

## 4.13 Major Culvert Construction

Ensure that major culvert installations receive compaction to obtain adequate structural integrity of the installation because culverts are generally soil-steel structures. The culvert itself will not support the design load without the soil-steel interaction. In order for the soil to work with the steel to support the design load, the culvert is adequately “bedded” and the soil appropriately compacted to be “structural.” The flexible steel is designed to distribute loads to the bedding and backfill surrounding it. Soil is most compactable when it is composed of select granular, free-draining material. Ensure that the backfill conforms to a specified size gradation.

Typical backfill compaction is the minimum Standard Proctor Density of 95%. To achieve that level of compaction, use hand tools to work smaller areas (between corrugations); mechanical compactors such as plate and jumping jack tampers; or rollers and vibrating compactor equipment.

Typical construction practices include the following:

- Provide adequate bedding before culverts are installed and backfilled. Where subgrade material is unsuitable, remove it and replace it with select granular, free-draining material compacted to support the culvert.
- Place and compact backfill in uniform layers, about 150–300 mm thick (compaction equipment and layer thickness as specified by the designer) of select granular, free-draining material on each side of the culvert in a balanced and progressive manner, to avoid potential distortion or displacement of the culvert.
- Remove cobbles and boulders from the backfill, particularly where they could contact the culvert. Use hand tools to compact the material immediately adjacent to the culvert within the corrugations. Fully compact each layer before the next layer is placed on top.
- Monitor compaction and complete compaction testing as specified by the designer.
- Avoid over-compaction of the backfill to prevent distorting the culvert. Continue backfill and compaction above the culvert, as specified in the design. Establish minimum culvert cover before any equipment loads are applied.