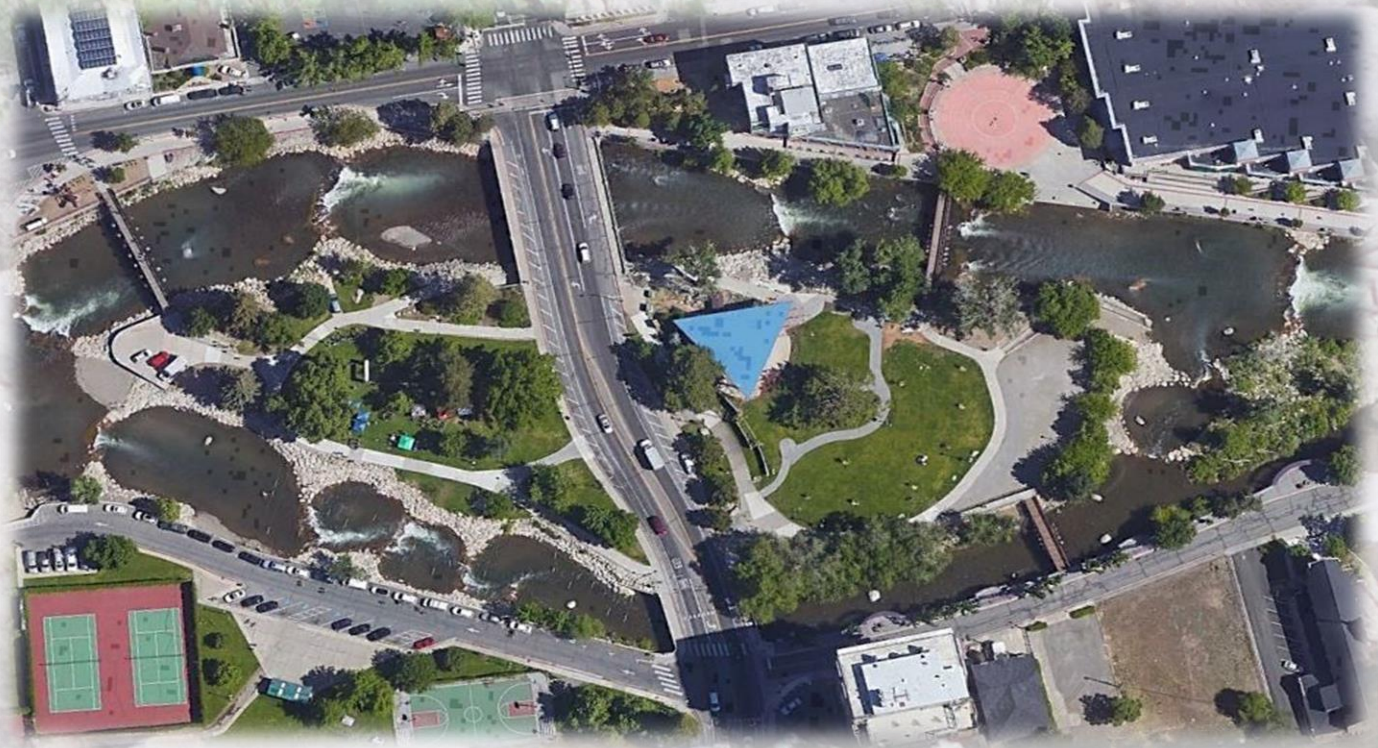
Design and Environmental Study For



ARLINGTON AVENUE BRIDGES REPLACEMENT

Design Review Committee Meeting #1 | March 08, 2022

Purpose of Today's DRC Meeting:

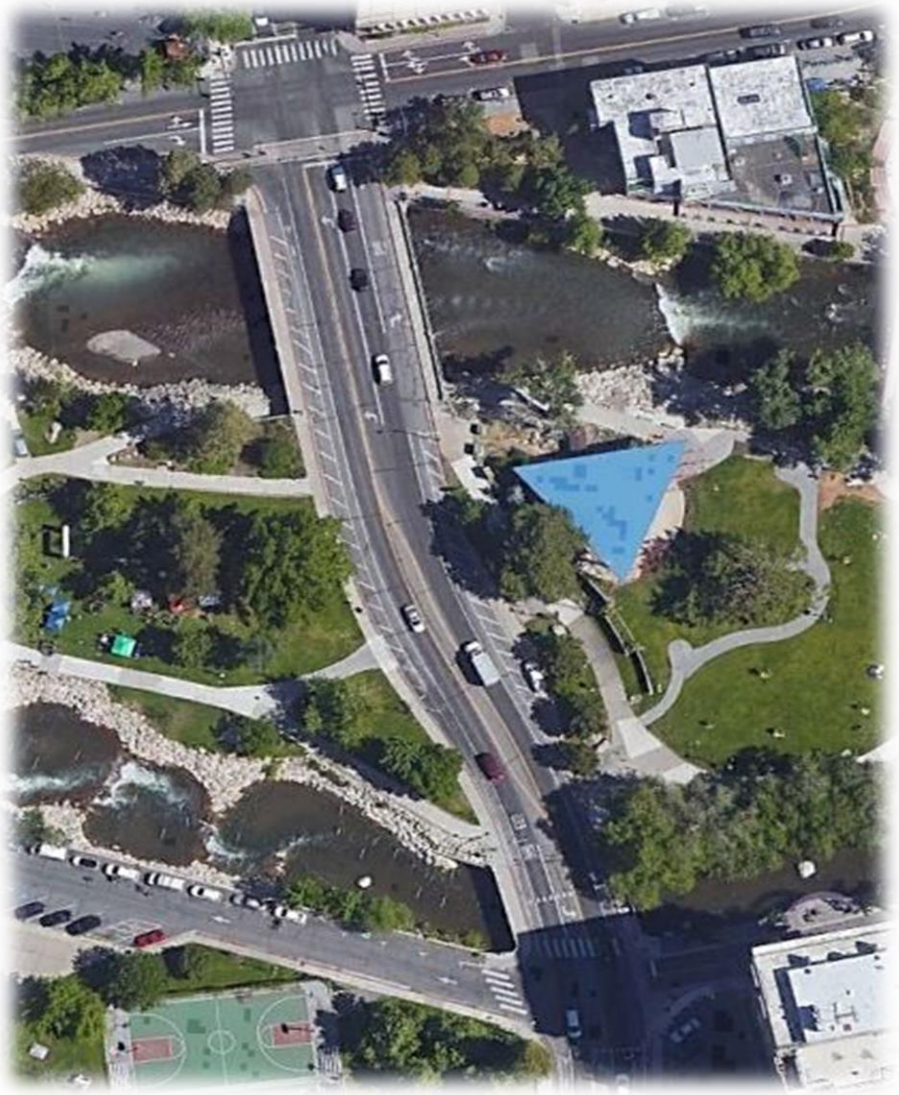
ARLINGTON AVENUE BRIDGES PROJECT

- ✓ Horizontal Design Criteria for Roadway, Sidewalks, Bike Lanes, Bus Pullouts
- ✓ Vertical Design Criteria for Roadway and Bridge
- ✓ Hydraulic Modeling – Existing Conditions and Path Forward

Agenda

ARLINGTON AVENUE BRIDGES PROJECT

- ✓ Project Purpose and Need
- ✓ Project History and Background
- ✓ Horizontal Roadway Criteria
- ✓ Vertical Roadway Criteria
- ✓ Hydraulic Modeling
  - Existing Conditions and Path Forward

