

RIO PUERTO NUEVO SUPPLEMENTAL PROJECT

**PRESENTED TO: DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES,
ALIANZA POR LA CUENCA DEL RIO PIEDRAS AND MUNICIPALITY OF SAN JUAN**

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U.S. Army Corps of Engineers
Jacksonville District

09 MARCH 2023

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US Army Corps
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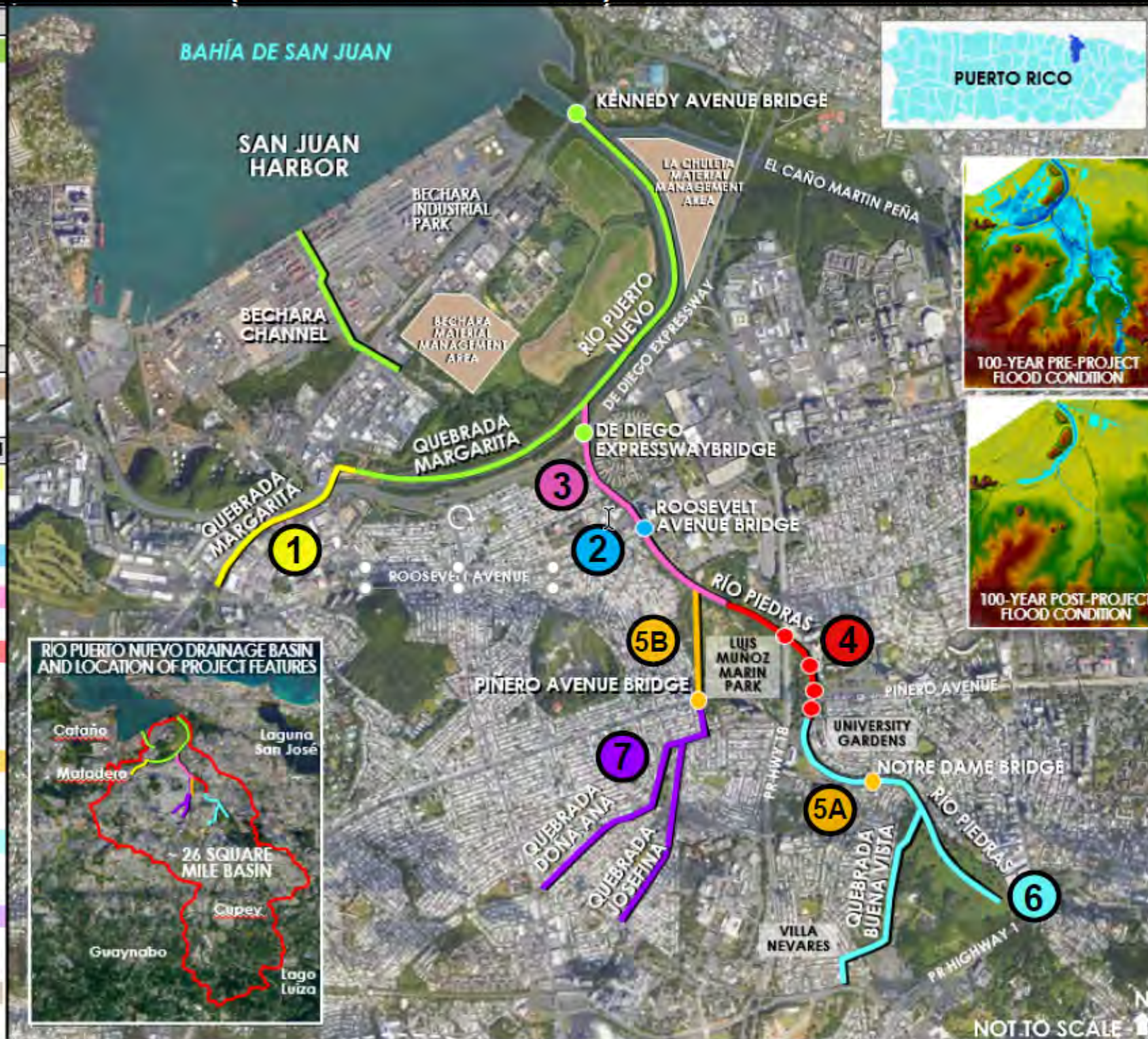
RIO PUERTO NUEVO – PROJECT OVERVIEW

2



CONTRACT IMPLEMENTATION, FEATURES, AND PROJECT MAP (ALL LOCATIONS ARE APPROXIMATE)

COMPLETED (COST SHARED)
CONTRACTS 1, 1A, 2A/AR, 2AA, 2C1, 2D WALLS
STATUS: 2D Walls, last completed, was May 2022 AMOUNT: \$470M
<ul style="list-style-type: none">Kennedy Bridge seismic retrofit; 36-inch water lineFirst 1.3 miles of channel improvementsQuebrada Margarita channel excavation and confluence wall; lower Puerto Nuevo channel dredgingBechara Channel secant pile wall box culvert; 90-inch sewer line modification; open channel workDe Diego Expressway Bridge abutments; east and west pier drill shaft reinforcementQuebrada Margarita Stilling BasinConstruction of 350-foot left channel wall and 750-foot right channel wall at channel confluence.
ONGOING (SUPPLEMENTAL) CONSTRUCTION
CONTRACT - LA CHULETA
<ul style="list-style-type: none">Upland Material Management Area (future capacity of ~350,000 cubic yards of material)
REMAINING (SUPPLEMENTAL) CONSTRUCTION
CONTRACT 1 UPPER MARGARITA CHANNEL
<ul style="list-style-type: none">Sewer line relocationConstruction of .63 miles of channel improvements at Upper Quebrada Margarita
CONTRACT 2 ROOSEVELT BRIDGE
<ul style="list-style-type: none">Roosevelt Avenue Bridge replacement
CONTRACT 3 MAIN CHANNEL (RIO PIEDRAS)
<ul style="list-style-type: none">Channel walls1.1 miles of Main Channel improvements
CONTRACT 4 LAS AMERICAS BRIDGES
<ul style="list-style-type: none">Channel, Stilling Basin and Bridge Replacements<ul style="list-style-type: none">4A-1: Las Americas Expressway Bridge4A-2: Piñero Avenue Bridge East4A-3: Northeast Access Ramp Bridge4A-4: Southeast Access Ramp Bridge
CONTRACT 5 NOTRE DAME & W. PIÑERO BRIDGE
<ul style="list-style-type: none">5A: Notre Dame Bridge replacement5B: Piñero Avenue Bridge West replacement; Quebrada Josefina downstream to Río Piedras
CONTRACT 6 MAIN CHANNEL / BUENA VISTA
<ul style="list-style-type: none">1.75 miles of Río Piedras channel improvements4 bridges (2 new; 2 replacements).80 miles channel diversion at Quebrada Buena Vista
CONTRACT 7 JOSEFINA & DOÑA ANA CHANNEL
<ul style="list-style-type: none">10 bridge replacements5000 LF. of Quebrada Josefina and 4400 LF. of Quebrada Doña Ana channel improvement
CONTRACT - BECHARA
<ul style="list-style-type: none">Upland Material Management Area (future capacity of ~600,000 cubic yards of material)



