

# **Topographic Maps**

## **Background Sheet**

### **History:**

The Articles of Confederation (1777) was ratified when western lands were yielded to the Federal Government. This yielding of land gave the Federal Government land to control and in return enabled all states formed from Federal land to have the same rights as the original states.

In order for the federal land to be sold (to raise money and encourage settlement) the land had to be surveyed (Ordinance of 1785). This survey required a system to legally describe the land and so the Public Land Survey System was instituted.

### **Survey:**

The Public Land Survey System is made up of a series of township and range designations. These designations are used to divide the land surface and provide property boundaries and locations. Each Township is subdivided into 36 sections and each standard section is one square mile (640 acres). Survey errors created some of the irregularities in shapes for many sections and townships that are seen on current maps.

Township and range divisions are made by using a perpendicular grid with the divisions being every 6 miles. Reference lines are determined for both township and range using a "baseline" and "principal meridian". The township notes the position north or south of the baseline and the range notes the position east or west of the Meridian. Several baselines and meridians are used so the township and range coordinates remain fairly small.

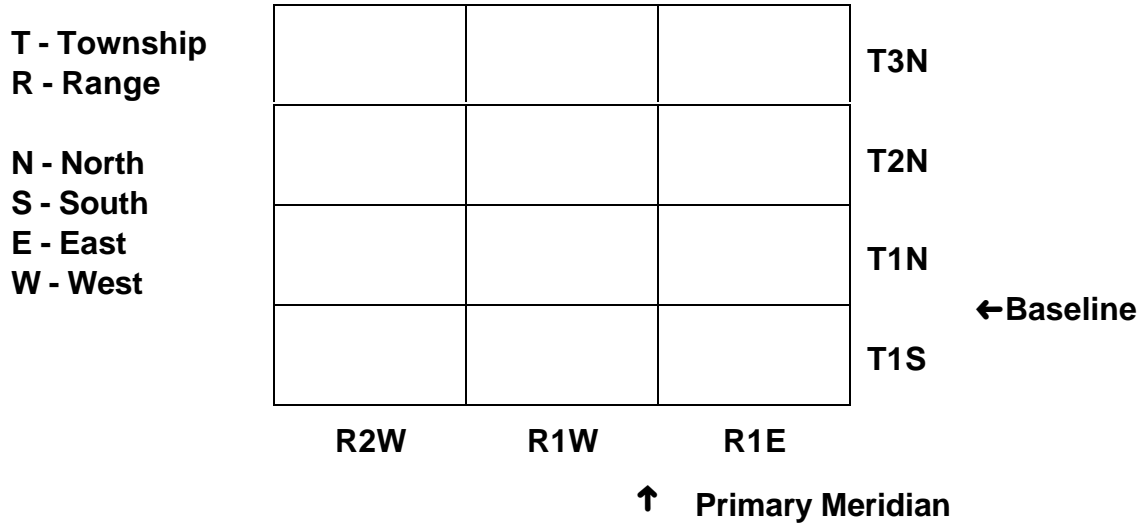
Since the earth is round and the grid system for the township and range designations is for a flat plane, a correction is made to the flat plane so that the plane will fit over the curved earth's surface. The corrections are made every 4 townships from the baseline. The correction adjusts the alignment of the north-south lines to converge towards the pole.

In addition to townships, ranges, and sections, topographic maps also show topography. Contour lines show the change in topography and therefore each contour line represents an increase or decrease in elevation. Also note that as the concentration of lines increases the ground topography is getting steeper. The contour interval is stated at the bottom of the topographic map generally below the map's scale. The map's scale will also vary depending on the type of topographic map. Other things shown on the topographic map will include: rivers, creeks, lakes, towns, roads, names of various items of topographic interest (mountains and mountain ranges, plains, forests, etc.), mines, cabins, county lines, railroad, shrubbery, windmills, and more.

