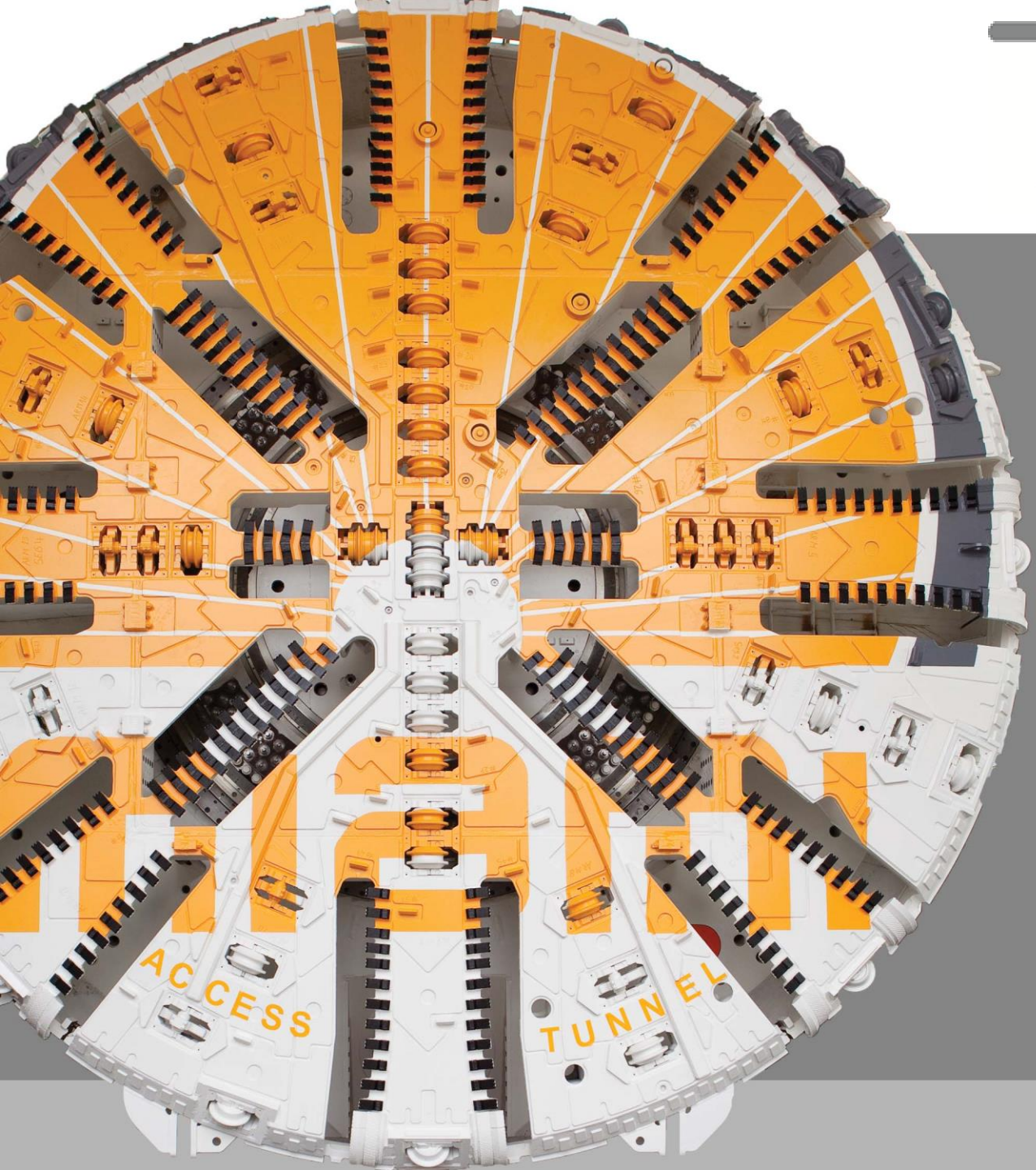


PORTMIAMI Tunnel

A public-private partnership project by

CASE STUDY

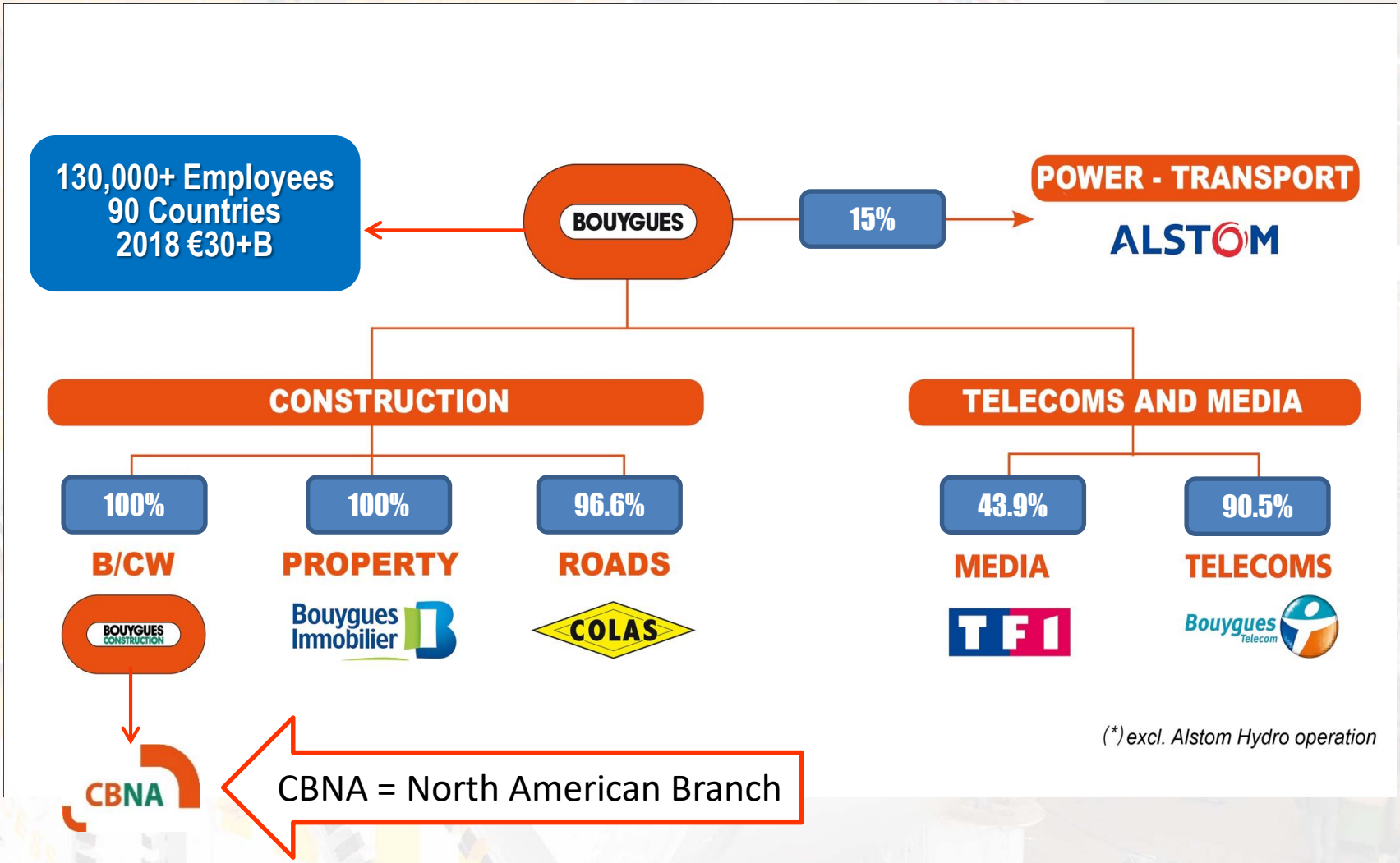
THE PORT OF MIAMI TUNNEL PROJECT STORY

Luz Weinberg

December 7, 2019
NALEO

www.portofmiamitunnel.com

BOUYGUES – *"Bwig"*



MIAMI TUNNEL PROJECT FACTS

In 1989, FDOT analyzed eight (8) alternatives in Project

Impacts Considered:

Environment
Existing Roadways
Socioeconomic factors

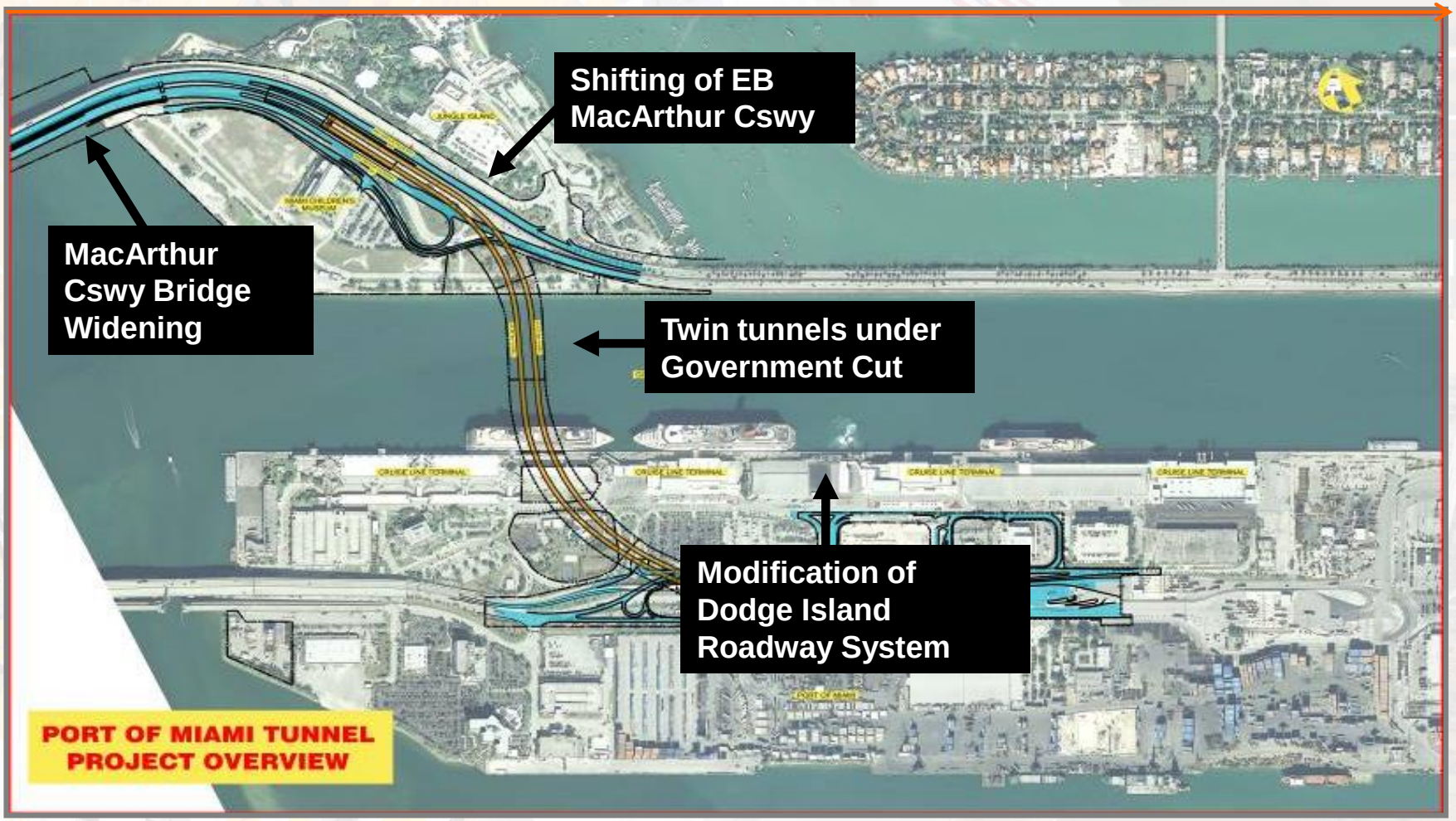
September 27, 1990 – FHWA confirms that Alternative 1 (Tunnel through Watson Island) is the Preferred Corridor Alternative.

PROJECT BENEFITS:

- Provide a direct connection between the Port and the Interstate Highway System.
- Maintain the Port's competitiveness (both cruise and container handling)
- Relieve congested downtown Miami streets thereby improving safety.
- Facilitate ongoing and future development plans in and around downtown Miami.

PROJECT LOCATION

SCOPE OF WORK



PROJECT HISTORY

WHY P3?

PROJECT HISTORY

Technically challenging and highly complex project.

FDOT did not have in-house expertise to operate the tunnel after construction.