RESILIENCE | QUALITY OF LIFE

FLOOD RISK MANAGEMENT

- 100-year storm event
- More than 250,000 people residing in the highly urbanized and densely developed basin
- Over \$125 million average annual economic benefits

UPDATED INFORMATION/DESIGN

- Stakeholder engagement and updated data/analyses facilitating design modifications such as natural channel bottoms where possible, versus concrete).

Concrete Wall

Natural Bottom Channel

ENVIRONMENTAL SUCCESSES

- 25+ acres of planted mangroves resulting in wildlife, such as the Antillean Manatee, returning to completed sections of the project.
- Improved sanitary sewer infrastructure reducing discharges into waterbody.

PEDESTRIAN CORRIDORS

- Planned linear parks, bike paths, and pedestrian bridges to increase connectivity across pedestrian corridors.

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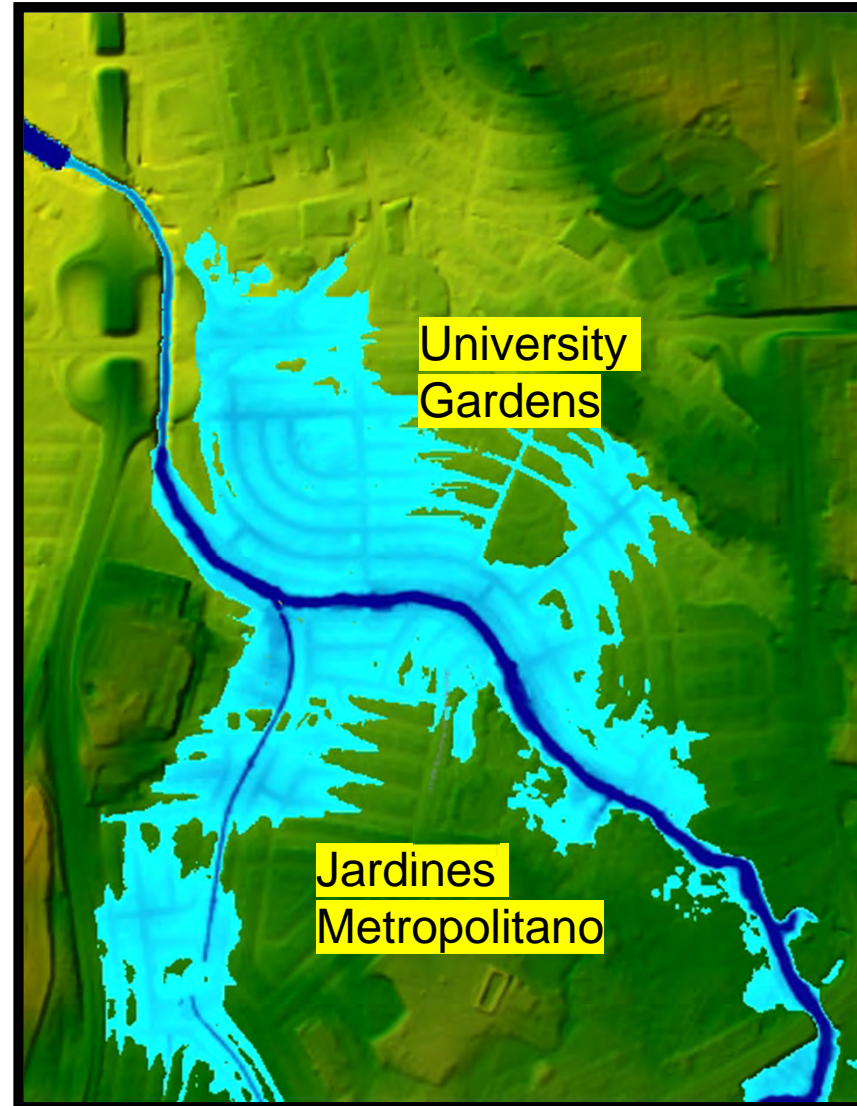
RIO PUERTO NUEVO