**Directions:**

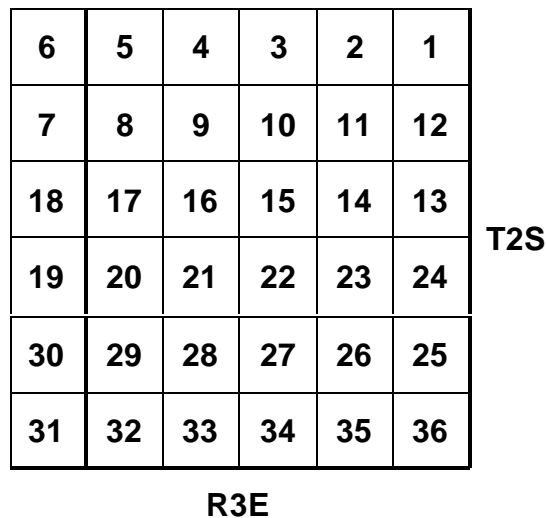
To read a topographic map the township is labeled at the center of the township, and the same applies to the range. See Figure 1.

**Figure 1 - Township and Range Divisions**



Each township is divided into 36 sections. The sections are numbered starting right to left and top to bottom in a six by six grid. The numbers seem to form a figure “S” that continues to repeat itself. See Figure 2. The sections number is place in the center of the section.

**Figure 2 - Sections**

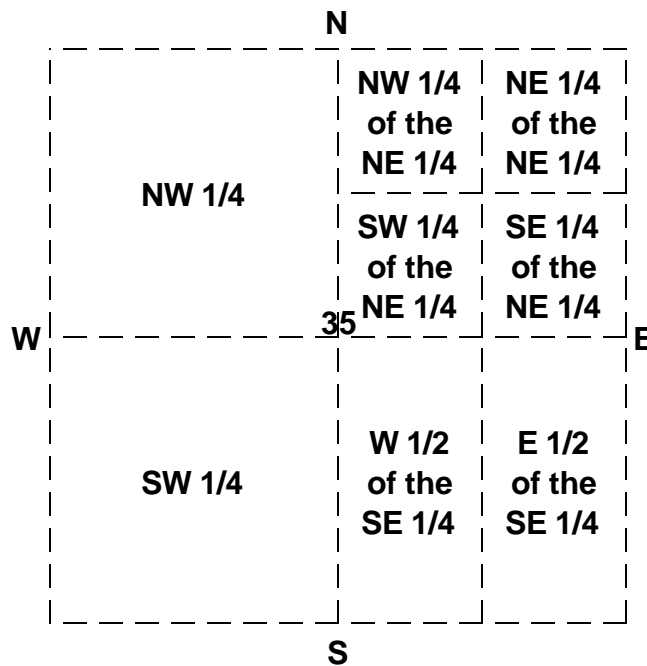


Finally, each section (640 acres) can be broken down by halves and quarters with each half or quarter able to be broken down again by quarters, etc. Each quarter (1/4) or half

(1/2) section is described by the north, south, east, or west direction of the split. For example, the northwest 1/4 or the northeast 1/4 of Section 35.

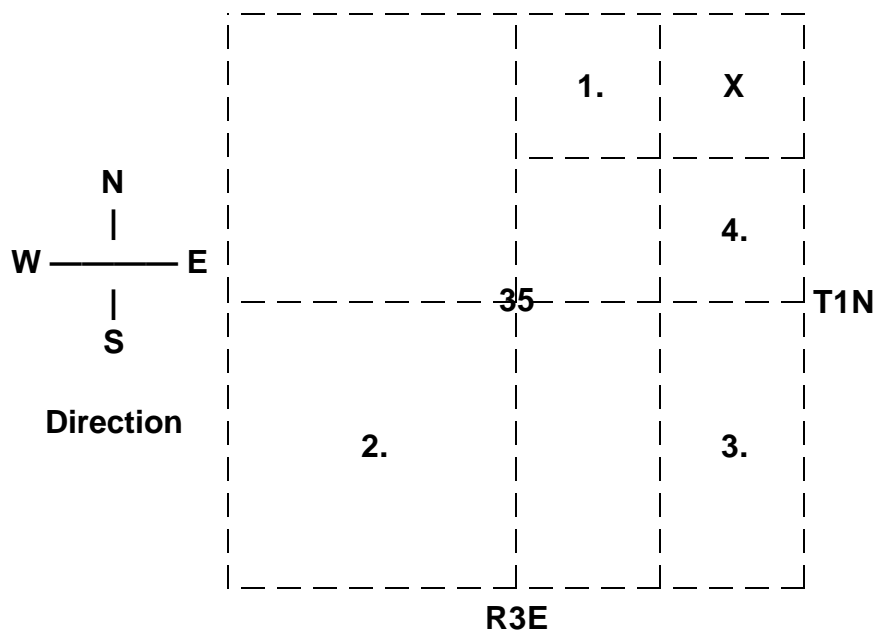
Always determine the location in the section by reading from the end of the location description to the beginning (right to left). This means to read the last part of the location (which is the section) and continue to read each section portion until the location description is complete. Once again, the northwest 1/4 of the northeast 1/4 of Section 35 means to find Section 35, then locate the northwest 1/4 of the northeast 1/4. The same direction apply for giving a location: Start with the smallest part of the section and work towards the entire section. See Figure 3.