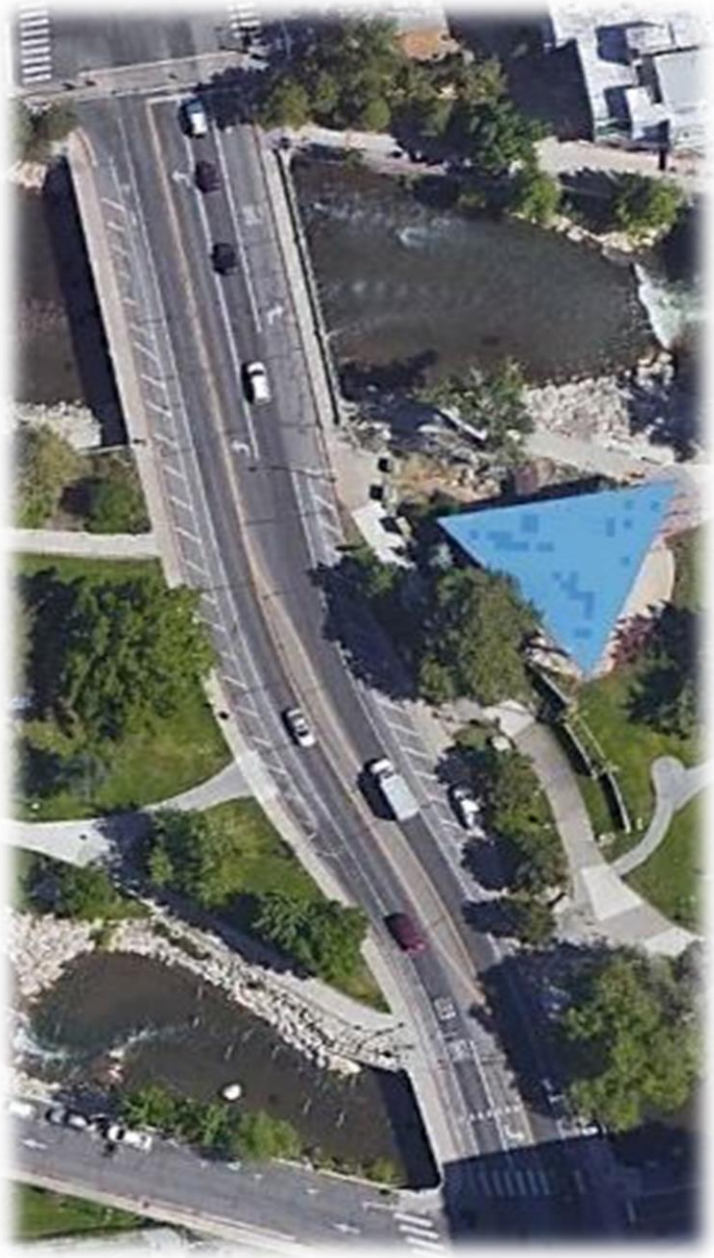


Horizontal Roadway Criteria

ARLINGTON AVENUE BRIDGES PROJECT

- ✓ Project Purpose and Need
- ✓ Project History and Background
- ✓ Horizontal Roadway Criteria
- ✓ Vertical Roadway Criteria
- ✓ Hydraulic Modeling

  Existing Conditions and Path Forward



Purpose and Need

ARLINGTON AVENUE BRIDGES PROJECT

Agreed upon with FHWA, NDOT, and City of Reno

Vetted with Reno City Council, TAC, SWG, and the Public during the Feasibility Study

- Address structurally deficient bridges
- Preserve the hydraulic capacity of the Truckee River
- Provide safe and ADA compliant multimodal improvements
- Respond to adopted regional and community plans

Project History and Background

ARLINGTON AVENUE BRIDGES PROJECT

- Feasibility Study completed June 2021
  - Define scope, constraints, and cost
  - Extensive public engagement process
  - Started with 5 initial bridge alternatives
    - Identified bridge structure type and aesthetic package to carry forward into NEPA clearance and design
  - Funding allocated
- NEPA/Design contract awarded to Jacobs December 2021

Honored to receive $7 Million RAISE Grant for Construction
Must be Obligated By September 2024!

Project History and Background

Feasibility Study Results

- Single Pier for North Bridge
- Clear Span for South Bridge (match existing)
- Aesthetics Theme - Modern Art Deco,
  a melding of old and new

NOTE: THIS GRAPHIC IS A GENERAL DEPICTION OF A SINGLE PIER BRIDGE, NOT A FINAL DESIGN

Project History and Background

ARLINGTON AVENUE BRIDGES PROJECT

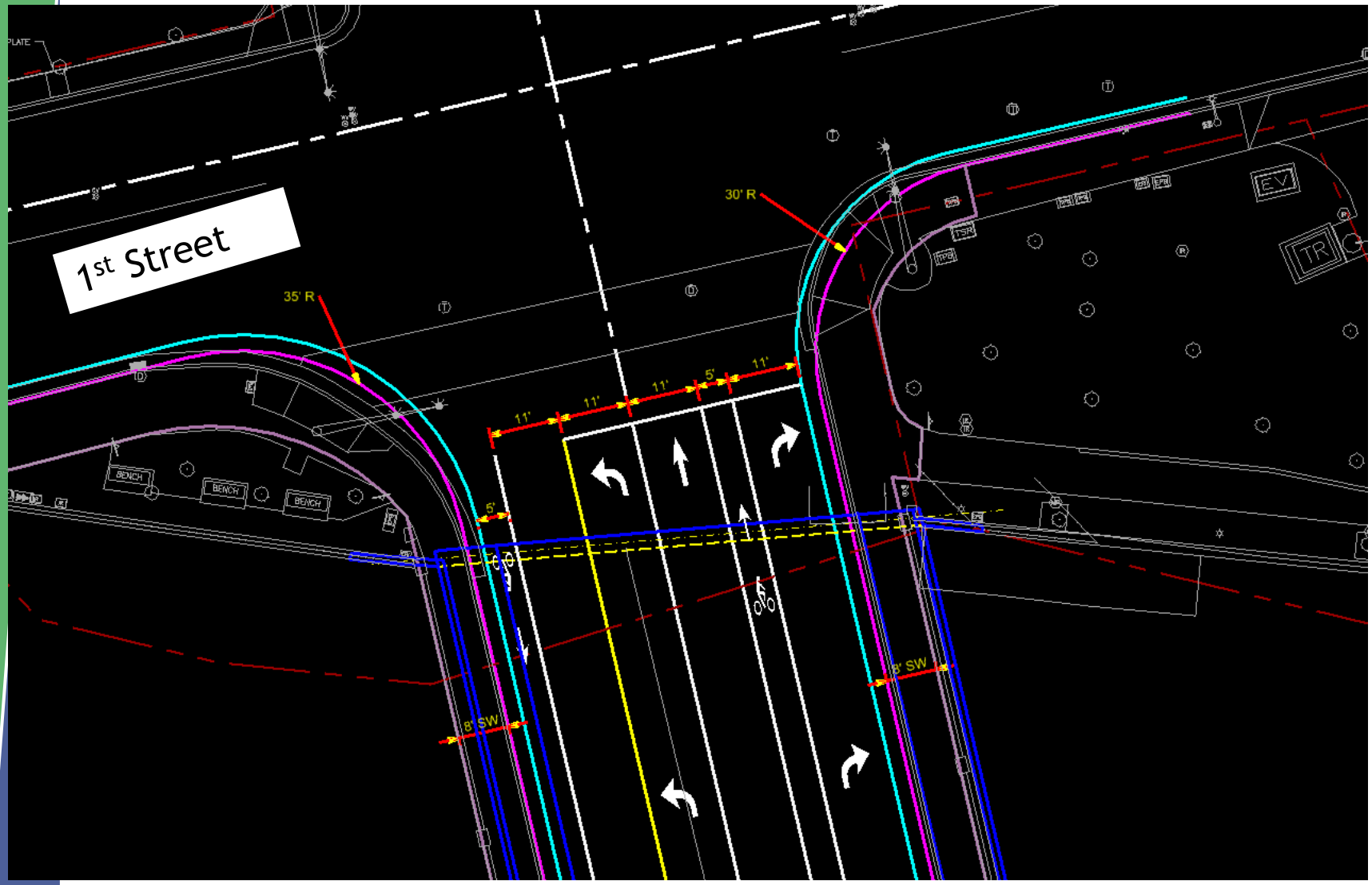
NOTE: THIS GRAPHIC IS A GENERAL DEPICTION OF A SINGLE PIER BRIDGE, NOT A FINAL DESIGN

Why Single Pier North Bridge?

- Reduced deck thickness
- Vertical clearance along path
- Opportunity for wider sidewalks along bridges
- Minor profile adjustments for hydraulic model clearance
- Similar look to existing (2-pier) bridge
- Maintenance access from bridge allows for debris removal prior to downstream narrowing of river
- Easier to construct
- Less expensive

Horizontal Roadway: North End @ 1st Street

ARLINGTON AVENUE BRIDGES PROJECT



- 5’ Bike Lane
- 11’ Southbound
- 11’ NB to WB Left Turn
- 11’ Northbound Thru
- 5’ Bike Lane
- 11’ NB to EB Right Turn