PRE PROJECT CONDITIONS

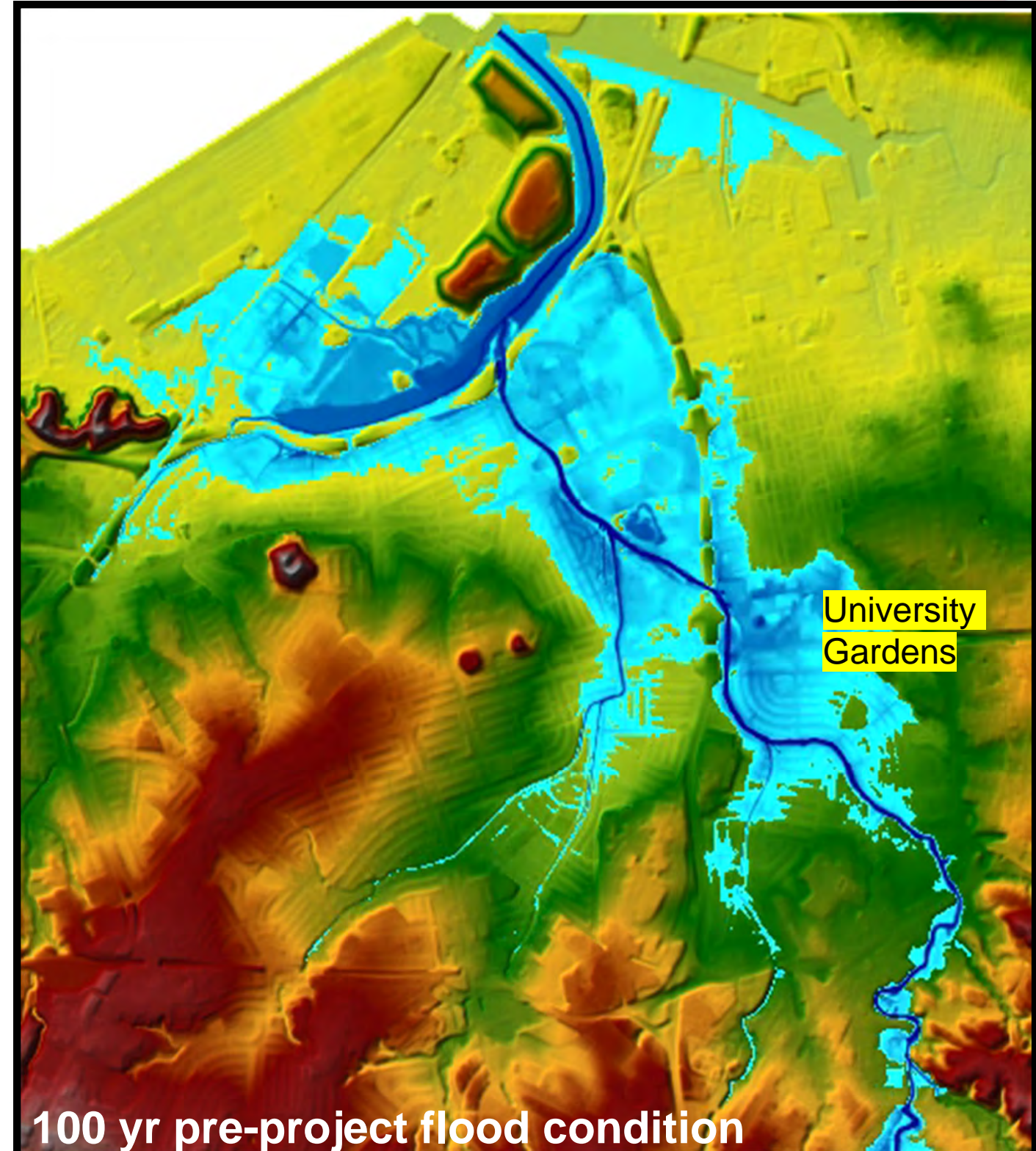
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- 26 square miles of highly urbanized, densely populated flood basin
- Existing channel overflows above 2-year storm event (bank full)
- Bank full refers to the water level stage that just begins to spill out of the channel into the floodplain.
- Bank full flows tend to occur frequently, on the average every two years, its how the river form its channel; natural river process.



	Low lying areas
	High lying areas (above flood area)
	Higher elevated area
	Highest elevation in basin
	Shallow flooding area
	Heavier flooding area



100 yr pre-project flood condition



RIO PUERTO NUEVO – IMPORTANCE OF PROJECT

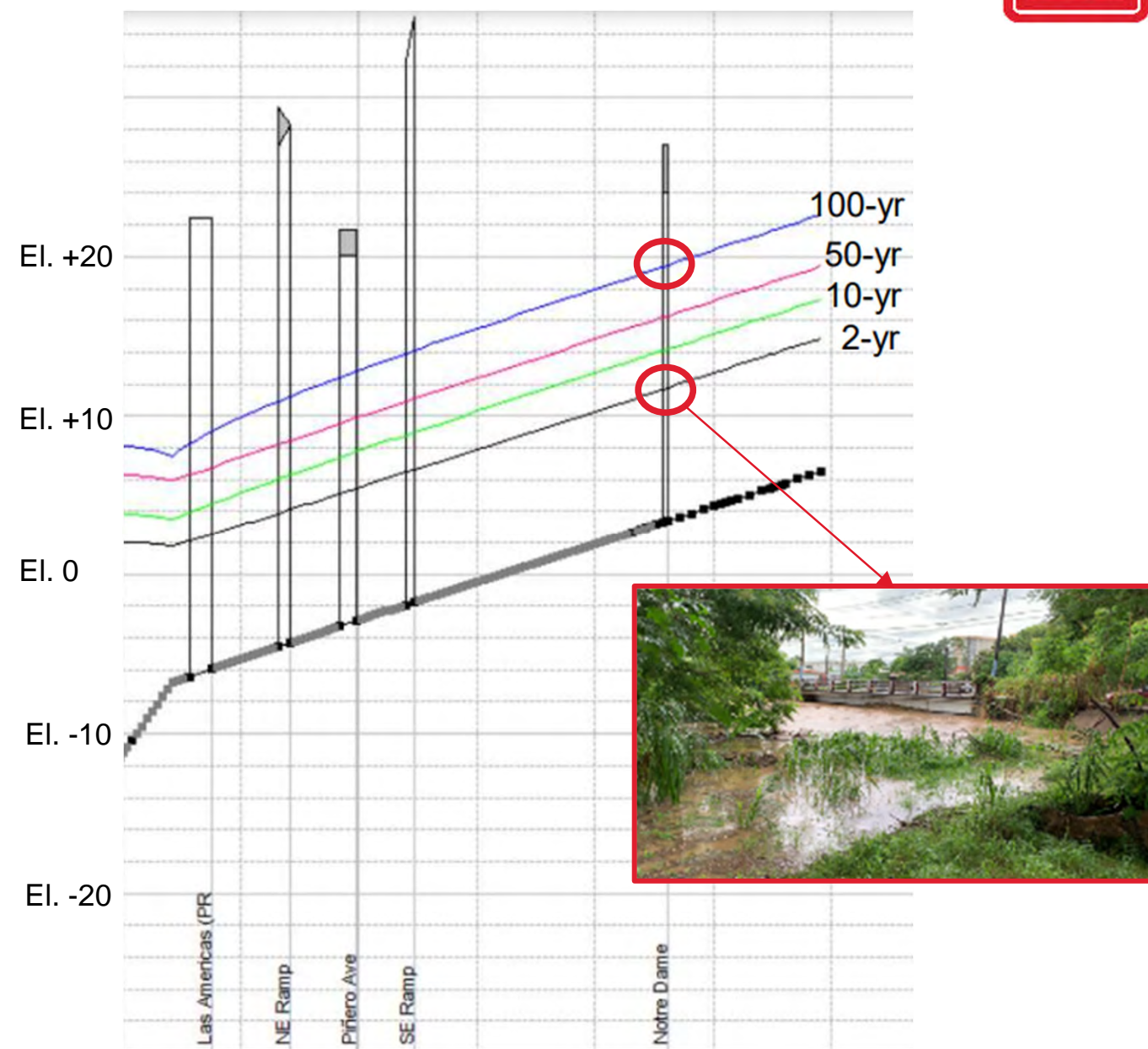


4



Note: Video taken on corner of Calle Interamericana and Calle Oxford showing flooding of Rio Piedras during a 5 to 10-yr storm event from Hurricane Lenny on November 15-19, 2009.

