



INSTALLATION OF A COMPOSITE BONDED LINER FOR CORROSION PROTECTION AND REHABILITATION OF EBMUD 105” INTERCEPTOR SYSTEM

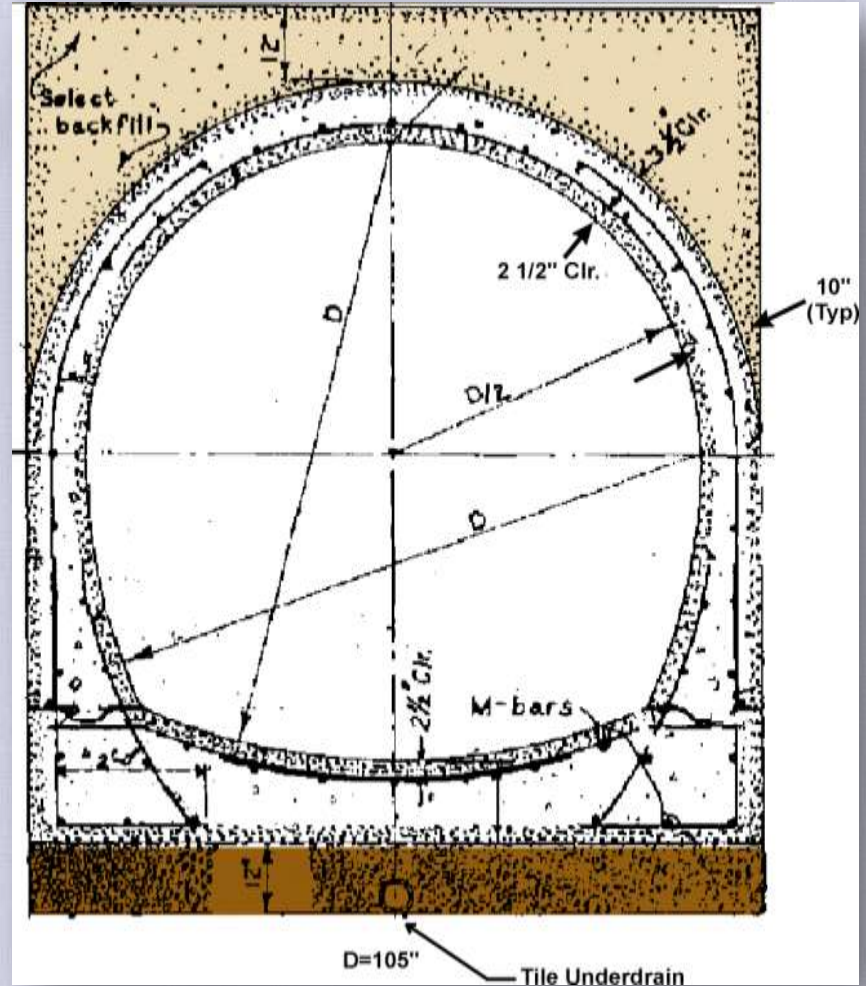
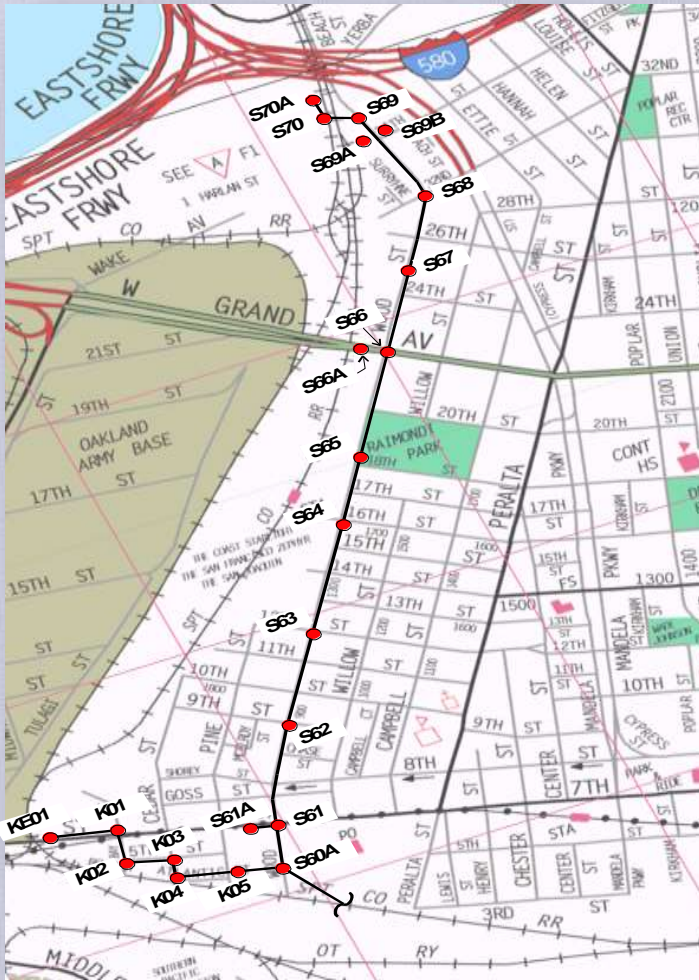
**TWENTY-FOURTH ANNUAL SHARING
TECHNOLOGIES SEMINAR**

