# SOUTH MONMOUTH REGIONAL SEWERAGE AUTHORITY'S INFILTRATION & INFLOW INVESTIGATION AND ABATEMENT

**Clean Water Council**

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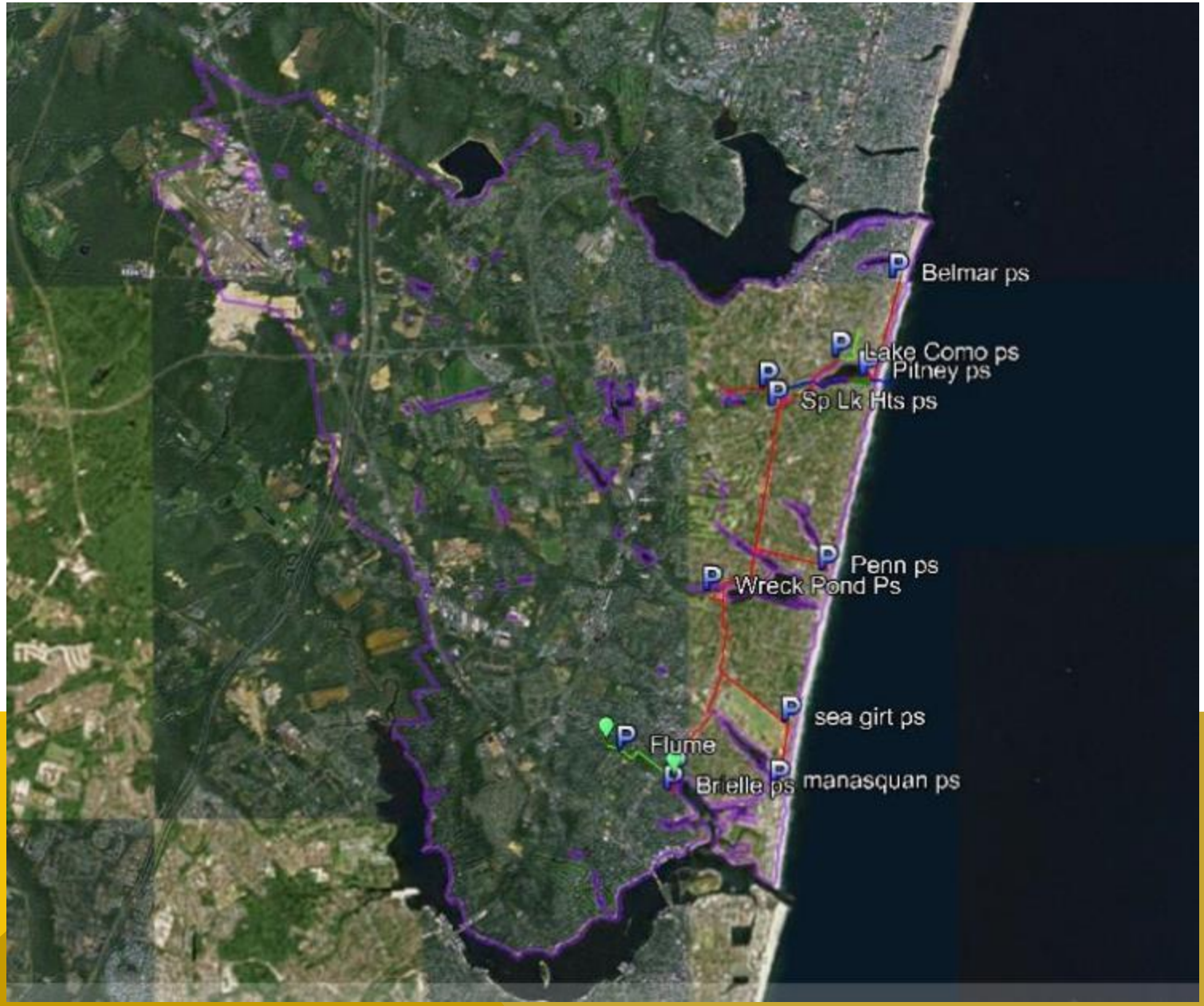
# OUTLINE

