Southeast Arizona Citizens Forum

Status of International Outfall Interceptor Sewer Pipe in Nogales, Arizona

United States
International Boundary and Water Commission

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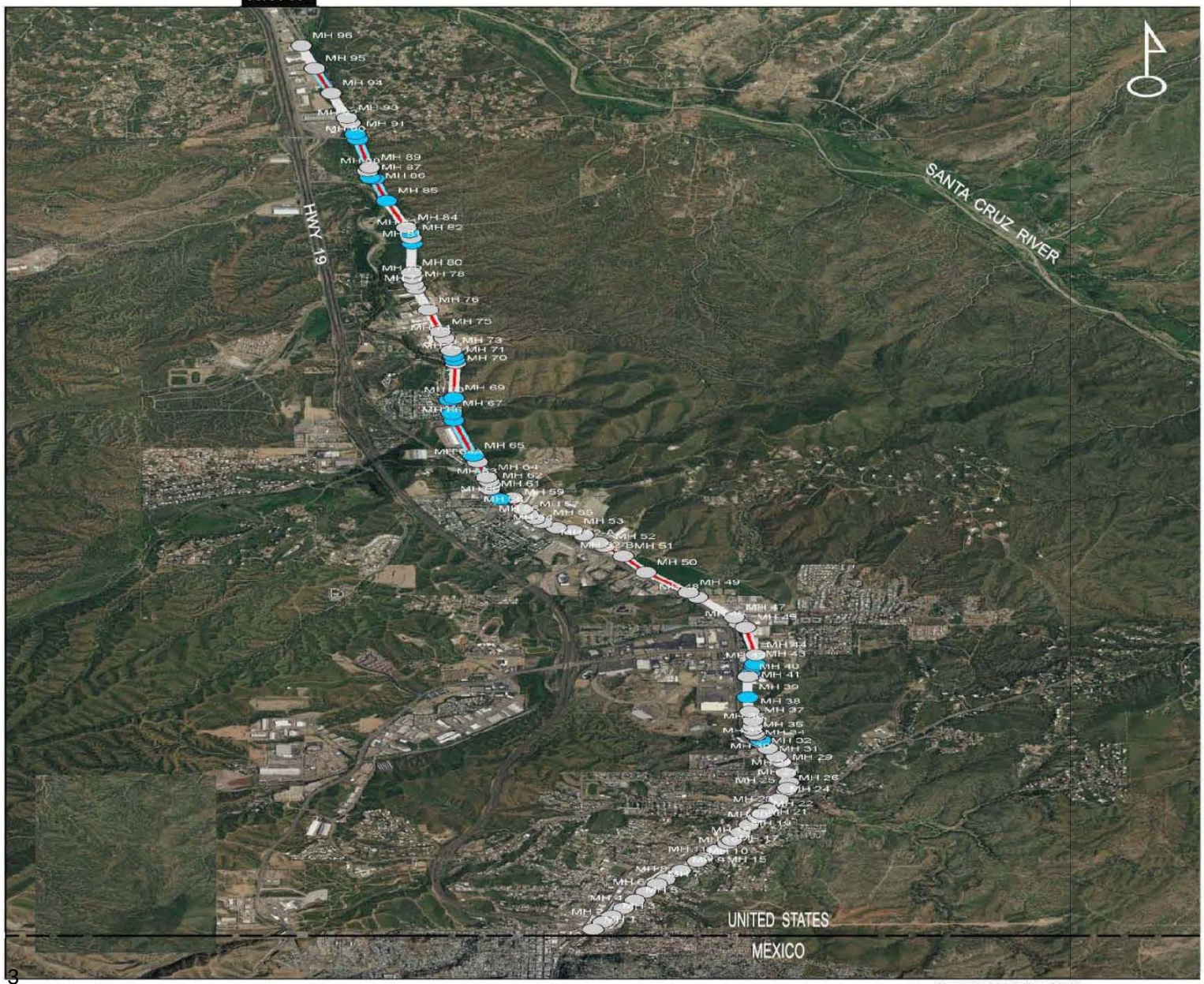
October 13, 2011

Presentation Topics

- Description of International Outfall Interceptor (IOI)
- History of IOI and Nogales International Wastewater Treatment Plant (NIWTP)
- Historical Ownership and Maintenance of the IOI
- Current condition of IOI, expected life span, and recommendations
- USIBWC's past, present, future plans
- Open discussion and questions

