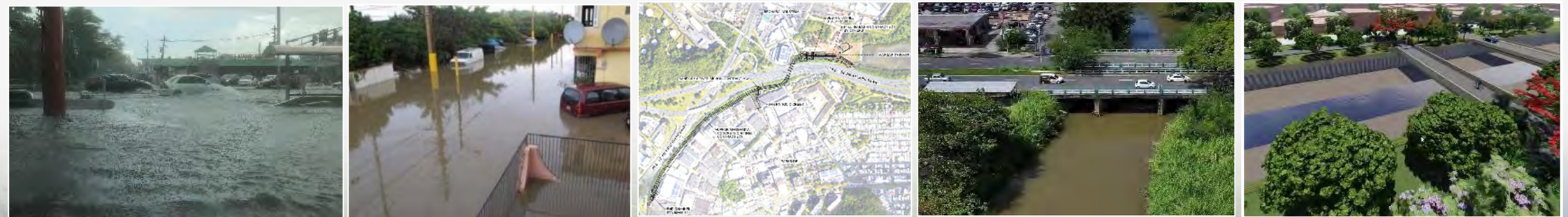
RIO PUERTO NUEVO
FLOOD RISK MANAGEMENT PROJECT



Jose Bilbao, P.E.
Senior Project Manager
Antilles Integrated Project Office
Jacksonville District, USACE

May 05, 2022

US Army Corps of Engineers®

DRNA

AGENDA

BRIEFING TO MAYOR OF SAN JUAN

- Introductions
- Project Overview
- Contract Status
- Buena Vista Existing Channel

RIO PUERTO NUEVO PROJECT OVERVIEW

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

COMPLETED

CONTRACTS 1, 1A, 2A/AR, 2AA, 2C1
STATUS: 2C1, last completed, was August 2020
AMOUNT: $450M
CONSTRUCTION:
- First 1.3 miles of channel improvements
- Kennedy Bridge seismic retrofit; 36-inch water line
- Quebrada Margarita channel excavation and confluence wall; lower Puerto Nuevo channel dredging
- Bechara Channel secant pile wall box culvert; 90-inch sewer line modification; open channel work
- De Diego Expressway Bridge abutments; east and west pier drill shaft reinforcement

ONGOING

CONTRACT 2D: RÍO PUERTO NUEVO CHANNEL WALLS
STATUS: March 2022 anticipated completion
AMOUNT: $21.5M
CONTRACT AWARD: February 2017
CONSTRUCTION:
- 350-foot left channel wall
- 750-foot right channel wall

REMAINING

SUPPLEMENTAL CONTRACT 1 | CONSTRUCTION
- Sewer line relocation
- Construction of .63 miles of channel improvements at Upper Quebrada Margarita

SUPPLEMENTAL CONTRACT 2 | CONSTRUCTION
- Roosevelt Avenue Bridge replacement

SUPPLEMENTAL CONTRACT 3 | CONSTRUCTION
- Channel walls
- 1.1 miles of Main Channel improvements

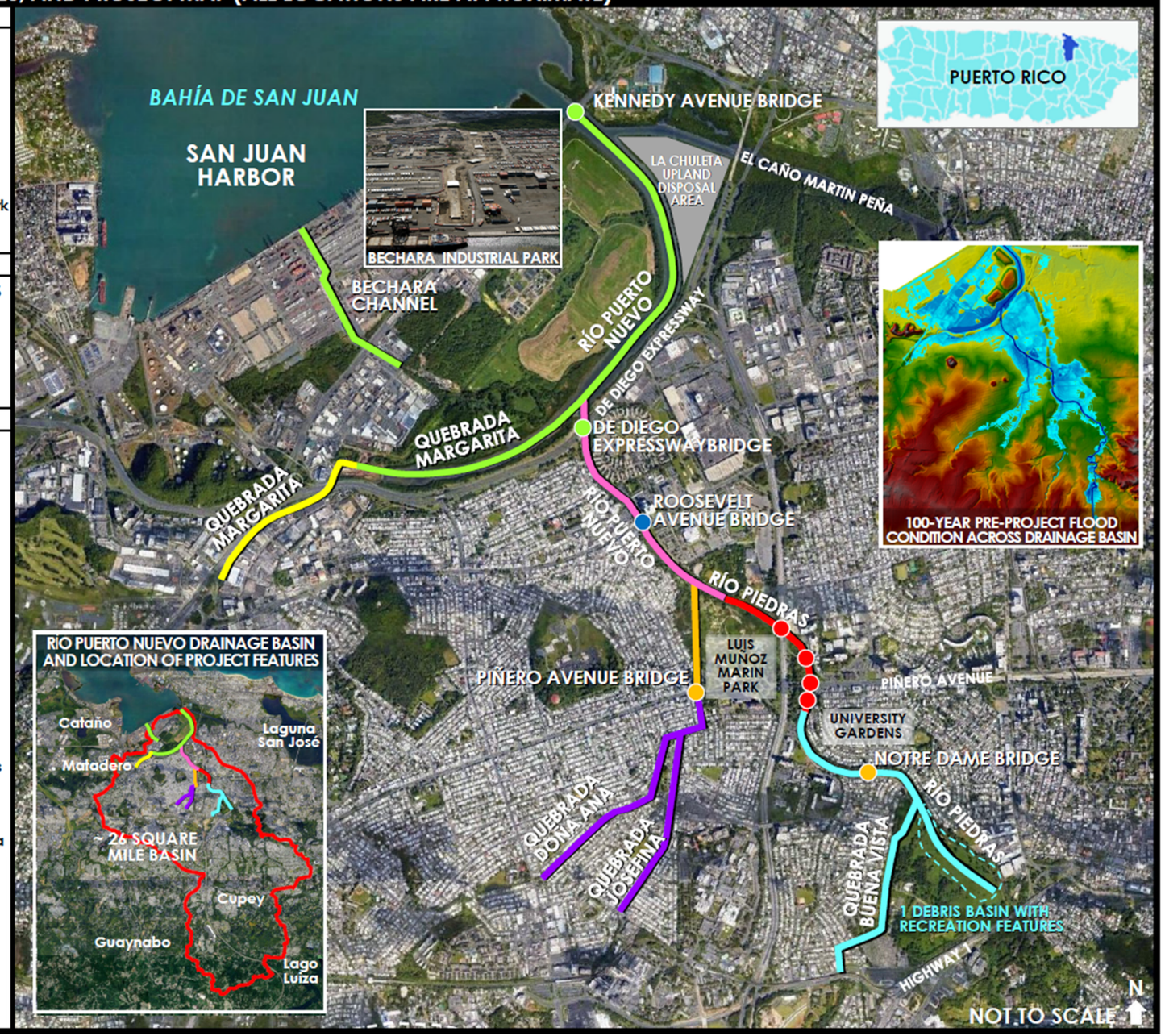
SUPPLEMENTAL CONTRACT 4 | CONSTRUCTION
- Stilling Basin and Bridge Replacements
  - 4A-1: Las Americas Expressway Bridge
  - 4A-2: Piñero Avenue Bridge East
  - 4A-3: Northeast Access Ramp Bridge
  - 4A-4: Southeast Access Ramp Bridge

SUPPLEMENTAL CONTRACT 5 | CONSTRUCTION
- 5A: Notre Dame Bridge replacement
- 5B: Piñero Avenue Bridge West replacement; Quebrada Josefina gap downstream to Río Piedras

SUPPLEMENTAL CONTRACT 6 | CONSTRUCTION
- 1.75 miles of Rio Piedras channel improvements
- 4 bridges (2 new; 2 replacements)
- .80 miles channel diversion at Quebrada Buena Vista
- Construction of 1 debris basin

SUPPLEMENTAL CONTRACT 7 | CONSTRUCTION
- 10 bridge replacements
- 5000 linear feet of Quebrada Josefina Channel improvements
- 4400 linear feet of Quebrada Doña Channel improvements

SUPPLEMENTAL CONTRACT LA CHULETA
- Upland Disposal Area (future capacity of ~500,000 cubic yards of material)



RIO PUERTO NUEVO – IMPORTANCE OF PROJECT

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

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

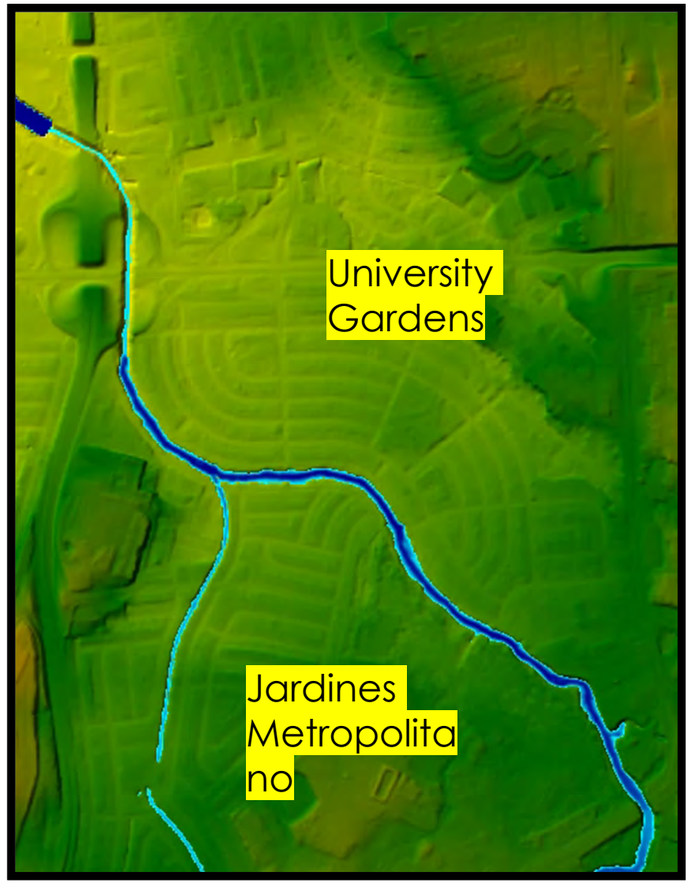
RIO PUERTO NUEVO – IMPORTANCE OF PROJECT

Note: Videos taken on 13 Oct 2021 showing Notre Dame Bridge during flood waters from Rio Piedras. This is less than a 1-year storm event.