- 8’ Sidewalks

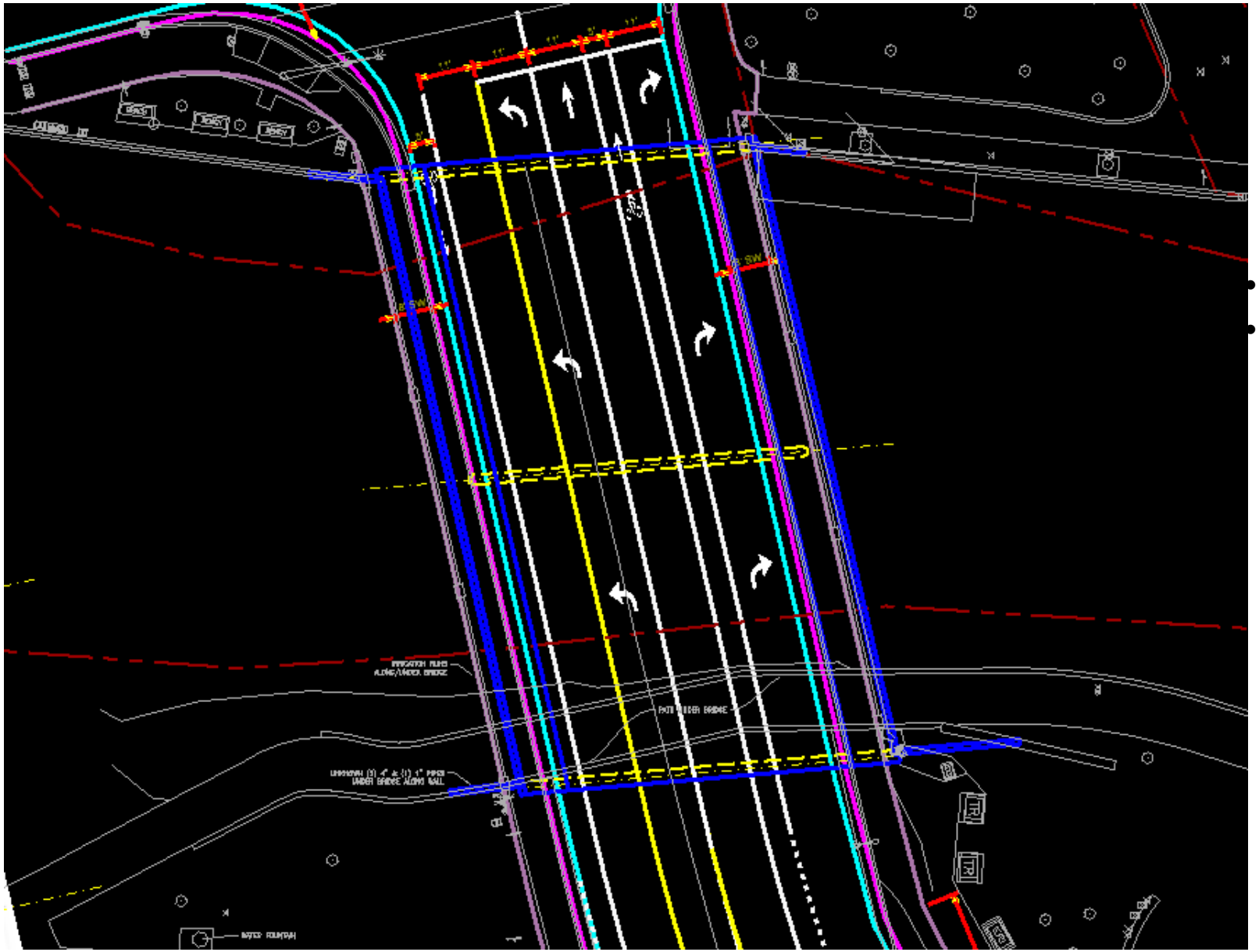
- 35’ Return SouthWest
- 30’ Return SouthEast
  (City Min. Minor Arterial = 30’
  No Specific Design Vehicle)

Bike Route Alternatives (Sara)

Vertical Separation between vehicles and pedestrians

Horizontal Roadway: North Bridge

ARLINGTON AVENUE BRIDGES PROJECT



- 8’ Sidewalks w/ Overview
- 10’ Sidewalks Continuous

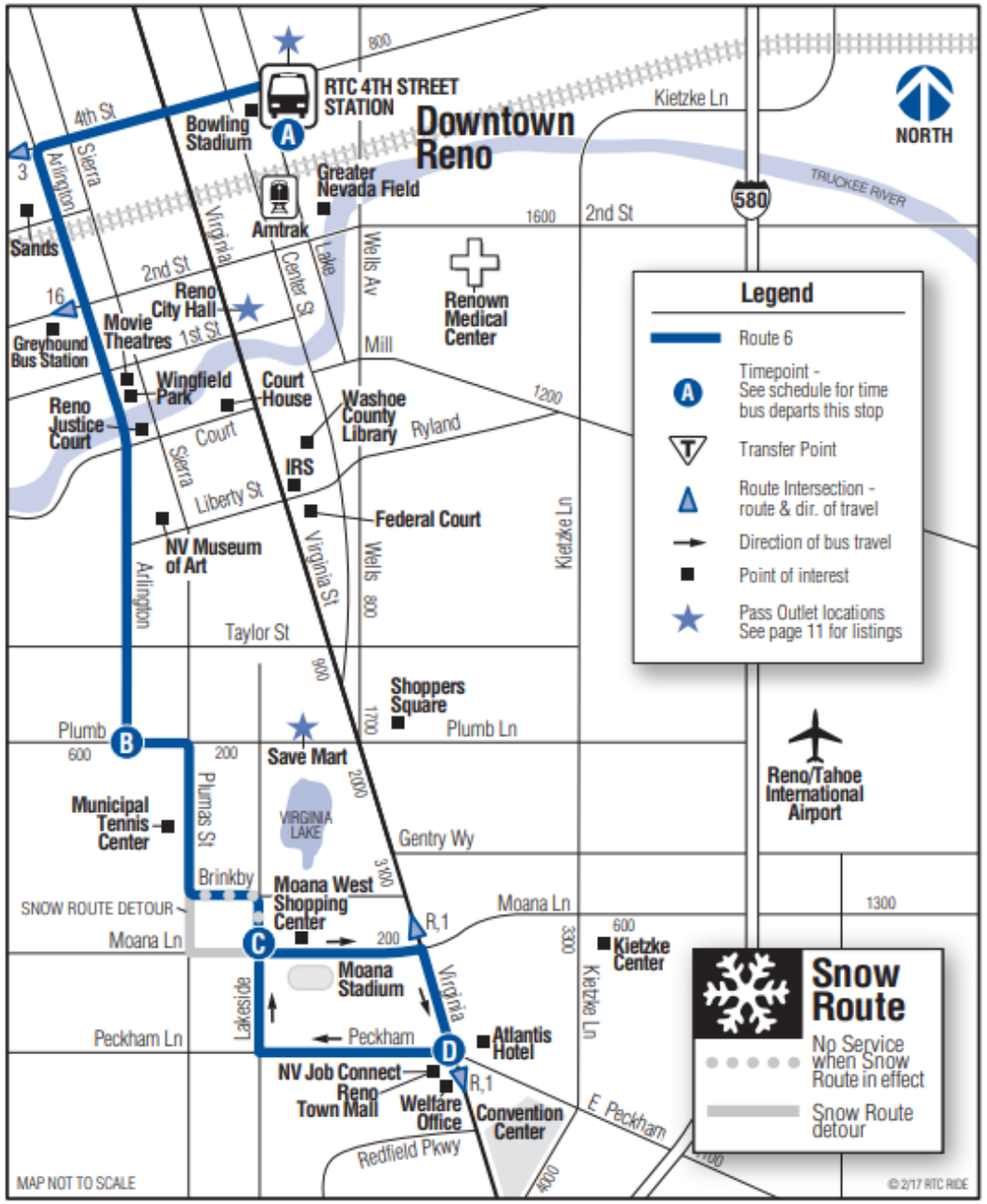
Horizontal Roadway: Middle Section Bus Stops