P3 structure transfers most risk for construction cost overruns, schedule delays and the long-term cost of operations and maintenance to the private sector organization.

P3 Alternative Delivery method was being embraced nationwide.

PROJECT HISTORY

35-yr. term guarantees FDOT a fixed long-term cost structure.

FDOT hosts Industry Forum (December 2005) to examine Public-Private Partnership (PPP) opportunities – response was positive.

Shortlist of 3 qualified proposers announced in April 2006 (delayed by Hurricane Katrina in 2005) and RFP issued November 2006.

PROJECT HISTORY

THE ROLLER COSTAER RIDE

PROJECT HISTORY

Original Team consisted of...
Constructor/Contractor: Bouygues Travaux Publics (BYTP)
Financing: ABN-Amro (Dutch firm)
Bonding: AIG
TIFIA Loan Advisors: Lehman Brothers

2006: ABN-Amro decides to pull out of team (withdraws from the P3 market). BYTP decides to continue with the pursuit of the project

2007: BYTP finds new equity partner: Babcock & Brown (B&B) from Australia.

BYTP/B&B submits proposal to FDOT in March 2007.

BYTP/B&B selected preferred bidder in April 2007.

PROJECT HISTORY

Negotiation to reach a financial close started immediately but lending institutions started to experience liquidity problems which led to the 2008 financial debacle.

Babcock & Brown went bankrupt and needed to be replaced.

AIG failed in providing the bid bonds and performance bonds and needed to be replaced.

Lehman Brothers went bankrupt... and needed to be replaced.

BYTP did not give up and ***persevered***...

PROJECT HISTORY

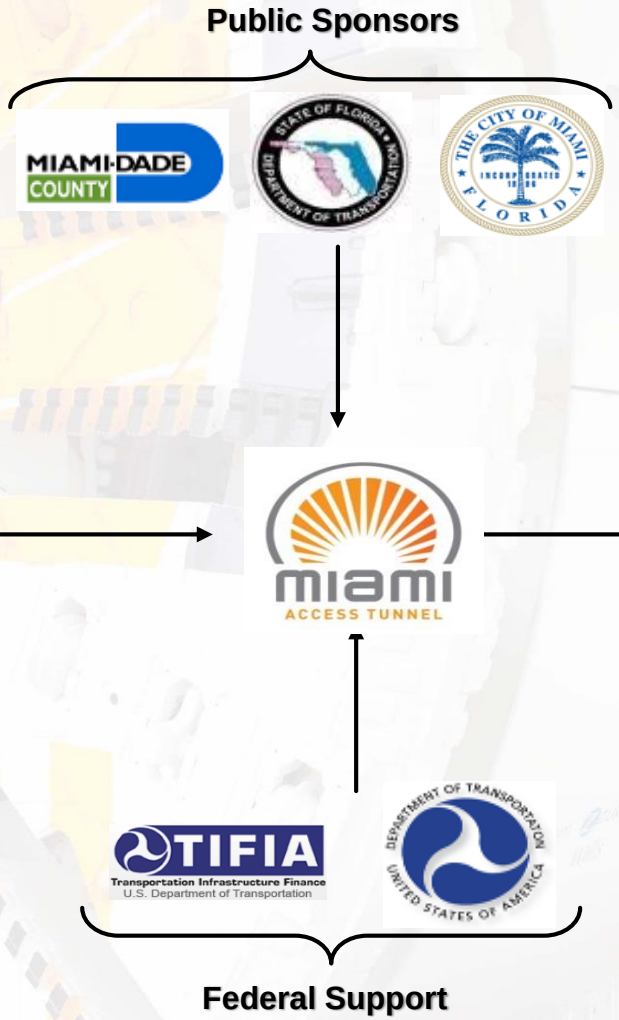
BYTP found all new partners in 2009.

Constructor: Bouygues Travaux Publics (BYTP)
Financing: Meridiam (+10 other lending institutions)
Bonding: Zurich Securities
Loan Advisors: Barclays Bank

Financial close occurred in October 2009 along with FDOT's issuance of the *Notice to Proceed*.

CBNA (fka BCWF) was created as BYTP's North American branch to execute the project.

PROJECT PARTNERS



FINANCING SCHEME

Construction Cost $712M

Payment to CBNA based on meeting predetermined Contract Milestones (vs. monthly progress)

MAT Concessionaire funded construction CAPEX

MAT Concessionaire was paid (by FDOT) $156M during construction + $350M at Final Acceptance

Source of Funds

FDOT contributing 50% of capital cost

Miami-Dade County contribution = $402.5M

City of Miami contribution = $50M

ROW contributions (County & City) = $50M

FINANCING SCHEME

FDOT funding Tunnel Operations & Maintenance of approximately $200 million over 30 years.

FDOT making availability payments as long as tunnel is open to traffic.

Second U.S. application of availability payments to finance a transportation project (the first also being in Florida - the I-595 Corridor Roadway Improvements).

Contract includes 'Handback' requirements to ensure Tunnel is returned to FDOT in first-class condition in 2044.

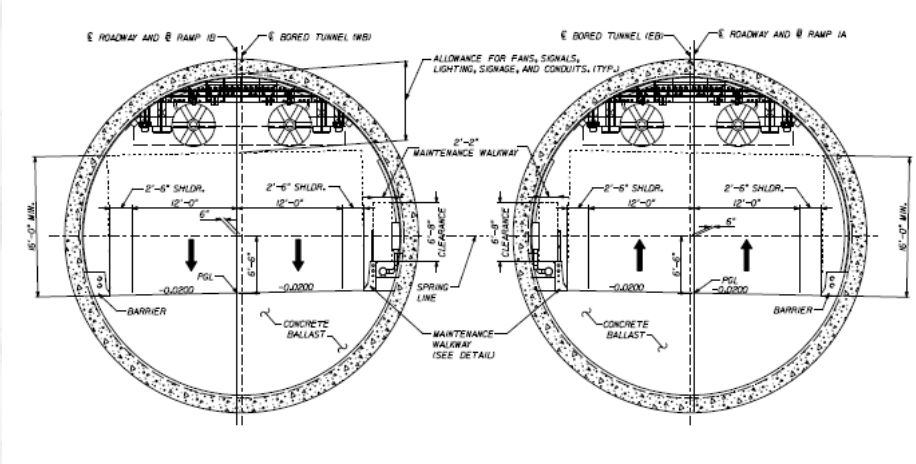
PROJECT KEY DATES

Project Start (Design):	October 2009
Construction Start:	May 2010
Start of First Bore:	November 11, 2011
Completion of EB Tube:	July 31, 2012
TBM Turn around:	Two months
Start of Second Bore:	October 29, 2012
Completion of WB Tube:	May 6, 2013
Substantial Completion:	August 3, 2014

