PACIFIC NORTHWEST CLEAN WATER ASSOCIATION
2010 CONFERENCE
October 24-27, 2010

Miles Crossing Vacuum Sewer System Project

MILES CROSSING SANITARY SEWER DISTRICT

MSA Murray, Smith & Associates, Inc. Engineers/Planners — CELEBRATING 30 YEARS SERVING THE PACIFIC NORTHWEST

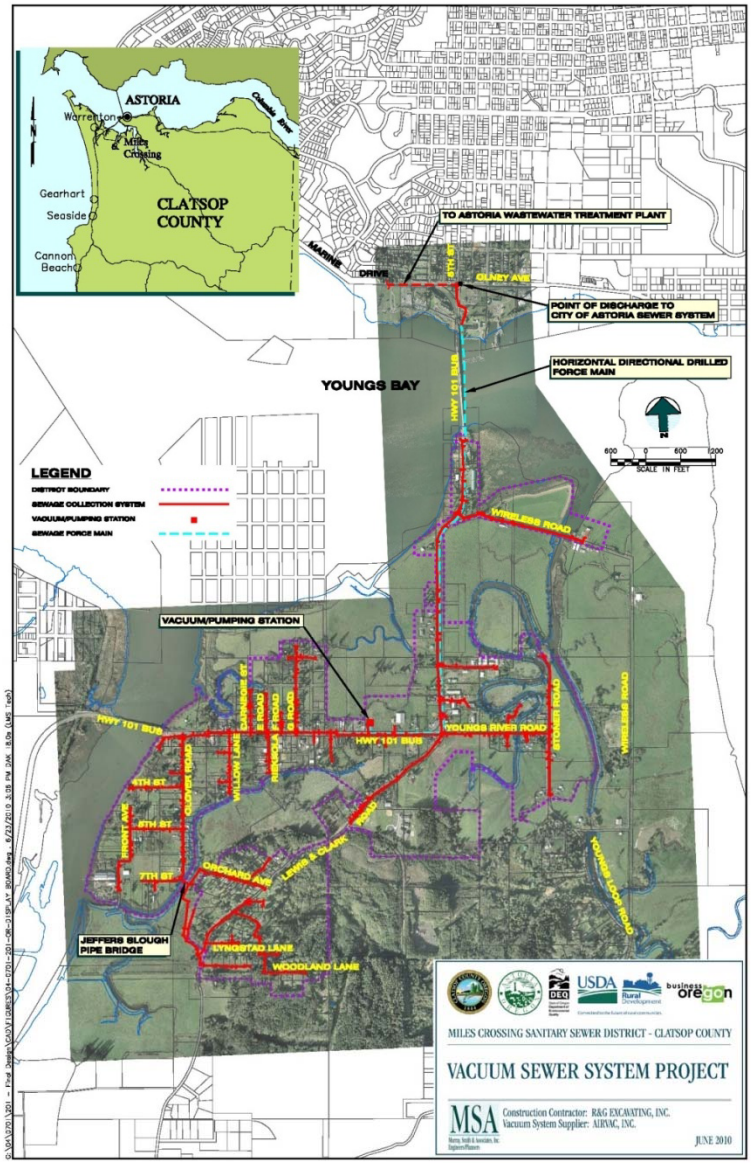
Presented by:
Phil Smith, P.E., Founding Principal
Murray, Smith & Associates, Inc.

Presentation Overview

- Background
- Vacuum Sewer Systems
- Vacuum System Manufacturer - Supplier Selection Process
- Project Details
- Project Challenges
- Summary

Background

- Miles Crossing community
  - Unincorporated
  - Population approx. 900
  - Mixed development
  - Residential, commercial
  - Industrial
  - Elementary school



Background (cont.)

- Individual on-site septic tank/drainfield systems
- High groundwater/high system failure rate
- Undertreated/untreated sewage discharges
- Historical environmental degradation and public health hazards

Background (cont.)

- District formed in 1999 by Clatsop County Board of Commissioners
- Purpose to implement a public wastewater collection, treatment and disposal system
- Development restrictions imposed by County due to on-site disposal system failures
- Some development subsequently allowed with use of “Blue Rooms”

Background (cont.)

