

Table 5. Preliminary assessment of the relative impact of different Project Elements for each environmental resource category evaluated.

	Aesthetics	Agriculture	Air Quality, Energy, GHG	Biology	Hydrology / Water Quality	Land Use	Recreation
AWTF Levee Augmentation	2	0	1	3 (with living shoreline) 1 (without living shoreline)	1	0	0
AWTF Relocation	1	3	2	3	1	3	2
Enhancement Marshes Levee Maintenance	1	0	1	3 (with living shoreline) 1 (without living shoreline)	1	0	0
Enhancement Marshes Levee Augmentation	2	0	1	3 (with living shoreline) 1 (without living shoreline)	1	0	0
New E. Marsh	0	3	2	3	1	3	2
Ocean Outfall Discharge	0	0	3	+	+	0	0
Site Restoration	0	0	1	2	1	1	2

0 = No Impact
1 = Low Impact
2 = Medium Impact
3 = High Impact
"+" = Potential Benefit to Water Quality and Biology within Humboldt Bay

Alternative 1. Augment AWTF Levees and Maintain and Adaptive Management of the Enhancement Marshes

The new AWTF sheet pile wall would have a medium aesthetic impact because it may block bay views from portions of trails and other vantage points. If a living shoreline is used to provide additional wind wave protection, then it would have biological impacts because it would fill existing mudflats, eelgrass habitat and potentially channels. Creation of salt marsh habitat, which has been substantially impacted around Humboldt Bay, is a potential benefit. However, the salt marsh habitat would be converted mudflat or eelgrass habitat and there was not historically salt marsh in the area where the living shoreline would be constructed.

Alternative 2. Augment AWTF Levees and Augment Enhancement Marshes' Levees

New AWTF and Enhancement Marshes sheet pile walls would have a medium aesthetic impact because they may block bay views from portions of trails and other vantage points. If a living shoreline is used to provide additional protection for the AWTF and/or Enhancement Marshes then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to protect levees from wave action and erosion (rather than a living shoreline) then encroachment to bay habitats would not occur.

Alternative 3. Augment AWTF Levees and New Enhancement Marsh

The new AWTF sheet pile wall would have a medium aesthetic impact because it may block bay views from portions of trails and other vantage points. Additionally, a new Enhancement Marsh would likely displace agricultural land that has existing biological value. This would impact agriculture / land uses and biology. However, the new enhancement marsh may be designed to have biological value that offsets the biological impact.

If a living shoreline is used to provide additional wind wave protection around the AWTF (and/or existing enhancement marshes in the interim before the new marsh is operational) then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to raise levee elevations (rather than a living shoreline) then encroachment to bay habitats would not occur.

Construction of the new marsh, restoration of the existing site, and effluent pumping to and from the new marsh would have air quality, greenhouse gas emissions, and energy impacts.

Alternative 4: Augment AWTF Levees and Ocean Discharge

The new AWTF sheet pile wall would have a medium aesthetic impact because it may block bay views from portions of trails and other vantage points. Ocean discharge would have an impact on air quality, greenhouse gas emissions, and energy due to the required effluent pumping. However, it would also remove the bay discharge, which could have water quality and biological benefits.

If a living shoreline is used to provide additional wind wave protection to the AWTF then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to raise levee elevations (rather than a living shoreline) then encroachment to bay habitats would not occur.

Alternative 5. Retreat AWTF and Maintain and Adaptive Management of the Enhancement Marshes

A new treatment facility would likely displace agricultural land that has existing biological value. This would impact agriculture / land uses and biology. There would also be additional impacts to air quality, greenhouse gas emissions, and energy due to the need to pump effluent from the existing collection system to the new

AWTF and back to the existing bay discharge location. Interim measures to protect the existing AWTF from flooding while the new facility is built would also have minor construction related impacts, primarily to biology.

If a living shoreline is used to provide additional wind wave protection to the marshes, then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to raise levee elevations (rather than a living shoreline) then encroachment to bay habitats would not occur.

Alternative 6. Retreat AWTF and Augment Enhancement Marshes' Levees

A new AWTF would likely displace agricultural land that has existing biological value. This would impact agriculture / land uses and biology. There would also be additional impacts to air quality, greenhouse gas emissions, and energy due to the need to pump effluent from the existing collection system to the new AWTF and back to the existing bay discharge location. Augmentation of the Enhancement Marsh levees would include a new sheet pile wall that would have a medium aesthetic impact because it may block bay views from portions of trails and other vantage points. Interim measures to protect the existing AWTF from flooding while the new facility is built would also have minor construction related impacts, primarily to biology.

