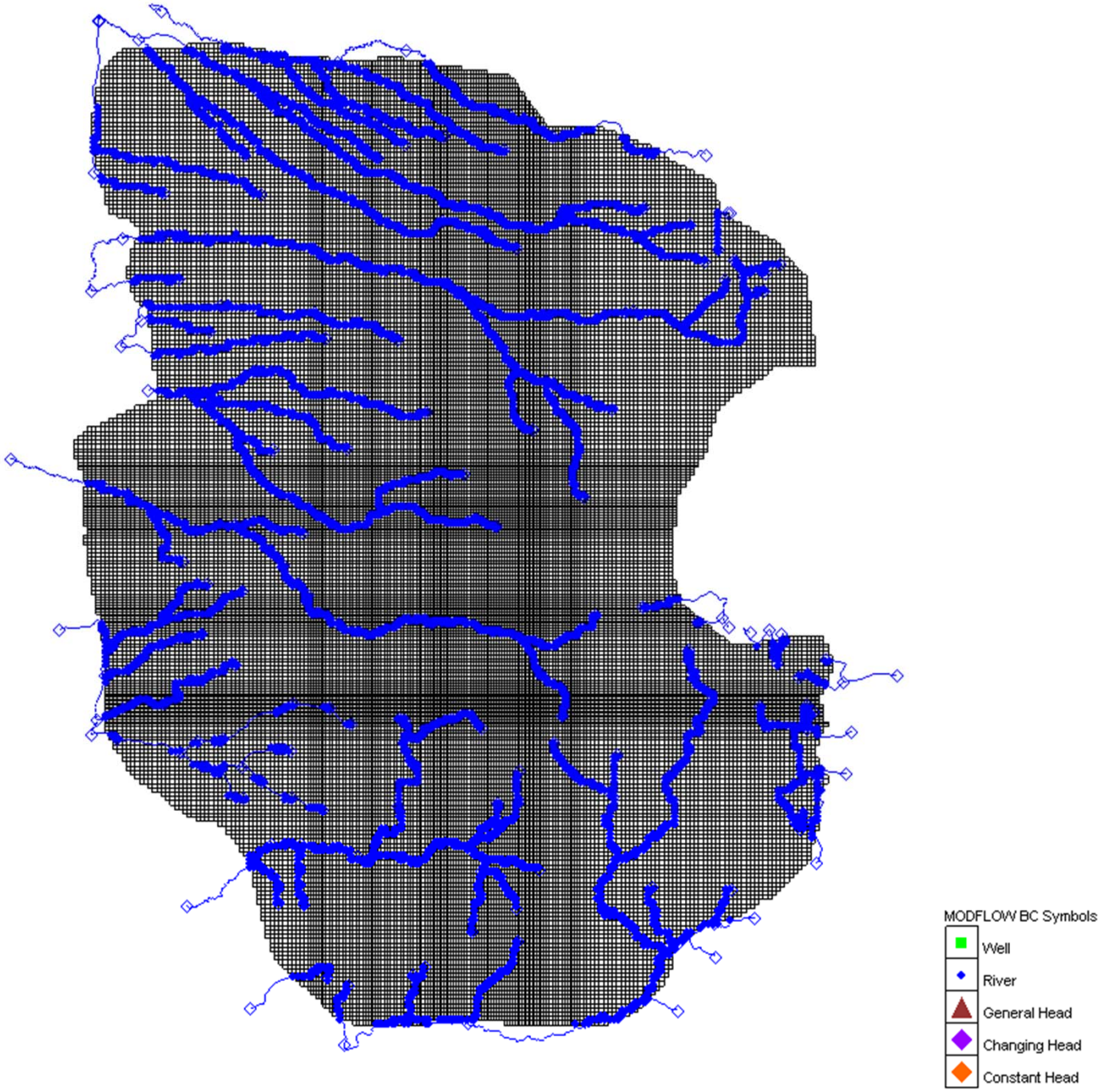
CE EN 547 – BRIGHAM YOUNG UNIVERSITY

MODFLOW Conceptual Models

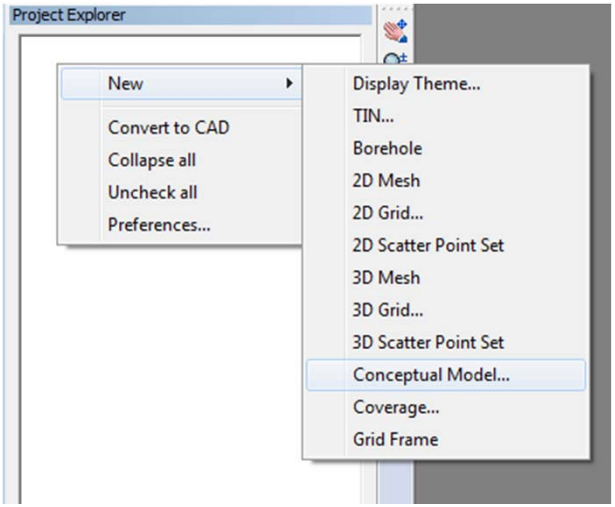

MODFLOW BC Symbols
Well
River
General Head
Changing Head
Constant Head

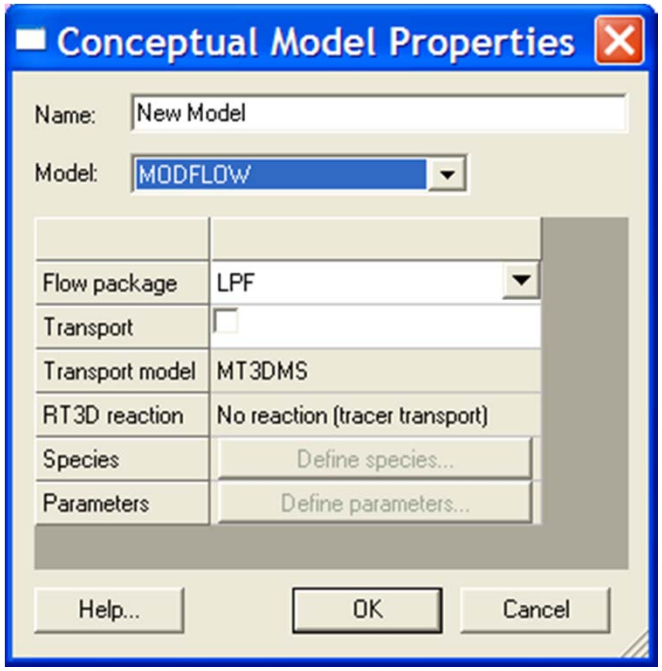
Steps

1. Build conceptual model object
2. Build coverages
3. Define grid frame
4. Build grid
5. Initialize MODFLOW
6. Activate cells in coverage
7. Map → MODFLOW

1. Build Conceptual Model Object

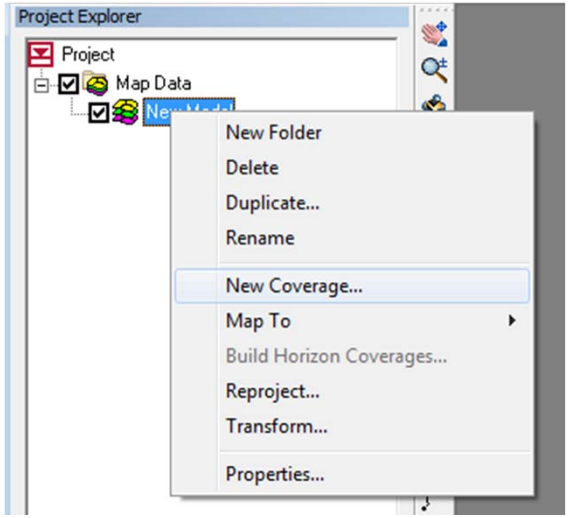
- Used to organize conceptual model data
- Defines flow package, transport option, species, etc.