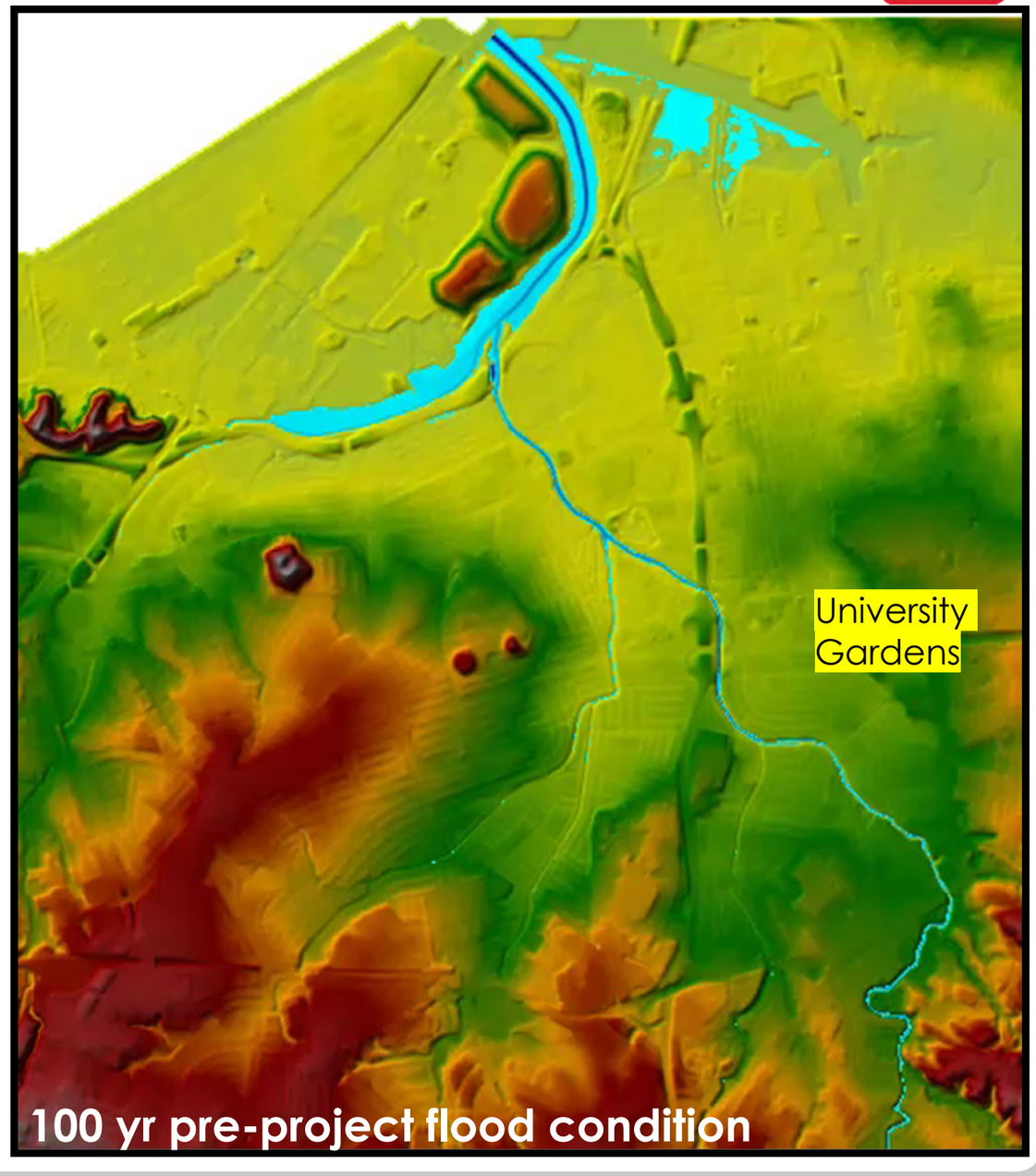
RIO PUERTO NUEVO

PRE PROJECT CONDITIONS

- 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



RIO PUERTO NUEVO – STAKEHOLDER ENGAGEMENT

MUNICIPALITY OF SAN JUAN:

- Meetings with Mayor and/or Mayor's office to discuss project design and impacts
  - Mayor of Guaynabo – 6/18/19
  - Mayor of San Juan – 8/8/19
  - Several Meetings with Municipality of San Juan – 2019 thru 2022
- Multiple meetings at Luis Munoz Marin Park to understand stakeholder interest and needs and implement Recreational Features. (8/8/19, 3/9/21)
  - Discussed connection of path from UPR to Luis Munoz Marin Park
  - Discussed the installation of Pedestrian Bridge and Service Bridge at Park

Note: COVID Impacts slowed down efforts from 3/2020 – 3/2021

ALIANZA/PARA LA NATURALEZA:

- Recommendation from Alianza to not impact Aquaducts . CNT-8 descoped from Project.
- Mutliple meetings held to try and understand the needs from Non-Government Organizations
- Discussions with ERDC to see what other Engineering with Nature alternatives exist for Rio Puerto Nuevo
  - Highly Urbanized Construction Footprint
- Continued transparency, discussions and implementation when possible.

SUMMARY OF ENGAGEMENT

- USACE has exceeded minimum NEPA requirements in engagement and outreach with the Alianza nonprofit group in the timeframe of 2018-2021).
  - Presentation December 2018 – USACE presentation at Engineering with Nature
  - Presentation December 2019 – USACE presentation in Person with Alianza and PLN
  - Phone conference March 2020 – Discussed our options for potential meeting however, COVID shutdown delayed changes of meeting.
  - Presentation October 2020 (Virtual) - USACE presentation to Alianza (invitation was sent to several residents and locals and what was supposed to be a technical meeting was made to be a briefing with several questions asked/answered).
  - Phone conference November 2020 - Follow up to explain USACE process and ask what the needs are of Alianza.
  - Phone conference – February 2021 – follow up to Alianza's letter and reasons why steering committee would delay design milestones and cost more money.

LOCAL RESIDENTS:

- Meetings held with residents of Borinquen and Warehouse owners in Matadero Sector (4/10/19, 6/18/19, 12/5/19, 2/12/20, 3/2/20, 4/19/21)
- Held meetings in the Puerto Nuevo Norte to discuss impacts of Supplemental Contract 3 along the west bank and impacts to lands (3/4/19)
- Multiple meetings with organized group at the Jardines Metropolitano and University Gardens. Discussed project impacts and understand the local concerns. (11/18/20, 3/10/21, 10/19/21)

