CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

MAILING ADDRESS:
P. O. BOX 4908
EUREKA, CA 95502-4908

F4a

MEMORANDUM

Date: June 11, 2009

To: Commissioners and Interested Parties

From: Peter M. Douglas, Executive Director
Robert S. Merrill, District Manager – North Coast District
James R. Baskin AICP, Coastal Program Analyst – North Coast District

Subject: **Addendum to Commission Meeting for Friday, June 12, 2009**
North Coast District Item F4a, Local Coastal Program Amendment No. CRC-MAJ-1-09 (Coasta Norte)

This addendum discusses changes to the proposed findings in the staff recommendation and includes correspondence on the LCP amendment received since publication of the staff report.

1. Revisions to Suggested Modifications and Findings

Staff is making the following revisions to the staff recommendation for Suggested Modification Nos. 2b, 4, and 7. The Suggested Modifications and associated findings language originally recommended by the staff are shown in standard formatted text while revisional additions suggested by the staff appear in **bold double-underlined text** and suggested deletions are shown in **~~bold double strikethrough text~~**.

- **Suggested Modification No. 2 as appears on pages 9-10 and 30-31 of the staff report should be replaced with the following:**

  ~~2a.~~ 4a. Inundation hazard and evacuation route maps for the areas of the City that have experienced historic tsunami inundation or for areas where tsunami inundation modeling efforts have been undertaken, such as depicted within NOAA Technical Memorandum ERL PMEL-103, "Tsunami Inundation Model Study of Eureka and Crescent City, California" (Bernard, E.N., C. Mader, G. Curtis, and K. Satake, 1994), or "Tsunami Inundation at

Crescent City, California Generated by Earthquakes Along the Cascadia Subduction Zone", (Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis, 2007; *Geophysical Research Letters*, Volume 34, L20601), and/or on subsequent superseding investigations, shall be developed and incorporated into the LCP. These maps shall depict maximum credible inundation zones and runup elevations and shall be updated and kept current to include new, peer-reviewed information on Crescent City tsunami hazards as it becomes available.

~~**2.b.**~~ **4.b.** New residential subdivisions situated within historic and modeled tsunami inundation hazard areas, such as depicted on the tsunami hazard maps described in 2.a. above, shall be designed and sited such that the finished floor elevation of all new permanent residential units are constructed with one foot of freeboard above the maximum credible runup elevation as depicted on the most recent government prepared Tsunami Hazards Maps, or as developed by local agency modeling, whichever elevation is greater**, taking into account sea level rates of three to six feet per century**. Additionally, all such structures containing permanent residential units shall be designed to withstand the hydrostatic and hydrodynamic loads and effects of buoyancy associated with inundation by storm surge and tsunami waves up to and including the tsunami runup depicted on the Tsunami Hazard Maps, without experiencing a catastrophic structural failure. **For tsunami resilient design purposes, a minimum sea level rise rate of 3 feet per century shall be used when combined with a maximum credible tsunami condition.** For purposes of administering this policy, "permanent residential units" comprise residential units intended for occupancy as the principal domicile of their owners, and do not include timeshare condominiums, visitor-serving overnight facilities, or other transient accommodations.

RATIONALE FOR REVISION(S)

- To correct the numeration to match that of the policy number, rather than the number of the suggested modification.
- To state specific sea level rise rates to be considered in the preparation of tsunami runup and inundation evaluations.

- **The final paragraph on page 29 of the staff report's Part III, Findings Section II.B.5 Geologic and Flooding Hazards shall be revised to read as follows:**

Of particular consequence is the loss of one's personal home and residence. Generally representing the primary and most significant financial investment for most persons, and often a substantial portion of their intended retirement income

from the return realized from its accrued equity, the loss of a personal residence, as contrasted with other, less substantially valued real property, such as a second home or timeshare vacation unit, can have profound negative impacts on its owners' livelihood as well as the whole community in terms of added social service costs. In addition, such homelessness can have profound psychological impacts on the resident-owners, in terms of an increased sense of physical vulnerability and social isolation which can hamper efforts to recover from their domestic crisis. **Moreover, given the significance of the potential loss, home owners may understandably be more likely to either stay in their homes to either "ride out" the storm or flood event, or spend additional time in securing their dwelling and their belongings before evacuating, placing themselves as heightened risks than would more casual occupants or part-time owners who would likely have a greater propensity to immediately vacate the premises.**

RATIONALE FOR REVISION(S)

- To further elaborate on the distinctions between the risk exposure of owner/occupants of permanent residences compared to part-time occupants or short-term visitors.

- **Suggested Modification No. 4, as appears on pages 11 and 36 of the staff report should be revised to read as follows:**

The best available ~~**and most recent**~~ scientific information with respect to the effects of long-range sea level rise shall be considered in the preparation of findings and recommendations for all requisite geologic, geo-technical, hydrologic, and engineering investigations. Residential and commercial development at nearshore sites shall ~~**undertake a design sensitivity analysis utilizing**~~ **analyze potential coastal hazards from erosion, flooding, wave attack, scour and other conditions, for** a range of potential sea level rise scenarios, from ~~**a minimum of two to**~~ three ~~**feet per one hundred years and including higher rise rates of rise of five**~~ to six feet~~**, as well as 10 feet in one hundred years**~~ **per century**. The analysis shall also consider localized uplift or subsidence**, local topography, bathymetry, and geologic conditions**. A similar sensitivity analysis shall be performed for ~~**all**~~ critical facilities, energy production and distribution infrastructure, and other development projects of major community significance using a minimum rise **rate** of 4.5 feet ~~**of sea level rise in 100 years**~~ **per century**. ~~**The analysis**~~ **These hazard analyses** shall **be used to identify current and future site hazards, to help guide site design and hazard mitigation and** identify sea level rise thresholds after which limitations in the development's design and siting would cause the improvements to become significantly less stable. ~~**These sensitivity analyses shall be used to identify**~~

~~**unanticipated site hazards and to help guide site design and hazards mitigation.**~~ **For design purposes, residential and commercial projects shall assume a minimum sea level rise rate of three feet per century and critical infrastructure shall assume 4.5 feet per century; greater sea level rise rates shall be used if development is expected to have a long economic life, if the proposed development has few options for adaptation to sea level higher than the design minimum, or if the best available scientific information at the time of review supports a higher design level.**

RATIONALE FOR REVISION(S)

- To clarify the coastal hazards affecting nearshore development to be evaluated for sea level rise and to more closely match the range of potential sea level rise scenarios to be considered in project evaluations to the range of sea level rise predicted by scientific studies.
- To state specific sea level rise rates to be considered in the preparation of sea level rise analyses.

- **The second paragraph on page 30 of the staff report's Part III, Findings Section II.B.5 Geologic and Flooding Hazards should be revised to read as follows:**

Therefore, the Commission attaches **Suggested Modification No. 2**, below, requiring new residential development resulting from subdivisions (including condominiums) located within historic and modeled tsunami inundation areas be designed and sited such that the floor elevation of "permanent residences" (i.e., primary domiciles) be constructed at a height above that of the maximum tsunami run up water depth on land anticipated at the development site. In addition, the suggested modification would require all such newly platted development structures containing permanent residential units to be resiliently designed to withstand the hydrostatic and hydrodynamic loads and effects of buoyancy associated with inundation by **sea level rise,** storm surge and tsunami waves up to and including the tsunami height projected to result from a near-source generated seismic event along the Cascadia Subduction Zone, without experiencing a catastrophic structural failure which would destroy the structures and impede the evacuation or rescue of persons occupying the building. The Commission finds that such requirements for permanent residential structures are appropriate and feasible measures to minimize risks to both property and "life," in terms of a person's livelihood and their enjoyment of their existence and faculties.

RATIONALE FOR REVISION(S)

- The change to the findings reflects the changes made to Suggested Modification No. 2.

- **The second paragraph on page 33 of the staff report's Part III, Findings Section II.B.5 Geologic and Flooding Hazards should be revised to read as follows:**

  The IPCC's findings were ~~**based on a**~~ **expanded to incorporate some increase in sea level rise by accelerated ice melt through a** 2007 report prepared by Dr. Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research (hereinafter "Rahmstorf Report"). This report has become the central reference point for much of recent sea level rise planning. ~~**The Rahmstorf Report projects that by 2100, sea level could be between 20 to 55 inches higher than 1990 levels.**~~ The Rahmstorf Report developed a quasi-empirical relationship between historic temperature and sea level change. Using the temperature changes projected for the various IPCC scenarios, and assuming that the historic relationship between temperature and sea level would continue into the future, he projected that by 2100 sea level could be between 20 inches and 55 inches (0.5 to 1.4 meters) higher than the 1990 levels (for a rate of 0.18 to 0.5 inches/year). These projections for future sea level rise anticipate that the increase in sea level from 1990 to 2050 will be from about 8 inches to 17 inches (for a rate of 0.13 to 0.28 inches/year); from 1990 to 2075, the increase in sea level would be from about 13 inches to 31 inches (for a rate of 0.15 to 0.36 inches/year) and that the most rapid change in sea level will occur toward the end of the 21st century. Most recent sea level rise projections show the same trend as the projections by Rahmstorf — that as the time period increases the rate of rise increases and that the second half of the 21st century can be expected to have a more rapid rise in sea level than the first half.

RATIONALE FOR REVISION(S)
➢ To more clearly depict the factors considered in the Rahmstorf Report and to eliminate redundant language.

- **The last paragraph on page 34 and the first two full paragraphs on page 35 of the staff report's Part III, Findings Section II.B.5 Geologic and Flooding Hazards should be revised to read as follows:**

  Given the general convergence of agreement over the observed and measured geodetic changes world wide in ocean elevations over the last several decades, most of the scientific community has ceased debating the question of whether sea level will rise several feet higher than it is today, but is instead only questioning the time period over which this rise will occur. However, as the conditions causing sea level rise continue to change rapidly, prognostications of sea level rise are similarly in flux. As a result of this dynamism, anticipated amounts and rates

of sea level rise used in project reviews today may be either lower or higher than those that will be utilized ten years from now. This degree of uncertainty will continue until sufficient feedback data inputs are obtained to allow for a clear trend to be discerned from what is now only a complex and highly variable set of model outputs. Accordingly, in the interest of moving forward from the debate over specific rates and amounts of rise to a point where the effects of sea level rise greater than those previously assumed in the past may be considered, one approach is to undertake ~~**a sensitivity**~~ **an** analysis on the development project and site to ascertain the point when significant changes to project stability would result based on a series **or a range** of sea level rise ~~**rates**~~ **amounts**. The analysis would be structured to use a variety of sea level rise projections, ranging from the relatively gradual rates of rise indicated by the IPCC and Rahmstorf models, to scenarios involving far more rapid rates of sea level rise based upon accelerated glacial and polar sea and shelf inputs.

For example, for the most typical development projects along the coast (i.e., residential or commercial), consideration of a two to three foot rise in level rise over 100 years could be assumed to represent the minimum rate of change for design purposes. However, in the interest of investigating adaptive, flexible design options, sensitivity testing should also include assessing the consequences of sea level rise at three to five times greater rates, namely five to six feet per century, ~~**and even 10 to 20 feet per 100 years**~~ **for critical facilities or development with a long expected project life**. The purpose of this ~~**exercise**~~ **analysis** is to determine, if there is some "tipping point" at which a given design would rapidly become less stable, and to evaluate what would be the consequences of crossing such a threshold. This type of analysis would make the property owner aware of the limitations, if any, of the initial project design early in the planning process. Depending upon the design life of the development, the economic and technical feasibility of incorporating more protective features, and levels of risk acceptance, the project proponent could propose, or the permitting agency may require, that greater flexibility be provided in the design and siting of the development, or other mitigation be identified, to accommodate the higher rates of sea level rise.

~~**The sensitivity analysis**~~ **This sea level range** approach would allow accelerated rates of sea level rise to be considered in the analysis of projects. Such evaluations provide some flexibility with regard to the uncertainty concerning sea level rise, providing an approach to analyze project in the face of uncertainty that would not involve the imposition of mandatory design standards based upon future sea level elevations that may not actually be realized**, and allowing flexibility in the acceptable amount of sea level rise for specific projects and for the best available scientific information at the time of review**. Given the nonobligatory and adaptive nature of this approach to hazards avoidance and minimization, as necessitated by such scientific uncertainty, it will remain

important to include new information on sea level trends and climate change as iterative data is developed and vetted by the scientific community. Accordingly, any adopted design or siting standards that may be applied to development projects should be re-examined periodically to ensure the standard is consistent with current estimates in the literature before being reapplied to a subsequent project.

RATIONALE FOR REVISION(S)
➢ To more clearly explain the reasoning behind the range-of-rates sea level rise evaluation.

- **The second paragraph of Suggested Modification No. 7 as appears on pages 12 and 24 of the staff report should be replaced with the following:**

Any future development at the former Del Norte Community Health Center site (APN 118-020-34), including any multi-family residential, recreational or visitor-serving commercial development, shall provide for a view corridor oriented from the vantage point of the intersection of Second and A Streets. The Second and A Streets view corridor shall be located within the southeasterly third of the vacated sixty-foot-wide West Second Street right-of-way and comprise a minimum of twenty feet (20′), extending southwesterly from A Street to the adjoining beach. **The view corridor from ground level to a height of ten feet (10′) shall be kept clear of obstructions, including physical development and/or storage of materials that would obstruct views through the corridor. Landscaping in the corridor shall be limited to seeded grass lawns, sodded turf, or other low-growing groundcovers whose height at maturity will not exceed one foot (1′) above finished grade. Balconies, bay windows, and other architectural features on upper floors (10 feet or more above grade) may extend a maximum of three feet (3′) into the view corridor.**

- **The last sentence of the first paragraph on page 24 of the staff report's Part III, Findings Section II.B.3 Visual Resources should be revised to read as follows:**

The modification would require that a minimum of a twenty-foot width of the West Second Street right-of-way be retained **and kept clear of above-grade obstructions including physical development and/or use as storage, with some minor exclusions for grounds landscaping and upper-story architectural features,** as a view corridor in the approval of any future development at the subject site.

RATIONALE FOR REVISION(S)

- To include minor exceptions for encroachments into the view corridor on upper stories where the corridor would not be functionally affected.
- To set limits on at-grade uses within the view corridor to assure its functionality.

2. Responses to Comments

As provided in Attachment No. 1, a comment letter has been received from Kirk Roberts raising several issues with respect to the proposed LCP amendment and/or staff recommendation for certification-with modifications. These issues regard: (a) spot-zoning; (b) evaluation of stormwater runoff treatment best management practices feasibility; (c) materials excerpted from the City's amendment request; and (d) the width of the suggested view corridor.

(a) Spot-zoning

Mr. Robert asserts that the subject LCP amendment comprises invalid "spot zoning" insofar as the report's analysis was focused primarily on the effects the LCP amendment would have on development potential at the former clinic site with little discussion of the effects on other lots within a similarly-zoned nearby Residential-Professional zoning district. *Black's Law Dictionary* defines spot zoning as the "(g)ranting of a zoning classification that differs from that of the other land in the immediate area… for treatment different from that of similar surrounding land and which cannot be justified on the basis of health, safety, morals, general welfare of the community, and which is not in accordance with a comprehensive plan." Spot zoning is typically discriminatory in nature, whereby a particular parcel or parcels are arbitrarily singled-out and down-zoned or otherwise restricted in their development potential compared to other similar properties in its vicinity.

The subject LCP amendment would change the zoning designation on a 7,200-square-foot area from Coastal Zone Two-Family (CZ-R2) residential to Coastal Zone Residential-Professional (CZ-RP) designation consistent with the existing designation on the remaining 1.07-acre portion of the former clinic site. This reclassification would expand the assortment of development types that could be pursued on the redesignated area, not further restrict them. In addition, for this case, the rezoning is effectively a zone boundary adjustment between two adjacent residential designations rather that the imposition of a new zoning district in an area with completely different zoning. Moreover, as proposed and further modified by Suggested Modification No. 8, the text of the Multiple Family land use designation that the subject Residential-Professional zoning would implement, clearly indicates that the properties so planned and zoned are intended as transitional areas between existing commercial and single-family residential areas, such as the setting of the former medical clinic parcel being rezoned. This, the subject rezoning does not constitute spot zoning in that: (1) it is not discriminatory in nature; (2) the reclassification is not different from that of other land in the immediate area; and (3) the rezoned designation is consistent with the City's land use plan.

Finally, with regard to the succinctness of the analysis of the effects the change to the Residential-Professional zoning district's lot-area-per-dwelling-unit from 1,500 square feet to 1,250-square feet in Footnote No. 13 on pages 43-44 of the report, given the scope of the effects of these changes, the analysis is adequate. The LCP amendment applies the Multiple Family land use designation to the former medical clinic site. The Medical Related land use designation would remain in place on the subject seven other parcels similarly zoned CZ-RP situated between "A" and "B" Streets south of Front Street (APNs 118-030-09, and -22 through -27). The Residential-Professional zone is a zoning district that implements both the Multiple Family land use designation and the Medical Related land use designation. To be approved, a proposed land use must be consistent with both the land use classification and the zoning district that pertains to the subject property. Accordingly, unlike at the former medical clinic site where the Multiple Family land use classification allows multiple family dwellings, the only class of development that could be authorized at the seven parcels between "A" and "B" Streets south of Front Street that would be fully consistent with the allowable land uses under both the land use plan and zoning standards would be medical-related professional offices, a use type which does not include residential dwellings for which the amended lot-area-per-dwelling standard would apply. As the amended lot-area-per-dwelling-unit standard does not apply to a use that cannot currently be developed on these other parcels, the analysis of the lot-area-per-dwelling-unit amendment in the report is focused on how this change would affect the former medical clinic site. If in the future the City were to propose an amendment of the land use designation for these parcels from Medical Related to Multiple Family, similar to that proposed for the former medical clinic site, the theoretical maximum number of potential dwelling units that could be developed on the whole of the 86,400-square-foot subject area would increase from 57 to 69 dwelling units under the proposed amended 1,250-square-foot lot-area-per-dwelling standard. The ramifications of such an increase in potential residential dwelling units on public service capacities, public access and coastal recreation, and other coastal resources would be reviewed as part of any such LCP amendment proposed for these lots.

(b) Stormwater Runoff Treatment Design Criteria

Mr. Roberts takes exception to the particular stormwater treatment feasibility analysis performed for the subject former medical clinic site proposed for land use and zoning redesignations from two perspectives: (1) that the preliminary water pollution control plan was based on a diagram is not consistent with any current construction plan as to the impervious area and building foot print; and (2) that the analysis did not use precipitation data from a near shoreline site more similar to that of the clinic parcel, such as McNamara Field.

To assess an LCP amendment's consistency with the water quality policies of the Coastal Act, the local government is typically required to include an analysis as to how water quality can be protected at a site or sites proposed for land use plan redesignation and/or a change in an LUP development policies. These analyses are intended for substantiating that inclusion of water quality control and treatment best management practices can feasibly be incorporated into any future development that may be undertaken at the site or sites under the amended classification(s) or policy(ies). As a wide variety of potential development designs are typically possible at a given locale, a reasonable development scenario is often used to ascertain whether

water quality BMP incorporation is feasible. Thus, the build-out scenario developed by Stover Engineering for the medical clinic site as depicted in Exhibit No. 9 of the staff report, comprising the construction of a theoretical 32,832 square-feet of impervious surface improvements on a 1.24-acre site consistent with zoning minimum yard, building setbacks, and lot coverage standards and utilizing a flow-based oil-water separation/interceptor device comprises a reasonable basis from which the feasibility of incorporating water quality protective features may be verified.

With regard to the availability of precipitation data from other near shoreline sites, such as McNamara Field, the 85th percentile numerical sizing criteria was developed as a cooperative undertaking by the Commission and the state regional water quality control boards. The information as to regional 85th percentile one-hour volumetric- and 24-hour events flow-based rainfall events was collated primarily from data collected from National Weather Service, Department of Water Resources, and Caltrans facilities' historic records. Unfortunately, no such data is available from the County airport at McNamara Field.

(c) Excerpted Exhibits

Mr. Roberts notes that public comment letters and responses thereto referenced in the City's LCP amendment application were not included within the Commission staff report. Mr. Roberts also asserts that the analysis did not address what effects the change in the lot-are-per-dwelling standard would have at the former clinic site location and the surrounding single-family residential properties.

For brevity sake and to limit the size of the staff report to a reasonable length, the totality of a local government's LCP amendment submittal is typically not included as exhibits to the staff report for the certification request, especially with respect to correspondence directed initially to the local agency for their hearing processes. The commenting interested party has been notified of this practice and informed that, if he and/or others would like the Commission to consider the comments previously made before the City Hearings, these comments be readdressed to the Commission and submitted prior to the June 12th hearing date.

With respect to the evaluation of the effects the changes to the CZ-RP zoning district's lot-area-per-dwelling standard would have at the former clinic site and environs, such analysis appears throughout the staff report, addressing its potential effect in a variety of contexts, including the adequacy of public services, effects, on coastal visual resources, impacts to environmentally sensitive areas, implications on coastal access and recreational opportunities, protection and reservation of sites for priority coastal-dependent uses, and avoidance and minimization of natural and man-made hazards. To certify the amendment to the Land Use Plan (LUP) portion of the City of Crescent City Local Coastal Program, the Commission must find that the LUP, as amended, is consistent with the policies of Chapter 3 of the Coastal Act. To certify the amendment to the Implementation Program (IP) portion of the LCP, the Commission must find that the IP, as amended, conforms with and is adequate to carry out the amended LUP. The staff report addresses the effects of the revised lot-area-per-dwelling-unit standard in the context of the LCP amendment's consistency with the Coastal Act and the LUP as amended.

(d) View Corridor Width

Mr. Roberts encourages the Commission to expand the width of the 20-foot-wide view corridor recommended in Suggested Modification No. 7 to 40 feet so that emergency services may access the adjoining beach, the corridor would be consistent with the 40-foot-wide view corridor imposed at the end of Front Street for the *Hampton Inn and Suites* development, and more adequately reduce the view blockage that would result from development of two adjacent multi-story structures.

A 20-foot-wide view corridor, with certain exceptions for upper-floor architectural elements (see the seventh bulleted revisions in Section 1 on page 7 above) is adequate to protect coastal visual resources at this site. First, as a matter of perspective, the 40-foot-wide view corridor at Front and A Streets for the adjacent hotel-restaurant project was intended to break up the visual bulk of the one- to three-story, two-building complex that at full build-out will comprised 59,360 square-feet of floor area, extending to 35 feet in height, and spanning 400 feet of its ±464-foot-wide, nearly two-block, expanse of A Street.

Secondly, as a functional consideration, the corridor, as proposed by the applicant and mandated to be kept open and clear by a project special condition, was intended to protect views of highly scenic offshore rocks and bluffs in the Halls Bluff area to the northwest. As discussed on pages 22 through 24 of the staff report's Part 3, Findings Section II.B.3., due to the up-sloping topography presence of intervening structures and vegetation, no such views of open ocean water or offshore rocky areas are present at the A and Second Streets public vantage point.

Accordingly, given the paucity of views afforded at the subject viewing point, establishing a 20-foot-wide view corridor within the western third of the vacated West Second Street right-of-way, effectively representing a street-ward protraction of the previously dedicated 20-foot-wide access easement at the rear of the subject property, and situated laterally adjacent to the six-foot-wide access easement on the neighboring hotel parcel, would adequately protect visual resources of the area.

ATTACHMENTS

1. Comment Letter from Kirk Roberts, dated June 3, 2009, received June 4, 2009
2. Letter from Eric Taylor, Associate Plannner, City of Crescent City, dated June 8, 2009, received June 10, 2009, authorizing Mr, Randy Baugh to speak on behalf of the City at the public hearing on the subject LCP Amendment

California Coastal Commission
North Coast District Office
710 E Street - Suite 200
Eureka, CA 95501-1865

CRC-MAJ-1-09

6-3-2009

CRC-MAJ-1-09 reports on LCP08A-01 which deals with the Coasta Norte property as well as multiple other lots in the same area.

Issue 1

There has been no consideration in the CCC report , the Crescent City Planning Commission or the Crescent City Council to the effects of these actions on those properties. Contrary to footnotes 13 in the Coastal Commission Staff Report, all these parcels were included in the local resolutions changing zoning designation and square footage. It was pointed out by the appellants locally that this would be spot-zoning except that the former Planning Director chose to include the other parcels to avoid this label. The bulk of the Commission report deals with Coasta Norte which is currently under appeal. This gives further proof that these local actions were in support of spot zoning.

The lot area per dwelling unit reduction was strenuously objected to at Planning Commission and Council hearings as not needed to amend the zoning issues. The City Attorney opined that it was difficult to grant variances in spite of the fact there have been 20 plus variances granted in the 2 years that appellant has been on the Planning Commission, and since Randy Baugh has purchased the property.

Clearly, when there is a definite plan proposed for any of the properties a request for a variance can be considered.

Issue 2

Since the thrust of this report (including its heading) is on Coasta Norte, we take exception to the Stover Engineering Storm Water Quality Analysis as being incomplete because it fails to provide data based on a local coastal location, instead using data from Eureka and adjusted by using data from 1.5 miles inland in Crescent City. There is no indication that data might be available from the local airport (McNamara Field) which is in a similar coastal location. It is well recognized in Crescent City that rainfall is considerably heavier as it approaches the coast line from the ocean and, in fact, weather conditions at the coastline are markedly different from the inland.

In addition, the preliminary water pollution control plan diagram is not consistent with any current construction plan as to the impervious area and building foot print. Again, the question of why this is in the package in the 1st place is questioned.

Issue 3

There does not appear to be exhibit "D" and exhibit "E" in the City's "Application for Local Coastal Program Amendment" (City # pgs. 1-10), Attachment A hand numbered (7-16 of 16) indicating the appellant's objections specifically to reduction of the lot area per unit and its effect on the local single family neighborhood, and related previously appealed CCC issues.

ATTACHMENT 1

Furthermore, the staff report does not address the effect of this reduction in increasing the potential number of units in issues currently on appeal and of CCC general interest.

Issue 4

While we applaud the Staff Report for requiring a 20 foot scenic view right of way along the vacated 2nd Street extension, we would encourage the Commission to increase it to 40 feet width for the following reasons:

1) Provide access to emergency services and the public to the beach

2) Make the Right of Way consistent with that imposed on the Hampton Inn at the end of Front Street

3) Reduce the view blockage caused by two multi-story structures

I hope that the site specific items recommended in this report are re-considered in the Staff Report on future Coasta Norte plans.

Signature on File

323 Wendell St
Crescent City CA 95531

377 J STREET CRESCENT CITY, CALIFORNIA 95531-4025

Administration/Finance: 707-464-7483 Public Works/Planning: 707-464-9506
Utilities: 707-464-6517 FAX: 707-465-4405

6/8/09

To: California Coastal Commission

Dear Commissioners,
The City of Crescent City would like to give our allotted time to Mr. Randy Baugh so that he may speak on our behalf regarding LCP Amendment NO. CRC-MAJ-1-09. If you have any questions please contact me at (707) 464-9506.

Sincerely,

Eric Taylor, Associate Planner
City of Crescent city
377 J Street
Crescent City, CA 95531

ATTACHMENT 2

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

F4a

Filed: April 30, 2009
90th Day: July 29, 2009
Staff: James R. Baskin
Staff Report: May 29, 2009
Hearing Date: June 12, 2009
Commission Action:

TO: Commissioners and Interested Parties

FROM: Peter M. Douglas, Executive Director
Robert S. Merrill, North Coast District Manager
James R. Baskin AICP, Coastal Planner

SUBJECT: **City of Crescent City LCP Amendment No. CRC-MAJ-1-09, (Coasta Norte).** (Meeting of June 12, 2009, in Marina Del Rey)

SYNOPSIS:

Background:

As discussed herein, the impetus for the proposed Local Coastal Program (LCP) amendments follows from appeals filed with the Commission of a decision of the City of Crescent City to grant a permit with conditions to Randy Baugh DBA: Development Consultants, Inc. for development of a mixed-use residential condominium and medical/real estate sales professional office project (File No. A-1-CRC-08-004). The Commission found that the appeal raised a substantial issue of conformance of the project as approved with the certified LCP at its meeting of March 7, 2008. The major assertions of the appeals regarded whether, in conditionally approving this development project, the City had adequately addressed the project's conformance with LCP policies and standards regarding the type of development and project site. These conformance issues related to: (1) the permissibility of uses under the land use designation currently applied to the project site; (2) the density and intensity of the proposed residential use; and (3) various other provisions within the LCP regarding the presence of geologic hazards, the protection of environmentally sensitive habitat areas, protection and provision of public access, ensuring the quality of coastal waters, and compatibility with visual resources at or near the site.

Since the March 2008 hearing on substantial issue, the City acted to amend the LCP provisions which conflict with the approved project and requested staff to schedule the *de novo* hearing on the appeal for a Commission meeting after the LCP amendment is acted on by the Commission.

Amendment Description:

The City of Crescent City proposes to amend its Land Use Plan (LUP) text and maps and corresponding Implementation Program (IP) text and maps to accommodate the development of the residential condominium at the site of the former Del Norte Community Health Center, located at the intersection of Second and "A" Streets. The subject property is currently designated on the land use plan map for medical-related professional office and residential duplex uses, and is correspondingly split-zoned for residential/professional office and two-family residential development. The text descriptions of these use categories within the currently-certified LUP specifically reserve the majority of the site for medical offices and sets restrictions on the types and densities of residential dwellings which can be developed on the remaining portion. In addition, notwithstanding the medical professional office use limitations of the LUP, the residential-professional zoning district standards further limit residential density over the whole of the site through its lot-area-per dwelling standard.

As submitted, Crescent City's LCP Amendment No. CRC-MAJ-1-09 would consist of: (1) proposed revisions to the text of the Coastal Element of the City's General Plan (LUP) providing specific policies intended to guide the types and densities of multi-family residential land uses and concurrent compatible visitor-serving facilities within the City's planning area to allow common wall residential development at greater than six units per acre and compatible visitor-serving uses in a manner that creates a transition from adjoining single-family residential uses to commercially designated property; (2) an associated change to the text of the Coastal Zone Zoning Regulations (CZZR) Residential-Professional zoning district standards to modify the lot-area-per-dwelling requirements; (3) an amendment to the land use plan map to redesignate a 1.24-acre parcel currently identified for medical-related professional office and duplex residential development to instead provide for multi-family and non-conflicting visitor-serving facility development; and (4) an amendment to the zoning map to redesignate the subject 1.24-acre parcel to Residential-Professional zoning.

The Commission notes that the proposed amendment would amend the LCP as described above and would not approve the specific development project it was intended to facilitate. A separate appeal of the coastal development permit granted by the City for the development must still be acted upon by the Commission before that particular development could go forward. Whether or not this particular project is ultimately granted the necessary permits and is developed, certification of the LCP Amendment would permanently change the land use and zoning designations applicable to the site and change policies and standards applicable to other sites within the City's coastal zone. The new designations, policies, and standards would apply to any future development proposal made for the site and other affected areas. Therefore, the Commission must evaluate the consistency of the range of development proposals that might

come forward under the proposed LCP amendment for consistency with the Coastal Act rather than the consistency of the specific project currently on appeal to the Commission.

On January 5, 2009, the City of Crescent City's City Council adopted the amendments and, in a subsequent hearing held on March 16, 2009, directed its staff to submit the changes for certification by the Commission.

Summary of Staff Recommendation:

The staff recommends that the Commission, upon completion of a public hearing, **certify the amendment request with suggested modifications**. The City proposes to amend the certified LUP and coastal zoning policies and standards, and redesignate and rezone the site from medical facilities and two-family residential designations to those that support multi-family and concurrent compatible visitor-serving facilities. As a result of these modifications, 1.24 acres of land would be designated in the LUP for multi-family residential development at densities greater than six dwellings per acre. With the concurrent modification to the Residential-Professional zoning district's lot-area-per-dwelling standard, the potential number of residential units that could be developed at the site would be raised from one to as many as 43 dwellings. Due to its location within the urbanized southwestern portion of the City, the subject area proposed for the LCP changes is contiguous with existing developed areas with adequate community service capacities and public utility infrastructure which could accommodate new development under the amended policies, standards, and designations. Thus, the amendment is consistent with the new development policies of the Coastal Act. In addition, as the site of the subject land use plan and zoning redesignations is located on a waterfront setting adjacent to a sandy-rocky beach in proximity to several coastal visitor destinations and recreational attractions with coastal views along the shoreline, the site is especially suitable for the visitor-serving component of the uses that would be allowed by the amendment, provided they are at intensities so as not to alter the character of the surrounding residential neighborhood as is proposed. However, based upon the current inventory and availability of visitor-serving facilities in the area, particularly overnight or short-term accommodations, there is no clear demand for development sites for additional transient lodging that would compel reserving the subject property for such priority uses. Additionally, the site is not appropriate for other forms of priority uses, such as port, marine, or harbor development, or intensive commercial recreational uses. Therefore the amendment is consistent with the priority visitor-serving use policies of the Coastal Act. Moreover, based upon information submitted for the associated appealed development project for which the amendment is being requested, the parcel proposed for LUP and zoning map redesignations is situated at a distance from adjacent marine intertidal wetland and onsite sandy intertidal ESHA such that the LCP prescribed 50-foot-wide buffer could be established and have adequate building site area available for development of permissible uses.

However, there are aspects of the proposed LCP amendment that are not consistent with the Coastal Act, and, in the case of the IP amendment, would not conform with and carry out the LUP as amended, with respect to: (a) exposure of persons and property to flooding hazards, particularly potential tsunami inundation; (b) consideration of sea level rise in geological and hydrologic evaluations; (c) protection and provisions of coastal access facilities; (d) protection of

visual resources; (e) consistency with Coastal Act priority use requirements; and (f) ensuring that the implementation is consistent with and adequate to carry out the policies of the land use plan. The Suggested Modifications recommended by staff would make the LUP amendments consistent with the Coastal Act and the IP amendments conform with and carry out the LUP, as amended, for the following reasons:

- LUP Chapter 5 – "Diking, Dredging, Filling and Shoreline Structures" Policy No. 3 omits certain classes of hazards numerated within Coastal Act Section 30252 for which new development is required to minimize risks to life and property. Suggested Modification No. 1 would include "flooding" along side "geologic" in the list of hazards to be avoided and risk exposure minimized.

- The LCP amendment includes no associated requirement to consider the need for design or siting requirements to minimize risks to life and property that would result from any new development under the amended LCP provisions at a site situated within a modeled tsunami run-up zone. Suggested Modification No. 2 would insert new policy language within the LUP Chapter 5 "Diking, Dredging, Filling and Shoreline Structures" policies requiring that development sites for permanent residences within tsunami run-up areas minimize exposure of persons and property by requiring the design of the occupied floor elevation for permanent residences to be above the projected inundation level.

- The LUP amendment includes no associated requirements for minimizing tsunami risk exposure by facilitating the evacuation of the additional number of persons the amendment would accommodate at the site. Suggested Modification No. 3 would insert new policy language in LUP Chapter 5 "Diking, Dredging, Filling and Shoreline Structures" requiring that information regarding the need for prompt evacuation to areas outside of the tsunami run-up zone in the event of a local earthquake be prepared and distributed for all new development entailing human occupied structures within such areas.

- The LUP requires that new development minimize risks to life and property in areas of high geologic hazard, assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. However, the amendment does not include any implementation provisions ensuring that scientific information regarding predicted rates for global sea level rise be taken into account in the determination of how to avoid and minimize exposure to geologic hazards, including coastal erosion, and flooding and tsunami inundation, would be assured. Suggested Modification No. 4 would append a new policy into LUP Chapter 5 – "Diking, Dredging, Filling and Shoreline Structures" requiring that all geological, geo-technical, engineering and hydrologic evaluations include in their analyses the effects of sea level rise.

- The property proposed for LUP and zoning redesignation has a history of vertical public access use in the form of an informal trail leading down to the adjacent rocky-sandy

beach and after-hours use of the former health clinic's parking lot as an access support facility. Suggested Modification No. 5 would insert policy language into LUP Chapter 1 – "Public Access" requiring that future development of the site be required to make an offer of dedication of a vertical accessway and/or public access support facility if the offer of dedication and/or public access support facility would alleviate the impacts of the proposed development and be related in nature and extent.

- The southwestern side of the property proposed for LUP and zoning redesignation comprises a vacated public street right-of-way which provides a visual corridor between adjoining building sites to the westerly ocean horizon as viewed from publicly accessible vantages along Second and A Streets. Suggested Modification No. 6 would append new LUP policy language into LUP Chapter 3 – "Coastal Visual Resources and Special Communities" requiring that the any future development on the subject property maintain the visual corridor.

- The proposed amendment to the description of the LUP's multi-family residential land use lists examples of "compatible visitor-serving commercial and recreational uses" which intermixes several forms of permanent residential development types not generally associated with providing visitor accommodations or services. Suggested Modification No. 7 would revise the proposed amended policy make a clearer distinction between types of residential and compatible visitor-serving uses permitted within the multi-family land use designation.

- The proposed amendment to the description of the multi-family residential land use category to identify "common wall residential development" as the principal use in such designated areas is intended to facilitate a condominium project. However, the Residential-Professional zoning district which implements this land use designation limits non-commercial, non-institutional, private residential development to one- and two-family dwellings, multiple family dwellings, and townhouses/row houses. Condominiums, cooperatives, and other partially privately-owned / partially commonly-owned housing types are not addressed in the currently certified coastal zoning regulations. Suggested Modifications No. 8 would make several changes to the definitions and phrasing of the zoning regulations so that confusion is avoided with respect to the privately-held residential units' compliance with lot and yard area standards, typically applied to dwelling and lot consolidated ownerships.

The Commission's procedures require that if the Commission wishes to certify an amendment with modifications, the Commission must first deny the LCP amendment request as submitted, and then certify the amendment if modified as suggested to incorporate the recommended changes. Therefore, staff recommends that the Commission, upon completion of the public hearing, deny the LCP amendment as submitted, and then certify the amendment if modified as suggested.

The appropriate motions and resolutions to adopt the staff recommendation are found on pages 6 through 8 of this report.

Analysis Criteria:

To certify the amendment to the Land Use Plan (LUP) portion of the City of Crescent City Local Coastal Program, the Commission must find that the LUP, as amended, is consistent with the policies of Chapter 3 of the Coastal Act. To certify the amendment to the Implementation Program (IP) portion of the LCP, the Commission must find that the IP, as amended, conforms with and is adequate to carry out the amended LUP.

Additional Information:

For additional information about the LCP Amendment, please contact James R. Baskin at the North Coast District Office at (707) 445-7833. Please mail correspondence to the Commission at the above address.

Status of Crescent City's City-wide LCP Update Program:

In addition to the LCP Amendments being proposed for the former Del Norte Community Health Center site associated with the envisioned *Coasta Norte* condominium project, the City is presently undertaking substantial revisions to its entire Local Coastal Program. On July 18, 2003, the City of Crescent City initially submitted and requested Commission certification of its *Local Coastal Plan Extract Policy Document* and *Local Coastal Plan Implementation Ordinance Update*, comprising a comprehensive update to the policies and Standards of its Land Use Plan and Coastal Zone Zoning Regulations, respectively. Currently, the City is finalizing its response to Commission staff's request for additional information and clarifications regarding the various proposed amended provisions. Staff anticipates that the City will complete the remaining portions of this undertaking within the next several weeks and that a public hearing before the Commission on the proposed updated LCP will be held in late 2009 or early 2010.

PART ONE: RESOLUTIONS AND SUGGESTED MODIFICATIONS

I. MOTIONS, STAFF RECOMMENDATIONS, AND RESOLUTIONS FOR LCP AMENDMENT NO. CRC-MAJ-1-09

A. DENIAL OF LUP AMENDMENT NO. CRC-MAJ-1-09, AS SUBMITTED:

MOTION I: I move that the Commission certify Land Use Plan Amendment No. CRC-MAJ-1-09 as submitted by the City of Crescent City.

