STREET IMPROVEMENTS
(Refer to Title 18, chapter 18.24 entitled "STREETS" of the Layton Municipal Code.)

I. Street widths

<table>
<thead>
<tr>
<th>STREET TYPE</th>
<th>ROW WIDTH</th>
<th>ASPHALT WIDTH</th>
<th>PARK STRIP WIDTH</th>
<th>SIDE WALK WIDTH</th>
<th>TBC TO TBC</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATERIAL</td>
<td>100</td>
<td>76</td>
<td>4.5</td>
<td>5</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>MINOR ARTERIAL</td>
<td>84</td>
<td>60</td>
<td>4.5</td>
<td>5</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>66</td>
<td>42</td>
<td>4.5</td>
<td>5</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>MINOR COLLECTOR</td>
<td>60</td>
<td>36</td>
<td>4.5</td>
<td>5</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>RESIDENTIAL COLLECTOR</td>
<td>62</td>
<td>32</td>
<td>7.5</td>
<td>5</td>
<td>37</td>
<td>TYPICAL THROUGH STREET FOR RESIDENTIAL DEVELOPMENT</td>
</tr>
<tr>
<td>RESIDENTIAL</td>
<td>58</td>
<td>28</td>
<td>7.5</td>
<td>5</td>
<td>33</td>
<td>TYPICAL INTERIOR STREET WITHIN A SUBDIVISION</td>
</tr>
<tr>
<td>MINOR</td>
<td>50</td>
<td>28</td>
<td>4.5</td>
<td>5</td>
<td>33</td>
<td>CUL-DE-SACS; LOOP STREETS SERVING 10 LOTS OR LESS; SENSITIVE LANDS</td>
</tr>
<tr>
<td>HILLSIDE RESIDENTIAL</td>
<td>39</td>
<td>28</td>
<td>6</td>
<td>33</td>
<td></td>
<td>HILLSIDE DEVELOPMENT AREAS ONLY - AS APPROVED BY CITY ENGINEER</td>
</tr>
<tr>
<td>PRIVATE STREET</td>
<td>*</td>
<td>28</td>
<td></td>
<td></td>
<td>33</td>
<td>*RIGHT OF WAY TO BE APPROVED BY CITY ENGINEER</td>
</tr>
<tr>
<td>SPLIT ROADWAY</td>
<td>2 @ 23' EA</td>
<td>2 @ 18' EA</td>
<td></td>
<td></td>
<td></td>
<td>HILLSIDE DEVELOPMENT AREAS ONLY - AS APPROVED BY CITY ENGINEER</td>
</tr>
</tbody>
</table>

A. The asphalt on all public streets, except frontage roads, shall be bordered on both sides by two and one-half foot wide, 6-inch high back curb and gutter.
B. For private street requirement – see Municipal Code 18.50.

II. Maximum block length between intersections

<table>
<thead>
<tr>
<th>Zoning</th>
<th>Maximum block lengths between street R-O-W that are considered local streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>R-S</td>
<td>1,000 feet</td>
</tr>
<tr>
<td>R-1-10</td>
<td>800 feet</td>
</tr>
<tr>
<td>R-1-8</td>
<td>700 feet</td>
</tr>
<tr>
<td>R-1-6</td>
<td>600 feet</td>
</tr>
</tbody>
</table>

A. Street intersections shall have a 90-degree approach angle.
1. The interior approach angle may be reduced to no less than 80 degrees as approved by the City Engineer.
2. The approach to an intersection shall have at least 100 feet of tangent (perpendicular) approach. This distance may increase with a change in speed or traffic volume.
3. "T" intersections will be acceptable if the centerlines are offset by at least 260 feet for residential streets.
4. On arterial and collector streets, drive entrances may be required to be aligned as determined by the City Engineer. The number and location of drive access points may also be limited.
III. Dead-end/Not-a-through-street definition

A. A dead-end street is a street that does not have another intersection located along the travel path, i.e., a cul-de-sac. The length of the dead-end is as described in the cul-de-sac section.

B. A “not-a-through-street” is a street access to a street network which contains other intersections and possibly dead-end streets.
   1. The City Engineer and the City Fire Marshall shall approve a ‘not-a-through-street’ network.
   2. A “not a through-street’ shall have the ability to provide for future street accesses which will provide at least a second access to the site.

IV. Second access requirements

A. A second access to a site is required under the following conditions:
   1. A multi family development that has 100 or more residential units shall be equipped throughout with two separate and approved fire apparatus access roads.
   2. A development that extends more than 1800 feet from a connecting street will have a second access.
   3. A development of one or two family dwellings where the number of dwelling units exceeds 30, unless fire apparatus access roads will connect with future development as determined by the City Engineer and Fire code official.

