

June 19, 2024

Attention: Bill Vennarucci – Sr. Project Manager  
DTLMU Investors, L.P.  
433 Marsh St.  
San Luis Obispo, CA 93401

SLR Project No.: 119.000019.00001

**RE: HUD Study**  
**Downtown Library and Affordable Housing Project**  
**Santa Cruz, California**

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## **TECHNICAL MEMORANDUM**

This Technical Memorandum addresses the work performed to date by SLR International Corporation for DTLMU Investors, L.P. at the Downtown Library and Affordable Housing Project site in Santa Cruz, California. The site is currently a parking lot. The results of the environmental noise study conducted at this site are presented in this Technical Memorandum along with an analysis of HUD requirements.

## **ENVIRONMENTAL NOISE STUDY**

### **General**

Sound level measurements were taken at the project site over a 48-hour period starting on April 9, 2024. The purpose of the measurements was to document noise at the site including local vehicle traffic.

### **Measurement Locations**

Long-term sound level measurements were taken at two locations along Lincoln Street and Cedar Street. The first monitor was placed on the northwest corner of the site, and the second monitor was placed on the west side of the lot. An aerial photo (**Figure 1**) showing the project site and the monitor locations is attached.

### **Measurement Instrumentation**

Two Larson Davis Model 831 Type 1 sound level meters were used (serial numbers 1708, and 3220). The meters recorded third-octave band and full-octave band sound levels as well as statistical parameters. The meters collected levels in terms of ten-second sound level averages and recorded statistical parameters on a fifteen-minute basis. The meters hold factory calibration certification traceable to NIST standards. The meters were field calibrated before and after the measurement period using a Larson Davis CAL200 pure tone calibrator, serial number 18332. Microphone windscreens were used for all measurements.

## **Weather**

The temperature ranged from approximately 54 to 74°F during the measurement survey. The skies were clear to partly cloudy. Wind speed ranged from 0 to 9 mph in various directions. The relative humidity ranged from approximately 55 to 88%. The ground conditions at the site were dry.

## **MEASUREMENT RESULTS**

The ten-second sound level averages measured at each position were used to calculate overall daytime average levels, nighttime average levels, and day-night average sound levels, or  $L_{dn}$ , for each location. The  $L_{dn}$  is an average of the measured sound levels over a 24-hour period where for the hours between 10:00 p.m. and 7:00 a.m. ten decibels are added to the interval levels. The  $L_{dn}$  may be thought of as a 24-hour time average with a nighttime penalty of 10 dB(A) added to account for the increased sensitivity to noise of an average listener during nighttime periods. The results from this survey are as follows:

Measurement Location	Description	Daytime Average ( $L_d$ )	Nighttime Average ( $L_n$ )	Day-Night Average Sound Level ( $L_{dn}$ )
#1	Northwest	64.2	55.0	64.5
#2	West	61.1	54.1	62.5

**Graphs 1 and 2**, attached to this report, show the results of the measurement survey. The top section of the graphs displays the ten and fifteen-second average sound levels for each sound monitor during the measurement period. The bottom section of the graph shows the third-octave frequency levels for the ten-second measurement periods. All levels are A-weighted or dB(A). The levels on the graph are primarily from local traffic.

## **HUD NOISE ASSESSMENT**

The HUD site noise requirements fall into three categories for an average day-night sound level (DNL) for a given parcel of land; < 65 dBA (DNL) the site is “acceptable”, between 65 & 75 dBA (DNL) the site is “normally unacceptable”, and >75 dBA (DNL) the site is “unacceptable”. For sites that are “acceptable” no improvements to the site or building façade elements should be required. For sites that are “normally unacceptable”, building façade and / or other site improvements must be shown to reduce sound levels to 65 dBA (DNL) for outside areas and 45 dBA (DNL) for interior spaces.

**The DNL at both measurement locations falls below 65 dBA and is therefore considered “acceptable”.**

### Future (2042) DNL

The Kimley Horn *Transportation Impact Study* report dated December 23, 2022 for this project outlines the predicted 2042 traffic for this project. Based on this study, it is estimated that the DNL at the project boundary will increase by no more than 3 dB. As this future DNL falls within the “normally unacceptable” category, STraCAT analysis has been performed at the two measurement locations.



Measurement Location	Description	Future (2042) HUD Assessment Noise Source Level (DNL, dBA)	HUD Minimum Required Sound Attenuation (dB)	HUD STraCAT Calculated Attenuation (dB)
#1	Northwest	68	26	35.0
#2	West	66	25	31.5

As shown in the above table, the **HUD minimum required sound attenuation is exceeded by the scheduled construction elements.**

## Closure

Sound level measurements were recorded at the Downtown Library and Affordable Housing Project site in Santa Cruz, California. The Day Night Average Sound Level was determined to be DNL 64.5 and 62.5 dB(A) at the measurement locations. Based on projected traffic level changes, a Year 2042 DNL of 68 and 66 dB(A) is predicted at the measurement locations. STraCAT analysis was performed for residential units at the two NSA locations. **The HUD minimum required sound attenuation is exceeded by the scheduled construction elements.**

This concludes this Technical Memorandum. Please call if you have any questions or comments.

Regards,

**SLR International Corporation**



**Nicholas A Block, P.E.**

Principal

[nblock@slrconsulting.com](mailto:nblock@slrconsulting.com)