- District obtained funding and completed facility planning
- Alternative sewage collection methods evaluated
- Vacuum sewer technology recommended
- Treatment and disposal alternatives evaluated
- Discharge to City of Astoria system selected
- DEQ approved facility plan

Background (cont.)

- District and City signed IGA for sewage treatment and disposal
- District obtained funding for design and construction
- Business Oregon (Oregon Economic & Community Development Department) funded project design (Clatsop County managed)
- USDA Rural Development funded construction (grant and loan)

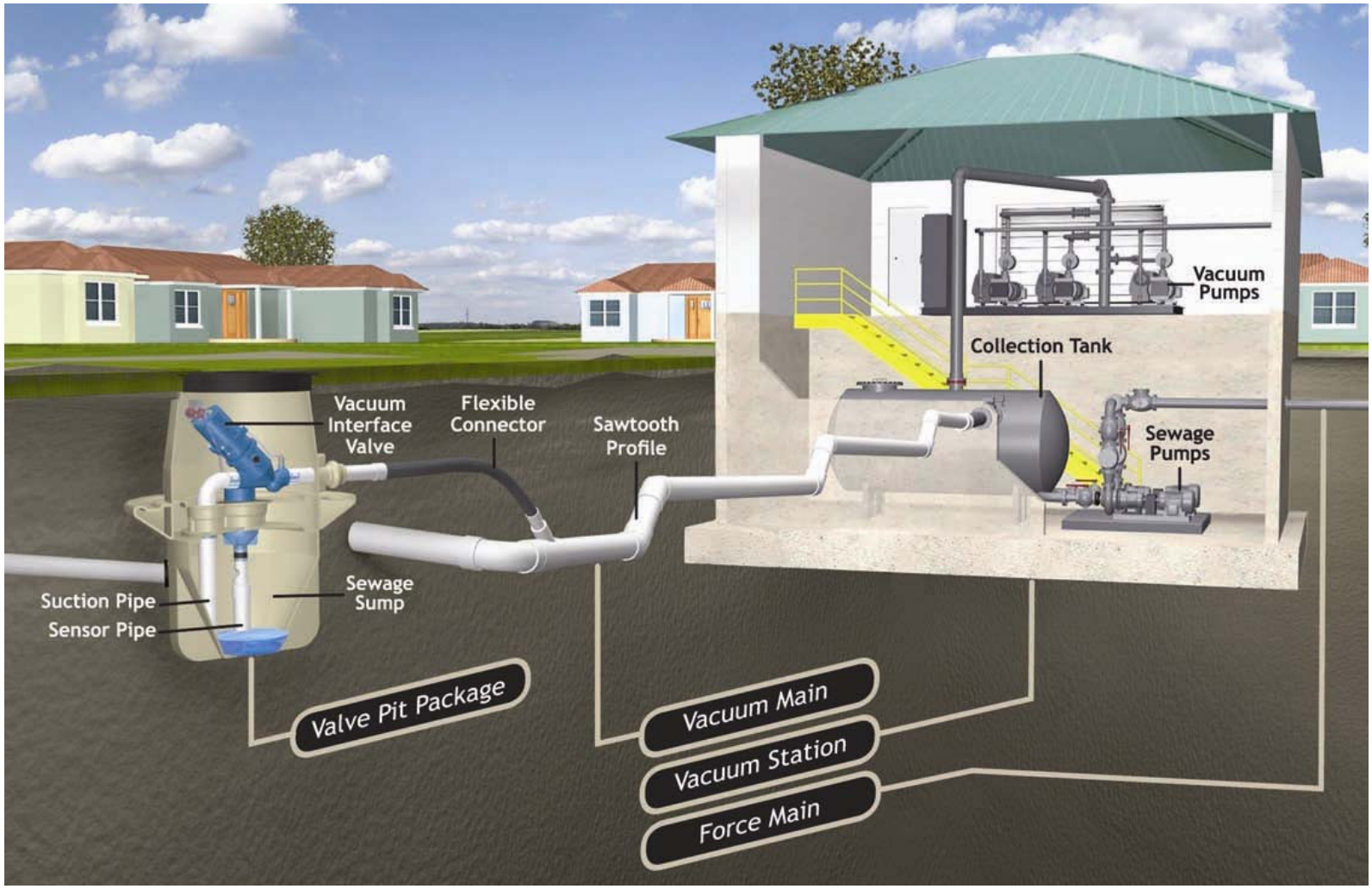
USDA Rural Development

Committed to the future of rural communities.