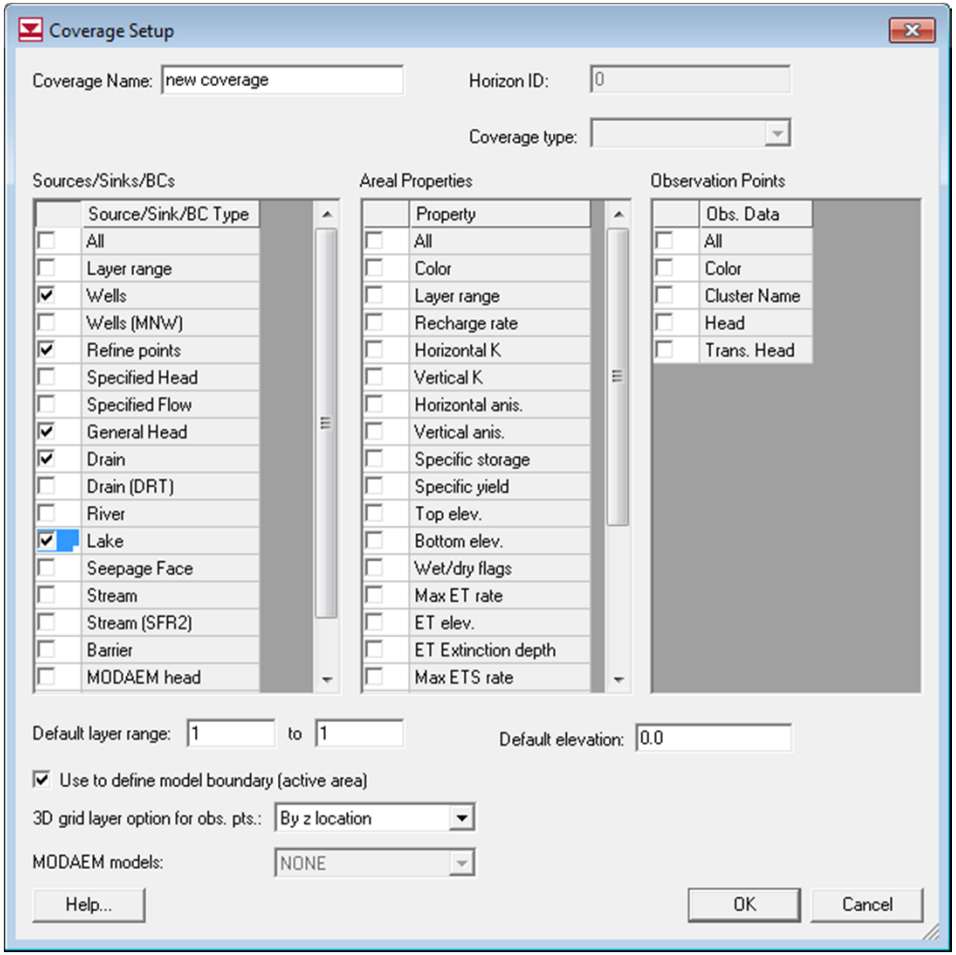




2. Build MODFLOW Coverages

- Any combination of coverages can be used
- Select desired properties



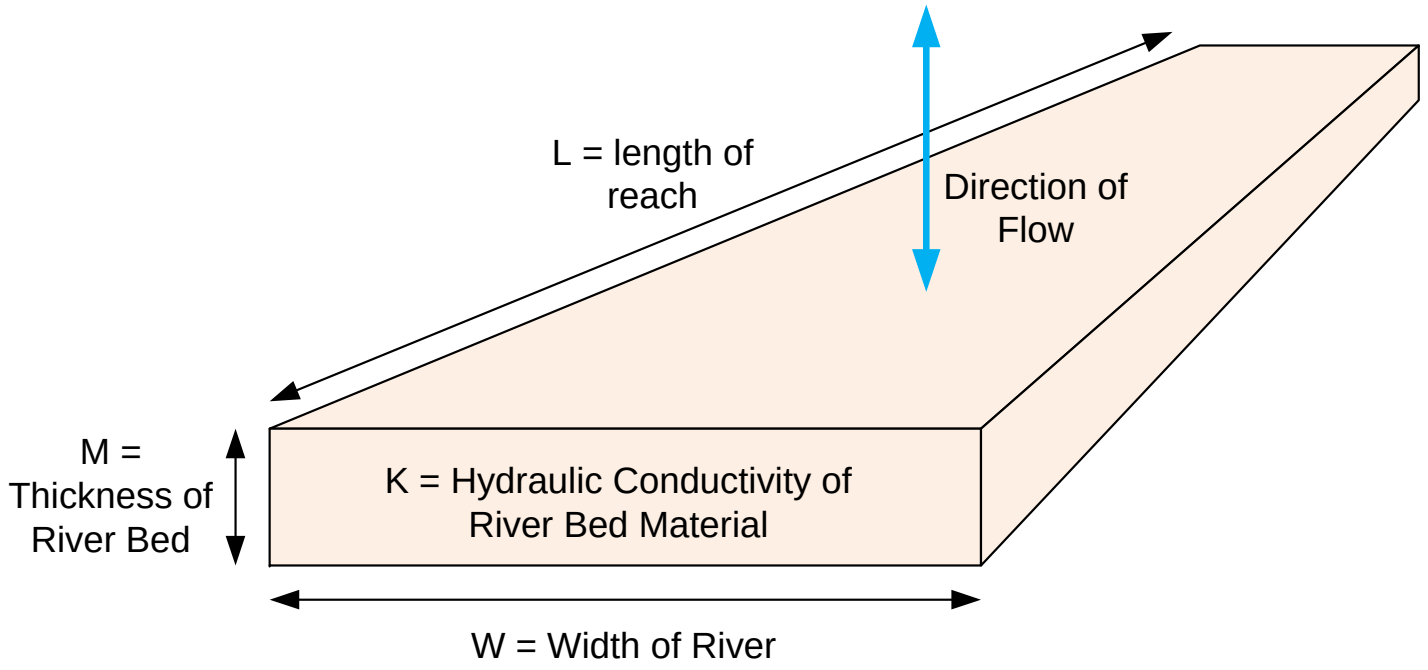


Conductances

- Many of the objects in the Source/Sink category must be assigned a **conductance** value.
- For **arcs**
  - the conductance should be assigned on a **conductance per length** basis.
- For **polygons**
  - the conductance should be assigned on a **conductance per area** basis.

GMS computes length or area and computes and assigns the appropriate value.