Attachments Figure 1

Graphs 1 and 2

STraCAT Analysis

W3.1 Partition STC Calculations





# Figure 1 - Environmental Noise Study

Downtown Library and Affordable Housing Project

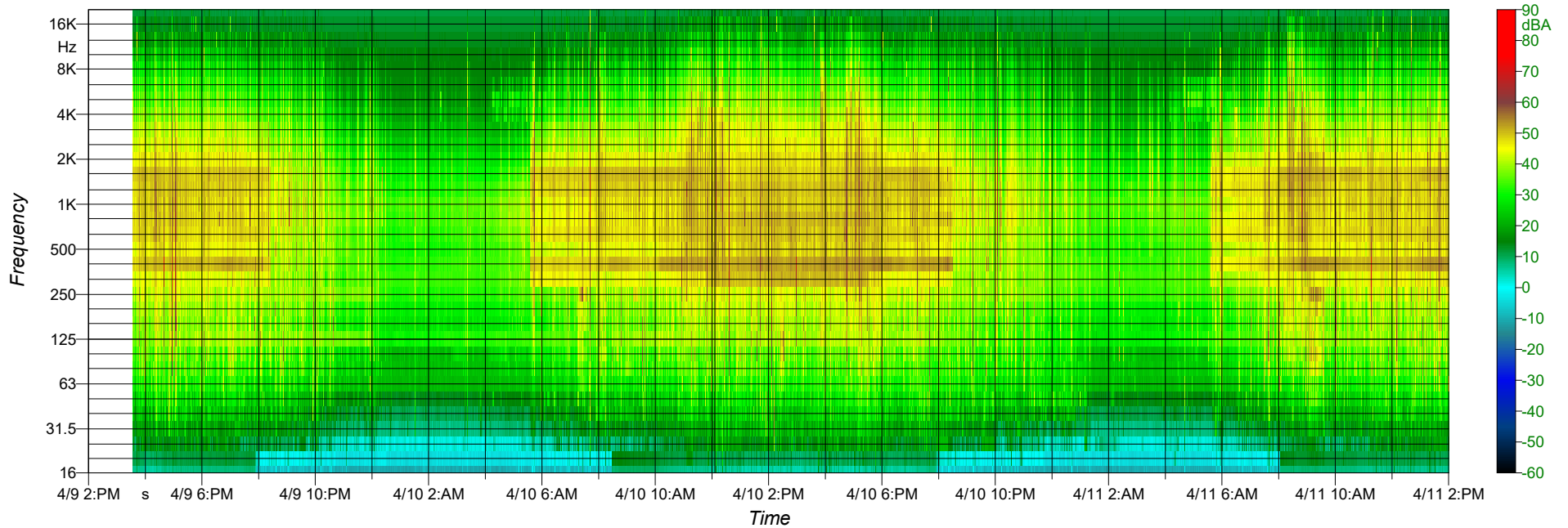
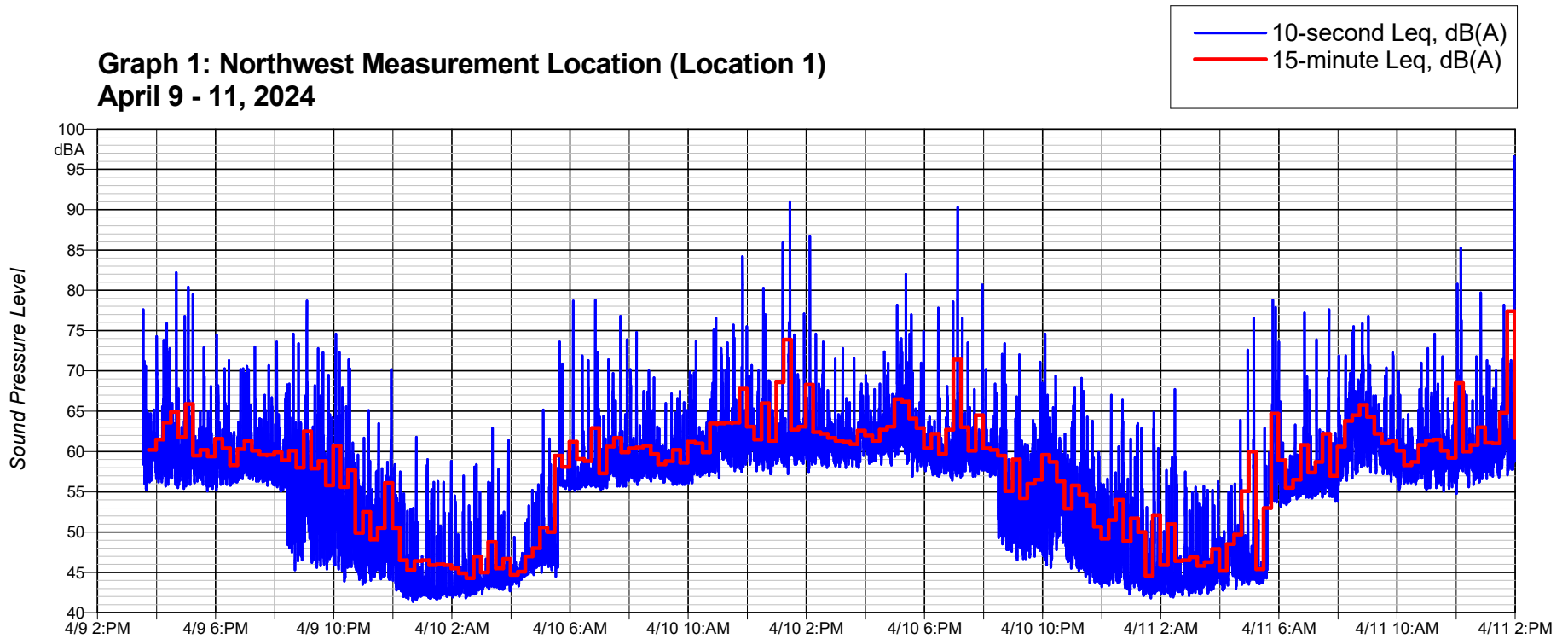
## Legend

-  DLAHP Site
-  Measurement Location (ML)