STAFF RECOMMENDATION TO DENY:

Staff recommends a **NO** vote. Following the staff recommendation will result in rejection of the Land Use Plan Amendment as submitted and adoption of the following

resolution and findings. The motion passes only by an affirmative vote of a majority of the appointed Commissioners.

RESOLUTION I TO DENY CERTIFICATION OF THE LAND USE PLAN AS SUBMITTED:

The Commission hereby denies certification of the Land Use Plan Amendment No. CRC-MAJ-1-09 as submitted by the City of Crescent City and adopts the findings set forth below on the grounds that the land use plan as amended does not meet the requirements of and is not in conformity with the policies of Chapter 3 of the Coastal Act. Certification of the Land Use Plan amendment would not meet the requirements of the California Environmental Quality Act, as there are feasible alternatives and mitigation measures that would substantially lessen the significant adverse impacts on the environment that will result from certification of the Land Use Plan Amendment.

B. CERTIFICATION OF LUP AMENDMENT NO. CRC-MAJ-1-09 WITH SUGGESTED MODIFICATIONS:

MOTION II: I move that the Commission certify Land Use Plan Amendment No. CRC-MAJ-1-09 for the City of Crescent City if it is modified as suggested in this staff report.

STAFF RECOMMENDATION TO CERTIFY WITH SUGGESTED MODIFICATIONS:

Staff recommends a **YES** vote. Passage of the motion will result in the certification of the land use plan amendment with suggested modifications and adoption of the following resolution and findings. The motion to certify with suggested modifications passes only upon an affirmative vote of the majority of the appointed Commissioners.

RESOLUTION II TO CERTIFY WITH SUGGESTED MODIFICATIONS:

The Commission hereby certifies Land Use Plan Amendment No. CRC-MAJ-1-09 for the City of Crescent City if modified as suggested and adopts the findings set forth below on the grounds that the Land Use Plan amendment with suggested modifications will meet the requirements of and be in conformity with the policies of Chapter 3 of the Coastal Act. Certification of the land use plan amendment if modified as suggested complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the plan on the environment, or 2) there are no further feasible alternatives or mitigation measures that would substantially lessen any significant adverse impacts on the environment that will result from certification of the Land Use Plan Amendment if modified.

C. DENIAL OF IMPLEMENTATION PROGRAM AMENDMENT NO. CRC-MAJ-1-09, AS SUBMITTED:

MOTION III: I move that the Commission reject Implementation Program Amendment No. CRC-MAJ-1-09 for the City of Crescent City as submitted.

STAFF RECOMMENDATION OF REJECTION:

Staff recommends a **YES** vote. Passage of this motion will result in rejection of Implementation Program Amendment and the adoption of the following resolution and findings. The motion passes only by an affirmative vote of a majority of the Commissioners present.

RESOLUTION III TO APPROVE CERTIFICATION OF THE IMPLEMENTATION PROGRAM AS SUBMITTED:

The Commission hereby denies certification of the Implementation Program submitted for the City of Crescent City and adopts the findings set forth below on grounds that the Implementation Program Amendment as submitted does not conform with and is inadequate to carry out the provisions of the Land Use Plan as certified. Certification of the Implementation Program Amendment would not meet the requirements of the California Environmental Quality Act as there are feasible alternatives and mitigation measures that would substantially lessen the significant adverse impacts on the environment that will result from certification of the Implementation Program as submitted.

D. APPROVAL OF IMPLEMENTATION PROGRAM AMENDMENT NO. CRC-MAJ-1-09 WITH SUGGESTED MODIFICATIONS:

MOTION IV: I move that the Commission certify the Implementation Program Amendment No. CRC-MAJ-1-09 for the City of Crescent City if it is modified as suggested in this staff report.

STAFF RECOMMENDATION TO CERTIFY WITH SUGGESTED MODIFICATIONS:

Staff recommends a **YES** vote. Passage of this motion will result in certification of the Implementation Program with suggested modifications and the adoption of the following resolution and findings. The motion passes only by an affirmative vote of a majority of the Commissioners present.

RESOLUTION IV TO CERTIFY THE IMPLEMENTATION PROGRAM WITH SUGGESTED MODIFICATIONS:

The Commission hereby certifies the Implementation Program Amendment for the City of Crescent City if modified as suggested on the grounds that the Implementation Program Amendment with the suggested modifications conforms with and is adequate to carry out the provisions of the Land Use Plan as certified. Certification of the Implementation Program if modified as suggested complies with the California Environmental Quality Act, because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the Implementation Program Amendment on the environment, or 2) there are no further feasible alternatives and mitigation measures that would substantially lessen any significant adverse impacts on the environment.

II. SUGGESTED MODIFICATIONS

Key for Modifications to City Language:

The attached Exhibit No. 8 presents the complete land use plan and zoning code amendments as proposed by the City, showing in strikeout and underline how the proposal would alter the existing zoning code text. In this Section, the revised text deletions and additions proposed by the City are shown in ~~strikeout~~ and underline, respectively. Text deletions and additions suggested by the Commission are formatted in **~~bold double strikethrough~~** and **bold double-underlined** text, respectively.

A. SUGGESTED MODIFICATIONS TO THE LAND USE PLAN:

SUGGESTED MODIFICATION NO. 1: Policy 3 of Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures* of the City of Crescent City Land Use Plan (LUP) shall be modified as follows:

> 3. The City shall require that new development minimize risks to life and property in areas of high geologic **and flooding** hazard, assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

SUGGESTED MODIFICATION NO. 2: A new Policy #4 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

> **2.a. Inundation hazard and evacuation route maps for the areas of the City that have experienced historic tsunami inundation or for areas where tsunami inundation modeling efforts have been undertaken, such as depicted within NOAA Technical Memorandum ERL PMEL-103, "Tsunami Inundation Model Study of Eureka and Crescent City, California" (Bernard, E.N., C. Mader, G. Curtis, and K. Satake,**

1994), or "Tsunami Inundation at Crescent City, California Generated by Earthquakes Along the Cascadia Subduction Zone", (Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis, 2007; *Geophysical Research Letters*, Volume 34, L20601), and/or on subsequent superseding investigations, shall be developed and incorporated into the LCP. These maps shall depict maximum credible inundation zones and runup elevations and shall be updated and kept current to include new, peer-reviewed information on Crescent City tsunami hazards as it becomes available.

2.b. New residential subdivisions situated within historic and modeled tsunami inundation hazard areas, such as depicted on the tsunami hazard maps described in 2.a. above, shall be designed and sited such that the finished floor elevation of all new permanent residential units are constructed with one foot of freeboard above the maximum credible runup elevation as depicted on the most recent government prepared Tsunami Hazards Maps, or as developed by local agency modeling, whichever elevation is greater. Additionally, all such structures containing permanent residential units shall be designed to withstand the hydrostatic and hydrodynamic loads and effects of buoyancy associated with inundation by storm surge and tsunami waves up to and including the tsunami runup depicted on the Tsunami Hazard Maps, without experiencing a catastrophic structural failure. For purposes of administering this policy, "permanent residential units" comprise residential units intended for occupancy as the principal domicile of their owners, and do not include timeshare condominiums, visitor-serving overnight facilities, or other transient accommodations.

SUGGESTED MODIFICATION NO. 3: A new Policy #5 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

All new development entailing the construction of structures intended for human occupancy, situated within historic, modeled, or mapped tsunami inundation hazard areas, shall be required to prepare and secure approval of a tsunami safety plan. The safety plan shall be prepared in coordination with the Del Norte County Department of Emergency Services, Sheriff's Office, and City Police Department, and shall contain information relaying the existence of the threat of tsunamis from both distant- and local-source seismic events, the need for prompt evacuation upon the receipt of a tsunami warning or upon experience seismic shaking for a local earthquake, and the evacuation route to take from the development site to areas beyond potential inundation. The safety plan information shall be conspicuously posted or copies of the information provided to all occupants. No new residential land divisions shall be approved unless it be demonstrated that timely evacuation to safe higher

ground, as depicted on adopted tsunami hazard maps, can feasibly be achieved before the predicted time of arrival of tsunami inundation at the project site.

SUGGESTED MODIFICATION NO. 4: A new Policy #6 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

The best available and most recent scientific information with respect to the effects of long-range sea level rise shall be considered in the preparation of findings and recommendations for all requisite geologic, geo-technical, hydrologic, and engineering investigations. Residential and commercial development at nearshore sites shall undertake a design sensitivity analysis utilizing a range of potential sea level rise scenarios, from a minimum of two to three feet per one hundred years and including higher rise rates of rise of five to six feet, as well as 10 feet in one hundred years. The analysis shall also consider localized uplift or subsidence. A similar sensitivity analysis shall be performed for all critical facilities, energy production and distribution infrastructure, and other development projects of major community significance using a minimum rise of 4.5 feet of sea level rise in 100 years. The analysis shall identify sea level rise thresholds after which limitations in the development's design and siting would cause the improvements to become significantly less stable. These sensitivity analyses shall be used to identify unanticipated site hazards and to help guide site design and hazards mitigation.

SUGGESTED MODIFICATION NO. 5: All subsequent policies within LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, currently numbered 4 through 7, shall be renumbered consistent with the three new appended policies added by Suggested Modification Nos. 1-4.

SUGGESTED MODIFICATION NO. 6: A new Policy #3 shall be appended to LUP Chapter 1 – *Public Access*, to read as follows:

For any new development at the former Del Norte Community Health Center site (APN 118-020-34), including any multi-family residential, recreational, or visitor serving commercial development, the City, or the Commission on appeal, shall require, if consistent with the criteria identified below: (a) an offer of dedication to the City or other public or private association acceptable to the Executive Director of the California Coastal Commission of a vertical public accessway to the beach following the alignment of the Second Street public right-of-way, extending west of A Street and including the portions of the existing informal trail down onto the adjoining beach; and/or (b) the development of public access support facilities, such as viewing platforms or vehicular parking spaces reserved for coastal access users. The configuration of the accessway shall be designed in a manner such that it may be connected to the Wendell Street right-of-way

> **for possible future extension of a trail northwesterly to the Third Street accessway, and may be connected to the southwest to the adjacent Hampton Inn and Suites accessway. The accessway and/or support facilities shall be required if the approving authority finds that the proposed development would either create significant adverse individual or cumulative impacts on existing access facilities or would result in an increase in public demand for public access facilities and that the offer of dedication and/or public access support facilities would alleviate the impacts and be reasonably related to the impacts in nature and extent. Either the City or another agency or non-profit entity approved by the Executive Director of the Coastal Commission, may accept any offers of dedication.**

All subsequent policies within LUP Chapter 1 – *Public Access*, currently numbered 3 through 5, shall be renumbered consistent with the new appended policy suggested above.

SUGGESTED MODIFICATION NO. 7: LUP Chapter 3 – *Coastal Visual Resources and Special Communities* Policy #4 shall be revised to read as follows:

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in designated highly scenic areas shall be subordinate to the character of its setting. Any future development at the former Seaside Hospital site (APN ~~**118-020-28**~~ **118-020-35**), including any recreational or visitor-serving commercial development, shall provide for a view corridor oriented from the vantage point of the intersection of Front and First Streets and directed toward the offshore rocky areas northwest of the site.
>
> **Any future development at the former Del Norte Community Health Center site (APN 118-020-34), including any multi-family residential, recreational or visitor-serving commercial development, shall provide for a view corridor oriented from the vantage point of the intersection of Second and A Streets. The Second and A Streets view corridor shall be located within the southeasterly third of the vacated sixty-foot-wide West Second Street right-of-way and comprise a minimum of twenty feet (20′), extending southwesterly from A Street to the adjoining beach.**

SUGGESTED MODIFICATION NO. 8: The description of the proposed amended "Multi-Family" (MF) land use designation shall be modified to read as follows:

> Multiple Family: ~~Over~~ Common wall residential development**, such as apartment buildings, condominiums, townhouses, and row houses,** at greater than six units per acre, ~~would include the present R-1, R-1-B zones and would~~

~~allow~~ implemented by R-2 and RP zoning ~~as~~ to establish a transition ~~to high density zoning~~ between one-family residential areas and adjoining commercially-zoned properties. Compatible visitor-serving commercial and recreational uses, including **~~timeshare condominium and~~** vacation rental **~~townhouses~~ units and other transient overnight accommodations**, may also be developed on oceanfront sites provided they are of a type and intensity so as to not detract from the intended primary residential character of the designation.

B. SUGGESTED MODIFICATIONS TO THE IMPLEMENTATION PROGRAM:

SUGGESTED MODIFICATION NO. 9: Sections 17.61.290, 17.61.295, 17.61.480, 17.61.483, 17.61.487, and 17.67.020 of the Coastal Zone Zoning Regulations shall be modified or appended as follows:

17.61.290 Lot.

"Lot" means land occupied or available to be occupied by a use, building or a unit group of buildings, accessory buildings or uses, together with such yards, open spaces, lot width and area as required by this title, and having its principal frontage upon a street. **For the definition of "unit," see Section 17.61.483.**

17.61.295 Lot area.

"Lot area" means the total horizontal area included within lot lines of a lot. **For the definition of "unit area," see Section 17.61.487.**

17.61.480 Townhouse or row house.

"Townhouse" or "row house" means one of a group of no less than four attached dwelling units**, held in either fee simple title or in common interest ownership, such as with condominium projects, community apartment projects, stock cooperatives, or other forms of common interest housing developments,** where each dwelling **~~unit~~** is located on **either** a separate lot **or within an exclusive use residential unit, with or without collectively owned portions of the project structures and/or common open space areas**.

17.61.483 Unit.

"Unit" means the spatial portion of a townhouse, row house, condominium, project, apartment collective, or stock cooperative intended for exclusive and individual use by its owner or owners, separate and apart from commonly owned portions of the structure(s) or project site(s).

17.61.487 Unit area.

"Unit area" means the physical three-dimensional interior area of a unit within townhouse, row house, condominium, project, apartment collective, or stock cooperative, as bounded by its walls, floor, and ceiling.

17.67.020 Uses permitted.

Uses permitted in the CZ-RP district include:

A. Business and professional offices such as doctors, dentists, lawyers, accountants and other professional offices;

B. One-family dwellings, occupied by not more than one family and not more than two boarders or roomers;

C. Two-family dwellings;

D. Multiple family dwellings;

E. Accessory buildings;

F. Day nurseries accommodating not more than five children in number;

G. Foster homes limited to those licensed by the state or county, and accommodating not more than six guests;

H. Motels and hotels, except for associated sales of food or drink;

I. Private clubs;

J. Roominghouses;

K. Townhouses**,** ~~(~~row houses~~)~~**, condominium projects, cooperative, apartments, stock cooperatives, and other attached, common interest housing developments**;**

L. Real estate and insurance offices;

M. Any of the following uses provided a use permit is secured:

1. Churches,
2. Day nurseries,
3. Dormitories for schools and colleges,
4. Guest homes,
5. Homes for the aged,
6. Home occupations,
7. Nonprofit organizations devoted to charitable, philanthropic or special purposes. Such uses shall not engage in the processing, repairing, refinishing, treatment, fabrication, manufacture or sale of materials or objects except that the sale of new works of art created or produced on the premises from raw materials by the patrons or members of nonprofit organizations may be permitted, if it is incidental and accessory to the principal use of the property,
8. Orphanages,
9. Parking lots,
10. Public utility substations.

PART TWO: INTRODUCTION

I. AREA DESCRIPTION/HISTORY

Crescent City is the northernmost incorporated city on the California coast. The City, which covers approximately 1.4 square miles, or 900 acres, has an estimated population of 7,542, with approximately an additional 7,500 living in the adjoining unincorporated areas receiving urban services. Crescent City is bounded by broad beaches and coastal bluffs to the west, the Crescent City Harbor on the south, scattered forests, and low density, rural-residential development to the north and east. Crescent City is the most urbanized part of Del Norte County and is the county's only municipality.

The Crescent City planning area encompasses the core commercial district, highway services strip, and adjoining residential areas within its municipal boundaries, and extends to the west, east and southeast to include the uplifted marine terraces of the Point Saint George area, the lower Elk Creek watershed, and exurban areas within the adjoining Bertsch Community Services District. Although the City's planning area spans more than 10 square miles, the portion of the City within the coastal zone is relatively small, consisting of a narrow, approximately one-block-wide band running along the its western ocean shoreline and harbor frontage.

II. LCP AMENDMENT: BACKGROUND

A. Crescent City Land Use Plan / Implementation Program.

The Crescent City Land Use Plan (Coastal Element of the General Plan), adopted in 1983, provides general goals and policies governing development throughout those portions of the City within the coastal zone. The plan document is organized into seven chapters addressing: (1) public access, (2) recreation and visitor-serving facilities, (3) coastal visual resources and special communities, (4) environmentally sensitive habitat areas, water, and marine resources, (5) diking, dredging, and filling, and shoreline structures, (6) industrial development and energy facilities, and (7) public works topics. Attached appendices detail further planning information in the form of mapping, visitor-serving market analysis, species found in the various designated environmentally sensitive areas, an inventory of industrial development, and public infrastructure schematics.

The Crescent City LCP Implementation Program, entitled "Coastal Zone Zoning Regulations" (CZZR) comprises Chapters 17.60 through 17.86 of the City Municipal Code. The zoning regulations provide definitions for the numerous land use and development terminology, establishes prescriptive use and development standards applied City-wide, in specified areas and in the various zoning districts, identifies the processes by which proposed development is reviewed and permitted, and sets procedures for appeals, variances and exceptions, zoning reclassifications and general plan amendments.

B. Impetus for LCP Amendments.

On January 22, 2008, the City Council of Crescent City denied a locally-filed appeal and upheld its Planning Commission's approval with conditions of Coastal Development Permit No. CDP-07-06 for the development of a 44-unit, mixed-use residential and professional office complex known as "Coasta Norte" at the former site of the Del Norte Community Health Center at Second and A Streets (see Exhibit Nos. 1-4). The City's action to approve the project was based on an interpretation that the project site's split Residential Two Family and Residential-Professional zoning represented the only controlling determination of permissible land uses and residential density insofar as the wording of the site's "Medical Related" (MR) land use designation was phrased in advisory rather than mandatory terms (i.e., "***Encourages*** *the development of concentration of medically related services*…") [emphasis added] allow for parking lots and townhouses/row houses residential and business & professional office development as conditionally- and principally-permitted use, respectively. In approving the permit, the City did not adopt findings addressing how the 44-unit residential complex conformed to the zoning district's: (a) 1,500-square-feet per residential unit lot-area-per-dwelling standard (limiting the permissible number of residences on the 1.24-acre parcel to 36); (b) 6,000-square-foot minimum lot area requirement for residential uses (restricting the maximum number of lots or condominium units to 9); and (c) 10-foot minimum rear yard area standard. In addition, the approval dismissed or only made conclusory findings with regard to the development's consistency with the Coastal Act's public access policies and the LCP's public access, ESHA and visual resource protection, and geologic hazards avoidance and risk minimization provisions.

On January 28, 2008, the City's approval of the mixed-use condominium/professional office project permit was appealed to the Commission. A subsequent appeal was filed on February 7, 2008 by Commissions Wan and Reilly. On March 7, 2008, the Commission determined that the appeal raised a substantial issue regarding the consistency of the project as approved by the City with the certified LCP and the access policies of the Coastal Act. Having made this determination, the City's approval of the project was stayed and the project application bound over for consideration by the Commission at a hearing *de novo*.

The appeal filed on the project raised contentions highlighting the proposed development's nonconformance with public access and recreation, water quality, environmentally sensitive habitat, geologic stability, and visual resources policies. However, a central underpinning of the appeal was the fact that the City's action to approve the permit without first seeking certification of certain crucial LCP provisions had not resolved the issue of the project's inconsistency with the LCP.

Subsequent to the Commission's determination that the appeal raised a substantial issue of conformance of the approved project with the LCP, the City initiated the subject LCP amendment to amend the LUP provisions with which the proposed condominium project is in conflict. The City also asked that the Commission's *de novo* hearing on the appeal be scheduled to occur after the LCP Amendment is acted upon by the Commission. On April 30, 2009, the City initially submitted the LCP application (see Exhibit Nos. 7 and 8). On May 4, 2009,

Commission staff determined the application to be complete for filing and scheduled the amendment for a hearing before the Commission.

C. Description of Area(s) Affected by the Proposed LCP Amendment.

As discussed in Section II.B. above, the impetus for the subject LCP amendment request is to facilitate development of a residential condominium project at the site of the former Del Norte Community Health Center, situated at 200 "A" Street, Assessors Parcel Number (APN) 118-020-34 (see Exhibit Nos. 1-4). The subject site is located along the ocean shoreline, immediately landward of an open sandy beach and rocky intertidal area, approximately 1,000 feet northeast of the Battery Point Lighthouse. Elevations at the property range from 20 to 24 feet above mean sea level (The property encompasses approximately 1.24-acre and extends across the width of one city block between Second and Third Streets, westerly of "A" Street. Following relocation of the clinic to a location in the vicinity of the Sutter Coast Hospital on Washington Boulevard in northern Crescent City, use of the project site for medical facilities was discontinued. The site was subsequently sold in 2007.

The project site's primary frontage is along "A" Street, which functions as a sub-collector route, conveying vehicular and other modes of traffic from the residential areas to the north to and from the open space and public facility areas adjacent to the Crescent City Harbor to the southeast. Land uses in the immediate vicinity of the property to the north are primarily single-family residential in character, with a hotel and future phased restaurant development located directly to the south of the project site between Second and Front Streets, at the former site of the Seaside Hospital, razed in 1994.

The subject property has two land use designations: "Residential" (R) on the northeasterly 7,200 square-foot portion of the site at Third and "A" Streets and Medical Related (MR) on the remaining 1.07-acre portion extending along "A" Street to the Hampton Ins and Suites site. The Residential land use designation provides for up to six units per acre of single-family and duplex apartment residential development and is described as a transition to high density zoning. The purpose of the Medical Related land use designations is stated as intended for encouraging "the development of concentration of medically related services adjacent to the hospital."

The property is zoned Coastal Zone Two-Family Residential (CZ-R2) and Coastal Zone – Residential Professional (CZ-RP) corresponding to the areas designated with "Residential" and "Medical Related land use designations. Adjoining residentially developed properties are zoned CZ-RP and Coastal Zone – Single-Family District (CZ-R1), with the adjoining hotel and restaurant complex having "Coastal Zone Commercial Waterfront" (CZ-CW) zoning. If approved by the Commission on appeal, the building improvements associated with the project that is the impetus for this LCP amendment would be located within both the currently zoned CZ-RP and CZ-R2 portions of the site.

The subject property is currently developed with a one-story, approximately 10,000-square-foot, one-story former medical clinic building and an additional approximately 25,000 square-feet of paved exterior off-street parking areas. The easterly ⅔ of the site is generally flat with the rear ⅓

of the lot sloping slightly downward toward the adjoining beach. The parcel is not located within a formally designated highly scenic area, as the City's LCP does not make that distinction for any specific sites, but focuses instead on the "scenic highway corridor" visible from Highway 101 at the City's southern entrance. Nevertheless, views from the project site are spectacular, consisting of nearby headlands, the Battery Point Lighthouse, and numerous offshore sea stacks. Due to the terrain of the property and the presence of adjoining residential-profession development, views to and along the coast from immediately in front of the project site from public streets and other vista points are somewhat constrained.

This parcel is proposed to be the only property within the coastal zone portion of Crescent City designated as "Multiple Family" (MF) in the land use plan. Accordingly, the proposed changes to the description of uses allowed on MF designated lands would affect only the 1.24-acre former medical clinic site.

The LCP amendment also includes changes to the Implementation Plan portion of the LCP, namely the development standards of the Residential-Professional (CZ-RP) zoning district. The northweasterly 7,200 square-feet of the subject clinic site is proposed to be rezoned from CZ-R2 to CZ-RP. No other properties are proposed to have their zoning changed to CZ-RP.

However, the changes to the CZ-RP standards would affect not only the former clinic site, but all such properties situated in CZ-RP zoning districts. Seven other contiguous parcels are zoned CZ-RP within the coastal zone portion of the City. These lands are situated between "A" and "B" Streets south of Front Street, APNs 118-030-09, and -22 through -27 (see Exhibit No. 3). Development on this flat 1½-block, roughly one-acre area consists of two single-family residences, a shuttered petroleum bulk plant, and tree-covered open space areas adjacent to the Battery Point Lighthouse County Park. Land uses in the immediate vicinity of these properties to the west include single-family residences and a vacant parcel currently permitted for future phased restaurant development. Areas to the south and southeast of the parcels consist of County and City parklands and the regional wastewater treatment plant. Parcels to the north and northeast of the CZ-RP parcels located outside of the coastal zone are currently vacant and planned for "Visitor and Local Commercial" development. These areas similar situated with sub-collector street frontage in close proximity to that provide coastal access and recreational facilities. The properties contain no environmentally sensitive habitat areas.

PART THREE: AMENDMENT TO LAND USE PLAN

I. ANALYSIS CRITERIA

To approve the amendments to the Land Use Plan (LUP), the Commission must find the LUP, as amended, will remain consistent with the policies of Chapter 3 of the Coastal Act.

As submitted, the proposed LUP amendment is not fully consistent with the policies of the Coastal Act, but if modified as suggested, will be consistent.

II. FINDINGS FOR LCP AMENDMENT

The Commission finds and declares as following for Amendment No. CRC-MAJ-1-09:

A. Findings for Denial of Amendment No. CRC-MAJ-1-09 as Submitted, and Approval if Modified.

1. Amendment Description:

The subject property for which the LCP amendments are proposed is located at the western terminus of Second Street at it intersection with "A" Street on the former site of the Del Norte Community Health Center (APN 118-020-34) (see Exhibit Nos. 7 and 8). As discussed above, these amendments were initiated by the City to help resolve issues regarding the nonconformance of a proposed condominium project currently under appeal to the Commission (File No. A-1-CRC-08-004, Randy Baugh DBA: Development Consultants, Inc.)

The LUP Coastal Land Use Map would be amended to change the designation of the former medical clinic site and the adjoining vacated segment of Second Street southwesterly of "A" Street from the current Medical Related (MR) and Residential (R) designations to the amended Multiple Family (MF) designation.

The proposed LUP amendment also contains a text change to the description of the Multiple Family land use designation and reclassification of the land use designation for the 1.24-acre parcel that is the subject of the amendment. The text changes to the currently-certified LUP as proposed by this LCP Amendment are as follows:

> Multiple Family: ~~Over~~ Common wall residential development at greater than six units per acre, ~~would include the present R-1, R-1-B zones and would allow~~ implemented by R-2 and RP zoning ~~as~~ to establish a transition ~~to high density zoning~~ between one-family residential areas and adjoining commercially-zoned properties. Compatible visitor-serving commercial and recreational uses, including timeshare condominium and vacation rental townhouses, may also be developed on oceanfront sites provided they are of a type and intensity so as to not detract from the intended primary residential character of the designation.

Under the currently-certified LUP, no lands are presently designed for multiple family development in the coastal zone portion of the City. Accordingly, the proposed changes in the recognized uses within MF designated areas would only affect future development on the 1.24-acre former medical clinic site.

B. LUP Amendment Consistency Analysis.

1. Priority Coastal Development.

The Coastal Act establishes certain priority uses which must be protected in favor of allowing other competing uses without such priority status. Generally, these priority land uses include uses that by their nature must be located on the coast to function, such as ports, and commercial fishing facilities, uses that encourage the public's use of the coast, such as various kinds of visitor-serving facilities, and uses that protect existing coastal resources such as wetlands and other sensitive habitat, and coastal agriculture. The Coastal Act requires that adequate land be reserved for such uses in the local coastal programs adopted for each coastal city and county. For example, Section 30222 of the Coastal Act states:

> *The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry.*

Additionally, Coastal Act Section 30213 states, in applicable part:

> *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.*

The proposed LUP amendments would reclassify the current "Medical-Related" and "Residential" land use designation to a "Multiple Family" (MF) designation, and revise the MF description, which currently recognize the site solely for residential development, so that visitor-serving commercial uses could be developed at the former medical clinic site at intensities that would not detract from the primary character of the designation. Accordingly, by amending the LUP as proposed, the site would become identified as an area in which priority coastal visitor-serving commercial uses may be developed with appropriate limitations on intensity to assure its suitability is maintained with respect to the surrounding development pattern, where currently no such designation exists.

As discussed previously, the subject oceanfront site for the proposed LUP amendments is situated in a transitional area between commercial visitor-serving overnight accommodations (Hampton Inn & Suites) on the south and the Hall's Bluff single-family residential neighborhood to the northwest. The property is currently occupied by a former regional medical clinic facility, a non-priority coastal use. Due to its shoreline setting as a site with beach and view amenities, its proximity to the Battery Point Lighthouse and the start of the Pebble Beach Drive scenic coastal route, and its location within a developed area with necessary community services, this site is particularly well-suited for visitor-serving uses.

Coastal Act Section 30222 directs that development on such suitable sites shall be prioritized for visitor-serving commercial recreational facilities, include overnight transient accommodations,

such as hotels, motels, recreational vehicle parks, campgrounds, and hostels. Section 30213 further directs that sites for lower cost visitor and recreational facilities be protected, encouraged, and, where feasible, provided, and states that developments providing public recreational opportunities are preferred. However, inherent in these mandates is the premise that such priority uses are indeed needed, insofar as there is either an inadequate level of existing facilities, or there is a paucity of sites dedicated to such development to meet future demand.

The City has a significant inventory of existing visitor-serving facilities, particularly lower-cost motels, in or near its coastal zone portions. The four motels within the incorporated boundaries of the City's coastal zone provide a total of 190 rooms, including the 35-room Hampton Inn and Suites adjacent to the former clinic site. The average rates for the coastal zone motels range from $116 in the winter off-season to $147 for the summer in-season. City-wide, there are 788 rooms available, with a best-rate range of $80 (winter) to $96 (summer). The City-wide hotel occupancy rate is 43% (2005). In addition, the City-owned recreational vehicle park on the harbor at the mouth of Elk Creek has 192 RV spaces and 10-20 camping sites. The RV park nightly rates range from $17 for the campsites to $28 for the beachfront RV sites. Therefore, the Commission finds that no compelling demand exists for sites for visitor-serving overnight accommodations to warrant reservation of the former medical clinic site solely for such priority use.

Notwithstanding the lack of current or pending need for transient overnight or short-term accommodations that might justify reserving the former medical clinic for such commercial visitor-serving facilities, the Commission concurs that non-compulsory development of such facilities should include appropriate limitations. Given the close proximity to an established beachfront single-family neighborhood, the scale of any such visitor-serving facilities would need to be limited to those in character to the surrounding area, such as vacation rentals, a small hostel or inn, or other similar low-intensity accommodations. The site is not appropriate for other kinds of priority uses such as for port, harbor, or marina development, or for intensive recreational facilities, such as commercial diving, wind-surfing, or watercraft attractions.

Thus, the Commission finds that this LCP Amendment is consistent with Sections 30220 and 30213 in that the site need not be reserved exclusively for visitor-serving facilities as existing visitor-serving accommodations within the Crescent City area sufficient to accommodate the foreseeable demand for such facilities, and that the amendment will nonetheless allow this site, which is suitable for visitor-serving commercial recreational facilities, to be used for such purposes.

As submitted, the amendment contains language which intermixes examples of residential and visitor-serving development types that would allowable uses in areas designated as Multiple Family. To clarify and distinguish between these primary and ancillary uses, the Commission adds **Suggested Modification No. 8:**

SUGGESTED MODIFICATION NO. 8: The description of the "Multiple Family" land use designation as proposed to be amended shall be modified to read as follows:

> Multiple Family: ~~Over~~ Common wall residential development**, such as apartment buildings, condominiums, townhouses, and row houses,** at greater than six units per acre, ~~would include the present R-1, R-1-B zones and would allow~~ implemented by R-2 and RP zoning ~~as~~ to establish a transition ~~to high density zoning~~ between one-family residential areas and adjoining commercially-zoned properties. Compatible visitor-serving commercial and recreational uses, including ~~**timeshare condominium and**~~ vacation rental ~~**townhouses**~~ **units and other transient overnight accommodations**, may also be developed on oceanfront sites provided they are of a type and intensity so as to not detract from the intended primary residential character of the designation.

As modified, the provisions of the LUP amendment concerning the inclusion of certain qualified visitor serving commercial facilities as an allowable use in Multiple Family land use designation is consistent with Section 30222 of the Coastal Act.

2. Locating and Planning New Development.

Section 30250(a) of the Coastal Act, in part, states:

> *New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources...*

The subject site of the proposed LCP amendments is located within a mixed-use area of the City within its urban services boundary. The site is served by municipal water and wastewater systems and adequate emergency, public safety, and other public services are available to serve the range of residential and visitor-serving uses. The site abuts Second and "A" Streets, classified under the City's circulation system as a local street and a collector route, respectively. Therefore, the proposed amendment is consistent with Coastal Act Section 30250 to the extent that the uses and development that would be allowed by the proposed LUP designation would be located in an urbanized area with adequate services. Thus, the Commission finds that the proposed LCP amendment as submitted is consistent with Section 30250 of the Coastal Act.

3. Visual Resources.

Section 30251 of the Coastal Act states, in applicable part:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and*

> *enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

The current certified LUP contains one policy specifically incorporating the requirements of Coastal Act Section 30251 as relate to the protection of visual resources. However, other than reiterating Section 30251 verbatim, specific details as to the identity of specific areas warranting visual protection are limited to addressing the need for maintaining a view corridor at the adjoining *Hampton Inn and Suites* waterfront commercial site. Other areas of concern regarding the protection of visual resources in the Crescent City area as identified within the currently certified LUP are: (1) prohibiting the erection of signage in areas zoned Open Space; (2) protecting view corridors along the Highway 101 southern entrance into the City; and (3) preserving the visual character of the town as expressed in its historically or architecturally significant structures. Despite its highly scenic setting, no other areas within the City are identified as possessing visual resources in need of special recognition or protective policies.

The subject site of the proposed amendment is located on an oceanfront site along the City's southwestern shoreline. Though views directly to the ocean from portions of "A" Street are somewhat limited by the presence of existing structures and the site's up-sloping topography towards the bluff edge, the southernmost 60 feet of the subject property comprises the vacated street right-of-way of West Second Street (see Exhibit Nos. 3 and 4). Except for its use as off-street parking for the former medical clinic, the above-grade portions of the area are currently unimproved, with no visible obstruction of seaward views from publicly accessible vantage points along "A" and Second Streets. In addition, the southern parking lot area presently provides a visual break between the bulk of the adjoining hotel and the former clinic offices.

The subject site could be developed under the proposed amendment in a manner that could cumulatively adversely affect the views to and along the coast at the site. For example, development of the site with a continuous structure from the north to south ends of the property, especially if undertaken consistent with the Residential Professional zoning district's 5-foot minimum side yard area standard for interior and corner lots, would result in 290 feet of the property's 300-foot-wide street frontage being occupied by structural improvements that could extend to a maximum height of 35 feet. While the presence of intervening residential structures along Third and Wendell Streets already block views to and along the ocean through the northern side of the subject property, structural development within the currently unobstructed southern parking lot area would block seaward open-sky and ocean horizon views. When considered with the ±230-foot-wide bulk of the adjoining hotel, such development would effectively form a near-continuous visual barrier along two blocks of the City's oceanfront in a manner that significantly deviates from the dispersed building arrangements on the adjoining blocks.

Development at such a scale would be inconsistent with the provision of Section 30251 of the Coastal Act that permitted development be sited and designed to protect views to and along the ocean and scenic coastal areas and be visually compatible with the character of the surrounding area. Without a visual policy in the LUP that more fully implements Coastal Act Section 30251,

maximized build-out of the site, involving development extending into the vacated street right-of-way, could potentially be viewed as permissible if such development merely conforms with the zoning district's quantitative minimum yard area and height standards and/or provides side yard setbacks and limits building heights in a manner consistent with the those on surrounding parcels. As a result, though some residual view corridor to the ocean might remain, and the new development's height and side yards approximate those in the adjacent area, visual resources would nonetheless be impacted qualitatively due to the cumulative bulk of the existing and new structures. Therefore, the amendment as submitted is inconsistent with Section 30251 of the Coastal Act and must be denied. However, the Commission finds that if modified to implement the provisions of Section 30251 and protect the specific views and open space currently corridors afforded across the site, the LUP amendment could be found consistent with the Coastal Act. Therefore, the Commission attaches **Suggested Modification No. 7**. The modification would require that a minimum of a twenty-foot width of the West Second Street right-of-way be retained as a view corridor in the approval of any future development at the subject site.

SUGGESTED MODIFICATION NO. 7: LUP Chapter 3 – *Coastal Visual Resources and Special Communities* Policy #6 shall be amended to read as follows:

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in designated highly scenic areas shall be subordinate to the character of its setting. Any future development at the former Seaside Hospital site (APN ~~**118-020-28**~~ **118-020-35**), including any recreational or visitor-serving commercial development, shall provide for a view corridor oriented from the vantage point of the intersection of Front and First Streets and directed toward the offshore rocky areas northwest of the site.
>
> **Any future development at the former Del Norte Community Health Center site (APN 118-020-34), including any multi-family residential, recreational or visitor-serving commercial development, shall provide for a view corridor oriented from the vantage point of the intersection of Second and A Streets. The Second and A Streets view corridor shall be located within the southeasterly third of the vacated sixty-foot-wide West Second Street right-of-way and comprise a minimum of twenty feet (20′), extending southwesterly from A Street to the adjoining beach.**

The LUP amendment as submitted is inconsistent with the visual resource protection policies of the Coastal Act and must be denied. As modified, the proposed LUP Amendment is consistent with Section 30251, as visual resources will be protected at the subject property.

4. Public Access and Recreation:

Coastal Act Sections 30210, 30211, and 30212 require the provision of maximum public access opportunities, with limited exceptions. Section 30210 states that maximum access and recreational opportunities shall be provided consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse. Section 30211 states that development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation. Section 30212 states that public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, adequate access exists nearby, or agriculture would be adversely affected.

As the site is a shoreline parcel adjacent to a beach, public access would be a consideration in the review of any new development proposed for the site. Of particular significance would be whether any future development under the amended LCP would result in increased demand for coastal access and recreational facilities, and whether adequate nearby access and recreational facilities exist that could meet any such increased demands.

The proposed amendment would change the land use and zoning designations governing the subject property in a manner such that an additional 43 residences could possibly be developed at the site in addition to the one residence currently permissible on the 7,200-square-foot portion of the property planned and zoned for one- and two-family residential development. Given current household and family size demographics[1], such modifications to the property's density and site development standards could result in approximately 111 to 132 addition persons living at this location along the City's western ocean beachfront area.

In its current form, the proposed LCP amendment does not address requiring offers of dedication of public access to the shoreline for new development where a significant adverse impact on existing public access facilities and/or a demand for new public access facilities would result. Instead, information submitted with the amendment request, makes note of the existing access path facilities at the adjoining hotel and "certifies" that, upon any future development at the subject clinic site property, these existing facilities will continue to be required to be maintained and the City may further condition such development projects to "…enhance public access as necessary and appropriate."

The City's recitation on the adjacent access facilities can be read to imply that these facilities are adequate to meet the demand of the potential roughly 120 new residents living in any multiple family development project constructed at the former clinic site the proposed amendments would facilitate. However, these facilities were primarily developed to offset the demand of visitors attracted to this area of the Crescent City oceanfront by the 94 new transient visitor-serving rooms and a 4,100-square-foot restaurant associated with the phased development of the adjacent

[1] U.S. Census 2000, Demographic Profile Highlights (for Crescent City California Zip Code 95531); http://factfinder.census.gov/servlet/SAFFFacts

Redwood Oceanfront Resort project. Additionally, no information was provided to ascertain whether overcrowding of these facilities and beach areas would result unless additional access facilities are provided. Therefore, as submitted, the LUP Amendment is not fully consistent with the Coastal Act policies concerning coastal access and recreation. **Suggested Modification No. 6** is necessary to ensure consistency with the Coastal Act public access provisions.