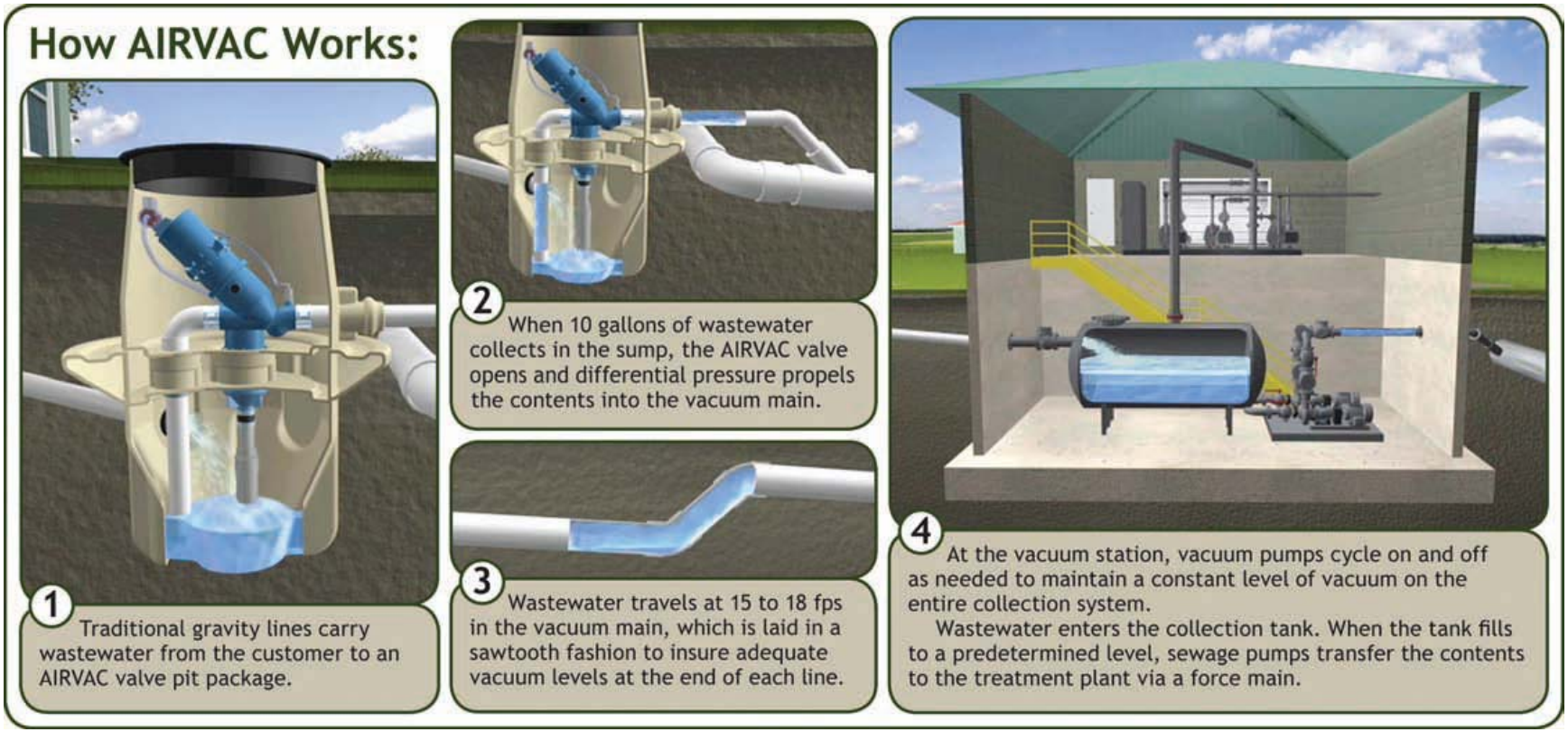
Vacuum Sewer Systems

- Use the differential pressure between atmospheric and a partial vacuum in the piping network and vacuum station collection vessel to transport and collect sewage
- Vacuum sewers first installed in Europe in 1882
- Basic elements
  - Vacuum valve pit
  - Vacuum sewer mains
  - Vacuum station