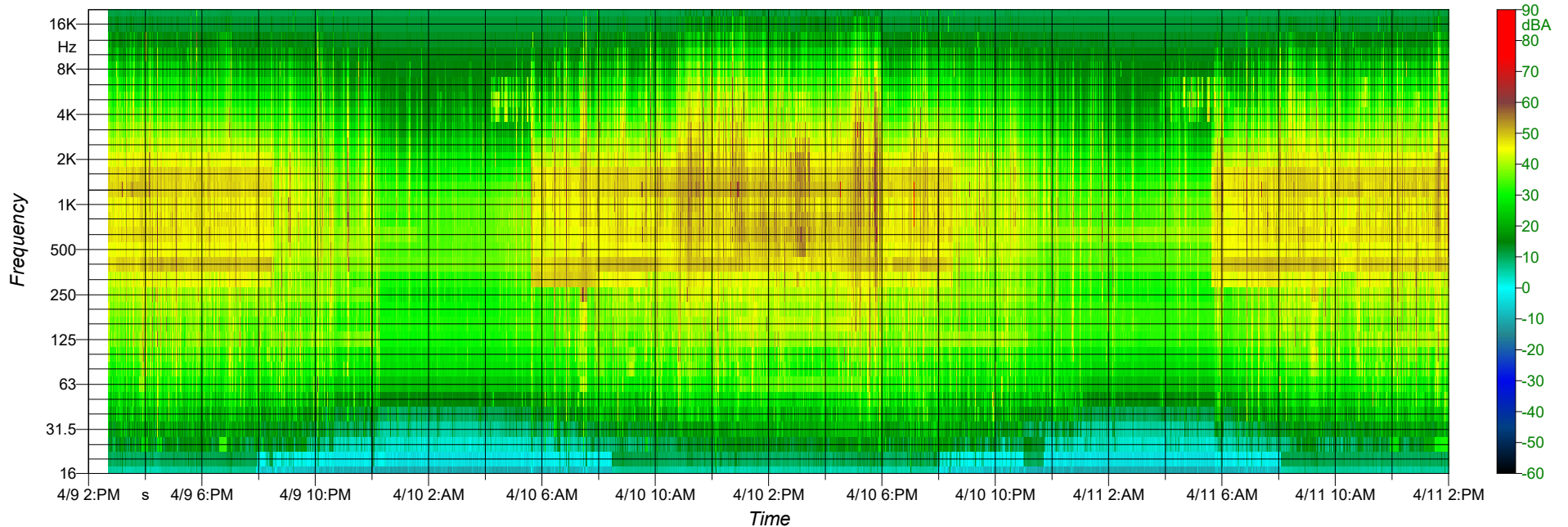
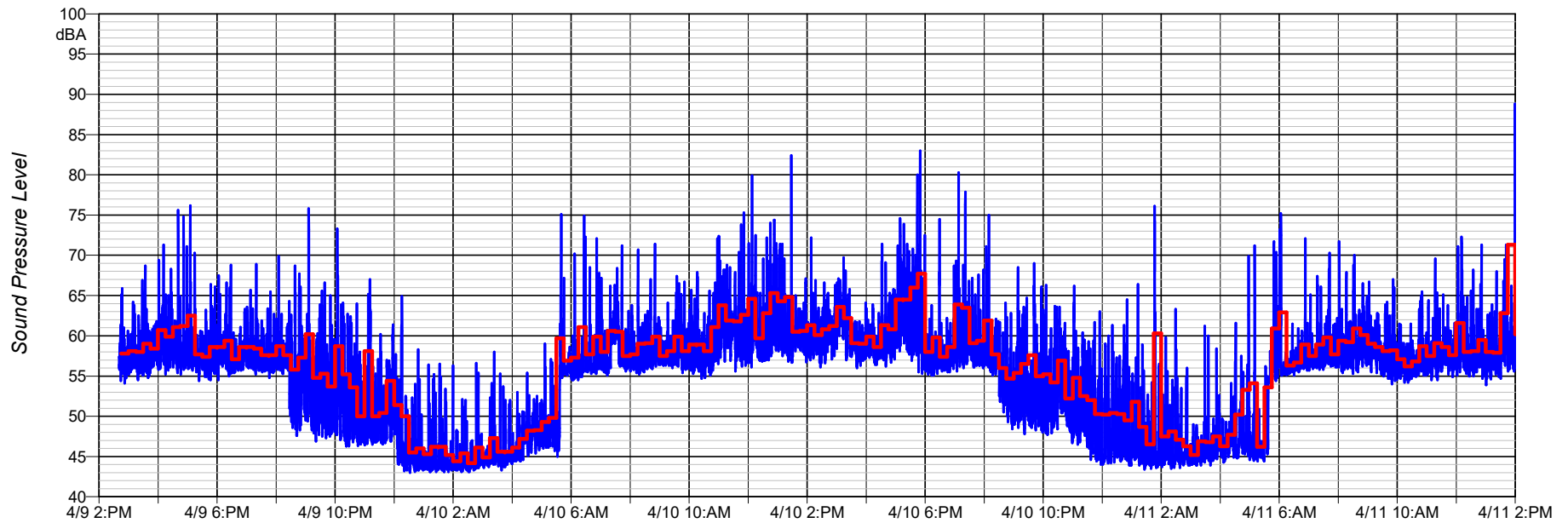




**Graph 1: Northwest Measurement Location (Location 1)**  
**April 9 - 11, 2024**



**Graph 2: West Measurement Location (Location 2)**  
**April 9 - 11, 2024**





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# Sound Transmission Classification Assessment Tool (STraCAT)

## Overview

The Sound Transmission Classification Assessment Tool (STraCAT) is an electronic version of Figures 17 and 19 in The HUD Noise Guidebook. The purpose of this tool is to document sound attenuation performance of wall systems. Based on wall, window, and door Sound Transmission Classification (STC) values, the STraCAT generates a composite STC value for the wall assembly as a whole. Users can enter the calculated noise level related to a specific Noise Assessment Location in front of a building façade and STraCAT will generate a target required attenuation value for the wall assembly in STC. Based on wall materials, the tool will state whether the composite wall assembly STC meets the required attenuation value.

## How to Use This Tool

### Location, Noise Level and Wall Configuration to Be Analyzed

STraCAT is designed to calculate the attenuation provided by the wall assembly for one wall of one unit. If unit exterior square footage and window/door configuration is identical around the structure, a single STraCAT may be sufficient. If units vary, at least one STraCAT should be completed for each different exterior unit wall configuration to document that all will achieve the required attenuation. Additionally, if attenuation is not based on a single worst-case NAL, but there are multiple NALs which require different levels of attenuation around the structure, a STraCAT should be completed for each differing exterior wall configuration associated with each NAL.

Exterior wall configurations associated with an NAL include those with parallel (facing) or near-parallel exposure as well as those with perpendicular exposure. When a façade has parallel or perpendicular exposure to two or more NALs, you should base the required attenuation on the NAL with the highest calculated noise level. For corner units where the unit interior receives exterior noise through two facades, the STraCAT calculation should incorporate the area of wall, window and door materials pertaining to the corner unit's total exterior wall area (i.e., from both walls).

### Information to Be Entered

Users first enter basic project information and the NAL noise level that will be used as the basis for required attenuation. This noise level must be entered in whole numbers. STraCAT users then enter information on wall, window and door component type and area. Again, as noted above, the wall, window and door entries are based on one unit, and one wall (except for corner units as discussed above). The tool sums total wall square footage based on the combined area of walls, doors and windows for the façade being evaluated.

Users may input STC values for materials in one of two ways. The tool includes a dropdown menu of common construction materials with STC values prefilled. If selected construction materials

manually. Verification of the component STC must be included in the ERR. Documentation includes the architect or construction manager's project plans showing wall material specifications. For new construction or for components that will be newly installed in an existing wall, documentation also includes the manufacturer's product specification sheet (cut sheet) documenting the STC rating of selected doors and windows.

*Required STC Rating and Determination of Compliance*

Finally, based on project information entered the tool will indicate the required STC rating for the wall assembly being evaluated and whether or not the materials specified will produce a combined rating that meets this requirement. Note that for noise levels above 75 dB DNL, either HUD (for 24 CFR Part 50 reviews) or the Responsible Entity (for 24 CFR Part 58 reviews) must approve the level and type of attenuation, among other processing requirements. Required attenuation values generated by STraCAT for NALs above 75 dB DNL should therefore be considered tentative pending approval by HUD or the RE.



## Part 1 Description

**Project**

DLAHP

**Sponsor/Developer**

Echelcon

**Location**

3-BD Unit at NSA #1

**Prepared by**

Nick Block, P.E.