Credit: https://www.youtube.com/watch?v=T_osfiDlaqA



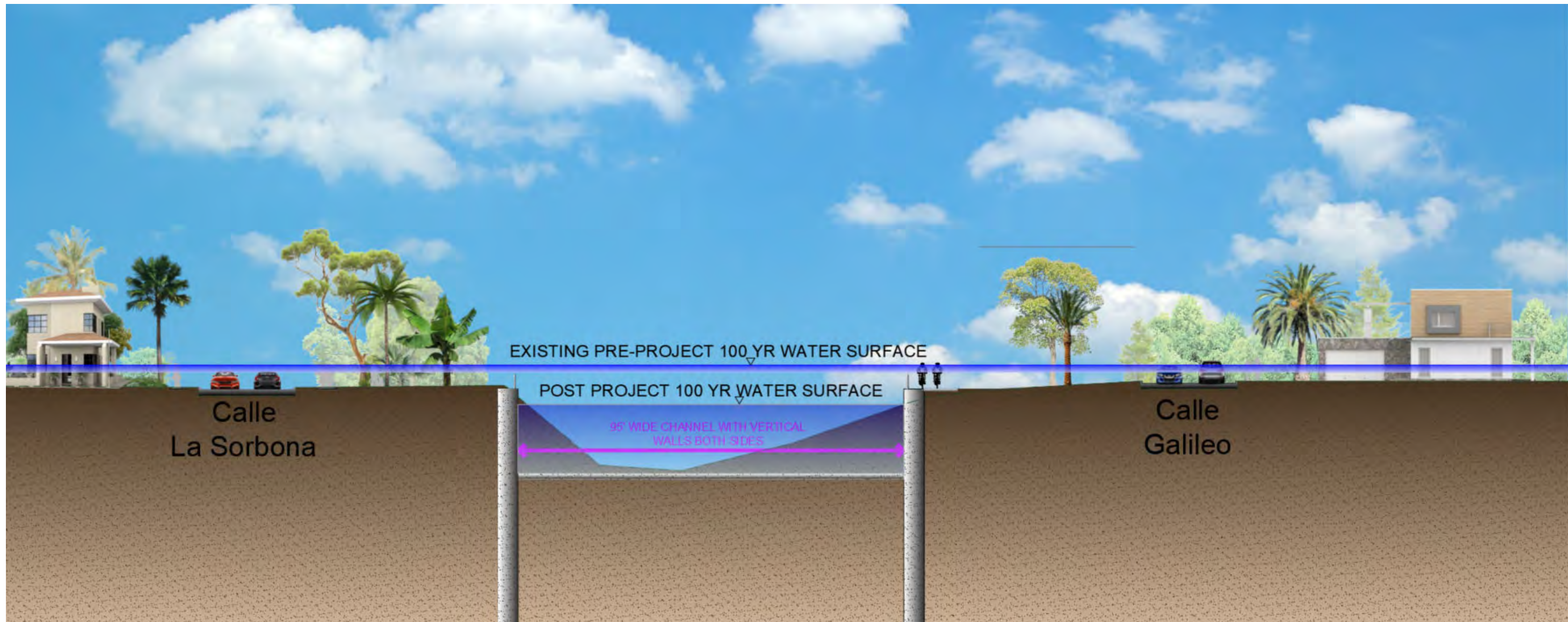
Note: Profile above highlights Notre Dame Bridge flooding between recently seen 1-2 yr events (~10-ft water elevation) and a 100-year storm event which would increase flooding by an additional ~8-ft.

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RIO PUERTO NUEVO

EXPECTED 100 YEAR FLOODING
(1% CHANCE OF ANNUAL EXCEEDANCE)





RECENT FLOODING IN RIO PIEDRAS

< 1-year storm event



13 Oct 2021 Notre Dame Bridge during flood waters from Rio Piedras. This is less than a 1-year (100% chance of occurring in a given year) storm event.

5-10-year storm event



Note: Video taken on property immediately south of Notre Dame Bridge showing flooding of Rio Piedras during a 5 to 10-yr storm event from Hurricane Lenny on November 15-19, 2009.

Credit: <https://www.youtube.com/watch?v=LWmPh9Bm1UA>

What will a 100-yr storm event look like in Rio Piedras?