Nogales and Rio Rico, Arizona

International Outfall Interceptor



0 2,500 5,000 10,000 Feet

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*Compromised locations are approximate

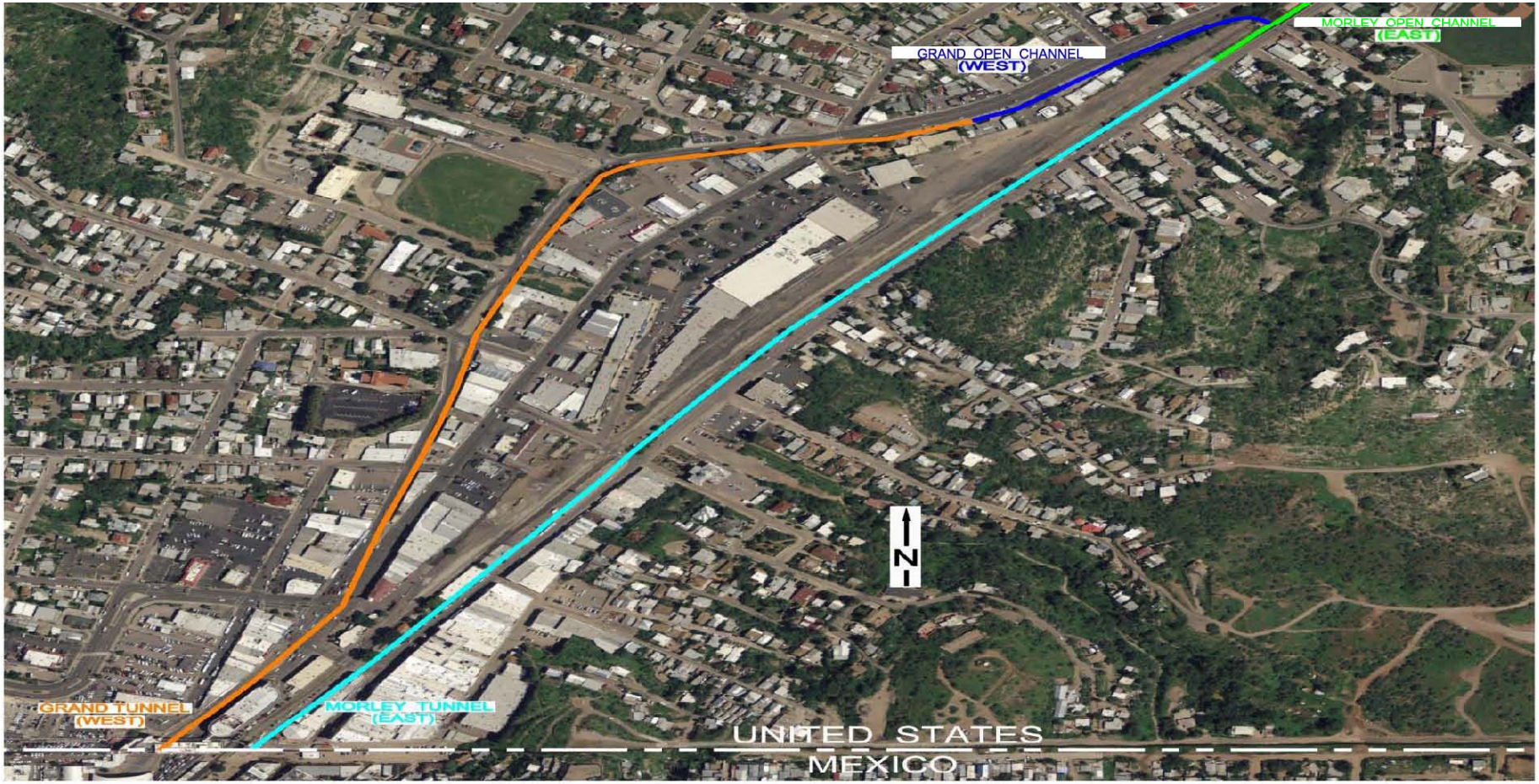
Description of IOI

- Trunk Sewer Transmission Line from International Boundary to the NIWTP
  - 99 Manholes
  - Approximately 9 miles long
  - Varies from 24 inches to 42 inches
  - Manholes 1-16 within closed underground box culvert
  - Manholes 17-32 within concrete trapezoidal section
  - Manholes 33-99 meanders within or beside the Nogales wash