SUGGESTED MODIFICATION NO. 6: A new Policy #3 shall be appended to LUP Chapter 1 – *Public Access*, to read as follows:

> **For any new development at the former Del Norte Community Health Center site (APN 118-020-34), including any multi-family residential, recreational, or visitor serving commercial development, the City, or the Commission on appeal, shall require, if consistent with the criteria identified below: (a) an offer of dedication to the City or other public or private association acceptable to the Executive Director of the California Coastal Commission of a vertical public accessway to the beach following the alignment of the Second Street public right-of-way, extending west of A Street and including the portions of the existing informal trail down onto the adjoining beach; and/or (b) the development of public access support facilities, such as viewing platforms or vehicular parking spaces reserved for coastal access users. The configuration of the accessway shall be designed in a manner such that it may be connected to the Wendell Street right-of-way for possible future extension of a trail northwesterly to the Third Street accessway, and may be connected to the southwest to the adjacent Hampton Inn and Suites accessway. The accessway and/or support facilities shall be required if the approving authority finds that the proposed development would either create significant adverse individual or cumulative impacts on existing access facilities or would result in an increase in public demand for public access facilities and that the offer of dedication and/or public access support facilities would alleviate the impacts and be reasonably related to the impacts in nature and extent. Either the City or another agency or non-profit entity approved by the Executive Director of the Coastal Commission, may accept any offers of dedication.**

With these modifications, the LUP, as amended, would be consistent with the Coastal Act public access policies as it would: (1) require that an offer of dedication or public access support facility be provided for new development having a significant adverse impact on existing access facilities, or increasing the demand for additional facilities where the offer of dedication or public access support facility would alleviate the impacts and be reasonably related to the impacts in nature and extent; and (2) facilitate acceptance of any offer of dedication to ensure that the impact or increased demand is offset.

Therefore, as submitted, the LUP Amendment is not consistent with the Coastal Act policies concerning coastal access and recreation and must be denied. The Commission finds, however,

that if modified with **Suggested Modifications No. 6** as described above, the LUP amendment would be consistent with the Coastal Act public access and recreation provisions.

5. Geologic and Flooding Hazards.

Coastal Act Section 30253 states in part that:

> *New development shall do all the following:*
>
> *(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
> *(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs…*

Tsunami Inundation

In the past 60 years, from 1959 to 2009, the City of Crescent City has experienced three significant, damaging tsunamis — in 1960, 1964, and 2006. Eleven people were killed by the 1964 tsunami and there was significant property damage from all three events. When the next major earthquake on the Cascadia Subduction Zone occurs, a tsunami is likely to be generated and it is very likely that Crescent City would experience a tsunami event similar to or larger than these recent historic events. Crescent City was one of the first communities in California to become a NOAA certified, TsunamiReady Community.

The City of Crescent City planning area includes a number of oceanfront lots, such as the site of the former medical clinic, along its western shoreline. These as well as other downtown areas, could be exposed to tsunami waves either from a locally generated tsunami or a far-field, non-locally generated event. Despite the many public information, warning system, and emergency response coordination initiatives undertaken by the City toward securing "tsunami ready" status, the current LUP, initially certified in 1983 and last amended in 2001, does not contain any specific policies concerning this sub-category of geologic hazard. This omission is undoubtedly due to the fact that scientific reassessments of the maximum intensity of seismic events along the northern California coast and the potential height of tsunami waves did not began to be released until the mid-1990s and were not widely distributed in public information campaigns until the last several years.

Most notable among this information are the evaluations of seismic and tsunami hazards that were prepared in the aftermath of the April 25-26, 1992 series of earthquakes that occurred in the Petrolia area near Cape Mendocino. Of particular relevance is the National Oceanic and Atmospheric Administration's (NOAA) 1994 release of its "Tsunami Inundation Model Study for Eureka and Crescent City, California" (NOAA Technical Memorandum ERL PMEL-103; Bernard, E.N., C. Mader, G. Curtis, and K. Satake (1994)) (see Exhibit No. 14). Although intended primarily for emergency evacuation purposes, the NOAA study's wave runup data

represent the most currently available information regarding tsunami inundation in the Crescent City area and provide a scientifically defensible zone of potential tsunami inundation for project planning purposes.[2] In addition, the study currently serves as the basis for tsunami hazard area mapping and public educational materials subsequently developed and distributed by others for the Humboldt Bay and Crescent City areas.[3]

Using historical wave propagation and coastal flooding data collected from a variety of tsunami events across the Northern Pacific Ocean basin, this study presents the areas of inundation that could result from various possible tsunami events. A near-source 8.4 moment-magnitude (M_w-8.4) seismic event on the Cascadia Subduction Zone region was determined to be a credible source for generating a 10 meter (33 feet), 33.3-minute period incident wave in 50-meter water depth. Based on modeling of the tsunami's onshore propagation, all land below four meters elevation would be flooded, with inundation levels in the harbor reaching six meters in some locations. The area of inundation could extend inland 1.3 kilometers, or approximately one mile from the harbor and ocean shorelines.

The analysis by Bernard et al. does not provide information on inundation at the medical clinic site, but one test area, called Location No. 4, is located approximately three blocks inland of the proposed project site. Maximum modeled runup at Location No. 4 was 8 meters (±26 feet) above mean high tide. In comparison, wave runup at the harbor was approximately 8.5 meters (±29 feet) above mean high tide. The medical clinic site, at elevations ranging from 17.5 to 21.5 above mean high tide lies laterally westward from Location No. 4, whose elevation is approximate 19.5 feet above mean high tide. Accordingly, maximum runup at the former clinic site can be expected to be comparable to the runup at Location No. 4, representing water heights ranging from approximately 4.5 to 8.5 feet above current grade. The City's Tsunami Hazard and Emergency Evacuation Maps clearly show the medical clinic site to be subject to runup, and within the "highest relative hazard" (red) inundation zone on the hazard map, which extends several blocks inland of the clinic parcel (see Exhibit Nos. 16 and 17).

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[2] The Commission notes that other scenario-based model tsunami inundation research has been conducted for Crescent City since the 1994 NOAA study, notably *Tsunami Inundation at Crescent City, California Generated by Earthquakes Along the Cascadia Subduction Zone*, Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis (2007), *Geophysical Research Letters*, Volume 34, L20601 (see Exhibit No. 15). The paper presented the results modeled from modeling six different near-source earthquakes on the San Juan de Fuca and Gorda CSZ plates, with and without combined offsets on the Little Salmon thrust fault. Using the City tide gauge as a comparative benchmark, located within the harbor approximately 1¼ miles from the medical clinic site, inundation levels of 6 to 7 meters (±20-23 feet) above mean sea level were projected at that locale. The results of this study as well as other model-based and observational inundation and run-up data from both near- and distant-source seismic events are currently being compiled collaboratively by the California Emergency Management Agency (CalEMA), the California Geological Survey (CGS) and the University of Southern California's Tsunami Research Center, onto a new set of tsunami hazard maps. Release of these new maps is scheduled for June 2009.

[3] See Redwood Coast Tsunami Work Group website: (http://www.humboldt.edu/~geology/earthquakes/rctwg/)

As cited above, Coastal Act Section 30253 requires that risks to life and property in areas of high geologic and flood hazards be minimized. In addition, new development must assure stability and structural integrity from geologic instability or destruction of the site and its surroundings and not contribute significantly to erosion, or in any way contribute to the need for protective devices that would substantially alter landforms. In its present wording LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures* does not include "flooding" alongside "geologic" in its list of applicable risk types to be minimized. As noted above, the area affected by the proposed LCP amendment is within a mapped tsunami wave run up inundation area. By accommodating much more intensive residential and commercial use than are currently allowed at the site by the LCP, the proposed amendment would facilitate development exposing greater numbers of people to flood hazard risks. To ensure that flood hazards associated with tsunami inundation are considered in the review of future development at the site under the LUP as amended in a manner consistent with Section 30253, the Commission attaches **Suggested Modification No. 1**, below, to append the word "flooding" into Policy No. 3 of LUP Chapter 5.

SUGGESTED MODIFICATION NO. 1: Policy 3 of Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures* of the City of Crescent City Land Use Plan (LUP) shall be modified as follows:

> 3. The City shall require that new development minimize risks to life and property in areas of high geologic **and flooding** hazard, assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

Protection of Permanent Residences

Over the last half-decade in the aftermath of catastrophic natural disasters around the world (e.g., Hurricane Katrina, Indonesian Tsunami, Cyclone Nargis), large-scale displacements of persons and homelessness resulting from flooding, especially in low-lying coastal areas, have come to be recognized by governing bodies and international aid agencies alike as a form of socio-economic disruption on a scale with that of pandemics, famines, and warfare. Such disturbances can significantly destabilize the security and well-being of whole populations and regions.

Of particular consequence is the loss of one's personal home and residence. Generally representing the primary and most significant financial investment for most persons, and often a substantial portion of their intended retirement income from the return realized from its accrued equity, the loss of a personal residence, as contrasted with other, less substantially valued real property, such as a second home or timeshare vacation unit, can have profound negative impacts on its owners' livelihood as well as the whole community in terms of added social service costs. In addition, such homelessness can have profound psychological impacts on the resident-owners, in terms of an increased sense of physical vulnerability and social isolation which can hamper efforts to recover from their domestic crisis.

The proposed amendments to the LUP include no modifications to the LCP to address the recently acknowledged implications to public health and safety from the potentially extreme seismic and flooding hazards associated with the City's geologic setting, particularly with regard to exacerbating potential loss of primary domiciles. This omission is particularly problematic when the impetus of the amendment—to provide for residential development, including permanent residences, at significantly greater densities along an open ocean shoreline site—is considered.

Therefore, the Commission attaches **Suggested Modification No. 2**, below, requiring new residential development resulting from subdivisions (including condominiums) located within historic and modeled tsunami inundation areas be designed and sited such that the floor elevation of "permanent residences" (i.e., primary domiciles) be constructed at a height above that of the maximum tsunami run up water depth on land anticipated at the development site. In addition, the suggested modification would require all such newly platted development structures containing permanent residential units to be resiliently designed to withstand the hydrostatic and hydrodynamic loads and effects of buoyancy associated with inundation by storm surge and tsunami waves up to and including the tsunami height projected to result from a near-source generated seismic event along the Cascadia Subduction Zone, without experiencing a catastrophic structural failure which would destroy the structures and impede the evacuation or rescue of persons occupying the building. The Commission finds that such requirements for permanent residential structures are appropriate and feasible measures to minimize risks to both property and "life," in terms of a person's livelihood and their enjoyment of their existence and faculties.

SUGGESTED MODIFICATION NO. 2: A new Policy #4 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

2.a. Inundation hazard and evacuation route maps for the areas of the City that have experienced historic tsunami inundation or for areas where tsunami inundation modeling efforts have been undertaken, such as depicted within NOAA Technical Memorandum ERL PMEL-103, "Tsunami Inundation Model Study of Eureka and Crescent City, California" (Bernard, E.N., C. Mader, G. Curtis, and K. Satake, 1994), or "Tsunami Inundation at Crescent City, California Generated by Earthquakes Along the Cascadia Subduction Zone", (Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis, 2007; *Geophysical Research Letters*, Volume 34, L20601), and/or on subsequent superseding investigations, shall be developed and incorporated into the LCP. These maps shall depict maximum credible inundation zones and runup elevations and shall be updated and kept current to include new, peer-reviewed information on Crescent City tsunami hazards as it becomes available.

2.b. New residential subdivisions situated within historic and modeled tsunami inundation hazard areas, such as depicted on the tsunami

> **hazard maps described in 2.a. above, shall be designed and sited such that the finished floor elevation of all new permanent residential units are constructed with one foot of freeboard above the maximum credible runup elevation as depicted on the most recent government prepared Tsunami Hazards Maps, or as developed by local agency modeling, whichever elevation is greater. Additionally, all such structures containing permanent residential units shall be designed to withstand the hydrostatic and hydrodynamic loads and effects of buoyancy associated with inundation by storm surge and tsunami waves up to and including the tsunami runup depicted on the Tsunami Hazard Maps, without experiencing a catastrophic structural failure. For purposes of administering this policy, "permanent residential units" comprise residential units intended for occupancy as the principal domicile of their owners, and do not include timeshare condominiums, visitor-serving overnight facilities, or other transient accommodations.**

With regard to minimizing flooding risks to "life," the Commission attaches **Suggested Modification No. 3**, below. This suggested modification would add a new policy requiring that for all new development involving the building of structures intended for human occupancy within historic, modeled, or formally mapped tsunami inundation hazard zones, a tsunami safety plan be prepared, approved, and distributed or otherwise posted in a conspicuous manner. The plan would provide constructive notice to occupants of the presence of tsunami inundation risk at the site and information regarding evacuation routes to safe high ground. Furthermore, the new policy would stipulate that, for any new residential development resulting from subdivisions, subdivision approval shall only be granted when it can be demonstrated that timely evacuation to safe higher ground, as detailed on adopted tsunami hazard maps, can feasibly be achieved prior to the predicted arrival time of tsunami inundation at the project site. The Commission finds that requiring that such information be provided with new development is an appropriate and feasible measure to minimize risks to life consistent with Section 30253 of the Coastal Act.

SUGGESTED MODIFICATION NO. 3: A new Policy #5 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

> **All new development entailing the construction of structures intended for human occupancy, situated within historic, modeled, or mapped tsunami inundation hazard areas, shall be required to prepare and secure approval of a tsunami safety plan. The safety plan shall be prepared in coordination with the Del Norte County Department of Emergency Services, Sheriff's Office, and City Police Department, and shall contain information relaying the existence of the threat of tsunamis from both distant- and local-source seismic events, the need for prompt evacuation upon the receipt of a tsunami warning or upon experience seismic shaking for a local earthquake, and the evacuation route to take from the development site to areas beyond potential inundation. The safety plan information shall be conspicuously posted or copies of the**

> **information provided to all occupants. No new residential land divisions shall be approved unless it be demonstrated that timely evacuation to safe higher ground, as depicted on adopted tsunami hazard maps, can feasibly be achieved before the predicted time of arrival of tsunami inundation at the project site.**

Thus, as submitted, the LUP amendment would fail to protect life and property from the risk of flooding from tsunami wave run up in a manner inconsistent with the Coastal Act policies concerning geologic and flooding hazards and must be denied The Commission finds, however, that if modified with **Suggested Modification No. 1, 2, and 3** to: (a) clarify that risks to both geologic and flooding hazards are to be minimized; (b) establish design standards affording protection to permanent residential units from tsunami inundation; and (c) require new development involving human-occupied structures in tsunami hazard areas to prepare and distribute or otherwise post constructive notice of risks of tsunamis and information relating to evacuation to safe ground, the LUP amendment would be consistent with Section 30253 of the Coastal Act in that minimizing risks to life and property in areas of high geologic and flooding hazard would be ensured and the development would not create or contribute to geologic-related instability or destruction for new projects in the coastal zone portions of the City.

Sea Level Rise

Sea level rise is an important consideration for the planning and design of projects in coastal settings. Such changes in sea level will exacerbate the frequency and intensity of wave energy received at shoreline sites, including both storm surge and tsunamis, resulting in accelerated coastal erosion and flooding in such locales. There are many useful records of historic sea level change, but little certainty about how these trends will change with possible large increases in atmospheric greenhouse gas emissions and air temperatures. Notwithstanding the controversy and uncertainties about future global or local sea levels, guidance on how to address sea level rise in planning and permitting process is evolving as new information on climate change and related oceanic responses become available.

The Commission, like many others permitting agencies, have undertaken past assessments of sea level rise effects using the principal of "uniformitarianism" as guidance — that natural processes such as erosion, deposition, and sea level changes occur at relatively uniform rates over time rather than in episodic or sudden catastrophic events. As a result, future ocean surface elevations have been extrapolated from current levels using historical rates of sea level rise measured over the last century. For much of the California coast, this equates to a rate of about eight inches per 100 years. Rates of up to one foot per century have typically been used to account for regional variation and to provide for some degree of uncertainty in the form of a safety factor. This rate of rise is then further adjusted upward or downward as needed depending upon other factors, such as localized subsidence or tectonic uplift. In the review of past development projects on Crescent City coastline areas, the roughly 2.6 millimeters-per-year (mm/yr) rate of localized tectonic lift has been found to be exceeding that of projected sea level rise by approximately -0.21 feet/century (-0.65 +/- 0.36 mm/yr), for the tide record spanning 1933 to 2006, resulting in a relative drop in local sea level.

Most climate models now project that the historic trends for sea level rise, or even a 50% increase over historic trends, will be at the very low end of possible future sea level rise by 2100. Satellite observations of global sea level have shown sea level changes since 1993 to be almost twice as large as the changes observed by tide gauge records over the past century. Recent observations from the polar regions show rapid loss of some large ice sheets and increases in the discharge of glacial melt. The 2007 Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) notes that sea level could rise by 7 to 23 inches from 1990 to 2100, provided there is no accelerated loss of ice from Greenland and West Antarctica.[4] Sea level rise could be even higher if there is a rapid loss of ice in these two key regions.

The IPCC's findings were based on a 2007 report prepared by Dr. Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research (hereinafter "Rahmstorf Report"). This report has become the central reference point for much of recent sea level rise planning. The Rahmstorf Report projects that by 2100, sea level could be between 20 to 55 inches higher than 1990 levels. The Rahmstorf Report developed a quasi-empirical relationship between historic temperature and sea level change. Using the temperature changes projected for the various IPCC scenarios, and assuming that the historic relationship between temperature and sea level would continue into the future, he projected that by 2100 sea level could be between 20 inches and 55 inches (0.5 to 1.4 meters) higher than the 1990 levels (for a rate of 0.18 to 0.5 inches/year). These projections for future sea level rise anticipate that the increase in sea level from 1990 to 2050 will be from about 8 inches to 17 inches (for a rate of 0.13 to 0.28 inches/year); from 1990 to 2075, the increase in sea level would be from about 13 inches to 31 inches (for a rate of 0.15 to 0.36 inches/year) and that the most rapid change in sea level will occur toward the end of the 21st century. Most recent sea level rise projections show the same trend as the projections by Rahmstorf — that as the time period increases the rate of rise increases and that the second half of the 21st century can be expected to have a more rapid rise in sea level than the first half.

Several recent studies have projected future sea level to rise as much as 4.6 feet from 1990 to 2100. For example, in California, the Independent Science Board (ISB) for the Delta Vision Plan has used the Rahmstorf Report projections in recommending that for projects in the San Francisco Delta, a rise of 0.8 to 1.3 feet by 2050 and 1.7 to 4.6 feet by 2100 be used for planning purposes.[5] This report also recommends that major projects use the higher values to be conservative, and that some projects might even consider sea level projections beyond the year 2100 time period. The ISB also recommends "developing a system that can not only withstand a design sea level rise, but also minimizes damages and loss of life for low-probability events or unforeseen circumstances that exceed design standards. Finally the board recommends the specific incorporation of the potential for higher-than-expected sea level rise rates into long term infrastructure planning and design."

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[4] The IPCC is a scientific intergovernmental body established by the World Meteorological Organization (WMO) and the United Nations Environmental Programme to provide the decision-makers and others interested in climate change with an objective source of information about climate change; http://www.ipcc.ch/ipccreports/assessments-reports.htm

[5] Independent Science Board, 2007. Sea Level Rise and Delta Planning, Letter Report from Jeffrey Mount to Michael Healey, September 6, 2007, CALFED Bay-Delta Program: http://deltavision.ca.gov/BlueRibbonTaskForce/Sept2007/Handouts/Item_9.pdf

The Rahmstorf Report was also used in the California Climate Action Team's Climate Change Scenarios for estimating the likely changes range for sea level rise by 2100.[6] Another recent draft report, prepared by Philip Williams and Associates and the Pacific Institute for the Ocean Protection Council, the California Energy Commission's Public Interest Energy Research (PIER) Climate Change Research Program, and other agencies also identifies impacts from rising sea level, especially as relate to areas vulnerable to future coastal erosion and flooding.[7] This report used the Rahmstorf Report as the basis to examine the flooding consequences of both a 40-inch and a 55-inch centurial rise in sea level, and the erosion consequences of a 55-inch rise in sea level.

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08, directing various state agencies to undertake various studies and assessments toward developing strategies and promulgating development review guidelines for addressing the effects of sea level rise and other climate change impacts along the California coastline.[8] Consistent with the executive order, at its June 4, 2009 meeting the governing board of the Coastal Conservancy will consider the adoption of interim sea level rise rates: (a) 16 inches (40 cm) by 2050; and (b) 55 inches (140 cm) by 2100 for use in reviewing the vulnerability of projects it funds. These rates are based on the PEIR climate scenarios. If adopted, these criteria would be utilized until the study being conducted by the National Academy of Sciences regarding sea level rise, requested by a consortium of state resource and coastal management agencies pursuant to the executive order, is completed.

Concurrently, in the Netherlands, where flooding and rising sea level have been national concerns for many years, the Dutch Cabinet-appointed Deltacommissie has recommended that all flood protection projects consider a regional sea level rise (including local subsidence) of 2.1 to 4.2 ft by 2100 and of 6.6 to 13 ft. by 2200.[9] Again, the Rahmstorf Report was used by the Delta Committee as a basis in developing their findings and recommendations.

Given the general convergence of agreement over the observed and measured geodetic changes world wide in ocean elevations over the last several decades, most of the scientific community has ceased debating the question of whether sea level will rise several feet higher than it is today, but is instead only questioning the time period over which this rise will occur. However, as the conditions causing sea level rise continue to change rapidly, prognostications of sea level rise are

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6 Cayan et al. 2009. Draft Paper: Climate Change Scenarios and Sea Level Estimates for the California 2008 Climate Change Scenarios Assessment; CEC-500-2009-014-D, 62 pages; http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-D.PDF

7 Heberger, et al. 2009. Draft Paper: The Impacts of Sea Level Rise on the California Coast; California Climate Change Center, California Energy Commission; CEC-500-2009-024-D, March 2009, 99 pages; http://www.pacinst.org/reports/sea_level_rise/index.htm

8 Office of the Governor of the State of California, 2008. Executive Order S-13-08; http://gov.ca.gov/index.php?/print-version/executive-order/11036/

9 Delta Committee of the Kingdom of the Netherlands, 2008. Working Together with Water: A Living Land Builds for its Future, Findings of the Deltacommissie, 2nd Ed. November 2008; http://www.deltacommissie.com/en/advies

similarly in flux. As a result of this dynamism, anticipated amounts and rates of sea level rise used in project reviews today may be either lower or higher than those that will be utilized ten years from now. This degree of uncertainty will continue until sufficient feedback data inputs are obtained to allow for a clear trend to be discerned from what is now only a complex and highly variable set of model outputs. Accordingly, in the interest of moving forward from the debate over specific rates and amounts of rise to a point where the effects of sea level rise greater than those previously assumed in the past may be considered, one approach is to undertake a sensitivity analysis on the development project and site to ascertain the point when significant changes to project stability would result based on a series of sea level rise rates. The analysis would be structured to use a variety of sea level rise projections, ranging from the relatively gradual rates of rise indicated by the IPCC and Rahmstorf models, to scenarios involving far more rapid rates of sea level rise based upon accelerated glacial and polar sea and shelf inputs.

For example, for the most typical development projects along the coast (i.e., residential or commercial), consideration of a two to three foot rise in level rise over 100 years could be assumed to represent the minimum rate of change for design purposes. However, in the interest of investigating adaptive, flexible design options, sensitivity testing should also include assessing the consequences of sea level rise at three to five times greater rates, namely five to six feet per century, and even 10 to 20 feet per 100 years. The purpose of this exercise is to determine, if there is some "tipping point" at which a given design would rapidly become less stable, and to evaluate what would be the consequences of crossing such a threshold. This type of analysis would make the property owner aware of the limitations, if any, of the initial project design early in the planning process. Depending upon the design life of the development, the economic and technical feasibility of incorporating more protective features, and levels of risk acceptance, the project proponent could propose, or the permitting agency may require, that greater flexibility be provided in the design and siting of the development, or other mitigation be identified, to accommodate the higher rates of sea level rise.

The sensitivity analysis approach would allow accelerated rates of sea level rise to be considered in the analysis of projects. Such evaluations provide some flexibility with regard to the uncertainty concerning sea level rise, providing an approach to analyze project in the face of uncertainty that would not involve the imposition of mandatory design standards based upon future sea level elevations that may not actually be realized. Given the nonobligatory and adaptive nature of this approach to hazards avoidance and minimization, as necessitated by such scientific uncertainty, it will remain important to include new information on sea level trends and climate change as iterative data is developed and vetted by the scientific community. Accordingly, any adopted design or siting standards that may be applied to development projects should be re-examined periodically to ensure the standard is consistent with current estimates in the literature before being reapplied to a subsequent project.

Regardless of its particular rate, over time elevated sea level will have a significant influence on the frequency and intensity of coastal flooding and erosion. Accordingly, rising sea level needs to be considered to assure that full consistency with Section 30253 can be attained in the review and approval of new development in shoreline areas.

The LUP as proposed to be amended contains no provisions for the consideration of sea level rise in the review of new development at shoreline proximate localities where instability and exposure to flooding risks could be intensified at higher ocean surface elevations. Without such provisions, the LUP as proposed for amendment would be inconsistent with the policies of Chapter 3 of the Coastal Act, specifically Section 30253 and must be denied. The Commission thus attaches Suggested Modification No. 4, below, to ensure that, to the greatest degree feasible given current scientific uncertainties relating to the variable projected rates of sea level rise, new projects in the City coastal zone area will minimize risks to life and property in areas of high geologic and flooding hazard and not create or contribute to geologic-related instability or destruction by requiring that the effects of sea level rise be quantitatively considered in geologic and other engineering technical evaluations of new development.

SUGGESTED MODIFICATION NO. 4: A new Policy #6 shall be appended to LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, to read as follows:

> **The best available and most recent scientific information with respect to the effects of long-range sea level rise shall be considered in the preparation of findings and recommendations for all requisite geologic, geo-technical, hydrologic, and engineering investigations. Residential and commercial development at nearshore sites shall undertake a design sensitivity analysis utilizing a range of potential sea level rise scenarios, from a minimum of two to three feet per one hundred years and including higher rise rates of rise of five to six feet, as well as 10 feet in one hundred years. The analysis shall also consider localized uplift or subsidence. A similar sensitivity analysis shall be performed for all critical facilities, energy production and distribution infrastructure, and other development projects of major community significance using a minimum rise of 4.5 feet of sea level rise in 100 years. The analysis shall identify sea level rise thresholds after which limitations in the development's design and siting would cause the improvements to become significantly less stable. These sensitivity analyses shall be used to identify unanticipated site hazards and to help guide site design and hazards mitigation.**

If modified as suggested above, the proposed amendment could be found consistent with Coastal Act policies concerning the avoidance and minimization of geologic and flooding hazards.

Continuity in Policy Numbering

To insure consistent numbering of the policies within LUP Chapter 5, the Commission attaches Suggested Modification No. 5 as follows:

SUGGESTED MODIFICATION NO. 5: All subsequent policies within LUP Chapter 5 – *Diking, Dredging, Filling and Shoreline Structures*, currently numbered 4 through 7, shall also be renumbered consistent with the three new appended policies suggested above.

Conclusion

The LUP amendment as submitted is inconsistent with the geologic and flooding hazards policies of the Coastal Act and must be denied. As modified, the proposed LUP Amendment is consistent with Sections 30253 as language assuring the comprehensive administration of those policies has been incorporated into the proposed LUP Amendment.

6. Protection of Marine Resources, Water Quality, and Environmentally Sensitive Habitat Areas (ESHA).

Coastal Act Section 30230 states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Coastal Act Section 30231 states that:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of wastewater discharge and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30240 of the Coastal Act directs:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The proposed amendment is intended to accommodate development of multi-family residential and compatible visitor-serving commercial uses at the former site of the Del Norte Community Health Center, a parcel situated on a low terrace adjacent to a rocky-sandy intertidal reach. Drainage from the project site is presently collected in drop inlets and curb-diked street gutters

and conveyed through a stormwater culvert within the vacated West Second Street right-of-way beneath the former clinic's southern parking lot to an outfall onto the adjacent beach. The adjoining intertidal beach areas and open ocean contain a variety of sensitive marine biological organisms, albeit in low diversity, including rockweed and encrusting brown algae, and scattered clusters of barnacles and limpets. The area is also considered wetlands, an identified class of environmentally sensitive habitat area under both the Coastal Act and the currently-certified LCP.

High density residential development projects of the type that the proposed amendment would facilitate typically include large amounts of impervious surfaces that would prevent infiltration of stormwater into the ground and result in greater amounts of sediment and other pollutants running off the site and entering coastal waters. In addition, such large scale development would likely include large parking lots where oil and grease deposits from vehicles would further degrade the water quality of stormwater runoff from the site.

The currently certified Crescent City LUP contains policy language specifically addressing the protection of marine resources, water quality, and environmentally sensitive habitat areas (ESHA). In addition to quoting Coastal Act Sections 30230, 30231 and 30240 on page 24 of the LUP's preface of the Environmentally Sensitive Habitat Areas / Water and Marine Resources chapter, Policy No. 2 of LUP Chapter 7 – *Public Works* requires that:

> *The City shall require that best management practices (BMPs) for controlling stormwater runoff and maintaining water quality be incorporated into development design and operation. All post-construction structural BMPs (or suites of BMPs) for new development, including but not limited to, recreational or visitor-serving commercial development within Coastal Zone - Commercial Waterfront zoning districts, shall be designed to treat, infiltrate or filter stormwater runoff from each storm event, up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor, for flow-based BMPs.*

LUP Chapter 4 – *Environmentally Sensitive Habitat Areas / Water and Marine Resources* Policy No. 2 directs that:

> *The City shall protect those areas that are designated as environmentally sensitive so that these habitats and their resources are maintained and any development shall be consistent with adjacent areas and with Section 30240 et seq. of the California Coastal Act as described herein on Page 24.*

Four specific locales are designated as ESHA under the currently certified LUP including:

- *Inter-tidal areas (Preston Island to North Breakwater)*
- *Sandy Beach (I*[nter] *T*[idal] *A*[reas]*) (North Breakwater to Harbor Boundary)*
- *Freshwater Wetlands (Elk Creek area)*

- *Freshwater Wetlands (McNamara Annexation)*

LUP Chapter 4 – Environmentally Sensitive Habitat Areas / Water and Marine Resources Policy No. 4 requires that:

> *The City shall maintain a buffer zone of 50 feet around all identified wetlands. The only allowable uses within this buffer zone shall be those uses as provided for in Section 30240 et seq. of the California Coastal Act of 1976 as described on page 24. Criteria for the establishment of the buffer zones for wetlands should be measured land ward from the edge of the wetlands.*

In addition, LUP Chapter 5 – Dredging, Diking, Filling, and Shoreline Structures Policy Nos. 1 and 2 place limitations on the dredging diking, and/or filling of enumerated wetland areas to uses identified in Section 30233 of the Coastal Act. Such activities in open coastal waters are further constrained to those which directly enhance harbor dependent uses such as recreational or-industrial programs.

These policies carry out the provisions of Sections 30230, 30231, 30233, and 30240 of the Coastal Act by providing a framework for requiring that future development: (a) incorporate best management practices to treat stormwater runoff for maintaining optimum water quality and biological productivity; (b) protect the enumerated classes of ESHA through limitations on uses and/or design and siting; and (c) provide protective buffers with uses therein limited to resource dependent ones. Moreover, the policies further references the types of management measures to can be utilized (e.g., flow-based onsite retention/detention, volumetric point-of-discharge filtration, preventing depletion of groundwater, maintaining natural riparian vegetation, minimizing stream alteration, etc.) and references numerical treatment goals of stormwater runoff events to which the measures must perform.

The LCP Amendment request included technical information, prepared by consultants for the development project for which the LCP amendment is being requested, demonstrating that, while the residential development potential on the subject 1.24-acre parcel would be significantly increased, marine resources, water quality and sensitive resource area protections could still be feasible provided at the site.

Based on studies prepared and submitted for the condominium project motivating the LCP amendment, no state or federal endangered, threatened, rare, or special concern plant or animal species, or their habitat, were found either on or in close proximity to the former clinic property (see Exhibit Nos. 12 and 13).

With respect to the protection of marine resources, the subject property proposed for redesignation under the amended LCP provisions is located adjacent to the inter-tidal areas between Preston Island and the North Breakwater of the Crescent City Harbor. This nearshore area is listed as an environmentally sensitive habitat area within the certified LCP. Given this setting, a marine wildlife impact evaluation was previously conducted for the adjacent hotel and restaurant development project (see Exhibit No. 10). The evaluation found the project environs

to be "immediately adjacent to a rocky intertidal habitat with nearshore inlets, and a relatively pristine coastal environment." However, an assessment of marine life in the intertidal range found a low diversity of organisms to be present, primarily consisting of rockweed (*Fucus distichus*), encrusting brown algae (*Dictyota* sp.), with small scattered colonies of barnacles (*Balanus*, *Chthalmus*, and *Pollicipes* sp.) and limpets (*Acmea* sp.). Sculpins, eel, hermit crabs and other predator/scavengers were similarly found to be in low abundance. The report found that the offshore inlet provides nesting habitat for one pair of nesting Black Oystercatchers (*Haematopus bachmani*) as well as roosting habitat for cormorants and gulls. Harbor seals are also known to use the isolated reef at the north end of the beach reach as a haul-out area and may pup there from March to May.

The report concluded that lack of diversity and depressed populations may be due to the unstable and physically harsh habitat provided by the cobble and sand substrate and heavy surf exposure. Though acknowledging that its effects were not known, the study noted the presence of a nearby storm drain outfall, inferring that it may also have some impact on marine organism productivity in the area. The potential project impacts identified in the evaluation were primarily limited to possible disturbances to hauled-out and pupping harbor seals from the presence of humans. Although the potential for the physical trampling of inter-tidal organisms was noted, the report concluded that this was not a significant concern given the lack of species (e.g., mussels, sea anemones, snails, starfish) which might be damaged by increased foot traffic along the beach. The report recommended mitigation measures in the form of signage and distributed information advising beach visitors to view marine mammals at a distance not approach the animals, especially from April to June, to contact the local marine mammal center is injured or stranded animals are encountered, and to avoid trampling over sensitive tidepool organisms. None of the proposed changes to the LCP would frustrate the ability to apply such mitigation measures to any future development project undertaken at the subject property.

With respect to the protection of other environmentally sensitive habitat areas, the site of the proposed land use plan and zoning designation changes lies adjacent to "marine / intertidal / sandy unconsolidated shore / regularly-flooded" (M2US2N)[10] wetlands as depicted on the U.S. Fish and Wildlife Service's National Wetland Inventory maps (see Exhibit No. 11). The upper extent of this intertidal area, as delineated by the Extreme Higher High Water (EHHW) line, corresponding roughly to the back-of-beach base of the short bluff at the southwesternmost corner of the parcel. The intertidal trends off to the north tangentially away from the former clinic property. These marine wetlands are fringed on their landward side by a band of vegetation dominated by Hooker willow (*Salix hookeriana*), a facultative wetland species[11], that extends approximately 30 to 50 onto the northwestern quadrant of the subject property. Given the prevalence of hydrophytic vegetation, this area appears to constitute wetlands. As noted

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[10] Refer to Classification of Wetlands and Deepwater Habitats of the United States, U.S. Fish and Wildlife Service - Office of Biological Services' Publication No. FWS/OBS-79/31, Lewis M. Cowardin, et al, USGPO December 1979, for a further discussion of the definition and the extent of wetland habitats; http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm

[11] U.S. Fish and Wildlife Service – National Wetlands Inventory, 1998. 1998 National List of Vascular Plant Species that Occur in Wetlands: 1998 Summary of Indicators; http://www.fws.gov/pacific/ecoservices/habcon/pdf/1998%20National%20list.pdf

above, these areas are listed as environmentally sensitive habitat within the LCP, as "inter-tidal areas" and "sandy beach ITAs," respectively. Consequently, as required by LUP Chapter 4 – *Environmentally Sensitive Habitat Areas / Water and Marine Resources* Policy No. 2, these intertidal areas are to be protected consistent with the provisions of Coastal Act Section 30240. Moreover, as both the intertidal reach and the willow thicket comprise wetlands, 50-foot-wide buffer around their upland exterior boundary is required to be established pursuant to LUP Chapter 4 – *Environmentally Sensitive Habitat Areas / Water and Marine Resources* Policy No. 4. Given the 240-foot depth of the parcel landward, adequate building area exists upland of the wetlands and their requisite buffers, such that development of the site under the modified LUP and zoning provisions could be feasibly design and sited consistent with the LCP's policies for protecting ESHA.

In addition to physical intrusion by humans in or near biologically sensitive areas, the introduction of non-point source pollution in the form of stormwater runoff, siltation from ground disturbing construction activities, and potential accidental releases of hazardous materials were other in which environmentally sensitive habitat and water quality may be adversely impacted by the project. Drainage at the project site currently flows toward the southern parking lot side of the former medical clinic property where it is collected in gutters and drop-inlets and discharged into the City's stormwater sewer. The closest storm drain to the subject property is located within the vacated West Second Street right-of-way. This 30-inch-diameter line passes under the parking lot and discharges into sub-tidal waters to the northwest of the project site approximately 200 meters offshore. Currently, no onsite pretreatment facilities are provided to pre-treat stormwater runoff before its discharge into the City drainage system.

Pollutants within stormwater runoff from multi-family residential uses have the potential to degrade water quality of the nearshore environment. Parking lots contain pollutants such as heavy metals, oil and grease, and polycyclic aromatic hydrocarbons that deposit on these surfaces from motor vehicle traffic. In addition, outdoor maintenance equipment, routine washing and steam-cleaning have the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the stormwater conveyance system.

As noted above, Policy No. 2 of LUP Chapter 7 requires that all post-construction BMPs shall be designed to treat, infiltrate, or filter stormwater runoff from each storm event up to the 85th percentile storm event. As shown in Exhibit No. 9, flow-based treatment of the 1.24-acre parcel, based on a scenario of an approximate 60% impervious surface area utilizing oil-water separator treatment facilities in conjunction with landscaping and bioswale filtration on the remaining 40% of the site, would need to accommodate an inflow of approximately 234.1 cubic-feet-per-hour to meet the 85th percentile criterion. Using a safety factor coefficient of 2.0, an in-flow of 468.2 cubic-feet-per-hour would result.[12] When in-flow decanting related storage volume is

[12] The Commission notes that, in formulating the flow-based treatment design calculations, the preparer utilized a .09″ per hour quantity for the 85th percentile precipitation event, stating that the rate was derived from data collected at the National Weather Service's field office on Woodley Island in Eureka ("Eureka WFO"), purportedly the nearest rain gauge location to the LCP amendment site, located approximately 75 miles south of Crescent City. A closer rain gauge to the project site exists at the CDOT maintenance station in Crescent City ("Crescent City MNTC

considered, such a flow would require a separator vault sized for an approximately 2,500 gallons capacity, whose typically 120-square-foot area could easily be accommodated on the 1.24-acre site.

Therefore, based upon information of record and provided with the LCP amendment request, the Commission finds that the LUP Amendment, as submitted, is consistent with Coastal Act Section 30231, in that the program changes would have no effect upon or reducing existing requirements within the LCP to providing numerical goal-based water quality best management practices. Additionally, the Commission finds that the LUP Amendment, as submitted, is consistent with Sections 30230, 30233, and 30240 regarding the protection of marine resources, wetlands, coastal waters, and other forms of ESHA, insofar as the modifications to the LCP would not obviate or reduce the protections afforded to these coastal resources, nor result in the creation of a parcel without a building site located such that impacts which would significantly degrade adjacent environmentally sensitive habitat areas are prevented, and compatibility with the continuance of habitat and adjacent beach recreation areas is ensured.