**Noise Level**

68

**Date**

6/19/2024

**Primary Source(s)**

Lincoln Street

## Part II - Wall Components

**Wall Construction  
Detail****Area****STC**

W3.1

162

43

[Add new wall](#)**162 Sq. Feet****43****Window****Construction Detail****Quantity****Sq Ft/Unit****STC**

Glazing 301

2

14

28

[Add new window](#)**Door Construction Detail****Quantity****Sq Ft/Unit****STC**[Add new door](#)



## Part III - RESULTS

## Wall Statistics

Stat	Value
Area:	162 ft <sup>2</sup>
Wall STC:	43

## Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	2	28 ft <sup>2</sup>	17.28%
Doors:	0	0 ft <sup>2</sup>	0%

## Evaluation Criteria

Criteria	Value
Noise source sound level (dB):	68
Combined STC for wall assembly:	35.01
Required STC rating:	26
Does wall assembly meet requirements?	Yes

[Print](#)

### Extra Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16" on center to 24" can increase the STC from 2-5dB.
- Adding a 2" air space can provide 3dB more attenuation.
- Increasing a wall's air space from 3" to 6" can reduce noise levels by an additional 5dB.
- Adding a layer of ½" gypsum board on "Z" furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½" gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall's airspace can add 4-10dB of attenuation.
- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.



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Exterior wall configurations associated with an NAL include those with parallel (facing) or near-parallel exposure as well as those with perpendicular exposure. When a façade has parallel or perpendicular exposure to two or more NALs, you should base the required attenuation on the NAL with the highest calculated noise level. For corner units where the unit interior receives exterior noise through two facades, the STraCAT calculation should incorporate the area of wall, window and door materials pertaining to the corner unit's total exterior wall area (i.e., from both walls).

### Information to Be Entered

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*Required STC Rating and Determination of Compliance*

Finally, based on project information entered the tool will indicate the required STC rating for the wall assembly being evaluated and whether or not the materials specified will produce a combined rating that meets this requirement. Note that for noise levels above 75 dB DNL, either HUD (for 24 CFR Part 50 reviews) or the Responsible Entity (for 24 CFR Part 58 reviews) must approve the level and type of attenuation, among other processing requirements. Required attenuation values generated by STraCAT for NALs above 75 dB DNL should therefore be considered tentative pending approval by HUD or the RE.

## Part 1 Description

**Project**

DLAHP

**Sponsor/Developer**

Echelcon

**Location**

1-BD Unit at NSA #2

**Prepared by**

Nick Block, P.E.

**Noise Level**

66

**Date**

6/19/2024

**Primary Source(s)**

Cedar Street



## Part II - Wall Components

**Wall Construction  
Detail****Area****STC**

W3.1

70

43

[Add new wall](#)**70 Sq. Feet****43****Window****Construction Detail****Quantity****Sq Ft/Unit****STC**

Glazing 302

1

27

28

[Add new window](#)**Door Construction Detail****Quantity****Sq Ft/Unit****STC**[Add new door](#)

## Part III - RESULTS

## Wall Statistics

Stat	Value
Area:	70 ft <sup>2</sup>
Wall STC:	43

## Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	1	27 ft <sup>2</sup>	38.57%
Doors:	0	0 ft <sup>2</sup>	0%

## Evaluation Criteria

Criteria	Value
Noise source sound level (dB):	66
Combined STC for wall assembly:	31.92
Required STC rating:	25
Does wall assembly meet requirements?	Yes

[Print](#)

### Extra Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16" on center to 24" can increase the STC from 2-5dB.
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- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.

Sound Insulation Prediction (v9.0.23)

Program copyright Marshall Day Acoustics 2017  
Margin of error is generally within STC ±3 dB  
- Key No. 1841

Job Name:

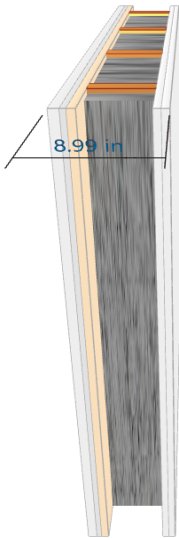
Job No.:

Date:6/14/2024

File Name:

Initials:nblock

Notes:



STC 43  
OITC 33

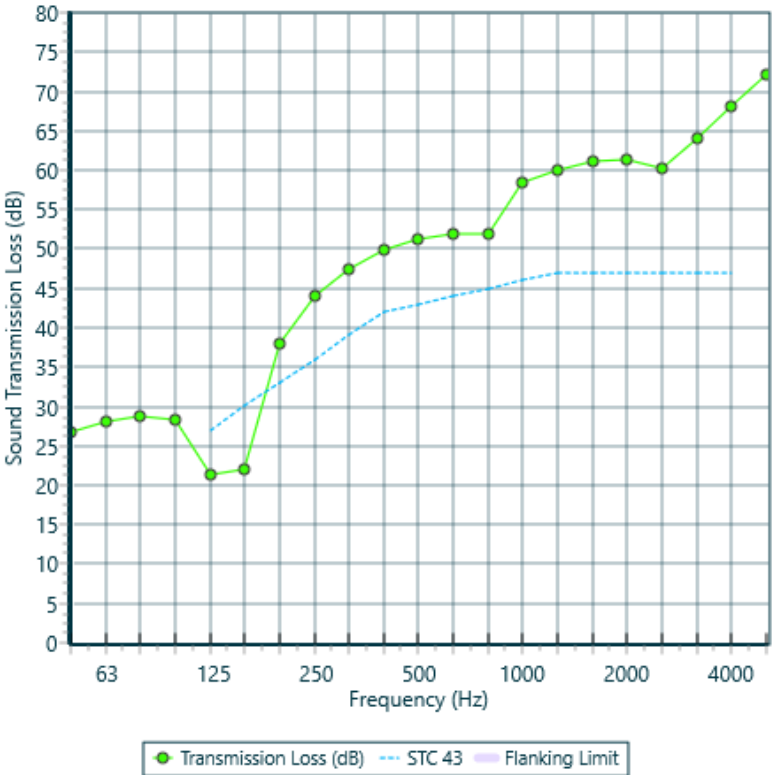
Mass-air-mass resonant frequency = -33 Hz  
Panel Size = 8.9 ft x 13.1 ft  
Partition surface mass = 19 lb/ft2

System description

Panel 1 : 1 x 0.874 in -Coat Plaster (sand:gypsum =3:1)  
+ 1 x 0.689 in Plywood  
+ 1 x 0.5 in DensGlass® Sheathing Georgia Pa

Frame: Timber stud (5.7 in x 1.8 in ), Stud spacing 16 in ; Cavity Width 5.67 in , 1 x fiberglass (1.4 lb/ft3) Thickness 6.0 in  
Panel 2 : 2 x 0.626 in Type X Gypsum Board

freq.(Hz)	TL(dB)	TL(dB)
50	27	
63	28	28
80	29	
100	28	
125	21	23
160	22	
200	38	
250	44	41
315	48	
400	50	
500	51	51
630	52	
800	52	
1000	58	55
1250	60	
1600	61	
2000	61	61
2500	60	
3150	64	
4000	68	67
5000	72	







