

Scope of Work: Santa Cruz County Climate Adaptation Vulnerability Assessment and Transportation Priorities Report (CAVA)
DRAFT

Task 1: Project Management and Coordination

Purpose: To design and implement a project management and coordination plan that will establish mutual trust, transparency, communications, clear expectations, and management procedures.

Task 1.1: Project Kick Off Meeting

Conduct an in-person kickoff meeting with the project team. The kickoff meeting is a chance to discuss expectations for the work, review key stakeholders and outcomes, and clarify any upfront questions so that work can commence accordingly.

In addition to a strategic discussion about the project, the kickoff will include a tactical/logistical discussion about project team communications, task schedule, background resources and data, stakeholder coordination, file sharing and other administrative items.

The discussion will include:

- day-to-day communications, administration protocols, and expected outcomes
- the various tasks of the project including development of the objectives of the project, project framework, and hazards and assets to be evaluated
- tools, data, and other methodologies that will be needed for mapping climate change hazards
- previously completed studies relevant to this project
- coordination with stakeholders, public, RTC and County

Task 1.2: Biweekly Check-Ins and Written Progress Reports

Consultant will facilitate biweekly (every 2 weeks) virtual check-in meetings with RTC and County staff. These meetings will serve as a regular touchpoint where the consultant team can give updates on progress, issues, and upcoming work, and where RTC/County staff can provide input or feedback. Consultant will provide meeting agendas and notes for each biweekly meeting with action items. Each month, consultant will provide a progress report, including any schedule updates, along with an invoice to the RTC contract manager. Each report should be sufficiently detailed for the contract manager to determine if the consultant is performing to expectations and is on schedule, percentage of budget spent and achievement of overall study objectives. Reports will also contain a summary of obstacles and issues, recommended solution or course of action, and a timeline for resolution.

Task 1 Deliverables:

- ▶ 1.1.1 Project schedule, meeting agenda and minutes
- ▶ 1.2.1 Biweekly meeting agendas, action items and conference calls
- ▶ 1.2.2 Monthly schedule updates

► 1.2.3 Written progress reports with each invoice

Task 2: Review Relevant Studies and Climate Hazard Tools and Data

Purpose: To review relevant plans, studies, and funding program guidelines to 1) understand the history of climate adaptation and hazard mitigation work done within Santa Cruz County, 2) understand the Caltrans Climate Adaptation Framework and work to date, and 3) identify best practices from similar studies on how to prioritize transportation infrastructure for future detailed climate resiliency assessments.

Task 2.1: Review Previous Studies Relevant to Project

Consultant will review previous studies, tools, data sources, and methodologies in tandem. Consultant will develop an annotated bibliography of the studies listed below with a brief description of their relevance, particularly from a climate hazard perspective to be included as an appendix in the final report. Part of that deliverable will be a synthesis of lessons learned and best practices, to provide guidance on the methodology, data, and key gaps in past analysis.

Consultant shall review previous climate adaptation work relevant to this project including but not limited to:

- 2013 County of Santa Cruz Climate Action Strategy
- 2015 Capitola Climate Action Plan
- 2017 Climate Change Scoping Plan Update
- 2017 Coastal Climate Change Vulnerability Report (Focus is on coastal zone in Santa Cruz County)
- 2019 County of Santa Cruz/City of Scotts Valley Complete Streets to Schools Plan
- 2019 Caltrans Climate Change Vulnerability Assessments – District 5 Technical Report
- 2020 Central Coast Highway 1 Climate Resiliency Study (Focus is on Moss Landing area in Monterey County)
- 2020 California Adaptation Planning Guide
- 2021 California Coastal Commission Draft SLR Policy Guidance for Critical Infrastructure
- 2021 County of Santa Cruz Local Hazard Mitigation Plan
- 2021 Caltrans Climate Change Adaptation Priorities Report – District 5
- 2021 Caltrans District 5 Active Transportation Plan
- 2021 Climate Action Plan for Transportation Infrastructure (CAPTI)
- Watsonville 2030 Climate Action and Adaptation Plan
- 2022 County of Santa Cruz Climate Action and Adaptation Plan
- 2022 Sustainable Santa Cruz County Plan and General Plan Update
- 2022 Santa Cruz County Active Transportation Plan
- 2023 County of Santa Cruz Regional Housing Needs Allocation
- 2023 County of Santa Cruz Housing Element Update
- U.S. Climate Resilience Toolkit
- Transformative Climate Communities Program
- City of Santa Cruz Climate Action Plan
- City of Watsonville Climate Action Plan