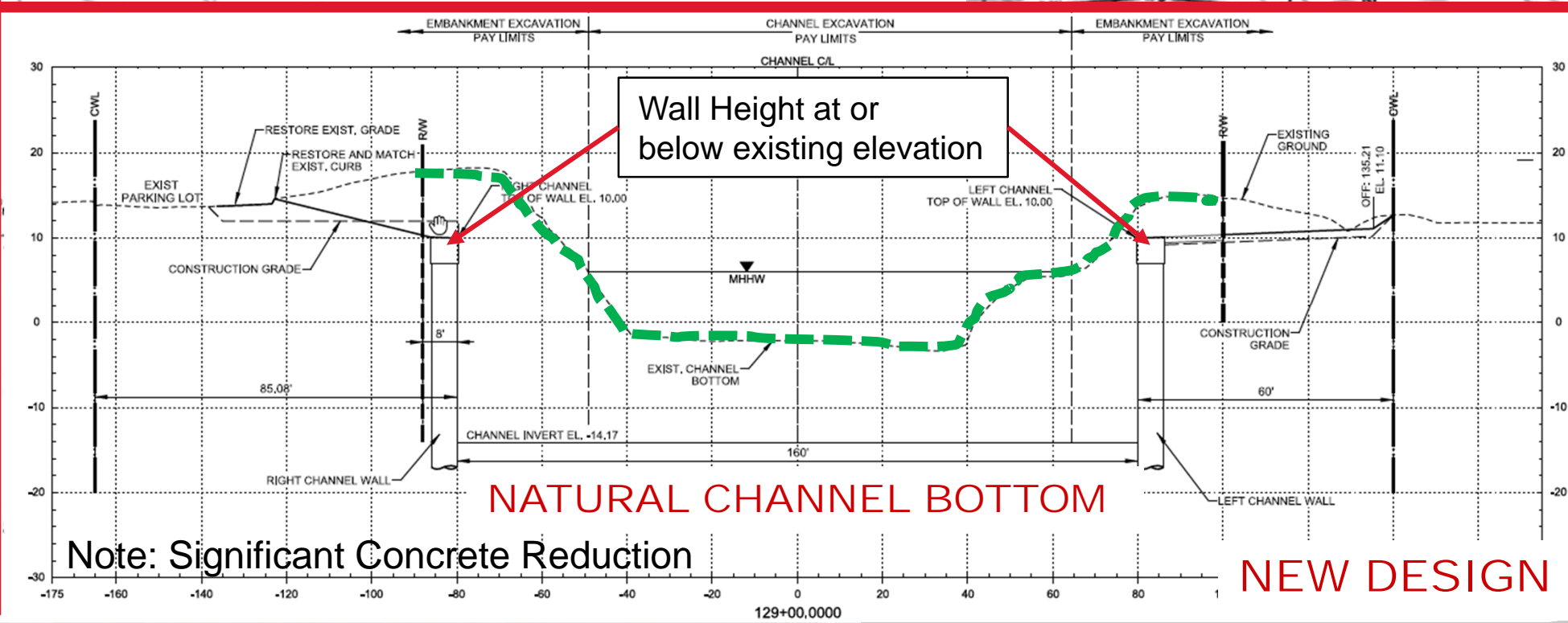
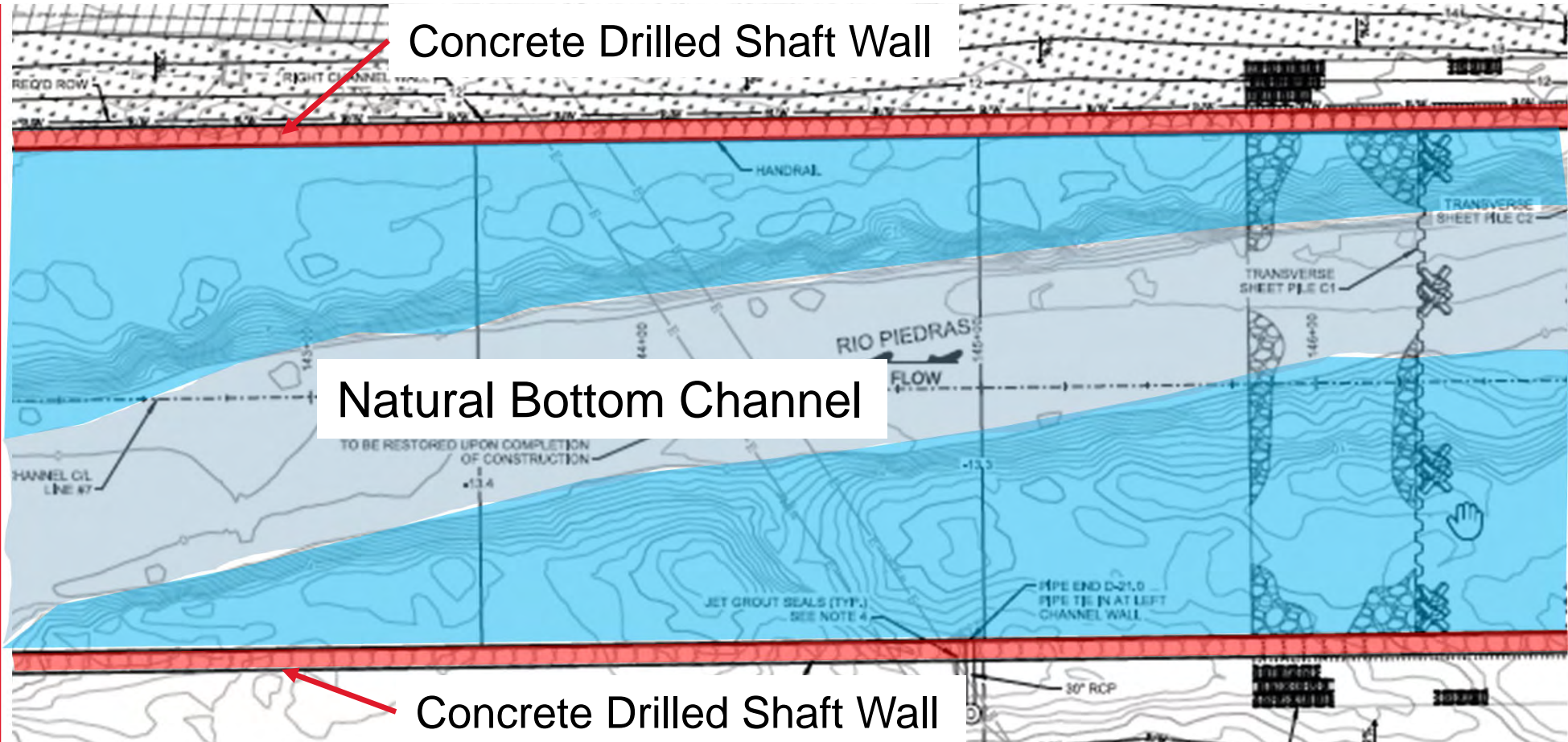
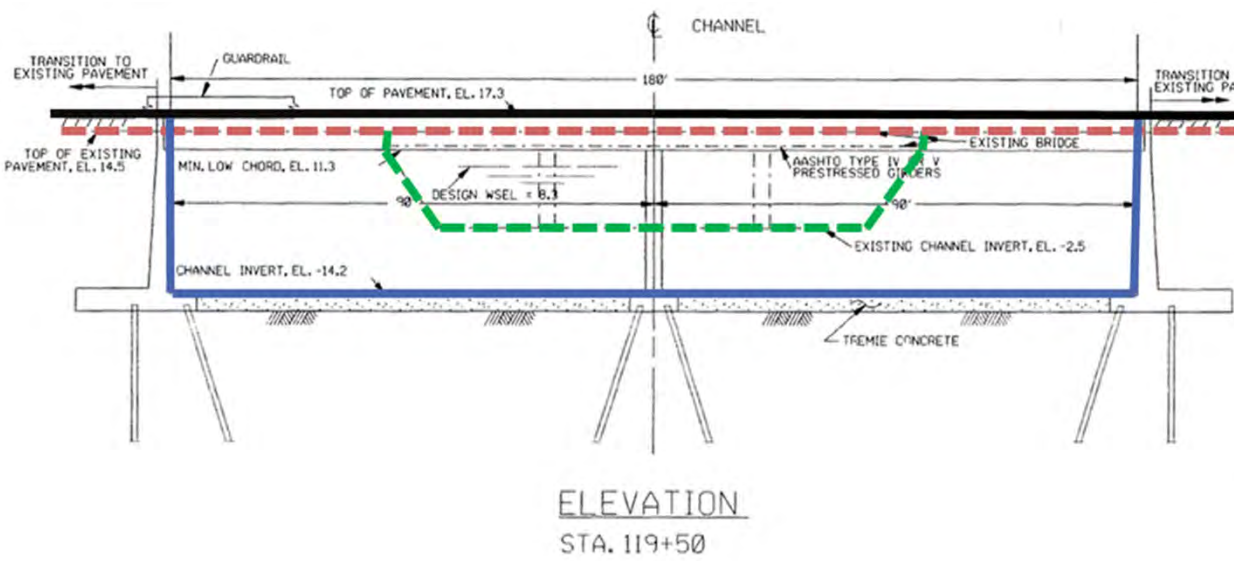
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RIO PUERTO NUEVO – DESIGN UPDATES CHANGES TO CONTRACT 3