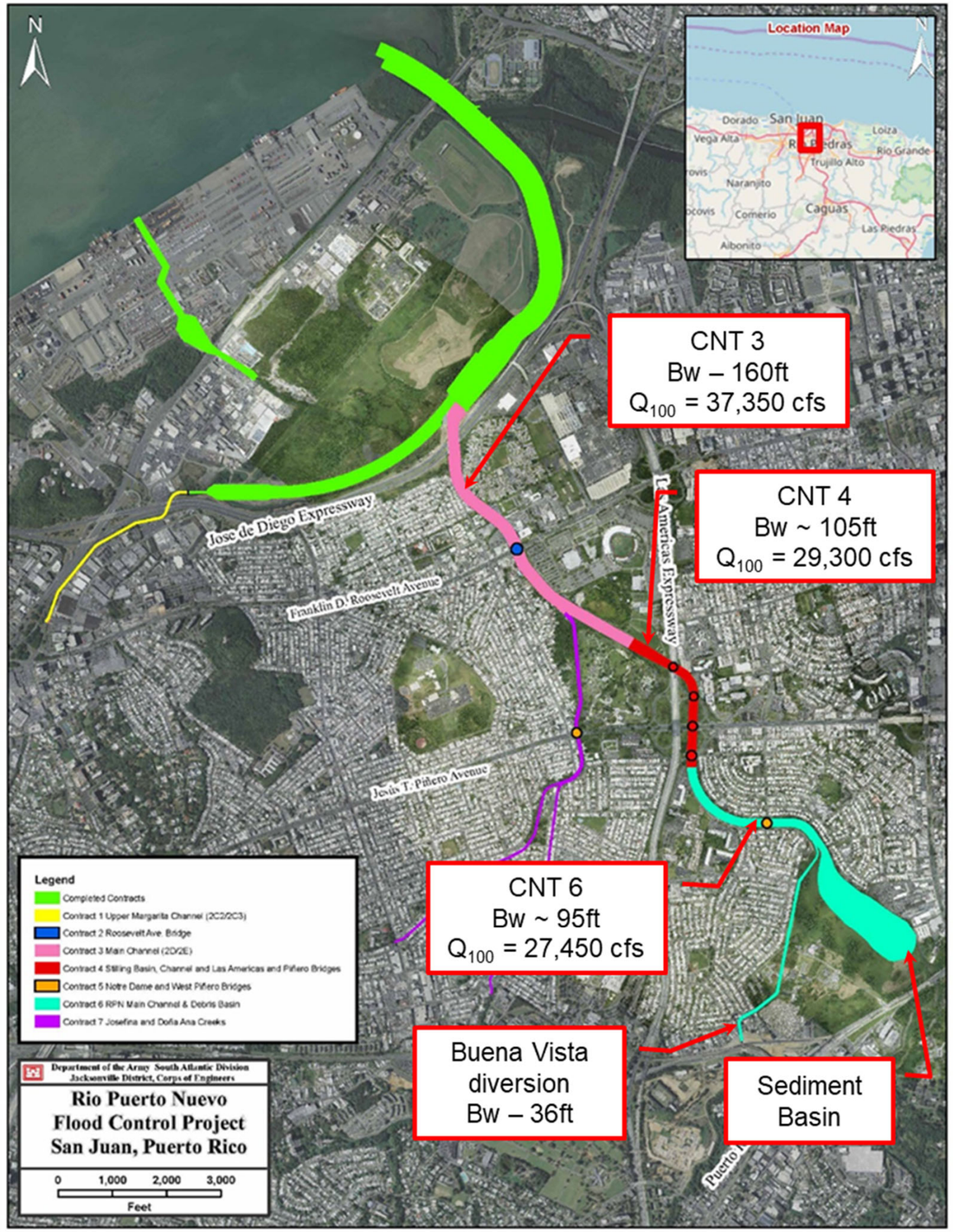
RIO PUERTO NUEVO DESIGN UPDATES

1991 INITIAL DESIGN

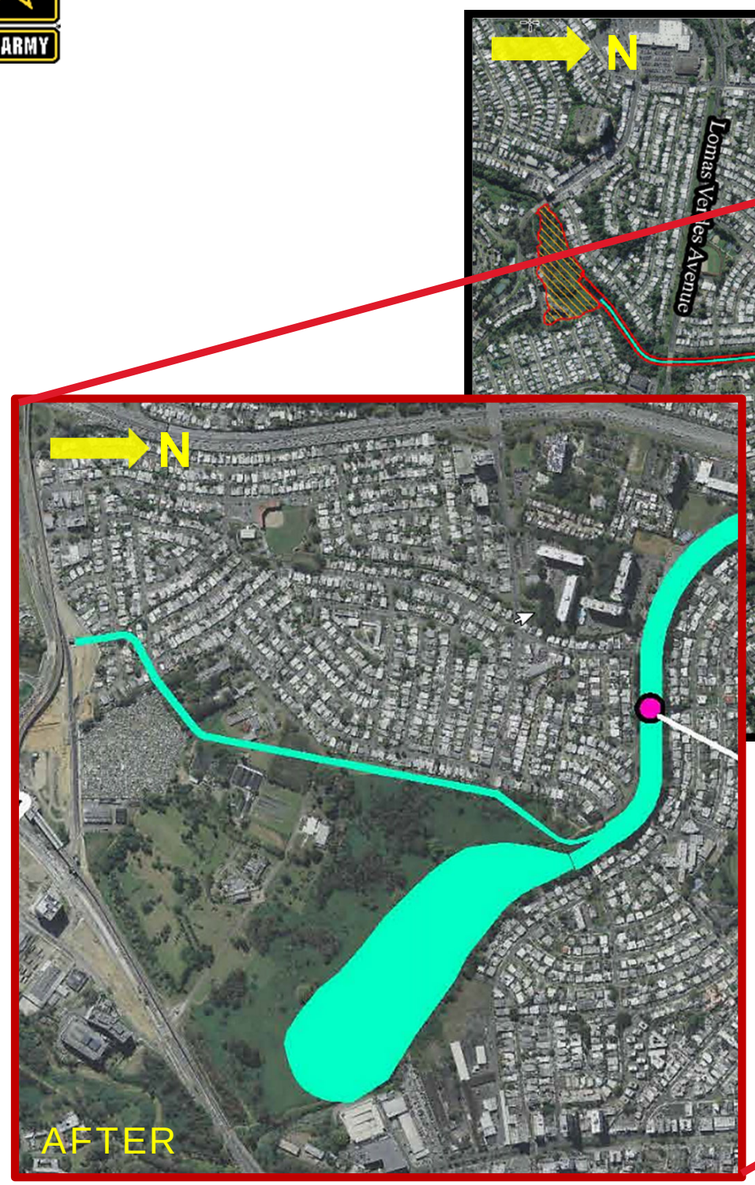
- Rainfall Frequency TP-42
- U-Frame concrete channels
- Super-critical flow regime
- Higher than natural grade wall height
- Steeper channel slopes

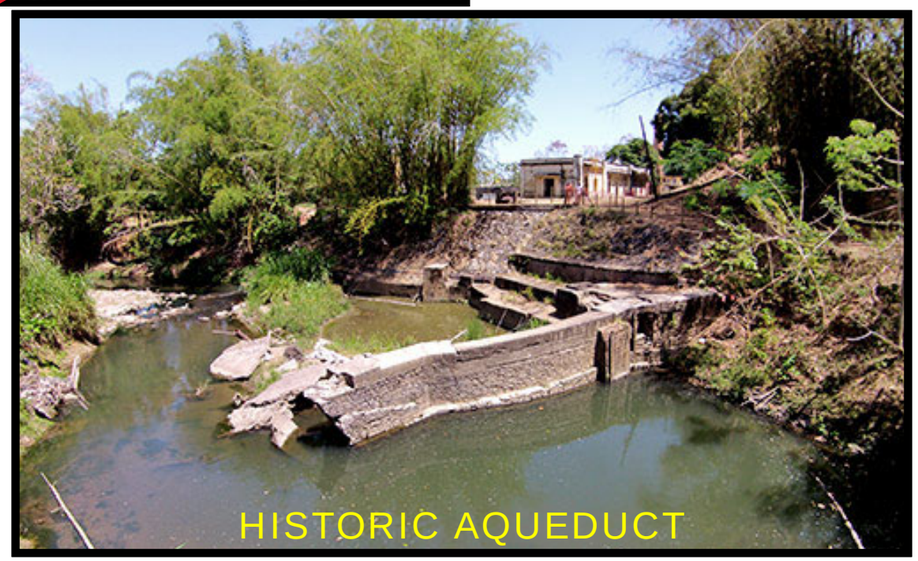
POST BBA-2018 DESIGN

- 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



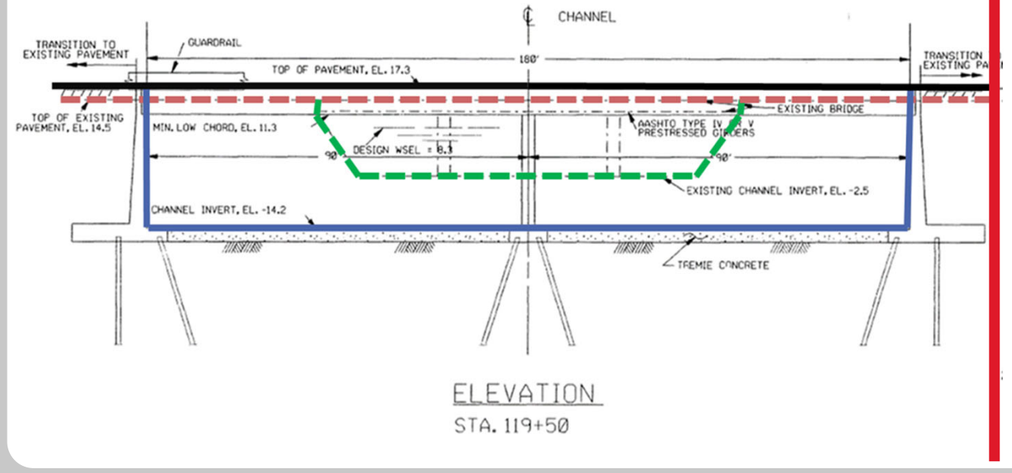
RIO PUERTO NUEVO – DESIGN UPDATES REMOVAL OF CONTRACT 8