Vacuum Sewer System Schematic



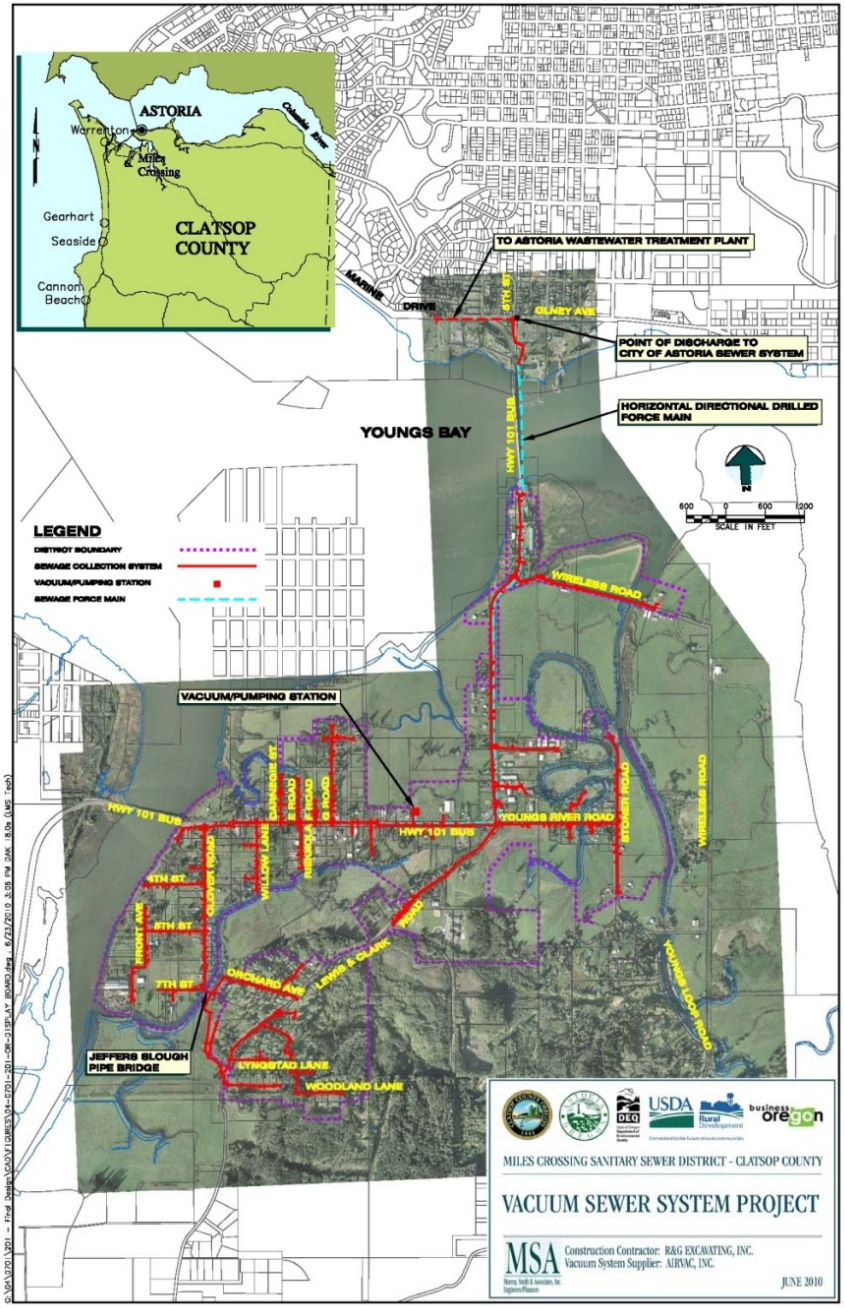
Vacuum Sewer System Operation



Vacuum System Manufacturer – Supplier Selection Process

- Early in design
- Process approved by USDA – RD
- AIRVAC, Inc. selected
- AIRVAC equipment incorporated into project design
- Vacuum valve pits, buffer tanks, vacuum tank, vacuum pumps, sewage pumps, and vacuum station control system

Project Details



Basic Project Data

- Service Area Characteristics

- Service Area: 642 acres
- Current Population: 900
- Design Population (20 years): 1,130
- Current Average Daily Flow: 31,000 GPD (approx. 35 GPCD)

- Vacuum Station

- Vacuum Tank: 3,400 gallons
- Operating Range: 16”-20” Hg (18.1’-22.6’) vacuum
- Vacuum Pumps: 4 @ 455 CFM; 25 HP each, 1 future
- Sewage Pumps: 2 @ 520 GPM @ 183’ TDH - 75 HP
- Backup Power: 300 kW; diesel

Basic Project Data (cont.)

- Force Main

- Force Main: 8” diameter - 9,250’ long
- 2,000’ under Youngs Bay - HDD
- Odor Control: Calcium nitrate

- Raw Sewage Storage Tank at Vacuum Station

- Total Volume: 105,000 gallons
- Operating Volume: 72,000 gallons

- Sewage Collection System

- 4”-10” vacuum mains - 40,000’
- 3” vacuum service laterals – 13,000’
- 315 vacuum pits
- 4” gravity sewers – structures to vac. pits – 28,000’

- Construction Cost

- $8.3 million

Central Vacuum Station

Youngs Bay Crossing

- Parallel and immediately east of Youngs Bay Bridge
- Horizontal directional drill – 2,000’ long
- 8” HDPE force main

Jeffers Slough Crossing

- 125’ slough wide slough
- Over-water crossing needed to conserve available vacuum
- Pipe bridge to support 10” vacuum main

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Private Service Work

