



# Pigs Eye Island Building

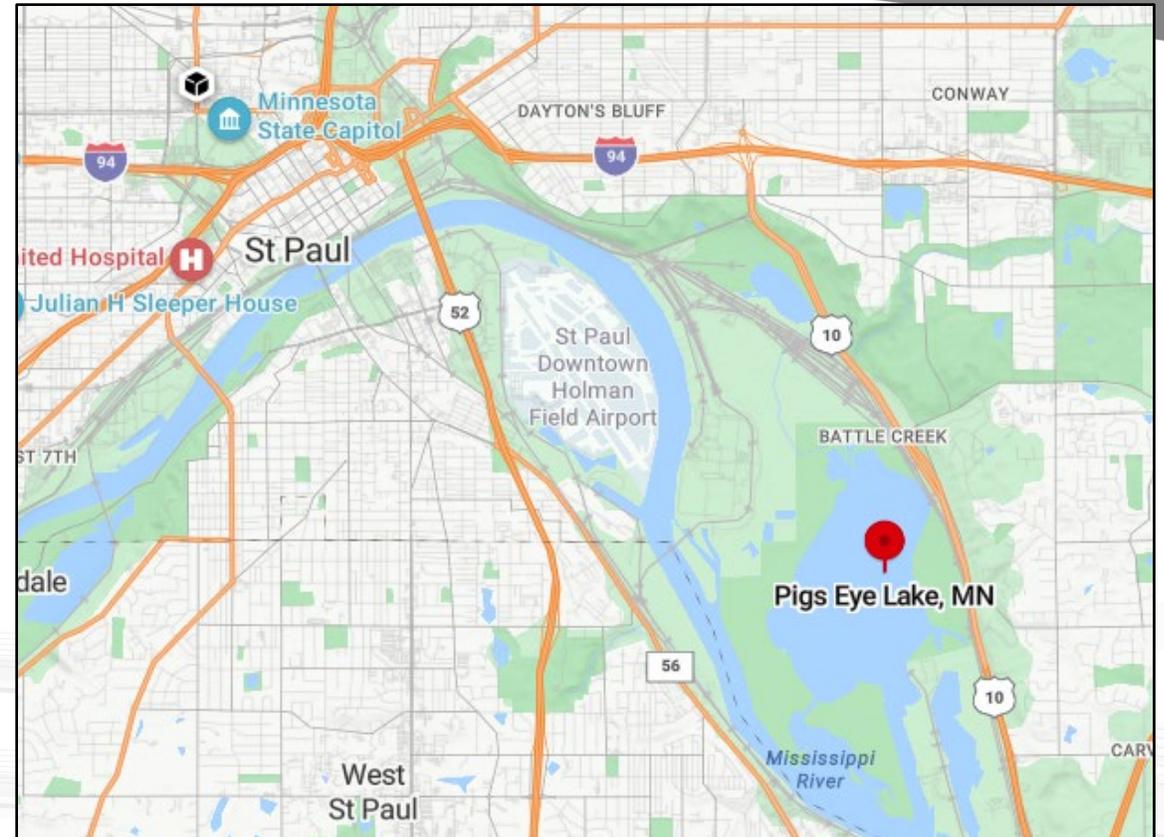
October 12<sup>th</sup>, 2023

# WEDA Eastern 2023



# Pigs Eye Project Introduction

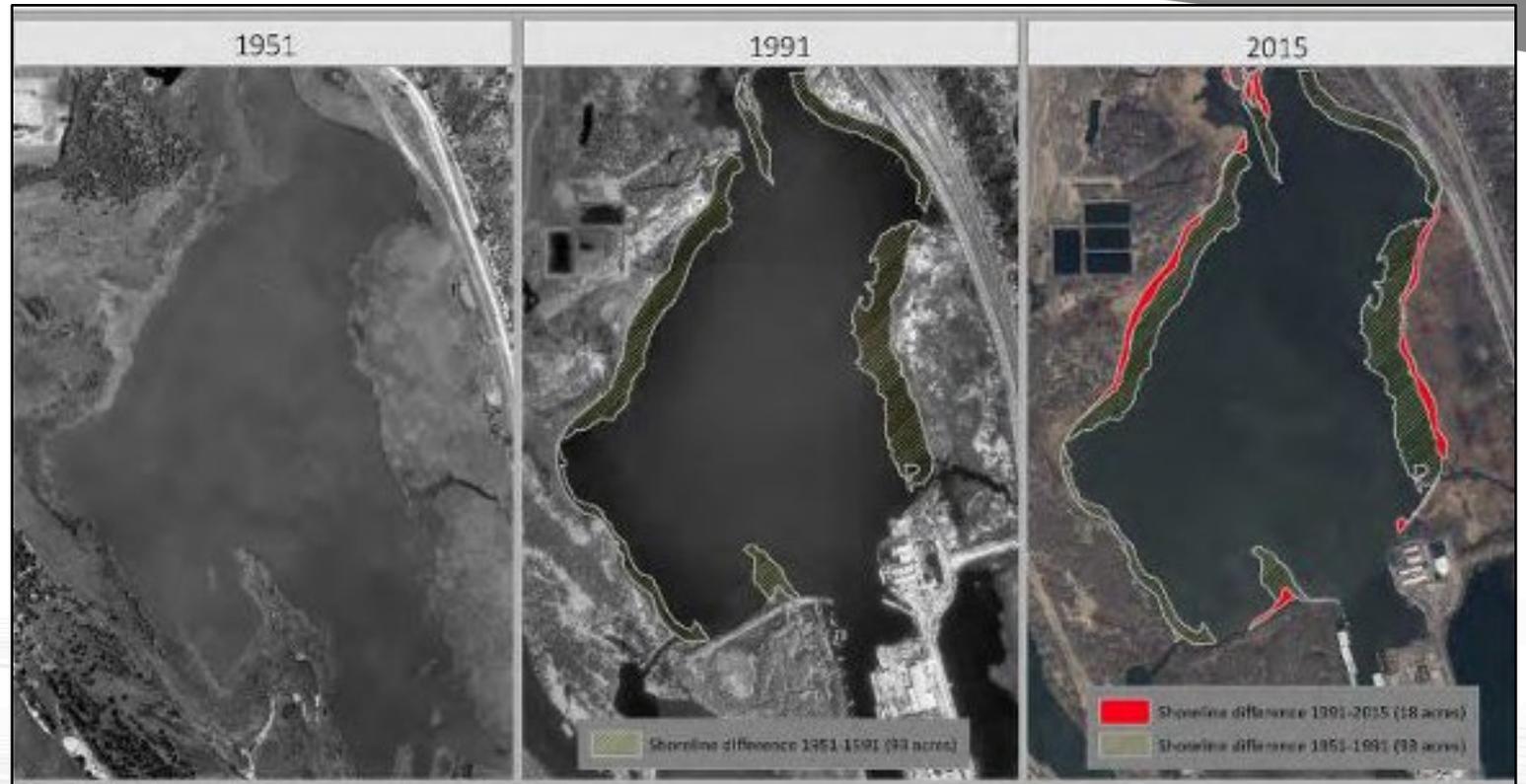
- Ramsey County, MN, and USACE proposed to enhance and restore the habitat in Pigs Eye Lake by constructing islands, sand benches, marshes, and terrestrial habitats.
  - Habitat Rehabilitation and Enhancement Project (HERP)
  - Restore wetland habitat due to significant erosion
  - Reduce turbidity within the lake
  - Promote habitat diversity
  - Beneficial use of dredge materials





# Pigs Eye Project Introduction

- Shallow depths within the lake have caused an estimated loss of over 100 acres of wetland shoreline
  - Significant winds in the shallow depths prevent aquatic vegetation from growing
- Fund Source: Outdoor Heritage Fund