**Figure 3 - Section Locations**



Note the each location could have several different location descriptions depending upon how many portions of a section an individual wishes to use. Do the Topographic worksheet for an example.

## Topographic Map Worksheet



A. Define the following abbreviations.

- T - \_\_\_\_\_  
 R - \_\_\_\_\_  
 S - \_\_\_\_\_  
 E - \_\_\_\_\_

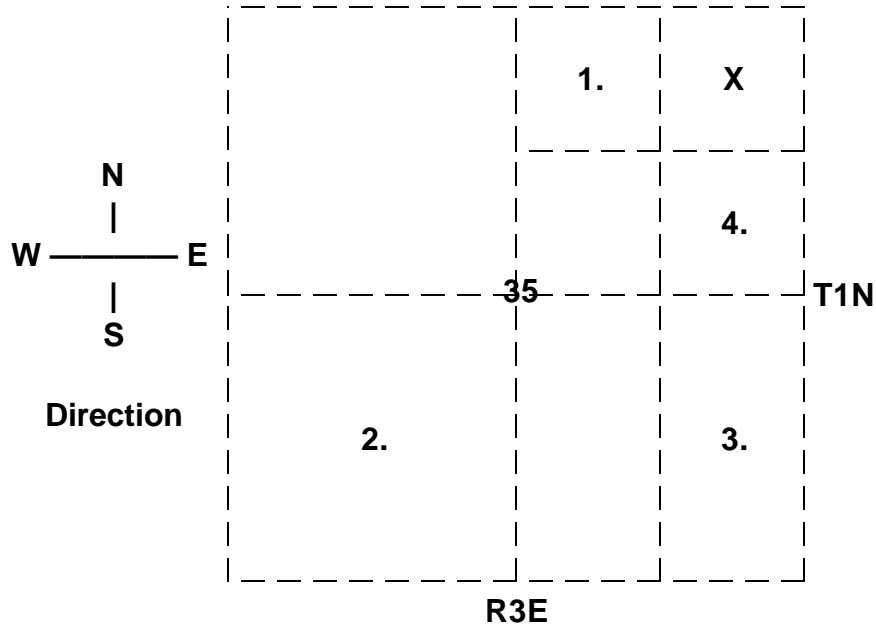
B. Give the location description for each number shown above.

1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 4. \_\_\_\_\_

C. Circle the location description for 'X' in Section 35 above that's correct.

1. SE 1/4 of the NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.
2. S 1/2 of the NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.
3. NE 1/4 of the NE 1/4 of the SW 1/4 of Section 35, T1N, R3E.
4. NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.

## Topographic Map Worksheet — Answer Sheet



A. Define the following abbreviations.

T - Township

R - Range

S - South

E - East

B. Give the location description for each number shown above.

1. NW 1/4 of the NE 1/4 of Section 35, T1N, R3E

2. SW 1/4 of Section 35, T1N, R3E

3. E 1/2 of the SE 1/4 of Section 35, T1N, R3E

4. SE 1/4 of the NE 1/4 of Section 35, T1N, R3E

C. Circle the location description for 'X' in Section 35 above that's correct.

1. SE 1/4 of the NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.

2. S 1/2 of the NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.

3. NE 1/4 of the NE 1/4 of the SW 1/4 of Section 35, T1N, R3E.

4. NE 1/4 of the NE 1/4 of Section 35, T1N, R3E.