7. Conclusion

Much of the proposed Land Use Plan amendment (i.e., amending site land use designations, revising the land use map) is consistent with the Coastal Act, especially as relate to the siting of new development in areas with adequate supporting service as required by Section 30250, and the assured protection of marine and water resources, and environmentally sensitive areas pursuant to Sections 30230, 30231, 30233, and 30240. While the proposed inclusion of visitor serving commercial uses as allowable uses within the Multiple Family LUP designation and designating the subject property with the Multiple Family LUP designation is consistent with the priority use policies of the Coastal Act, the wording of the proposed amendments to the Multiple Family LUP designation, particularly with regard to the enumerated examples of such types of uses, is overly broad and needs further clarification as to which forms of the examples are actually types of residential developments. In addition, five other aspects of the amendment as proposed did not adequately address particular Coastal Act policies relevant to future development of the site with the new uses the amendment would allow. These aspects of the amendment concern exactions for public access facilities, protecting coastal recreation, avoiding and minimizing geologic and flooding hazards, and protecting visual resources. Therefore the Land Use Plan amendment as submitted is not consistent with the Coastal Act and must be denied. However, with the suggested modifications discussed above, the LUP amendment would be consistent with the Coastal Act. Therefore, the Commission finds the City's Land Use Plan, as modified, conforms with the requirements of Chapter 3 of the Coastal Act pursuant to Section 30512.2 of the Coastal Act.

STN"), situated roughly 1½ miles to the northeast, where a one-hour rate of 0.10″ is recorded. This 10% difference in design intensity would represent an additional 52 cubic-feet-per-hour that would need to be accommodated in the treatment works. Notwithstanding this error, the Commission finds that adequate area exists on the project site to construct flow-based treatment works which could process this additional capacity.

PART FOUR: AMENDMENT TO IMPLEMENTATION PROGRAM

I. ANALYSIS CRITERIA

Section 30513 of the Coastal Act establishes the criteria for Commission action on proposed amendments to certified Implementation Programs (IP). Section 50513 states, in applicable part:

> *…The commission may only reject zoning ordinances, zoning district maps, or other implementing actions on the grounds that they do not conform with, or are inadequate to carry out, the provisions of the certified land use plan. If the commission rejects the zoning ordinances, zoning district maps, or other implementing actions, it shall give written notice of the rejection specifying the provisions of land use plan with which the rejected zoning ordinances do not conform or which it finds will not be adequately carried out together with its reasons for the action taken.*

II. FINDINGS FOR DENIAL OF IP AMENDMENT NO. CRC-MAJ-1-09 AS SUBMITTED AND CERTIFICATION IF MODIFIED

The Commission finds and declares as following for Amendment No. CRC-MAJ-1-09:

1. Description of Proposed Implementation Program Amendments:

The proposed IP amendment includes an amendment of the Zoning Map to reclassify the zoning designation for a portion of the subject property and a text change to the standards of the zoning designation regarding the pro rata amount of lot area for each multiple family dwelling.

The two amendments proposed by this IP Amendment are as follows:

a. Amend the zoning designation for the northeastern 7,200-square-feet of the 1.24-acre former Del Norte Community Health Center site (APN 118-020-34) from Residential-Professional Two family (CZ-R2) to Residential-Professional (CZ-RP) zoning designation; and

b. Amend the text of the Section 17.67.030.B.5 of the Coastal Zone Residential Professional Zoning District to change the lot-area-per-dwelling standard from 1,500 square-feet per dwelling to 1,250 square-feet.[13]

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[13] In addition to the former medical clinic site, this change to the coastal zoning regulations would also alter development standards over an approximately one-acre area comprising seven other parcels similarly zoned CZ-RP situated between "A" and "B" Streets south of Front Street (i.e., APNs 118-030-09, and -22 through -27). However, no change is proposed under the amendment request to change the currently-certified "Medical Related" land use designation for these

A copy of the proposed amended code section is included in Exhibit No. 8.

2. Consistency with LUP Land Use Designations.

Under the City's current coastal zoning ordinance provisions, the northeast 7,200 square-feet of the project site is designated for residential duplex development with the potential maximum number of two residential units based upon a minimum 6,000 square-foot lot size and 3,000 square-feet-per dwelling development standards. The remaining roughly 1.07-acre portion of the site is currently zoned CZ-RP, wherein a maximum potential 31 residential dwellings on as many as seven separate lots could be developed consistent with the current 6,000 square-foot lot size and 1,500 square-feet-per dwelling development standards. To accommodate the proposed condominium project at the 1.24-acre former medical clinic presently under appeal before the Commission, the City has proposed that the lot-area-per-dwelling standard be reduced from 1,500 square-feet to 1,250 square-feet. The proposed amendment would allow development of up to 43 dwelling at the subject site.

As amended to incorporate the changes proposed by LUP Amendment No. CRC-MAJ-1-09, as modified, the LUP would provide for common-wall residential development (e.g., duplexes, apartments, townhouses, and row houses) at densities greater than six dwelling per acre to be developed within an existing urban area designated for "Multiple Family" (MF) land use. In addition, adequate community services and public utility reserve capacities are available to accommodate development at the increased residential density that would result from redesignating the northeastern ⅛ of the property to MF and lowering of the CZ-RP's lot-area-per-dwelling standard from 1,500 square-feet/dwelling to 1,250 square-feet/dwelling. In addition, compatible visitor-serving commercial uses at intensities that did not detract from the primary residential character of the designation would also be allowed. With regard to subdivisions, the combined changes to the land use and zoning district standards would provide for the creation of as many as nine lots containing up a total of 43 dwelling units. This proposed change to the IP to amend the zoning designation over the northeasterly portion of the property and modify the lot-area-per-dwelling would therefore be consistent with the corresponding changes to the land use plan map designation and definition of the Multiple Family category description in terms of maximum residential density.

However, for the proposed zoning district to effectively implement the land use policies of the LUP with respect to permissible uses, changes to the LUP's MF designation's permissible uses should also be reflected in changes to the list of principally- or conditionally-permitted uses within the zoning district designations. Moreover, the zoning district prescriptive development standards (e.g., lot dimensions, height limits, etc.) should similarly comport with LUP standards for its new uses so that such uses could feasibly be developed in at least one zoning district. While the proposed changes to the lot-area-per-dwelling standard would clearly conform to the redefined MF category insofar as residential development at "greater than six units per acre"

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properties. Thus, as only medical-related professional office development would continue to be the only permissible use fully consistent with both the parcels' land use and zoning designations, the change in the lot-area-per-dwelling standard would have no effect on development therein.

would be facilitated, no language modifications have been proposed for ensuring that the full range of new "common wall residential development, such as apartment buildings, condominiums, and townhouses" may be developed within the Residential Professional or any other zoning district. Moreover, the zoning regulations do not clearly address the differences between the physical three-dimensional space in which each privately-owned residence "unit" comprises, from the "lot," the land area onto which the development is constructed in terms of their requisite minimal size. Therefore the Implementation Plan Amendment as submitted does not adequately carry out the provisions of the LUP and must be denied pursuant to Section 30513 of the Coastal Act. The Commission thus finds that it is necessary to modify sections of CZZR Chapter 17.61 – *Definitions* and Section 17.67.020 of the Residential Professional zoning district standards.

Suggested Modification No. 9 modifies Section 17.61.480 to include collective ownership condominiums and housing collectives, with or without common areas, within the definition of "townhouse or row house." Furthermore, Section 17.67.020.K is modified to add "condominium projects, and other attached, common interest housing developments" alongside "townhouses**,** (row houses)" in the list of uses permitted in the CZ-RP zoning district. This language more precisely mirrors the language of the amended description of the Multiple Family land use designation regarding types of common wall residential development, as further revised by Suggested Modification No. 8. In addition, Suggested Modification No. 9 modifies the existing definition of "lot" and "lot area" at Sections 17.61.290 and 17.51.295, and inserts new definitions at Sections 17.61.483 and 17.61.487 of the terms "unit" and "unit area," respectively. These modifications are intended to make a distinction between the privately-owned physical residential space within a townhouse, row house, condominium or housing cooperative development from the platted land area onto which a land use is sited, for purposes of regulating their minimum sizes.

SUGGESTED MODIFICATION NO. 9: Sections 17.61.290, 17.61.295, 17.61.480, 17.61.483, 17.61.487, and 17.67.020 of the Coastal Zone Zoning Regulations shall be modified or appended as follows:

17.61.290 Lot.

"Lot" means land occupied or available to be occupied by a use, building or a unit group of buildings, accessory buildings or uses, together with such yards, open spaces, lot width and area as required by this title, and having its principal frontage upon a street. **For the definition of "unit," see Section 17.61.483.**

17.61.295 Lot area.

"Lot area" means the total horizontal area included within lot lines of a lot. **For the definition of "unit area," see Section 17.61.487.**

17.61.480 Townhouse or row house.

"Townhouse" or "row house" means one of a group of no less than four attached dwelling units**, held in either fee simple title or in common interest ownership, such as with condominium projects, community apartment projects, stock cooperatives, or other forms of common interest housing developments,** where each dwelling ~~unit~~ is located on **either** a separate lot **or within an exclusive use residential unit, with or without collectively owned portions of the project structures and/or common open space areas**.

17.61.483 Unit.

"Unit" means the spatial portion of a townhouse, row house, condominium, project, apartment collective, or stock cooperative intended for exclusive and individual use by its owner or owners, separate and apart from commonly owned portions of the structure(s) or project site(s).

17.61.487 Unit area.

"Unit area" means the physical three-dimensional interior area of a unit within townhouse, row house, condominium, project, apartment collective, or stock cooperative, as bounded by its walls, floor, and ceiling.

17.67.020 Uses permitted.

Uses permitted in the CZ-RP district include:

A. Business and professional offices such as doctors, dentists, lawyers, accountants and other professional offices;

B. One-family dwellings, occupied by not more than one family and not more than two boarders or roomers;

C. Two-family dwellings;

D. Multiple family dwellings;

E. Accessory buildings;

F. Day nurseries accommodating not more than five children in number;

G. Foster homes limited to those licensed by the state or county, and accommodating not more than six guests;

H. Motels and hotels, except for associated sales of food or drink;

I. Private clubs;

J. Roominghouses;

K. Townhouses**,** ~~(~~row houses~~)~~**, condominium projects, cooperative, apartments, stock cooperatives, and other attached, common interest housing developments**;

L. Real estate and insurance offices;

M. Any of the following uses provided a use permit is secured:

1. Churches,
2. Day nurseries,
3. Dormitories for schools and colleges,
4. Guest homes,

5. Homes for the aged,
6. Home occupations,
7. Nonprofit organizations devoted to charitable, philanthropic or special purposes. Such uses shall not engage in the processing, repairing, refinishing, treatment, fabrication, manufacture or sale of materials or objects except that the sale of new works of art created or produced on the premises from raw materials by the patrons or members of nonprofit organizations may be permitted, if it is incidental and accessory to the principal use of the property,
8. Orphanages,
9. Parking lots,
10. Public utility substations.

4. Conclusion

For the most part, the zoning code amendments (i.e., amending site zoning, revising the lot-area-per-dwelling development standard) as proposed would conform with and be adequate to carry out the provisions of the City's Land Use Plan as amended. However, the proposed change to the definition of the LUP's Multiple Family land use designation, as modified by the Commission in Suggested Modification No. 8, does not have clear counterparts within the coastal zone zoning regulations with respect to distinguishing the new types of residential projects that could be developed in MF designated areas. In addition, in its present form, confusion may arise as to whether the minimum size of a separately conveyable condominium "unit" must comply with the lot area standards for the zoning district. Therefore the Implementation Plan Amendment as submitted does not adequately carry out the provisions of the LUP and must be denied pursuant to Section 30513 of the Coastal Act. However, with the suggested modification, the zoning code amendment would more fully describe and regulate common wall residential development types permissible within the CZ-RP zoning and thereby conforms with and is adequate to carry out the requirements of the LUP, as amended.

Therefore, the Commission finds the City's Implementation Program, as modified, conforms with and is adequate to carry out the requirements of the certified Land Use Plan consistent with Section 30513 of the Coastal Act.

PART FIVE: CALIFORNIA ENVIRONMENTAL QUALITY ACT

In addition to making a finding that the amendment is in full compliance with the Coastal Act, the Commission must make a finding consistent with Section 21080.5 of the Public Resources Code. Section 21080.5(d)(2)(A) of the Public Resources Code requires that the Commission not approve or adopt an LCP:

> *...if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effects which the activity may have on the environment.*

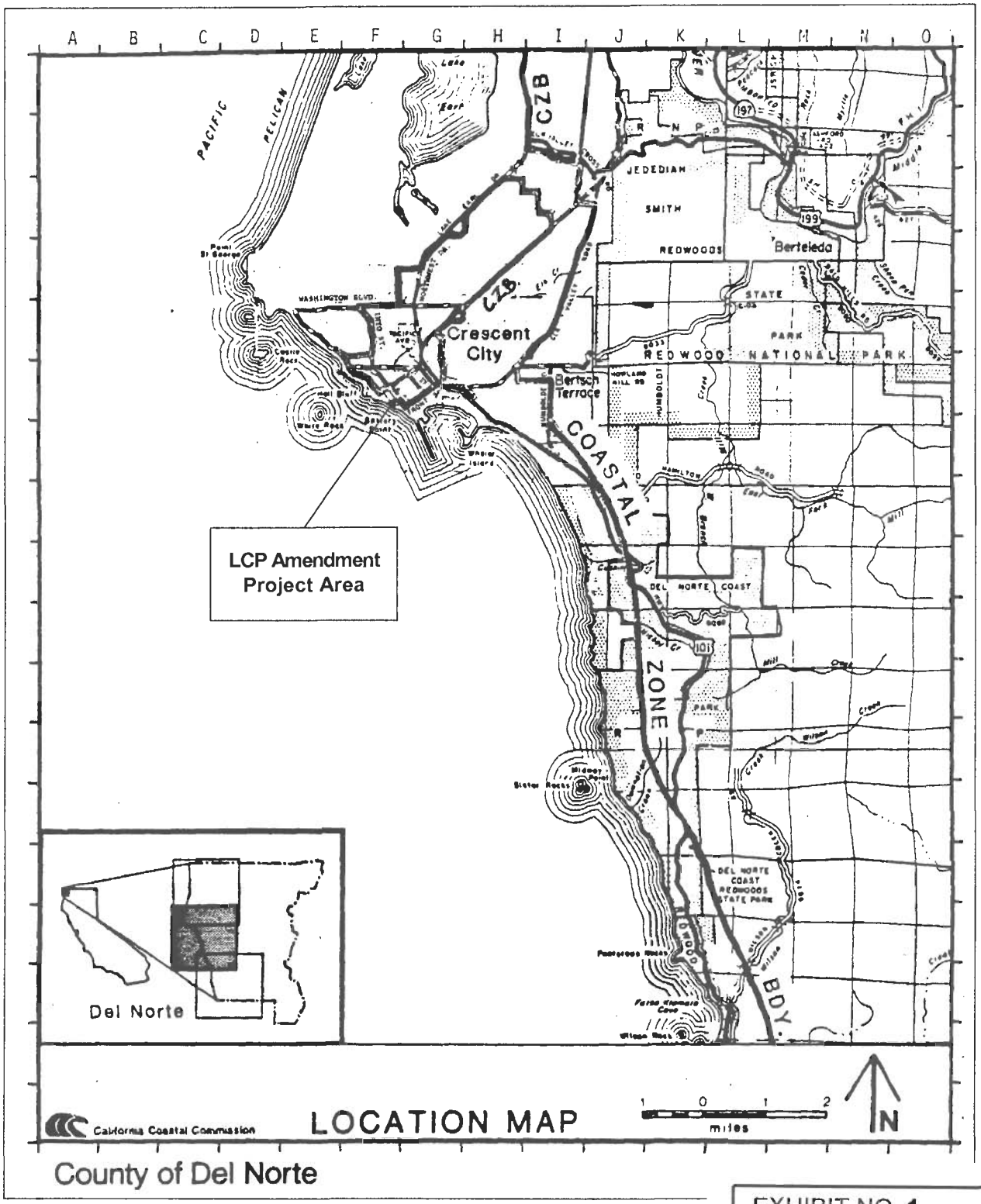
As part of their local action on the subject LCP amendment on January 5, 2009, the city council, citing Section 15265(a)(1) of the California Environmental Quality Act implementation guidelines (14 CCR §§15000), determined the subject LCP amendment to be statutorily exempt from environmental review by the City. No optional notice of exemption was filed with the Office of Planning and Research.

As discussed in the findings above, the amendment request with incorporation of the suggested modifications is consistent with the California Coastal Act. Among these modifications are changes to the LCP's development project application processing procedures to ensure that scientific factual information is utilized in determining whether or not there is substantial evidence that the project would have potentially significant adverse effects on the environment, as required by CEQA Sections 21080(c) – (e), and further detailed in CEQA Guidelines Section 15064(b).

There are no other feasible alternatives or mitigation measures available which would substantially lessen any significant adverse effects which the activity may have on the environment. The Commission finds that approval of the LCP Amendment with the incorporation of the suggested modifications will not result in significant environmental effects within the meaning of the California Environmental Quality Act.

EXHIBITS:

1. Regional Location Map
2. LCP Amendment Vicinity Map
3. Plan View Aerial Photograph
4. Oblique Aerial Photograph
5. Excerpt, Currently Certified Land Use Map
6. Excerpt, Currently Certified Zoning Map
7. City Resolution of Submittal
8. Proposed Amendments to the City of Crescent City Land Use Plan and Implementation Program
9. *Preliminary Water Quality Calculations*, Stover Engineering, March 11, 2009
10. *Marine Wildlife Impact Evaluation*, Crescent Coastal Research, December 1999
11. Excerpt, USFWS National Wetlands Inventory – *Sister Rocks* Quadrangle
12. *Biological Report: State and Federal Listed Species Survey*, NRM Corp., August, 2007
13. *Biological Supplement: Sensitive Species Surveys*, Gedik Biological Assoc., March 6, 2009
14. Excerpts, *Tsunami Inundation Model Study for Eureka and Crescent City, California*, Bernard, E.N., C. Mader, G. Curtis, and K. Satake, November 1994
15. *Tsunami Inundation at Crescent City, California Generated by Earthquakes Along the Cascadia Subduction Zone*, Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis, October 2007
16. *Relative Tsunami Hazard – Crescent City, California*
17. *Tsunami Hazards and Evacuation Routes*



County of Del Norte

EXHIBIT NO. 1
APPLICATION NO.
CRC-MAJ-1-09 (COASTA NORTE)
CRESCENT CITY LCP AMEND.
REGIONAL LOCATION MAP

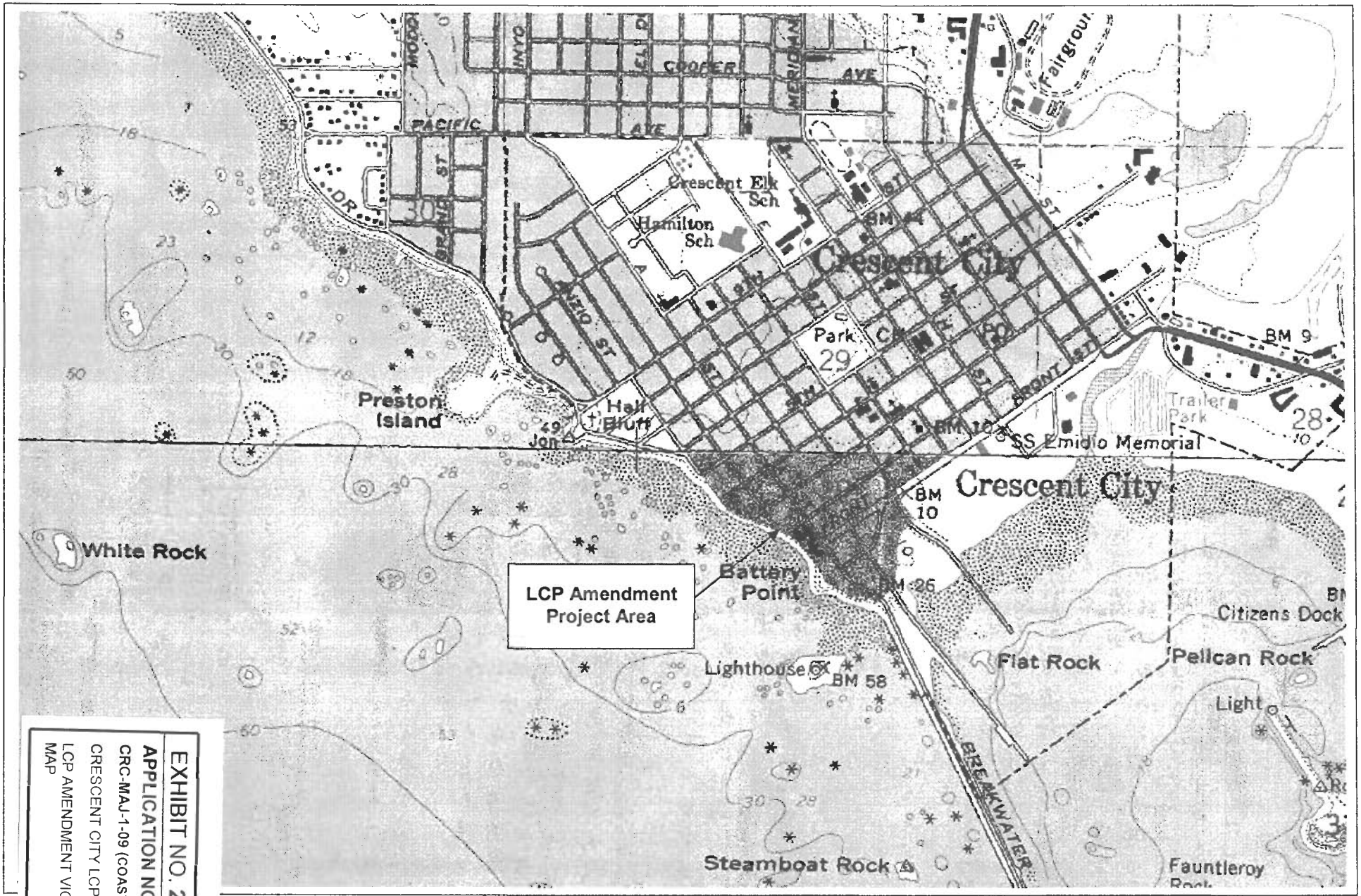


EXHIBIT NO. 2

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

LCP AMENDMENT VICINITY MAP

EXHIBIT NO. 3

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

PLAN VIEW AERIAL PHOTOGRAPH

Source: California Coastal Records Project Copyright © 2005 Kenneth & Gabrielle Adelman. All rights reserved

EXHIBIT NO. 4

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

OBLIQUE AERIAL PHOTOGRAPH

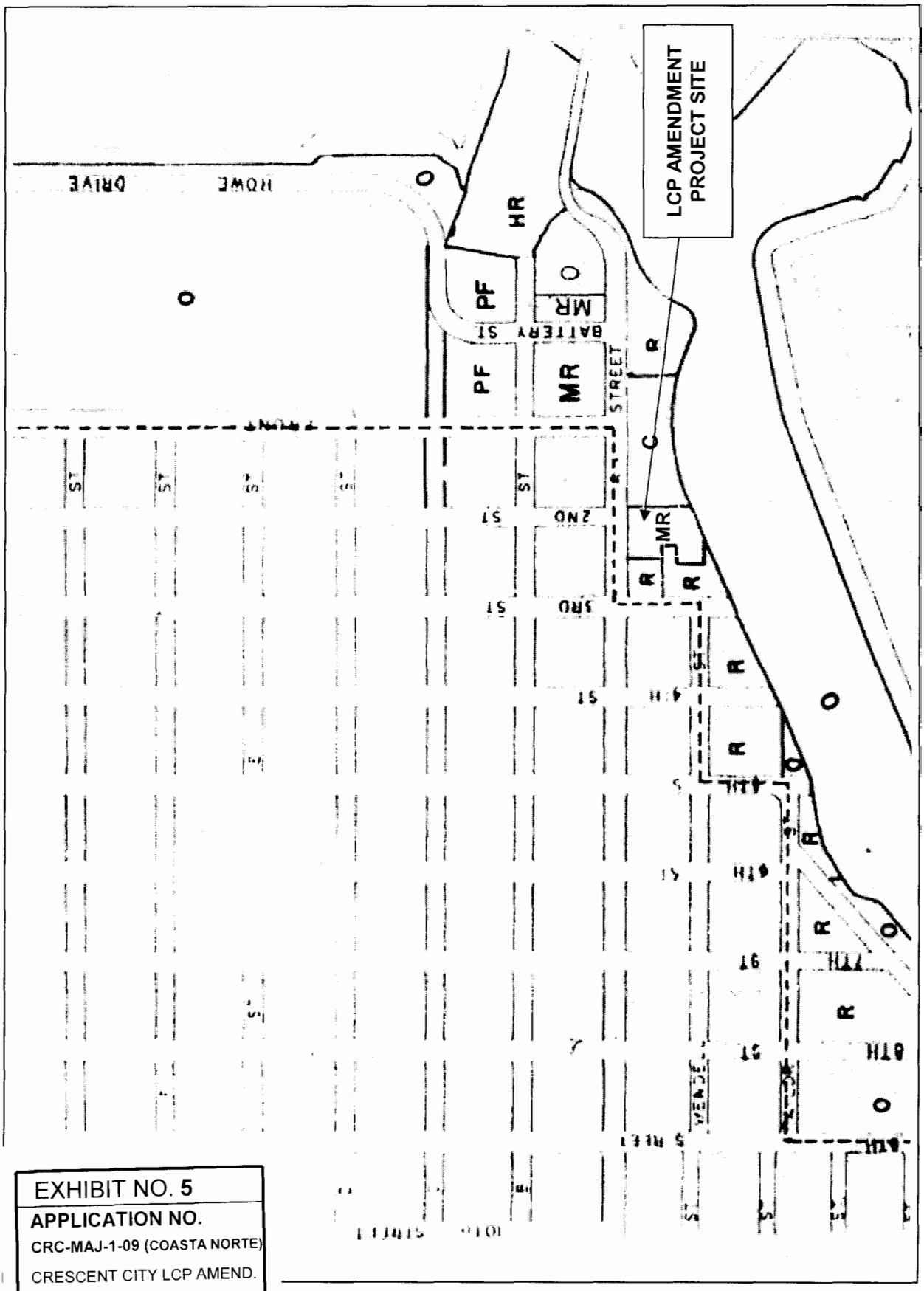


EXHIBIT NO. 5

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

EXCERPT, CURRENTLY CERTIFIED LAND USE MAP

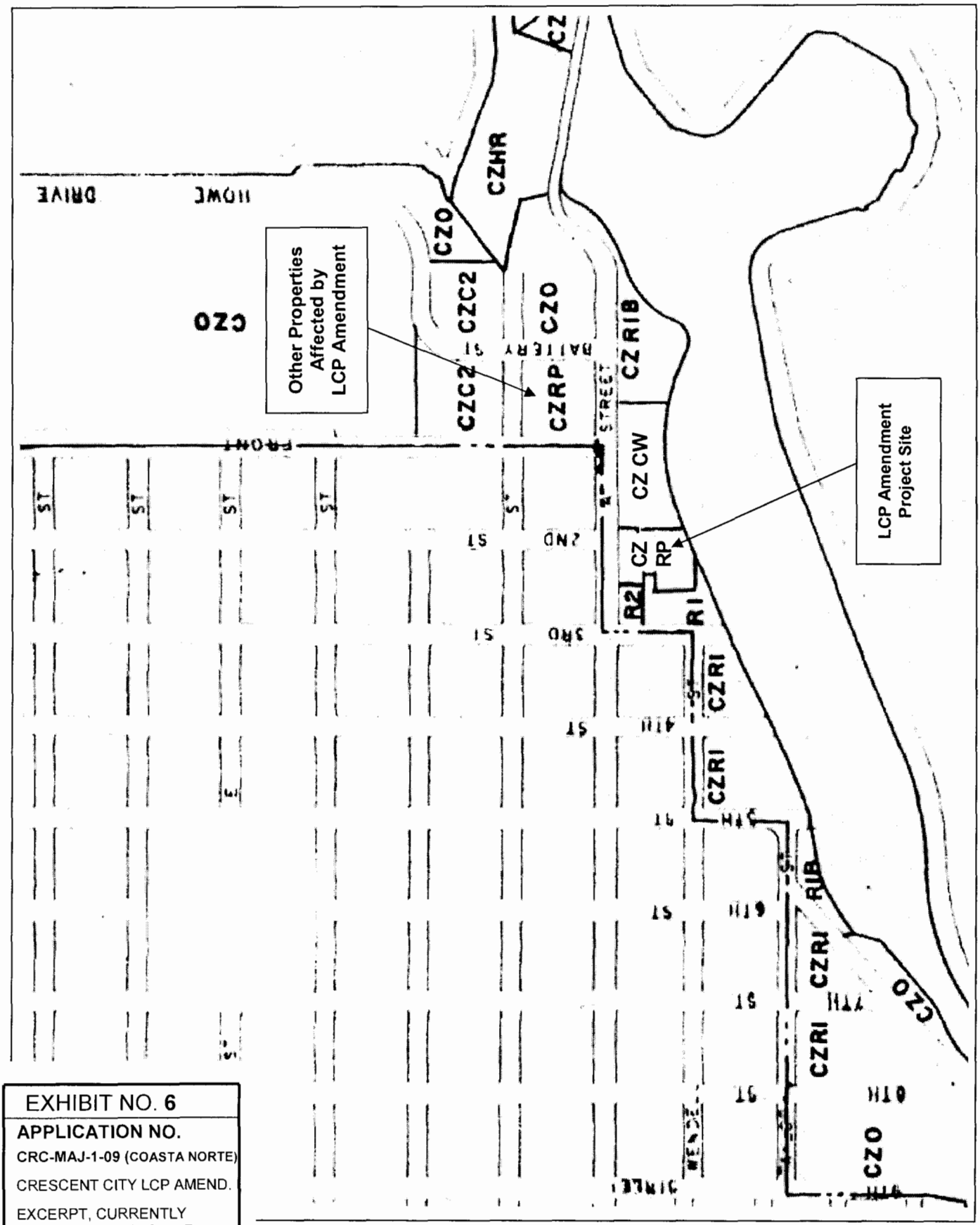


EXHIBIT NO. 6

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

EXCERPT, CURRENTLY CERTIFIED ZONING MAP

RESOLUTION NO. 2009-12

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CRESCENT CITY, CALIFORNIA TRANSMITTING TO THE CALIFORNIA COASTAL COMMISSION AMENDMENTS TO ITS LOCAL COASTAL PROGRAM LAND USE PLAN AND IMPLEMENTATION PLAN ELEMENTS PERTAINING TO COASTAL DEVELOPMENT WITHIN CERTAIN SPECIFIED LOCALITIES

WHEREAS, the California Coastal Commission certified a Local Coastal Program for the City of Crescent City, March 1983, and

WHEREAS, in December 2008, the City Council received a recommendation from the Planning Commission to approve revisions to certain policy provisions and development standards in the Local Coastal Program pertaining to coastal development within Multiple Family land use designated areas and Coastal Zone Residential-Professional zoning districts, and

WHEREAS, in January 2009, the City Council held the required public hearing regarding this Local Coastal Program amendments, and

WHEREAS, the City Council determined that the public health, safety, and general welfare warranted approval of said amendment, and

WHEREAS, the City Council conducted a duly noticed public hearing, waived the second reading and made the following findings:

1. The project is consistent with the Crescent City General Plan and Local Coastal Plan.
2. The project is consistent with the policies of the Chapter Three of the California Coastal Act.
3. The project is statutorily exempt from the California Environmental Quality Act pursuant to CEQA Guidelines section 15265(a)(1); and

WHEREAS, the local government intends to carry out the Local Coastal Plan in a manner fully consistent with the California Coastal Act; and

WHEREAS, this amendment will take effect automatically upon Coastal Commission approval.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Crescent City hereby transmits to the California Coastal Commission an amendment to the Local Coastal Program to revise certain land use plan policy provisions and zoning district development standards as identified in Exhibit "A" and "B" attached hereto and by reference made a part hereof.

EXHIBIT NO. 7
APPLICATION NO.
CRC-MAJ-1-09 (COASTA NORTE)
CRESCENT CITY LCP AMEND.
CITY RESOLUTION OF SUBMITTAL (1 of 6)

The above and foregoing Resolution 2009-12 was introduced by Council Member Burns, was seconded by Council Member Westfall, and passed and adopted at a meeting of the City Council of the City of Crescent City held on the 16th day of March, 2009, by the following vote:

AYES:	Council Members Burns, Westfall, Slert, Murray, and Mayor Schellong
NOES:	None
ABSTAIN:	None
ABSENT:	None

Kelly Schellong

Kelly Schellong, Mayor

ATTEST:

L. Dianne Nickerson

L. Dianne Nickerson, City Clerk

COASTAL LAND USE PLAN MAP DESIGNATIONS

The Land Use Map for the Coastal Zone of the City of Crescent City contains seven land use designations for the City's coastal zone. The following is a summary of the designations:

Residential: Up to six units per acre, would include the present R-1, R-1B zones and would allow R-2 zoning as a transition to high density zoning.

Multiple Family: ~~Over six units per acre, would allow R-2 zoning as a transition to residential areas~~. Common wall residential development at greater than six units per acre, implemented by R-2 and RP zoning to establish a transition between one-family residential areas and adjoining commercially-zoned properties. Compatible visitor-serving commercial and recreational uses, including timeshare condominium and vacation rental townhouses, may also be developed on oceanfront sites provided they are of a type and intensity so as to not detract from the intended primary residential character of the designation.

Commercial: Allows the limited use of commercial activities subject to the following recommendations:

1. No heavy commercial uses should be allowed in the coastal zone;
2. Highway oriented services should be located along Highway 101;
3. The principle commercial uses shall be co-generation energy facilities and waste water production.

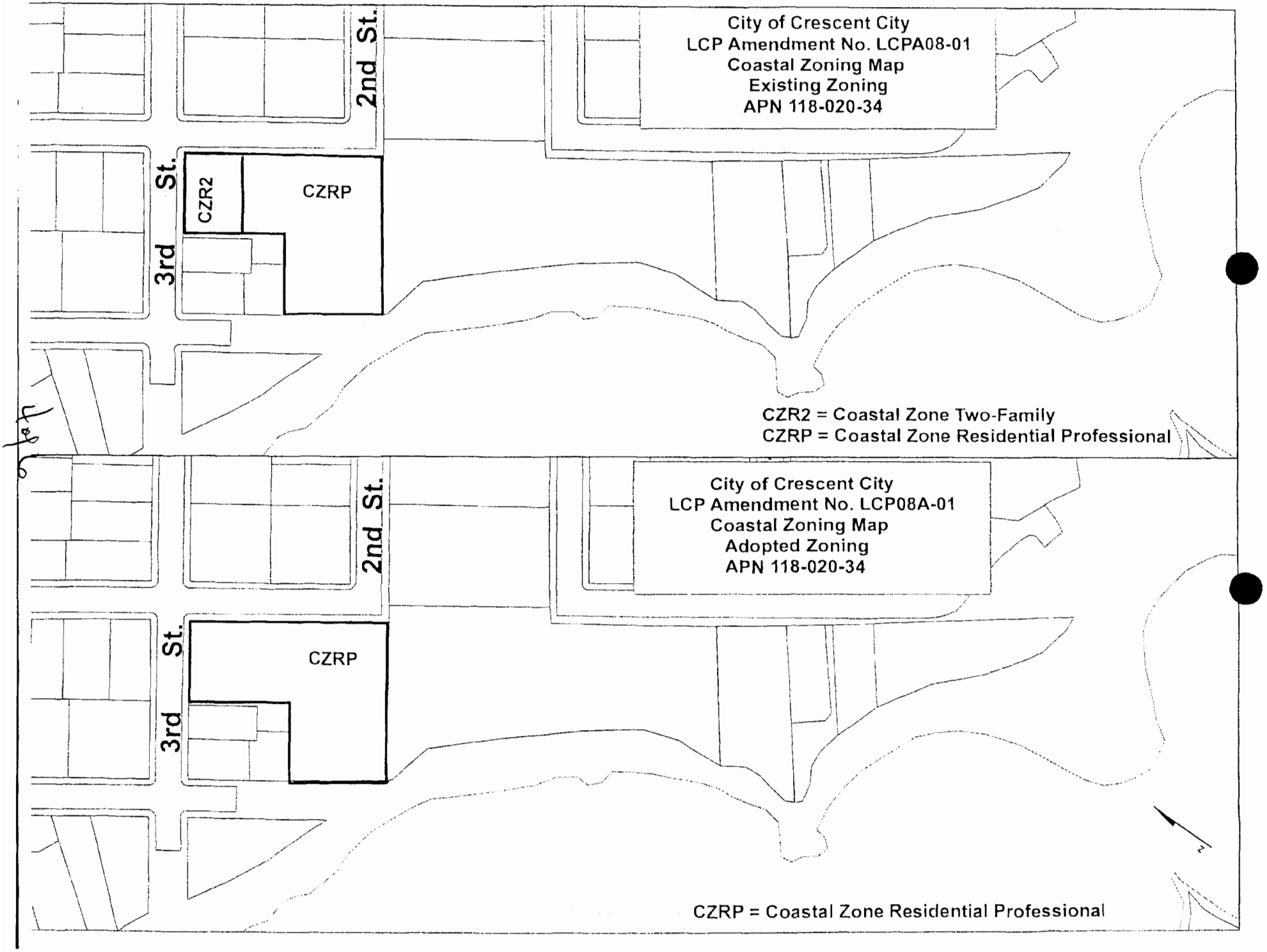
Public Facilities: Governmental agency uses.

Medical Related: Encourages the development of concentration of medically related services adjacent to the hospital.

Harbor Related: Commercial and recreational activities that are dependent in some way upon a harbor location.

Open Space: Includes parks, beaches, wooded areas, cemeteries and other areas of a similar nature and value.