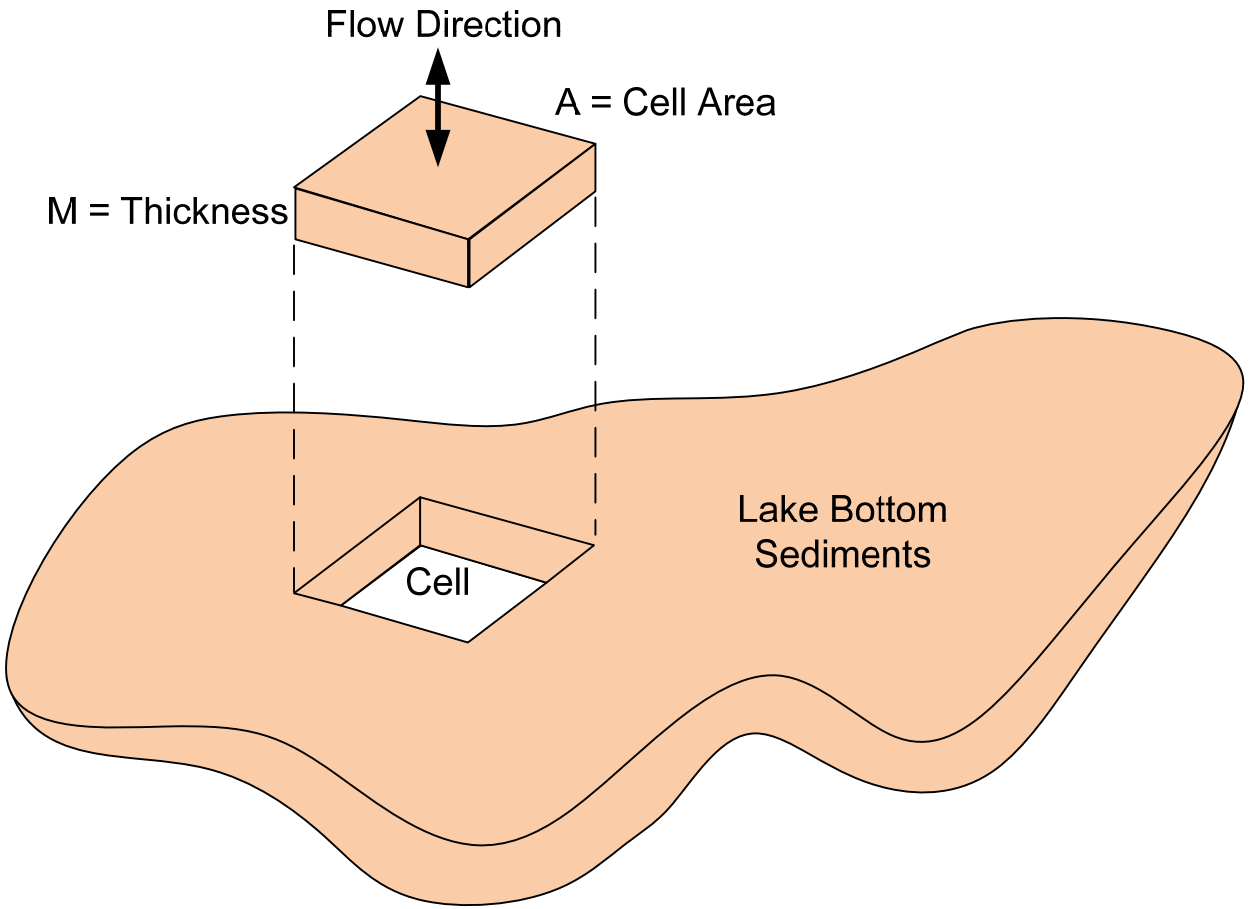
Arc Conductance



$$C_{cell} = \frac{KA}{M} = \frac{KLW}{M}$$

$$C_{arc} = \frac{KW}{M}$$

Polygon Conductance

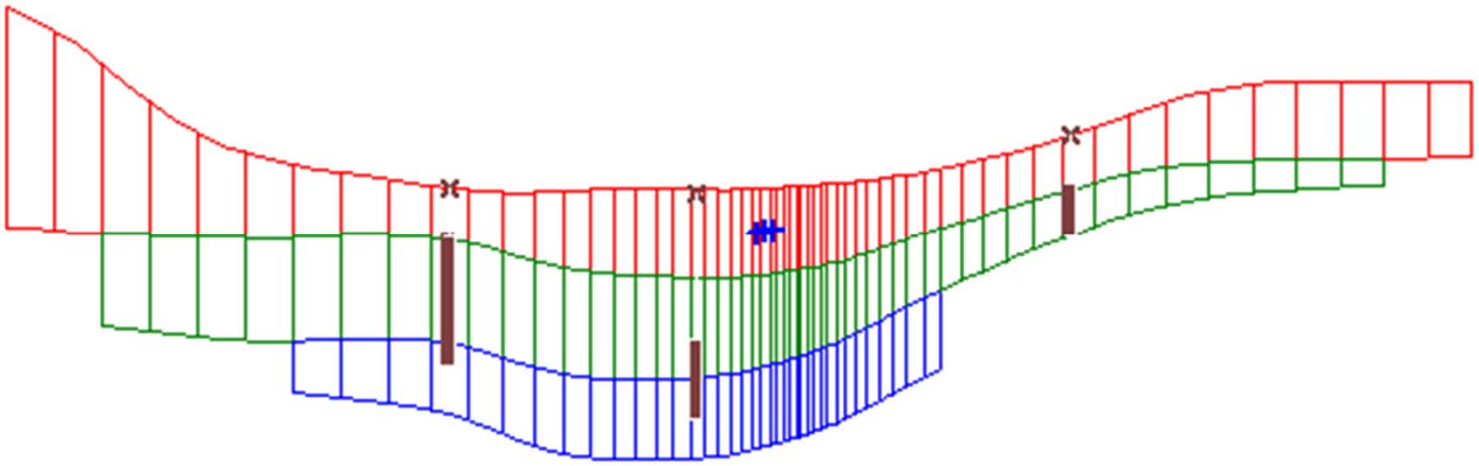


$$C_{cell} = \frac{KA}{M}$$

$$C_{poly} = \frac{K}{M}$$