ARLINGTON AVENUE BRIDGES PROJECT

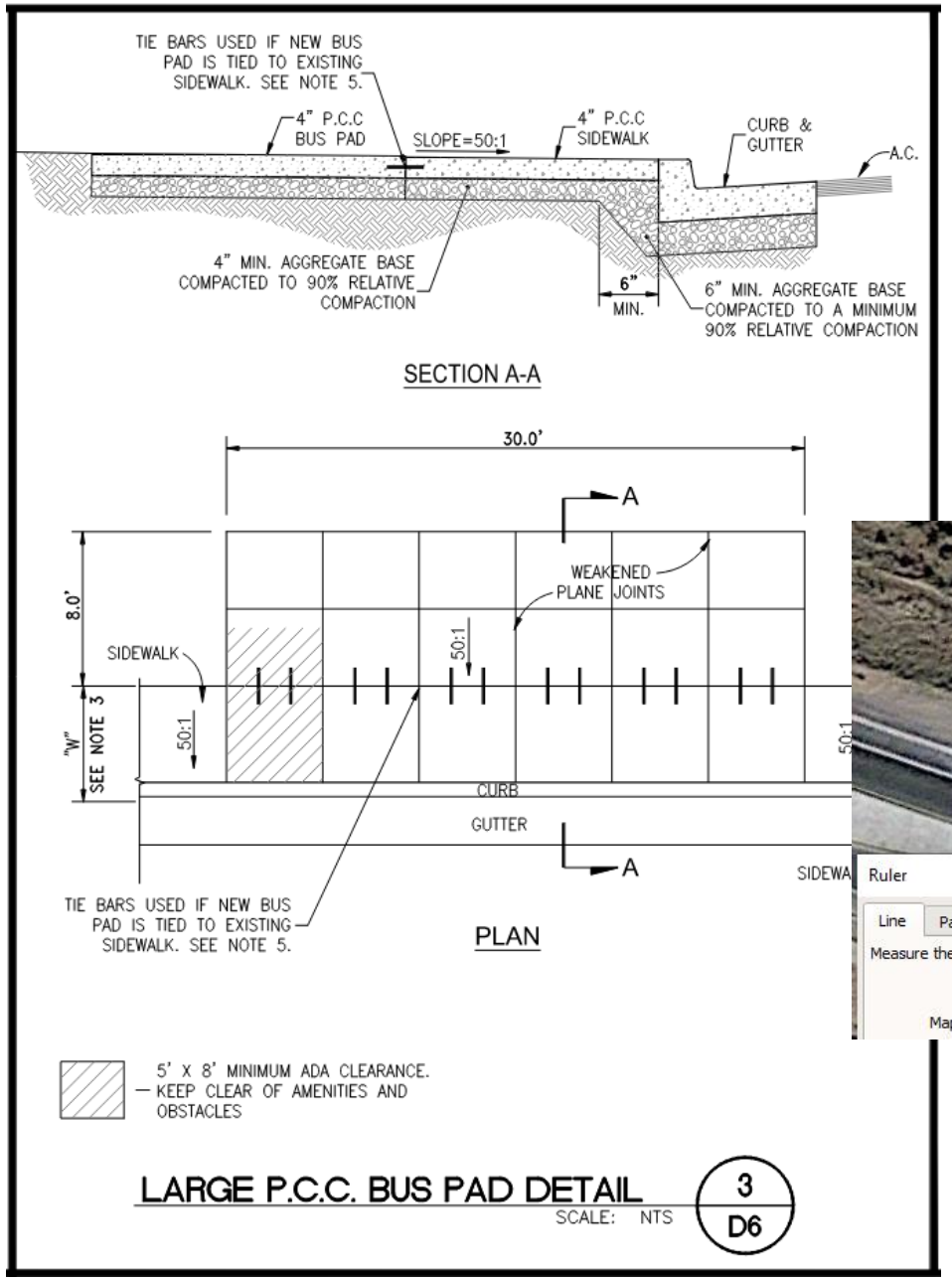
- 50’ Long Transitions In/Out
- 50’ Long Bus Stop w/
  8’ SW and additional 8’ staging
- 12’ Bus Lane
- RTC Bus Route 6: Arlington/Moana

Route 6 Map: Arlington/Moana

ARLINGTON AVENUE BRIDGES PROJECT



RTC's Bus Pad Detail:

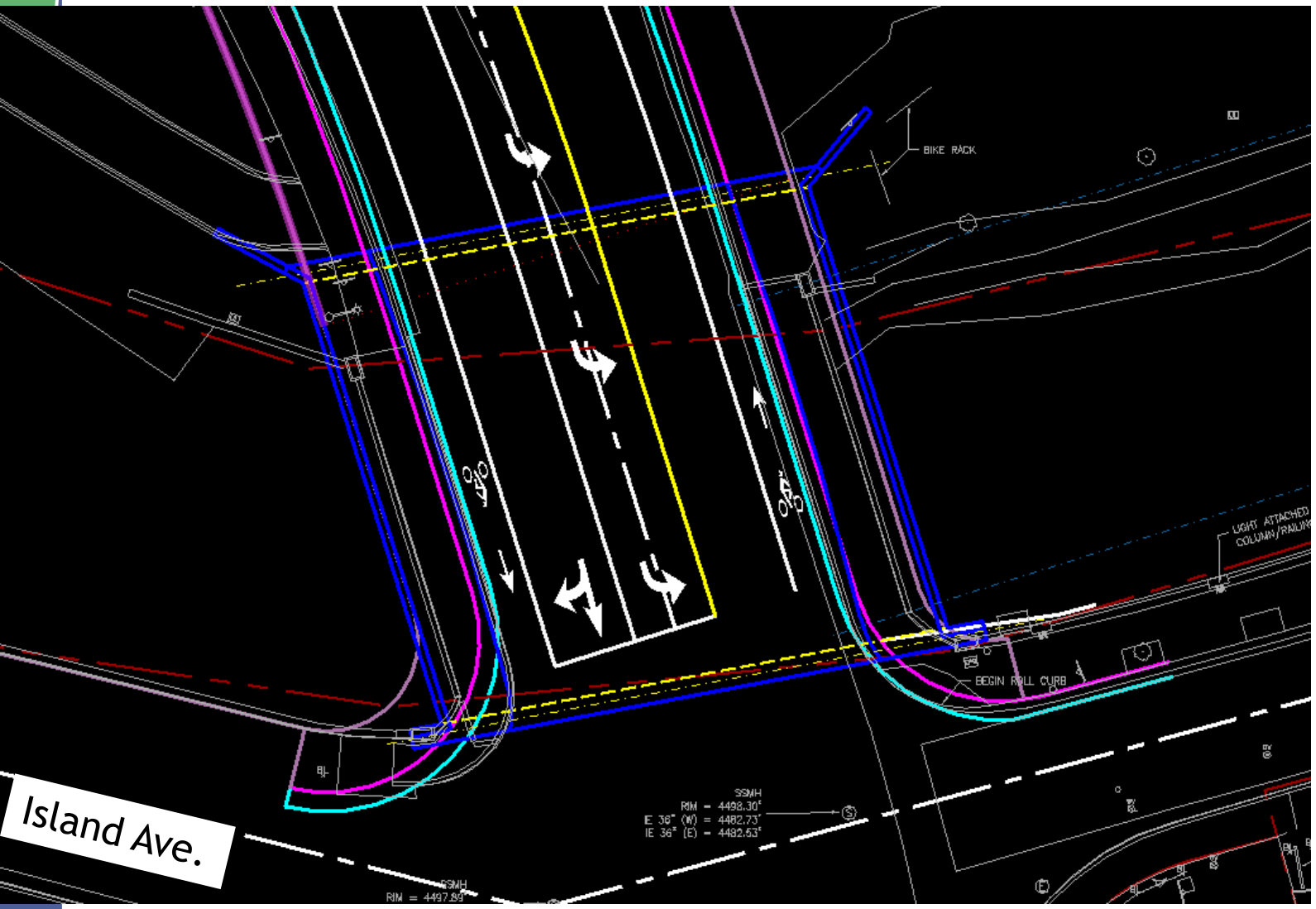


- "Large" = 30'
- Proposed Arlington Pads = 50' Long

- Sky Vista / Lemmon Drive Example: 150' Total Length

Horizontal Roadway: South End @ Island Ave.

ARLINGTON AVENUE BRIDGES PROJECT



- 5’ Bike Lane
- 11’ SB Right Turn/Thru
- 11’ Left Turn
- 11’ Thru
- 5’ Bike Lane

- 8’ Sidewalks

- 20’ Radius Returns
  (City Minimum for Local St.;
  No Specific Design Vehicle)

Will Evaluate a Design Vehicle to Reduce radius at west side (see existing layout)
(Bike lane width, one-way receiving lane)

Bridge:
- 8’ Sidewalks w/ Overlook
- 10’ Continuous Sidewalk

Horizontal Roadway:

ARLINGTON AVENUE BRIDGES PROJECT

5. Minimum horizontal curve radii shall be as specified in the ensuing table:

Minimum Horizontal Centerline Design Radii for Streets in City of Reno

	Minimum Design	With Normal	With 2% Super-	With 4% Super-

ty of Reno Public Works Design Manual
ıst Revised: January 2009

103

Chapter 1 – Streets

Street Classification	Speed	Crown	elevation	elevation
Local Streets Serving less than 20 lots Serving between 20 & 50 lots Serving more than 50 lots	 20 mph 25 mph 30 mph	 100 feet 185 feet 300 feet	 250 feet	 230 feet
Collector Streets	30 mph	430 feet	335 feet	300 feet
Minor Arterial Streets	40 mph	820 feet	630 feet	565 feet
Major Arterial & Expressway Streets	50 mph	1,390 feet	1,045 feet	925 feet

- As shown: 500’ Reversing Centerline Curves

- Design Exception Required: (Matches Existing Conditions)

Curves on any street, except local streets, shall be separated by a tangent of not less than one hundred 100 feet. Unless specifically approved in a tentative map or other public review, no local street in a residential district shall have a tangent of greater than six hundred (600) feet or the distance of twelve (12) lots on one side of the street, whichever is less, unless it can be demonstrated that the tangent is visually broken by a vertical curve or that a longer tangent is necessary to preclude a traffic hazard. A successful street design will result in traffic calming and reduce the need for future installation of traffic calming measures

Vertical Design Criteria:

SECTION 2. - Design Requirements:

1. All streets shall have a minimum grade of 0.6%, unless approved otherwise by the City Engineer. Commercial collector, arterial and expressway streets shall have a maximum grade of 6.0%, except as noted in item 1a below. It is desirable to have a maximum grade of 6.0% on residential collector and local streets. If approved by the City Engineer, residential collector and local streets with a northern exposure are allowed a maximum grade of 10.0% and residential collector and local streets with a southern exposure a maximum grade of 12.0%. The following criteria shall also apply to street grades for all functional classifications.