IOI Three Sections

1. Closed Box Culvert Section
   - Approximately 1 mile
2. Concrete Trapezoidal Section
   - Approximately 1.1 mile
3. Earthen Section
   - Approximately 6.9 miles

Underground Box Culverts within Grand & Morley Tunnels



Underground Box Culvert Approx. 10'x 20' Looking South

USIBWC and City of Nogales filled in voids within underground box culverts with concrete

Concrete Trapezoidal Channel IOI is just beneath bottom slab

Highway Overpass: Historically damaged panels over the years

Panel and Floor displacement near Highway 82 Overpass

Panel Displacement; IOI on average only 2'-3' below bottom slab

History of IOI & NIWTP

- Original treatment plant located is where the current City of Nogales Public Works office off Hohokam Street (1950)
  - Approximately 2 miles from the border (IOI alignment down Morley Street)
- Present location of IOI constructed from 1970-1971 out to Rio Rico, Arizona
  - Alignment follows approximately the Nogales Wash
- The NIWWTP has been upgraded several times beginning in the 1970's, 1990's, and finally this last time in 2009. The plant is often running at over the design capacity of 14.6 MGD.

NIWTP

TREATED EFFLUENT
IOI INTO HEADWORKS AT NIWTP
SANTA CRUZ RIVER
NOGALES WASH
Kachina
Avenida Acaponeta
Calle Criana
Via Puebla
Via Orquidia
Calle Tecolote
Zinia Ct
Clavel Ct
Calle Hernandez
Calle Garcia
Calle Gomez
Via Rosamorada
Calle Vaquero
Circulo Botas
Hacha Ct
Peccary Ct
Paseo Magdalena
Via Caliente
Mate Ct
Pendleton Dr
Via Fray Marcos
Gerardo Sanchez
Cabana Ct
19
© 2011 INEGI
© 2011 Google
Google
Imagery Date: 6/11/2011
1992
31°26'56.69" N 110°57'42.59" W elev 3467 ft
Eye alt 11699 ft

NIWTP in Rio Rico, Arizona; Confluence with Santa Cruz

Nogales, Arizona

Approximate two-mile radius around the IBWC Nogales International Wastewater Treatment Plant.

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Historical Ownership and Maintenance

- Beginning with the passage of City of Nogales Resolution Nos. a-160 (1946) and A-210 (1949), the City relieved the USIBWC of all responsibility for the entire project, including construction, and maintenance of the IOI and Wash. While funding has shifted over the years from the U.S. to the City, and later in 1990 it morphed to a cost-sharing basis between the USIBWC and the City (with some construction and maintenance assistance rendered by the USACE and USIBWC), legal responsibility for the IOI and Wash has always remained with the City.

Current IOI Conditions, Expected Remaining Life Span and Recommendations

- The IOI is actively eroding and deteriorating.
  - The original structural strength of the pipeline has been compromised and the rate of deterioration is unknown.

- The remaining life of the pipeline can only be estimated.
  - Reliability of this system is only as good as its weakest link.

Eroded bottom of pipe; looking at first section of pipe into U.S.

Inflow and Infiltration (I and I)