Layer List:

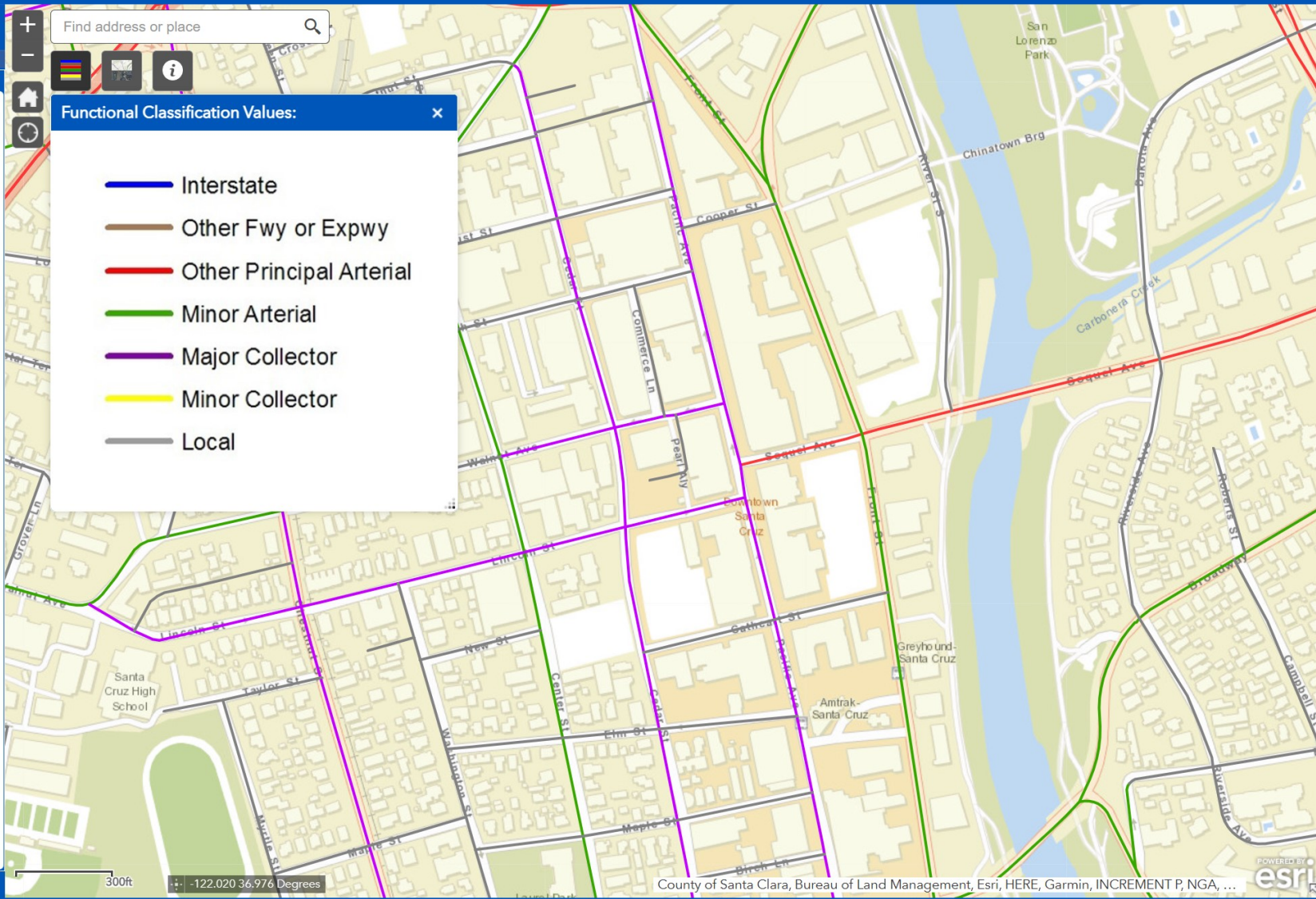
Layers

- ☒ California Road System (CRS) - Map Grid
- ☐ 2010 Adjusted Urban Areas
- ☐ County Boundaries
- ☐ Caltrans District Boundaries
- ☐ California Scenic Highways
- ☐ 2023 National Highway System (NHS)
- ☒ Functional Classification Roads
- ☐ 2015 City Boundaries

Find address or place

Functional Classification Values:

- Interstate
- Other Fwy or Expwy
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local





Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

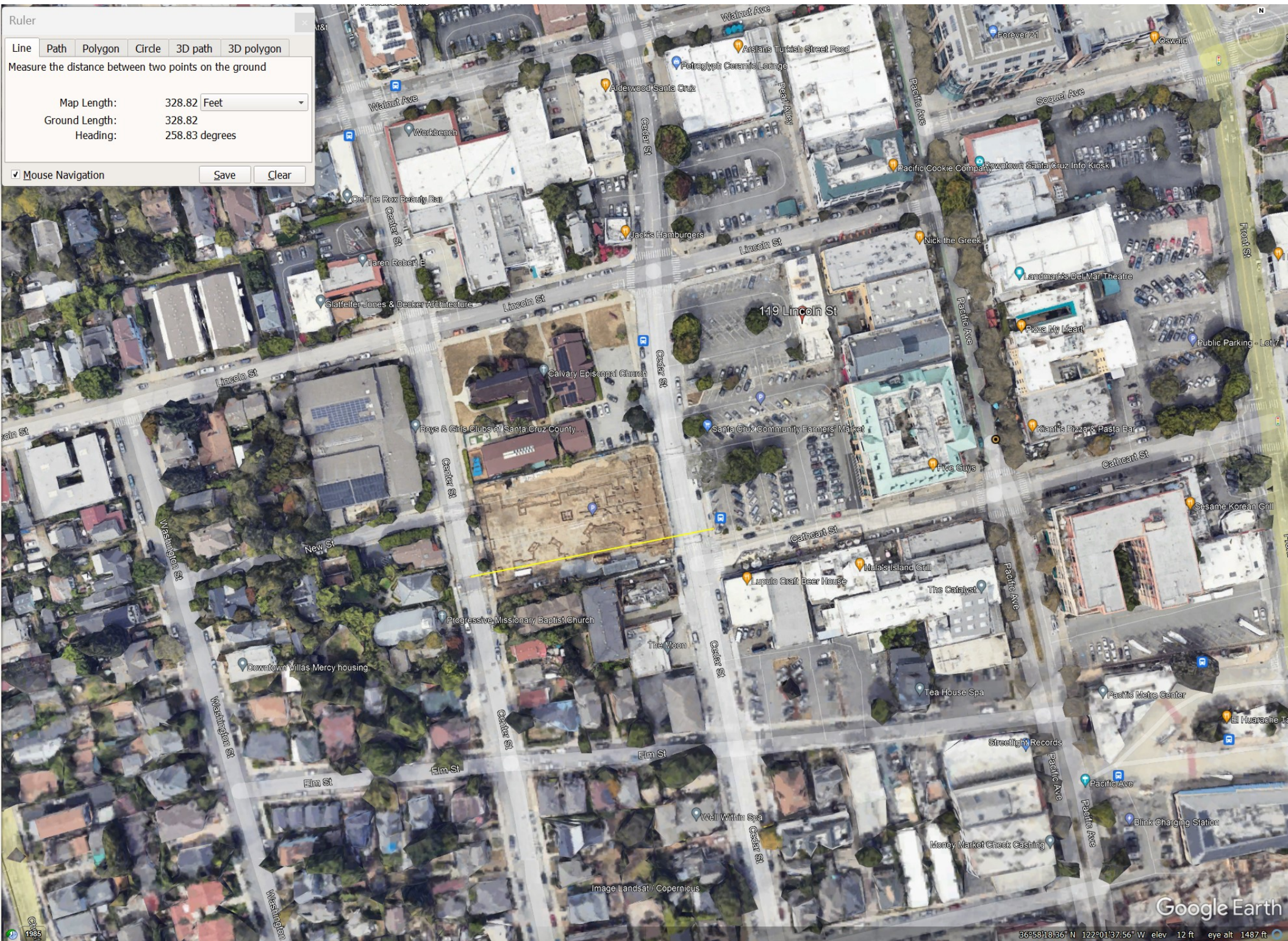
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Ground Length: 328.82