Shoreline Erosion in Pigs Eye Lake From 1951–2015



# Pigs Eye Lake History

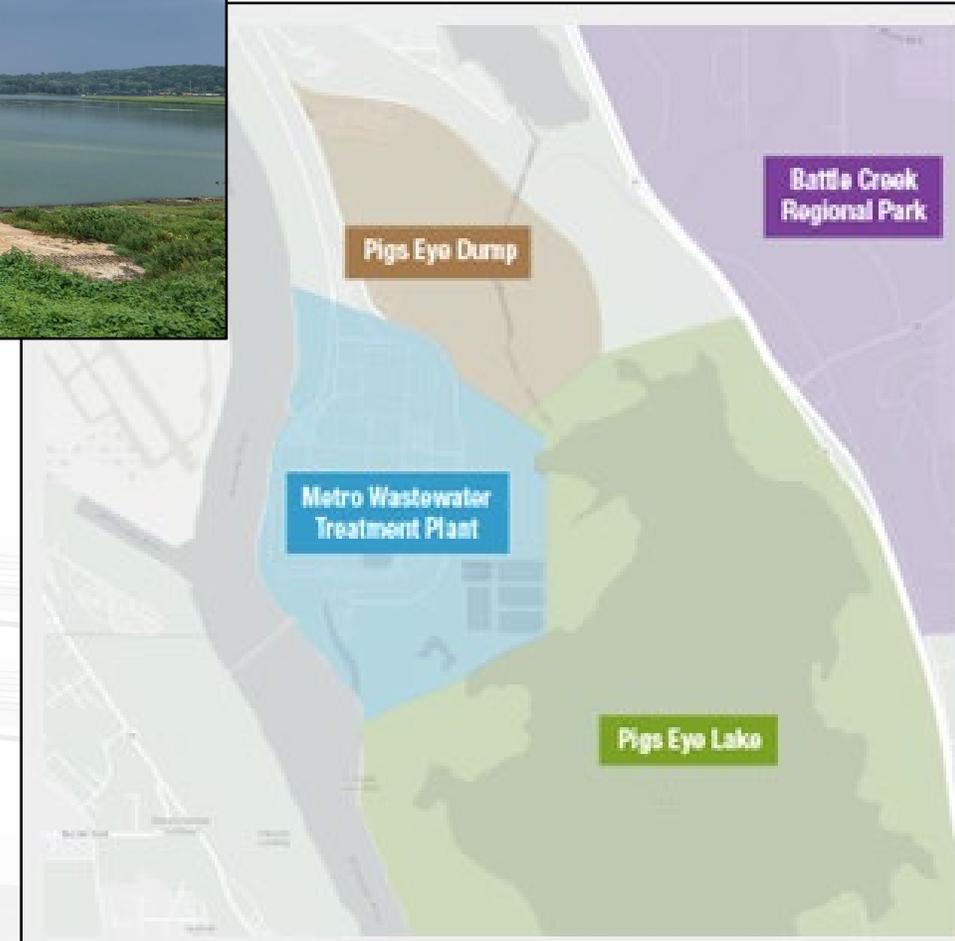
- Located in Pool 2, St. Paul, MN
- Named after Pierre “Pig’s Eye” Parrant, one of the first pioneers of St. Paul.
- A riverine wetland that covers over 600 acres.
- Formed during the construction of Lock and Dam #2
- Downstream Battle Creek has significant barge and industry activity
- Home of one of the largest heron rookeries in the state.