A TRUE ENGINEERING FEAT

CBNA

TUNNEL BORES: MAIN TASK



2 tunnels each 4,200 ft. long

Tunnel bore 42 ft. with 37ft. ID

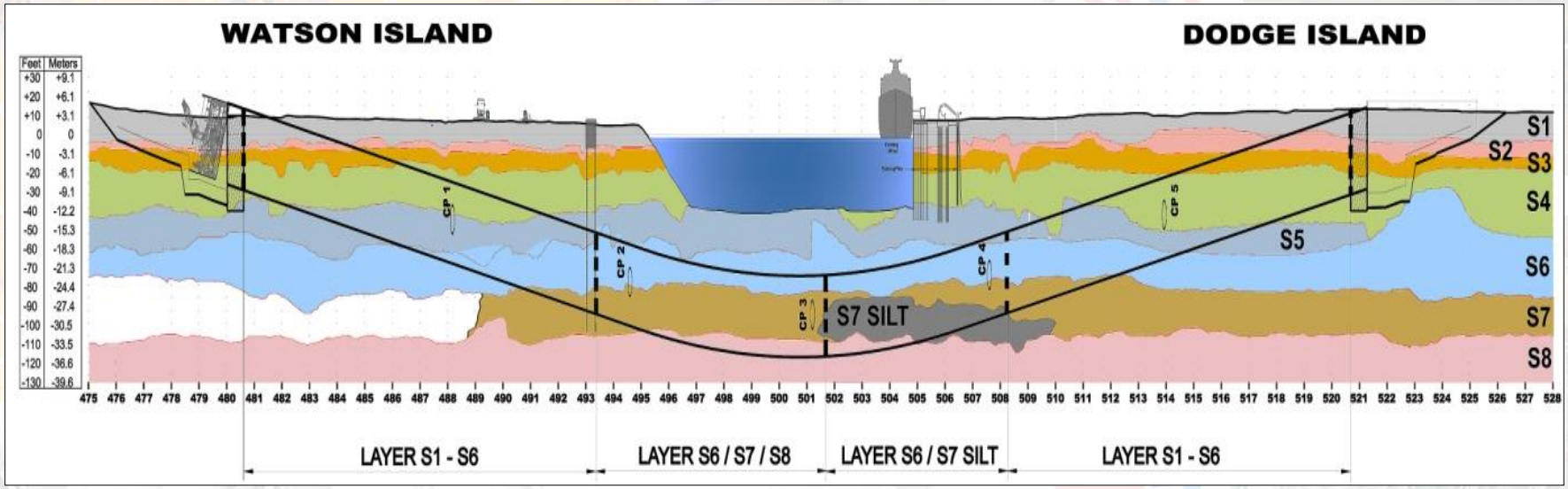
8-piece rings using 5.6ft wide by 28 in. thick universal segments

5% maximum grade and a tight horizontal curve Rmin= 1,000 ft.

Low ground cover : from ABOVE grade to 1.5 Tunnel Dia. (less than 1 Dia. in Channel)

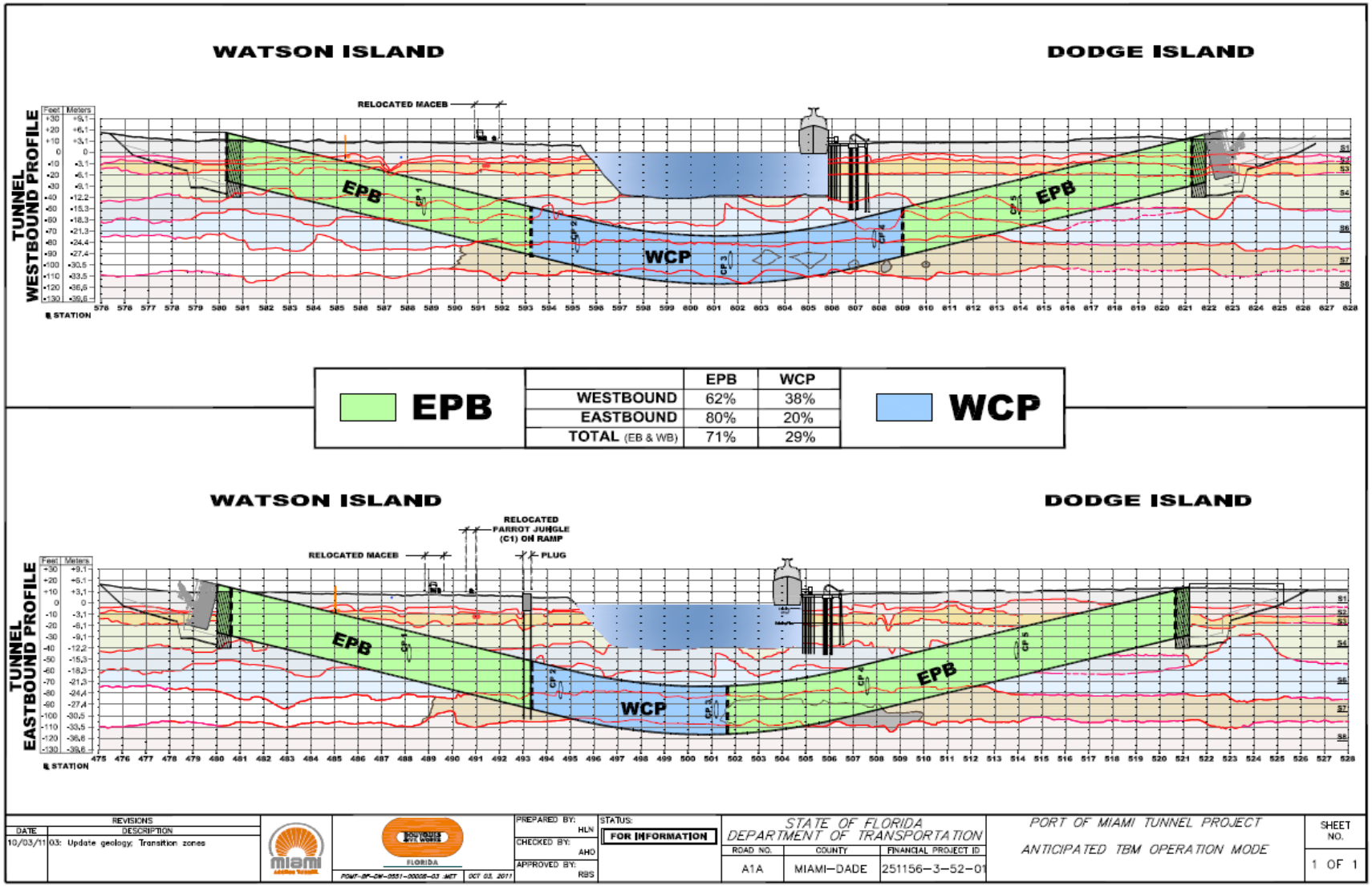
Tunnel Separation: 1/3 to 1 ¼ Dia. (edge to edge),