Heading: 258.83 degrees

☒ Mouse Navigation

Save Clear





Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

Map Length: 906.95 Feet

Ground Length: 906.94

Heading: 171.29 degrees

☒ Mouse Navigation

Save Clear





Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

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Ground Length: 536.52

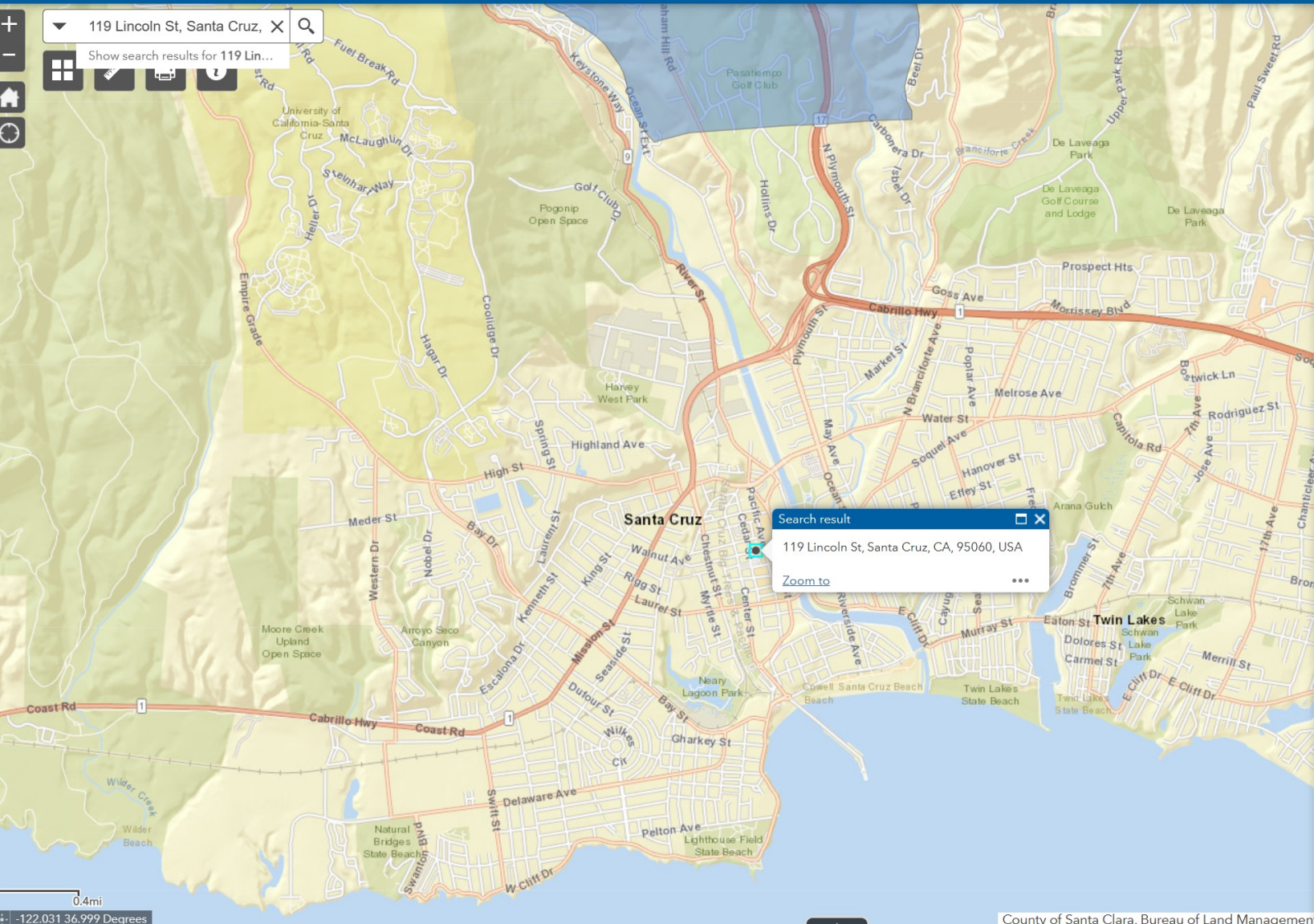
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☒ Mouse Navigation

