

Exhibit B-2: Pipeline Design Standards – see note 7

Hazard Zone	Material/Requirements	Notes
<p>1. Liquefaction Very High/High.</p> <p>High probability (80% of instances) of significant lateral spreading.</p>	<p>Ductile iron with mechanical restrained joints; Provide expansion sleeves to allow 1.0 percent expansion over the length of the pipe; Polyethylene wrap.</p>	<p>Note 1 Note 2</p>
<p>2. Liquefaction Moderate/Low.</p> <p>Low probability (< 20%) of liquefaction occurrences. Significant settlement expected.</p>	<p>Ductile iron with mechanical restrained joints. Polyethylene wrap.</p>	
<p>3. Fault Crossing Zone.</p> <p>Surface fault rupture expected. Significant lurching expected.</p>	<p>Ductile iron with mechanical restrained joints; Provide expansion sleeves to allow expected expansion; Polyethylene wrap.</p>	<p>Note 3 Note 4 Note 5</p>
<p>4. Landslide/SF3-SF4 Zones.</p> <p>Catastrophic geotechnical failure expected. Significant lurching expected</p>	<p>Ductile iron with mechanical restrained joints; Polyethylene wrap.</p>	<p>Note 4</p>
<p>5. Liquefaction Very Low.</p> <p>Some settlement expected. Some lurching expected.</p>	<p>Ductile iron with wedges-embedded-in-gasket, restrained joints. PVC with bell & spigot joints</p>	<p>Note 6</p>

Notes:

1. Install pipe joints/expansion sleeves to accommodate displacement (compression or tension). Install them fully extended or compressed, as required, to accommodate displacement in the direction expected.
2. Minimize anchor points and connections, including connections to the distribution system. Anchor points include bends 22.5 degrees and greater, and all connections, tees, crosses, valves, or other appurtenances that would limit the movement of the pipe through the soil. Where anchor points are required, design the pipe to be flexible to accommodate the expected deformation without yielding the pipe. Flexible design can include provision of two restrained flexible joints, in series, on each branch connection with a short connecting leg to allow longitudinal movement of the main pipeline. The joint harness should include 2 bolts, top and bottom, to allow bending of the joint. Where extension of compression movements are expected at anchors, provide extension and/or compression sleeves in the pipe with joint restraint systems that will allow extension but will keep the joint from pulling out.
3. Design in accordance with ASCE *Guidelines for Seismic Design of Oil and Gas Pipelines*

4. Provide isolation valves on both sides of fault crossing or landslide zone, with connection points to connect temporary pipe/hose to bypass the failed pipe.
5. Align pipe perpendicular to fault crossing to the extent possible to keep it in tension when the fault moves.
6. Install the joint so the spigot end is pushed into the bell, keeping the line painted on the spigot end (used to show proper insertion depth) visible. Do not push the spigot end “home”, making contact with the back end of the bell.
- 7. Designer shall perform field test to verify hazard zone categories.**