PROJECT CHALLENGES: GEOLOGY



8 distinctly different and "moody" layers

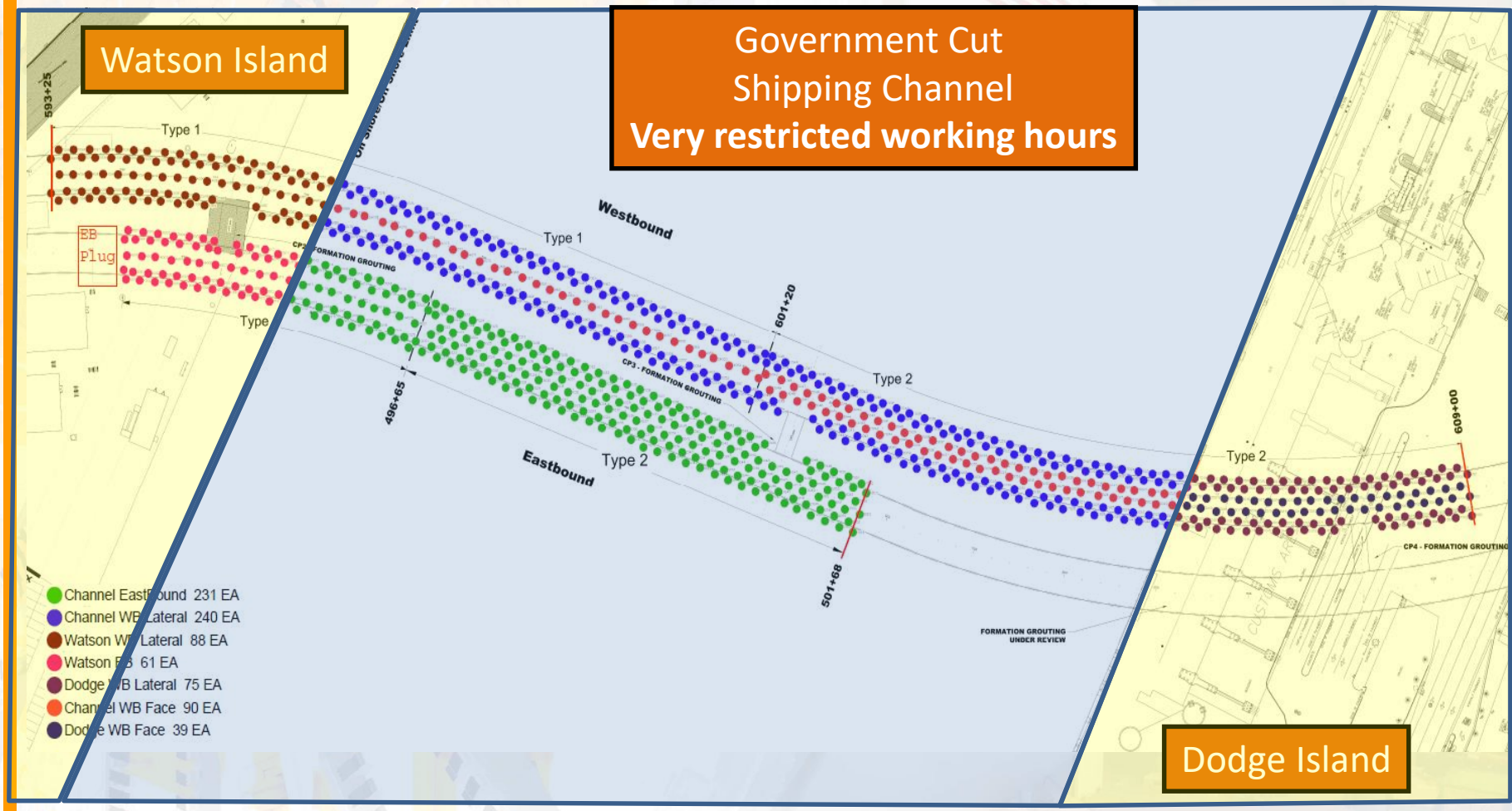
TWO TUNNELLING MODES



	EPB	WCP
WESTBOUND	62%	38%
EASTBOUND	80%	20%
TOTAL (EB & WB)	71%	29%

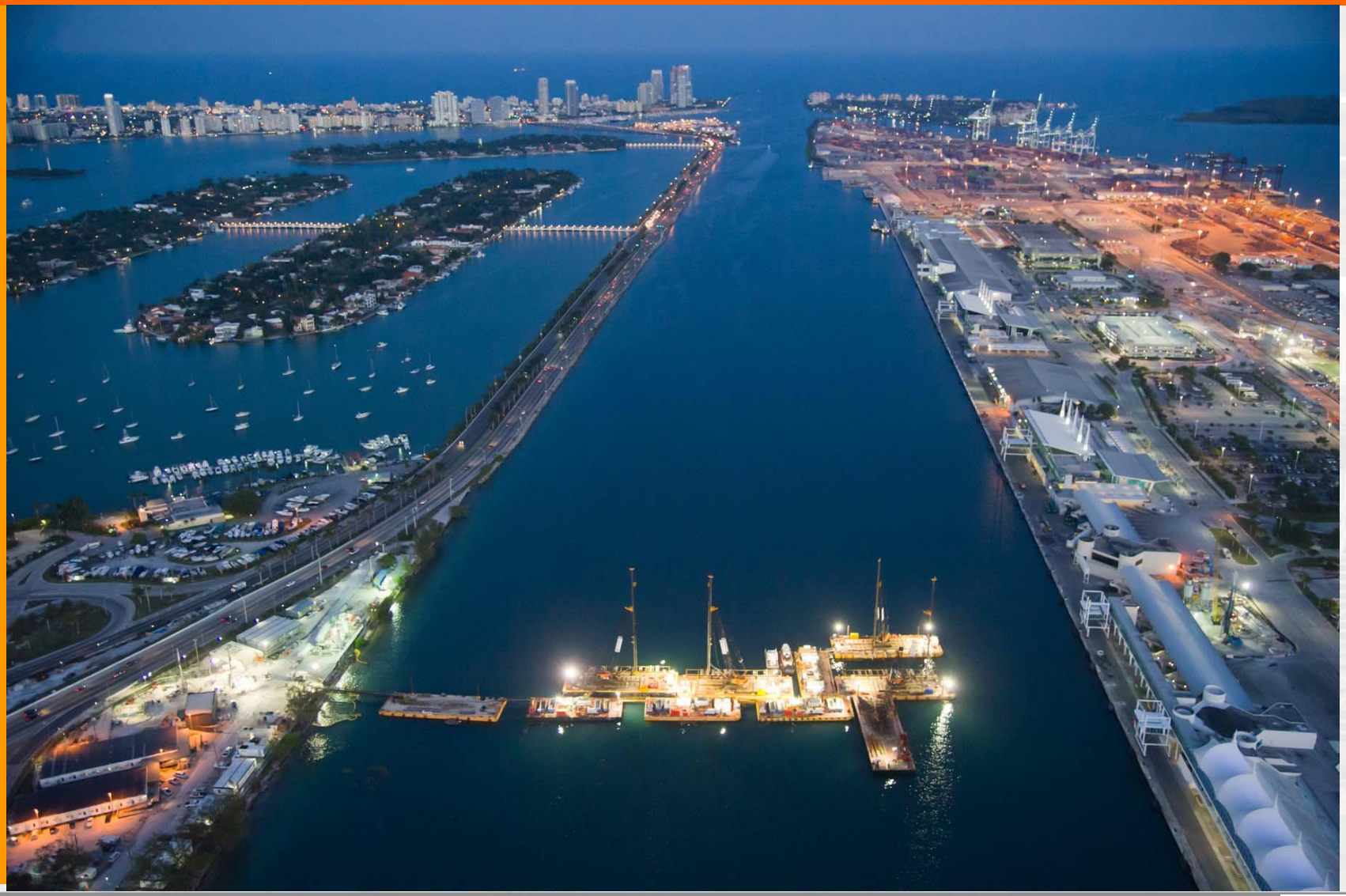
REVISIONS		PREPARED BY:	STATUS:	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PORT OF MIAMI TUNNEL PROJECT	SHEET NO.
DATE	DESCRIPTION	HLN	FOR INFORMATION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	ANTICIPATED TBM OPERATION MODE	
10/03/11	03: Update geology; Transition zones	CHECKED BY: AHO		A1A	MIAMI–DADE	251156–3–52–01		1 OF 1
		APPROVED BY: RBS						