Review climate adaptation planning efforts from similar coastal counties including but not limited to:

- San Francisco, San Mateo, Alameda, Monterey, San Luis Obispo, Santa Barbara

Task 2.2: Review Tools, Data, and Methodologies for Mapping Climate Hazards

Consultant will review the relevant climate hazard data, tools, and mapping listed below. One key consideration will be whether to use the recently released Scripps Localized Constructed Analogs 2 (LOCA2) downscaled climate projections that are based on the Coupled Model Intercomparison Project Phase 6 (CMIP 6) global climate models (GCMs) used in the International Panel on Climate Change (IPCC) Sixth Assessment Report (AR 6). These LOCA2 projections are now available at the 6-kilometer grid cell resolution. Scripps is also developing an even higher resolution version of these projections (3-kilometer). The LOCA2 projections are not yet incorporated into Cal-Adapt, but they will become the predominant climate projections used in the State over the coming years.

Like the annotated list and synthesis of studies provided in 2.1, consultant will provide a similar list and synthesis of tools and data for this task, focusing on those most relevant for Santa Cruz County to be included as an appendix in the final report.

Consultant shall review tools, data, and methodologies for mapping climate change hazards in Santa Cruz County including but not limited to:

- Cal-Adapt 2.0
- NOAA Sea Level Rise data
- FEMA Flood Hazard Areas
- Scripps Institution of Oceanography – 100-year storm precipitation depth
- Scripps Institution of Oceanography – Average Maximum Temperature
- US Forest Service Wildfire Models
- State of California Sea Level Rise Guidance – 2018 Update
- Nature Conservancy Coastal Resilience mapping portal
- Center for Western Weather and Water Extremes
- Santa Cruz County – Atkins Debris Flow Flood Study
- MBARI Climate Change Research
- USGS Coastal Storm Modeling System (CoSMoS)
- AR6 Climate Change 2021 – Intergovernmental Panel on Climate Change

Deliverables:

- ▶ 2.1.1 List and summarize studies reviewed and provide best practices as they inform pertinent aspects of this analysis.
- ▶ 2.2.1 List and summarize tools/data/methodologies reviewed and provide existing best practices for mapping climate hazards.

Task 3: Develop Project Framework

Purpose: Identify the methodology for performing the vulnerability assessment, prioritization metrics, and project priority list. A memorandum outlining the detailed methodology will be developed that includes climate hazards and assets to be evaluated and metrics for assessing prioritization.

Consideration should be given for the 2017 Coastal Climate Change Vulnerability Report that evaluated

climate impacts along the coast of Santa Cruz County. The project framework memorandum will be a section of the final report.

Task 3.1 Determine the climate hazards that impact the transportation infrastructure

Consultant along with the RTC and County project team and with input from public and stakeholders will establish the list of climate hazards to be evaluated vis-à-vis the transportation infrastructure in the county. Hazards will include but are not limited to:

- ▶ Coastal flooding (including both storm surge and tidal flooding exacerbated by sea level rise (SLR))
- ▶ Coastal erosion (including both cliff retreat and shoreline erosion)
- ▶ Riverine/localized flooding (including changes driven by precipitation and wildfire impacts; and including debris flow)
- ▶ Slope failure (including changes driven by high intensity precipitation)
- ▶ Extreme heat
- ▶ Wildfire direct impacts

Task 3.2 Determine the most up-to-date climate science data and tools to use for assessing climate impact

Leveraging the review of climate hazard data from Task 2, consultant with input from the RTC and County project team will establish the set of climate data to use for the vulnerability assessment. This will be done in coordination with the client PM and other project stakeholders. The climate hazard data will align with the hazard types determined in Task 3.1.

Task 3.3 Determine the transportation assets that will be evaluated

Consultant along with the RTC and County project team and input from the public and stakeholders will establish the transportation assets to be evaluated in the assessment. These will include local transportation assets in the unincorporated areas in the county and along the Santa Cruz Branch Rail Line (SCBRL).