# Pigs Eye Lake History

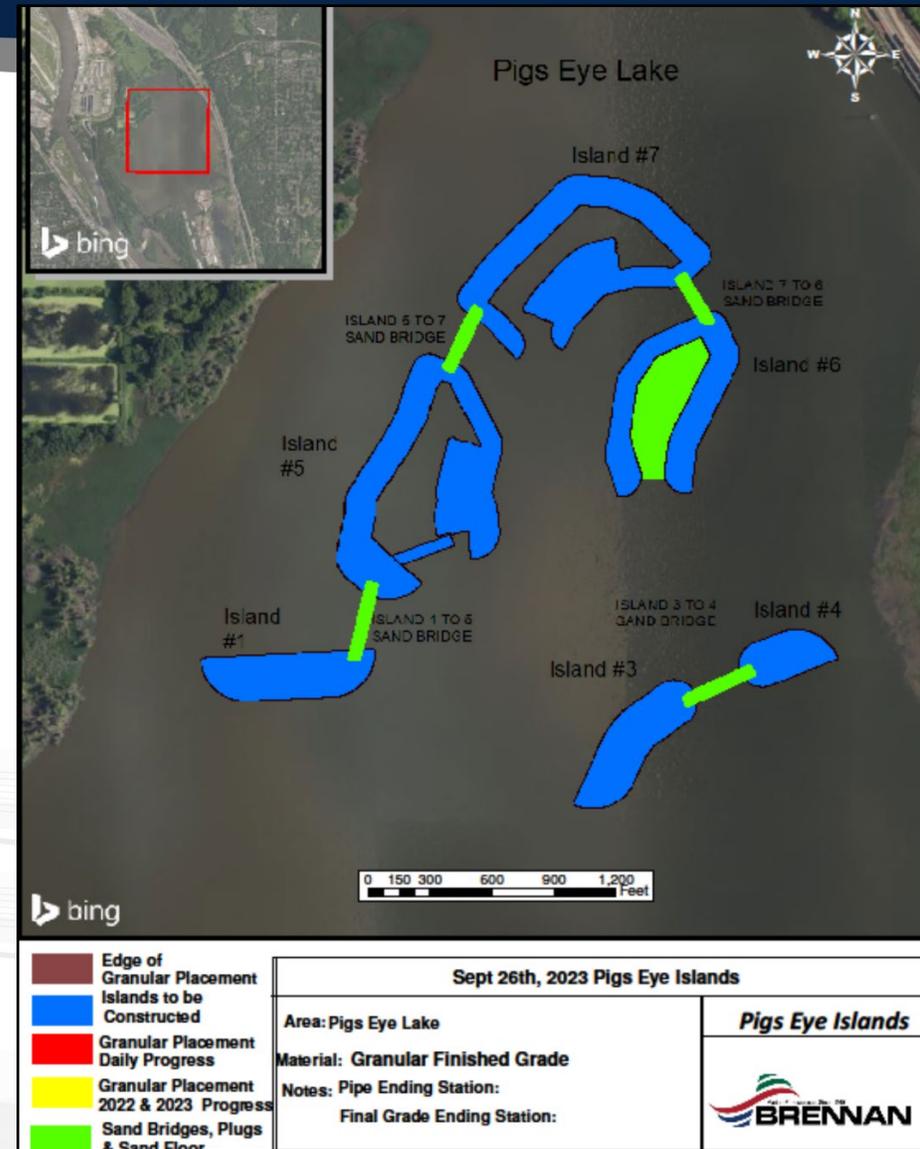
- Adjacent Pig's Eye Dump
  - St. Paul, MN
  - MN's largest unpermitted landfill
  - From 1956 to 1972,
  - Over 8 million cubic yards of municipal, commercial, and industrial waste
  - 2001 Partially cleaned up





# Bidding Process

- Request For Proposal
  - NAICS Code 237990
  - Designated 100% Small Business set aside
  - Technical approach and past performance requirements
- LS Marine (LSM) partnered with J.F. Brennan Company Inc. (JFB)
- JFB & LSM collaborated on previous HERP projects
- JFB has completed multiple HERP projects





# Bid Schedule

- **Base Bid schedule consisted of the following items**

- Island Construction Granular Fill (CY)
  - Island 1, 3, 4, 5 and 7
  - Island features included
- Island Construction Fine Fill (CY)
- Rock Groins (TN)
- Turf Establishment (ACRE)
- Restoration/Plantings
  - Grasses & Willows

- **Option 1– Awarded**

- Island Construction Granular Fill (CY)
- Sand Floor Underwater Feature





# Scope – Borrow Site Preparation

- Pine Bend & Upper & Lower Boulanger  
– Borrow Sites
- LSM Strips Granular and Loads into Barges
- Barges Transported 4 miles upstream to Pigs Eye Lake
  - Tug and Deck Barge
- Barges Tied off at Brennan Slurry Barge





# Scope – Granular Construction

- Granular material offloaded by Brennan
  - 130,000 lb material handler
- Fed into Brennan screened Hopper/Slurry Tank system
- Slurry Hydraulically Pumped
  - 2 @ 1000 HP booster pumps
  - 5,000 feet from the transfer barge.
- Pipeline placed on a light-duty barge until a pad is established
  - Open-discharged
- Island Equipment Shape and Grade
  - Averaging 85 CY/LF
  - Around 50-100 LF gained per day







# Equipment – Granular Construction

- LSM Equipment (Borrow Site Stripping and Transport)
  - Tugs
  - 200' Deck Barges
  - Large Dozer
  - Large Excavators
- Brennan Equipment (Granular Offloading and Island Construction)
  - Transfer Spud Barge
  - 130,000 lb. material handler
  - Hopper
  - Slurry Tank
  - High-pressure boosters for water and granular pumping
  - LGP dozers for Island Construction
  - Amphibious excavator for Island Construction
  - (5,550 feet) 14" HDPE dredge pipe