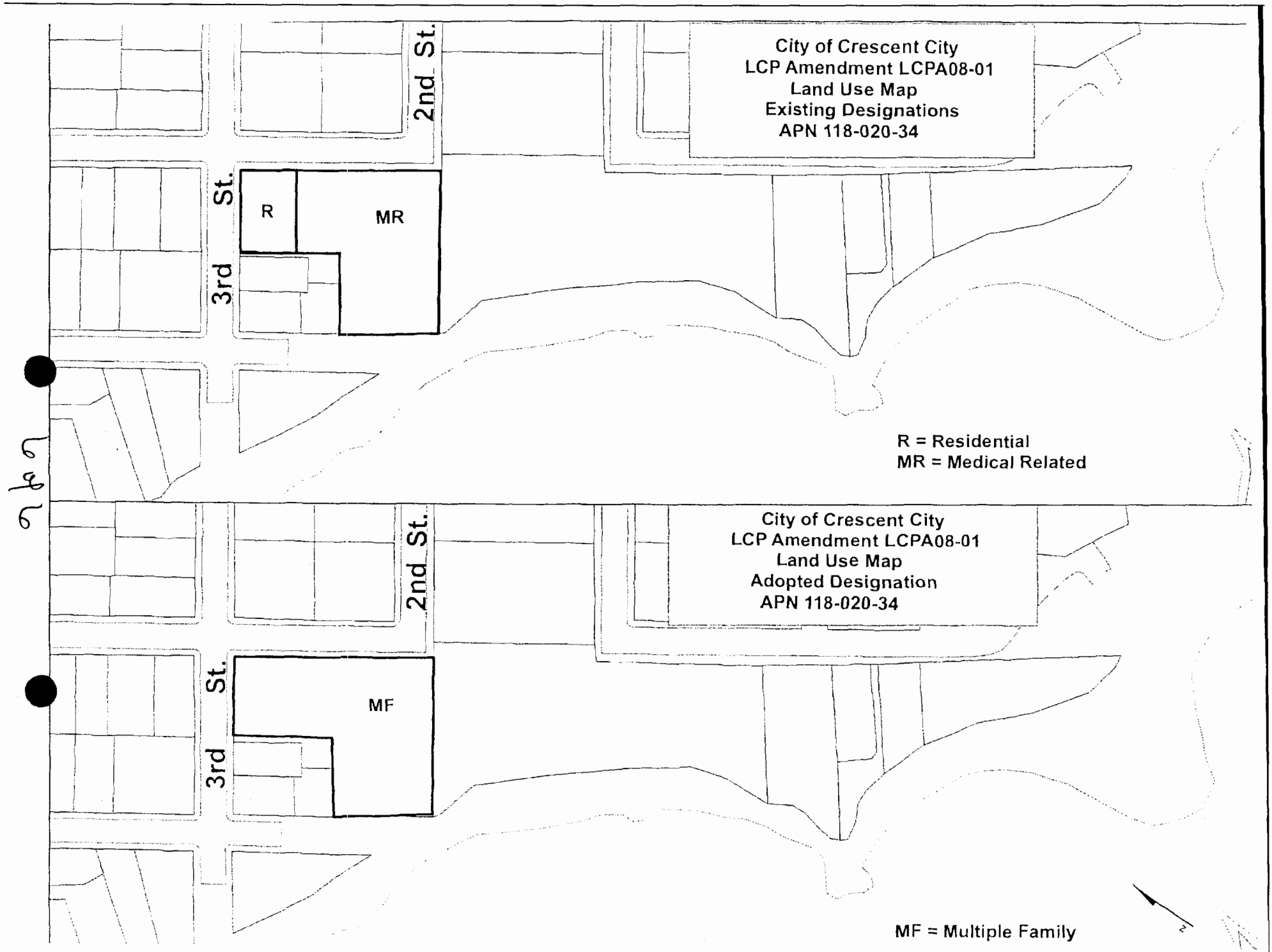
The zoning map for the coastal zone of the City of Crescent City contains a district designated Highway Services/Natural Resources (HS/NR) for commercial activities subject to the natural resources protection policies established by the coastal element of the General Plan concerning wetlands and wetland buffers.


City of Crescent City
LCP Amendment No. LCPA08-01
Coastal Zoning Map
Existing Zoning
APN 118-020-34
2nd St.
3rd St.
CZR2
CZRP
CZR2 = Coastal Zone Two-Family
CZRP = Coastal Zone Residential Professional
City of Crescent City
LCP Amendment No. LCP08A-01
Coastal Zoning Map
Adopted Zoning
APN 118-020-34
2nd St.
3rd St.
CZRP
CZRP = Coastal Zone Residential Professional

Chapter 17.67 CZ-RP COASTAL ZONE RESIDENTIAL-PROFESSIONAL DISTRICT

17.67.030 Height and area regulations.

In the CZ-RP district, the height of buildings and the minimum dimensions of yards and lots shall be as follows:
A. Height. Maximum building height shall be thirty-five feet.
B. Yards and Areas.
1. Front Yards. Twenty feet for residential uses, ten feet for nonresidential uses;
2. Side Yards. Minimum five feet for interior and corner lots. Reverse corner lots shall have a side yard equal to one-half the required front yard of the lots abutting the rear of such reversed corner lots;
3. Rear Yards. Ten feet;
4. Lot Area. Minimum six thousand square feet for residential uses. No minimum for nonresidential uses;
5. Lot Area Per Dwelling Unit. A minimum of ~~fifteen hundred square feet~~ twelve hundred and fifty square feet per dwelling unit, except that single-family uses shall conform to the CZ-R1 requirements and duplexes shall conform to the CZ-R2 requirements;
6. Lot Coverages. For nonresidential uses, no requirements. For residential uses, coverage shall be the same as required in the most restrictive zone in which they are first permitted. (Ord. 537 (part), 1983).


City of Crescent City
LCP Amendment LCPA08-01
Land Use Map
Existing Designations
APN 118-020-34
2nd St.
3rd St.
R
MR
R = Residential
MR = Medical Related
City of Crescent City
LCP Amendment LCPA08-01
Land Use Map
Adopted Designation
APN 118-020-34
2nd St.
3rd St.
MF
MF = Multiple Family

RESOLUTION NO. 2009 – 02

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CRESCENT CITY AMENDING THE LOCAL COASTAL PLAN LAND USE MAP AND THE TEXT OF THE COASTAL ZONE MULTIPLE FAMILY LAND USE DESIGNATION

WHEREAS, on November 13, 2008, the Crescent City Planning Commission conducted a duly noticed public hearing to consider amending the Local Coastal Plan Land Use Map and the text of the Coastal Zone Multiple Family Land Use Designation, and

WHEREAS, on November 13, 2008 the Planning Commission recommended that the City Council adopted the proposed amendments, and

WHEREAS, on December 15, 2008 the City Council introduced the proposed amendment, waived the first reading and set the date of the public hearing, and

WHEREAS, on January 5, 2009 the City Council conducted a duly noticed public hearing, waived the second reading and made the following findings:

1. The project is consistent with the Crescent City General Plan and Local Coastal Plan.
2. The project is consistent with the policies of Chapter Three of the California Coastal Act.
3. The project is statutorily exempt from the California Environmental Quality Act pursuant to CEQA Guidelines section 15265(a)(1).

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Crescent City approves and adopts Local Coastal Plan Amendment No. LCPA08-01, the revised land use map and text of which are attached respectively as Exhibits A and B.

The above and foregoing Resolution No. 2009-02 was introduced by Council Member Burns, was seconded by Council Member Murray and passed and adopted at a regular meeting of the City Council of the City of Crescent City held on the 5th day of January 2009, by the following vote:

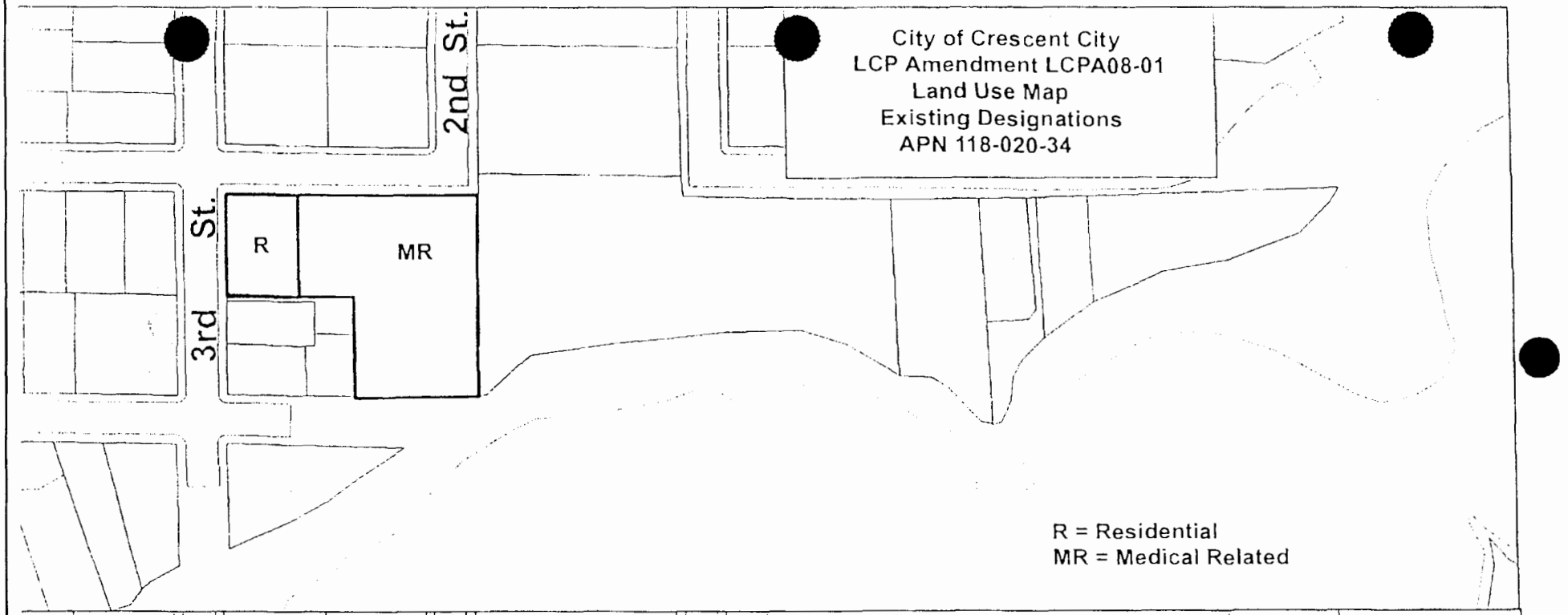
AYES: Council Members Burns, Murray, Slert, and Mayor Schellong
NOES: None
ABSTAIN: Council Member Westfall
ABSENT: None

Kelly Schellong, Mayor

ATTEST:

L. Dianne Nickerson, City Clerk

EXHIBIT NO. 8
APPLICATION NO.
CRC-MAJ-1-09 (COASTA NORTE)
CRESCENT CITY LCP AMEND.
PROPOSED AMENDMENTS TO THE CITY OF CRESCENT CITY LAND USE PLAN AND IMPLEMENTATION PROGRAM (1 of 16)



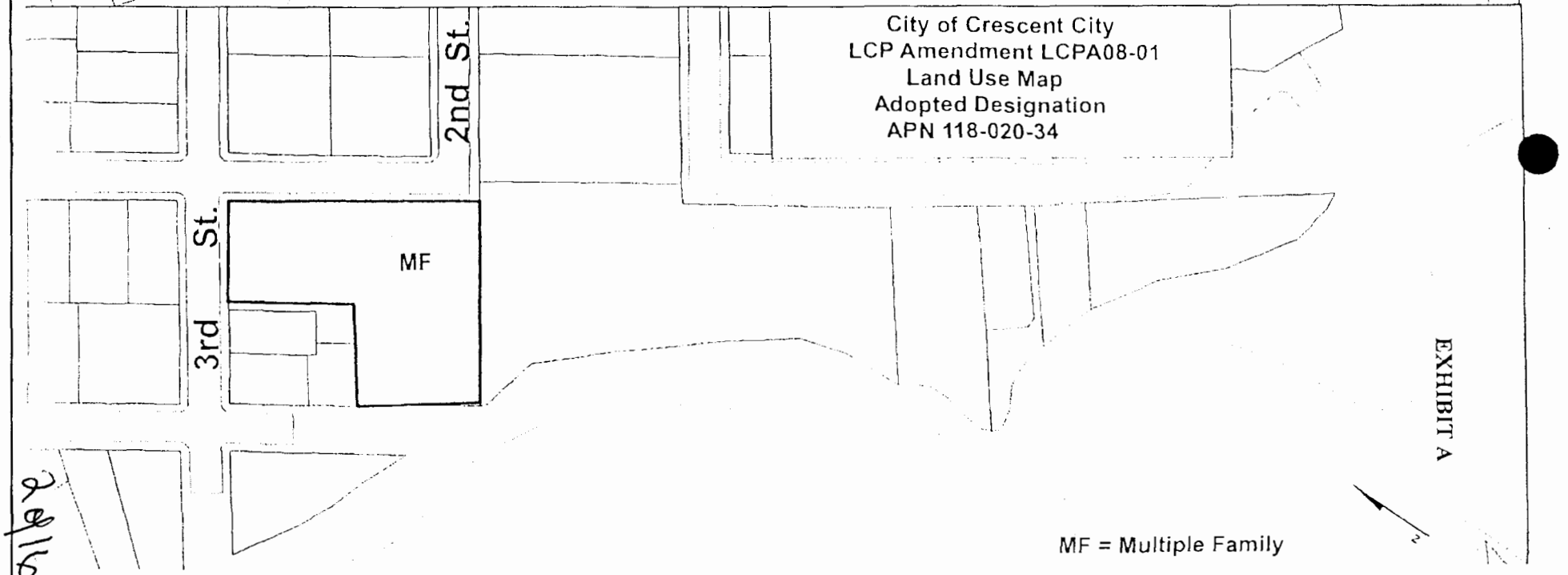


EXHIBIT A

2 of 2

EXHIBIT B

LOCAL COASTAL PLAN AMENDMENT NO. LCPA08-01

Incorporating the following text:

Multiple Family

Multiple Family: Common wall residential development at greater than six units per acre, implemented by R-2 and RP zoning to establish a transition between one-family residential areas and adjoining commercially-zoned properties. Compatible visitor-serving commercial and recreational uses, including timeshare condominium and vacation rental townhouses, may also be developed on oceanfront sites provided they are of a type and intensity so as to not detract from the intended primary residential character of the designation.

CITY OF CRESCENT CITY
ORDINANCE NO. 737

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CRESCENT CITY REVISING THE CRESCENT CITY MUNICIPAL CODE TITLE 17, COASTAL ZONING, BY AMENDING THE COASTAL ZONING MAP AND THE TEXT OF SECTION 17.67.030.B

SECTION ONE. Findings and Declaration of Intent

a. California Government Code §36934 *et seq.* and §65850 allow for the amendment, by ordinance, of the Municipal Code.

b. Crescent City Municipal Code §17.81.010 allows amendments and rezoning in the Coastal Zone.

c. On November 13, 2008, the Planning Commission of the City of Crescent City held a duly noticed public hearing on the proposed municipal code text amendment.

d. On November 13, 2008, the Planning Commission recommended that the City Council adopt findings that the proposed amendment is consistent with the Crescent City Zoning Code, General Plan, and Local Coastal Plan.

e. On November 13, 2008, the Planning Commission recommended that the City Council adopt the proposed rezoning and municipal code text amendment.

f. On December 15, 2008 the City Council introduced the proposed amendment, waived the first reading and set January 5, 2009 for the public hearing.

g. On January 5, 2009, the City Council held a duly noticed public hearing and waived the second reading.

h. The City Council finds that amending the City's Coastal Zoning Map and municipal ordinance in the manner stated herein is statutorily exempt from the California Environmental Quality Act pursuant to CEQA Guidelines Section 15265(c).

i. The City Council finds that the proposed ordinance is consistent with the policies of Chapter Three of the California Coastal Act.

j. The City Council finds that the proposed ordinance is consistent with the Crescent City Crescent City Zoning Code, Local Coastal Plan, and General Plan, and is complete and adopted.

The City Council of the City of Crescent City, California does ordain as follows:

SECTION TWO. Specified Revisions to the Coastal Zoning Map and Title 17, Municipal Code.

a) The City of Crescent City Zoning Map is modified as depicted in Exhibit A.

b) The City of Crescent City Municipal Code is modified to read as follows:

17.67.030 Height and area regulations.

5. Lot Area Per Dwelling Unit. A minimum of twelve hundred and fifty square feet per dwelling unit, except that single-family uses shall conform to the CZ-R1 requirements and duplexes shall conform to the CZR2 requirements;

SECTION THREE. Classification.
This ordinance is considered to be of a general and permanent nature and as such is classified as a code ordinance.

SECTION FOUR. Severability Clause.
If any part of this Ordinance or its application is deemed invalid by a court of competent jurisdiction, the City Council intends that such invalidity will not affect the effectiveness of the remaining provisions or applications and, to this end, the provisions of this Ordinance are severable.

SECTION FIVE. Effective date.
This ordinance shall become effective 30 days following its final passage and adoption.

The above and foregoing Ordinance No. 737 was introduced by Council Member Burns, was seconded by Council Member Murray and passed and adopted at a regular meeting of the City Council of the City of Crescent City held on the 5th day of January 2009, by the following vote:

AYES:	Council Members Burns, Murray, Slert, and Mayor Schellong
NOES:	None
ABSTAIN:	Council Member Westfall
ABSENT:	None

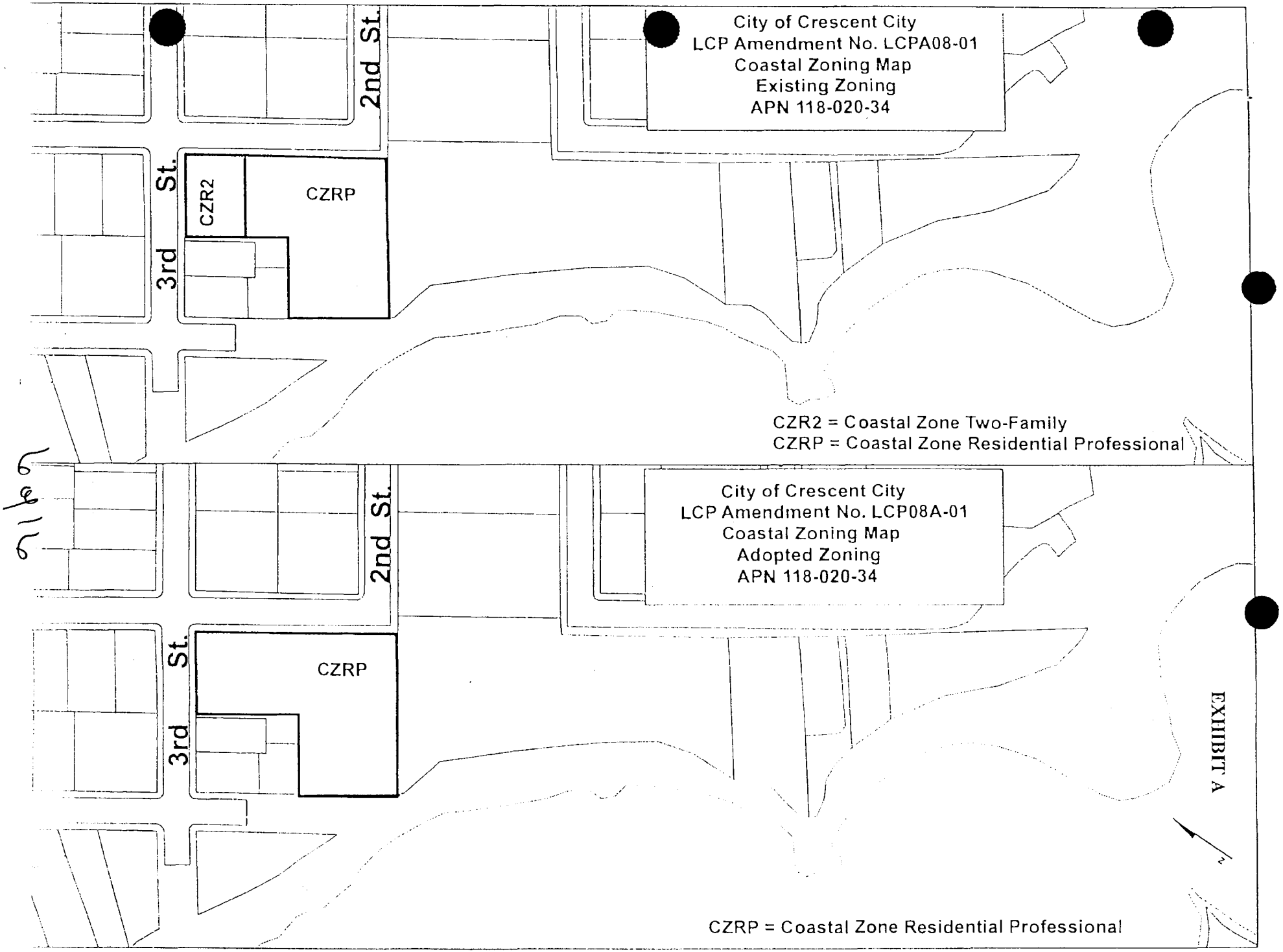
Kelly Schellong, Mayor

ATTEST:

L. Dianne Nickerson, City Clerk

APPROVED AS TO FORM:

Robert Black, City Attorney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Coastal Zoning Map
Adopted Zoning
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2nd St.
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CZRP
CZRP = Coastal Zone Residential Professional
EXHIBIT A

ATTACHMENT A

APPLICATION FOR LOCAL COASTAL PROGRAM AMENDMENT

LCPA08-01 Submittal
Section IV.
Attachment A

The following discussions and attached documents fulfill the submittal requirements contained in Coastal Commission Administrative Regulations (14 Cal. Calif. Code Reg. Sec. 13551 & 13552):

(1) A resolution adopted and dated by the Board of Supervisors or City Council after a public hearing (PRC Section 30510(a)):

- *Indicating that the local government intends to carry out the LCP in a manner fully consistent with the California Coastal Act.*

- *Indicating when it will take effect (automatically upon Commission approval or requiring formal local action after Commission approval).*

The City Council adopted Resolution 2009-12 on March 16, 2009, which indicates that the City intends to carry out the LCP in a manner fully consistent with the California Coastal Act and that the amendment will take effect automatically upon Coastal Commission approval. Resolution 2009-12 is attached as Exhibit 1.

(2) A clear, reproducible copy of the adopted amendment(s).

- *If revision to certify text, submit either with strikeouts and underlines or with indication of what policies, paragraph(s) or page(s) it replaces.*

- *If map change, submit a new (replacement) map or submit a supplemental map with indication that previously adopted map is to be superseded by the supplement for the specific geographic area indicated (CCR §§13552(b), (c)).*

The adopted amendment consists of two parts, a text revision and a map change. Resolution 2009-12 states that the respective components of the amendment are "...identified in Exhibit 'A' and 'B' attached hereto and by reference made a part

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hereof." The amendment components therefore follow the attached Resolution 2009-12 and are labeled Exhibit A and Exhibit B.

(3) Discussion of the amendment's relationship to and effect on other sections of the previously certified LCP, including the access component. If the amendment to the certified LCP involves a land use plan (LUP) change only, an indication of which certified zoning provision(s) carries it out. If the amendment involves a zoning change only, an indication of which certified land use plan provision(s) it carries out (CCR §§ 13552 (c) and (f)).

The discussion below follows the order in which the respective sections appear in the LCP. The discussion below focuses on the applicable policies of the LCP, primarily to illustrate that the proposed amendment is consistent with the intent and letter of the policies and does not conflict with their implementation.

PUBLIC ACCESS

Public Access Policy No. 1 states that, "The City recognizes the importance of access to and along [the] shoreline. Therefore, all City owned beachfront property, including its dry sand beaches, shall be maintained in a manner to protect all existing accessways. If, in the future, the City finds that existing public accessways are inadequate to meet recreational needs, it shall encourage the development of additional accessways consistent with the City's ability to pay maintenance costs and obtain adequate funding to develop said areas."

There are two coastal access easements already in place by way of deed restrictions that were conditioned by the Coastal Commission's approval of the redevelopment of the Seaside Hospital property:

1) a five-foot-wide "trail" inside of a six-foot-wide easement that encompasses the existing sidewalk on the north side of the Hampton Inn, and
2) a twenty-foot wide easement connecting the westerly end of the five-foot-wide "trail" to the beach. The twenty-foot easement presently contains a meandering footpath to the beach.

The city certifies that it will require any subsequent development on this site to maintain the access easements and footpath, and may further condition such projects to enhance public access as necessary and appropriate.

RECREATION AND VISITOR SERVING FACILITIES

Recreation and Visitor Serving Facilities Policy No. 1 states that, "The City of Crescent City shall assure the preservation of areas which are zoned Open Space in a manner consistent with the uses allowed in Open Space areas."

The subject parcels are not zoned Open Space. The adjacent beach area is zoned Open Space, but the proposed amendment does not have the potential to affect the Open Space

area and does not involve or propose any uses within or modifications to the Open Space area.

Recreation and Visitor Serving Facilities Policy No. 2 states that, "The City of Crescent City shall continue its policy of designating land uses for recreational and visitor serving facilities, provided that the fiscal integrity of the City is retained and such services shall be located within those areas zoned as highway services. In such highway service areas, recreational uses shall be a priority use."

The subject parcels are not zoned as highway services and are therefore not subject to or conflict with this policy in any way.

Moreover, the city includes a significant number of visitor-serving facilities, particularly motels and other transient-occupancy facilities in or near the Coastal Zone, as well as in or near the Coastal Zone-Highway Service District. Within the Coastal Zone inside city limits, there are four motels with a total of 190 rooms, and a city-owned RV park and campground that has 192 RV sites and 10-20 campsites (the camping area is being reconfigured). The average rates of the coastal zone motels are $116/winter and $147/summer. The RV park summer rates range from $17 for campsites to $28 for beachfront RV sites.

Bear in mind that the range of motel rates includes outliers: a low rate of $40 summer/$55 winter and a high rate of $279 winter/$329 summer. Within city limits, both within and outside of the Coastal Zone, there are 666 motel rooms with an average best-room rate of $80 winter and $96 summer

<u>COASTAL RESOURCES AND SPECIAL COMMUNITIES</u>

Coastal Resources and Special Communities Policy No.1 states that, "The City shall encourage the maintenance of the visual and scenic beauty of Crescent City. No signs advertising commercial or privately owned businesses shall be erected in these areas zoned open space."

The proposed amendment does not have the potential to directly affect any visual or scenic aspect of the city, in that the amendment does not propose any changes to uses or standards that affect or concern structural height, building setbacks, lot coverage, or viewshed preservation. Any subsequent development projects will conform to this policy by way of the architectural review process and required compliance with Coastal Resources and Special Communities Policy No. 4 below.

Coastal Resources and Special Communities Policy No. 4 states that, "The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in

designated highly scenic areas shall be subordinate to the character of its setting. Any future development at the former Seaside Hospital site (APN 118-020-28), including any recreational or visitor-serving commercial development, shall provide for a substantial view corridor oriented from the vantage point of the vicinity of the intersection of Front and A Streets and directed toward the offshore rocky areas northwest of the site."

The proposed amendment does not have the potential to directly affect the visual or scenic quality of the area. Any subsequent development projects will conform to this policy by way of the architectural review process and by required compliance with California Coastal Act section 30251 as discussed under the California Coastal Act Consistency section below.

The development of the former Seaside Hospital site (into the Hampton Inn) was conditioned to establish and maintain a 40-foot-wide view corridor westward from the intersection of Front and A Streets. The proposed amendment does not involve or have the potential to affect the former Seaside Hospital site or the established view corridor.

ENVIRONMENTALLY SENSITIVE HABITAT AREAS/WATER AND MARINE RESOURCES

Environmentally Sensitive Habitat Areas/Water and Marine Resources Policy No. 2 states that, "The City shall protect those areas that are designated as environmentally sensitive so that these habitats and their resources are maintained and any development shall be consistent with adjacent areas and with Section 30240 et seq. of the California Coastal Act as described herein on Page 24."

The LCP defines "Environmentally sensitive areas" as "any area in which plants or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments (Coastal Act Section 30107.5), including: areas of special biological significance as identified by the State Water Resources Control Board; rare and endangered species habitat identified by the State Department of Fish and Game; all coastal wetlands and lagoons; all marine wildlife; and education and research reserves; nearshore reefs; tidepools; sea caves; islets and offshore rocks; kelp beds; indigenous dune plant habitats; and wilderness and primitive areas."

None of the properties affected by the proposed amendment are within or contain any part of an Environmentally Sensitive Habitat Area. The proposed amendment does not have the potential to directly affect adjacent Environmentally Sensitive Habitat Areas. All of the subject properties were either developed and vacated in the past or presently contain development, including parking lots, storage buildings, residences and transient occupancy uses. Any subsequent development projects will conform to this policy by way of the architectural review process and by required compliance with California Coastal Act section 30240 as discussed under the California Coastal Act Consistency section below.

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Environmentally Sensitive Habitat Areas/Water and Marine Resources Policy No. 4 states that, "The City shall maintain a buffer zone of 50 feet around all identified wetlands. The only allowable uses within this buffer zone shall be those uses as provided for in Section 30240 et seq. of the California Coastal Act of 1976 as described on page 24. Criteria for the establishment of the buffer zones for wetlands should be measured land-ward from the edge of the wetlands."

The LCP utilizes the definition of "wetland" contained in Coastal Act §30121: "'Wetland' means lands within the coastal zone which may be covered periodically or permanently with shallow water marshes, open or closed brackish water marshes, swamps, mudflats, and fens."

None of the subject parcels contain or are within 50 feet of identified or designated wetlands.

DIKING, DREDGING, FILLING, AND SHORELINE STRUCTURES

Diking, Dredging, Filling, and Shoreline Structures Policy No 3 states that, "The City shall require that new development minimize risks to life and property in areas of high geologic hazard, assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs."

The proposed amendment is not "development" per se. Any subsequent development projects will conform to this policy by way of the architectural review process and by required compliance with California Coastal Act sections 30231-30233 as discussed under the California Coastal Act Consistency section below.

Diking, Dredging, Filling, and Shoreline Structures Policy No. 4 states that, "The City shall approve revetments, breakwaters, groins, harbor channels, seawall, cliff retaining wall, and other such construction that alters natural shoreline processes when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. "Existing structure" means a structure in existence on March 14, 2001."

The proposed amendment does not involve any coastal-dependent uses and does not intend or ensure the protection of any existing structures in any way.

Diking, Dredging, Filling, and Shoreline Structures Policy No. 7 states that, "The City shall include a condition in the approval of all new development on ocean fronting parcels that no shoreline protective structure shall be allowed in the future to protect the development from bluff erosion. Prior to the issuance of a coastal development permit for the development, a deed restriction acceptable to the Planning Director shall be recorded memorializing the prohibition on future shoreline protective structures."

11 9 16

The city shall condition any subsequent development project on the affected properties to comply with this policy.

INDUSTRIAL DEVELOPMENT AND ENERGY FACILITIES

Industrial Development and Energy Facilities Policy No. 3 states that, "The City shall zone areas adjacent to the harbor as Harbor/Coastal Related. Harbor/Coastal Related uses include those activities that are dependent upon functions or activities of the harbor/coast, as well as those which do not have to depend upon the harbor to function effectively. Industrial development in this area shall, therefore, be an allowable use. This zoning will, therefore, encourage the development of the harbor and ensure that the area is available for coastal related industrial development."

The certified LCP designates the subject properties Medical Related and Residential, with respective certified implementing zoning designations of Coastal Zone-Residential Professional and Coastal Zone Two Family Residential. The subject parcels are not "adjacent" to the harbor are therefore not suitable for coastal industrial development or aquaculture. Moreover, the subject properties are either occupied by or are adjacent to residential, transient-occupancy, or light commercial uses. Incidentally, the proposed land use designation pending certification by the state is Visitor & Local Commercial, which does not envision industrial uses on or adjacent to the properties affected by the amendment.

PUBLIC WORKS

Public Works Policy No. 2 states that, "The City shall require that best management practices (BMPs) for controlling stormwater runoff and maintaining water quality be incorporated into development design and operation. All post-construction structural BMPs (or suites of BMPs) for new development, including but not limited to, recreational or visitor-serving commercial development within Coastal Zone-Commercial Waterfront zoning districts, shall be designed to treat, infiltrate or filter stormwater runoff from each storm event, up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor, for flow-based BMPs."

The proposed amendment does not involve the design, development or operation of any structure or facility. The city shall require any subsequent development project to comply with this policy.

Public Works Public Works Policy No. 3 states that, "The City shall reserve the specific area of "B" to "C" Street from Front Street to the Pacific Ocean for future expansion of the Wastewater Treatment Plant."

The affected parcels are not within the area described above, and are therefore not subject to or conflict with this policy.

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COASTAL LAND USE PLAN MAP DESIGNATIONS

The proposed amendment would apply the Multiple Family (MF) land use designation over all of the subject parcels. Since the certified MF designation is currently not applied to any land in the Coastal Zone, the amendment would substantially implement the intent of this designation, which would allow residential development of "Over six units per acre, [and] would allow R-2 zoning as a transition to residential areas." The word "substantially" is used because the proposed map amendment would rezone the only current R-2 zoning (the northernmost 7,200 square feet of APN 118-020-34) to Coastal Zone-Residential Professional (CZ-RP); although R-2 zoning could still conceivably be applied within the MF designation in a future rezoning; i.e. the potential for R-2 zoning would not be eliminated from LCP Part II, Implementation Zoning.

(4) If the amendment is to the land use plan only (there is no certified Implementation Plan), an indication of the zoning measures that will be submitted to carry out the amendment.

The amendment proposes both changes to the Land Use Plan and the Implementation Zoning, and is therefore not subject to this requirement.

(5) If the amendment affects an area between the sea and the first public road paralleling the sea, an analysis must be made on the effect of that amendment on the certified public access component.

The amendment affects only one parcel between the sea and the first public road. The effect of the amendment is discussed under Requirement 3/Public Access/Public Access Policy No. 1 above.

(6) If the amendment involves a change in density or public service provision, an analysis of potentially significant adverse cumulative impacts on coastal resources and access, due to the change, and how the change can be found consistent with the policies of Chapter 3 and 6 of the California Coastal Act.

The text amendment proposes an increase in density; but any analysis of the effects of the increase must be conducted in the light of the land-use designation and zoning standards as previously adopted by the City Council and certified by the Coastal Commission. The total land area affected by the amendment is approximately 1.74 acres. All but 7,200 square feet (<0.17 acre, or <10%) of the affected land area is designated Medical Related (MR), the entire purpose and description of which states that the MR designation "Encourages the development of [a] concentration of medically related services adjacent to the hospital."

The City's legitimate and enduring contention is that the description does not in any way contain mandatory language. The description is clearly advisory. The designation only encourages a medically-related use, and in no way requires it. This contention is borne out by the adopted and Coastal Commission-certified implementing zoning of Coastal Zone-Residential Professional (CZ-RP). The principally-permitted uses adopted by the City Council, certified by the Coastal Commission and listed in Section 17.67.020 of the Coastal Zone Zoning Regulations include, but are not limited to:

A. Business and professional offices such as doctors, dentists, lawyers, accountants and other professional offices;
B. One-family dwellings, occupied by not more than one family and not more than two boarders or roomers;
C. Two-family dwellings;
D. Multiple family dwellings; [emphasis added]
E. Accessory buildings;
F. Day nurseries accommodating not more than five children in number;
G. Foster homes limited to those licensed by the state or county, and accommodating not more than six guests;
H. Motels and hotels, except for associated sales of food or drink;
I. Private clubs;
J. Roominghouses;
K. Townhouses (row houses);

Moreover, in 2004, consistent with the California Coastal Act, the certified LCP and MR-implementing zoning of CZ-RP, the city permitted residential development on two parcels contained in the block designated MR, bounded by Front, A, Battery and B Streets. Development of the two single-family residences there was done via the coastal development permit process, with duly noticed public hearings and notification to the Coastal Commission. If Coastal Commission staff and the opponents of the proposed amendment assert that residential uses are not consistent with the current MR designation, the City's obvious question is why did Coastal Commission staff and neighborhood residents not raise the issue of consistency at that time?

Most importantly, since the hospital no longer exists and has been replaced by the Hampton Inn, the MR designation is obsolete and creates a situation of inconsistency with the implementing CZ-RP zoning. The City intends to preserve the CZ-RP zoning to effectively implement the more rational and realistic proposed MF land-use designation.

Although the current description of the MF designation does not contain a density standard, the implementing certified zoning applied to most of the affected properties, CZ-RP, sets a lot-area-per-dwelling-unit standard of 1,500 sq. ft. The potential density allowed under current zoning would therefore be 29 units per acre (43,560/1,500 = 29.04). The total area involved in the amendment and currently under CZ-RP zoning is approximately 1.74 acres, or 75,784 square feet. At 29 units per acre (1,500 sq. ft. per dwelling unit) the potential number of dwelling units in the CZ-RP is 50.

14 of 16

The zoning amendment proposes a decrease of the lot-area-per-dwelling-unit standard in the CZ-RP to 1,250 square feet. The 75,784 square feet currently under CZ-RP zoning would then have a potential density of 34 units per acre. The potential number of dwelling units in the current CZ-RP zone would therefore be 59 units.

(7) The Secretary of Resources has determined that LCP amendments fall within the statutory exemption of LCPs from EIR preparation. However, the Commission's review of LCP amendments must comply with the standards of CEQA. Therefore, an amendment request must be accompanied by sufficient information to enable the Commission to prepare an environmental analysis which satisfies the requirements of CEQA.

The City has provided sufficient information to demonstrate that the potential for adverse environmental impacts posed by the amendment is not significantly greater than the impact potential of currently allowed uses and densities.

(8) A summary of the measures taken to ensure public and agency participation.

- *Include list of hearing dates, sample notice, mailing list.*
- *Comments received from hearing participants (written and verbal) and names and addresses.*
- *Any response to comments by the local government.*

Attached Exhibit C includes a list of hearing dates, copies of the public notices, and copies of the mailing lists. Attached Exhibit D consists of comments received from hearing participants. Attached Exhibit E consists of the City's responses to comments.

(9) All staff reports and other information addressing the LUP amendment request's consistency with the Coastal Act, and/or the adequacy of the implementation program, as amended, to conform with and carry out the certified LUP. (PRC §§30512 and 30513)

Attached Exhibit F consists of the Planning Commission and City Council staff reports, which respectively contain information addressing the consistency of the amendment with the California Coastal Act.

(10) Where required pursuant to Section 30241.5 of the Coastal Act, a determination of the viability of existing agricultural uses, including the economic feasibility of the conversion of the agricultural land to other uses.

There are no existing agricultural uses or aquacultural uses, or the potential for such uses, within the City Limits or within at least one mile of the subject properties. This requirement does not apply.

16 of 16

STOVER ENGINEERING

Civil Engineers and Consultants

PO Box 783 - 711 H Street
Crescent City CA 95531
Tel: 707.465.6742
Fax: 707.465.5922
info@stovereng.com

MEMORANDUM Reference: 4030

To: Randy Baugh

From: Ryan C. Young, PE

Date: 11 March 2009

Subject: Preliminary Water Quality Calculations

Included with this memo is our preliminary storm water quality analysis for the subject property on A Street. The analysis is based on the 85th Percentile Runoff procedure for flow through oil water separation. It is assumed that the site will be constructed to drain to the existing inlet on A Street at the southeast corner of the property. This analysis provides the required size of future treatment facilities. The specific device will need to be illustrated on the final construction plans.

I trust this provides the information you require. Please feel free to contact me with any questions.

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

JOB 4030
SHEET NO. 1 OF 2
CALCULATED BY R. YOUNG DATE 3/10/09
CHECKED BY DATE
SCALE

PROFESSIONAL ENGINEER
RYAN YOUNG
C 67604
EXP. 6/30/09
CIVIL
STATE OF CALIFORNIA

REDWOOD OCEAN FRONT RESORT

STORMWATER QUALITY TREATMENT DESIGN

85TH PERCENTILE NUMERIC SIZING CRITERIA 3/16/09

THE STORMWATER QUALITY DESIGN IS BASED ON THE ATTACHED MEMO FROM THE CALIFORNIA COASTAL COMMISSION.