   a. Grades in excess of 8.0% shall be limited to a horizontal tangent length of 400 feet. Grades in excess of 10.0% shall be limited to a horizontal tangent length of 200 feet. Street segments with grades in excess of 8.0% shall provide landings contiguous to both sides of the steeper section. Each landing shall have a grade of 6.0% or less, and a length of at least 100 feet.

   b. On long grades, the steeper grades shall be provided near the bottom of the ascent wherever possible, with shallower grades near the top of the ascent.

   c. Street intersections shall not be allowed when the grade on the primary street exceeds 6.0% on streets with a northern exposure and 8.0% on streets with a southern exposure.

   d. Design controls for vertical curves shall conform to AASHTO's "A Policy on Geometric Design of Highways and Streets", Latest Edition.

   e. Sharp horizontal curvature shall not be introduced at or near the top of a pronounced crest vertical curve or near the bottom of a pronounced sag vertical curve. Consideration shall be given for stopping sight distances, as set forth by AASHTO's "A Policy on Geometric Design of Highways and Streets", Latest Edition.

   f. Maximum grade on a cul-de-sac shall be 6%.

   g. Grade Breaks shall extend to street crown. If partial grade breaks are used, the design engineer shall demonstrate the need, and how slopes affect curb returns and ADA ramps.

City of Reno Public Works Design Manual
Last Revised: January 2009

102

ARLINGTON AVENUE BRIDGES PROJECT

- 0.6% minimum grade
- 6.0% maximum grade
  Will evaluate exceptions if necessary

- Design Speed = 5 mph over posted
  - 30 mph 1st Street to south end of North Bridge
  - 20 mph south end of north bridge to Island Ave.

Vertical Design Criteria:

ARLINGTON AVENUE BRIDGES PROJECT

- Posted Speed:
  - 15 mph northbound prior to Island Avenue
  - Existing RRFB at Island Avenue
  - 25 mph northbound as approach 1st Street Intersection

Vertical Design Criteria:

- Posted Speed: 15 mph southbound, 3 signs

Roadway Discussion/Questions

Hydraulics

ARLINGTON AVENUE BRIDGES PROJECT

Photo Credit: rgj.com

Photo Credit: KOLO News 8

Existing Hydraulics:

ARLINGTON AVENUE BRIDGES PROJECT

- Design Criteria:
  - Need to analyze 2 events:
    - 14,000 cfs per CTWCD
    - 100-year storm per FEMA requirements
  - 14,000 cfs (approximately 50-year event)
    - Section 408 Permit required (altering the USACE Civil Works Project)
    - Section 408 Permit goes through the local sponsor
      - = Carson-Truckee Water Conservation District (CTWCD)
      - CTWCD requires analysis of 14,000 cfs (approx. 50-year event)
        - No more than 0.1’ raise in WSE
        - 2’ Freeboard over the 14,000 cfs flow

Existing Hydraulics:

ARLINGTON AVENUE BRIDGES PROJECT

- 100-year event
  - FEMA uses: USACE Sacramento District Nevada Feasibility Report and EIS (1985) = 18,500 cfs
    - *Prior to Flood of 1997*
  - Northern NV Comprehensive Regional Water Management plan Staff Report (2016) = 20,700 cfs
    - *After Flood of 1997*
    - Virginia Street Bridge = 1' over 100-year Storm (water confined to channel)
    - TMRDM and NDOT Typically require 2' freeboard at 100-year, <u>But No Less than Existing Conditions</u>

1997 Flood:

ARLINGTON AVENUE BRIDGES PROJECT

1997 Flood
Arlington Avenue
Looking Northwest

Photo Credit:
National Weather Service

Existing Hydraulics:

ARLINGTON AVENUE BRIDGES PROJECT

- 100-year event
  - Virginia Street Bridge = 1’ over 100-year Storm (water confined to channel)
  - Arlington Bridges 100-yr flow NOT confined to channel so freeboard is impractical to achieve
    - TMRDM and NDOT Typically require 2’ freeboard at 100-year, <u>But No Less than Existing Conditions</u>

Existing Hydraulics, 14,000 cfs:

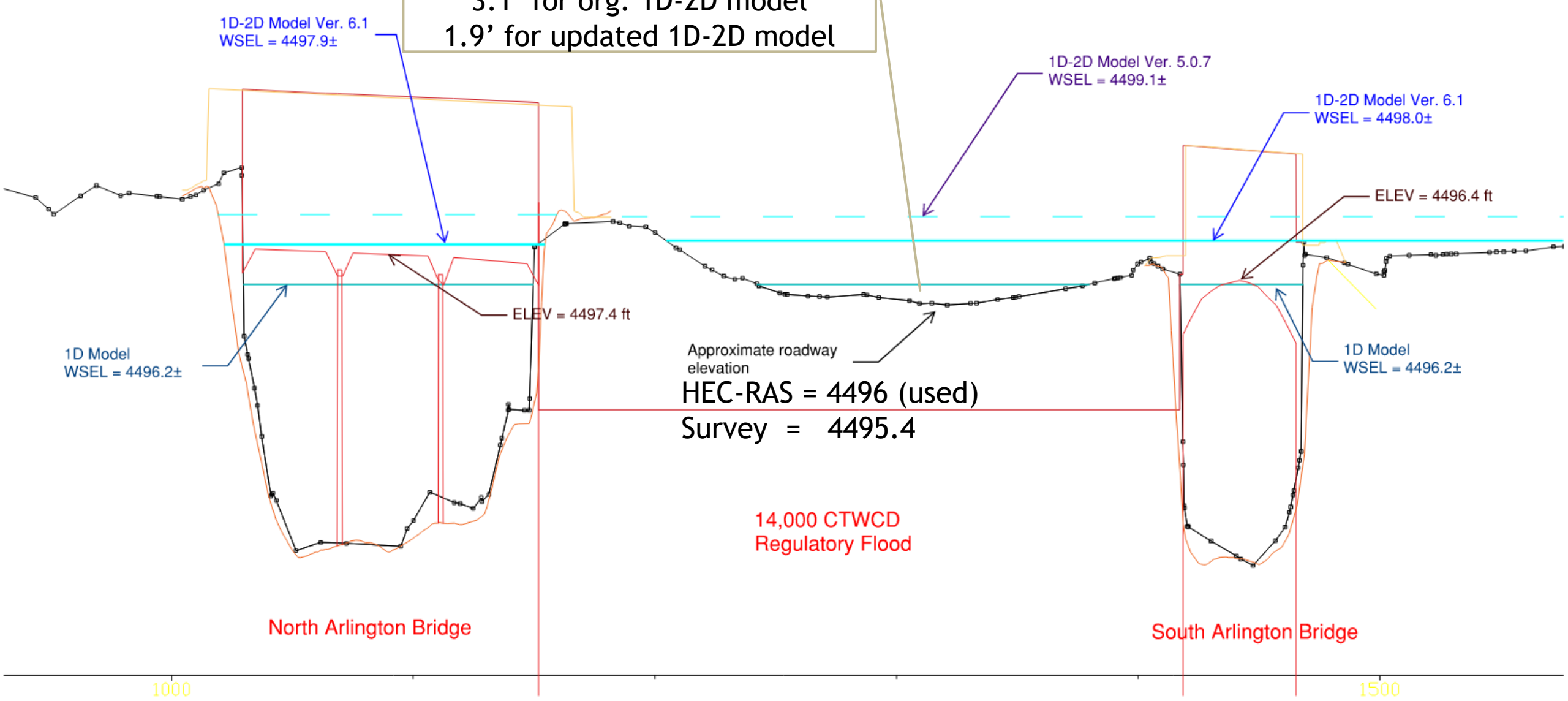
ARLINGTON AVENUE BRIDGES PROJECT

- Feasibility Study used ‘Older’ (Current at the time)
  - CTWCD 14,000 cfs regulation flood model, HEC-RAS 1D Model
    - 4496.2 ft
- CTWCD since updated their model to replace the section for Arlington Bridges and surrounding area with 2D modeling in HEC-RAS version 5.0.7 (is 1D-2D hybrid)
  - Bridges in this model are approximated with culverts
  - 4499.1 ft (+2.9 ft over 1D model)
- Jacobs updated the 2D model area to HEC-RAS version 6.1 which has bridge routines to more accurately model bridges (is 1D-2D hybrid)
  - 4497.9 ft (+1.7 ft over 1D model) (-1.2’ less than *v.5.0.7* 1D-2D HEC-RAS)

ALL MODELS SHOW WATER OVER ARLINGTON AVENUE BETWEEN THE 2 BRIDGES FOR THE 14,000 CFS

Existing Hydraulics, 14,000 cfs:

Water Depth on Arlington Avenue:
0.4’ for 1D model
3.1’ for org. 1D-2D model
1.9’ for updated 1D-2D model