Save Clear







Legend

Sole\_Source\_Aquifers

0.4mi

-122.031 36.999 Degrees

County of Santa Clara, Bureau of Land Management

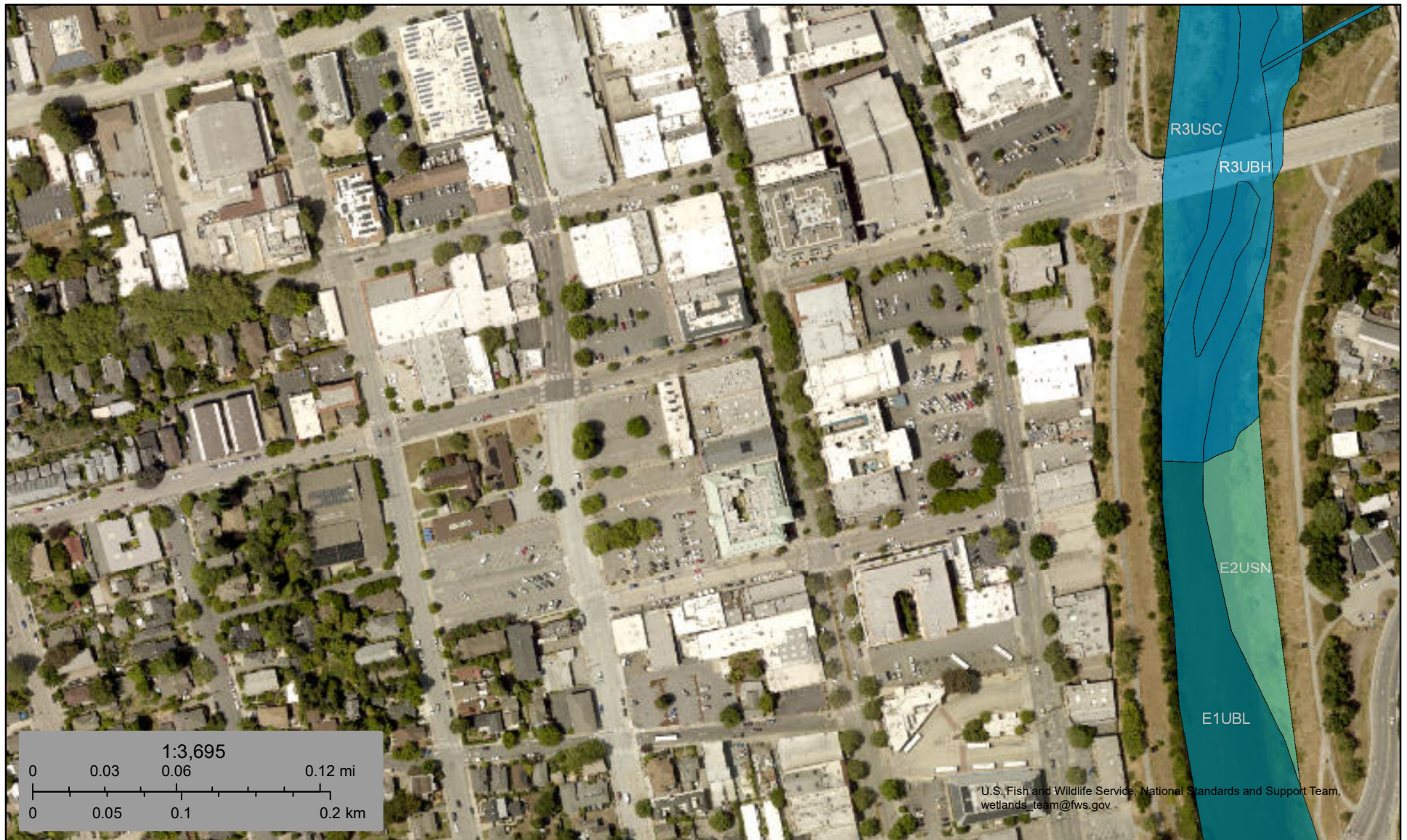




U.S. Fish and Wildlife Service


# National Wetlands Inventory

## No Wetlands



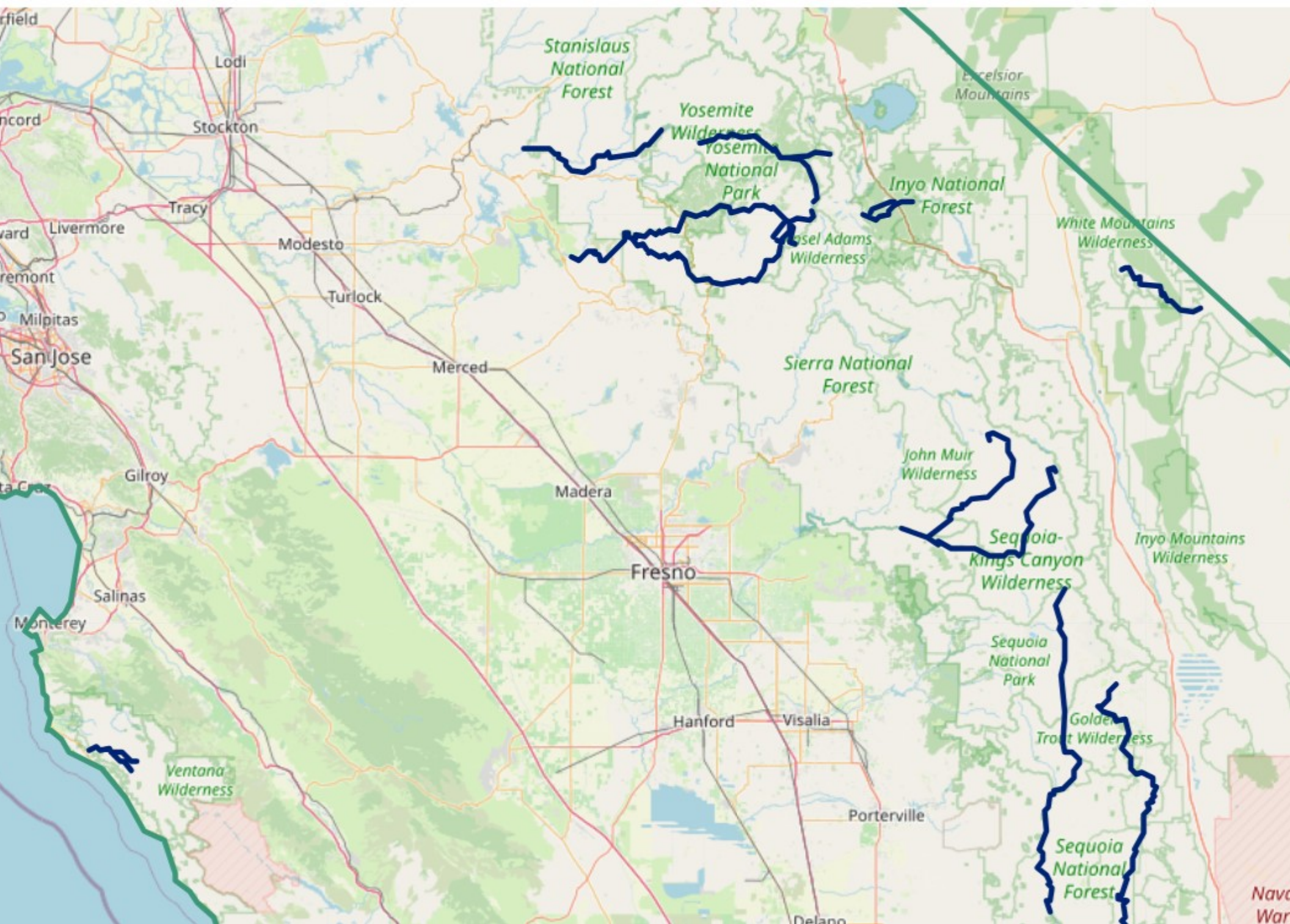
December 5, 2023

### Wetlands

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.