If a living shoreline is used to provide additional wind wave protection to the marshes, then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to raise levee elevations (rather than a living shoreline) then encroachment to bay habitats would not occur.

Alternative 7. Retreat AWTF and New Enhancement

A new treatment facility and enhancement marsh would likely displace agricultural land that has existing biological value. This would impact agriculture / land uses and biology. There would also be additional impacts to air quality, energy and greenhouse gas due to the need to pump effluent from the existing collection system to the new treatment system/marsh and back to the existing bay discharge location. Trails would not be maintained in their current location and new recreation opportunities would be created elsewhere in less vulnerable areas. The site would be restored to appropriate habitats, as determined by future studies. Interim measures to protect the existing AWTF and marshes from flooding while the new facility is built would also have minor construction related impacts.

If a living shoreline is used to provide additional wind wave protection to the marshes in the interim period before a new marsh is operational, then it would have biological impacts because it would fill existing mudflats, eelgrass habitat, and potentially channels. Salt marsh created on portions of the living shoreline would have biological value and offset impacts to some extent. However, salt marsh was not historically present in the area of the potential living shorelines. If RSP is used to raise levee elevations (rather than a living shoreline) then encroachment to bay habitats would not occur.

Alternative 8. Retreat AWTF and Ocean Discharge

A new AWTF would likely displace agricultural land that has existing biological value. This would impact agriculture / land uses and biology. There would also be additional impacts to air quality, greenhouse gas emissions, and energy due to the need to pump effluent from the existing collection system to the new treatment facility and then to the ocean discharge point. Removal of the bay discharge could have biology and water quality benefits. Interim measures to protect the existing AWTF from flooding while the new facility is built would also have minor construction related impacts.

5. Permits & Authorizations

All alternatives involve major construction that would impact sensitive species and wetlands/Water of the US and therefore it should be assumed that all alternatives would require permitting under the Clean Water Act, Coastal Act and Harbors and Navigation Code. The retreat options have potential land use conflicts and may therefore require changes to general plans / local coastal plans and zoning and/or major use permits. Specific regulatory requirements of each alternative cannot be scoped well until more project details are known, including the specific locations of a relocated treatment facility and/or enhancement marsh. However, the following permits and authorizations are generally expected to be required.

5.1 Use Permit / LCP Amendment – Humboldt County / City of Arcata

The existing facility is located in areas zoned Public Facility and Natural Resource and is an authorized use, therefore. no use permit is anticipated to be required for alternatives that protect facilities in place.

The Retreat Study Area where the AWTF and/or Enhancement Marsh would be relocated is nearly entirely within the County of Humboldt's land use jurisdiction and zoned Agriculture Exclusive, which does not readily allow for development of wastewater treatment facilities. A General Plan Amendment, Zoning Map Amendment, and/or Conditional Use Permit would likely be required. It is also possible that the City of Arcata would annex the site.

5.2 Development Permit – Humboldt Bay Harbor, Recreation, and Conservation District

In general, any development within Humboldt Bay's tidelands requires a permit from the Humboldt Bay Harbor, Recreation and Conservation District (Harbor District) to comply with the California Harbors and Navigation Code. All alternatives are expected to require a Development Permit from the Harbor District.

5.3 CEQA – City of Arcata

The CEQA process is managed by a lead agency, which coordinates reviews involving multiple state and, in some cases, federal agencies. Potential lead agencies may include local or state entities with jurisdictional authority, land use control, or funding responsibilities. For this project, the City of Arcata is the most likely lead agency because per CEQA Guidelines 15051(b)(1) "If a project is carried out by a public agency, that agency shall be the lead agency even if the project would be located within the jurisdiction of another public agency." An Initial Study / Mitigated Negative Declaration or Environment Impact Report are the likely CEQA pathways given the complexity of the selected project.

5.4 Caltrans

An Encroachment Permit may be required from Caltrans for portions of alternatives that encroach on Caltrans right of way on SR 255. The most likely project components that would require this are new pipeline(s) extending to the existing ocean outfall or between a relocated treatment facility, enhancement marsh(es), the collection system and/or bay discharge points.

5.5 Clean Water Act Section 404 – US Army Corps of Engineers

Clean Water Act Section 404 pertains to the dredging and filling of Waters of the United States and is regulated by the U.S. Army Corps of Engineers (USACE). The protection alternatives that include bay fill to expand levee prisms or for construction of a living shoreline would require a Section 404 permit. If components of any alternative impact Waters of the United States, then they would also require permits. Given the scale of all

alternatives, it is likely that an Individual Permit will be required. However, depending on design details, a Nationwide Permit may be applicable.