- **SMRSA Background**
- **I&I Investigation Process:**
  - Planning & Investigation
  - Groundwater Monitoring Wells
  - Manhole Inspections
  - Smoke Testing
  - Flow Monitoring
  - Clean & Televise
- **Repairs**
- **Results**

# SMRSA

- **9.1 MGD WWTP ( 1998 Avg 6.9 mgd, 2013 Avg 5.8 mgd )**
- **MEMBER COMMUNITIES (Primarily Coastal/Tidally Influenced Aging Collection Systems)**
  - Belmar
  - Lake Como
  - Wall Twsp. (portion of)
  - Spring Lake Heights
  - Spring Lake
  - Sea Girt
  - Manasquan
  - Brielle
- **11 REGIONAL SMRSA OWNED PUMP STATIONS AND COMMON FORCEMAIN HEADER***
- **26 SQ. MILE SERVICE AREA**

# SMRSA


Belmar ps
Lake Como ps
Pitney ps
Sp Lk Hts ps
Penn ps
Wreck Pond Ps
sea girt ps
Flume
Brielle ps
manasquan ps

# PLANNING & INVESTIGATION

- Established Goals
  - Reduce baseline flows (Infiltration).
  - Reduce peak flows (Inflow).
- Met with Member Communities
  - Established stakeholders.
  - Identified problem areas.
  - Identified areas previously upgraded.
- Data Collection Phase ( Maps, Maintenance Records, Interview stakeholders, etc.).
  - Field verified maps.
- Identified possible funding sources.
- Identified manpower (in house staff , consultants, contractors).

# GROUNDWATER MONITORING WELLS

- Goal was to establish existing groundwater levels relative to the depths of pipes in the corresponding collection system.
- Installed small diameter wells throughout project area.
- Recorded groundwater levels using water level meter*.
- Did not proceed with further investigation until we knew water levels were impacting pipes.

# MANHOLE INSPECTIONS

- Goal was to determine existing conditions of manholes throughout service area.
- Developed MH numbering scheme.
- Coordinated with Police (Traffic Control & Access).
- Physically inspected every manhole.
- Prepared a conditional assessment report (i.e. depth, material of construction, condition, est. infiltration rate, if debris present, low lying area, etc).
- Made recommendations on repairs depending on cost effectiveness, complexity and urgency.

