| Model Input Parameter | Description of Parameter | Mound Height | Mound Extent | Effect on Groundwater Mounding |
| --- | --- | --- | --- | --- |
| Horizontal Hydraulic Conductivity of Aquifer  | Measure of resistance to flow of water through a unit volume of aquifer matrix in the horizontal direction.* [Table 12 of USGS Paper 1839-D](http://pubs.usgs.gov/wsp/1839d/report.pdf) provides a summary of mean horizontal permeability by predominant particle size.
* Typically assumed to be greater than vertical hydraulic conductivity by a 10:1 ratio.
 | Decreases as hydraulic conductivity increases | Increase as hydraulic conductivity increases | Increasing horizontal hydraulic conductivity allows for greater ability to transmit water away from the source of infiltration. This allows for lower height of groundwater mounding, but greater extents.  |
| Initial Saturated Thickness of Aquifer | Thickness of the [aquifer](http://stormwater.pca.state.mn.us/index.php/Glossary), or permeable layer that can contain or transmit groundwater, within the saturated zone measured from the seasonal high water table to the bottom of the aquifer. * Specific Minnesota aquifer information can be found on the [MDNR groundwater provinces web page](http://dnr.state.mn.us/groundwater/provinces/index.html).
 | Decreases with greater thickness | Increases with greater thickness | Increasing aquifer thickness allows for a larger area to transmit water to and from the source of infiltration. This allows for lower height of groundwater mounding but greater extents as water moves away from the source. |
| Specific Yield | Governs the amount of water the unsaturated zone of an aquifer can store once recharge reaches the water table.* Specific Yield = Volume of water released from media storage by gravity per total volume of aquifer (%).
* [Table 29 of USGS Water Supply Paper 1662-D](http://pubs.usgs.gov/wsp/1662d/report.pdf) provides a compilation of Specific Yields for various materials.
 | Increases with lower values | Increases with lower values | Groundwater mound height and extent are lower when specific yield is higher because the aquifer can store more water per unit volume of aquifer. |
| Infiltration Basin Shape | * Shape can vary from square, rectangle, round or elongate. Extents of the basin will vary by depth and drawdown time of the basin per [Infiltration Basin Design Criteria](http://stormwater.pca.state.mn.us/index.php/Design_criteria_for_Infiltration_basin).
 | Decreases for rectangular installations | Increases for rectangular basin | Long narrow basins are much more efficient at infiltrating water than circular or square ones. High perimeter to area ratio basins have more efficient hydraulic sections because flow is radially away from the basin or recharge area once the mound height reaches the basin bottom. |
| Infiltration Basin Depth | The maximum depth of ponded water within the infiltration basin. * This is determined by size of the basin, infiltration rate of soils, and required drawdown time per [Infiltration Basin Design Criteria](http://stormwater.pca.state.mn.us/index.php/Design_criteria_for_Infiltration_basin). Maximum of 3 feet allowed.
 | Increases with greater depth | Increases with greater depths | Greater basin depths allow for increased groundwater mounding height and extent. |
| Design Storm | The design storm dictates the rainfall event intensity, duration, and statistical recurrence interval the infiltration basin is designed to manage.* Determined by MPCA [unified sizing criteria](http://stormwater.pca.state.mn.us/index.php/Overview_of_unified_stormwater_sizing_criteria)
* To meet MPCA Permit, required treatment volume is the [water quality volume](http://stormwater.pca.state.mn.us/index.php/Glossary#W)
 | Increases with larger design storms | Increases with larger design storms | Larger design storms result in increased amounts of runoff and larger volume of water to be infiltrated. |
| Percent Impervious Cover | [Impervious cover](http://stormwater.pca.state.mn.us/index.php/Overview_of_basic_stormwater_concepts) represents the regions within the drainage area that are unable to infiltrate stormwater, resulting in stormwater runoff. | Increases with higher percentages | Increases with higher percentages | Higher imperviousness results in increased amounts of stormwater runoff and larger volume of water to be infiltrated. |
| Recharge or Infiltration Rate | The rate at which water placed within the basin reaches the water table.* Use as check on assumed hydraulic conductivity and design storm intensity to check the limiting infiltration factor.
* If vertical hydraulic conductivity (1/10th of horizontal hydraulic conductivity) is greater than design storm intensity rate, adjust the vertical and corresponding hydraulic conductivity to be equal to design storm intensity value.
* If design storm intensity is greater than vertical hydraulic conductivity, the vertical and corresponding horizontal hydraulic conductivity value assumptions are adequate.
 | Increases with higher rates | Increases with higher rates | Magnitude and extents of groundwater mounds are directly proportional to the recharge rate. Duration of recharge also impacts the height and extent of groundwater mounding. The longer the duration at the specified recharge rate, the greater the magnitude and extent of mounding.  |