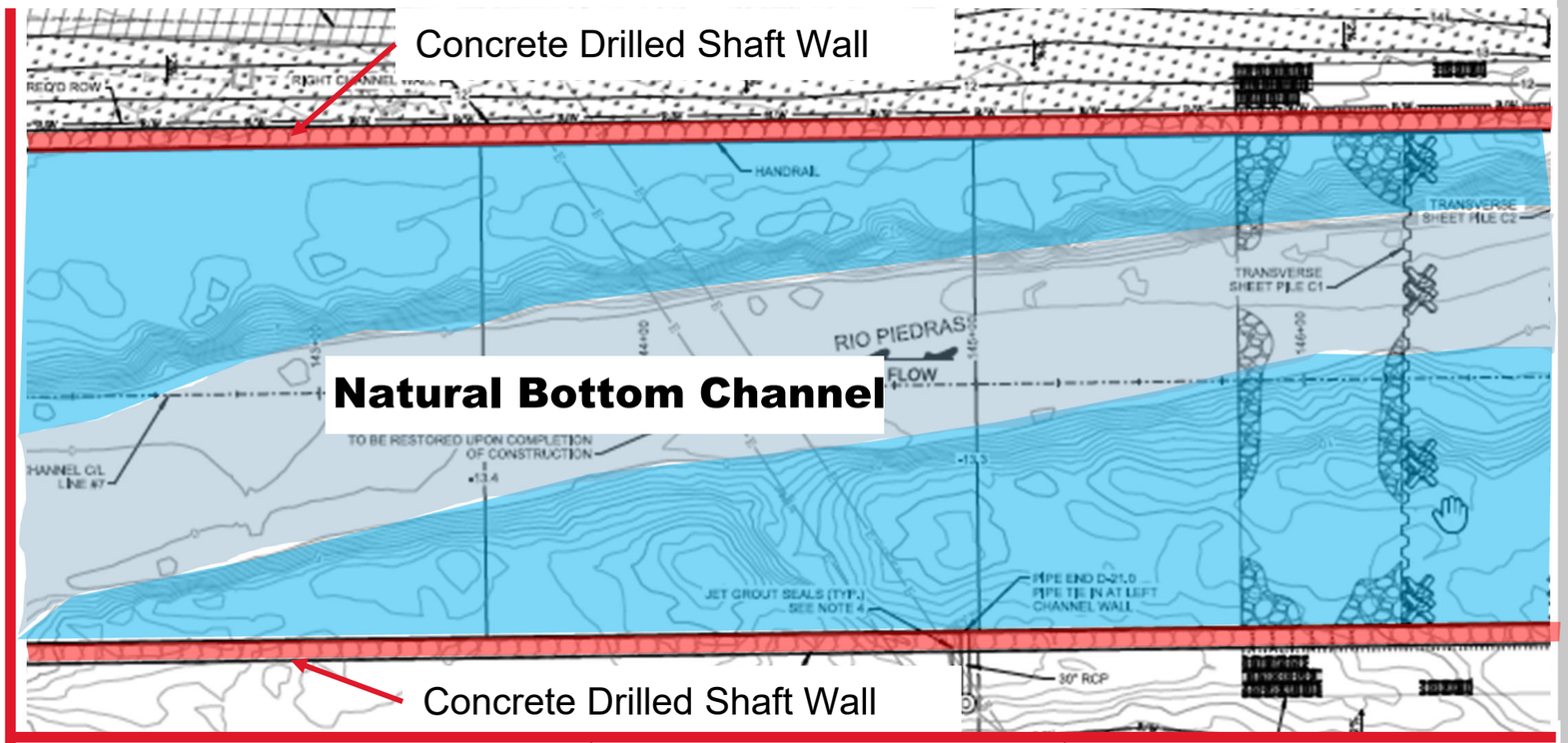


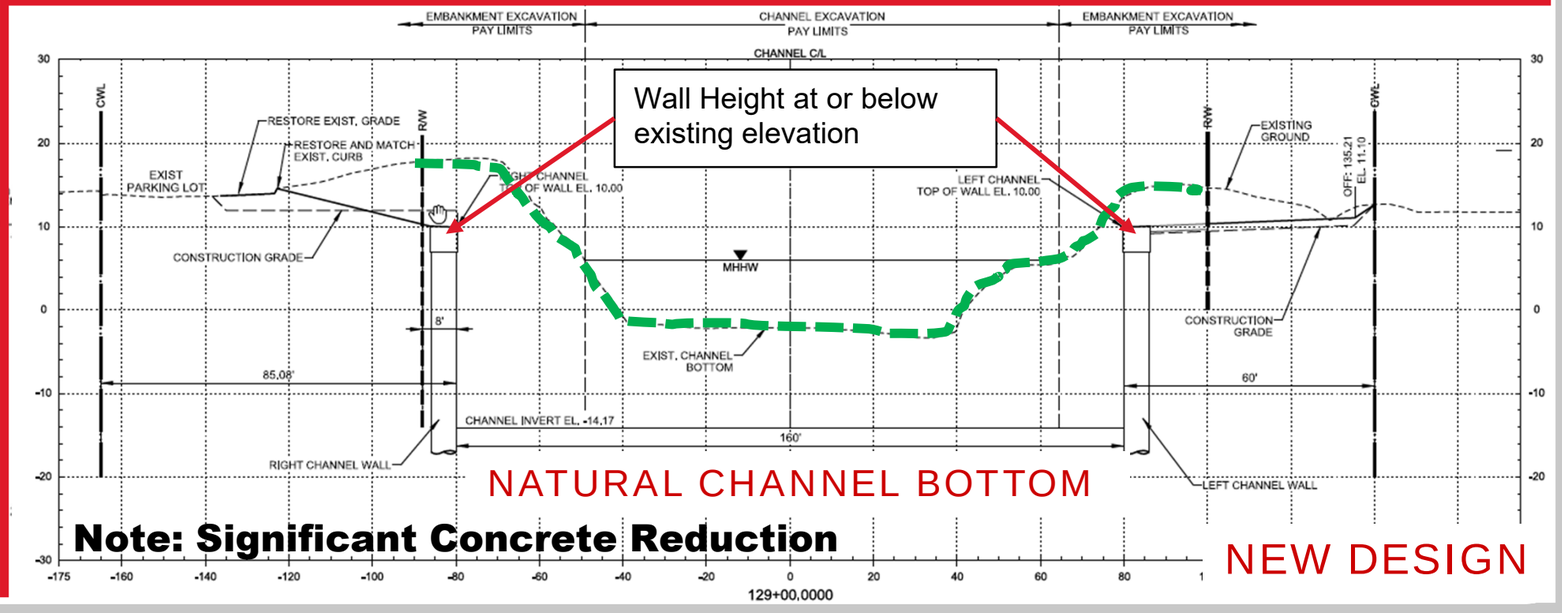
RIO PUERTO NUEVO – DESIGN UPDATES CHANGES TO CONTRACT 3

OLD DESIGN



ELEVATION
STA. 119+50





NATURAL CHANNEL BOTTOM

Note: Significant Concrete Reduction

NEW DESIGN

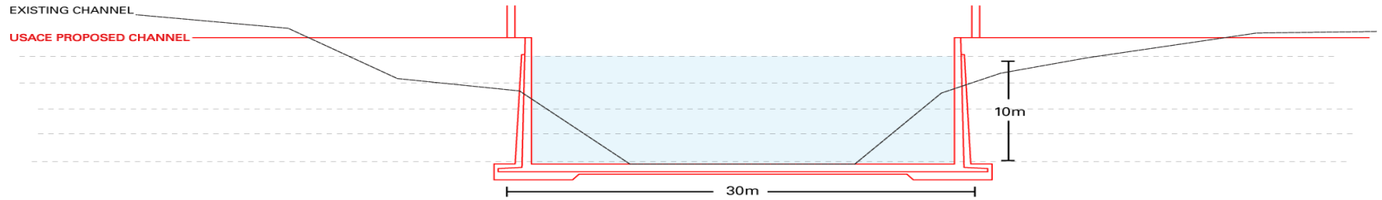
RIO PUERTO NUEVO – DESIGN UPDATES
CHANGES TO CONTRACT 4 THRU 6

CONTRACT 4 and 6

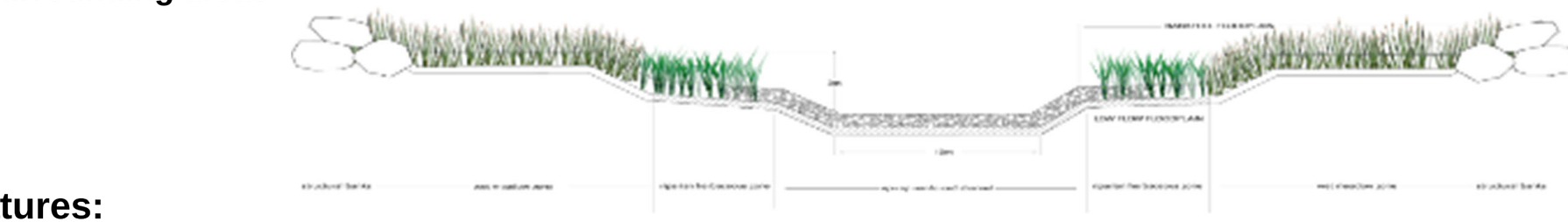
RIO PUERTO NUEVO – NATURAL CHANNEL DISCUSSION

Purpose of Project /Authorized Benefits

- Project was modeled for urban environment
- Minimizes impacts to real estate (508 parcels of land)
- Channel to fully provide flood damage reduction of 100-year storm (as authorized) for surrounding areas
- Minimize impacts to environment
- Minimize impacts to community



USACE (Original Design)



❑ USACE Rio Piedras Design Features:

- U shaped Channels with vertical concrete walls and bottoms that are either natural or ACBM
- Bottom Width 100 – 160 feet
- Supercritical/subcritical flow for all storms

❑ Natural Channel Conceptual Design Features:

- Channel is tiered trapezoidal, rip-rap and vegetation lined
- Significantly Wider Channel to convey 100-year flow
- Subcritical flow for all storms (tranquil flow)

Natural Channel Concept

RIO PUERTO NUEVO – NATURAL CHANNELIZATION WHEN POSSIBLE

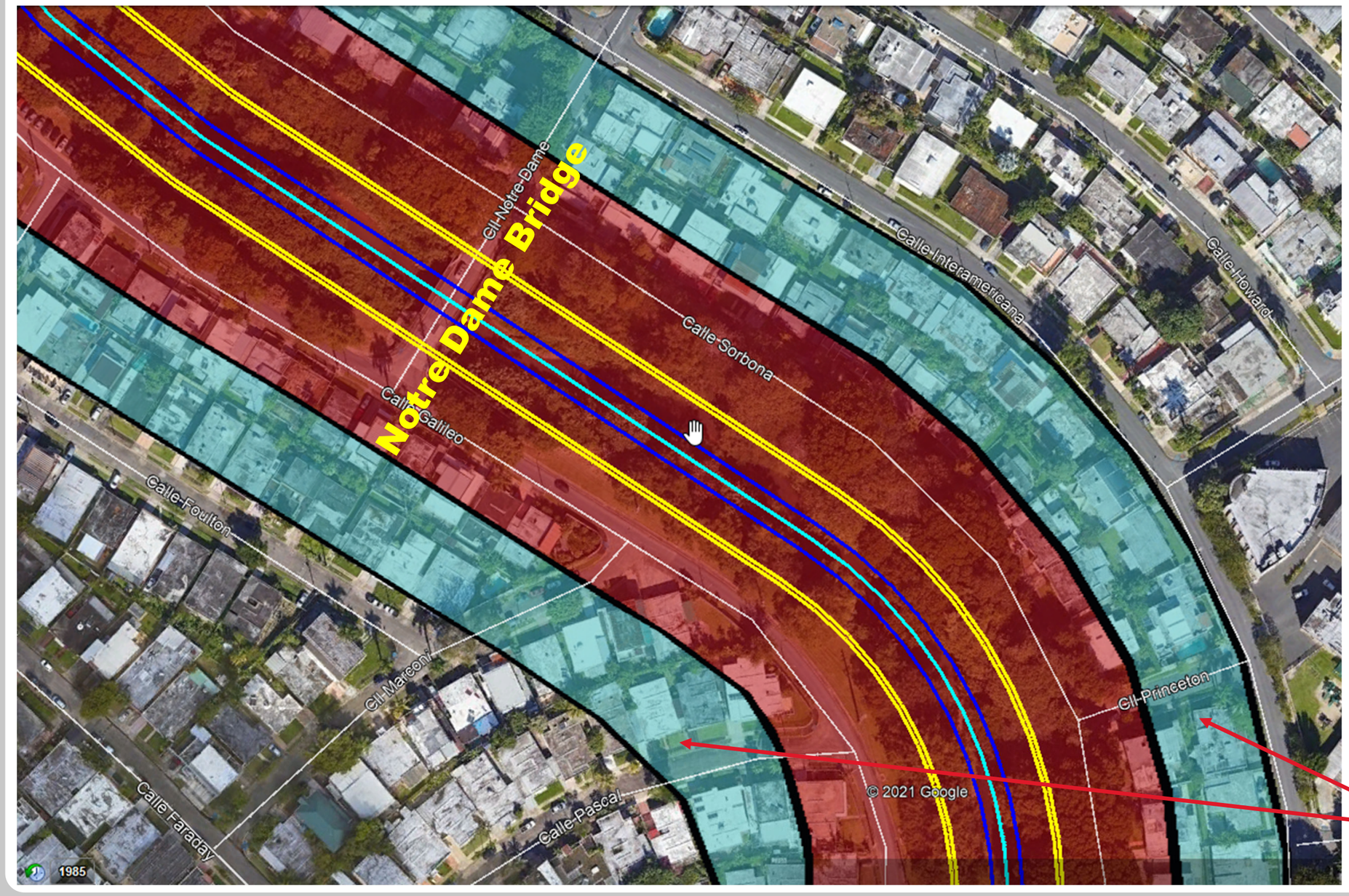
*** ~2003 Aerial**

*** 2019 Aerial**

<u>Considerations:</u>

- **When space allows, USACE design the most economically feasible project which is a natural channel (this includes least Real Estate Impacts)**
- **Rio Piedras runs through highly urban areas of San Juan and impacts to Real Estate necessitate Concrete Channel walls for successful design.**
- **Considerations include Impacts to: Community, Environment, Real Estate with minimal acquisition.**