FORMATION GROUTING DESIGN



Grouting: 1,050 holes; (~19 miles of drilling); ~65,000 cu.yd. grout

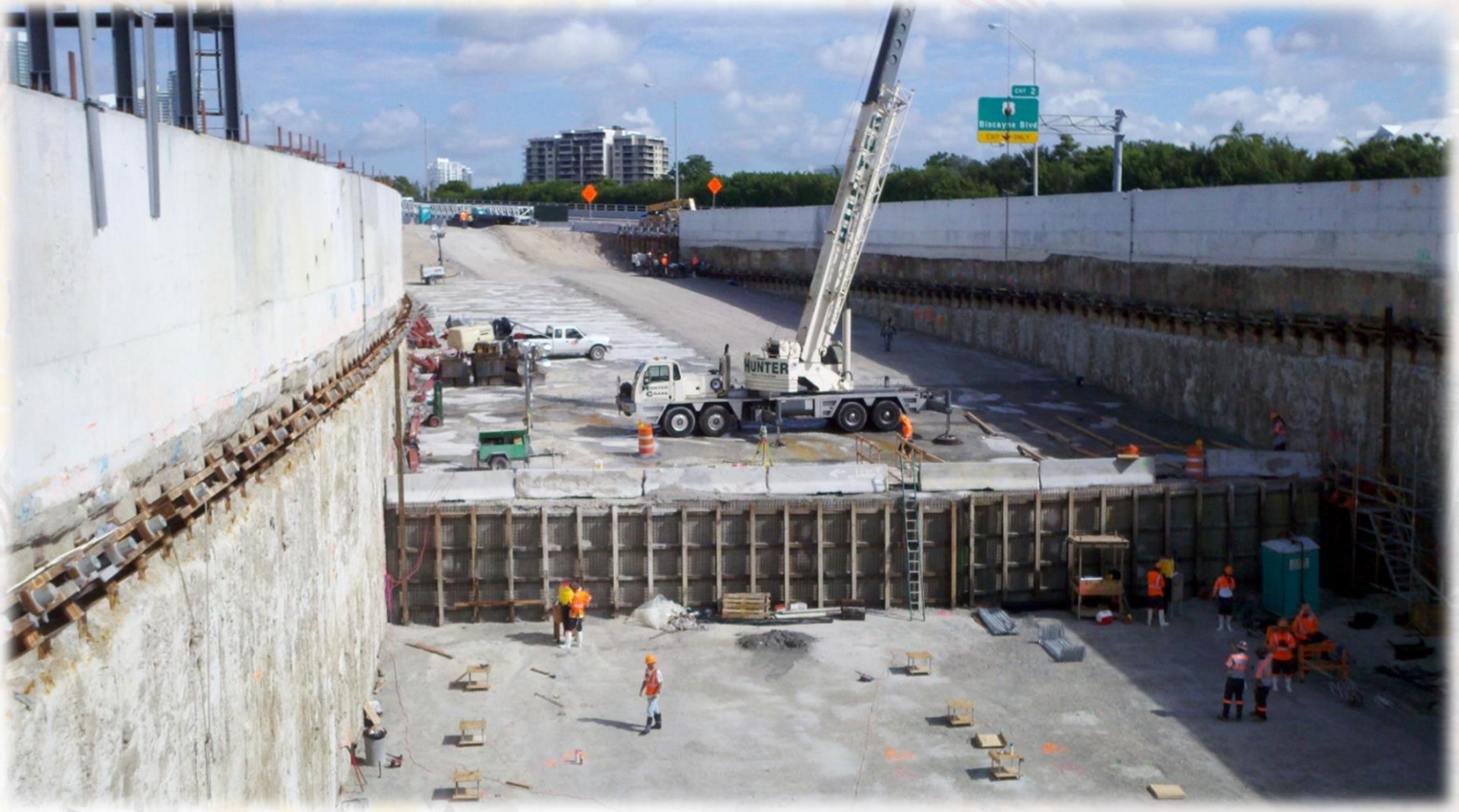
FORMATION GROUTING



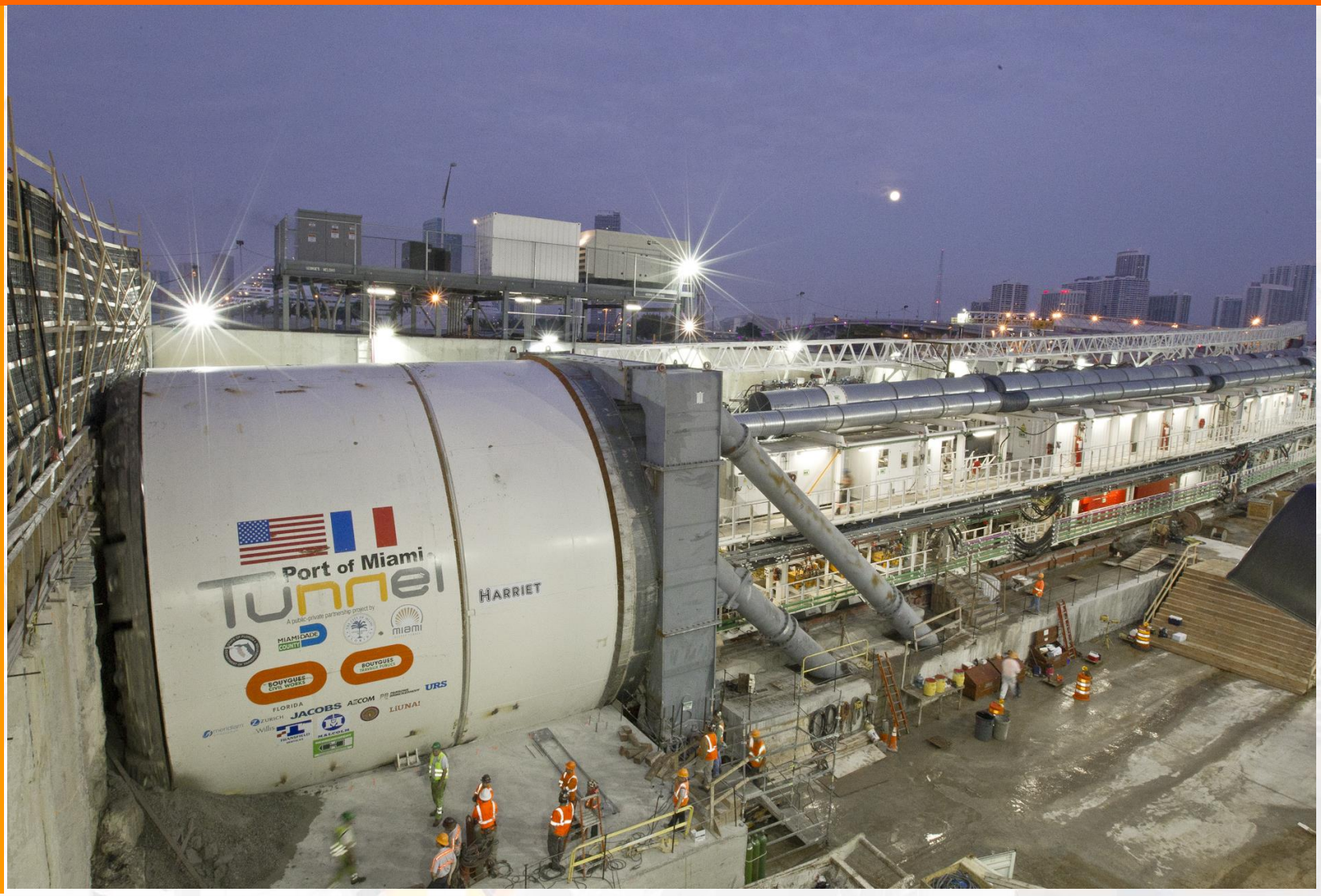
PORTAL EXCAVATION

PORTAL EXCAVATION

PORTAL DEWATERING



MINING START Nov. 11, 2011



MINING

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CBNA

MINING

MINING

MINING

BREAKOUT #1: July 31, 2012