OLD DESIGN



U-Frame
Concrete
Channel





RIO PUERTO NUEVO – DESIGN UPDATES CHANGES TO CONTRACT 4

8



U-Frame
Concrete
Channel

OLD DESIGN

CONTRACT 4 and 6



NEW DESIGN





RIO PUERTO NUEVO – (CNT-6) RIO PIEDRAS DESIGN IDEAS

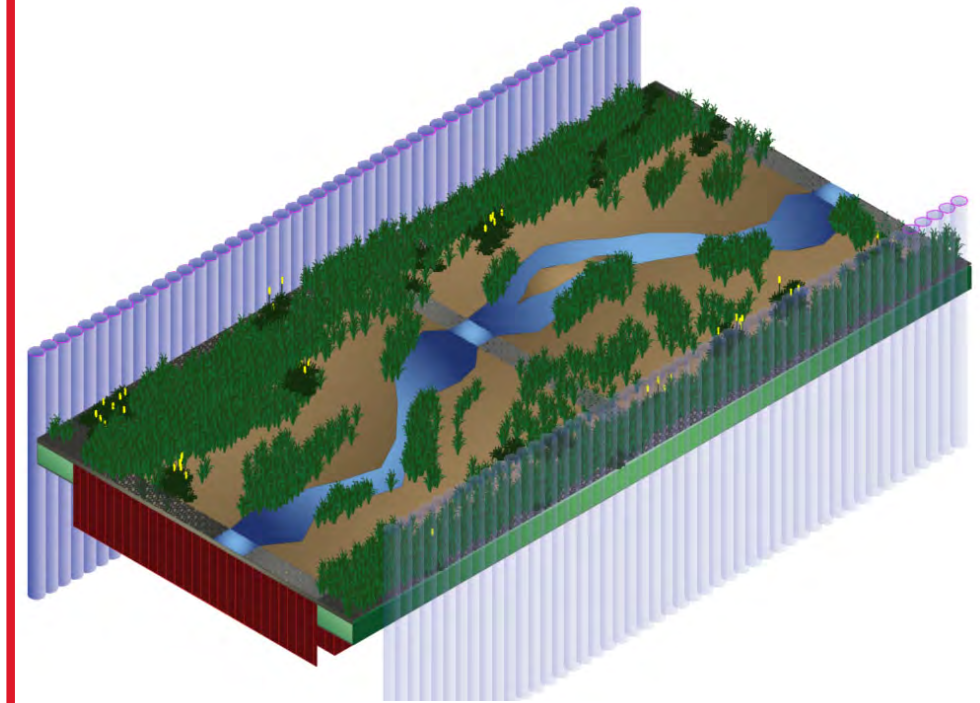
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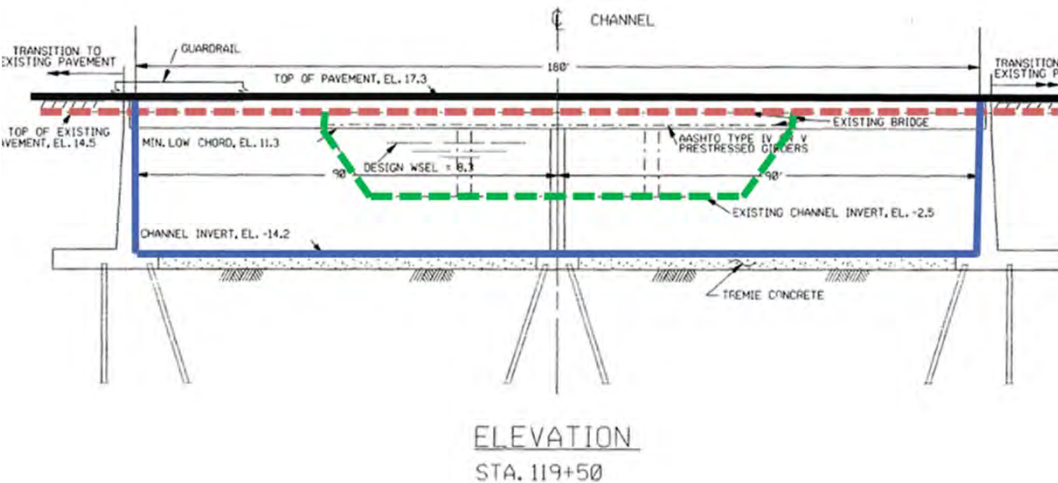
U-Frame Concrete Channel Bottom