RIO PUERTO NUEVO – NATURAL CHANNEL IMPACT



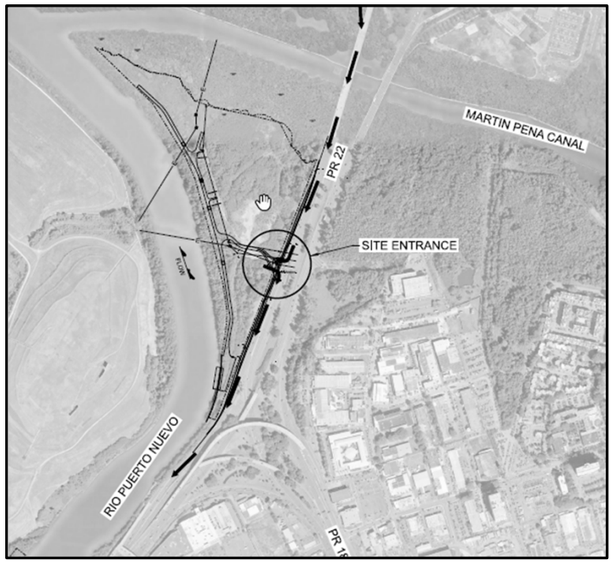
NATURAL CHANNEL ISSUES:

- 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

CONTRACT LA CHULETA

DISPOSAL SITE FOR EXCAVATED MATERIALS



STATUS

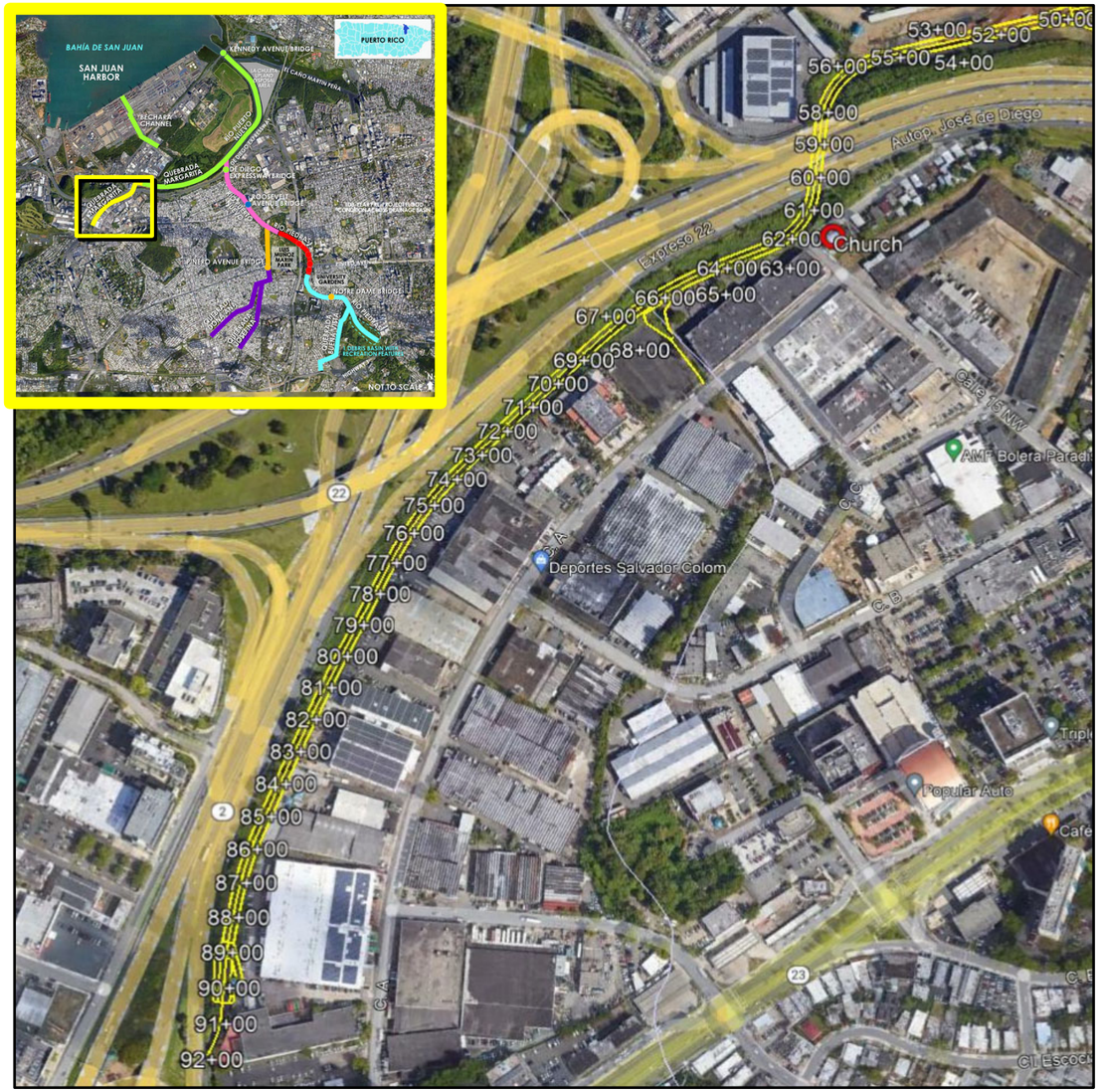
- Design complete
- Project has been advertised.

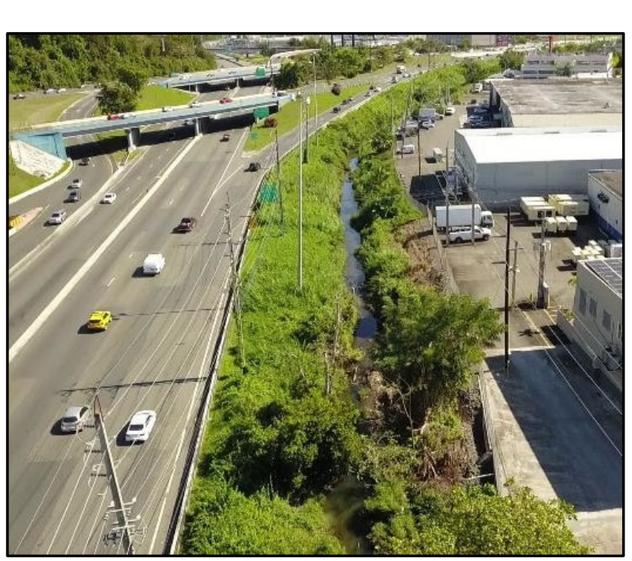
SCHEDULE

Design Complete:	Apr. 2022
Receipt of Real Estate:	Feb. 2022
Advertisement:	Apr. 2022
Award:	Jun. 2022
Construction Start:	Aug. 2022

CONTRACT 1 – UPPER MARGARITA CHANNEL

MATADERO SECTOR





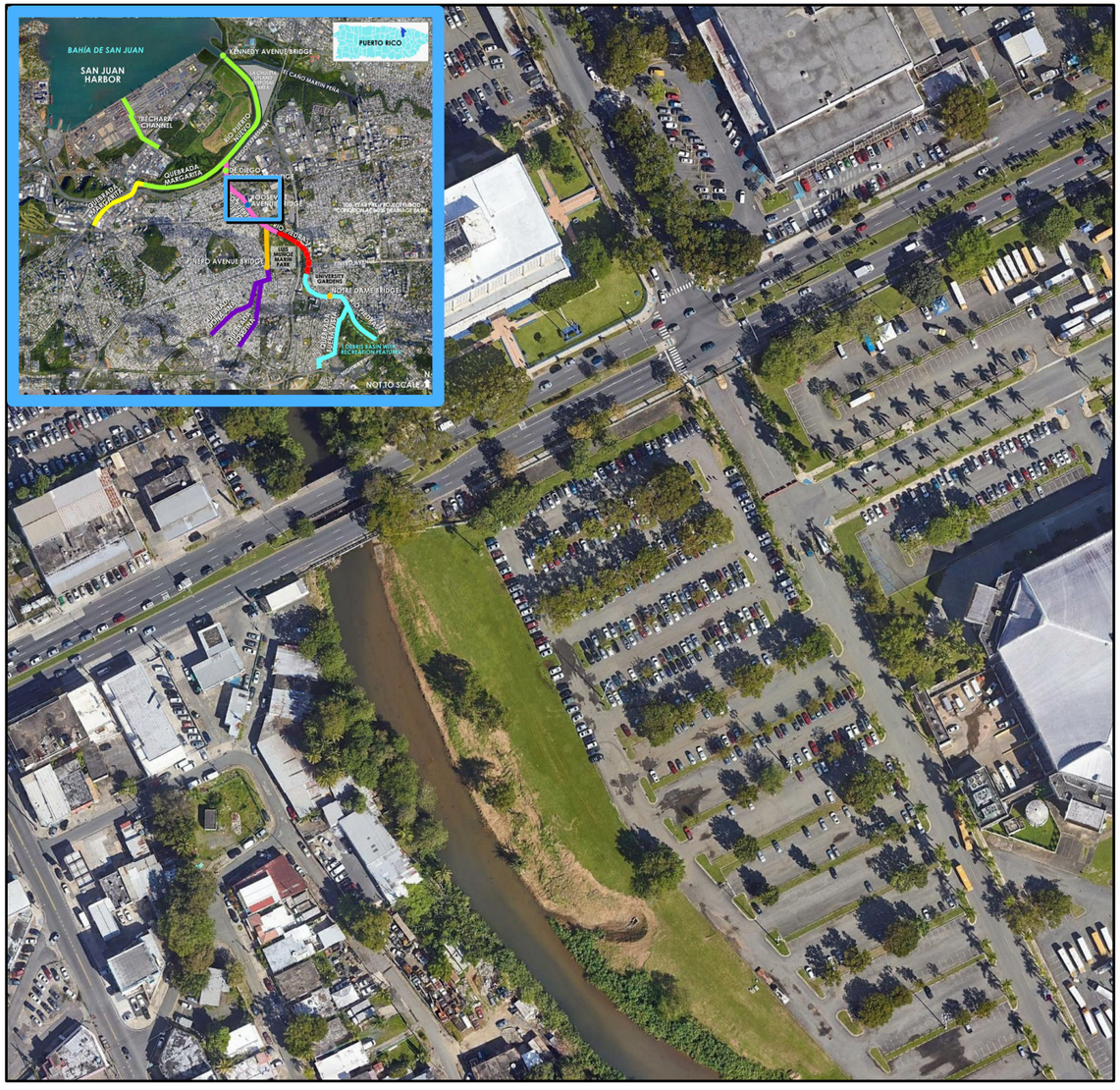
STATUS

- Design nearly complete
- Re-design of electrical
- Reviewing comments from PRASA on Sewer Siphon

