

Columbia River Pipeline Trestle Design

Group 14 – TRED Engineering



**University of
New Hampshire**

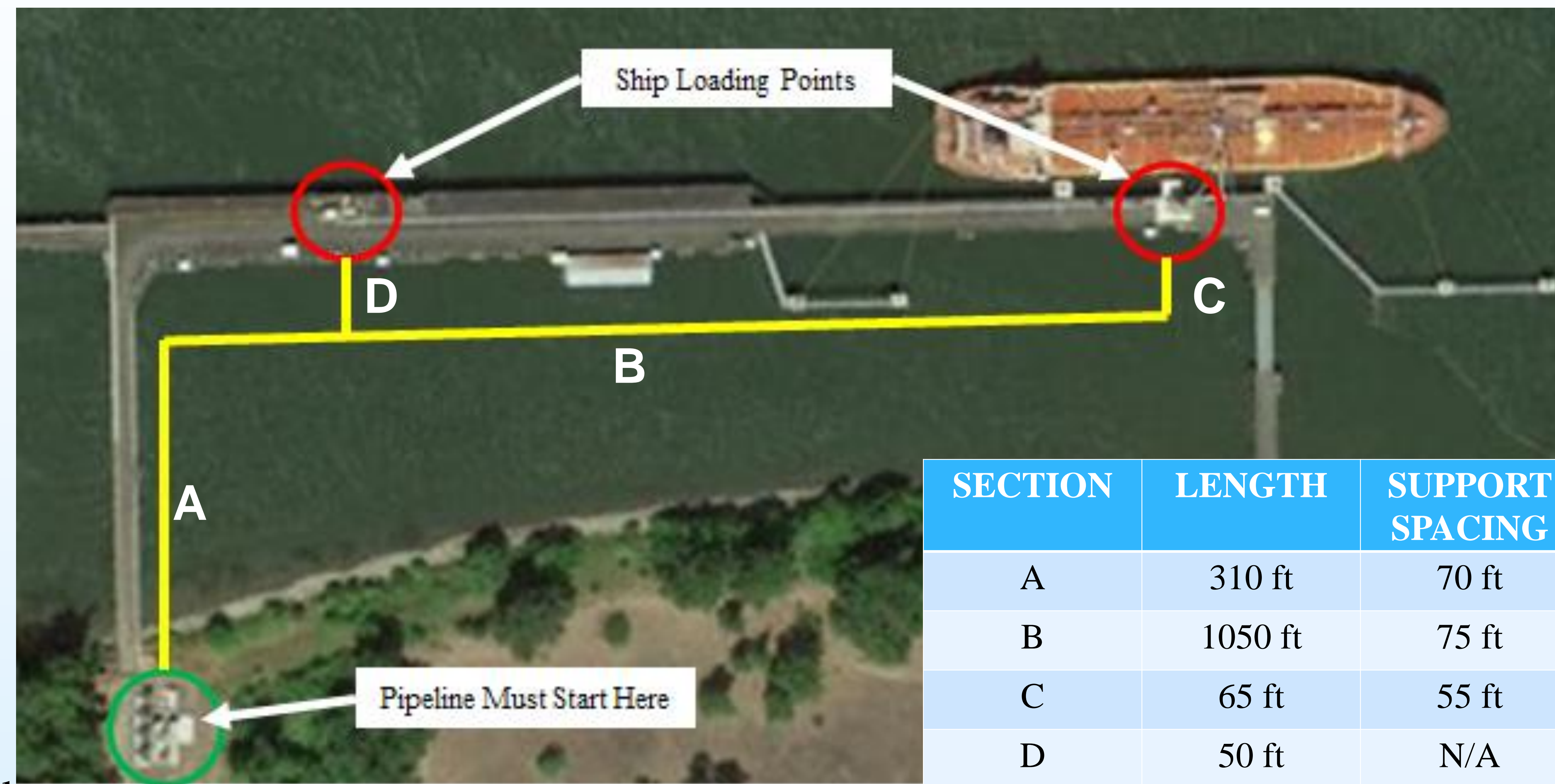
College of Engineering
and Physical Sciences

Tyler Gleason, Dan Martineau, Elanor Price, Robert Moon
Faculty Advisor: Dr. Robert Henry, Project Sponsor: Zack Jenkins, Collins Engineers
Department of Civil and Environmental Engineering, University of New Hampshire

Scope

- Develop a conceptual design for a new pipeline trestle
- Develop design loads using pseudo structural analysis
- Investigation into the effect of seismic activity on the foundation design
- Feasibility analysis of the design using anticipated loading, seismic impacts, and cost estimation