TURNING A 1,500-TON TBM SHIELD

THE TBM TURNAROUND

TURNING A 1,500-TON TBM SHIELD

TBM TURN AROUND

TBM TURN AROUND

TBM TURN AROUND

WB MINING START Oct. 29, 2012

THE End: Breakout #2: May 6, 2013

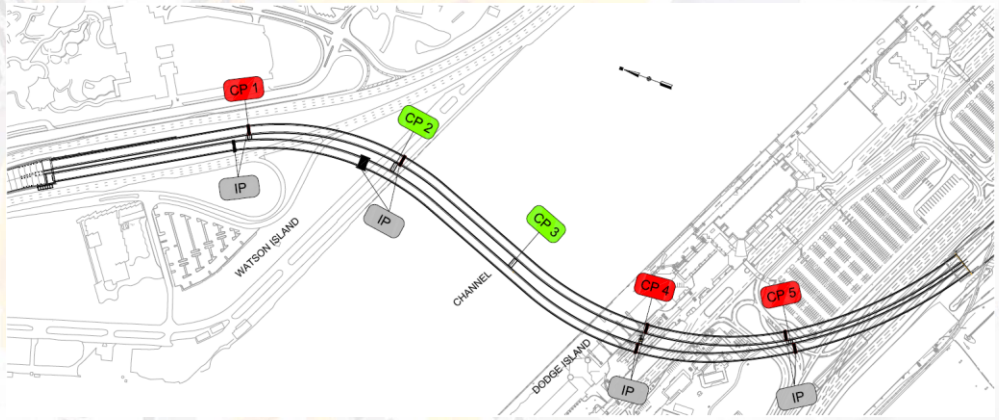
TUNNEL ROADWAY DEVELOPMENT

EMERGENCY ACCESS/EXITS: CP

Cross Passages required to provide emergency egress between tunnels. Spaced every 800ft

2 on Watson, 2 on Dodge & 1 in the Channel.