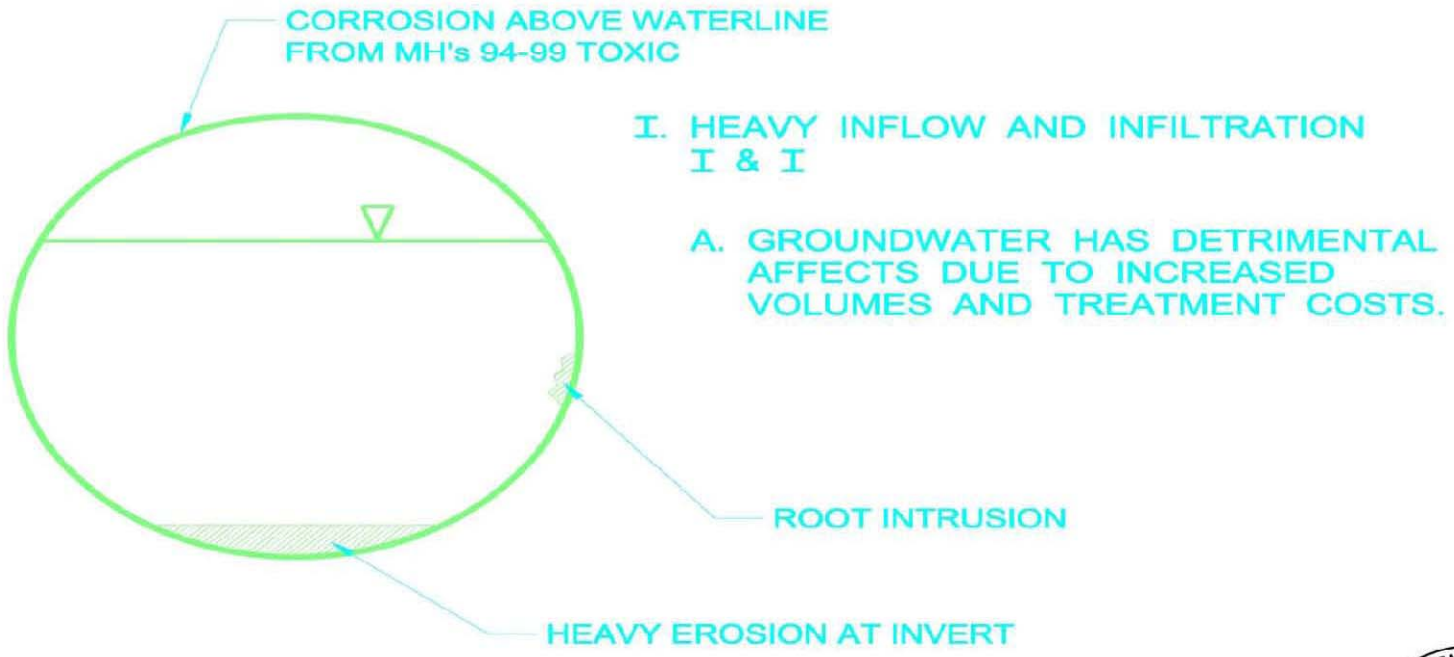
Brown and Caldwell 2005 Study Funded by BECC

- **FINDINGS:**

- Existing condition of pipeline
- Pipeline is over 40 years old, (Typ. Lifespan of pipe is 50 years)
- Half the original pipe thickness remaining
- Erosion of invert is number one concern as seen on next slide
- Corrosion is occurring near treatment plant

Erosion of bottom of pipe due to excessive velocities of solids

EROSION VS CORROSION



LAST SLIDE SHOWS THE ABSENCE OF A PIPE BOTTOM

Recommendations

- Assessment Program
  - Re-inspect every two or three years
- Rehabilitation (Approximately 30 million)
  - Slip Lining
  - Cured-In-Place Pipe (CIPP) – resin filled polyester tube is inserted into pipe and inflated with water or steam and cured-in-place
- Replacement (Approximately 100 million)
  - Open Cut Complete replacement of existing pipe

USIBWC's past, present, and future

- **PAST**
  - Almost yearly repairs are needed around the Hwy 82 overpass in the trapezoidal concrete channel
  - Displacement of panels have the IOI in constant jeopardy
  - Last August replacement of first section of pipe from Mexico to Manhole #1
    - Cost to repair $1.4 million
    - Provided technical expertise during design and construction

USIBWC's past, present, and future

- **PRESENT**
  - Provided a Scope of Work for Design Services to rehabilitate IOI
  - Procured funding of $750,000 for design services based on a 50/50 share of contract with City of Nogales
  - Conduct Contracting and Design Administrative Services for Scope of Work
  - Provided a Memorandum of Understanding, (MOU) to help agency fund City of Nogales projects during emergencies, (Wash & IOI)

USIBWC's past, present, and future

- **FUTURE**
  - Award design contract following cost sharing agreement with the City of Nogales in Fiscal Year 2012
  - Task group will be formed to focus on objectives and goals pertaining to the IOI, NIWWTP, and the wash
  - Commissioners have asked principal engineers (US and Mexico) to prepare a Joint Engineers Report to establish the path forward

Repairs First Section of Pipe Last Year at this time; Pump Bypass

Bottom of pipe is gone due to inherent erosion

Open Discussion and Questions