SCHEDULE

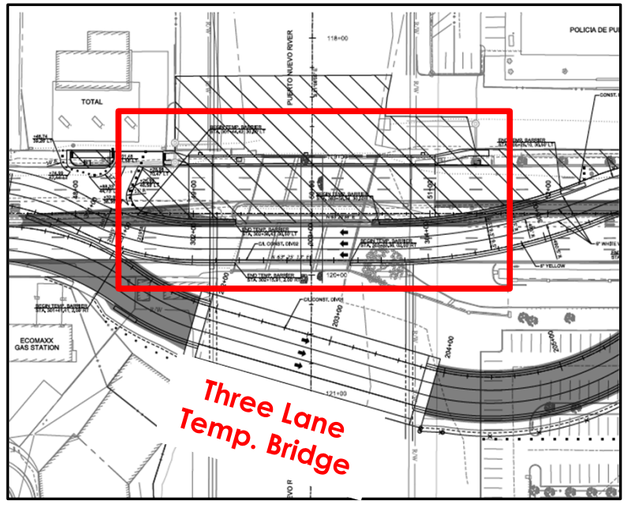
Design Complete:	Dec. 2022
Receipt of Real Estate:	Dec. 2022
Advertisement:	Dec. 2022
Award:	Jun. 2023
Construction Start:	Aug. 2023

CONTRACT 2 – ROOSEVELT BRIDGE REPLACEMENT



STATUS

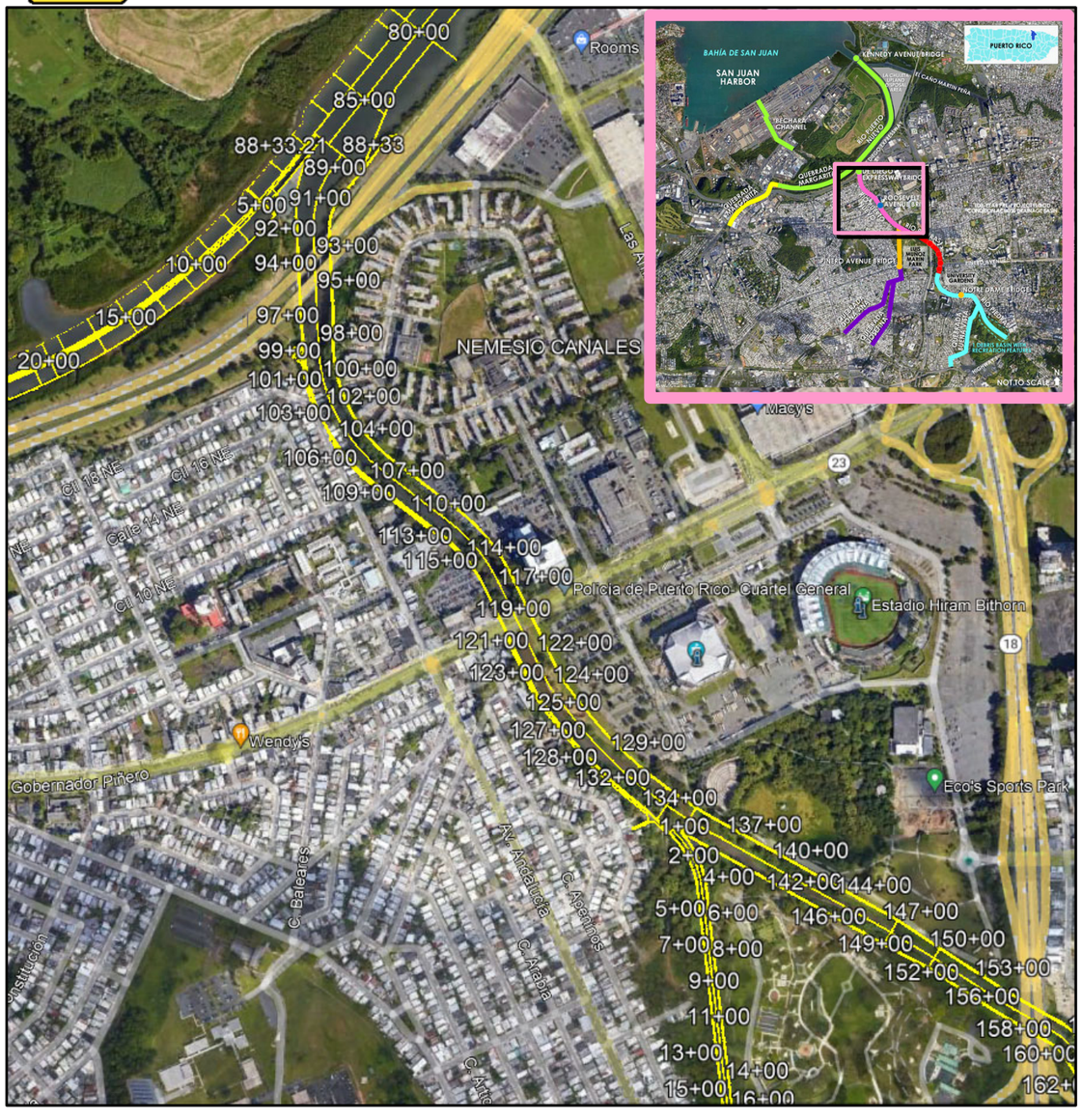
- Design complete,
- Currently awaiting endorsement in OGPE
- In process with Land Acquisition of required lands



SCHEDULE

Design Complete:	Nov. 2022
Receipt of Real Estate:	Nov. 2022
Advertisement:	Nov. 2022
Award:	May 2023
Construction Start:	Jul. 2023

CONTRACT 3 – CHANNEL WALLS/IMPROVEMENTS



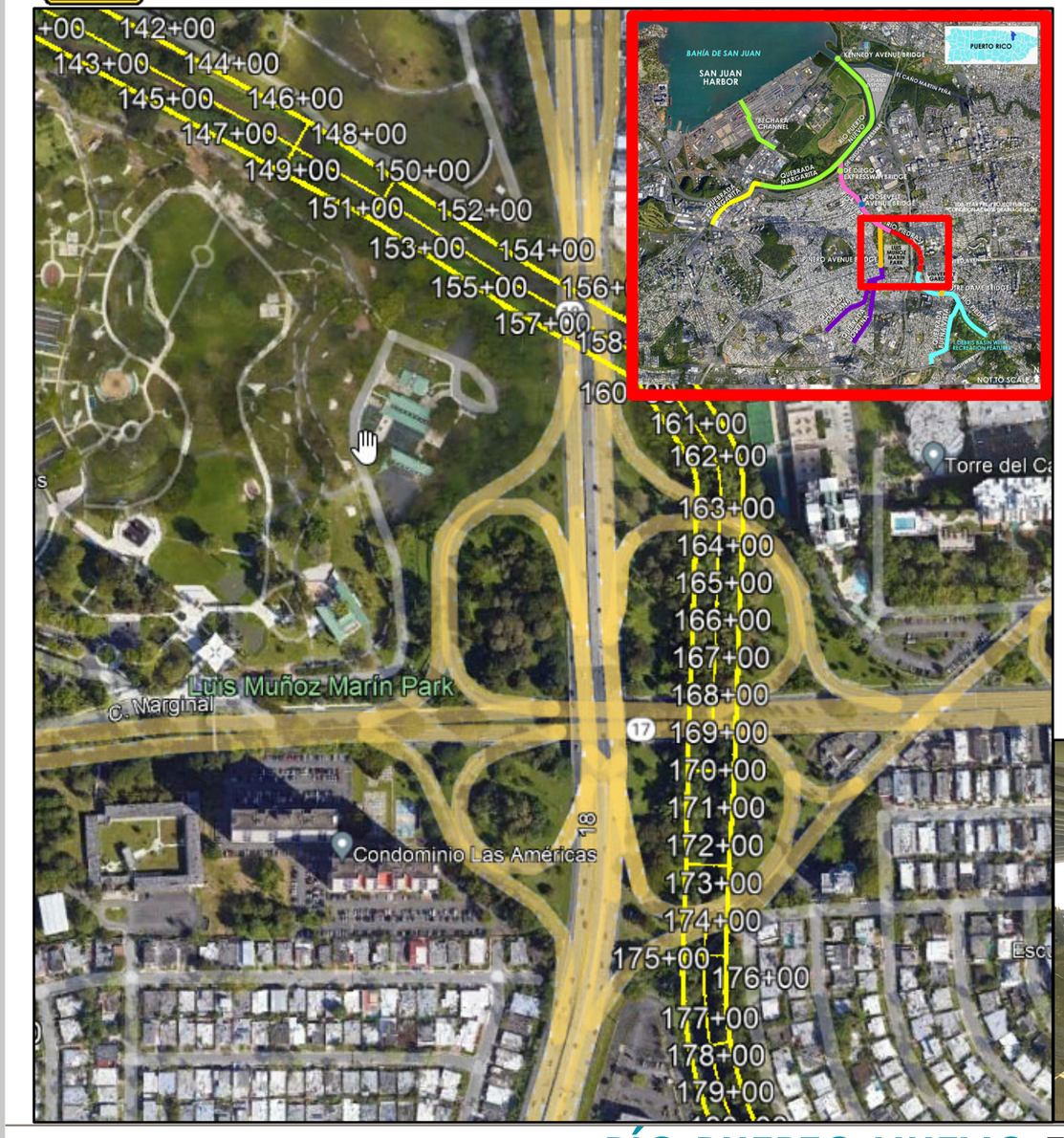
STATUS

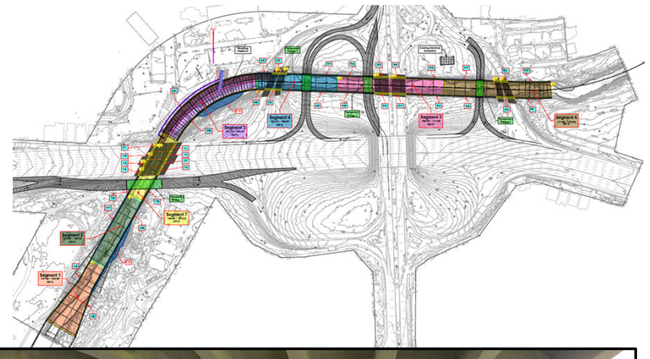
- Design complete, incorporating comments
- Currently awaiting endorsement in OGPE
- In process with Land Acquisition of required lands