5.6 Clean Water Action Section 401 – North Coast RWQCB

Clean Water Act Section 401 regulates water quality standards under the authority of the U.S. Environmental Protection Agency (EPA). The EPA delegates this responsibility to the State Water Resources Control Board (SWRCB), which in turn assigns implementation to its RWQCBs. Clean Water Act 401 Certification would be required from the North Coast Regional Water Quality Control Board for all alternatives.

5.7 Porter-Cologne Act – North Coast RWQCB

The Porter-Cologne Water Quality Control Act, codified as California Water Code Division 7, established the SWRCB and RWQCBs. This law implements federal National Pollutant Discharge Elimination System (NPDES) requirements and mandates water quality control plans for Waters of the State. For Waters of the US, Section 401 Water Quality Certification through the North Coast RWQCB will also provide coverage under the Porter-Cologne Act. An NPDES permit amendment to the AWTF's existing permit would be required for any alternative that moves the discharge to the ocean, changes discharge characteristics (water quality or volume), or includes new Enhancement Marshes for EBEP compliance.

5.8 Fish & Game Code Section 1600 – California Department of Fish and Wildlife

California Fish and Game Code Section 1602 governs activities that divert or obstruct the natural flow of water or use material from any river, stream, or lake; change the bed, channel, or bank; as well as deposit material into any river, stream, or lake. Such activities require a Lake and Streambed Alteration (LSA) Agreement, and mitigation measures may also be necessary. Activities within Humboldt Bay proper do not typically trigger the need for a 1600 permit. However, one may be required for activities (e.g., pipelines or relocated treatment system or enhancement marsh) that effect channels, including potentially for crossing Mad River Slough.

5.9 California Endangered Species Act – California Department of Fish and Wildlife

California law regulates the take of state-listed species through California Endangered Species Act (CESA) Projects within Humboldt Bay must comply with CESA—typically through an Incidental Take Permit or Memorandum of Understanding—for longfin smelt (*Spirinchus thaleichthys*) and coho salmon (*Oncorhynchus kisutch*) that occur within Humboldt Bay. Take under CESA can likely be avoided for coho salmon by observing in-water work restrictions / windows, but an Incidental Take Permit (ITP) may be required for longfin smelt due to in-water work associated with development of a living shoreline or other levee augmentation around the AWTF or Enhancement Marshes.

5.10 Endangered Species Act Section 7 – National Oceanic and Atmospheric Administration Fisheries / US Fish and Wildlife Service

Under Endangered Species Act (ESA) Section 7, the take of protected species and the conservation of their habitats is regulated through a review and mitigation process overseen by the U.S. Fish and Wildlife Service (USFWS) and/or National Oceanic and Atmospheric Administration (NOAA) Fisheries. Federal agencies must consult with these resource agencies for any project or policy they authorize, fund, or implement. Consultation would be required for in-water work associated with development of a living shoreline or levee improvements around the AWTF or Enhancement Marshes for Chinook salmon (*O. tshawytscha*), steelhead trout (*O. mykiss*),

and green sturgeon (*Acipenser medirostris*). There is also potential that consultation would be required for impacts to channels and slough areas where tidewater goby (*Eucyclogobius newberryi*) could be impacted.

5.11 Migratory Bird Treaty Act of 1918 – USFWS

This international treaty prohibits the taking of migratory birds without prior authorization from the USFWS. If a species is also listed as endangered, compliance with ESA is required. Projects in and around Humboldt Bay that affect migratory bird habitat, including roosting areas, will likely require consultation with USFWS, along with implementation of construction buffers and other avoidance measures.

5.12 National Environmental Policy Act

Due to the need for federal permits (e.g., under the Clean Water Act) and likelihood for federal funding, all alternatives are likely to have a federal nexus. Hence, documentation will be required under NEPA. There are various tiers of complexity for documentation under NEPA. Further project details will be required before it can be determined how NEPA will be complied with and which agency will be the Lead NEPA agency. However, the lead agency is likely to be the USACE unless there is substantial federal funding from a different federal agency.

5.13 Coastal Act – California Coastal Commission

All alternatives are located within the Coastal Zone and subject to permit requirements under the Coastal Act. Permitting would be through the City of Arcata, County of Humboldt, and/or Coastal Commission depending on the location of specific Project components. In some cases, a consolidated permit between the City and Coastal Commission or County and Coastal Commission would provide a more efficient pathway than individual permits from multiple agencies.

5.13.1 Case Studies

The following two case studies involved protection or retreat of wastewater systems and are relevant for consideration of the Arcata system.