# SMOKE TESTING

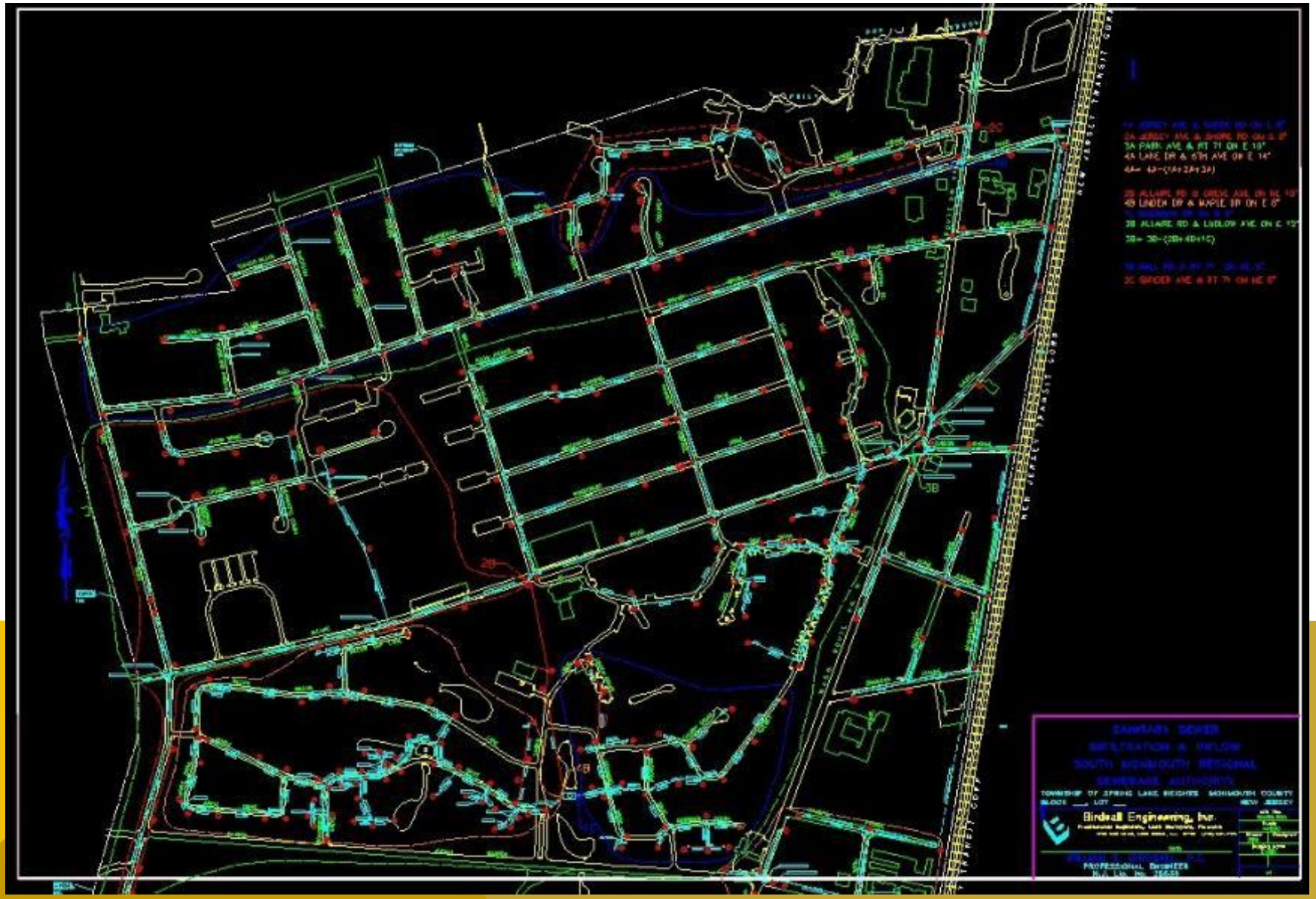
- Goal was to identify major sources of Inflow through cross and/or broken connections.
- Equipment (blower & smoke) and Manpower.**
- Coordinated with Police Traffic Control & Access & Fire Department, Newspaper, & Door Knockers.
- Prepared report of findings and turned over to member community to rectify problems and/or notify residents of violations.**
- Precipitated immediate repairs of major sources of inflow.

# SMOKE TESTING

# FLOW MONITORING

- Goal was to quantify flows and identify problem areas which warranted further investigation.
- Developed Mini Sewer SubSystems*.
- Calculated effective pipe dia. (weighted average).
- Coordination (Police Traffic Control & Access).
- Utilized Area Velocity(AV) Flow Meters*.
- Placed meters for approx. 1-2 weeks, longer if no rainfall event.
- Utilized Flowlink software to evaluate low flow periods(mostly residential communities so looked at 12-4am). Any flow during this period was determined to be extraneous.
- Benchmark for future investigation was 1500gpd/in.dia/mile
- Other considerations ( difficulty in measuring low flows, sump pumps, pump stations).

# FLOW MONITORING



# FLOW MONITORING

# CLEAN & TELEVISE

- Cleaned and Televised areas of concern based on smoke testing, and flow monitoring.
- Public Bid – items included cleaning/ LF, Grit Removal/Ton, TV Inspection/LF.**
- Reviewed video(s) and written inspection reports.
- Made recommendations for repairs based on cost effectiveness of repair (> .6 pint/min infiltration).
- Ex. Repairs ( grouting of joints, spot repair, CIP, remove and replace pipe segment).

# CLEAN & TELEVISE

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# REPAIR CONTRACT(S)

- Met with member communities in order to review recommendations and get buy in from stakeholders and define scope.
- Prepared plans/specifications for repairs/replacement
- Bid multiple construction contracts in order that they could be completed concurrently.
- Bid items ( ex. grouting per/gal, pipe replacement/L.F., Cured in Place Pipe/ L.F., etc.)**.