SCHEDULE

Design Complete:	Feb. 2023
Receipt of Real Estate:	Feb. 2023
Advertisement:	Mar. 2023
Award:	Jul. 2023
Construction Start:	Sep. 2023

CONTRACT 4 – LAS AMERICAS EXPRESSWAY BRIDGES





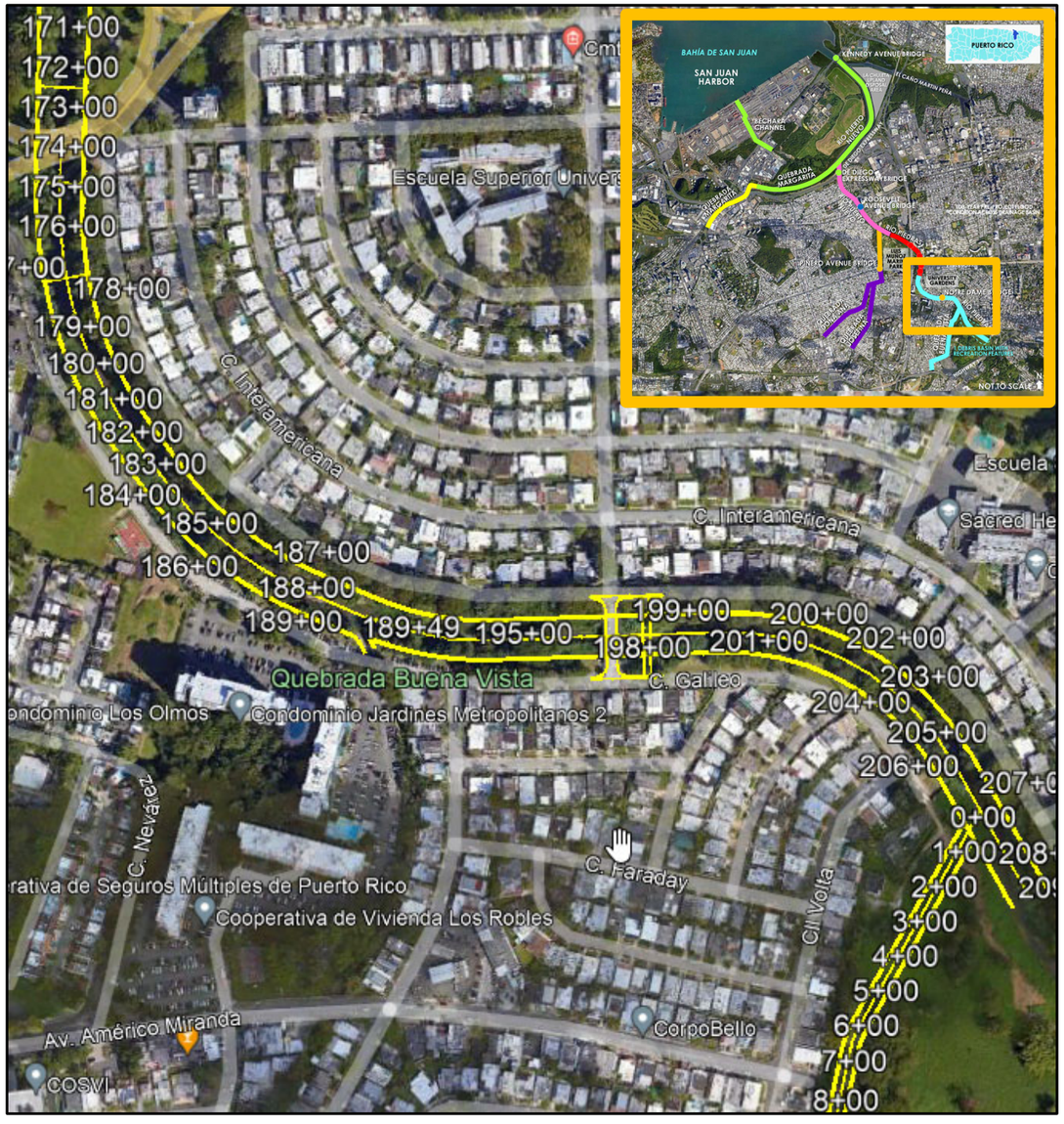
STATUS

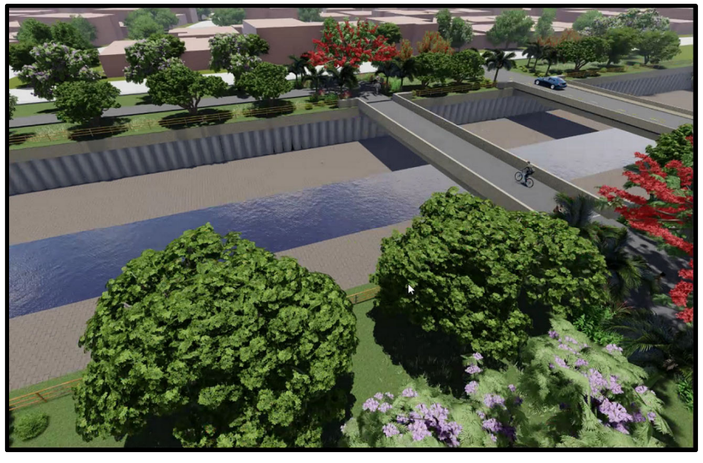
- Preliminary Design complete
- Additional Survey of Electrical lines pending

SCHEDULE

Design Complete:	Jun. 2025
Receipt of Real Estate:	Jun. 2025
Advertisement:	Jul 2025
Award:	Dec. 2025
Construction Start:	Feb. 2026

CONTRACT 5A – NOTRE DAME BRIDGE





STATUS

- Revised intermediate Design in May 2022
- Utility Design will be incorporated in to next design submittal.

SCHEDULE

Design Complete:	Feb. 2024
Receipt of Real Estate:	Feb. 2024
Advertisement:	Feb. 2024
Award:	Aug. 2024
Construction Start:	Oct. 2024

RIO PUERTO NUEVO CONTRACT 5B, 6 & 7

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- 750-foot right channel wall

