Ground and Invert Elevations

The ground elevation of a junction is the elevation at which the assumption of pressure flow is no longer valid. Normally, this is the street or ground elevation; however, if the manholes are bolted down, the ground elevation should be set sufficiently high so that the simulated water surface elevation does not exceed it. When the hydraulic head must exceed the ground elevation to maintain continuity at the junction, the program allows the excess junction inflow to "overflow onto the ground" and become lost from the system for the remainder of the simulation period (but the "lost" water is included in the final continuity check).

If an open channel (trapezoidal or irregular cross section) is connected to a junction, EXTRAN will compute the ground elevation (GRELEV). The elevation where surface flooding occurs is set at the elevation where the HGL exceeds the defined cross section. It is important that cross-sections are defined to be large enough to convey the peak flow.

Nodal flooding of open-channel systems should only be allowed if the HGL elevation cannot significantly rise above a certain elevation. Occasionally it is necessary to perform routing on the water that surcharges onto the ground. In this case, the ground surface (e.g., a street and gutter system) must be simulated as a conduit in order to route the flows and maintain continuity. In addition, manholes must be simulated as vertical pipes in order to transport water to and from the surface channel. Since an infinite slope (vertical) is not permitted, equivalent pipes are used for the manholes. With this arrangement, water may surcharge (move vertically out of a "manhole-pipe) and return to the sewer system at a downstream location through another "manhole-pipe." Inflow constrictions by inlets etc. can be simulated as orifices if their hydraulic characteristics are known. With this extra effort, dual "major" (street surface) and "minor" (subsurface sewer network) drainage systems can be simulated.