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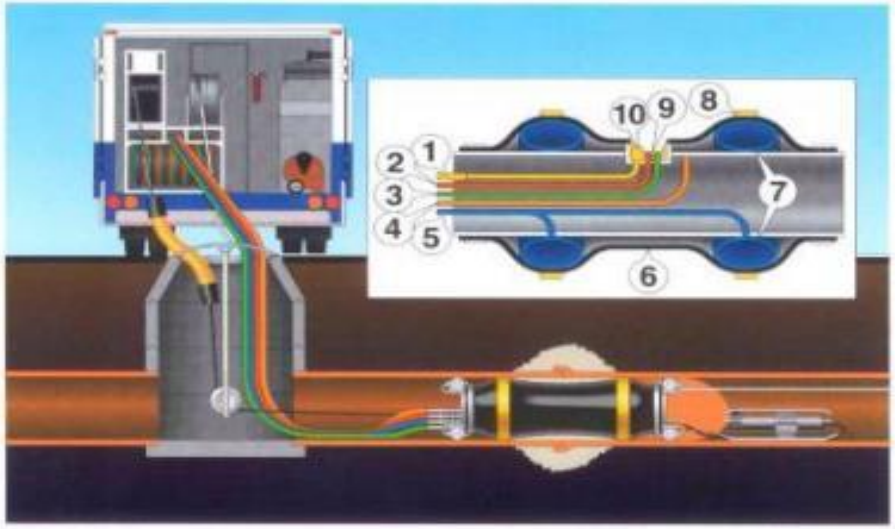
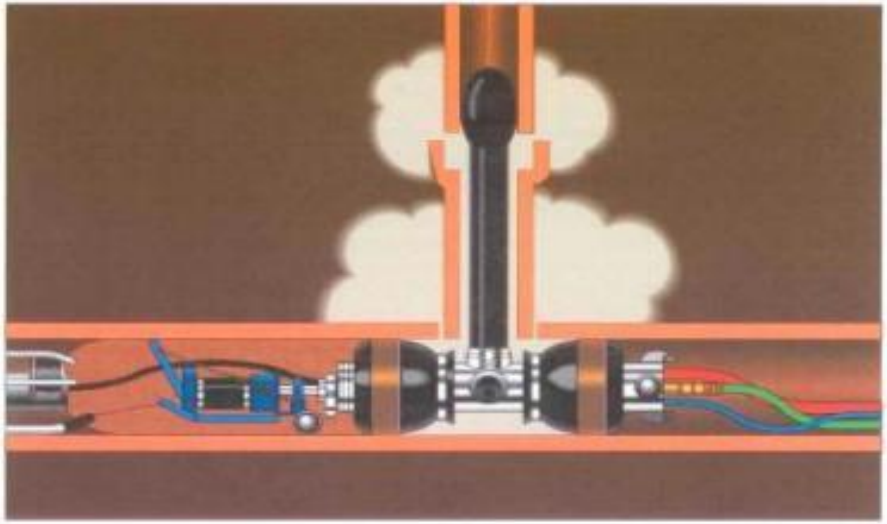



Modern injection packers are very sophisticated, consisting of; (1) Pressure Sensing Line, (2) Chemical "A" Line, (3) Chemical "B" and Air Pressure Line, (4) Sleeve Air Line, (5) End Seal Air Line, (6) Sleeve, (7) End Seal Elements, (8) Sealing Pads, (9) Chemical Injection Ports, (10) Pressure Sensor Element.



New injection packers can seal lateral connections and the first few feet of service lines with chemical grout quickly and cost-effectively.

# RESULTS-BENEFITS

- Total Project Cost $7 million. Funded thru NJDEP/NJEIT.
- Reduced baseline flows to WWTP by approximately 650,000 gpd. Cut instantaneous peaks dramatically.
- $700K +  annual savings in treatment costs
- Provided for additional capacity in both collection systems and WWTP.
- Provided member towns conditional assessment reports of their infrastructure. Extended life of their assets.
- This project success, acted as an incentive for member towns to make additional I&I repairs, due to flow proportioned rate structure.

# THANK YOU!
# Questions?

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