Existing Hydraulics, 14,000 cfs
Influence of Downstream Bridges

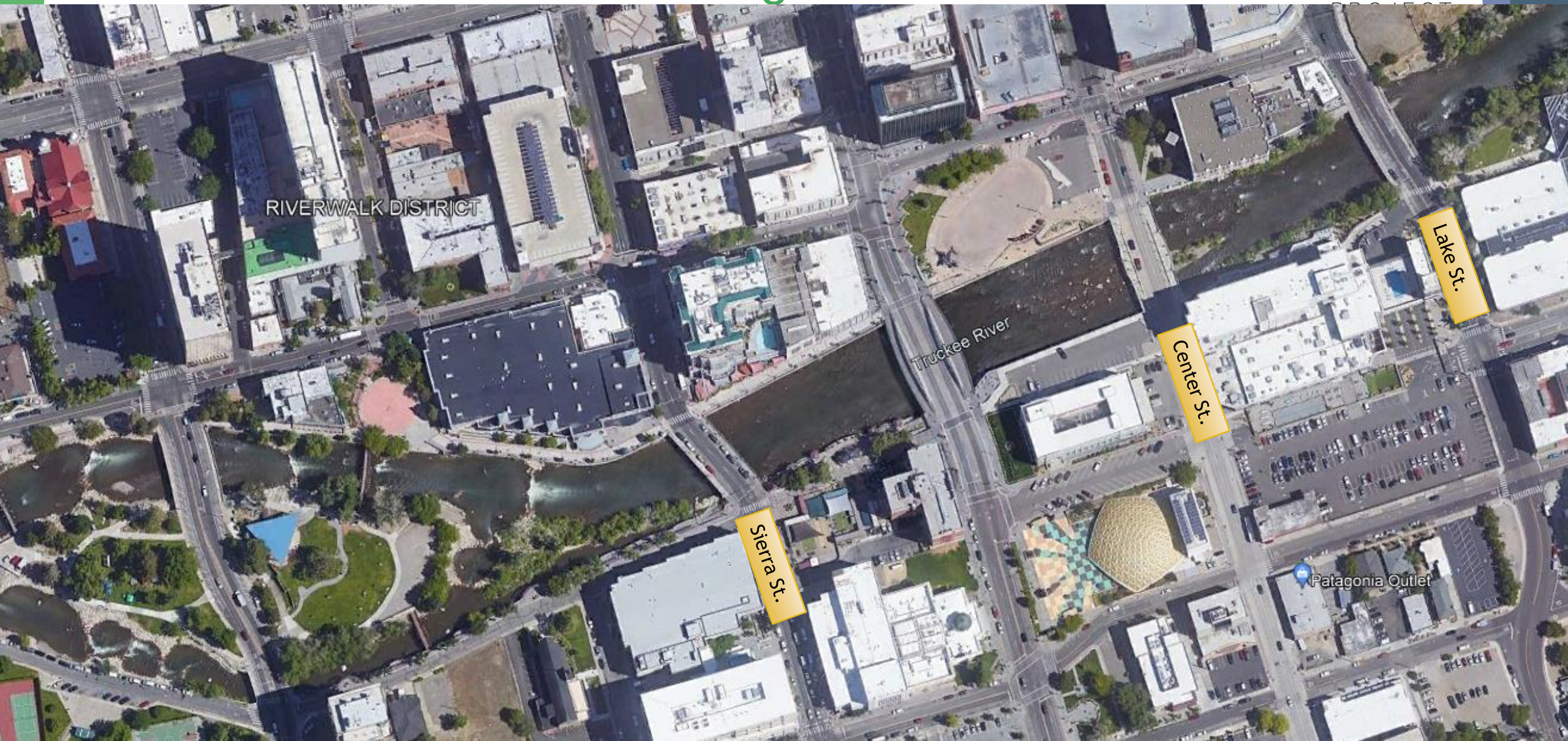
ARLINGTON AVENUE BRIDGES PROJECT

- Removal of 3 downstream bridges, Sierra Street, Center Street, and Lake Street
  - For 14,000 cfs analysis – affects WSEL a little bit:
    - Reduces WSEL at north bridge by 0.4’ and at the south bridge by 0.1’
  - For 100-year flows, it is assumed will more significantly affect the WSEL at Arlington bridges (have not modeled)

Existing Hydraulics, 14,000 cfs

Influence of Downstream Bridges

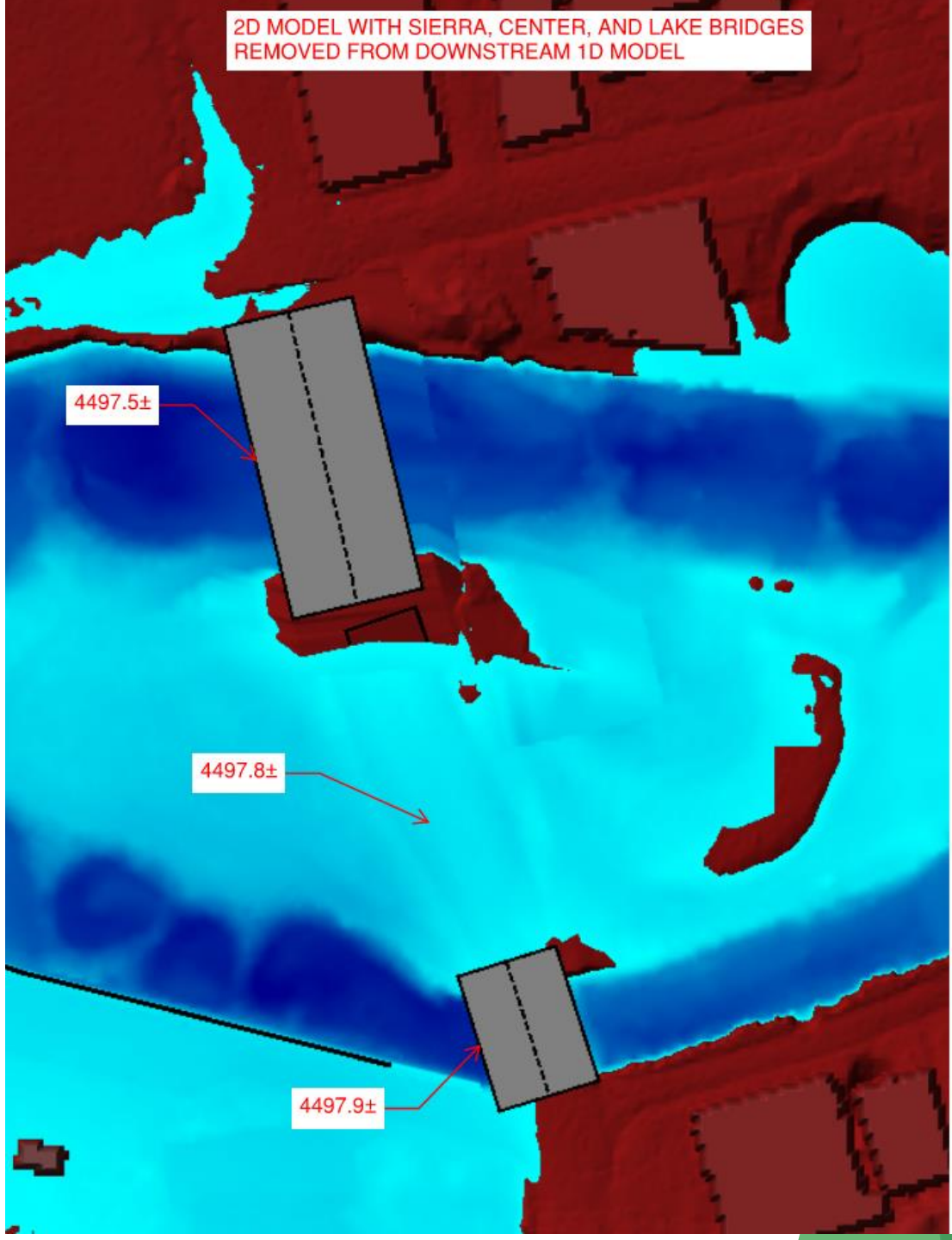
ARLINGTON AVENUE BRIDGES



Existing Hydraulics, 14,000 cfs

Influence of Downstream Bridges

- Removal of 3 downstream bridges, Sierra Street, Center Street, and Lake Street
  - Reduces WSEL at north bridge by 0.4’ and at the south bridge by 0.1’