PUG 2016

EBMUD COLLECTION SYSTEM



WOOD STREET INTERCEPTOR



INVESTIGATIONS AND PRIOR PROJECTS

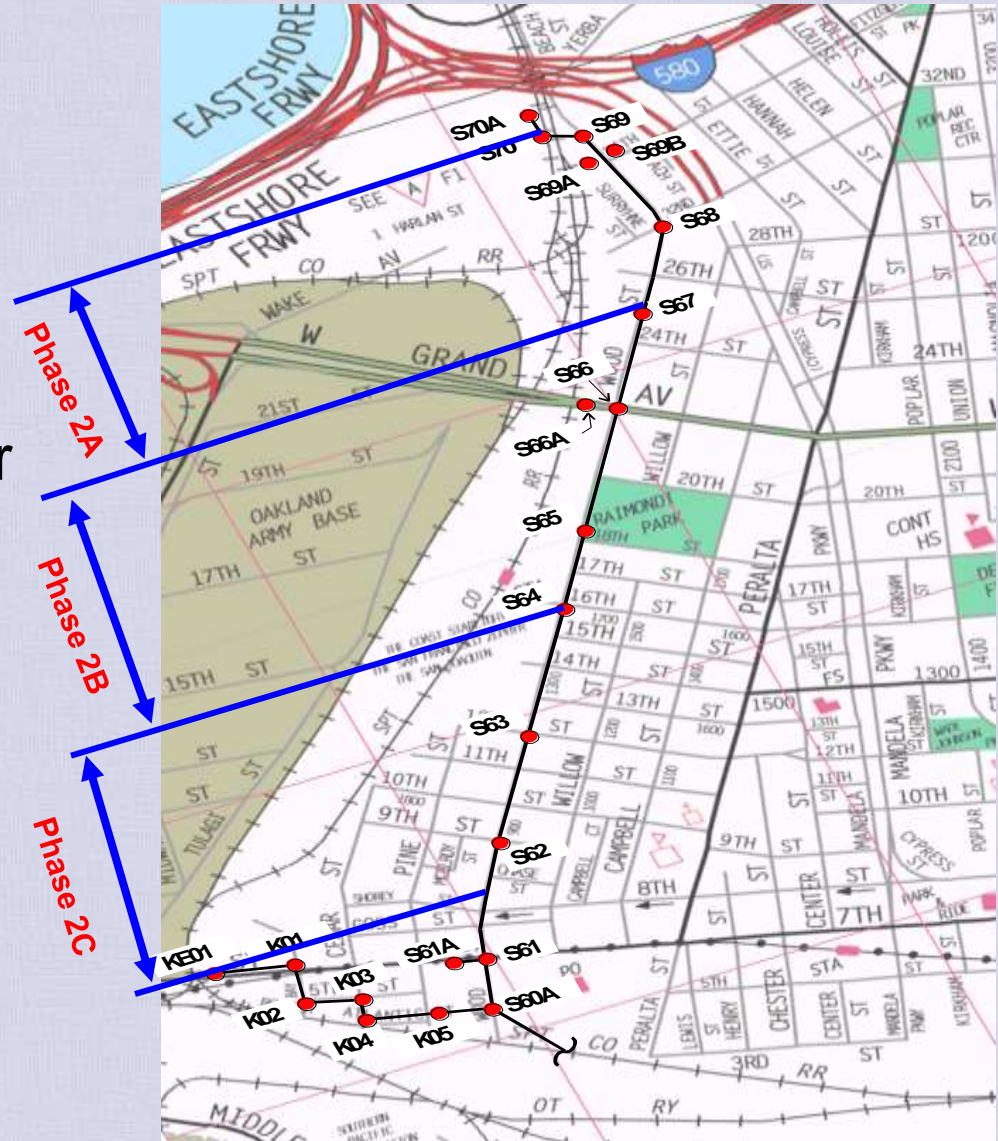
- Inspection after 1989 Loma Prieta earthquake reveals severe corrosion.
- 1st rehabilitation project in 1993 (350 lf).
- Interceptor Damage Assessment Project completed in 1997 by Brown and Caldwell.
- 2nd rehabilitation project in 2000 (2,300 lf).
- Asset Management Program (2008 - 2011) identifies 6,000 lft requiring rehabilitation.