It is critical that some of the data gathering described in Task 5 be done in parallel or prior to completing this subtask. Availability of asset-level, location-specific (e.g., GIS) data will shape the granularity of the asset list. Fortunately, the county does have several key datasets readily available including layers on County maintained Roads, bridges (which includes some culverts), bicycle facilities, and minor assets such as signals, signs, posts, and streetlights.

Establishing the units of analysis (e.g., roadway segmentation) will be another important portion of this task. This should be done in a manner that can inform future adaptation work, whether it be capital projects or maintenance activities. Some GIS processing will be required to establish units of analysis. For some asset types or asset-related information, such as slopes adjacent to roadways or rail, GIS processes for creating this data that will streamline the effort will be needed.

These assets may include but are not limited to the following:

- Local roadways
 - Roadways

- Slopes and embankments
- Retaining walls
- Guardrails
- Sidewalks
- Bicycle facilities
- Bridges
- Culverts and other drainage systems
- Utilities along roadway infrastructure
- Intersections – traffic signals etc.
- SCBRL rail and trail
 - Track, ties, and ballast
 - Bridges
 - Retaining walls
 - Slopes and embankments
 - Culverts and other drainage systems
 - Trail pavement

Task 3.4 Establish the metrics that include both exposure level and degree of consequences that will determine the prioritization

Consultant along with the RTC and County project team and input from public and stakeholders will establish the set of metrics to be used in assessing both exposure level of the assets to different hazard types and the degree of consequences of this exposure. The attributes and characteristics of the hazard and asset data in Tasks 3.2 and 3.4 will help determine these metrics. Metrics could include but are not limited to the following:

- Hazards
 - Length of asset exposed to a given level of sea level rise, coastal cliff retreat, and 100-year storm flooding
 - Lowest SLR increment that results in damage from coastal hazards
 - Highest Projected Wildfire Level of Concern
 - Highest Projected Post-Wildfire Mud Debris Level of Concern
 - Length of Asset exposed to riverine flooding – 100- year storm
 - Areas with temperature forecasts for over a given number of degrees
 - Length of asset exposed to slopes above or below with a grade greater than a given number of degrees
 - Length of Asset adjacent to slopes over 20%
- Consequences
 - Average annual daily traffic
 - Average annual daily truck traffic
 - Identify if transit route and/or active transportation route
 - Incremental travel time/distance to detour around the asset if impacted
 - Status as evacuation route
 - Bridge scour rating
 - Existing asset condition rating
 - Existence of critical utilities (water, gas, electric, sanitary sewers, etc.)

- Location relative to disadvantaged and vulnerable communities
- Impacts to existing RHNA sites with lower income housing
Roadways with only one way in and out

Task 3.5 Develop the project framework for performing the vulnerability assessment, prioritization metrics, and project priority list.

Develop the project framework for performing the vulnerability assessment, prioritization metrics, and project priority list. A memorandum, to be included as a section in the Final Report, outlining the detailed methodology will be developed that includes the hazards and assets evaluated, tools utilized and data needs for determining the metric ratings.

This subtask will incorporate all the information established earlier in the task and create the structure for the Tasks 5 and 6 work. One important discussion point will be finalizing how the metrics scaled (e.g., placed on a relative scale from 0 to 100) and then combined, including how they are weighted. The method can include a cross-hazard score in addition to scores for each hazard. The memorandum should also specify how stakeholder input will be incorporated into the analysis and prioritization. The method will include practitioner input on past trouble locations – an invaluable source of information for these analyses – and about planning priorities for the region. Public input shall also be tied into the analysis process.

Thus, this subtask will tie in heavily with Task 4 as well. The analysis will produce a large amount of information, so organizing and synthesizing findings will be critical. This subtask will describe how that information can be summarized and displayed, including a list of maps, tables, and charts that will be produced. Consultant will compile this information in a comprehensive memorandum that will guide the technical work for the remainder of the project.

Deliverables:

- ▶ 3.1.1 List of climate hazards to be evaluated
- ▶ 3.2.1 List the data and tools to be used for assessing climate hazards for all of Santa Cruz County
- ▶ 3.3.1 List of transportation assets to be evaluated
- ▶ 3.4.1 Table of Metrics for each Asset-Hazard Combination
- ▶ 3.5.1 Memorandum on Project Framework defining the lists and maps of hazards and assets and the metrics to be utilized for prioritization of asset resiliency assessments.

