

23. Description of Avoidance, Minimization and Compensation

Project Alternatives:

Alternative 1 - No Action

Shell does not relocate the pipeline. There are no impacts to wetlands or open water.

Funding has been approved for the project to deepen the Neches River to 48'. The existing Houston – Houma 22" Pipeline crossing the river will have to be relocated to accommodate the deepening. "No action" is not an option. Additionally, Shell would like to eliminate the span in Bird Island Bayou and provide needed cover for the pipeline in the area between Neches River and the Bridge City Valve Site.

Alternative 2 – Lower Pipeline in same ROW

The pipeline would be lowered in the same ROW. This alternative will eliminate the need for new ROW. Temporary wetlands impacts are less than the preferred alternative; however, safety, constructability and economic issues make this alternative impractical.

There are several obstacles that prevent this alternative from being a viable solution.

- i. Broadwalk's 16" Ethylene Pipeline is 12' north and the 18" Sabine Pipeline is 12' south of the HO HO. Shell's pipeline was installed in 1952 and has girth welds. Girth welds are sensitive to external stresses.
 - ii. Jetting under the existing pipeline exposes the welds to harmful stresses. Shell's policy is to sleeve the vintage girth welds when the pipeline is excavated. The girth welds are every 40'. The weld encasements would require excavation wide enough for workers to install the sleeve or the pipeline will need to be lifted aboveground. There is not enough room to safely excavate the pipeline, or lift it, to install sleeves to encase the vintage girth welds. Leaving the vintage welds unprotected after the stress of lowering is not an accepted risk.
- ii. There are foreign pipelines crossing 2' below the pipeline that prevent lowering.
- iii. The existing HO HO pipeline is in the middle of 7 to 9 foreign pipelines east of Bird Island Bayou. We assume the other pipelines along the replacement route also have inadequate cover or are exposed. The foreign pipeline owners are not likely to allow Shell to work over their pipelines or cross the pipelines with heavy equipment.
- iv. The pipeline will have to be operated at a reduced pressure or shut down while being lowered, causing an economic hardship on the owner and

customers of the pipeline. While economic issues are minor compared to safety, they are still a consideration.

Alternative 3 – Replacement Pipeline in new ROW (Preferred Alternative)

Moving to a new right of way, adjacent to, and paralleling existing pipelines is the safest and best solution for accommodating the river deepening project and eliminating the suspended pipeline and lack of cover in the Bessie Heights area. The project will temporarily impact 52 acres; however, there will not be any permanent loss of wetlands and all areas will be returned to their pre-construction elevations. A threatened and endangered species survey by consultants concluded the project is unlikely to have adverse effects on threatened or endangered species. The project will be submitted to USFWS for further review. Appropriate erosion and sediment control measures will be implemented to protect adjacent wetlands and water bodies.

Minimization:

Most of the impacts, 77%, will occur in open water. To minimize wetlands impacts, temporary mats will be installed along the access routes and the workspaces at the tie-in locations. All material staging and pipe preparations will take place on the matted workspaces.

All erosion and sediment control measures will be properly installed and maintained with good engineering practices.

Excavated areas will be returned to their pre-construction contours as soon as practicable.

Land disturbing activities will be limited to areas immediately needed for construction. Existing vegetation outside of the construction workspaces will not be disturbed.

Compensation:

Shell will purchase mitigation credits from an approved mitigation bank to compensate for unavoidable losses.