INVESTIGATIONS: H₂S CORROSION

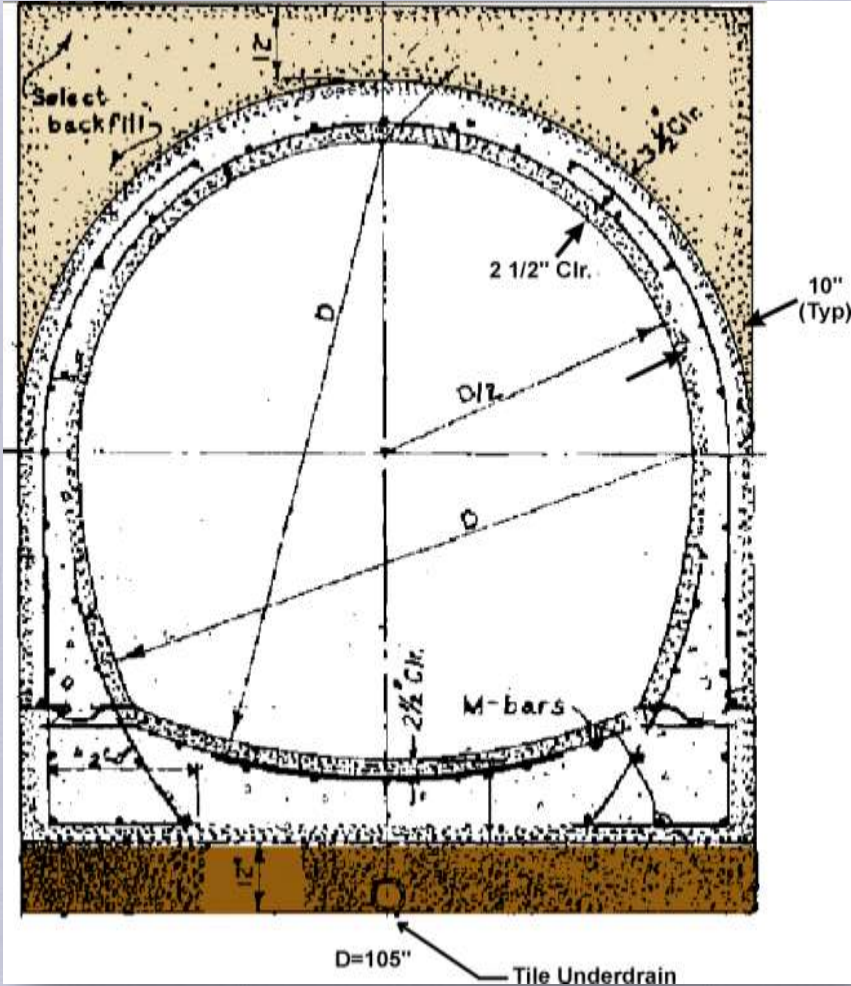


SD342 PROJECT

- 3rd Rehabilitation Project (2012-2015):
 - Phase 2A: Repair liner defects from 2000 project.
 - Phase 2B and 2C: lining 5,200 lf of pipe and 5 manholes.