Articulated Concrete Block Mattress Channel Bottom



Grade Control/Natural Channel Bottom



OLD DESIGN 1991



DESIGN UPDATE 2021-2022

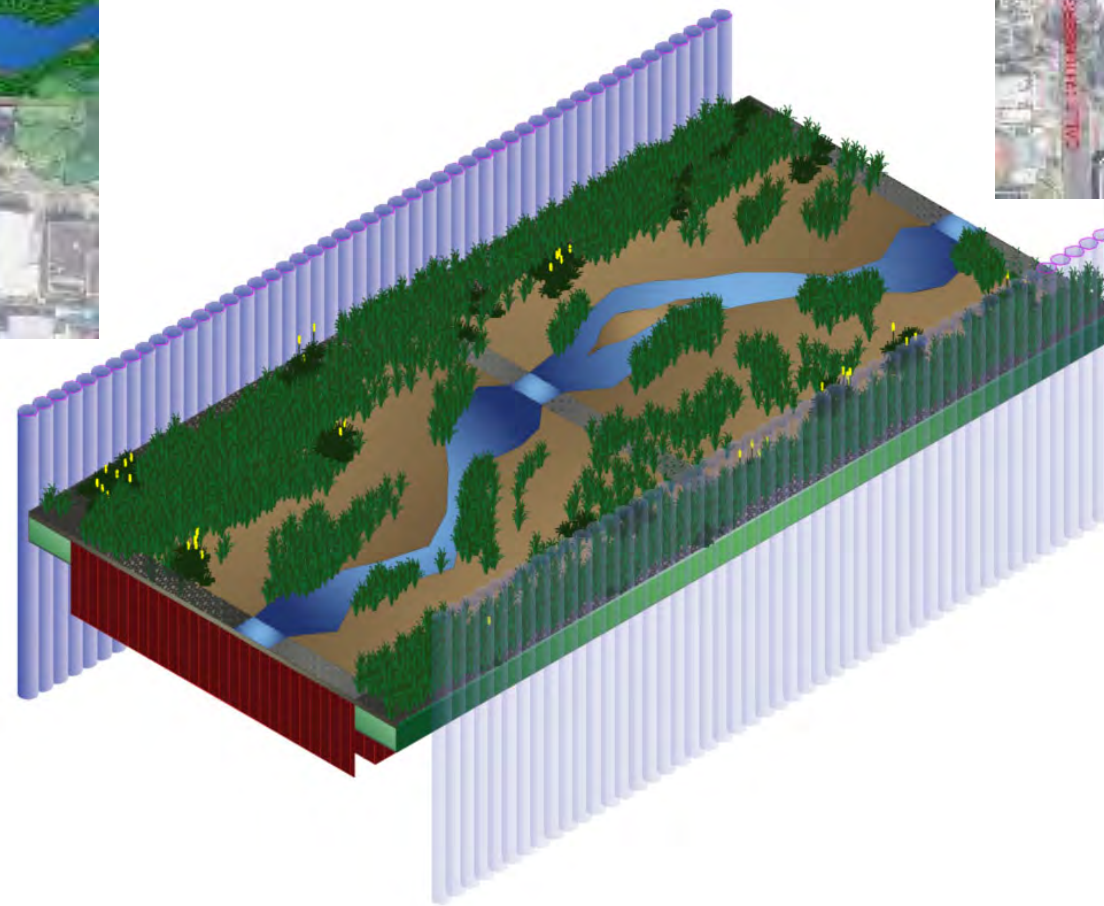


NEW DESIGN - 2023



RIO PUERTO NUEVO – (CNT-6) RIO PIEDRAS DESIGN

10



CONCEPTUAL DESIGN
URBAN COORIDOR

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RIO PUERTO NUEVO – (CNT-6) RIO PIEDRAS DESIGN

11



CONCEPTUAL DESIGN

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RIO PUERTO NUEVO – CONTRACT 6 ALTERNATE DESIGN (AVOIDING UPR PROTECTED LANDS – ECOLOGICAL CORRIDOR)

12



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RIO PUERTO NUEVO – (CNT-6) RIO PIEDRAS DESIGN

13



DESIGN ON UPR LAND

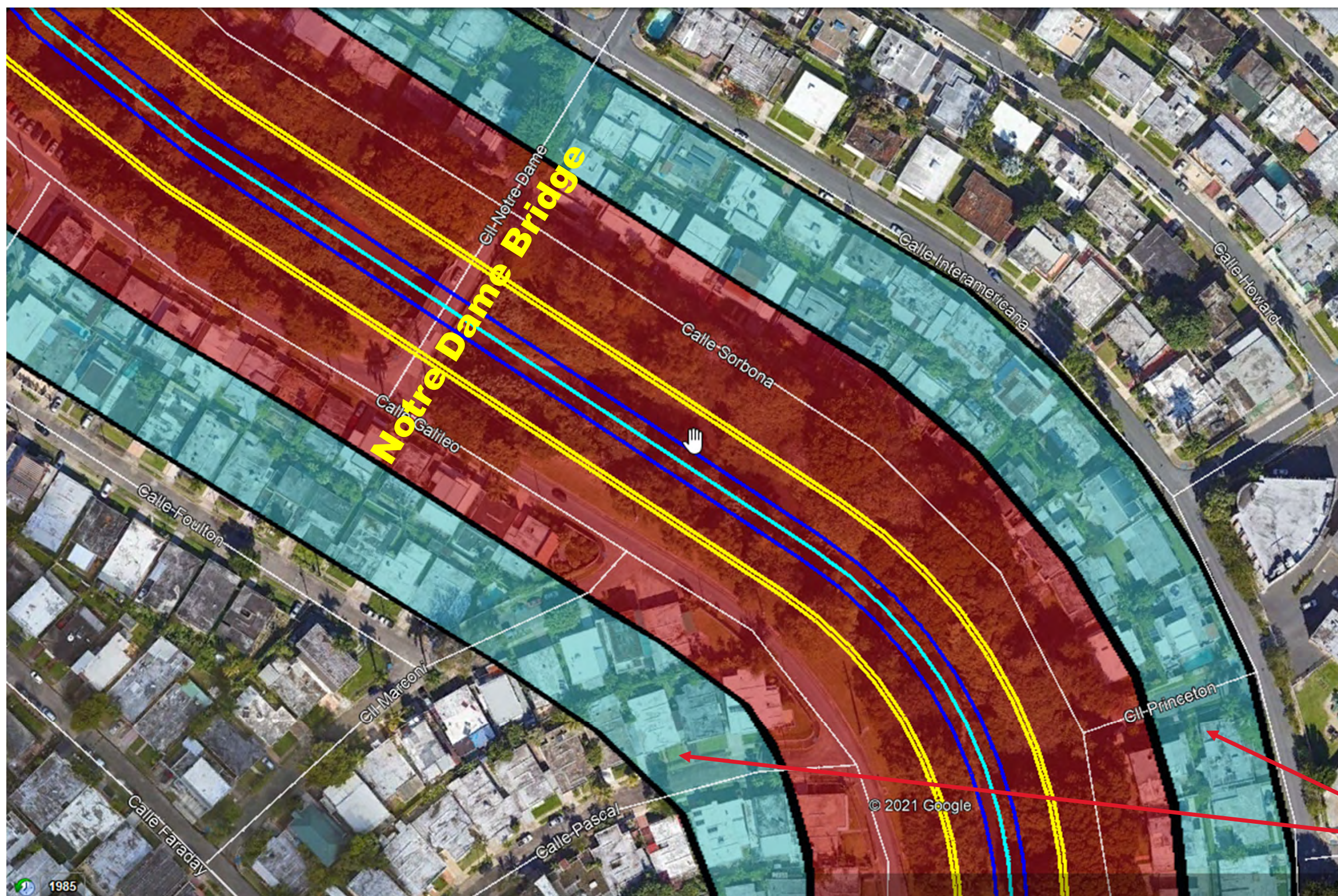


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RIO PUERTO NUEVO – NATURAL CHANNEL IMPACT