SIZE TREATMENT FACILITIES FOR OIL/WATER SEPERATION PER THE FOLLOWING FORMULA:

$$Q = (i)(A_i)(C_i)$$

WHERE: Q = STORMWATER RUNOFF GENERATED FROM THE 85TH PERCENTILE 1-HOUR STORM EVENT. (FLOW BASED BMPS)

i = PRECIPITATION FROM 85TH PERCENTILE 1-HR EVENT

A_i = TOTAL IMPERVIOUS AREA, POST-DEVELOPMENT

C_i = IMPERVIOUS AREA RUNOFF COEFFICIENT

DETERMINE i, PRECIPITATION

i = .09 IN/HR (85TH PERCENTILE HOURLY RAINFALL FROM NEAREST RAIN GAUGE STATION)

2 of 9

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

JOB 4030
SHEET NO. 2 OF 2
CALCULATED BY E. YOUNG DATE 3/10/09
CHECKED BY _____ DATE _____
SCALE _____

DETERMINE AREA

TOTAL IMPERVIOUS AREA = 32,853 SF

DETERMINE RUNOFF COEFFICIENT, C

IMPERVIOUS AREA IS COMPOSED OF ROOFTOP AND ASPHALT
C = .95

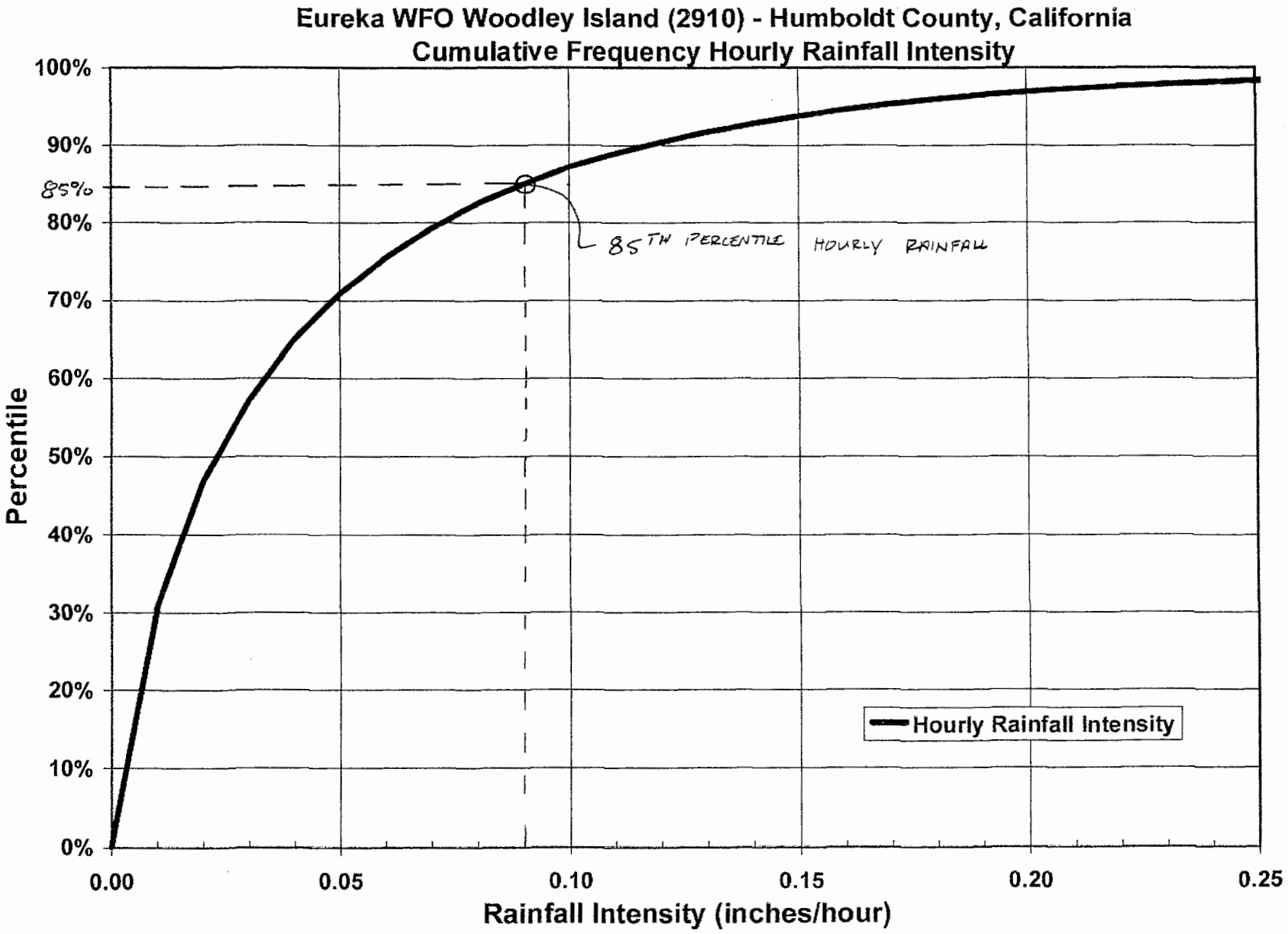
FOR FLOW BASED BMP

$Q = (0.09\ IN/HR)(1\ FT/12\ IN)(32,853\ SF)(0.95) = 234.1\ CF/HR$

FOR FLOW BASED BMP USE 2.0 SAFETY FACTOR

$2 \times 234.1\ CF/HR = 468.2\ CF/HR$

$(468.2\ CF/HR)(1\ HR/3600s) = 0.13\ cfs\ MIN.$


Eureka WFO Woodley Island (2910) - Humboldt County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
85%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
85TH PERCENTILE HOURLY RAINFALL
Hourly Rainfall Intensity
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)

b&f

Water Quality Lesson o' the Month

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

Deciphering 85th Percentile Numeric Design Criteria

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

Brought to you by the Water Quality Unit

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

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

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

Applying the 85th Percentile Numeric Sizing Criteria

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

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

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

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

Inside This Issue

1	What, where, when, why, how of the design goal. Definitions of "percentile" storms and where to find 85th percentile storm data.
2	The formula! (And what it means.)

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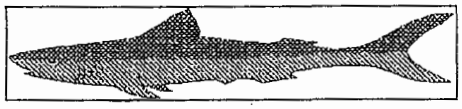
Defining the 85th Percentile Storm in Your Region

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

What is the 85th percentile storm event?

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

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



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

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

Where to find 85th percentile data

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

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

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

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

The formula!

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

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

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

Q: Stormwater runoff generated from the 85th percentile, 24-hr (or 1-hr) storm event. *This is the runoff volume that the BMPs (suites of BMPs) are expected to handle.* [**ft^3/24hours** or **ft^3/hour**]

i: Precipitation from the 85th percentile, 24-hr (or 1-hr) storm event [**inches/24-hrs** or **inches/hour**]

A_I: Total impervious area after development [ft^2]

C_I: Impervious area runoff coefficient (~ 0.9) [2]

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

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

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

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

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

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

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

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

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

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

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

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

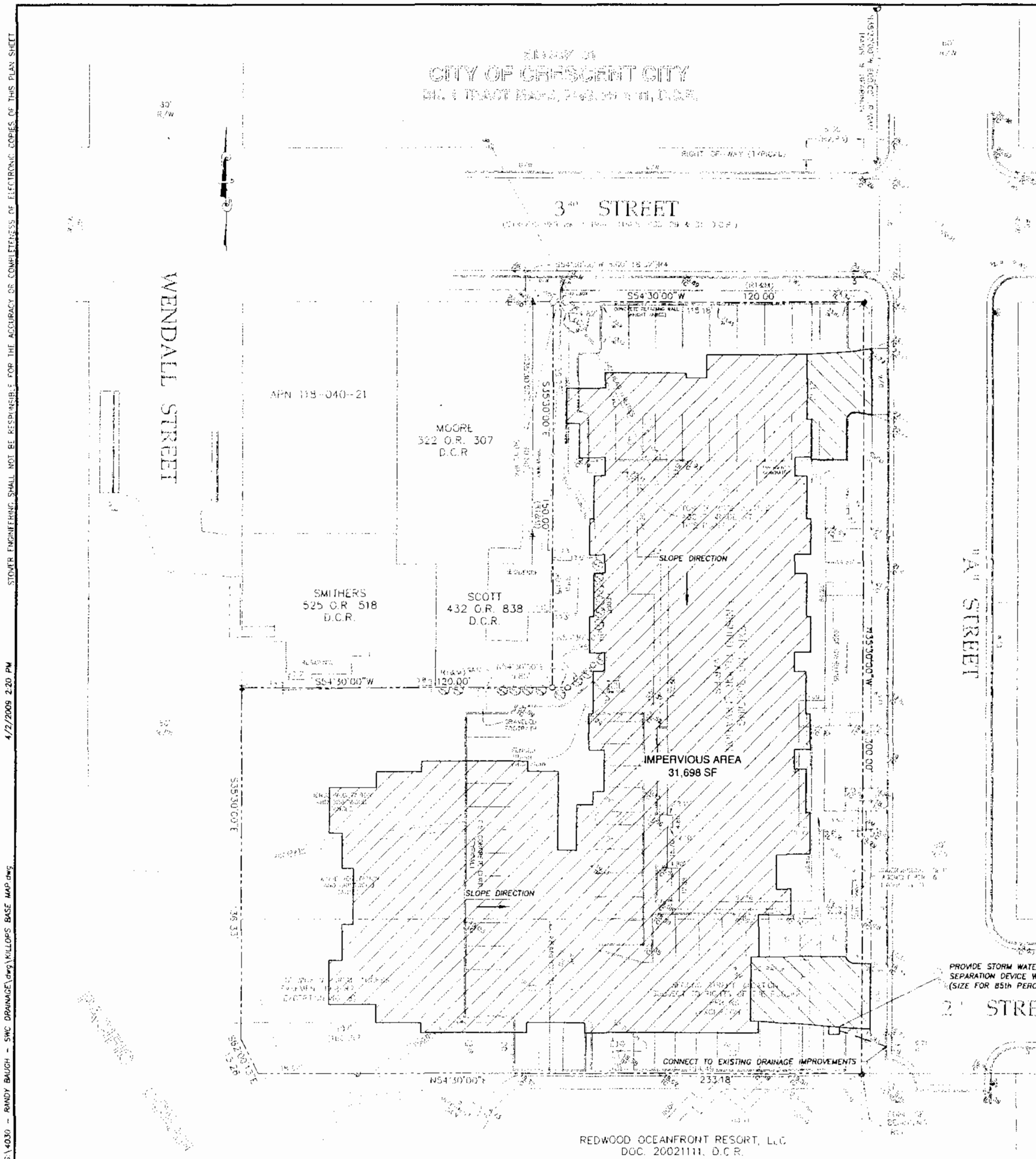
This table presents some of the commonly used runoff coefficients. Keep in mind that the coefficient for a specific development type needs to be applied to the entire development area, including both pervious and impervious areas. The reason is that the number has already considered the average proportions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

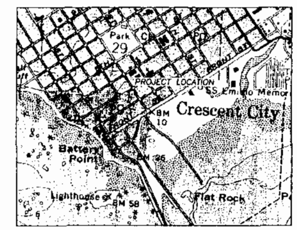
Type of Area or Development	"C"
TYPE OF DEVELOPMENT	
Urban business	0.70—0.95
Commercial office	0.50—0.70
Residential development	
Single-family homes	0.30—0.50
Condominiums	0.40—0.60
Apartments	0.60—0.80
Suburban residential	0.25—0.40
Industrial development	
Light industry	0.50—0.80
Heavy industry	0.60—0.90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

85th Percentile Condition Compliance

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

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





VICINITY MAP
NTS

GENERAL NOTES

1. EXISTING TOPOGRAPHIC INFORMATION IS PROVIDED BY KILLOPS LAND SURVEYING (PROJECT NO. 07-102) DATED FEBRUARY 2007.
2. PROPOSED BUILDING FOOTPRINT IS BASED ON PROPOSED GARAGE FLOOR PLAN BY IAN BIRCHALL + ASSOCIATES DATED 11/11/08. BUILDING IS APPROXIMATE BASED ON DIMENSIONS GIVEN AND SCALING FROM PDF.

85th PERCENTILE NUMERIC DESIGN INFORMATION

$Q = (i)(A_I)(C_I)(F.S.)$
Q = STORM WATER RUNOFF GENERATED FROM 85th PERCENTILE 1-HOUR STORM EVENT (FLOW BASED BMP)
i = PRECIPITATION FROM 85th PERCENTILE 1-HOUR EVENT
A_I = TOTAL IMPERVIOUS AREA AFTER DEVELOPMENT
C_I = IMPERVIOUS AREA RUNOFF COEFFICIENT
F.S. = FACTOR OF SAFETY
$Q = (0.09\ IN/HR)(31{,}698\ SF)(0.95)(1FT/12IN)(2.0) = 468.2\ FT^3/HR$

WATER QUALITY NOTES

1. THIS PRELIMINARY STORM WATER QUALITY PLAN IS FOR THE PURPOSE OF DETERMINING THE 85th PERCENTILE VOLUMETRIC WATER QUALITY FLOW RATE ONLY. FINAL CONSTRUCTION PLANS SHALL INCORPORATE STORM WATER POLLUTION PREVENTION BEST MANAGEMENT PRACTICES.
2. PERMANENT OIL WATER SEPARATION OR INTERCEPTOR SHALL BE SIZED TO ACCOMMODATE 468.2 FT³/HR. THE OIL WATER SEPARATION DEVICE SHALL INTERCEPT RUNOFF FROM ROOF TOPS AND PARKING AREAS.
3. FINAL LOCATION OF STORM WATER TREATMENT FACILITIES SHALL BE INCORPORATED IN THE FINAL CONSTRUCTION PLANS.
4. ADDITIONAL WATER TREATMENT MEASURES SUCH AS BIO-FILTRATION SWALES, PERMEABLE SURFACES, AND DRIP EDGES MAY BE INCORPORATED AS NECESSARY ONCE DETAILED GRADING PLANS ARE COMPLETED.

No.	Date	Revision	Aprvd

DRAWING INFO: DESIGNED BY: SME DRAWN BY: GLH CHECKED BY: WLS
BAR IS EQUAL TO ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES IF DISTANCE VARIES ACCORDINGLY.

PRELIMINARY

STOVER ENGINEERING
Civil Engineers and Consultants
PO BOX 783 - 711 H STREET
CRESCENT CITY, CA 95531 - 707-465-6742

COASTA NORTE
CRESCENT CITY, CA
PRELIM. WATER POLLUTION CONTROL PLAN

JOB NO. 4030
SCALE: 1"=20'
DATE: 04/02/09
SHEET 1 OF 1

9 of 9

MARINE RESOURCES ADJACENT TO THE PROPOSED REDWOOD OCEANFRONT RESORT HOTEL CONSTRUCTION SITE, CRESCENT CITY, DEL NORTE COUNTY, CALIFORNIA

A MARINE WILDLIFE IMPACT EVALUATION

14 December 1999

by
Crescent Coastal Research
Compiled by Craig Strong
112 W. Exchange, Astoria, OR 97103

Introduction

The Redwood Oceanfront Resort proposed hotel site (on a portion of APN 118-02-28) is immediately adjacent to a rocky intertidal habitat with nearshore islets, and a relatively pristine coastal environment. Concern for negative impacts to marine species by hotel construction and use activities prompted this report.

Site Description

From the construction site at approximately 5 m above Mean Sea Level, there is a 2 m soil dropoff protected from erosion by grasses and large driftwood and storm wrack. A steep slope, coarse sand and cobble beach extends about 20 m seaward from the supralittoral, dropping about 3 m (1:7 slope) to the rocky interdidal. Slope is more gradual and variable in the intertidal, extending up to 60 m out from the beach to the 0.0 tide level. It is composed mostly of bedrock, with small boulders, cobble, and coarse sand in low spots. At high tide only one islet is free from wave wash and spray, about 250 m offshore. The Crescent City wastewater effluent pipe runs under the beach in the middle of the area and extends out 200 m, where secondary treatment sewage is deposited offshore.

Marine Life

Only the upper and mid- intertidal regions were surveyed during our field visits on 9-10 December. Diversity of intertidal organisms is very low for an intertidal habitat. Brown algae (*Fucus distichu,* and encrusting brown algae) dominate the surface area, with very few grazers, predators, or filter feeding organisms. There are small disperse colonies of young encrusting barnacles (*Balanus* and *Chthalamus sp*), and a few small (<20 cm diameter) patches of gooseneck barnacles (*Pollicipes*), and a few clusters of limpets (*Acmea sp.*). None of the usual mid and upper intertidal fauna; Turban snails (*Tegula funebralis*) *Littorina* snails, Isopods (*Ligia sp*), sea stars (*Pisaster*), or anemonaes (*Xanthopleura*) were seen, though some may be present at low numbers. No mussels *mytilus californianus*) occur in the entire area, and this is true of the entire Crescent City shoreline south of Point St. George. Sculpin, eel, hermit crabs, and other predator/scavengers are at low abundance, corresponding with the other animals. The cobble and sand element combined with heavy surf exposure in this area may make this habitat too unstable and physically harsh for many of the usual intertidal organisms. The effect of the sewage outfall here is unknown, but it may also have some impact.

The offshore islet has supported one pair of nesting Black Oystercatchers, and provides roost habitat for cormorants and gulls. No other nesting seabirds occur nearby or onshore (Carter et al. 1992, pers. obs.). At low tide, harbor seals haul out on an isolated reef near the north end of the site, and they some may pup there from March to May.

Potential Impacts and Recommendations

While there may be no direct access provided from the proposed resort to the beach and intertidal areas, it is expected that customers will use existing access points and that visitor use on the shoreline will increase by some amount. Degradation of intertidal habitat from foot traffic and 'exploring tidepools' is a well documented phenomenon all along the west coast. At this site, however, diversity is low and there are essentially no species present which would be subject to crushing. The algae covered rocks are slippery and make the area somewhat hazardous for walking. While there is no basis to keep visitors from the rocky intertidal (at >80 m from Harbor Seals, see below), it is advisable that some information on wave, tidal flooding, and walking hazards be given to customers.

The offshore islet used by Black Oystercatchers and roosting seabirds has an adequate water buffer and is not subject to disturbance. There is a small tidal channel water buffer between shore and the main Harbor Seal houl-out site, but these seals are sensitive to human presence and would likely be displaced by approaching people. It is against federal law to disturb marine mammals (Marine Mammal Protection Act, 1972). At the same time, the seals can be easily viewed from a distance, and are an asset to the wildlife experience of potential resort customers and locals alike. We recommend that information on the seals be provided to customers and that an advisory sign be posted to keep people away from the animals, particularly from April to June (contact the NorthCoast Marine Mammal Center or Crescent Coastal Research for information on the seals and options for signage).

References

Carter, H.R., G.J. McChesney, D.L. Jaques, C.S. Strong, M.W. Parker, J.E. Takekawa, D.L. Jory, and D.L. Whitworth. 1992. Breeding populations of seabirds in California, 1989-1991. Unpubl. draft final report, U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, Dixon, CA (USGS, BRD). 818PP.

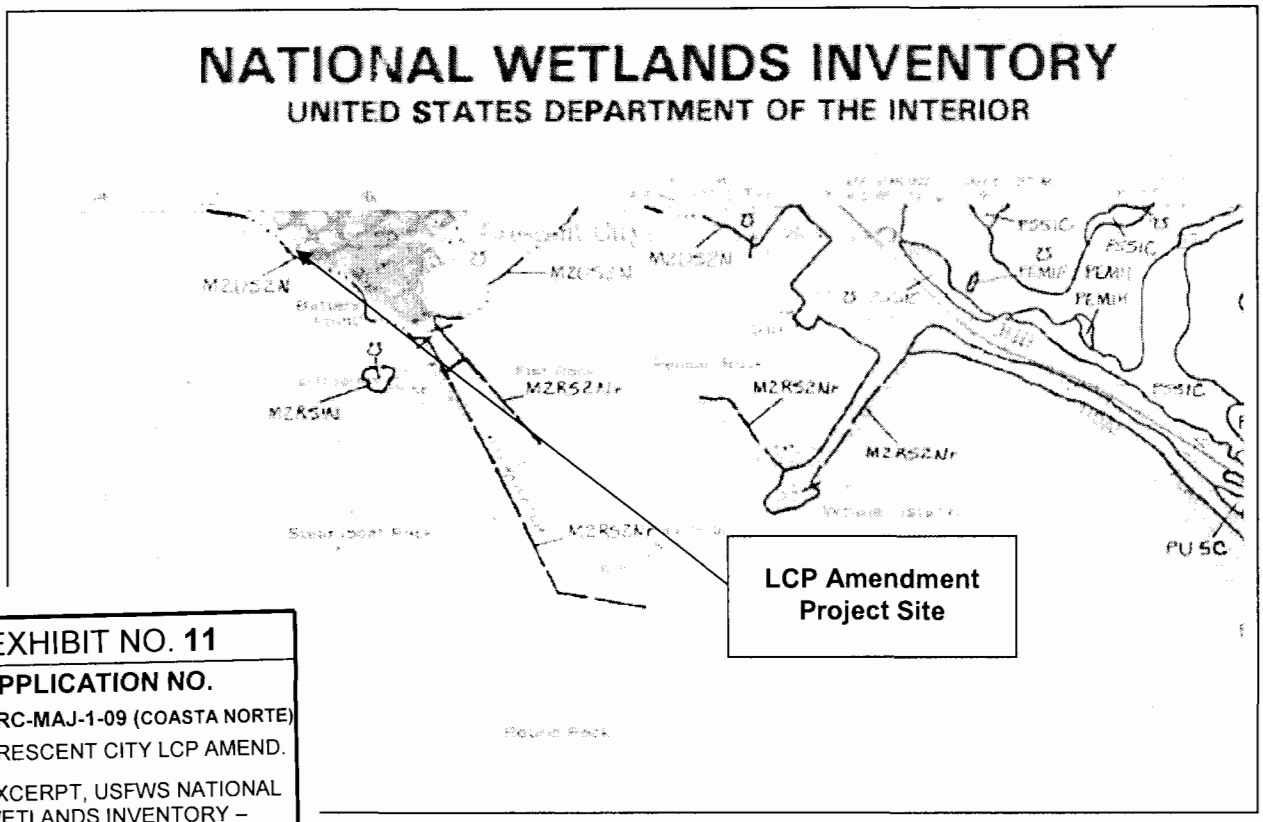


EXHIBIT NO. **11**

APPLICATION NO.

CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

EXCERPT, USFWS NATIONAL WETLANDS INVENTORY – *SISTER ROCKS* QUADRANGLE

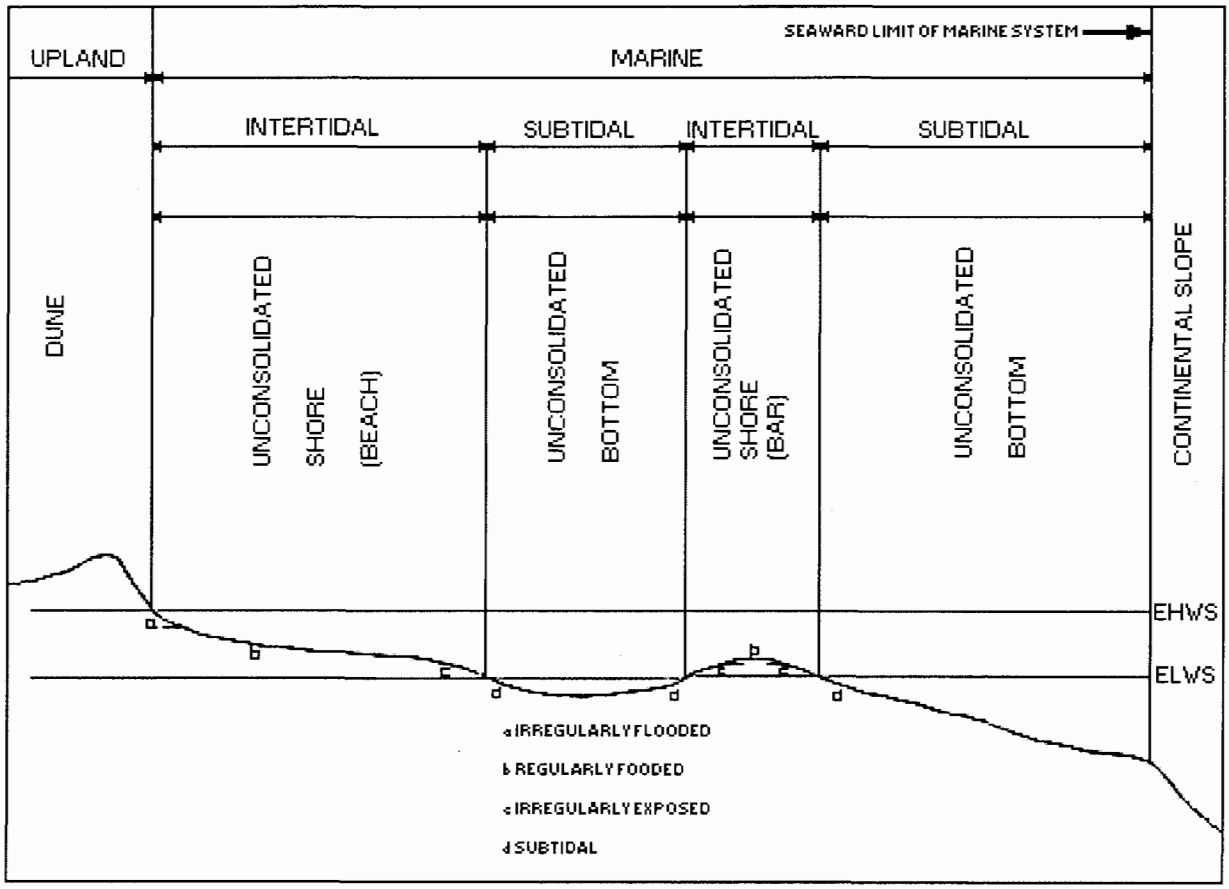


Fig. 2. Distinguishing features and examples of habitats in the Marine System. EHWS = extreme high water of spring tides; ELWS = extreme low water of spring tides.

Source: U.S. Fish and Wildlife Service – National Wetlands Inventory *Sister Rocks* Quadrangle
Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al, 1979

NRM
NATURAL RESOURCES MANAGEMENT
CORPORATION

1434 Third Street • Eureka, CA • 95501-0682
707 442-1735 • fax: 707 442-8823
Email: nrm@nrmcorp.com
Web: www.nrmcorp.com

Biological Report: State & Federal Listed Species Survey of 200 "A" Street, Crescent City, California

Prepared by: Birgit Semsrott, Staff Botanist & David Loya, Plant Ecologist
Natural Resources Management Corporation
1434 Third Street, Eureka CA 95501

Prepared for: Development Consultants, Inc.
Randy Baugh
3941 Park Drive, Ste. 20338
El Dorado Hills, CA 95762

Submitted on: August 13, 2007

1.0 Introduction

This report documents findings regarding the presence of rare, threatened, or endangered plant and animal species and sensitive habitats on the subject parcel. At the request of the project proponent, this report is a only a documentation of findings. As such, this targeted biological report does not provide recommendations and is not a biological assessment. The report findings are based on a survey of the vegetated portion of 200 "A" Street in Crescent City, California.

2.0 Project Location and Environmental Setting

The subject parcel is located in Del Norte County at 200 "A" Street, Crescent City, California (Figure 1). The property is on section 29 of Township 16 North, Range 1 West on the Sister Rocks U.S.G.S. 7.5 minute quadrangle. The parcel is approximately 1.25 acres, and an area of approximately 0.25 acres (136 x 85 ft) on the western 1/3 or the property is vegetated. This vegetated portion is referred to herein as the "project area."

The project area is bordered by development on three sides and abuts the strand of Pebble Beach on its southwestern boarder. The upper beach consists of rocks, and large woody debris. The soils are sand, and the project area is more or less flat, with gentle slopes (less than 5%).

Land use on the site includes a building, an asphalt parking lot, and remnant stabilized strand vegetation (Figure 2). The developed footprint is roughly 1.00 acre. The stabilized strand vegetation is composed of an open grass-predominated vegetation type (0.15 acres), a Hooker's willow scrub (0.05 acres), a patch of Himalayan blackberry (*Rubus discolor*; 0.05 acres), and a roughly 0.01 acre patch of a cultivated hedge. The Hooker's willow is contiguous with a remnant patch of coastal scrub in the Hooker willow series (Sawyer and Keeler-Wolf 1995), consisting of a dense stand of Hooker's willow (*Salix hookerina*). The vegetation types are depicted in Figures 3-5.

3.0 Survey Methods

3.1 Botanical Survey Methods

Prior to field work, we consulted the current inventories of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California* (CNPS 2007) and the DFG California Natural Diversity Database (CNDDB 2007) to determine which rare plant species are reported to occur within the project area. I used this information to compile a target species list (Table 1). We queried the Sister Rocks USGS 7.5' quadrangle and all contiguous quadrangles to develop the target species list. Species for which habitat does not exist in the project area (e.g., coniferous forest) were not included to the target species list. Furthermore, since the database queries only result in those species that have been recorded in the specified quadrangle, we added any species lacking such records but may occur in the area. We also checked the *Inventory of Rare and Endangered Plants of California* (CNPS 2007) for uncommon but not endangered List 4 plants and included them in the survey.

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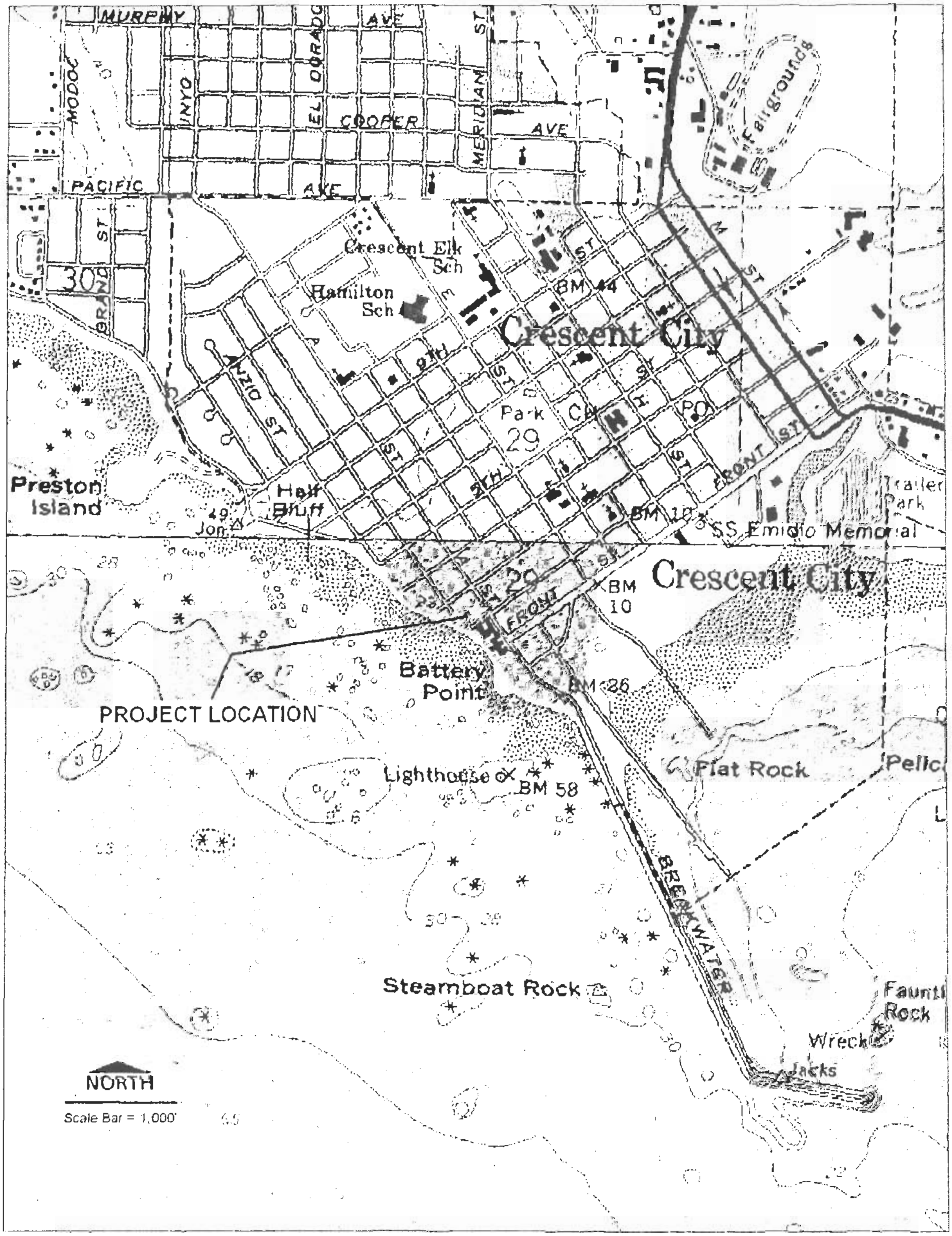
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Hamilton Sch
BM 44
Crescent City
ANZIO ST
Park
PO
FRONT ST
Trailer Park
Preston Island
Half Bluff
SS Emidio Memorial
Crescent City
BM 10
FRONT
Battery Point
BM 26
PROJECT LOCATION
Lighthouse
BM 58
Flat Rock
BREAKWATER
Steamboat Rock
Wreck
Jacks
NORTH
Scale Bar = 1,000'

3 of 13


NORTH
Scale Bar = 40'
Legend
Bramble
Cult. Hedge
Development
Grass
Willow

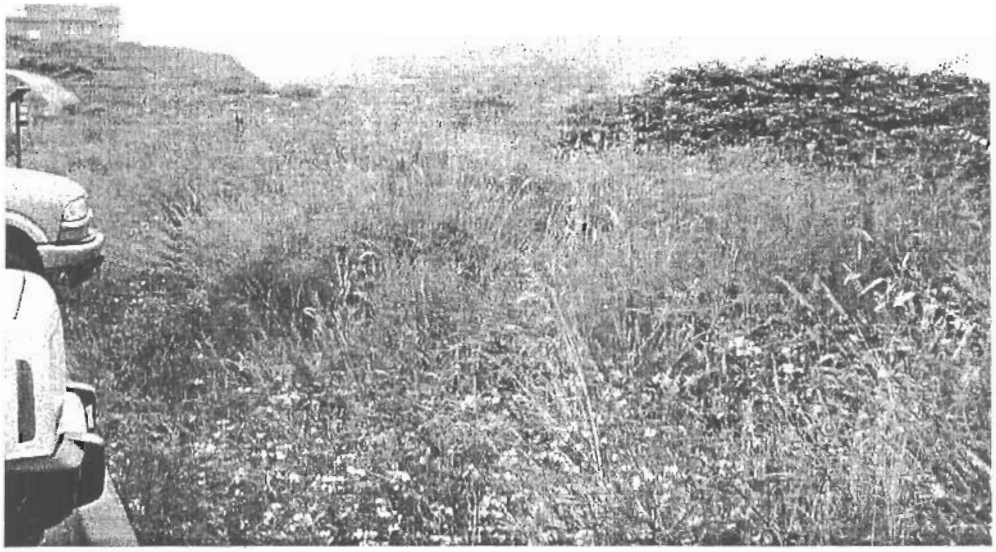
4 of 13

Figure 3. Hooker's willow in the NW part of the property.

Figure 4. A dense patch of Himalayan blackberry in the south of the property.

5 of 13

Figure 5. Herbaceous vegetation covers approximately half of the project area adjacent to the parking lot.



Ms. Semsrott, who is qualified to conduct rare plant surveys having a Master's of Arts in Biology (botany emphasis) as well as experience surveying for the target species, visited the site on August 2, 2007. The total number of field survey hours was 1.5 hours. She used an intuitively controlled survey method and covered the project area intensively. The survey was not seasonally appropriate (i.e., conducted during the species blooming period) for all of the target species. Those species for which the survey was not seasonally appropriate are identified in the results table.

We identified all vascular plants encountered to at least the lowest taxonomic level necessary for a rare species determination and recorded a species list (Table 5). Unless specified otherwise, the taxonomic nomenclature used follows Hickman (1993).

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Table 1. Target plant species list and results table for 200 "A" Street, Crescent City

Plant Species	Listing[1]	Blooms	Habitat and Elevation	Species Present / Habitat Present
Abronia umbellata ssp. breviflora-pink sand-verbena	List 1B.1	Jun-Oct	Coastal dunes;0-10m	No/Marginal habitat present, but no dunes
Calamagrostis crassiglumis-Thurber's reed grass	List 2.1	May-Jul	Coastal scrub(mesic), Marshes and swamps(freshwater);10-45m	No/Marginal habitat present
Carex lenticularis var. *limnophila*-lakeshore sedge	List 2.2	Jun-Aug	Bogs and fens, Marshes and swamps, North Coast coniferous forest/shores, beaches; often gravelly;0-6m	No/No
Carex viridula var. *viridula*-green sedge	List 2.3	(Jun)Sep-Aug	Bogs and fens, Marshes and swamps(freshwater), North Coast coniferous forest(mesic);0-1600m	No/No
Castilleja affinis ssp. *litoralis*-Oregon coast Indian paintbrush	List 2.2	Jun	Coastal bluff scrub, Coastal dunes, Coastal scrub/sandy;15-100m	No/ **habitat present – survey was not seasonally appropriate – This plant may be present on the property.**
Castilleja miniata ssp. *elata*-Siskiyou Indian paintbrush	List 2.2	May-Aug	Bogs and fens, Lower montane coniferous forest(seeps)/often serpentinite;0-1750m	No/No
Cochlearia officinalis var. *arctica*-arctic spoonwort	List 2.3	May-Jul	Coastal bluff scrub(on basaltic sea stack);0-50m	No/No
Coptis laciniata-Oregon goldthread	List 2.2	Mar-Apr	Meadows and seeps, North Coast coniferous foreststreambanks/mesic;0-1000m	No/No
Empetrum nigrum ssp. *hermaphroditum*-black crowberry	List 2.2	Apr-Jun	Coastal bluff scrub, Coastal prairie;10-200m	No/ **habitat present – survey was not seasonally appropriate, but plant is an evergreen shrub.**
Eriogonum nudum var. *paralinum*-Del Norte buckwheat	List 2.2	Jun-Sep	Coastal bluff scrub, Coastal prairie;5-80m	No/Yes
Erysimum menziesii ssp. *eurekense*-Humboldt Bay wallflower	List 1B.1	Mar-Apr	Coastal dunes;0-10m	No/ **habitat present – survey was not seasonally appropriate. This plant may be present on the property.**
Gilia capitata ssp. *pacifica*-Pacific gilia	List 1B.2	Apr-Aug	Coastal bluff scrub, Chaparral(openings), Coastal prairie, Valley and foothill grassland;5-869m	No/Yes
Gilia millefoliata-dark-eyed gilia	List 1B.2	Apr-Jul	Coastal dunes;2-30m	No/Yes

[1] Listing includes federal, state, and CNPS listed rare, threatened and/or endangered taxa. CNPS inventory quadrangle data include only CNPS list 1-3 plants (CNPS list 4 plants were only considered if they were also state- or federally-listed). **CNPS 1A** = presumed extinct in CA; **CNPS 1B** = rare, threatened, or endangered in CA and elsewhere; **CNPS 2** = rare, threatened, or endangered in CA, but more common elsewhere; **CNPS 3** = plants about which more information is needed—a review list; **CNPS 4** = Uncommon plants—a watch list; **FE or FT** = Federally-listed Endangered or Threatened; **CE or CT** = State-listed Endangered or Threatened; **SC** = State-listed Species of Concern. The Threat Code Extension that follows the CNPS List Code (e.g., 1B.1) is defined as follows: **.1** - Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat); **.2** – Fairly endangered in California (20-80% occurrences threatened); **.3** – Not very endangered in California (<20% of occurrences threatened or no current threats known).