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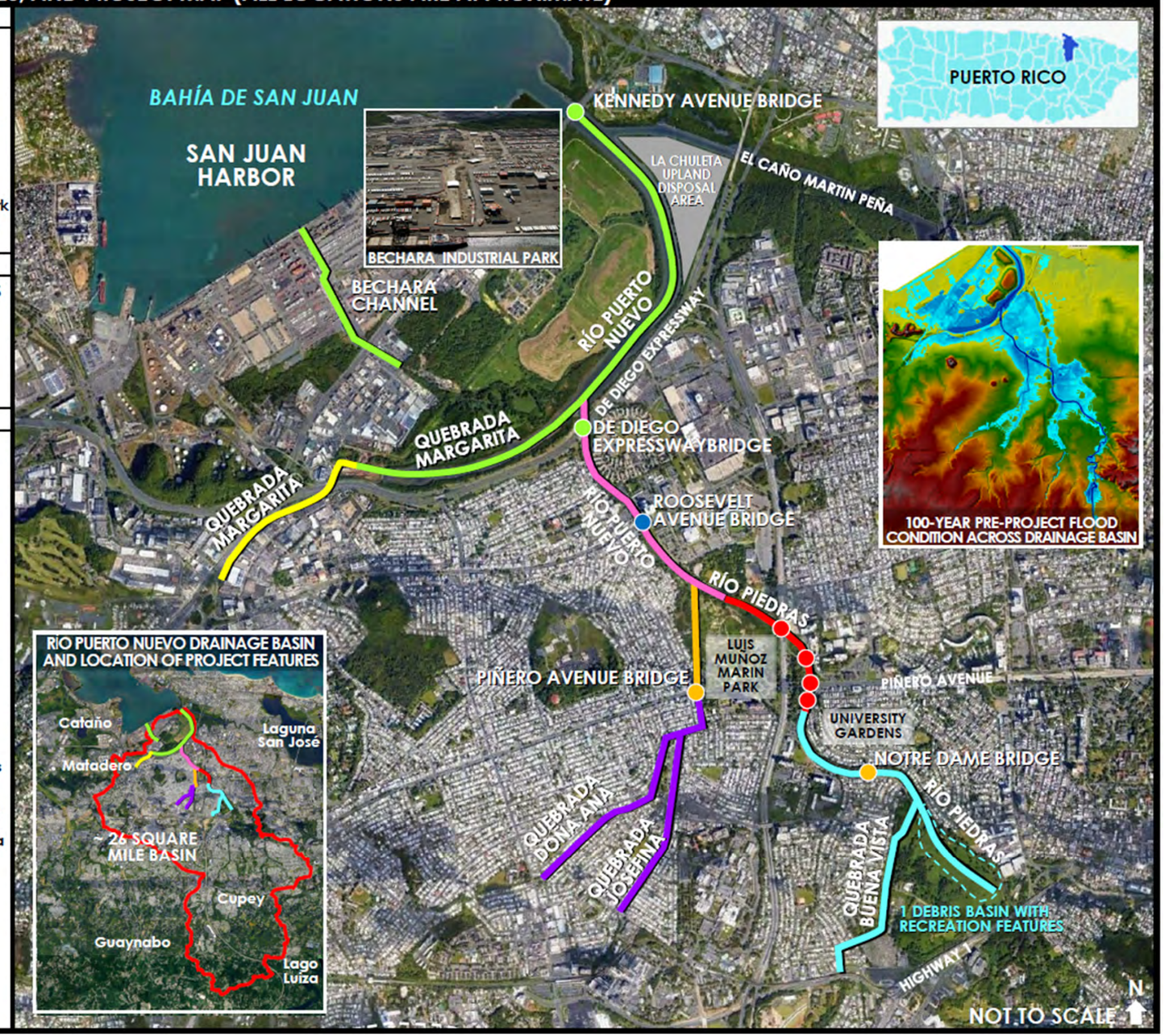
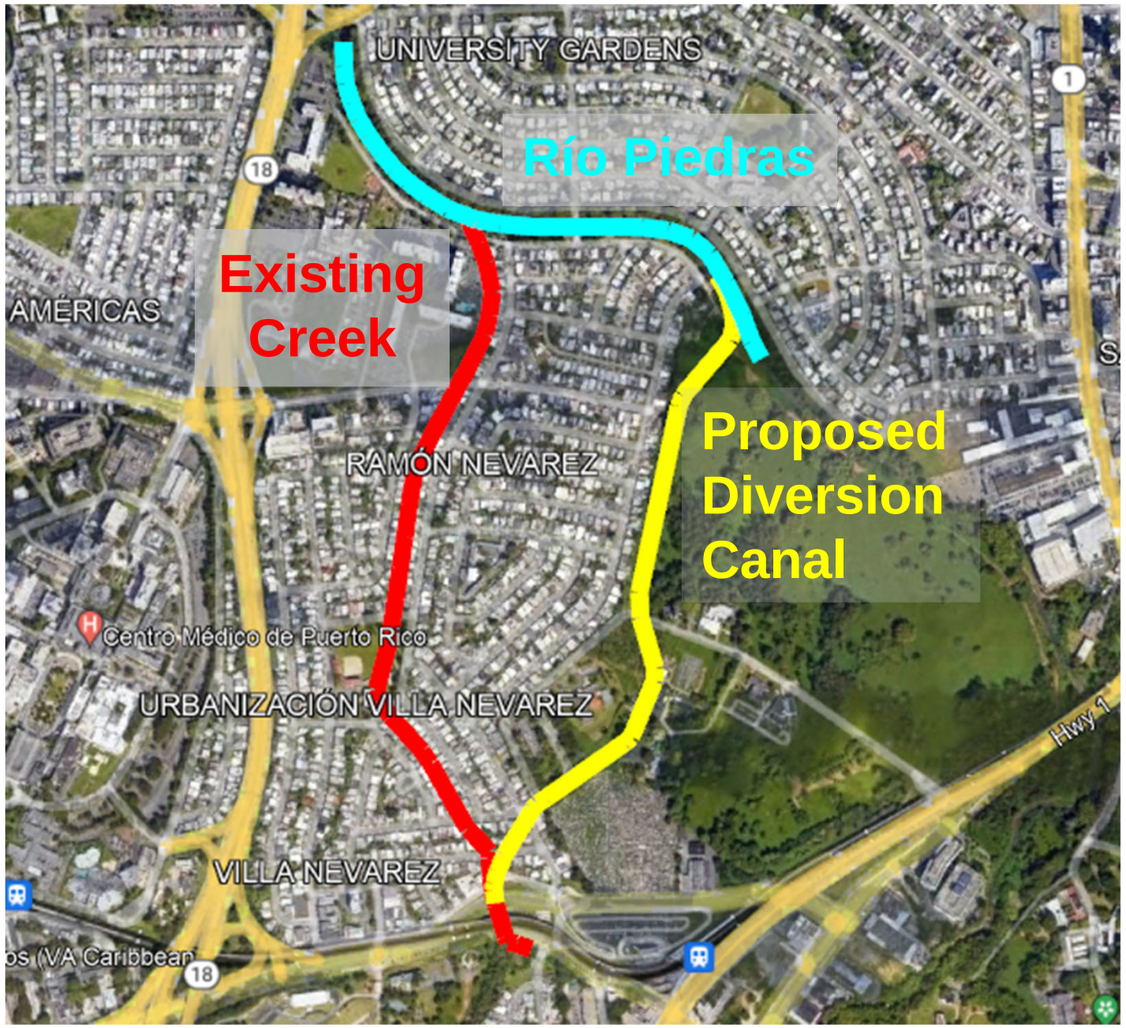
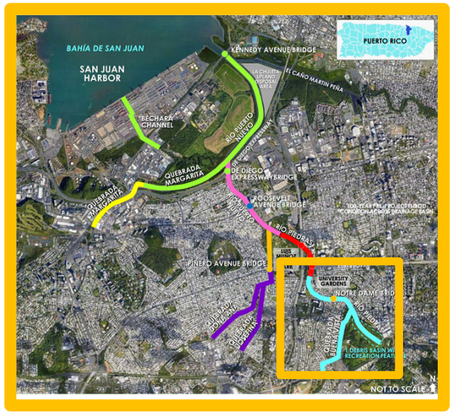


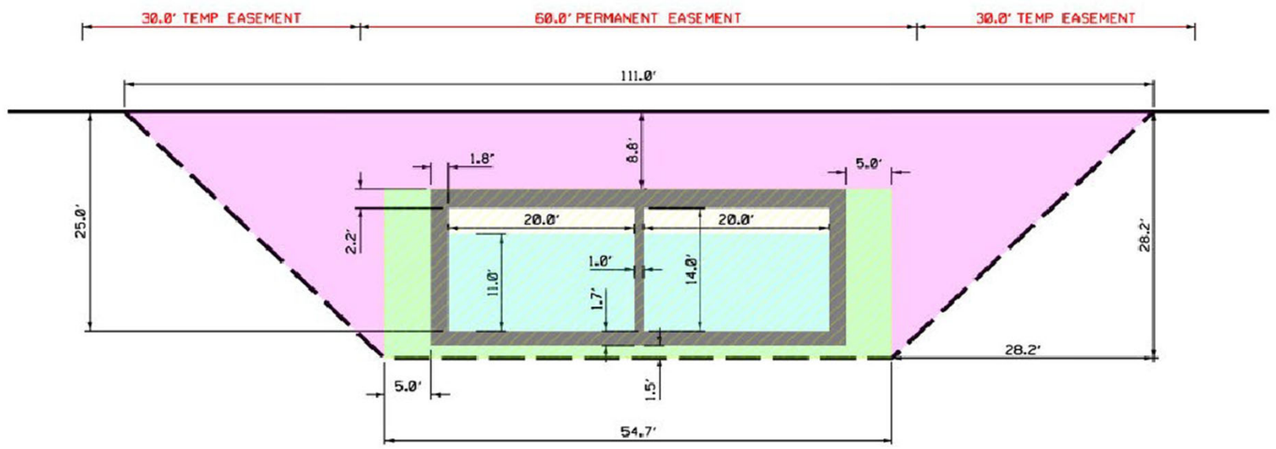
CONTRACT 6 – BUENA VISTA DIVERSION CHANNEL

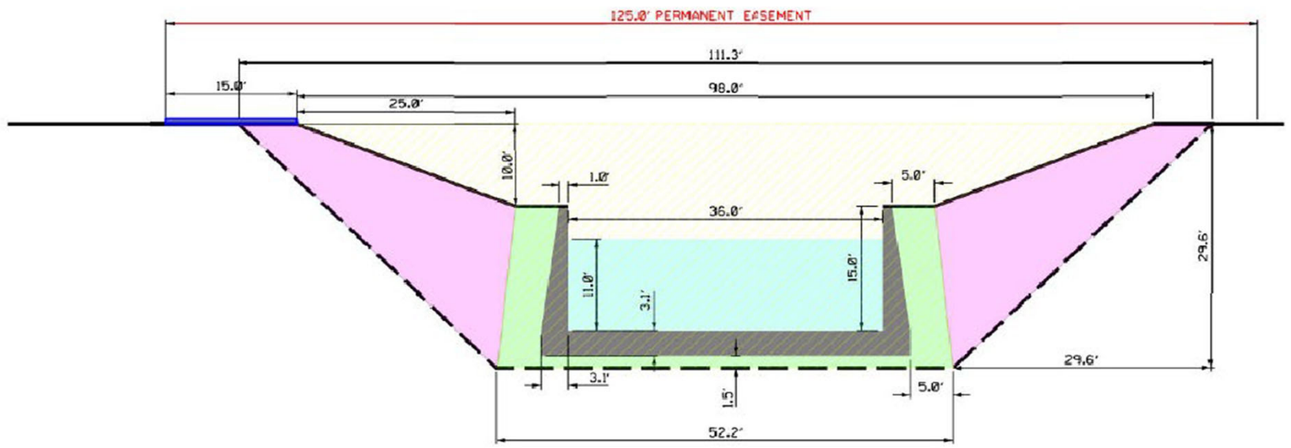
- Revised intermediate Design in May 2022
- Existing creek walls have failed in multiple locations and will likely continue to fail in other locations.
- Several wall sections are currently leaning
- The Río Puerto Nuevo project will divert much of the flow away from this creek, but the creek is still required for local storm drainage
- After the project is constructed, the 100-year storm will likely be near the top of the walls and may be over the walls in some areas (based on a preliminary analysis)
- The RPN project will divert approximately 70% of the Buena Vista Creek discharge from PR-21 bridge through a diversion channel.
- Buena Vista Creek will received mostly local runoff and not discharge from the Buena Vista Creek headwaters.
- Preliminary analysis shows that residual flooding may occur under large storm event (e.j. 100-year storm events) but we don't have the data available to make a concrete assessment yet.





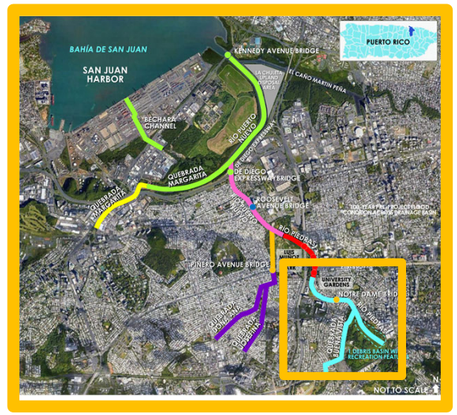
CONTRACT 6 – BUENA VISTA DIVERSION CHANNEL





Buena Vista Diversion Canal

- 1,300 Ea. five-foot diameter concrete drilled shaft piles (~80 feet deep)
- 80,000 cy of concrete
- 7,000 tons of reinforcing steel
- 2,000,000 LCY of excavated material to be disposed
- 330,000 LCY of suitable fill
- 8,000 tons of steel sheet pile
- 321,000 square feet of ACB



CONTRACT 6 – BUENA VISTA EXISTING CONDITIONS

- General observations from May 2021 site visit
  - Walls appear to be vertical slabs rather than typical structural walls.
  - No rebar connection apparent from wall to bottom slab
  - Clogged drains or no drains in places
  - Structures or other walls have been built on top in some sections.

CONTRACT 6 – BUENA VISTA EXISTING CONDITIONS

- **A few trusses have failed under the Villa Nevárez Park baseball field**

CONTRACT 6 – BUENA VISTA EXISTING CONDITIONS

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