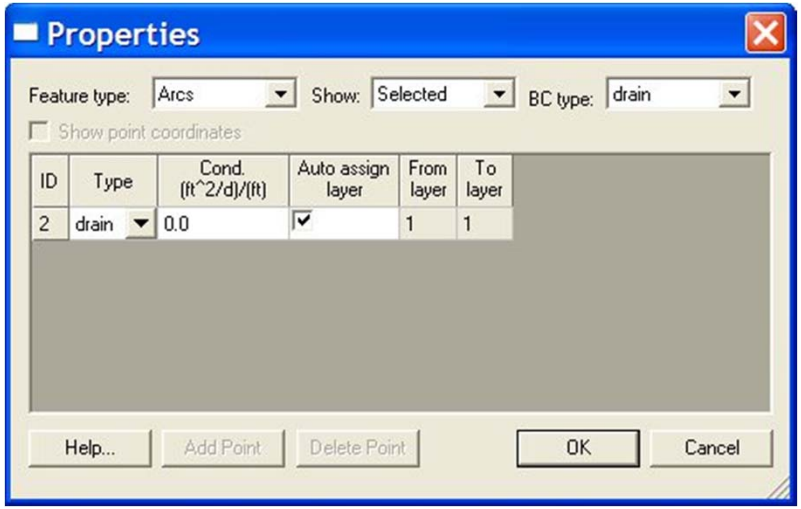
Well Screens

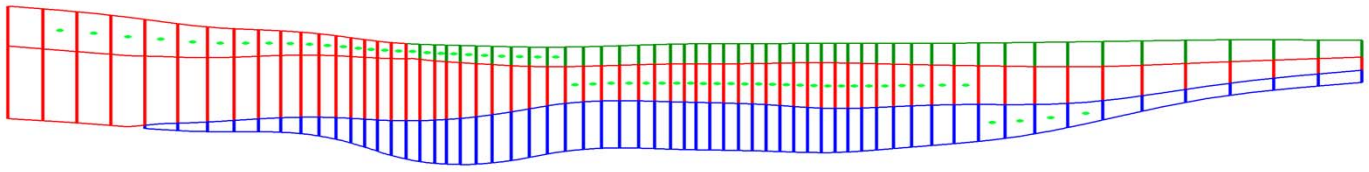
- Elevations entered for well screen as part of well properties
- Layers and partitioned Q automatically assigned



Auto Assign Elevations

