 Figure 1

Table 2 Standard Installations Soils and Minimum Compaction Requirements

SPIDA was programmed with the Standard Installations and many design runs were made. An evaluation of the output of the designs by Dr. Frank J. Heger produced a load pressure diagram significantly different than proposed by previous theories. See Figure 2. This difference is particularly significant under the pipe in the lower haunch area and is due in part to the assumption of the existence of partial voids adjacent to the pipe wall in this area. SIDD uses this pressure data to determine moments, thrusts, and shears in the pipe wall, and then uses the ACPA limit states design method to determine the required reinforcement areas to handle the pipe wall stresses. Using this method, each criteria that may limit or govern the design is considered separately in the evaluation of overall design requirements. SIDD, which

pipe so that the pipe may settle slightly into the bedding and achieve improved load distribution. Compactive efforts in the middle-third of the bedding with mechanical compactors is undesirable, and could produce a hard flat surface, which would result in highly concentrated stresses in the pipe invert similar to those experienced in

Figure 3 Three-Edge Bearing Test

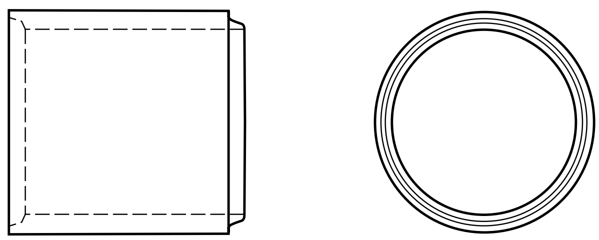
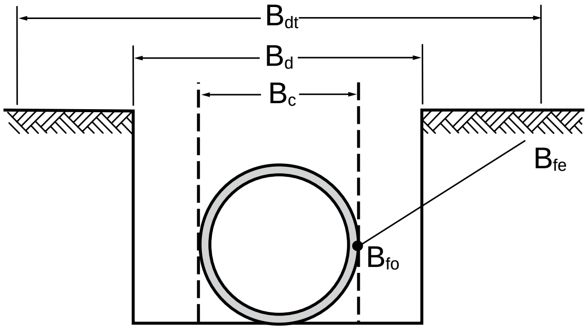


Figure 4 Variable Bedding Factor



the Design Manual[7], experience indicates that active lateral pressure increases as trench width increases to the transition width, provided the sidefill is compacted. A SIDD parameter study of the Standard Installations indicates the bedding factors are constant for all pipe diameters under conditions of zero lateral pressure on the pipe. These bedding factors exist at the interface of the pipewall and the soil and are cer st[7 7sicx1067 6I4n67 6I4m un1x10 0 m2beddcx1067l.5(l]TJ0.077 Tw 0 -1.3 TD[(q 1 0 0 1 .im4

based on -load at 0.01-inch crack and/or ultimate load as shown below in Table 7. The 0.01-inch crack -load ($D_{0.01}$) is the maximum three-edge-bearing test load supported by a concrete pipe before a crack occurs having a width of 0.01 inch measured at close intervals, throughout a length of at least 1 foot. The ultimate -load (D_{ult}) is the maximum three-edge-bearing test load supported by a pipe divided by the pipe's inside diameter. -loads are expressed in pounds per linear foot per foot of inside diameter.

ASTM Standard C 655 for reinforced concrete -load culvert, storm drain and sewer pipe covers acceptance of pipe designed to meet specific