Constructed after the two bored tunnels are completed.



Cross Passage - CSM Treatment
Cross Passage - Formation Grouting & Ground Freezing
Intervention Plug – CSM Treatment

CBNA

PORTAL CONSTRUCTION

THE BRIDGE: MACARTHUR EXPANSION

- Interior Widening for additional traffic lanes to tunnel continue.
- Work on Piers 16, 17, 18 & 19 as well as demo of site establishment.
- Pier Construction (10' segments cut into existing walls to splice reinforcement with #11 rebar for erection of the piers.

TUNNEL COMPLETION

TUNNEL COMPLETION

... OR SO WE THOUGHT...

PROBLEM #1: Leaking Water Pipe

The tunnel's main discharge line was installed and tested in March 2014 – PASS

The roadway was constructed over the pipe in April 2014.

May 2014: Pipe failed to hold specified pressure – FAIL

Three attempts made to find and fix the problem – FAIL

Ultimately, concrete roadway was demolished, and entire pipe replaced.

July 2014 – pressure test was successful – PASS

PROBLEM #2: Exhaust Fans

April 2014 – fan experiences failure: loose tarp goes through fan.

April 2014 – fan experiences failure: reason unknown.

May 2014 – same day as opening ceremony, fan experiences failure: loose bolts.

May – August 2014: Fans all re-inspected and recertified.

July 2014 – fan experiences failure: Employee hard hat goes through fan.

Result: 89-day delay with resulting steep LDs (with banks!).

MIAMI'S NEW LANDMARK

4 YEARS in 2-1/2 MINUTES

Lessons Learned

P3 Model was appropriate for the Miami Tunnel project.

Geotechnical Risk Sharing between public and private sector was fair (contingency fund in place for unexpected events).

Contractual terms negotiated with FDOT and not overly onerous.

Constructor had direct access to FDOT during the construction phase – this was KEY!

Lessons Learned

P3 Market in Canada booming – tremendous amount of experience by Owners.

Several large, well known contractors have scaled back pursuing P3 projects (e.g., Skanska, Fluor, Granite, AECOM) due to unfavorable risk profiles, multiple failed bids and losses.

Consequently, P3 Market in the USA seems to have slowed down – no longer trendy.

Design-Build projects still very strong market.

THANK YOU!

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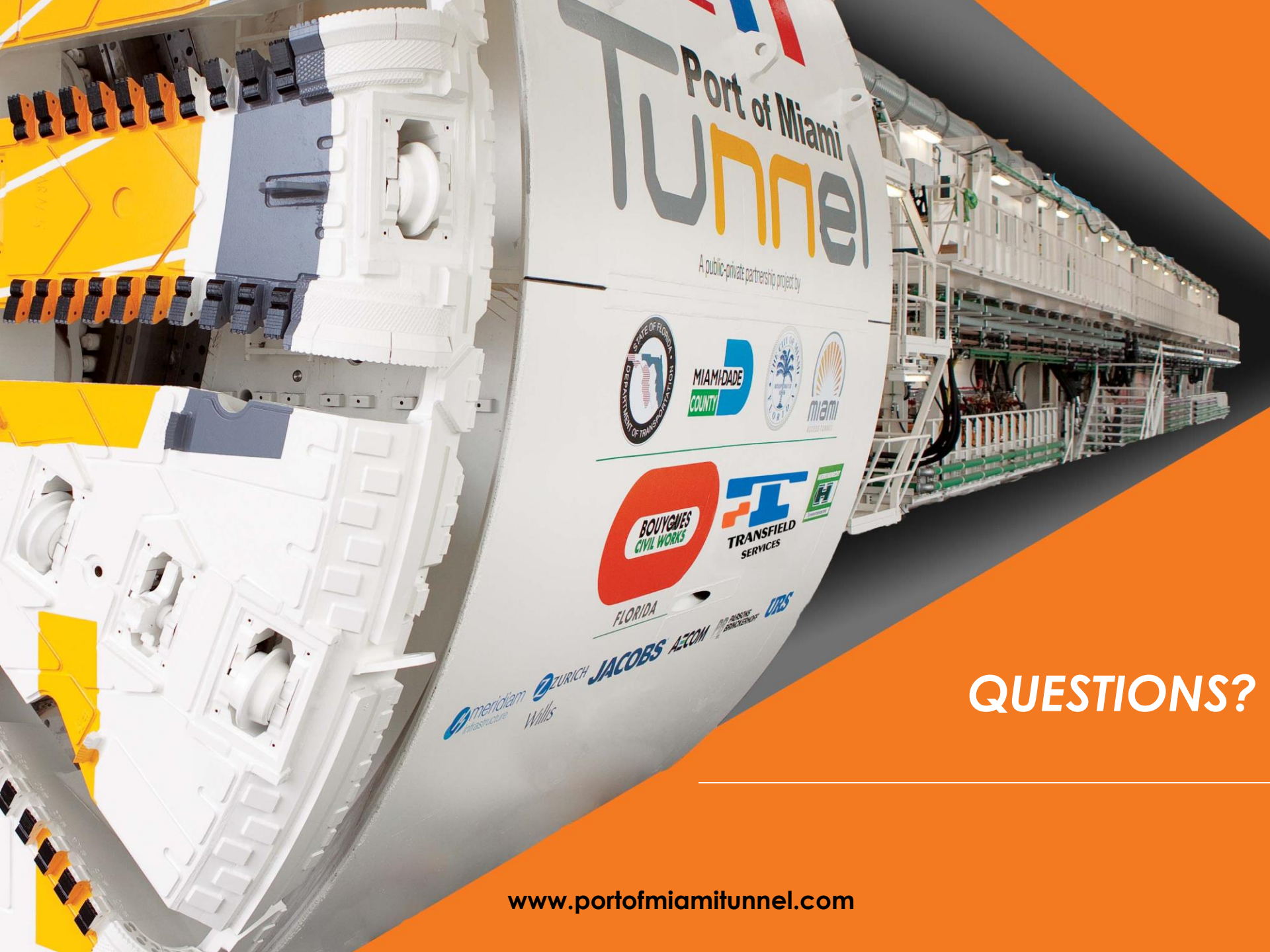

QUESTIONS?

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