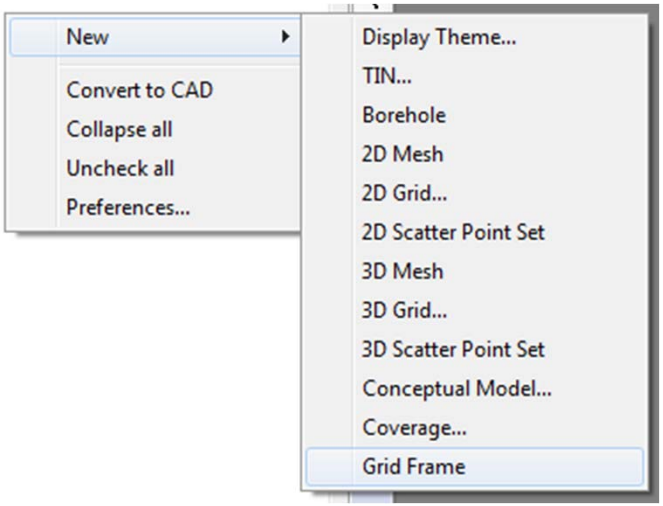
- Elevations entered at nodes as part of properties
- Layers automatically assigned

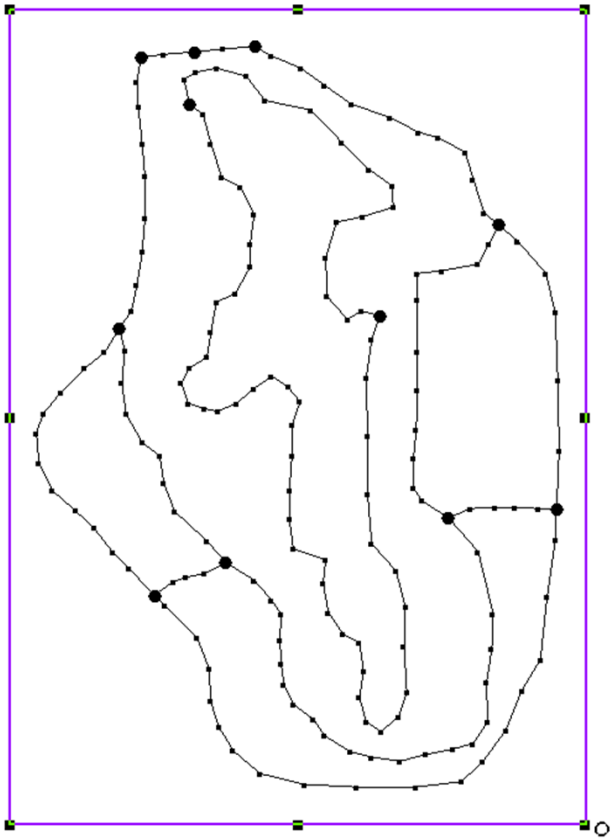




3. Grid Frame

- Defines location of grid relative to conceptual model
- Can be used to rotate the grid