WOOD STREET INTERCEPTOR



SD342 PROJECT: DESIGN GOALS

- Long-term corrosion protection (+ 50 years)
- Maintain hydraulic capacity
- Repair structural defects
- Minimize impact to treatment plant
- Minimize impact to community

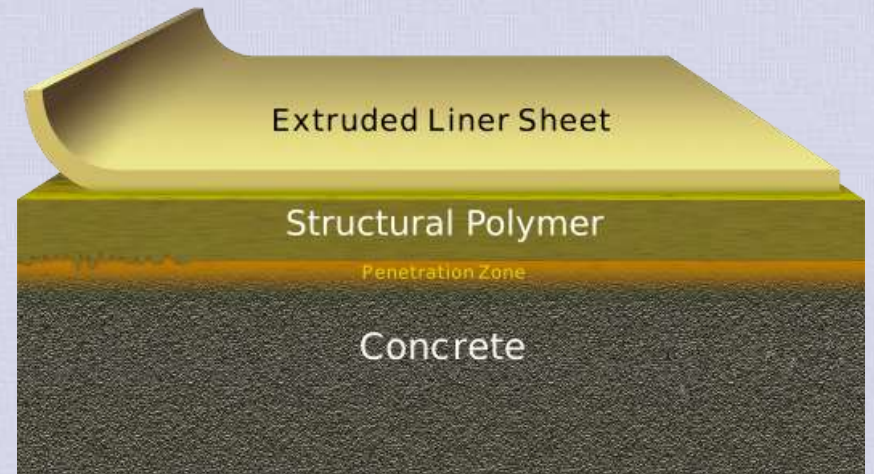
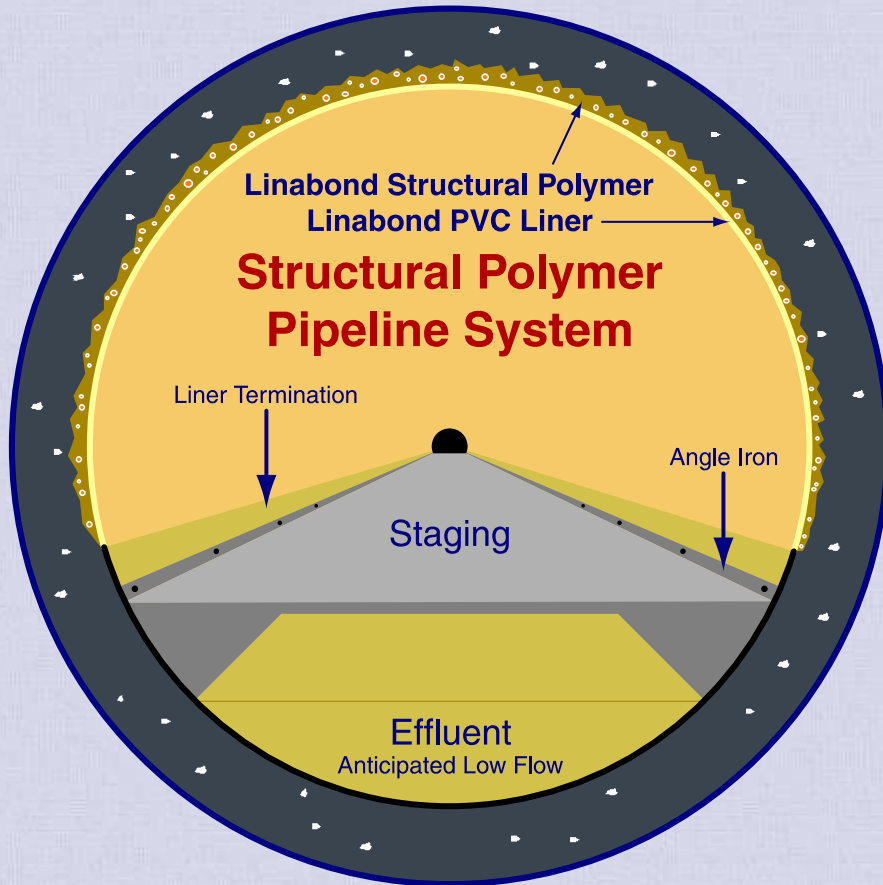
METHODS AND MATERIALS