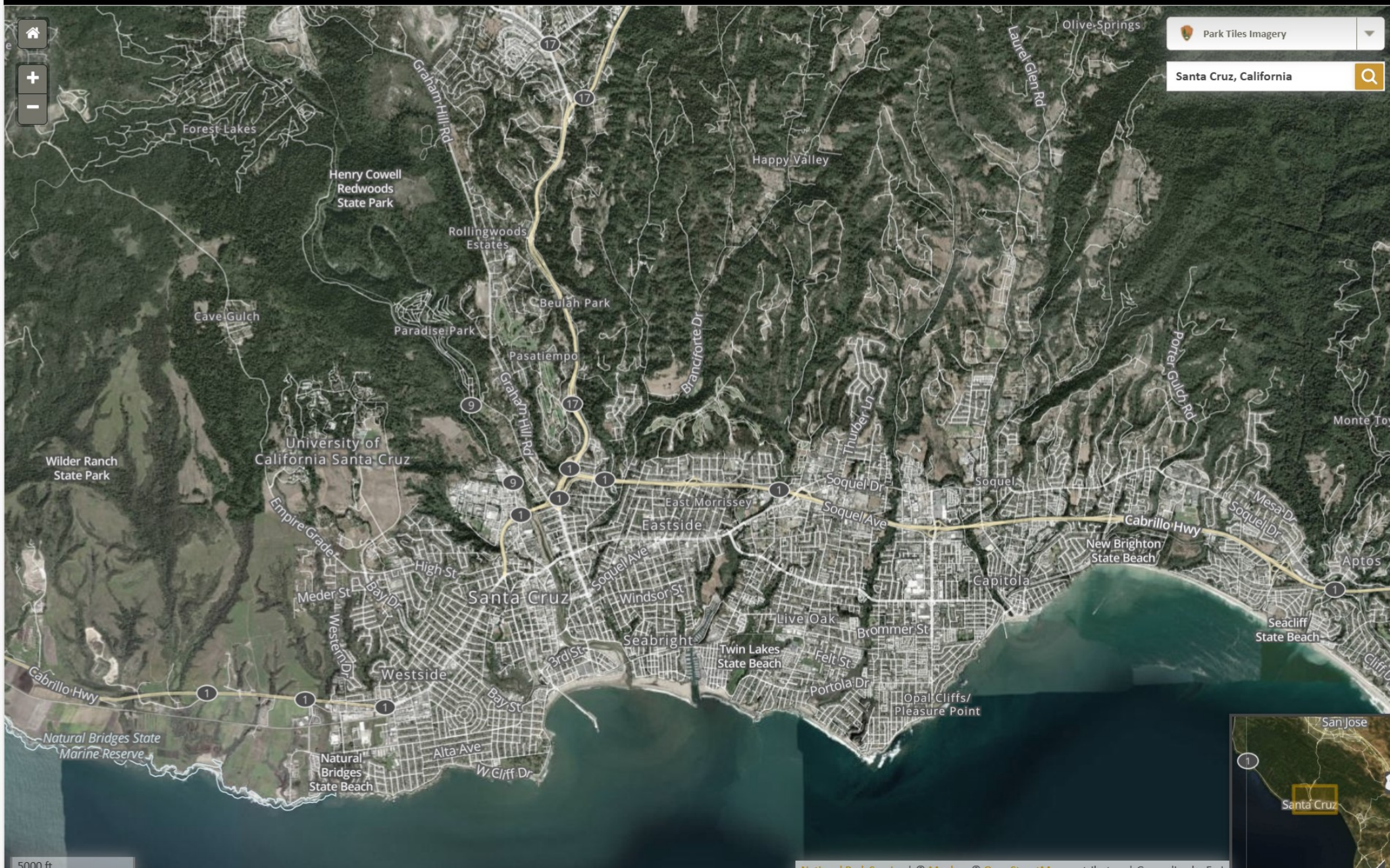


# Nationwide Rivers Inventory

National Park Service  
U.S. Department of the Interior



This is a listing of more than 3,200 free-flowing river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" values.







U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
WASHINGTON, DC 20410-1000

This Worksheet was designed to be used by those “Partners” (including Public Housing Authorities, consultants, contractors, and nonprofits) who assist Responsible Entities and HUD in preparing environmental reviews, but legally cannot take full responsibilities for these reviews themselves. Responsible Entities and HUD should use the RE/HUD version of the Worksheet.

## Environmental Justice (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/environmental-justice>

**HUD strongly encourages starting the Environmental Justice analysis only after all other laws and authorities, including Environmental Assessment factors if necessary, have been completed.**

**1. Were any adverse environmental impacts identified in any other compliance review portion of this project’s total environmental review?**

☐ Yes → *Continue to Question 2.*

☒ No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

**2. Were these adverse environmental impacts disproportionately high for low-income and/or minority communities?**

☐ Yes

**Explain:**

[Click here to enter text.](#)

→ *The RE/HUD must work with the affected low-income or minority community to decide what mitigation actions, if any, will be taken. Provide any supporting documentation.*

☐ No

**Explain:**

[Click here to enter text.](#)

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

### **Worksheet Summary**

Provide a full description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your program or region

**Include all documentation supporting your findings in your submission to HUD.**

**The project site is suitable for its proposed use; and the project won't be adversely affected by any pre-existing environmental conditions. All environmental factors can and will be mitigated as necessary.**

- One structure on site is to be demolished – a limited asbestos survey identified no ACM but mirror mastic and roofing was not sampled and are assumed to contain ACM until sampled and shown otherwise. As such, those items will be required to be sampled prior to demolition of the building
- All local, state and federal requirements for handling, removal and worker protection are required to be adhered to, include permits, chain-of-custody, and disposal in a location approved for said materials if sampling identifies ACM in the previously unsampled areas.
- Future noise levels are projected to slightly exceed 65 dBA which will require mitigation to ensure that indoor noise levels do not exceed DNL 45 dBA.
- The project is located in flood zone AE and will be elevated out of the flood zone or flood proofed to a minimum of 2' above BFE. All residential units will be above the BFE.

As all issues will be mitigated, they will not present environmental issues for future residents. There are no other issues identified in the Environmental Assessment that would have an adverse effect on project residents and, therefore, there are no factors that will have environmental impacts disproportionately high for low-income and/or minority residents.

- Regardless of population group served, the population will not be affected disproportionately by environmental issues.
- Additionally, the project will benefit the minority and low-income populations by bringing much needed affordable housing units to the neighborhood and community.
- See Attach O: Environmental Justice