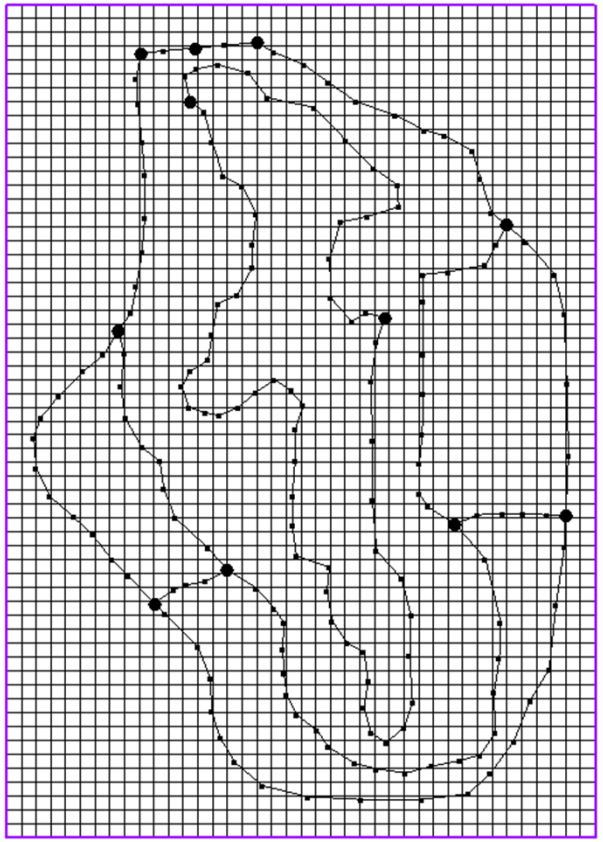




Use *Grid Frame* tool to edit 

4. Build Grid

- Select "Map → 3D Grid" command from Feature Object menu 
- Creates grid that fills grid frame

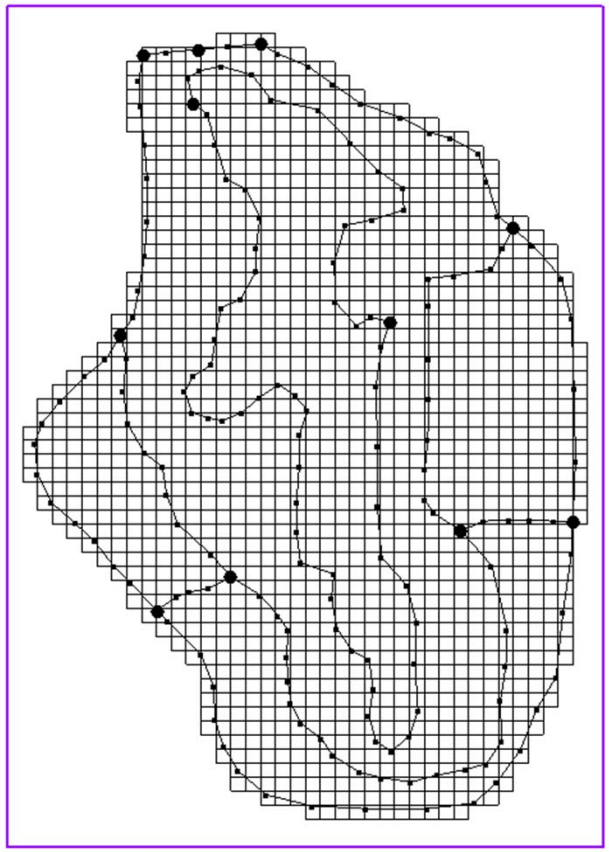


5. Initialize MODFLOW

- Select "New Simulation" command in MODFLOW Menu in 3D Grid Module
- Initializes MODFLOW data structures
- Defines steady state vs. transient
- Defines stress periods (if applicable)

6. Activate Cells in Coverage

- Select the "Activate Cells in Coverage(s)" command in Feature Objects menu
- Inactivates all cells outside of conceptual model boundary



7. Map → MODFLOW

- Select conceptual model in Project Explorer
- Select the "Map → MODFLOW" command in Feature Objects menu
- Discretizes model input