5.13.1.1 Ocean Beach Wastewater Systems Adaptation Project

The San Francisco Public Utilities Commission (SFPUC) South Ocean Beach Wastewater System provides wastewater treatment for 35 percent of the area of San Francisco. Some of the system's major subsurface wastewater infrastructure, including overflow storage in the Lake Merced Tunnel, was constructed along the Great Highway and additional infrastructure (pump station and wastewater treatment plant) exists directly inland of the Great Highway. The infrastructure became more vulnerable over the years, and in 2015 the Coastal Commission approved a Coastal Development Permit (CDP) for temporary armoring while requiring the development of a long-term plan.

Over the course of almost a decade, the SFPUC solicited input from the public and developed a long-term plan that incorporated nature-based solutions. The project proposed in the 2024 CDP (2-21-0912) was to abandon and remove the Great Highway and construct a seawall and revetment armoring structure seaward of the Lake Merced Tunnel that would be covered with engineered dunes; construct a service road and public access improvements; conduct regular beach replenishment; modify roadway and intersections; remove all prior temporary armoring and related development; and restore dune habitat.

The proposal to armor conflicts with Coastal Act policies (specifically Section 30235, which generally prohibits armoring of structures that are not considered "existing structures") because the existing facilities were built after the Coastal Act and is not a coastal-dependent use. The project was also not the preferred long-term solution under the Commission's SLR Guidance. However, the Commission approved the CDP under conflict resolution provisions because the retreat alternative was not considered feasible and denial would likely lead to

failure of critical wastewater infrastructure, causing untreated sewage discharges into the ocean, harming marine resources and water quality. Therefore, approval of the project would be more protective of coastal resources compared to denial.

The staff report acknowledged that the project would have been an ideal opportunity for managed retreat of critical wastewater facilities away from the shoreline. This alternative was considered infeasible by the SFPUC primarily due to cost (estimated at $270 million for the Lake Merced Tunnel, plus billions for other facilities). The SFPUC also states significant permitting and legal hurdles as well as environmental and construction impacts to the recreational area and new facility locations. The Coastal Commission staff report notes that from their perspective, the retreat alternative was not fully assessed and could be the least environmentally damaging alternative.

Some notable Special Conditions that could be relevant to the Arcata wastewater treatment system include:

– Revised Final Plans (Condition #1) requiring public access enhancements including a multi-use pathway, overlooks, parking, restrooms, etc.
– Habitat and Dune Management Plan (Condition #3) for habitat restoration and dune creation to mitigate for dune impacts at a ratio of 3:1.
– Public Access Management Plan (Condition #5) to further protect, monitor, and maintain public access and recreational use of the area.
– Monitoring, Reporting, and Adaptive Management Plan (Condition #7) of the armoring, public access, dunes, beach, and habitat mitigation areas.
– Future Maintenance/Repair (Condition #8) includes the allowance of some maintenance and repair activities of the project's armored components while requiring notification to the Coastal Commission of activities 30-days prior to their commencement.
– Coastal Hazards (Condition #9) waives a right to future shoreline armoring other than the armoring authorized by the CDP.
– Shoreline Armoring Duration (Condition #10) limited to authorizing armoring for 20 years, requiring a CDP amendment to keep the armoring in place after that time.
– Interim Authorization of Temporary Measures (Condition #12) provides a time limit for the temporary measures to stay in place, connecting the limit to a future project phase.

5.13.1.2 City of Morro Bay Water Reclamation Facility Project

For about 10 years, the City of Morro Bay worked to replace its aging wastewater treatment plant, which failed to meet Clean Water Act standards and risked fines for noncompliance with a RWQCB order. The city initially approved a plan in 2011 to redevelop the wastewater treatment plant at its current site, but the Coastal Commission denied the proposal in 2013 after appeals, citing the following inconsistencies with the LCP:

– LCP Conflict: A new wastewater treatment plant is not an allowed use under the LCP's light-industrial zoning. The existing plant is a non-conforming use, and constructing a new facility would require an LCP amendment, which was unlikely given the site's designation for visitor-serving redevelopment.
– Coastal Hazard Risks: The site is in a tsunami run-up zone and flood-prone area, with risks exacerbated by sea-level rise and dune migration. Elevating the plant on a large fill slope would not minimize hazard risk as required by the LCP and would involve excessive grading inconsistent with LCP policies.
– Visual and Scenic Impacts: The site lies in an LCP-designated sensitive view area between Highway 1 and Morro Rock. The proposed facility would be taller and visually intrusive, conflicting with LCP policies to protect and enhance coastal scenic qualities.
– Insufficient Water Reclamation: The project included only a small reclamation component, discharging most treated wastewater to the ocean. This failed to meet LCP requirements to maximize recycled water use for groundwater protection and potable water offset.