Trestle Configuration



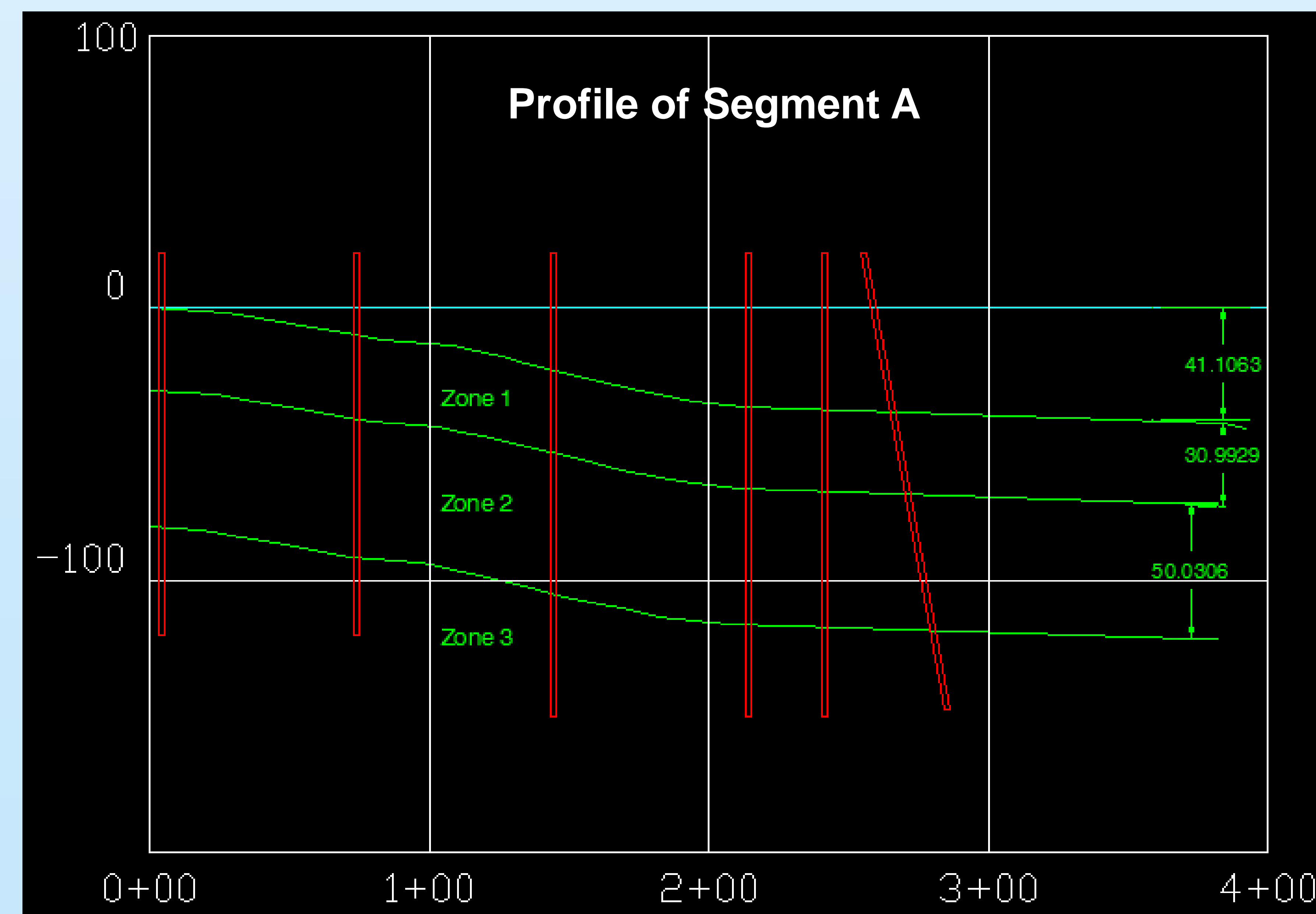
Existing Conditions

- Located in Clatskanie, Oregon on the Columbia River
- Two access trestles and a main dock
- Currently used for the distribution of ethanol
- Recent upgrades to pier: docking for larger vessels, two loading stations
- Region known for seismic activity

Loading Cases

- Loads vary throughout cross section, 5 loading point groups, worst cases for each found
- Fixed supports supporting 3 perpendicular directions
- Roller supports allow for thermal expansion in longitudinal direction
- 7 load cases in ASCE 7-10
- 2 load cases for seismic events in ASCE 61-14
- Pipe content considered as dead load or live load in seismic events

Foundation Profile



Foundation Design

- Deep foundation piles
 - 24-inch diameter, open-ended steel pipe piles
 - 120 to 170 feet long
 - Piles driven into non-liquefiable soil zone
 - Bearing piles designed for CLE hazard level
- Soil Conditions
 - Soils on site potentially liquefiable
 - On site there are 3 different soil zones
 - Potential for seismic settlement and lateral spreading