- Complete new service connections
- Existing foundations to new vacuum pits
- Easement and access agreements
- Documentation of existing conditions
- Coordination with property owners
- Detailed site mapping for attachment
  to easements
- Property owner releases

Astoria IGA

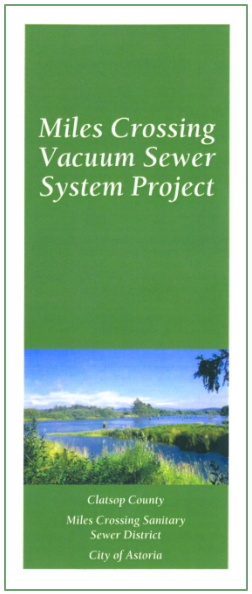
- Anticipated additional District flow to City system triggered CSO concerns
- Extended negotiations with City and DEQ regarding potential for overflows to Youngs Bay with additional District flow
- Final resolution – amended IGA
- Requirement for raw sewage storage at District's vacuum station

Coordination with ODOT/County

- ODOT/Clatsop County Public Works coordination
- Project trench patching funds transferred to County
- Partially funded full-width County road restoration/ upgrading in District
- Achieved best value for District and County
- Close coordination with Highway 101 Business upgrading by ODOT

Public Relations

- Long history of community involvement
- Design
  - Public meetings & open houses
  - Project brochure – meetings & mailing
  - Direct property owner contact
- Construction
  - Periodic contacts with property owners – District, engineer & contractor



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Summary

- 100% of structures connected to new system
- Discharge of undertreated/untreated sewage eliminated
- Decades of environmental degradation and public health hazards eliminated
- Need for interim disposal measures (Blue Rooms) eliminated

Summary

- Impediment to community economic growth removed
- Substantial current building activity and planning for development within District

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