- Sliplining
- Cured-in-Place Pipe
- Spiral Lining
- Plastic Lining
- Replacement

PLASTIC LINING METHODS

- Danby: semi-rigid partial ribbed liner grouted in place
- T-Hab: grouted in place ribbed liner with portable support forms
- Linabond Structural Polymer System: composite bonded liner.

STRUCTURAL POLYMER SYSTEM



CONSTRUCTION

- High Level of coordination with District
- 4 to 5 hr window
- Work on platform w/ active flows
- Safety
- Ventilation

SEQUENCE OF WORK

- Hydro-blasting
- Structural Repair with Mortar / Rebar
- Structural Polymer Application
- Installation of PVC Liner
- Form Removal
- Seams and Terminations
- Inspection/Repair/Test

HYDROBLASTING



CROWN REPAIR



PRESSURE WASHING



STRUCTURAL POLYMER APPLICATION



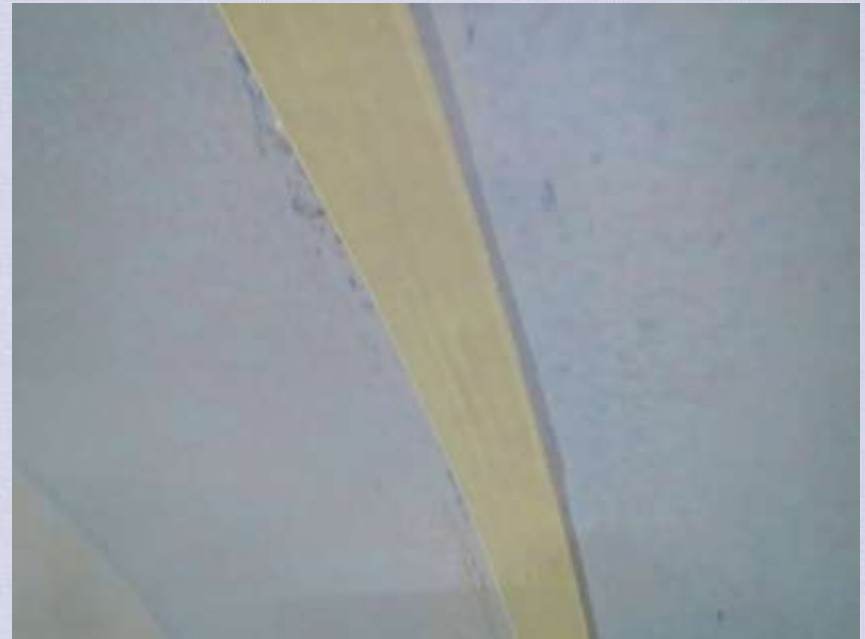
PVC SHEET INSTALLATION



TEMPORARY SUPPORTS



SEAM AND TERMINATION BEADS



COMPLETED PIPE



LINING SYSTEM INSTALLATION VIDEO



LESSONS LEARNED

- Extent of corrosion difficult to determine with CCTV alone
- Rehabilitate before extensive structural repairs are required
- Design must address:
 - impacts on residents from noise, odors, and traffic,
 - coordination with treatment plant operations
- Consult with manufacturers for latest materials and procedures

LESSONS LEARNED

- Constant and thorough inspection and testing is required for rehabilitation projects
- Rehabilitated sewers should be inspected and monitored periodically to identify and repair problems before major reconstruction is required.
- Because of high level of coordination with District, Contractor and Manufacturer, it developed into a very safe work environment.