Over a period of approximately six years, the city worked with a Water Reclamation Facility Citizens Advisory Committee to identify feasible relocation sites and develop evaluation criteria for alternatives, sought public input, and ultimately developed a new proposal for a new Water Reclamation Facility. In 2019, the city received a CDP (3-19-0463) to relocate their facility to an agricultural area of unincorporated San Luis Obispo County; construct wastewater conveyance infrastructure (new pipelines and pump stations), convey treated recycled water to new wells for groundwater injection/replenishment and potable reuse; modify an existing ocean outfall; and decommission and demolish the existing treatment plant and restore the site.

Generally, the Coastal Commission supported relocating the wastewater treatment facility primarily to avoid coastal hazard risks and improve long-term resilience. The existing plant is in a low-lying area near Morro Creek and the ocean, which faces significant threats from flooding, tsunamis, erosion, and sea level rise. Keeping critical infrastructure in this location would risk catastrophic failure, water quality impairment, and require shoreline armoring. The staff report noted that "…relocating critical wastewater infrastructure away from the shoreline and eliminating potential coastal hazard threats, which could have significant adverse impacts on coastal resources including water quality, is clearly warranted under the Coastal Act and the Commission's [2015-adopted SLR Policy] Guidance." Relocation inland achieves several key objectives of the Coastal Act:

– Coastal Hazard Avoidance: Moving the facility out of a flood and tsunami zone eliminates long-term risks without relying on shoreline protective devices, which the Coastal Act discourages.
– Water Quality and Supply Security: The new inland site allows for tertiary treatment and a robust water recycling program, improving ocean and estuary health and providing up to 80% of the City's potable water needs.
– Public Access and Recreation: Removing the plant from prime oceanfront land opens that area for higher-priority uses like public recreation and visitor-serving development.
– Climate Adaptation: Relocation aligns with the Commission's SLR Policy Guidance and represents proactive planning for climate change impacts.

Although the project would subdivide and cause permanent loss of agricultural land (~15 acres), staff found that denying the project would conflict with Coastal Act policies related to coastal hazards avoidance, water quality improvement, water supply resiliency, and public coastal access and recreation enhancement. Therefore, on balance, approval of the project would be more protective of coastal resources compared to denial.

Some notable Special Conditions that could be relevant to the Arcata wastewater treatment system include:

– Agricultural Mitigation Program (Condition #5) to provide an agricultural conservation easement over agricultural property at a ratio of at least 2:1 or alternative commensurate mitigation.
– Wastewater Treatment Plant Removal and Restoration Plan (Condition #7) which would include the removal of all plant components (e.g., buildings, fences, storage tanks, etc.), and the site restoration "to a safe and level configuration roughly matching the surrounding areas."
– Outfall Assessment Plan (Condition #8) to inspect the existing outfall line at the connection point and ocean termination point and identify best management practices to avoid adverse impacts.
– Wastewater Service Boundary (Conditions #9) to prohibit expanding wastewater services outside the City's current service area without a CDP amendment.
– Coastal Hazards Response (Condition 11) to "waive any rights that [the City] may have under Coastal Act Section 30235, the City's LCP, or other applicable laws, to shoreline protective devices to protect the development authorized by this CDP."

6. Technical Information Needs

As described above, the City of Arcata is the most likely CEQA Lead Agency. Core information required to develop complete CEQA documentation and permit application packages may include the following:

- Project Description
- Geotechnical Report
- Alternatives Analysis
- Basis of Design Report
- 65% Design
- Phase 1 Environmental Site Assessment or contamination testing (may be needed if the site has a history of contamination)
- Restoration Plan (for relocation alternatives)
- Studies to support CEQA
  - Air Quality Study including modelling using the California Emissions Estimator Model
  - Traffic Study (for relocation alternatives)
  - Noise Study (for retreat/relocation alternatives)
  - Visual Simulations / Impact Assessment (for retreat/relocation alternatives)
  - Cultural and Historical Resources Investigation (may be needed for new ground disturbance areas)
  - Assembly Bill 52 Consultation
  - Biological and Botanical Resource Evaluation (including wetland delineation and mapping of Environmentally Sensitive Habitat Areas)
- Additional studies to support NEPA compliance
  - Section 106 Consultation
  - Historic Properties Identification Report
- Additional studies to support permit applications
  - ESA Section 7 Biological Assessment

Additional studies could be identified once an alternative is chosen and agency pre-consultation meetings have occurred.