Task 4: Public and Stakeholder Outreach

Task 4.1 Consultant will provide graphic support and attend stakeholder meetings as part of the team to answer questions about the project.

This project will follow the equity outreach guidelines under development by RTC through a parallel effort. Consultants' role will be to support and implement this approach to engage stakeholders and get public input throughout the course of the CAVA project. While SCCRTC will direct the outreach, including selecting outreach locations and leading advertising, consultant will support SCCRTC with developing exhibits, graphics, and maps for the outreach events. Consultant will attend meetings and deliver presentations at events.

Consultant will provide input on definition of vulnerable communities and list of these communities, prepared by RTC and County project team. Consultant will also provide input on Outreach Plan prepared by RTC and County project team.

Deliverables:

- ▶ 4.1.1 Graphics to support stakeholder and public outreach and attendance at meetings
- ▶ 4.1.2 Input on list of vulnerable communities and Outreach Plan developed by RTC and County project team

Task 5: Vulnerability Assessment

Based on the framework developed in Task 3, this task will compile, process, and visualize the climate hazard and transportation asset vulnerability data.

Task 5.1 Map the climate hazard areas

Using the most up-to-date climate science data and tools for assessing climate impact areas, map the climate hazard areas for all of Santa Cruz County, building on the work that has previously been mapped within the coastal zone and emphasizing the areas within the interior of the county that are prone to wildfire, flooding, slope failure, and debris flow.

Consultant will produce a set of detailed maps showing the climate hazard data overlaid with the County. These maps will correspond with those defined in the Task 3 methodology memorandum. Consultant will work with the RTC and County to establish a suitable template for the maps, including base map, features, and scale. Consultant will present draft maps to discuss preliminary findings and to edit formatting. This initial discussion of hazard findings will be a key checkpoint in the project and may be a good opportunity to share a project update with a broader set of stakeholders.

Task 5.2 Collect and compile the data on transportation asset locations and other attributes that will be used in the metrics

Consultant will collect and compile the data on transportation asset locations and other attributes that will be used in the metrics (AADT, transit route, active transportation, critical utilities, evacuation route status etc.) into a GIS. Consultants will work with RTC and the County to compile the data needed on the asset's locations and other attributes as feasible and will map in a GIS. The collection and compilation of transportation asset data in GIS or similar format (e.g., tabular with coordinates) is a critical path activity for solidifying portions of the methodology in Task 3. As alluded to earlier in this scope, Task 5.2 will commence prior to Task 3.3 so that it can inform the transportation assets defined in that subtask.

Task 5.3 Determine areas with disadvantaged/vulnerable communities

Determine the areas with disadvantaged/vulnerable communities in the unincorporated county that could be impacted by climate hazards. RTC and County will work with the consultant to define and map the location of these vulnerable communities in the unincorporated county that could be impacted by climate hazards. This information is important for establishing a set of equitable priorities and recommendations in Task 6.

Deliverables:

- ▶ 5.1.1 Map the climate impact areas for each of the hazards for all of Santa Cruz County in a GIS

► 5.2.1 Map of asset data in a GIS including existing conditions and data needed for consequence metrics.

► 5.3.1 Map of disadvantaged/vulnerable communities in unincorporated Santa Cruz County in a GIS using tessellated or more granular analysis geographies than census block levels.

Task 6: Prioritize Transportation Projects for Adaptation Planning

This task will apply the methodology devised in Task 3 and create a list of priority assets for project-level adaptation planning.

Task 6.1 Evaluate the transportation assets within the hazard areas and score the assets using the metrics that have been identified.

Consultant will process the hazard and asset data gathered and calculate the exposure and consequence metrics for each asset-hazard combination. Consultant will then combine these metrics into scores for each hazard and an overall score for cross-hazard comparison, and provide these results in tabular and GIS format.

Task 6.2 Determine the list of priority transportation projects for the unincorporated county and the SCBRL

After scoring the transportation assets in Task 6.1, consultant will share those results with the RTC and County project team and input will be solicited from the public and other stakeholders. The scores can be ordered from highest vulnerability to lowest vulnerability. This is an important chance for stakeholders to react to the results and establish which assets should be explored in more detail and potentially implemented as adaptation projects. These conversations will ground truth the scoring results and tease out additional areas that may need to be prioritized.