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Table 1. Target plant species list and results table for 200 "A" Street, Crescent City

Plant Species	Listing[1]	Blooms	Habitat and Elevation	Species Present / Habitat Present
Hesperevax sparsiflora var. *brevifolia*-short-leaved evax	List 2.2	Mar-Jun	Coastal bluff scrub(sandy), Coastal dunes;0-215m	No/Yes
Lathyrus japonicus-sand pea	List 2.1	May-Aug	Coastal dunes;1-30m	No/Yes
Lathyrus palustris-marsh pea	List 2.2	Mar-Aug	Bogs and fens, Coastal prairie, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, North Coast coniferous forest/mesic;1-100m	No/No
Lilium occidentale-western lily	List 1B.1	Jun-Jul	Bogs and fens, Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps(freshwater), North Coast coniferous forest(openings);2-185m	No/No
Oenothera wolfii-Wolf's evening-primrose	List 1B.1	May-Oct	Coastal bluff scrub, Coastal dunes, Coastal prairie, Lower montane coniferous forest/sandy, usually mesic;3-800m	Yes/**Not on property, but ~20' from property line beachward.**
Packera bolanderi var. *bolanderi*-seacoast ragwort	List 2.2	(Apr)May-Jul	Coastal scrub, North Coast coniferous forest/sometimes roadsides;30-650m	No/Yes
Phacelia argentea-sand dune phacelia	List 1B.1	Jun-Aug	Coastal dunes;3-25m	No/Yes
Romanzoffia tracyi -Tracy's romanzoffia	List 2.3	Mar-May	Coastal bluff scrub, Coastal scrub/rocky;15-30m	No/Yes
Sidalcea malviflora ssp. *patula*-Siskiyou checkerbloom	List 1B.2	May-Aug	Coastal bluff scrub, Coastal prairie, North Coast coniferous forest/often roadcuts;15-815m	No/No

3.2 Animal Species Assessment Methods

Prior to the on-site investigation, we compiled a list of special status animal species from the CNDDB *RareFind* 3 (DFG 2007). A query based on USGS 7.5' Sister Rocks and Crescent City quadrangles and coastal habitats (coastal bluff scrub, coastal dunes, coastal prairie, and coastal scrub) resulted in 14 animal species (Table 2).

The project area was surveyed for the presence of each target species' required habitat. No animal species were encountered in the field, so no species list is included here.

3.3 Sensitive Habitats

The following habitats are listed as sensitive with the DFG: Coastal and Valley Freshwater Marsh, Coastal Brackish Marsh, and Northern Coastal Salt Marsh. During the field investigation, we assessed the presence of these habitats based on their characteristic plant species.

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Table 2. The animal target species list. for 200 A ST, Crescent City

Scientific Name / Common Name	Federal (F) or State (S) Status[1]	Global (G); State (S) Rank	habitat requirements	habitat present
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	delisted	G5T4; S2	forages on natural pasture or that cultivated to grain; loafs on lakes, reservoirs, ponds	no
Cerorhinca monocerata rhinoceros auklet		G5; S3	nests on off-shore islands and rocks	no; co cliff caves present
Charadrius alexandrinus nivosus Western snowy plover	Threatened	G4T3; S2	sandy beaches	**Not on subject property; however, habitat present on adjacent beach**
Coenonympha tullia yontockett Yontocket satyr		G5T1T2; S1	coastal dunes; grassy areas among dunes with coniferous lee, or grassy exposed slopes	**Marginal habitat present**
Elanus leucurus white-tailed kite		G5; S3	rolling foothills and valley margins with scattered oak and river bottomlands and marshes next to deciduous woodlands	no; no open grass lands, meadows; no dense-topped trees for nesting and perching
Eucyclogobius newberryi tidewater goby	Endangered	G3; S2S3	brackish water	no; no open water
Eumetopias jubatus Steller sea-lion		G5; S2	hauls out on islands and rocks	no
Fratercula cirrhata tufted puffin		G5; S2	open ocean; nests along the coast on islands or rarely on mainland cliffs	no
Limnephilus atercus Fort Dick limnephilus caddisfly		G4; S1	not well known; known only from Fort Dick in Del Norte County	no lentic habitat, streams, or cold springs
Martes Americana humboldtensis Humboldt marten		G4G5T!; S1	coastal redwood zone	no
Monadenia fidelis pronotis rocky coast Pacific sideband		G4G5T1; S1	coastal habitat; rocky, moist habitat with seashore plants	Marginal habitat present in rocky area to the west.
Rana aurora aurora northern red-legged frog		G4T4; S2	usually near dense riparian cover	Possible low quality foraging habitat in willows
Rhyacotriton variegatus southern torrent salamander		G3G4; S2S3	forests with streams and seepages	no
Speyeria zerene hippolyta Hippolyta frittilary	threatened	G5T1; S1	coastal meadows in Del Norte County; larvae feed only on the foliage of Western Dog Violet (Viola adunca)	no; no Western Dog Violet observed

[1] Global & State Ranking: The global rank (G-rank) is a reflection of the overall condition of an element throughout its global range. The state rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. **G1** = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals OR less than 2,000 acres; **G2** = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres; **G3** = 21-80 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres; **G4** = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat; **G5** = Population or stand demonstrably secure to ineradicable due to being commonly found in the world. Subspecies receive a **T**-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety; **S1** = Less than 6 EOs OR less than 1,000 individuals OR less than 2,000 acres; *S1.1* = very

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4.0 Results

4.1 Botanical Species

The survey was not seasonally appropriate for all target species, and none of the target species were found in the project area. However, we found two Wolf's evening primrose (*Oenothera wolfii*) plants approximately 20 feet from the property line along the edge of the upper beach (Figure 6). Survey results for the target species are summarized in Table 1.

Of the 33 plants species encountered eight are native to California. The patch of Hooker's willow is a remnant of a fragmented coastal scrub community and a plant common to coastal wetlands. Himalayan blackberry is an exotic bramble native to Eurasia. The majority of the species in the grassy area were exotic species.

4.2 Animal Species

Survey results for the animal species are summarized in Table 2. None of the target species listed in Table 2 were encountered in the project area; however, the survey coverage was focused on habitat, and protocol level surveys were not conducted for any species.

There is potential habitat for snowy plovers on the beach adjacent to the property. There is also very marginal habitat for northern red-legged frog in the willow scrub, as well as habitat for the rocky coast Pacific sideband snail in near the strand.

4.3 Sensitive Habitats

None of the DFG listed sensitive coastal habitats were encountered on the subject parcel. The vegetation present is remnant coastal scrub. The scrub habitat was historically impacted with the development of the Crescent City coastline, and the entire community along Pebble Beach has been affected. The remnant coastal scrub habitat is present along the entire interface between Crescent City and the Coast.

This report did not consider the presence of wetlands on the property.

5.0 Conclusion/Recommendations

At the time of this writing, we were not apprised of a project. Lacking a project description, we cannot assess potential impacts to sensitive species and habitats. In addition, at the project proponent's request, this report has focused on the investigation findings without reference to biological opinion or recommendation. For this reason, we do not present recommendations here.

Figure 6. Wolf's evening primrose grows along the upper beach margin on Crescent City property.

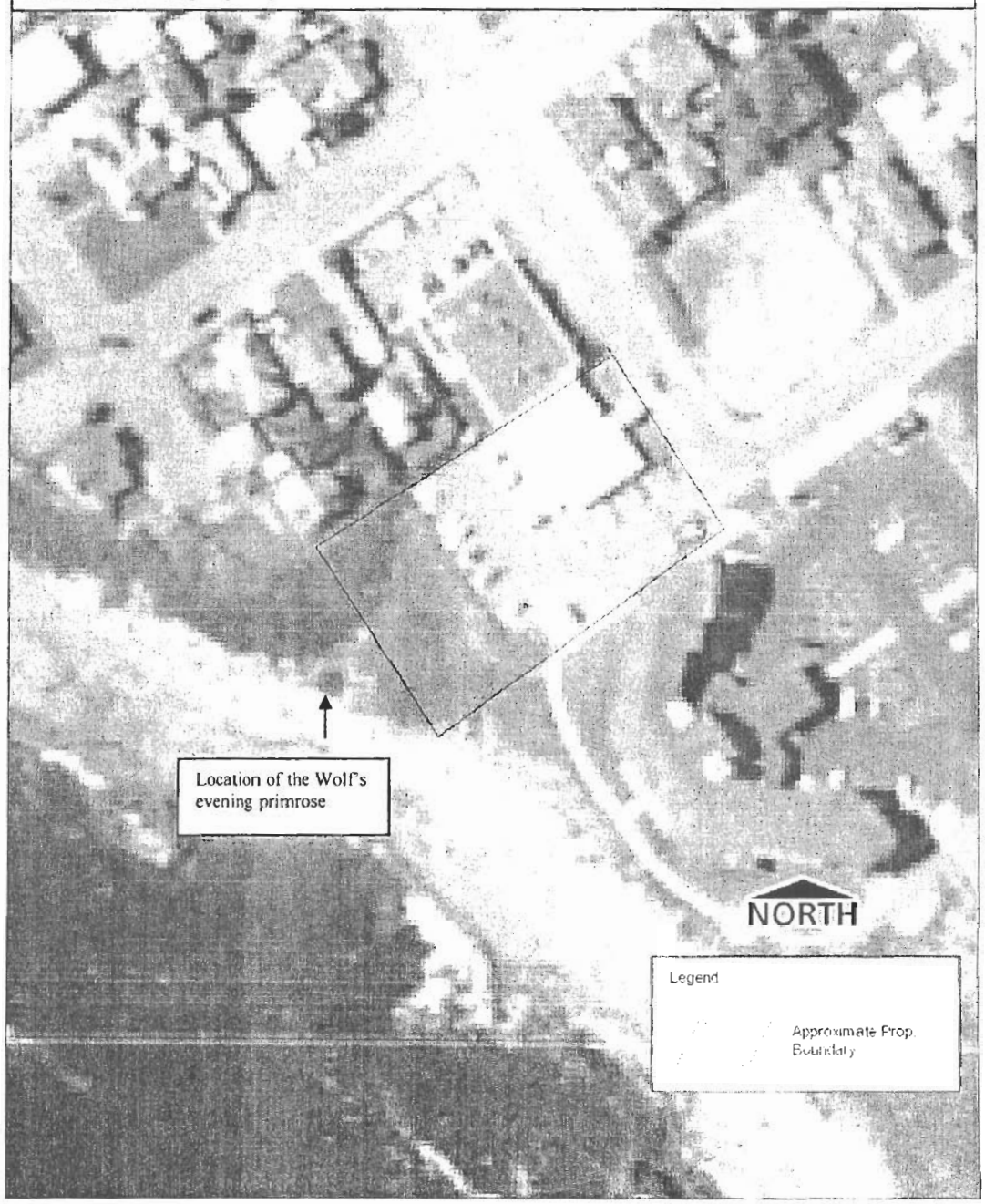

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Table 3. Overall list of all vascular plants noted on 200 A Street, Crescent City, CA on August 2, 2007. Plants listed with an asterisk (*) are native to California.

	Scientific Name	CommonName
Trees		
	*Salix hookeriana**	Hooker's willow
Shrubs		
	*Myrica californica**	wax myrtle
	Rosa sp.	rose
	Rubus discolor	Himalayan blackberry
Herbaceous		
	Agrostis sp.	bent grass
	*Ambrosia chamissonis**	beach-bur
	*Aster chilensis**	common California aster
	Avena sp.	Oatgrass
	Bromus sp.	brome
	Carpobrotus edulis	Fig-marigold
	Cirsium arvense	Canada thistle
	Convolvulus arvensis	field bindweed
	Crocosmia sp.	crocosmia
	Daucus carota	wild carrot or Queen Anne's lace
	*Equisetum arvense**	common horsetail
	Fragaria chiloensis	beach strawberry
	Holcus lanatus	common velvet grass
	Hypochaeris glabra	smooth cat's-ear
	Hypochaeris radicata	hairy cat's-ear
	Leymus mollis	
	Lolium multiflorum	Italian ryegrass
	Lotus corniculatus	birdfoot trefoil
	Melilotus alba	white sweetclover
	Mentha pulegium	pennyroyal
	Plantago lanceolata	English plantain
	*Potentilla anserina ssp. Pacifica**	cinquefoil
	Ranunculus repens	creeping buttercup
	Raphanus raphanistrum	Jointed Charlock
	Rumex crispus	curly dock
	Sonchus sp.	sow thistle
	Vicia sp.	vetch
	Trifolium repens	white clover

References

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CNPS (California Native Plant Society). 2007. *Inventory of Rare and Endangered Plants.* (on-line edition, v7-06a). California Native Plant Society, Sacramento, CA. (accessed on-line at www.cnps.org/inventory)

Hickman, J.C. 1993. *The Jepson Manual: Higher Plants of California.* University of California Press, Berkeley, CA. 1400 pp.

Sawyer, J.O., & T. Keeler-Wolf 1995. *A Manual of California Vegetation.* California Native Plant Society, Sacramento, CA. 471 pp.

GEDIK
BioLOGICAL
ASSOCIATES

707/677-9073
FAX: 707/677-9073
E-MAIL: tamshere@att.net
www.GedikBioLOGICAL.com
P.O. BOX 104 • TRINIDAD CA 95570

March 6, 2009

Randy Baugh
D. C. I.
3941 Park Drive # 20338
El Dorado Hills, CA 95762

RE: Coasta Norte Biological Supplement: Sensitive Species Surveys

Dear Mr. Baugh,

This letter serves to address your recent request to provide supplemental biological information for your proposed project at 200 A Street in Crescent City (assessor parcel number 118-020-34). Specifically, this letter focuses on the requirement for seasonally appropriate surveys for Oregon coast Indian paintbrush (*Castilleja affinis* ssp. *litoralis*), black crowberry (*Empetrum nigrum* ssp. *hermaphroditum*), Humboldt Bay wall-flower (*Erysimum menziesii* ssp. *eurekense*), and the Western snowy plover (*Charadrius alexandrinus nivosus*) that were previously considered potentially present for your site by NRM (August 2007).

I visited your site on February 16, 2009. As per your description, your parcel consists of a 1.25 acre lot, of which 1.1 acres have been developed (currently as a business complex with adjoining parking lot) since 1972 (refer to Attachment 1 for site photo). You indicated that the remaining parcel was low-cut/mowed in the past year. The parcel currently consists of predominantly-ruderal species such as velvet grass (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), creeping buttercup (*Ranunculus repens*), wild mustard (*Raphanus sativus*), and Himalayan berry (*Rubus discolor*). Refer to site photo 3 in Attachment 2. Young Hooker willows (*Salix hookeriana*) occur in the northwestern portion of the property, southeast of the terminus of Wendell Street and downslope and southeast of a residential unit (Attachment 2, photos 1 and 2). A couple older, more established willows occur at the southeast corner (and possibly oustide) of the parcel boundary.

The undeveloped portion of the property is bowl-shaped, with adjacent lands sloping 10-15% downward into the undeveloped area (Attachment 2, photo 4). A relatively-new hotel (Hampton Inn) abuts the parcel to the southeast (Attachment 2, photo 5), and residential development abuts the parcel to the west, north, and northeast (Attachment 1). The parcel is abutted to the southwest by a right-of-way (for Wendell Road) that adjoins the coastline, with an approximately 4-foot tall "wall" of driftwood bordering between the shoreline and the adjacent right-of-way (Attachment 2, photos 6 and 7). Native dunegrass (*Leymus mollis*), invasive iceplant (*Carpobrotus sp.*), and a couple of evening primrose (*Oenothera cf. wolfii*) occur in this area. The adjacent coastline consists of a narrow swath (approximately 30-40 feet) of coastal strand habitat with what appears to be a predominance of alluvial-run rock leading seaward to a rocky shoreline (Attachment 2, photos 8-10).

Based upon these habitat characteristics, there does not appear to be suitable habitat for the sensitive species listed above. Specifically, Indian paintbrush is found in sea bluffs and dry places in chaparral (Hickman 1993) and coastal bluff scrub/ sandy coastal dunes (CNPS. 2001). The established ruderal composition of species at your site, combined with a lack of sandy dune, scrub, or chaparral habitats at this location does not appear suitable to support this species. Similarly, Humboldt Bay wall-flower- as its name suggests- is solely found within the Humboldt Bay vicinity, in Humboldt County, and primarily on foredune habitat,

which does not occur at your site. While this species may have been listed by the California Natural Diversity Database as a result of the standard methodology "nine quad query" search utilized by professional botanists, it is my professional opinion that suitable habitat for this species does not occur at your site. Black crowberry is another species typically found in habitat that does not match your site. This species most commonly occurs on rocky sea cliffs in coastal scrub (Hickman 1993). Therefore, while it may be located in the vicinity, such as nearby offshore rocks and/or rocky cliffs, suitable habitat does not appear to be present on your site nor the adjacent coastal strand. Lastly, Western snowy plovers most commonly utilize open sandy beaches, not tidally-inundated rocky shorelines such as those located adjacent to the Wendell Road right-of-way and your parcel.

Therefore, based upon my professional opinion and 10 years of experience working in coastal and dune habitats in Humboldt and Del Norte counties, I do not see a need for conducting additional surveys for the species listed above because the habitat characteristics at your site are not suitable for these species.

Please do not hesitate to contact me if you have any other questions or if I can be of further assistance.

Sincerely,

Tamara L. Gedik
Principal Biologist
Certified Associate Ecologist
(Ecological Society of America)

Attachments

REFERENCES

California Coastal Commission. Letter to Randy Baugh. 4 February 2009.

CNPS. 2001. Inventory of Rare and Endangered Plants of California (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA . x + 388pp.

Hickman, James C., Ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, CA.

NRM. 2007. Biological report: state and federal listed species survey of 200 "A" Street in Crescent City, California. Unpublished report prepared for Randy Baugh, Development Consultants Inc., by Birgit Semsrott and David Loya. Eureka, CA.

Attachment 1. Figure provided by D.C.I. showing project site and surrounding area.

Attachment 2. Site Photos taken February 16, 2009 by T. Gedik.

Photos 1 and 2. Looking northwest from nearby parking lot towards Wendell Road, showing young willows (note: parcel was cleared/low-cut mowed within past 2 years)

Photo 3. General site vegetation, looking southwest from near parking lot.

Photos 4 and 5. View from northwestern parcel boundary near adjacent residence, looking southeast at bowl-shaped undeveloped area, existing development onsite (parking lot and business complex), and adjacent hotel development.

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Photos 6 and 7. Views of driftwood "wall" bordering Wendell Road right-of-way and adjacent shoreline.

Photos 9-11. Views of coastal strand (with driftwood and alluvial rock) abutting Wendell Road right-of-way, and adjacent rocky shoreline.

NOAA Technical Memorandum ERL PMEL-103

TSUNAMI INUNDATION MODEL STUDY OF EUREKA AND CRESCENT CITY, CALIFORNIA

E. Bernard
C. Mader
G. Curtis
K. Satake

Pacific Marine Environmental Laboratory
Seattle, Washington
November 1994

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / Environmental Research Laboratories

Tsunami Inundation Model Study of Eureka and Crescent City, California

E.N. Bernard[1], C. Mader[2], G. Curtis[2], and K. Satake[3]

1. INTRODUCTION

On April 25, 1992, a series of strong earthquakes occurred near Cape Mendocino, California. The sequence began with an M_s-7.1 tremor at 11:06 a.m. (local time) on April 25. Strong aftershocks with 6.6 and 6.7 magnitudes occurred on April 26 at 00:41 a.m. and 4:18 a.m., respectively. These three earthquakes and more than 2,000 recorded aftershocks illuminated the configuration of the Mendocino Triple Junction, where the Pacific, North America, and southernmost Gorda plates meet. The M_s-7.1 earthquake generated a small tsunami that was recorded by tide gauges from Oregon to southern California. After detailed study of this earthquake, Oppenheimer *et al.* (1993) concluded that

> "The Cape Mendocino earthquake sequence provided seismological evidence that the relative motion between the North America and Gorda plates results in significant thrust earthquakes. In addition to the large ground motions generated by such shocks, they can trigger equally hazardous aftershock sequences offshore in the Gorda plate and on the Gorda-Pacific plate boundary. This sequence illustrates how a shallow thrust event, such as the one of moment magnitude (M_w) 8.5 that is forecast for the entire Cascadia subduction zone, could generate a tsunami of greater amplitude than the Cape Mendocino main shock. Not only would this tsunami inundate communities along much of the Pacific Northwest coast within minutes of the main shock, but it could persist for 8 hours at some locales."

On May 9, 1992, the Federal Emergency Management Agency (FEMA) hosted an after-action discussion meeting with the scientific community at the Presidio of San Francisco, California. From these discussions, eight recommendations were formulated, including one to produce tsunami inundation maps for northern California. The tsunami inundation study was ranked number two of the eight and was identified as time-sensitive. NOAA responded to this recommendation by offering to cost-share the study with FEMA and transmitted a proposal to FEMA on August 24, 1992. On December 22, 1992, FEMA decided to fund the project, and funds were delivered to NOAA on

2415

[1] Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration, 7600 Sand Point Way NE, Seattle, WA 98115-0070.
[2] Joint Institute for Marine and Atmospheric Research, University of Hawaii, 1000 Pope Road, Honolulu, HI 96822.
[3] Department of Geological Sciences, University of Michigan, Ann Arbor, MI 48109-1063.

May 5, 1993. The project was completed on May 4, 1994, with this report representing a summary of the study.

FEMA also funded the California Office of Emergency Services to examine other effects of a larger Cascadia Subduction Zone earthquake—such as ground shaking, liquefaction, and landslides. A report entitled "Planning Scenario in Humboldt and Del Norte Counties for a Great Earthquake on the Cascadia Subduction Zone" by Toppozada *et al.* includes hazards maps for emergency planning purposes. This tsunami study was coordinated with the earthquake study through discussions and meetings between Eddie Bernard and Tousson Toppozada of the California Division of Mines and Geology. The tsunami effects described in the Toppozada *et al.* report were based on the tsunami inundation maps described in this report.

The summary report consists of a project overview with appendixes to document the scientific/technical details of each phase of the project. This format was chosen to provide an overview for the nonspecialist while supplying scientific/technical details for the specialist. In this way, we hope to reach a wide audience of readers interested in the tsunami hazard and illustrate the use of some technical tools for emergency preparedness. E.N. Bernard (NOAA) prepared the summary report while C.L. Mader (University of Hawaii) wrote the technical appendixes on inundation modeling and K. Satake (University of Michigan) authored the technical appendixes on earthquakes and regional modeling. George Curtis (University of Hawaii) wrote the appendix on an engineering model.

2. TECHNICAL BACKGROUND

The propagation of a tsunami from its source to a coastal area and the resultant flooding can be mathematically depicted with reasonable accuracy by sets of coupled, partial-differential equations. Analytical solutions of these equations are usually unattainable except in certain simplified cases. However, solutions can be closely approximated, even in very difficult cases, by means of a number of techniques well suited to use by computers. These solution schemes, referred to as numerical models, can provide great insight into the nature of the process under study. Two such numerical models, one a regional propagation model and the other an inundation model, have been applied to the problem of examining the impact that a large, locally generated tsunami could have on California. The models are described in detail in Appendixes A and B. A third model, developed by George Curtis (University of Hawaii), termed an engineering model, is presented in Appendix C. The engineering model was used as an independent check on the Mader inundation model. Redundancy such as the engineering model is desirable in studies for emergency preparedness. Although the details of these models are described in Appendixes A, B, and C, two major items of information needed to implement the models should be understood.

In the first place, if a model is to describe realistically the evolution of a tsunami from its source to its termination, it must be provided with an accurate rendition of the shape of both the seafloor over which the wave travels and the shape of the ground it potentially floods. This is accomplished

by compiling the bottom depths and land elevations of the area of interest. (See Appendixes A and B for details.) For mathematical reasons, the model cannot use a continuously varying depiction of topography but must deal with discrete depths and elevations that have been averaged over a certain, finite area. In the case of the regional model, the topography is provided on a model grid made up of grid squares measuring 1.6 km on a side. For the inundation models, Crescent City is represented by a 25-m grid while Humboldt Bay is modeled using a 100-m grid.

Knowledge of the nature of the numerical grid used in the model is the key to understanding the results. Any topographic data point in the model represents the *average* depth/elevation over the appropriate grid box. Quantities calculated by the model likewise represent average quantities over the same areas. A calculated wave elevation of, say, 3.1 m above sea level does not mean that the water everywhere in the appropriate grid would be uniformly 3.1 m above sea level. Rather, it means that the water depth on that particular grid block averages roughly 3.1 m. In the same sense, if flooding is indicated by the model in a grid block that contains both high and low elevations, this does not necessarily imply flooding at the highest elevations. The point is that simulation results must not be taken too literally but should be interpreted with a measure of common sense.

The second type of information needed to conduct tsunami simulations concerns the nature of the waves approaching the threatened area. For this study, the regional model is first used to generate the tsunami at the source and propagate the tsunami to the input boundary of the inundation model, which can then perform the flooding computations.

Tsunami generation in the regional model is not a trivial matter and involves the depiction of seafloor deformation by a major thrust earthquake. Based on our present understanding of tsunami generation, however, vertical seafloor deformation (both uplift and subsidence) defines the initial amplitude of the tsunami. Several different models exist that can calculate deformation patterns based on assumptions about the slip, depth, length, width, and dip angle of the earthquake fault plane. The problem becomes one of making intelligent estimates of these parameters. To assist in this process, Bernard and Satake attended a meeting of specialists to discuss the nature of earthquakes in the Cascadia Subduction Zone on April 8, 1993, at the California Division of Mines and Geology in Sacramento, California (see Appendix I). As a result of this meeting, four earthquake scenarios were developed along with their corresponding fault-plane parameter sets (Appendix I).

3. VALIDATION OF TSUNAMI MODELS

The models used in this study have been tested extensively and have been applied to a variety of cases published in the scientific literature (see Appendix A, B, and C). However, because of the complexity of these models, it is always appropriate to compare simulations with observed data to avoid errors. For this study, we used a combination of model results/data comparisons, *and* we used independent computations with a third model for redundancy. Our principal data set was the 1992

Cape Mendocino earthquake/tsunami. The details of the comparison experiments are described in Appendixes D and E.

The regional model (1.6-km grid) used by Satake produced good agreement with eight tide gauges that recorded this tsunami. He used the fault-plane parameters estimated by Oppenheimer *et al.* (1993) to compute seafloor deformation and tsunami generation, and this produced a 30-cm wave with period of about 30 min in an area offshore of Humboldt Bay (see Appendix D). As a check, Mader used a 1-km grid regional model with a slightly different generating mechanism and obtained similar results offshore of Humboldt Bay (see Appendix E). The 30-cm wave with 30-min period was then used as input for the inundation model. Good agreement was found between the tide gauge record within Humboldt Bay at North Spit and the computed wave form (see Fig. E-3). We were encouraged by these results since the model simulation produced both the amplitude *and* the time sequence observed at the tide gauge. Inundation computations could not be checked because this tsunami arrived at low tide and did not flood any areas. Furthermore, to our knowledge, no tsunami inundation data exist for Humboldt Bay.

However, inundation data are available for the extensive flooding of Crescent City by the 1964 Alaska tsunami. These data were used to check an inundation model of Crescent City. The numerical experiment is described in Mader and Bernard (1993), and the data/model comparison is shown in Fig. 3 of that study (Appendix F).

In summary, the regional model was checked against the 1992 Cape Mendocino event and an independent model run. The Humboldt Bay inundation model was checked against the 1992 tsunami record at North Spit, and the Crescent City inundation model was checked against the 1964 Alaska tsunami flooding survey.

4. SCENARIOS OF POSSIBLE TSUNAMIS

We originally envisioned a straightforward approach to the development of earthquake fault-plane estimates that would be used in regional models to provide tsunami input for the inundation models. This worked well for the simulation of the 1992 Cape Mendocino earthquake and was accepted practice in August 1992 (when the proposal for this study was submitted). We met with specialists on the Cascadia Subduction Zone to define the type of earthquake that might be expected from this area. These specialists are part of a different FEMA study to examine other earthquake effects in this region such as ground shaking, liquefaction, and landslides. The results of a 1-day meeting on possible earthquake scenarios from the Cascadia Subduction Zone are described in Appendix I where the expected earthquake would be a magnitude M_w 8.4 affecting an area of 240 km × 80 km with a vertical deformation of 100–400 cm. Based on follow-up discussions with these specialists, Satake refined the possible fault ruptures into four cases for a 240-km-long earthquake. The details of his investigation are presented in Appendix G.

He then used these four cases to generate four different tsunamis that are presented in Appendix G. Based on his study, the 240-km-long earthquakes would produce tsunamis of

maximum amplitudes of about 280 cm in 50 m water depth offshore of Humboldt Bay and maximum amplitudes of about 250 cm offshore of Crescent City. Based on the fault plane solution technique, the range of incident tsunami waves for the inundation models would be 2.9 m for the 240-km-long earthquake.

Our original plans were modified by new field observations related to tsunami generation dynamics. Three large tsunamis were generated in Nicaragua (September 1992), Indonesia (December 1992), and Japan (July 1993) by M_w-7.7–7.8 earthquakes. These tsunamis were surprisingly large when viewed in the context of a single fault-plane model seafloor displacement pattern. The Nicaragua tsunami was generated by a very slow earthquake that produced 10-m runup along the coastline. The fault plane solution given by the earthquake parameters yielded a vertical deformation of only 37 cm over an area of 200 km × 100 km (Imamura *et al.*, 1993). Using this uplift as initial conditions for a regional tsunami model produced tsunami heights that were too low, by a factor of 5.6 to 10, to explain the observed 10-m runup values on the coast (Abe *et al.*, 1993). A similar problem was reported by Yeh *et al.* (1993) in the case of the Indonesia tsunami. The fault-plane solution for the M_w-7.8 Indonesia earthquake yielded a maximum vertical displacement of 125 cm—much too small to produce tsunami wave amplitudes responsible for the observed 26-m runup values. Most recently, the M_w-7.8 earthquake in July 1993 in the Sea of Japan was initially described by a fault-plane solution that produced a vertical displacement of about 200 cm. Again, regional tsunami model simulations produced waves too low to account for the 20–30-m runup values that were observed (personal communication, Nobuo Shuto). The Indonesia event was estimated to deform an area 100 km × 50 km (Yeh *et al.*, 1993), and the Sea of Japan earthquake was computed to be 150 km × 50 km (Somerville, 1993). Focal mechanisms of these earthquakes were both thrust fault type.

One hypothesis to explain the surprisingly large tsunamis generated by these earthquakes is that the earthquakes triggered underwater slumps (Yeh *et al.*, 1993). It also has been pointed out (González *et al.*, 1993) that the fault-plane solutions only provide *average* displacements over the deformation zone without detailing the roughness characterizing the deformation; i.e., some areas could deform vertically more than 10 m, but could be compensated by other areas that suffer little or no displacement in such a way that the average over the entire area remains only 1–2 m.

The important point here is that we can expect that, in many cases, *tsunami wave amplitudes will be much higher than a fault-plane generating mechanism might indicate*. Not only may a fault-plane solution underestimate vertical seafloor displacement, it also fails to replicate all earthquake/slumping dynamics that could contribute to tsunami generation. For example, offshore slumping is a significant portion of the overall tsunami threat to California (McCarthy *et al.*, 1993).

Therefore, our tsunami hazard assessment *must* take into account the potential inadequacy of the fault-plane formalism to provide realistic estimates of offshore tsunami amplitudes. To do this, we examined two well-studied earthquakes that generated tsunamis. One case was the 1993 Hokkaido tsunami, which was generated by a smaller earthquake than the scenario considered in this study.

The second case was the 1964 Alaska tsunami, which was generated by a larger earthquake than this scenario study. We reasoned that these two events would bracket the scenario event and guide us in estimating the scenario tsunami empirically.

The 1964 Alaska tsunami was generated by an M_w-9.2 magnitude earthquake that deformed an area 700 km × 150 km with some areas of vertical deformation in excess of 17 m. Numerous slumps and landslides generated local tsunamis that ran up as high as 55 m in fjord-like embayments. Runup values of 25–30 m were measured throughout Prince William Sound (Cox, 1972). Extensive studies of the earthquake and resultant tsunami have led researchers to infer that the incident waves in the generation area were 10–15 m (Cox, 1972).

For the more recent 1993 Hokkaido tsunami, the M_w-7.8 earthquake deformed an area of 100 km × 50 km, roughly half the size of the scenario earthquake. The resultant tsunami ran up 20–30 m near the source. Using numerical models, Shuto estimated that the incident wave had to be about 8 m in 50-m depth of water (personal communication).

Using these two cases as a guide, we concluded that a 10-m incident wave as input for the inundation model was a reasonable estimate. That is, it fell between the estimated values of incident waves for the 1993 Hokkaido earthquake (8 m) and the 1964 Alaska earthquake (10–15 m). We selected a period of 30 min for the 10-m amplitude based on observations from the 1992 Cape Mendocino tsunami. It should be noted that in a similar study to produce inundation maps for Valparaiso, Chile (Bernard *et al.*, 1988), the incident wave for the inundation model was 10 m (Hebenstreit, 1984).

The results of using a 10-m incident wave for the Humboldt Bay and Crescent City inundation model are presented in Appendix H. The results have been compared with computations using the JIMAR Tsunami Research Effort engineering model as a check on the accuracy. Favorable comparisons give us the confidence that the models are functioning properly. The results from these inundation model runs are considered to be the most reasonable estimates of an M_w-8.4 scenario and have been transferred to 1:24,000-scale maps that are located in the envelope on the back cover of this report.

5. TSUNAMI HAZARD IMPLICATIONS

This study illustrates two approaches to estimating the potential flooding of tsunamis along a seismically active coastline. The first is to seek seismic/geological expertise to define the earthquake as accurately as possible and use fault-plane modeling for tsunami generation that then provides an estimate of offshore tsunami amplitude. Present knowledge of the Cascadia Subduction Zone is very limited, but, as of May 1994, we feel our estimate of 3 m offshore tsunami amplitude based on scenario earthquake represents state of the art. A second approach is to base estimates of the offshore tsunami amplitude on case studies of appropriate historical events. At this stage in our research on tsunami generation dynamics, this leads to a 10 m offshore tsunami amplitude estimates and is therefore a more conservative approach. A key element in either approach is cross-checking

the tsunami models. For this study, two regional tsunami models were run for redundancy, and the inundation model was cross-checked with an engineering model. In this way, we feel we have guarded against some gross error in numerical modeling. Finally, it should be emphasized that this study represents the first attempt at integrating seismology and oceanography in an interdisciplinary project to study locally generated tsunamis. We hope future attempts will improve upon this procedure, but we also hope that future investigators appreciate the effort required to conduct interdisciplinary research.

In using the results of this study, we recommend that a series of meetings be held with the scientists who produced the earthquake/tsunami scenarios and the users of the information. In dealing with this much uncertainty, knowledge of the process is critical for public policy formulation. We hope this study provides a framework to deal with tsunami hazard mitigation along the U.S. west coast in an informed, rational way.

6. CAUTIONARY NOTE

The results of this study are intended for emergency planning purposes. Appropriate use would include the identification of evacuation zones. This study should **NOT** be used for flood insurance purposes, because it is not based on a frequency analysis.

7. ACKNOWLEDGMENTS

This study was funded by NOAA (Coastal Ocean Program and PMEL) and FEMA with in-kind support from the California Division of Mines and Geology (J. Davis and T. Toppozada), the California Seismic Safety Commission (T. Tobin and R. McCarthy), the U.S. Geological Survey (D. Oppenheimer and S. Clarke), Humboldt State University (G. Carver), the University of Hawaii (C. Mader and G. Curtis), and the University of Michigan (K. Satake). All support is gratefully acknowledged.

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Appendix H: Tsunami Inundation

Charles L. Mader and George Curtis

H1. Eureka

The interaction of a tsunami wave similar in maximum amplitude to the April 1992 Eureka tsunami and a 10-m incident tsunami with Humboldt Bay and Eel River was modeled. The topographic grid was 100 m square, and the friction was described with a DeChezy coefficient. The areas normally under water had a coefficient of 40, while most of the land areas had a coefficient of 30. Populated areas with buildings had a coefficient of 10 as did regions with heavy timber. The model had 192 cells in the east-west direction and 375 cells in the north-south direction for a total of 72,000 cells. The calculations were performed on 50-MHz, 486 personal computers using the OS/2 operating system and the SWAN computer code with MCGRAPH graphics.

The tsunami wave similar to the April 1992 event was described by a 2-m-high tsunami wave in 50 m of water with a period of 33.3 min. The southern end of the Humboldt spit was flooded. The Eel River region was flooded inland as much as 2.5 km. Only the region across from the Bay entrance was flooded inside the Bay.

The Cascadia Subduction Zone earthquake was modeled using a 10-m-high tsunami wave in 50 m of water with a 33.3-min period. All the Humboldt spit was flooded. The inundation levels inside the harbor reached 3 m at some locations and extended inland over 5.0 km in the Eel River region.

The inundation area for the 10-m tsunami is shown in Fig. H-1 with the X and Y axis being the grid number or 100 m. The lines labeled A, B, and C are the one-dimensional engineering model locations used to cross check the inundation model. Favorable comparisons led to the conclusion that the inundation model was performing properly.

H2. Crescent City

The interaction of a tsunami wave similar to the April 1964 event and a 10-m incident tsunami with Crescent City harbor and town was modeled. The topographic grid was 25-m square, and the friction was described with a DeChezy coefficient of 30, which is appropriate for most of the flooded area. The model had 160 cells in the east-west direction and 240 cells in the north-south direction for a total of 38,400 cells. The calculations were performed on 50-MHz, 486 personal computers using the OS/2 operating system and the SWAN computer code with MCGRAPH graphics.

The tsunami wave similar to the April 1964 event was described by a 5-m-high tsunami wave in 50 m of water with a period of 33.3 min. All the land below 2-m elevation was flooded, and the inundation levels inside the harbor reached 4 m at some locations and extended inland over 600 m.

The Cascadia Subduction Zone earthquake was described by a 10-m-high tsunami wave in 50 m of water with a 33.3-min period. All the land below 4 m elevation was flooded and the

inundation levels inside the harbor reached 6 m at some locations and extended inland over 1.3 km. The wave heights as a function of time at seven locations are shown in Fig. H-2. The locations are shown as dots with their location numbers. The depths at the various locations are, in order, 22.6 m, 7.9 m, and 6.4 m below high tide and 3.1 m, 0.2 m, 3.0 m, and 2.7 m above high tide. The maximum water level over land was 8 m for locations 4, 5, and 6.

The inundation area for the 10-m tsunami is shown in Fig. H-3 with the X and Y axis being the grid number or 25.0 m. The lines labeled A through E correspond to the locations of the one-dimensional engineering model used to cross check the inundation model performance.