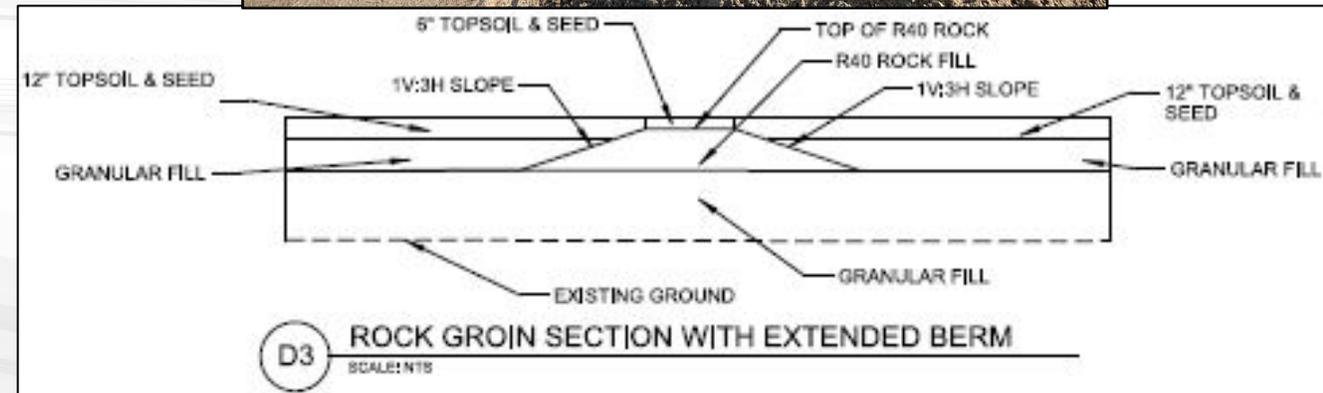
# Equipment – Granular Construction





# Scope – Channel Dredging & Rock Groin

- Work Plan in Sequential Order
- Access Channel dredging from the project staging area to islands
  - 40' Wide, 5' Deep
  - Material Hauled to Upper Boulanger
  - Not enough analytical studies for BU on the Islands
- Rock Groin Construction
  - R40 Rip Rap
  - LSM will import rock groins from an approved quarry
  - Rock will serve as an anchor to the island





# Scope – Fine Fill and Vegetation

- Fines Construction
  - Placed mechanically after granular construction and rock groin
  - Upper Boulanger – fines borrow site
  - Will serve as a bed for vegetation growth
  - ~12” of cover
  - ~38,000 CY Fines
- Plantings and Willows
  - LSM will establish vegetation after fines construction is complete
    - Winter Wheat, Virginia Wild Rye, Prairie Cord Grass, and Switchgrass
  - Willows will be planted within their specified window
    - 15,300 Cuttings





# Project Efficiencies and Statistics

- 440,000 CY of Granular Material Pumped and Graded
- 20,000 CY dredged for channel access
- 6,400 TN of Rock Groins
- 38,000 CY of Fines
- 15,300 Willows to be planted
- 38 Acres of Islands and Features Created
- 5,500 feet of Pipeline
- 17,350 Safe Manhours (Brennan)