14



NATURAL CHANNEL ISSUES:

- Much Larger Channel required to pass the total volume of water
- Much more Real Estate Acquisition would significantly increase cost (approximately an additional 160 parcels, Inter-Americana university, apartments on Calle Galileo)
- USACE preference is to go with natural channel when land is available

Construction and
Maintenance Easements



RIO PUERTO NUEVO – RECREATIONAL FEATURES

15



LEGEND

- | | | | |
|--|--|---|-----------------|
| Linear park system proposed boundary | P Potential public parking lot or deck | Opportunity for hardscape and grass/ground cover vegetation only (within 15' of floodwall vegetation-free zone) | Proposed bridge |
| Proposed flood management channel | * Park/educational/ public transit/ amenity connection opportunity | Opportunity for wide range of landscape plants (outside the 15' floodwall vegetation-free zone) | Proposed tunnel |
| Proposed pedestrian/bike path with potential space for vegetation | Existing public rail transit line | Opportunity for wall/vegetation screening or combination. | |
| Proposed pedestrian/bike path with limited room for vegetation (routing TBD) | | | |

LINEAR PARK/BICYCLE PATH:

- Plans for a linear park and bike path that connects all communities adjacent to the project to the Luis Muñoz Marín Park.
 - Includes a path from Puerto Nuevo Notre (thru Roosevelt Avenue Bridge)
 - Includes linear park and paths from Reparto Metropolitano thru Piñero Avenue pedestrian crossing.
 - Includes a path from University of Puerto Rico through the Villa Nevares / Jardines Metropolitano / University Gardens areas, crossing over at Notre Dame Bridge
- Replanting of vegetation and trees equal in number to the ones removed (native, noninvasive species)
- One Service Bridge connecting both sides of park at the southern end of Luis Muñoz Marín Park

Note: Concept Drawing



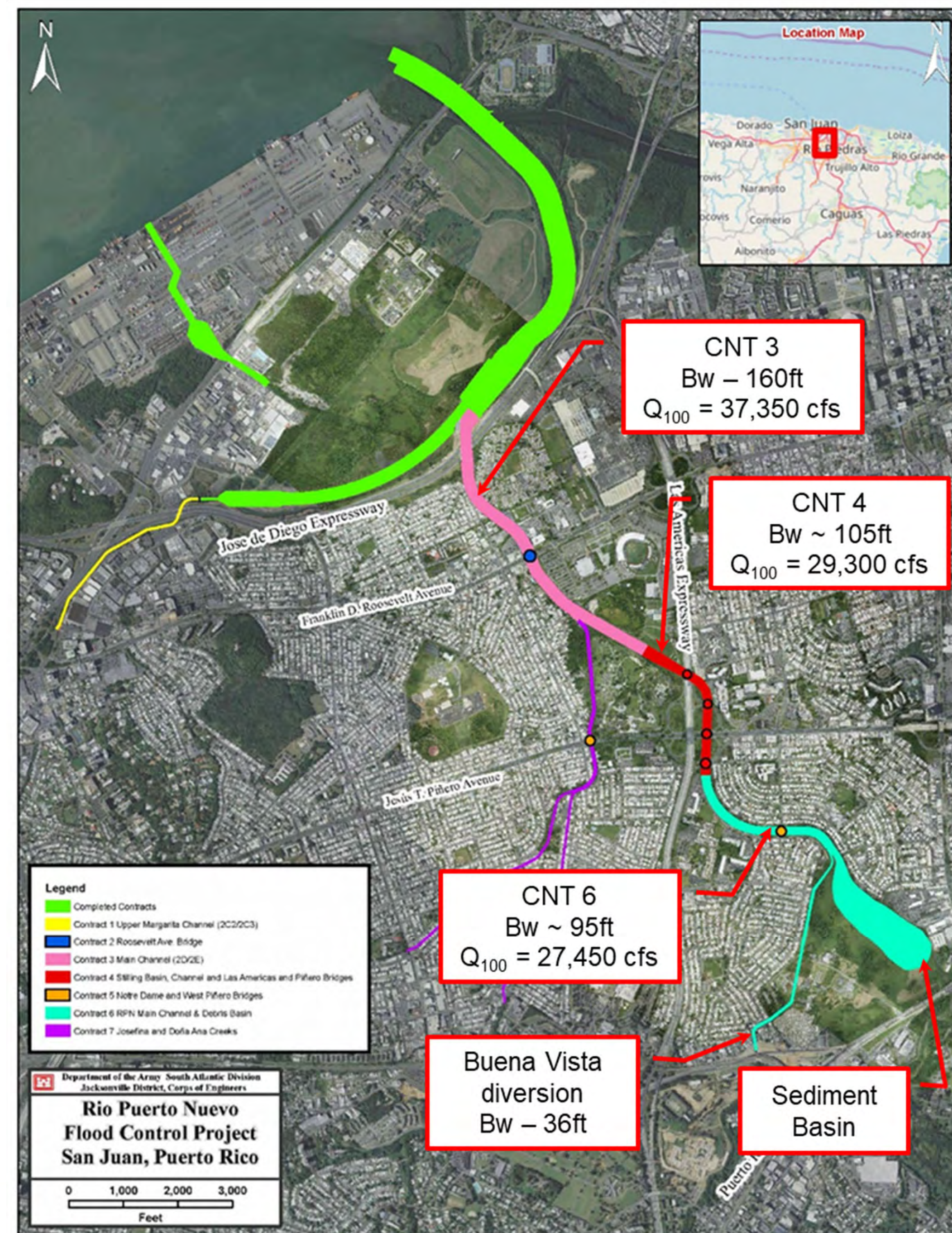
RIO PUERTO NUEVO DESIGN UPDATES

1991 INITIAL DESIGN

- Rainfall Frequency TP-42
- U-Frame concrete channels
- Super-critical flow regime
- Higher than natural grade wall height
- Steeper channel slopes

POST BBA-2018 DESIGN

- Rainfall Frequency NOAA ATLAS 14
- Climate Change and Sea Level Rise considerations
- Natural bottom channels or with scour protection
- Reduced Flow regime
- Walls below natural grade
- Milder channel slopes





QUESTIONS?

17



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