Using the results of the scoring and these discussions, consultant will develop draft lists of priority transportation projects for both the unincorporated county and the SCBRL. To be useful, the lists of priority projects should be established using both the scoring exercise and the expert input, rather than simply a list of the highest scoring assets. In addition to feedback from the stakeholder discussions, consultant will rely on input from our engineering lead regarding project feasibility to help establish this list.

The Task 6 priority lists should include projects that will be competitive for resilience-focused funding, including the Federal BIL/IIJA PROTECT discretionary grants and CTC Local Transportation Climate Adaptation Program.

Deliverables:

► 6.1.1 Table of scores for transportation assets

► 6.2.1 List of transportation assets in priority order for local transportation facilities in Unincorporated County

► 6.2.2 List of transportation assets in priority order for SCBRL including the Rail Trail

Task 7: Draft and Final Report

Purpose: To prepare the Administrative, Draft, and Final Reports that clearly lays out the climate adaptation vulnerability assessment and the methodology for prioritization of transportation assets for future detailed resiliency assessments. Consultant will work with the RTC and County to prepare the content and outline for a visually appealing, graphics-oriented report. Consultant will use the deliverables prepared for the previous tasks in preparing the report. This task will summarize the outcomes of Tasks 2-6, and graphically communicate the key findings and recommendations of the Vulnerability Assessment (Task 5) and the Prioritized Transportation Projects for Adaptation Planning (Task 6). More specifically, the final report will detail the climate adaptation vulnerability assessment and the methodology for prioritization of transportation assets for future detailed resiliency assessments, as well as next steps for RTC/County to take to make the community and infrastructure more resilient for future climate events.

Task 7.1: Preparation of Administrative Draft

Consultant will prepare an initial administrative draft of the final report. The administrative draft will include draft language that clearly documents:

- ▶ the tools, data, and methodologies used in the vulnerability assessment and transportation prioritization,
- ▶ recommendations for next steps, and
- ▶ a detailed description of the analysis completed including any assumptions and limitations to the analysis as well as the public and stakeholder outreach.

Methodologies used need to be rigorously documented. The administrative draft will be submitted as a Word document, along with a proposed InDesign template, cover page, and graphics for RTC and County Staff to review. Consultant will revise the administrative draft based on a consolidated set of comments from RTC and County staff.

Task 7.2: Draft Report and Presentation for RTC, Partner Agencies, and the Public

Consultant shall address comments received on administrative draft from RTC and County staff and prepare draft report. The draft report, which will be shared with advisory committees for input, will be a graphically-rich InDesign document. Consultant will share and present the draft report at a partner agency meeting and to the RTC and County Board of Supervisors, and will compile all comments received including from members of the public and other stakeholders and make revisions as directed by RTC/County.

Task 7.3: Final Report

Complete the final report with consideration of comments received from RTC and County BOS, RTC Committees, stakeholders, public and RTC and County staff on draft document. Final report should include a discussion of funding opportunities and recommendations for next steps. Include credit of the financial contribution of the Caltrans grant program on the cover of the report. Consultant will address all comments from stakeholders in the Final Report so that it serves as a roadmap for next steps for RTC/County. The consultant team will also develop a GIS Story map to serve as an interactive, public-facing information portal for the community.

Deliverables:

- ▶ 7.1.1 Administrative Draft of Santa Cruz County Climate Adaptation Vulnerability Assessment and Transportation Priorities Report
- ▶ 7.1.2 Revised Administrative draft based on RTC and County staff comments.
- ▶ 7.2.1 Draft of Santa Cruz County Climate Adaptation Vulnerability Assessment and Transportation Priorities Report
- ▶ 7.2.2 Compiled list of comments from public, partner agency, advisory committees, County, and RTC and responses to the comments
- ▶ 7.2.3 Meeting agenda, presentation slides, and oral presentation of draft report at partner agency meeting and meeting minutes
- ▶ 7.2.4 PowerPoint and oral presentation of draft report at RTC and County BOS meetings
- ▶ 7.3.1 Final Report of Santa Cruz County Climate Adaptation Vulnerability Assessment and Transportation Priorities Report
- ▶ 7.3.2 Compiled list of comments from public, stakeholders, partner agency, advisory committees, County, and RTC and responses to the comments
- ▶ 7.3.3 GIS Storymap of report findings for graphical and visual representation of results.