# Challenges and Lessons Learned

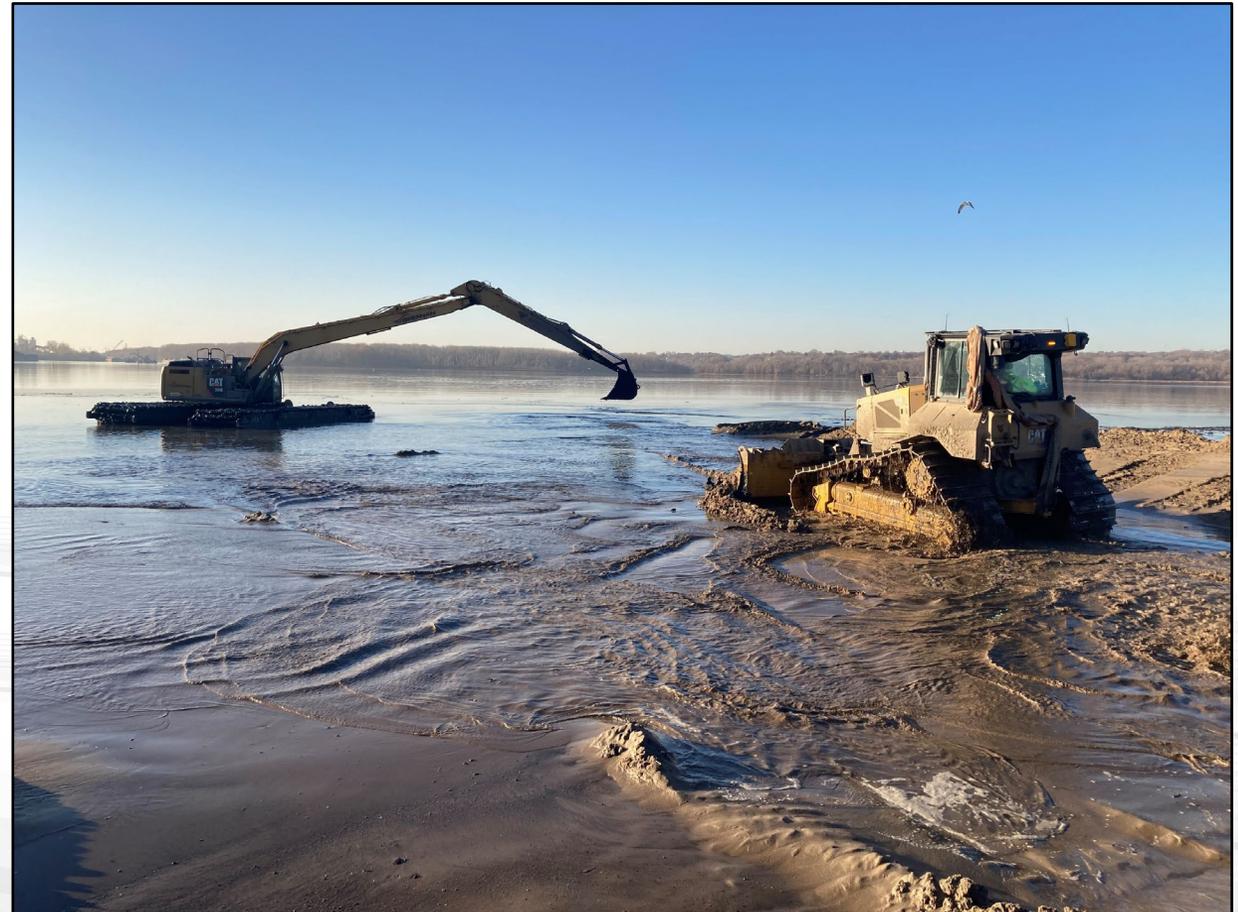
- Low water levels in Pigs Eye Lake provided difficult island access for equipment maintenance and fueling.
  - 1 to 2 feet depths
- Solution:
  - Light, low-drafting utility barges
  - Ancillary excavator to propel the barge
  - Durable Kann boats with fuel tanks on board
- Silty sand caused buildup on the grizzly screen and difficulty in getting the sand to fall through the hopper
- Solution
  - Pneumatic Vibrators
  - Lined Hopper with Steep Slopes





# Challenges and Lessons Learned

- Soft organic lakebed material created significant mud waves during island construction
  - Possible slope stability issues
  - Inability to bridge the granular fill
- Solution
  - Continuously Surcharge sand with dozers
  - Disperse mud to the side using amphibious hoe
- 20% project overrun on granular
  - Deep, soft sediment required more to bridge
  - More concerns for significant settlement
  - Partial Completion of Sand Floor
- Solution
  - Overbuild islands 1' above design to alleviate settlement
  - Tolerance Grade, if necessary





# Additional Project Information

- **Turbidity Requirements**
  - Studied and Evaluated
  - No threshold requirements
- **4 Levels of Habitat Created**
  - Deepwater Habitat – submerged bench
  - Sand floor Habitat
  - Water Line Habitat
  - Upland Habitat





# Project Partners & Stakeholders



**US Army Corps  
of Engineers®**  
St. Paul District





# Pigs Eye Video Link

[Pigs Eye Island Building](#)

Questions



Marine Professionals Since 1919

**BRENNAN**

**Thank You**