Existing Hydraulics, 14,000 cfs

Estimated Design to get Required 2 feet freeboard

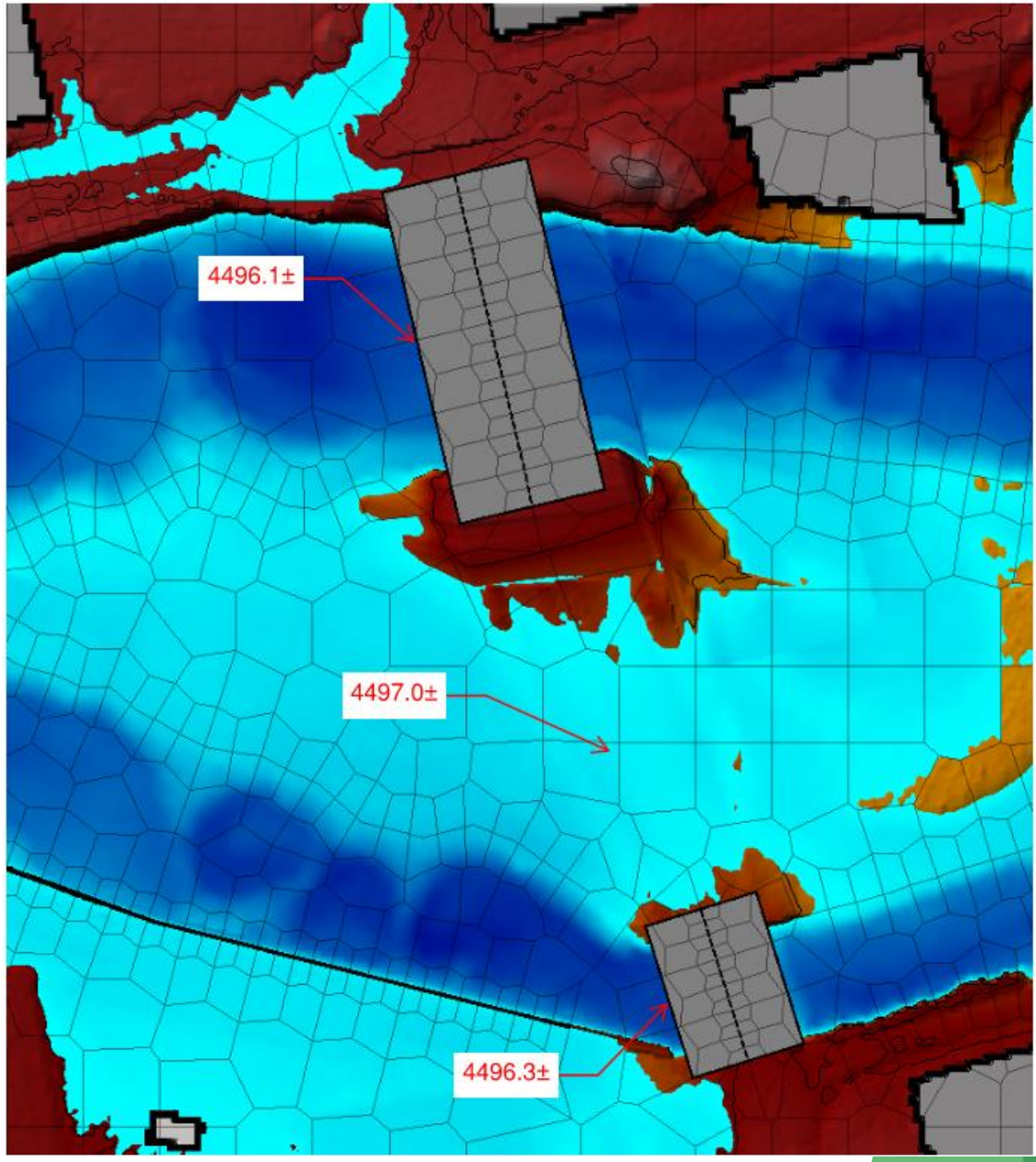
- Additional Area Under Bridges
- 55-60 feet span w/ existing low chord elevation (4497.4 north bridge and 4496.4 south bridge)

Existing Hydraulics, 14,000 cfs

Estimated Design to get Required 2 feet freeboard

- Raise low chord minimum elevation to 4498.5

- Water flows over Arlington Avenue between bridges



Existing Hydraulics, 14,000 cfs

Estimated Design to get Required 2 feet freeboard

- Raise Arlington Roadway Profile to 4497.5’
- Raise low chord minimum elevation to 4498.5’
  - *No change to upstream WSEL*

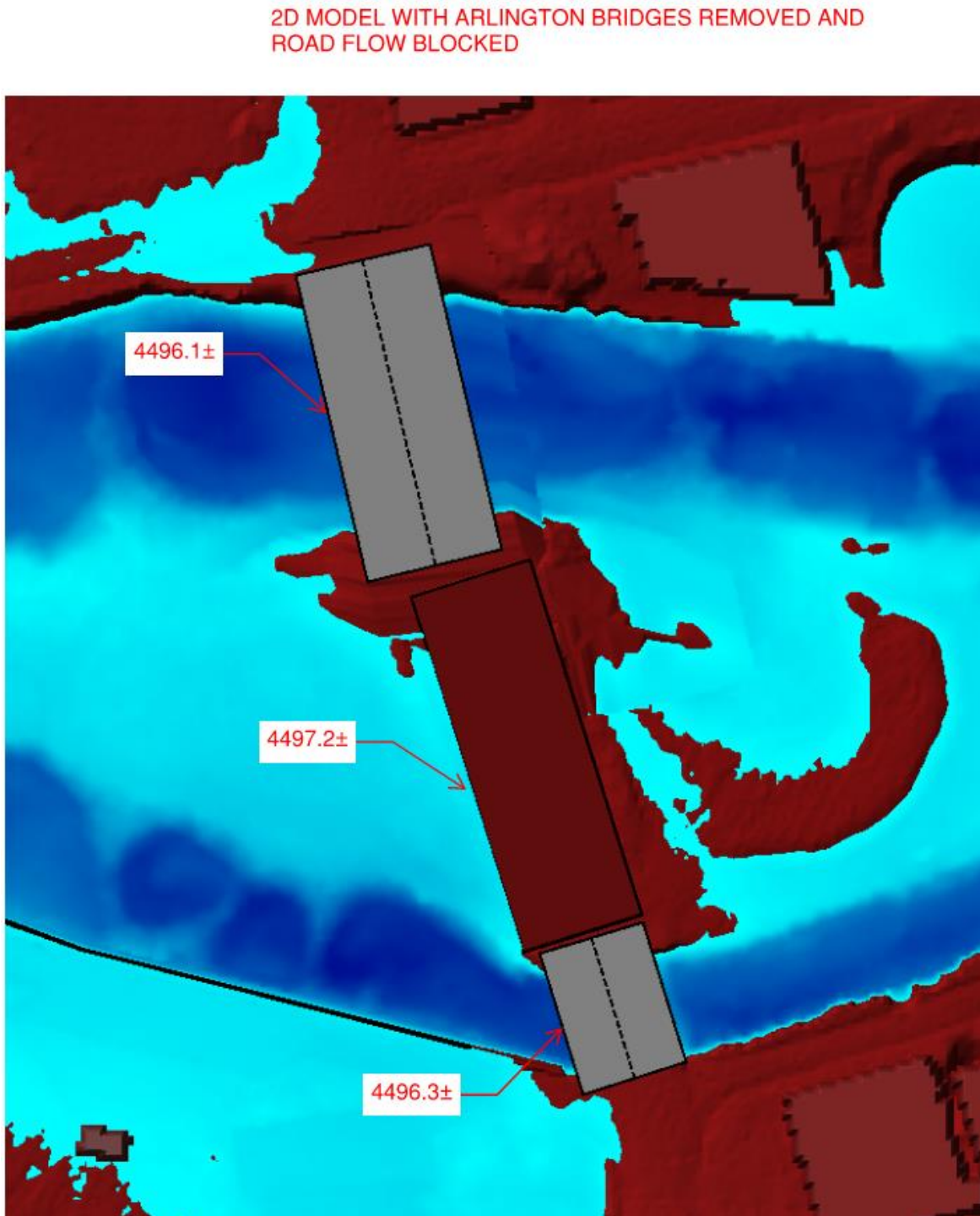
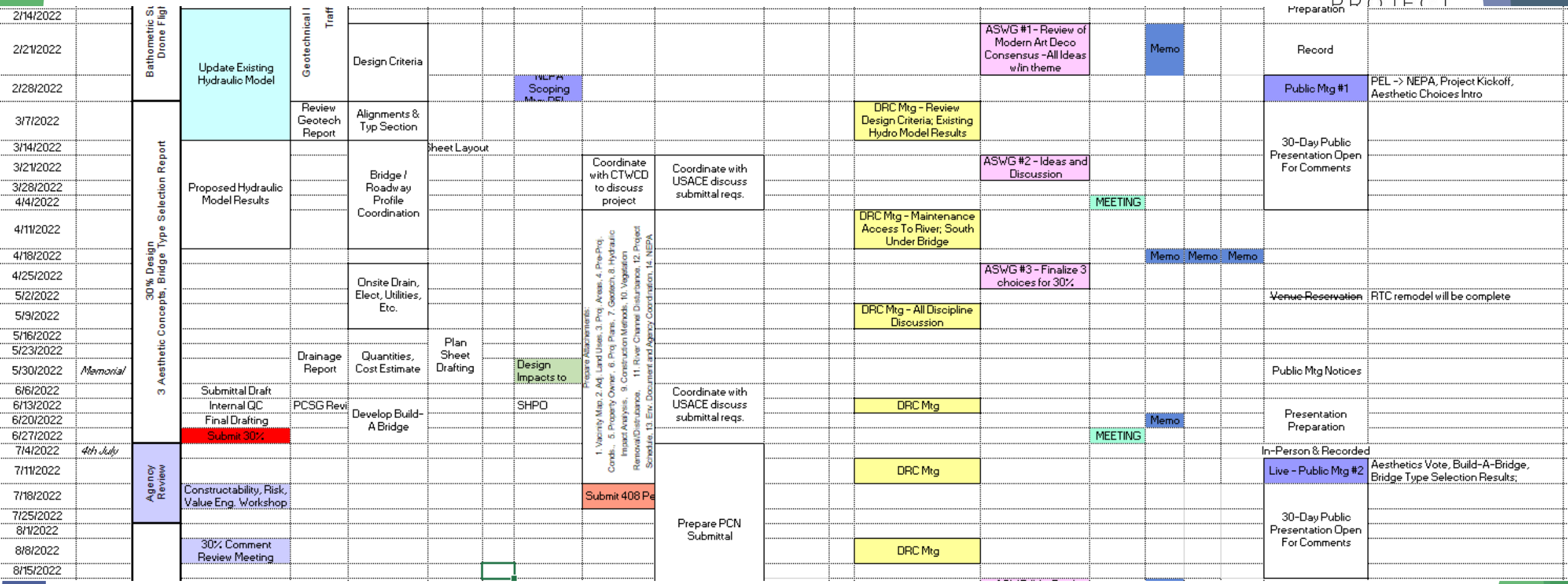