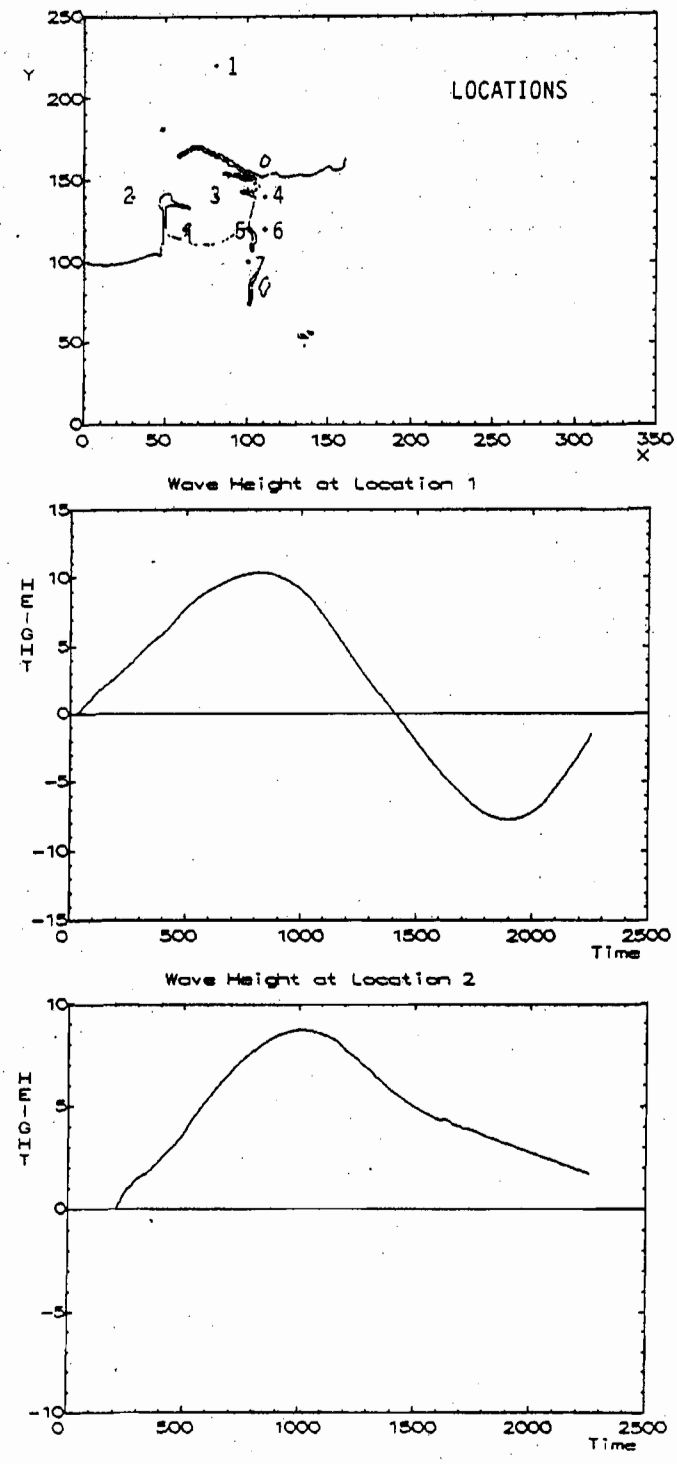

Fig. H-2. The wave heights as a function of time at various Crescent City locations for a 10-m-high tsunami wave in 50 m of water with a 33.3-min period.

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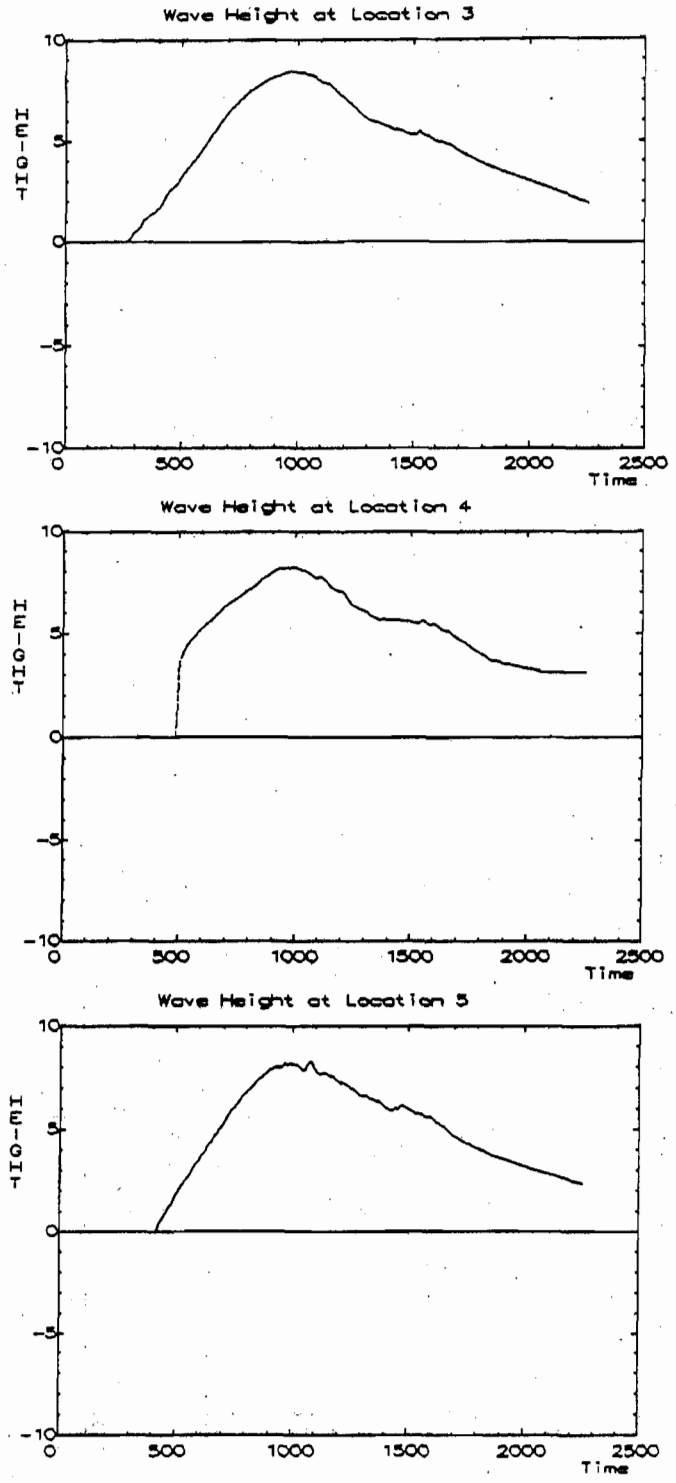

Fig. H-2. (continued).

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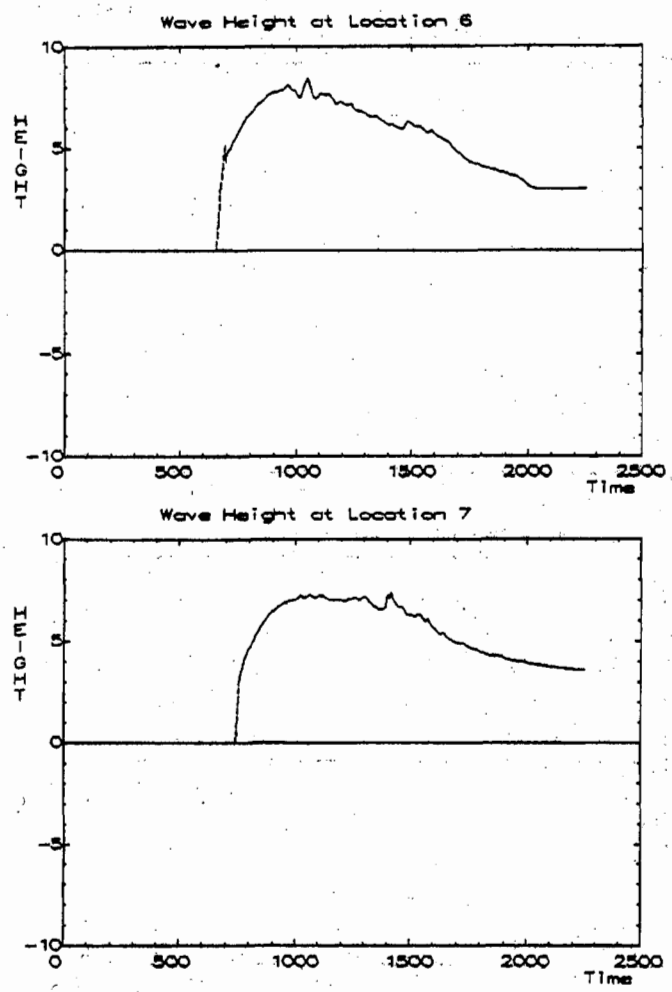

Fig. H-2. (continued).

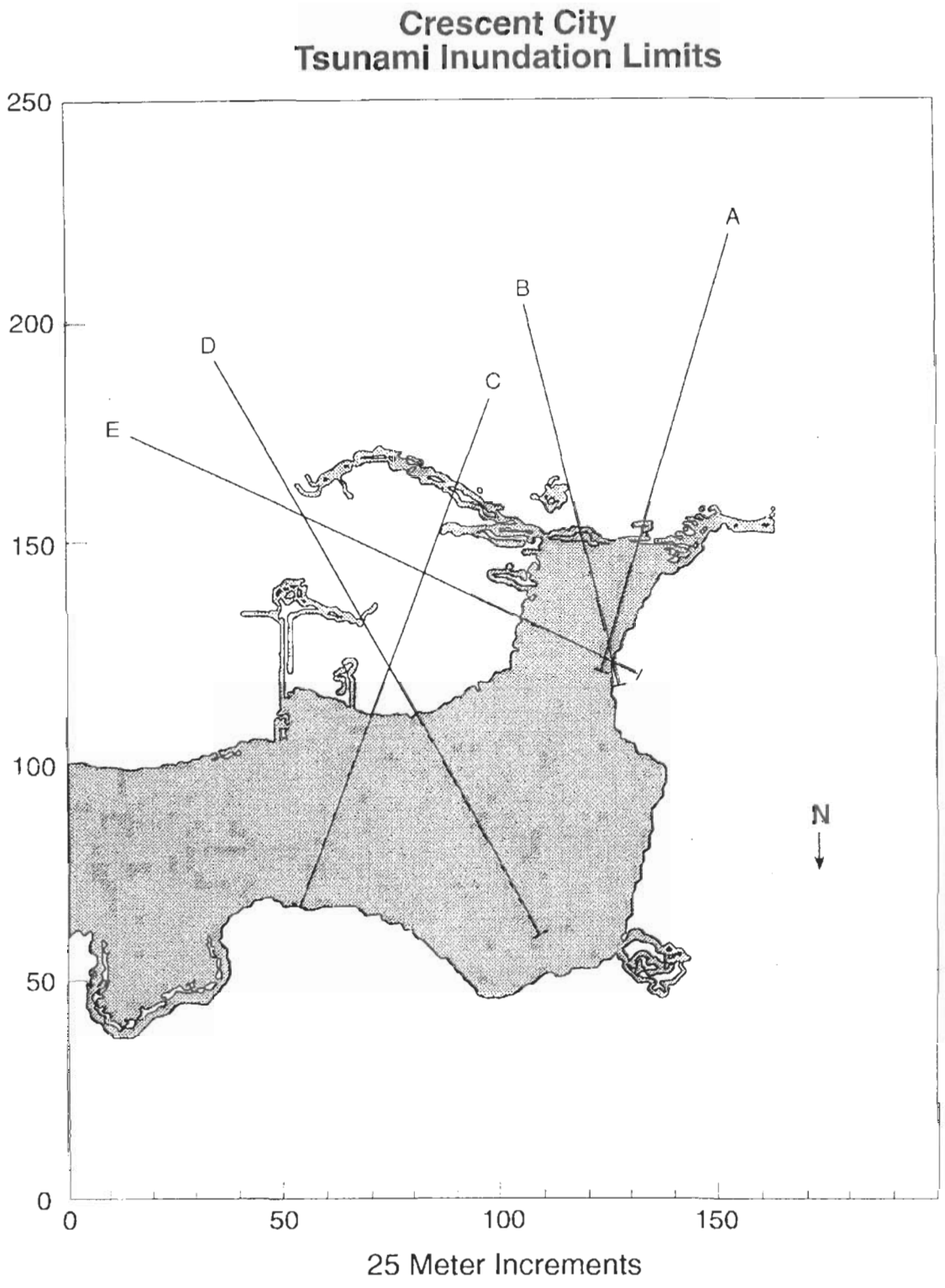

Fig. H-3. The Crescent City inundation areas for a 10-m, 33.3-min-period high tsunami. Lines labeled A, B, C, D, and E represent the locations of the engineering model used to cross check the inundation model calculations. The length of the line represents the extent of flooding estimated by the engineering model.

Tsunami inundation at Crescent City, California generated by earthquakes along the Cascadia Subduction Zone

Burak Uslu,[1] José C. Borrero,[1,2] Lori A. Dengler,[3] and Costas E. Synolakis[1,4]

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[1] We model tsunami inundation and runup heights in Crescent City, California triggered by possible earthquakes on the Cascadia Subduction Zone (CSZ). The CSZ is believed capable of producing great earthquakes with magnitudes of $M_w \approx 9.0$ or greater. We simulate plausible CSZ rupture scenarios and calculate inundation using MOST. We benchmark our CSZ inundation projections against mapped flooded areas and tide gauge data from the 1964 tsunami, which destroyed 29 city blocks, and also from the damaging 15 November 2006 Kuril Islands tsunami. Results suggest that inundation from CSZ tsunamis could extend over 3 km inland, twice as far as the limits of the 1964 inundation. Crescent City is most vulnerable to slip on the Gorda segment of the CSZ. Rupture of the northern or Juan De Fuca segment produces lower water heights than the 1964 event. At Crescent City, CSZ ruptures produce a leading elevation wave that arrives only minutes after the earthquake. Educational and self-evacuation are essential to save lives. **Citation:** Uslu, B., J. C. Borrero, L. A. Dengler, and C. E. Synolakis (2007), Tsunami inundation at Crescent City, California generated by earthquakes along the Cascadia Subduction Zone, *Geophys. Res. Lett.*, *34*, L20601, doi:10.1029/2007GL030188.

1. Introduction

[2] The destructive nature of tsunamis was demonstrated once again by the great earthquake and tsunami of 26 December 2004. The Cascadia subduction zone along the Pacific Northwest coast of North America has been compared to the Sunda–Andaman subduction zone based on probable earthquake magnitudes and paleotsunami effects [*Dengler*, 2006]. Abundant paleoseismic data from northern California, Oregon, Washington and Vancouver Island, Canada [*Atwater et al.*, 1995], and modeling results based on Japanese written records [*Satake et al.*, 2003] suggest that past tsunamis were of comparable size to the Indian Ocean event.

[3] Crescent City, located on the California coast about 460 kilometers north of San Francisco, is near the southern end of the CSZ and is particularly vulnerable to tsunami damage from distant events. Twenty-four tsunamis have been recorded since 1938, nine with amplitudes of 0.5 meters or larger [*Dengler and Magoon*, 2006]. The tsunami triggered by the March 28, 1964 (M_w = 9.2) great Alaskan earthquake killed 11 and caused at least $15 million in losses [*Lander et al.*, 1993] in Crescent City. On November 15, 2006 a tsunami generated by an M_w 8.3 earthquake in the Kuril Islands caused an estimated $5.9 million in damages to the small boat basin in Crescent Harbor [*Kelley et al.*, 2006; C. Young, personal communication, 2006].

[4] Several studies have looked for geologic evidence of past tsunamis in the Crescent City (CC) area [*Abramson*, 1998; *Pacific Gas and Electric*, 2003; *Clarke and Carver*, 1992]; deposits interpreted as tsunami sands have been found in a number of locations suggestive of inundation significantly greater than observed in 1964. Numerical modeling as part of the California Division of Mines and Geology (CDMG) for an earthquake on the southern Cascadia subduction zone showed flooding about twice as far inland as in 1964 [*Bernard et al.*, 1994; *Toppozada et al.*, 1995]. *Bernard et al.* [1994] used an early generation hydrodynamic model to estimate inundation in Crescent City. That model was never validated through benchmark testing [*Yeh et al.*, 1996] and the results were incompatible with some paleotsunami data, particularly in the Humboldt Bay region [*Pacific Gas and Electric*, 2003].

[5] This study re-examines the tsunami hazard in CC from Cascadia earthquakes. We use the numerical model MOST [*Titov and Synolakis*, 1998] to simulate tsunami generation, propagation and runup. MOST has been benchmarked against measured tsunami water heights and model results can be directly compared with tide gauge recordings of past events. We investigate the relative tsunami hazard posed by segments and full ruptures of the CSZ and the sensitivity of the results to slip partitioning [*Uslu*, 2007].

2. Regional Geologic Setting

[6] Figure 1 shows the location of the CSZ, which runs from Cape Mendocino in California north of Vancouver Island, British Columbia. Subduction rates along the CSZ vary from north to south approaching 4 cm/yr where the Juan de Fuca plate subducts beneath the North American plate in the vicinity of Washington state [*Satake et al.*, 2003], slowing to 3 cm/yr at the northern end of the Gorda plate beneath southern Oregon [*Wang et al.*, 2001] and reaching zero at the southern end of the Gorda plate at the Mendocino triple junction in northern California [*Clarke and Carver*, 1992].

[7] *Wang et al.* [2003] combined information about the 1700 A.D. earthquake and other subduction zones and calculated the limits of a potential rupture, strains, rupture velocities and uplift rates. Their conservative approach for the CSZ, assumes a full coseismic rupture over the entire subduction zone with an average recurrence of 520 years.

[1] Department of Civil Engineering, University of Southern California, Los Angeles, California, USA.
[2] ASR Ltd., Marine Consulting and Research, Raglan, New Zealand.
[3] Department of Geology, Humboldt State University, Arcata, California, USA.
[4] Laboratory of Natural Hazards, Technical University of Crete, Chania, Greece.

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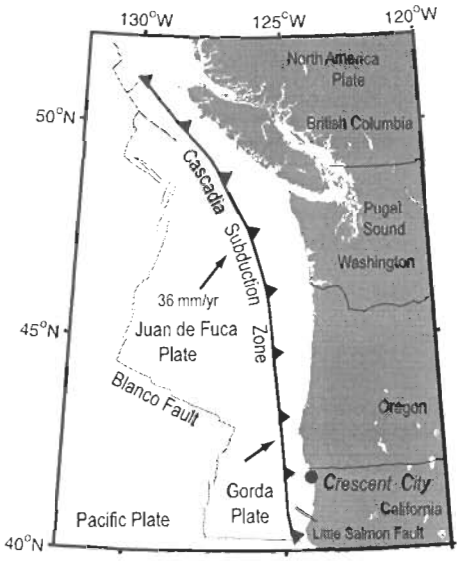

Figure 1. Tectonic settings of the Cascadia subduction zone [after *Satake et al.*, 2003].

[8] Although paleoseismic data support the possibility of a long rupture and there is consensus that 1700 event involved the entire zone [*Satake et al.*, 2003; *Satake and Atwater*, 2007], this may not happen in every CSZ event. The stress field and rates of strain accumulation vary from north to south and it is possible that some events are segment ruptures. For example, [*Clarke and Carver*, 1992] define a southern or Gorda segment with dimensions of about 240 km × 80 km with a fault dip of 10–20°. Paleotsunami studies from southern Oregon show several events not present in records from elsewhere on the subduction zone [*Nelson et al.*, 2006], possibly related to segment ruptures. This apparently random alternating between segment ruptures and mega-events involving the whole length of the fault was first described in Japan by *Ando* [1975] and more recently documented in other provinces [*Cisternas et al.*, 2005; *Nanayama et al.*, 2005]. In addition to the main rupture zone, a number of subsidiary faults in the CSZ accretionary fold and thrust belt pose a tsunami hazard [*Clarke and Carver*, 1992]. Simultaneous rupture of the Little Salmon fault with CSZ, located along the northern edge of the Eel River basin, was included in the CDMG Cascadia scenario [*Toppozada et al.*, 1995].

3. Tsunami Scenarios

[9] We modeled six scenarios to assess the local tsunami hazard from a CSZ rupture, varying slip, length of rupture and magnitude (Table 1). Scenarios SN and SW involve rupture of the southern or Gorda segment of the subduction zone only, and differ only in the width of the rupture zone. SP1 and SP2 also only rupture the Gorda segment, but partition the slip between the Little Salmon fault and the CSZ. CSZ N considers only slip on the northern or Juan de Fuca segment of the CSZ, with 11 m of slip along a 800 km × 100 km rupture, stopping just north of the California border. CSZ L, the largest magnitude event modeled, simulates rupture of the entire subduction zone with characteristics believed similar to the 1700 rupture, combining the average slip and the dimensions of *Satake et al.* [2003] with partitioned slip on the Gorda segment similar to SP1. The northern 800 km is characterized by a slip distribution with an average of 12 m. The southern part includes slip on both the CSZ and the Little Salmon fault and is identical to SP2. The initial conditions for these scenarios are shown in Figure 2.

[10] To validate our CSZ modeling results, we ran simulations of the March 28, 1964 Alaska earthquake, the 1992 M_w 7.1 Cape Mendocino earthquake [*González et al.*, 1995] and the November 15, 2006 M_w 8.3 Kurils Islands earthquake. For the 1964 source, we used a double fault mechanism with M_w = 9.2 as suggested by *Plafker* [1969, 1972]. We compare the

Table 1. Source Parameters Used in Modeling

Sources	Comment	L, km	W, km	Disp, m	Dip, deg	Rake, deg	Strike, deg	Depth, km	M_w
CSZ-SN	Gorda Segment Narrow	150	80	8	10	90	350	5	8.44
		90	80	8	10	90	340	5	
CSZ-SW	Gorda Segment Wide	150	100	8	10	90	350	5	8.51
		90	100	8	10	90	340	5	
CSZ-SP1	Gorda Little Salmon 1	150	30	4	10	90	350	5	8.48
		150	10	4	30	90	350	5	
		150	70	8	10	90	350	10	
		90	30	4	10	90	340	5	
		90	70	8	8	90	340	10	
		90	10	4	20	90	310	5	
CSZ-SP2	Gorda Little Salmon 2	150	100	8	10	90	350	5	8.50
		90	30	4	10	90	340	5	
		90	70	8	10	90	340	10	
		90	10	4	20	90	310	5	
CSZ-N	Juan de Fuca Segments	800	100	11	15	90	n/a	5	8.95
CSZ-L	Full Rupture	800	100	11	15	90	n/a	5	9.02
		240	100	7	10	90	n/a	5	
Benchmarks									
Alaska 1964		400	290	10	10	90	224	5	9.16
		400	175	10	9	75	230	15	
Kurils 2006		200	100	4	10	90	215	30	8.25
C.Mendocino 1992		21.5	16	2.7	12	107	342	6.3	6.96

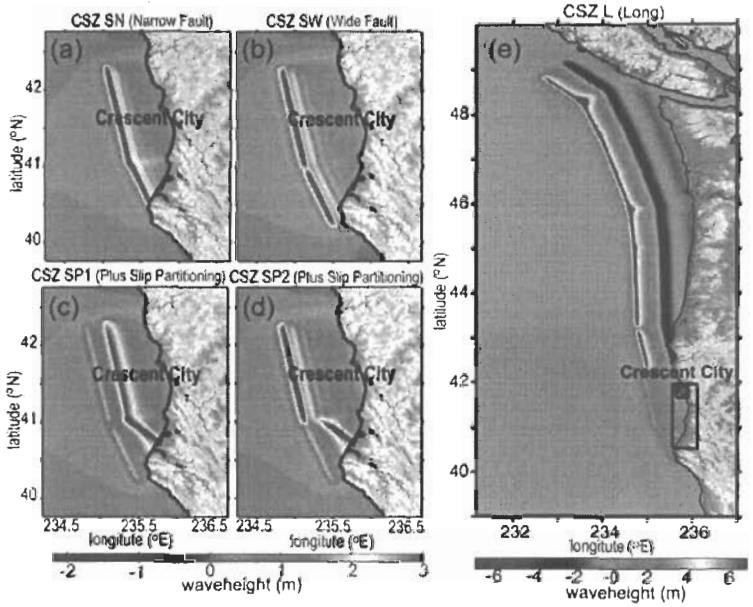

Figure 2. (a–e) Initial conditions for cases CSZ SN, SW, SP1, SP2 and L. Note that Figure 2e uses a different color scale. CSZ N is similar to Figure 2e, but no rupture extends into California.

modeled inundation results to the post tsunami survey data of *Magoon* [1966].

4. Tsunami Modeling

[11] Numerical modeling of tsunamis involves three parts; generation, propagation and runup. We assume an instantaneous, static initial condition calculated from the earthquake displacement field using [*Okada*, 1985] model for a fault rupture at depth. For tsunami wave propagation and runup, we use the model MOST (Method of Splitting Tsunami), which solves the 2 + 1 non-linear shallow water wave equations in rectangular or spherical coordinates [*Titov and Synolakis*, 1997], runup calculations are performed using a moving shoreline algorithm to the wave front over dry land [*Titov and Synolakis*, 1998]. Runup and inundation are computed over the post earthquake deformed topography.

[12] We used a system of three nested grids as shown in Figure 2e. The bathymetry and topography data were merged using GIS from the highest resolution and regridded to a uniform 3-arc second resolution. The nested grid configuration allows for more efficient computation of

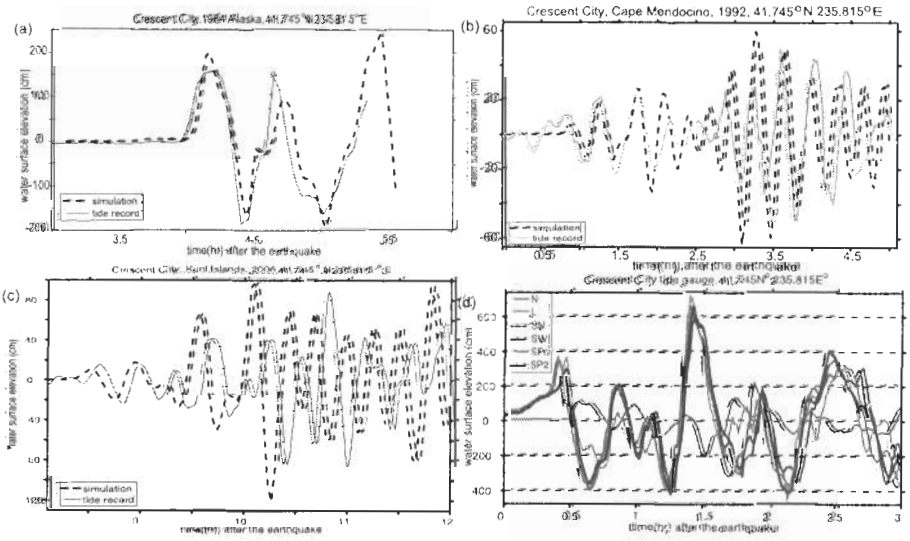

Figure 3. Comparison of tide gage records to model results of 1964, 1992 and 2006 events and model results from CSZ-SN, SW, SP1 and SP2 at the Crescent City tide gauge station. Zero represents mean sea level.

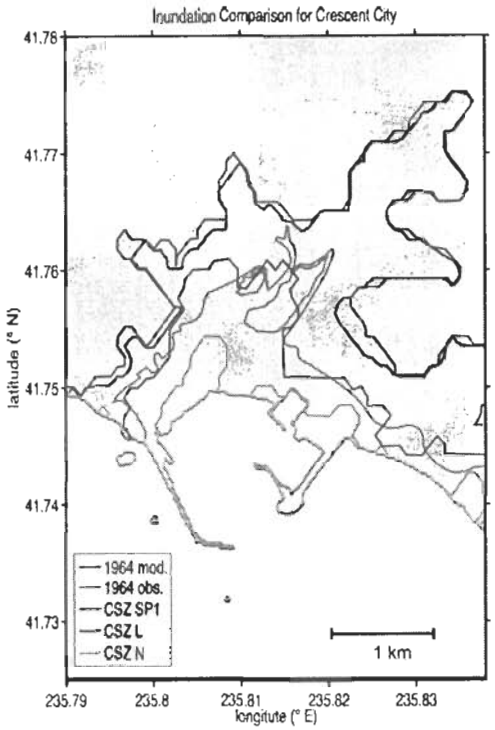

Figure 4. Observed tsunami inundation distances from the 1964 event [*Magoon*, 1966] compared to selected CSZ scenario events.

propagation in areas where local runup is not of interest. Similar multi grid computations for Southern California are discussed by *Borrero et al.* [2005].

5. Results

[13] Figure 3a compares the 1964 tide gage record located in Crescent Harbor to the model results. Water levels are referenced to mean sea level. The first two cycles show a good fit in arrival time, amplitude and period between the modeled and observed data. The tide gauge housing was knocked over as the third surge arrived, destroying the instrument and cutting the record short.

[14] Figure 3b compares modeled and observed records of the 25 April 1992 tsunami produced by the Cape Mendocino (M_w 7.1) earthquake. This was the first large earthquake in historic times located on the CSZ [*González et al.*, 1995] and the modeled results are a good match for the measured tsunami record.

[15] Figure 3c compares the modeled and observed records of the tsunami generated by the 15 November 2006 Kuril Island earthquake at Crescent Harbor. Our model captures the initial wave arrival, the wave periods and the maximum wave height, but not the precise time history. Higher resolution is needed to model the complex harbor resonance effects at the shorter periods generated by this smaller event [*Synolakis*, 2004].

[16] The modeled water level histories at the site of the CC tide gauge are shown for Cascadia scenarios in Figure 3d. The four Gorda scenarios, SN, SW, SP1 and SP2, show very similar results. The differences are well within the error margins of the simulations. The full Cascadia rupture CSZ L is marginally larger than the Gorda segment events. The only scenario that is significantly smaller is the northern segment rupture CSZ N.

[17] Figure 4 shows the expected inundation from CSZ scenarios to the observed flooding measured by *Magoon* [1966] for the 1964 tsunami. The full rupture CSZ L produces nearly identical inundation to the partitioned slip model CSZ SP1 and the other three Gorda segment ruptures (not shown). The maximum extent of flooding is 3.8 km from the coastline in the vicinity of Elk Creek, more than twice as far inland as observed in 1964. Only the northern segment rupture CSZ N produces less extensive flooding than the 1964 event.

6. Discussion and Conclusion

[18] We performed inundation modeling for tsunamis affecting CC using both near and far field sources. Our model accurately simulated the water level history produced by the March 28, 1964 Alaska earthquake, 1992 Cape Mendocino earthquake and the November 15, 2006, Kuril Islands earthquake. Our results suggest that a tsunami caused by ruptures on the CSZ would impact Crescent City worse than in 1964. Such an event would inundate 3.8 km inland, twice as far inland as the 1964 event. Inundation distances of this order were observed in Aceh during the 2004 megatsunami [*Borrero*, 2005; *Geist et al.*, 2006; *Synolakis and Kong*, 2006]. We note that the maximum slip in any of our scenarios for the Gorda rupture is 8 m. If the slip were substantially greater, both wave heights and inundation extent would be larger. We also studied the effects of slip partitioning on six segments from the Gorda plate. Further effects of heterogeneous slip, such as those of *Geist and Dmowska* [1999] need to be investigated in future studies.

[19] Rupture of the Gorda segment of the Cascadia subduction zone controls the tsunami hazard at Crescent City. The full rupture (CSZ L) produces marginally larger inundation than the four other scenarios that only involve a Gorda rupture. The width of the rupture and the amount of slip partitioning between the CSZ megathrust and the Little Salmon fault has little effect. In contrast, the northern rupture (CSZ N), an event nearly as large in magnitude as the full rupture and significantly larger than any of the Gorda segment events, produces less inundation than the 1964 tsunami.

[20] The arrival of the first tsunami wave at CC for all Gorda ruptures is only minutes after the earthquake is initiated. The crest of the first tsunami wave arrives at the tide gauge in CC in only 25 min (Figure 3d). Because the north coast of California is so close to the leading edge of the subduction zone, the adjacent offshore area is predominately uplifted in a Cascadia event producing a leading–elevation wave [*Tadepalli and Synolakis*, 1996]. For subduction zones that are further offshore, subsidence produces a leading–depression wave on the adjacent coastline, thus providing a recognizable natural warning signal and additional time to evacuate. For Crescent City, the water level will begin rising almost immediately after the earthquake. Residents must be prepared to self evacuate, after any violent shaking that lasts more than 30 sec.

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J. C. Borrero, C. E. Synolakis, and B. Uslu, Department of Civil Engineering, University of Southern California, Los Angeles, CA 90089-2531, USA. (jborrero@usc.edu; costas@usc.edu; uslu@usc.edu)

L. A. Dengler, Department of Geology, Humboldt State University, Arcata, CA 95521, USA. (lad1@humboldt.edu)

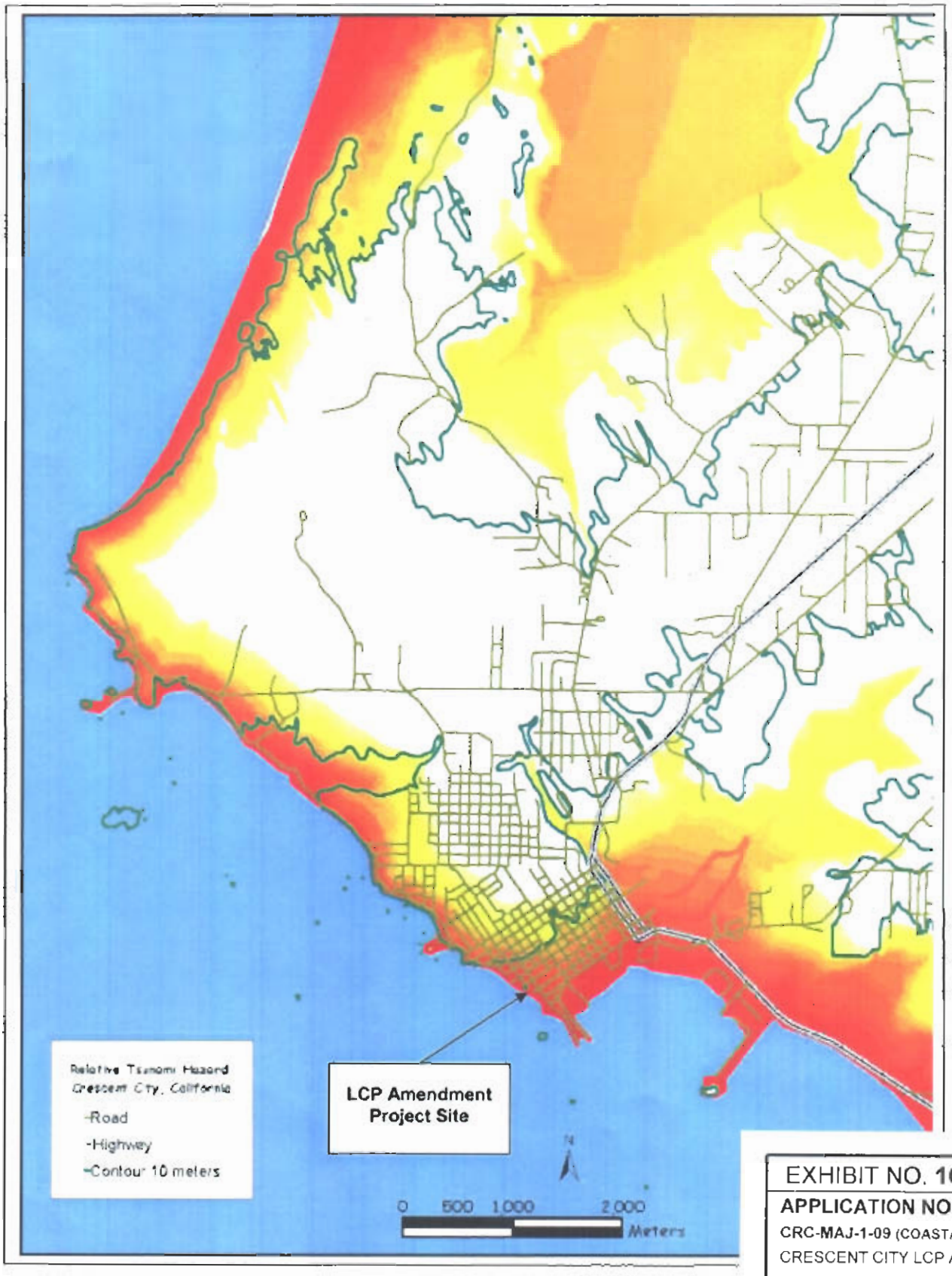


EXHIBIT NO. 16

APPLICATION NO.

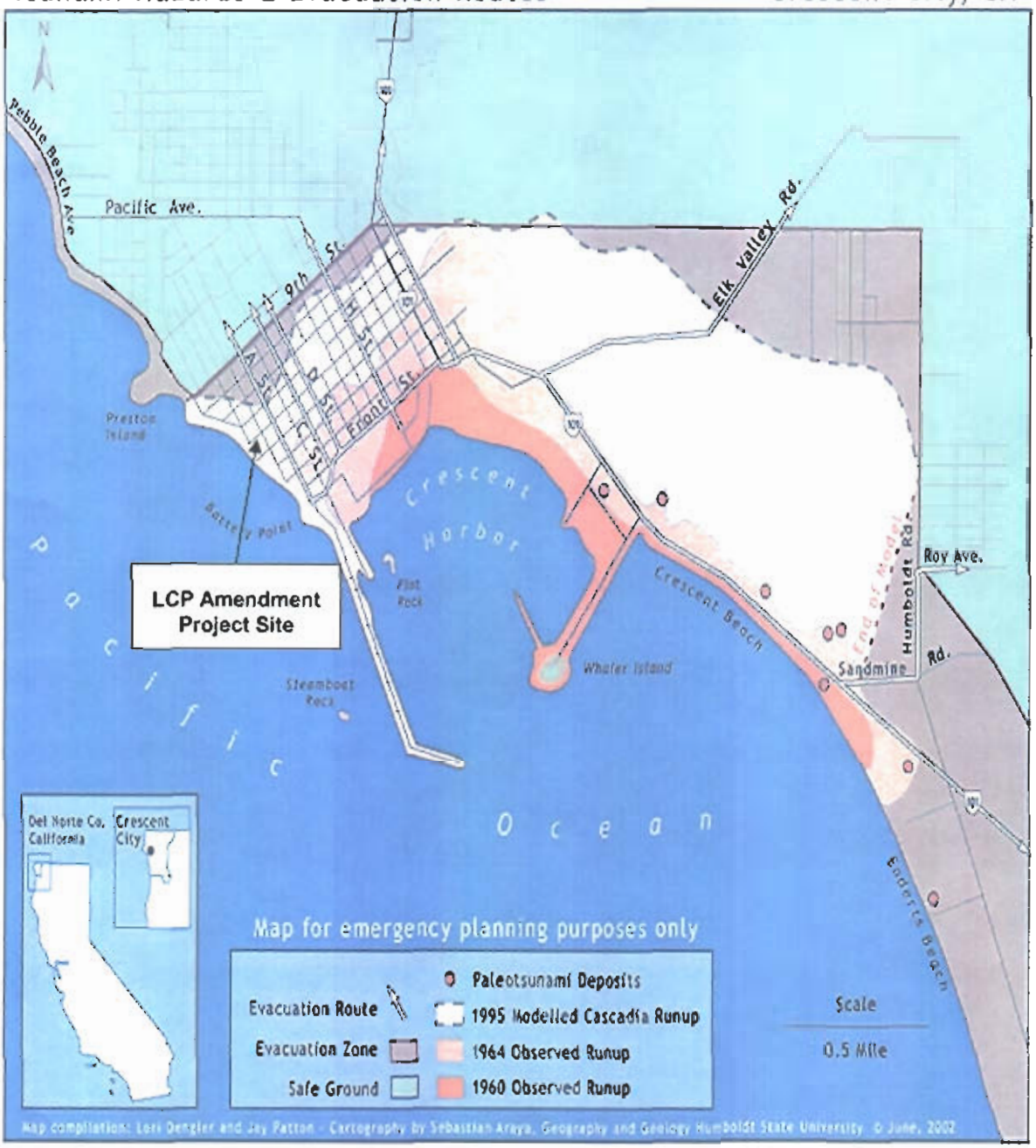
CRC-MAJ-1-09 (COASTA NORTE)

CRESCENT CITY LCP AMEND.

RELATIVE TSUNAMI HAZARD - CRESCENT CITY, CALIFORNIA

Tsunami Hazards & Evacuation Routes

Crescent City, CA



1960 Tsunami runup data: Wallace Griffin personal communication
1964 Tsunami runup data: Lander and others, 1993
1995 Modelled runup data: Bernard and others, 1994

Evacuation Zone data: Del Norte Co. Office of Emergency Services
Paleotsunami deposit data: Gary Carver personal communication
Streets and coastline: ESRI data

EXHIBIT NO. 17
APPLICATION NO.
CRC-MAJ-1-09 (COASTA NORTE)
CRESCENT CITY LCP AMEND.
TSUNAMI HAZARDS AND EVACUATION ROUTES