Photo:

2017
Arlington Avenue
Looking West

Photo Credit:
Reno Gazette-Journal

Project Timeline



Thank You for Participating!

jtortelli@rtcwashoe.com

ARLINGTON AVENUE BRIDGES PROJECT

U.S. Department of Transportation
Federal Highway Administration

US Army Corps of Engineers

Building A Better Community
Through Quality Transportation.
rtcwashoe.com

Jacobs

Stantec

CME

PK Electrical, Inc.

CIVILFX NOW A DIVISION OF Parametrix

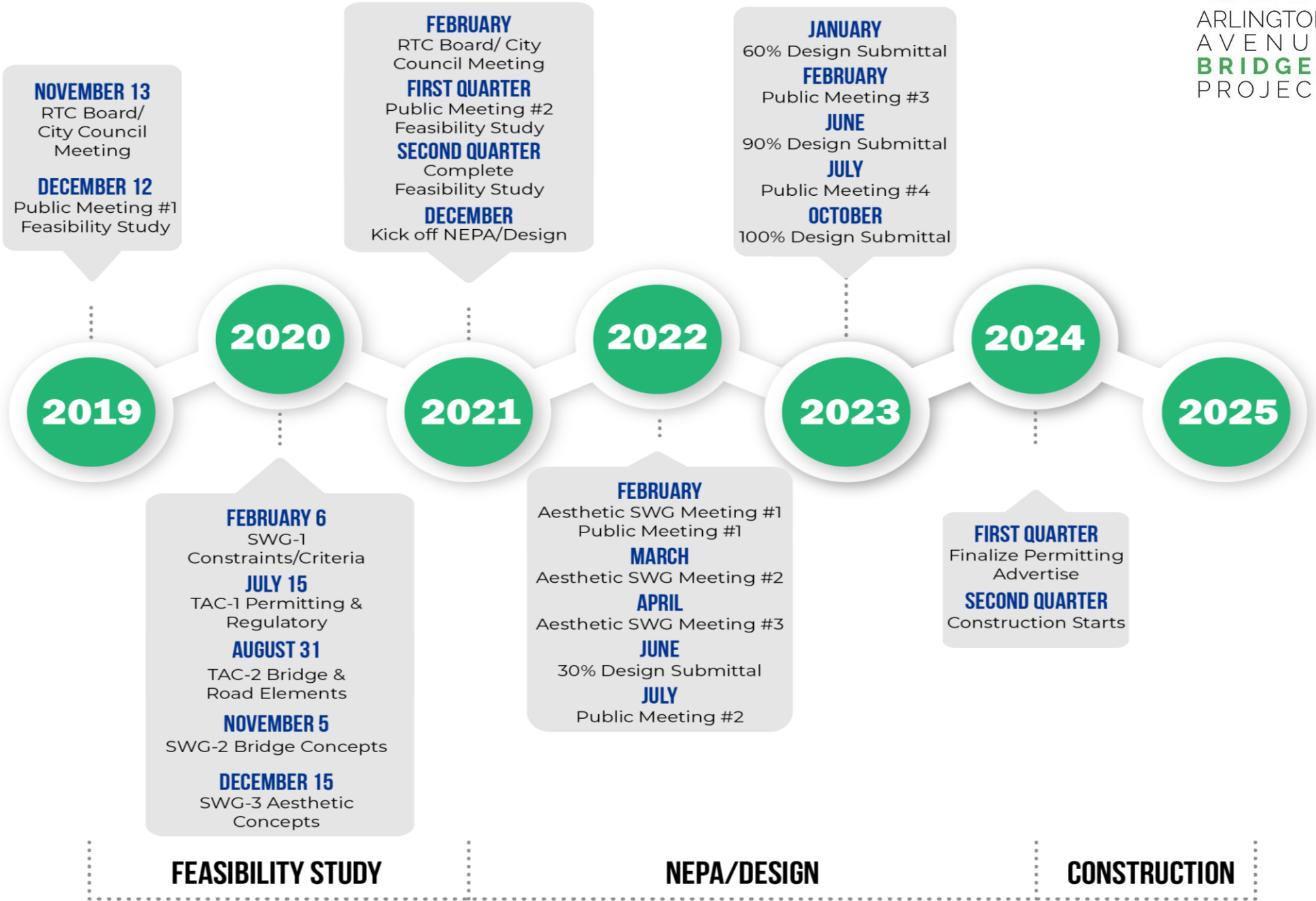
PCSG

ARLINGTON AVENUE BRIDGES PROJECT

Other Slides if Necessary

Project Timeline

ARLINGTON AVENUE BRIDGES PROJECT



Roles & Responsibilities

ARLINGTON AVENUE BRIDGES PROJECT

- **RTC –** Management and Administration for NEPA/Design/Construction
- **City of Reno –** Owner, Design Review
- **NDOT –** LPA Agreement, Environmental Oversight and Review
- **FHWA –** NEPA class of action determination, Environmental Oversight and Review
- **USACE –** Section 408 Permit, Section 404 Permit
- **CTWCD –** Local sponsor of USACE for Section 408 Permit
- **Jacobs –** Prime Consultant, Survey, Environmental, Bridge, Civil, Hydro, Sign/Stripe
- **Stantec –** Landscape & Aesthetics
- **Civil FX/Parametrix –** Renderings
- **CME –** Geotechnical
- **PK Electrical –** Lighting and Electrical
- **SJ Marketing –** Public Outreach with the RTC communications Team
- **PCSG –** ICE, Constructability, Construction Schedule

Identified Key Groups

ARLINGTON AVENUE BRIDGES PROJECT

Aesthetic Stakeholder Working Group (ASWG)

- Review, provide input, and decide on aesthetic concepts and final design
- 4 meetings – February, March, April, August 2022

Design Review Committee (DRC)

- Technical review, identify/discuss major impacts of design decisions, discuss environmental impacts
- Monthly meetings through final design

Agency Involvement

- Provide update and opportunity for discussion on decisions made and permitting status
- Quarterly meetings as necessary

Utility Involvement

- Coordinate design, adjustment, relocation, and additional utilities
- Bi-monthly meetings as necessary with focused discussion at DRC meetings

Public

- Obtain feedback on bridge type, landscaping, and aesthetics
- Provide advance notification of what to expect during construction
- 4 public meetings anticipated

Bridge Girder

Cast in Place or Precast - Undetermined

Cast-In-Place (CIP)

- Falsework within the river for abutments and superstructure
- Aesthetically more ‘park’ friendly look
- Time of construction – 2-4 years (River Restrictions/Vehicle Access)

CIP – Box Girder From Veteran’s Parkway (Reno)
No Columns for Arlington Bridges

Precast

- Falsework within the river for abutments; superstructure set in place
- Aesthetically more ‘highway’ type look
- Piers and pier cap can have custom formliner
- Time of construction – 1-2 years (River Restrictions/Vehicle Access)

Precast Girders – Project NEON (Las Vegas)
No Columns for Arlington Bridges

Notes:

- *South Bridge has no pier*
- *North Bridge has one solid pier wall instead of columns*