V. Street curve designs

A. Vertical curves shall meet the following AASHTO design standards
   1. Vertical crest curves, minimum design control
      a. Subdivision (25 mph), K=12
      b. Minor collectors (≤30 mph) K=19
      c. Collectors (≤40 mph) K=44
      d. Other streets - As directed by the Engineer
   2. Vertical sag curves, minimum design control
      a. Subdivision (25 mph), K=26
      b. Minor collectors (≤30 mph) K=37
      c. Collectors (≤40 mph) K=64
      d. Other streets - As directed by the Engineer
   3. Vertical curve calculation:

      \[ L=KA \quad E=AL/800 \quad Y=E*(D^2)/(T^2) \]

"K" is the allowable rate of vertical curvature.
"L" is the length of the vertical curve.
"A" is the algebraic difference of the approach and departure slopes.
"E" is the curve offset from the approach tangent line.
"Y" is the offset from the tangent line to the curve at any given point along the curve.
"D" is the distance from the beginning point of the curve to any point desired along the curve.
"T" is ½ the length of the curve or L/2.
Example –
Assume that the approach grade to a crest curve is 2% and the departure grade is 8%.
\[ L = KA \]
\[ L = 20 \times (8 - (-2)) = 200 \text{ feet} \] (minimum length)

**B. Horizontal curve design**

1. The minimum centerline street radius, with a standard 2% crown, shall be:
   - a. Minor – Subdivision \(<25 \text{ mph}\) \(R=200'\)
   - b. Feeder - Subdivision \(<30 \text{ mph}\) \(R=333'\)
   - c. Collector - \(<35 \text{ mph}\) \(R=510'\)
   - d. Collector - \(<40 \text{ mph}\) \(R=762'\)
   - e. Arterial - \(<45 \text{ mph}\) \(R=1,039'\)

2. The minimum centerline radius with a standard crown shall be 200 feet.

3. The minimum turning path for street intersections, parking/fire lanes must meet AASHTO “Minimum Turning Path for Intermediate Semitrailer (WB-50’ Design Vehicle” as shown below:

<table>
<thead>
<tr>
<th>Type of vehicle</th>
<th>Min. Turning Radius (front outside tire)</th>
<th>Minimum radius (Inside rear tire)</th>
<th>Maximum turn radius (front fender)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB-50’</td>
<td>45’</td>
<td>17’</td>
<td>45.7</td>
</tr>
</tbody>
</table>

**VI. Street Slopes**

**A.** The minimum street slope allowed is 0.50 % . The minimum street slope through a cul-de-sac is 1%.

**B.** The maximum street slope allowed without special approval is 8.0 %.

**C.** The maximum street slope allowed with special approval from the City Fire Chief and the City Engineer is 12.0 %.

1. The City Fire Chief and the City Engineer shall review and grant special approval for grades between 8.1% and 12.0%.

2. Grades of 10% that exceed 500 continuous feet are required to provide an approved automatic fire sprinkler system to all residential, commercial and industrial buildings.

3. The location of connecting streets with slopes less than or equal to 8.0% is reviewed.

4. The locations of downhill exits are considered. A street that is proposed to terminate downhill will not be allowed to exceed 8.0% if no downhill exit is available.

5. The maximum distance of a slope exceeding 8.0% shall not exceed 500 feet. This distance may only be adjusted by the City Fire Chief and the City Engineer. The slope that exceeds 8% should be preceded and followed by a slope less than 8% for at least twice the distance of the slope that exceeds 8%.

**D.** Intersecting streets shall have an approach slope not exceeding 4.0%. The distance of this approach pad shall be no less than 100 feet or as approved by the City Engineer.

**E.** Streets shall be designed to carry excess storm water, which may not be contained in the storm drainpipe system (beyond the 10-year design storm) out of the subdivision on street surfaces. Low points shall not be designed unless all other
alternatives are exhausted.

F. Vertical curves at the approach and departure grade shall be designed to meet the minimum “K” values listed in Street Curve Designs section.

VII. Street pavement thickness

A. The geotechnical report shall include a recommendation for asphalt, roadbase, and sub-grade structure depths.

B. The minimum standard pavement structure shall be 3 inches of asphalt surface course and 8 inches of gravel roadbase.

C. The following table indicates different street structures for differing California Bearing Ratio (CBR) values:

<table>
<thead>
<tr>
<th>Subgrade Class</th>
<th>Pavement Section</th>
<th>Traffic Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I Minor Street</td>
</tr>
<tr>
<td>Very Poor CBR &lt;3</td>
<td>Asphalt Concrete Surface</td>
<td>3”</td>
</tr>
<tr>
<td></td>
<td>Untreated aggregate base</td>
<td>10”</td>
</tr>
<tr>
<td></td>
<td>Aggregate sub-base</td>
<td>-</td>
</tr>
<tr>
<td>Poor CBR 3-8</td>
<td>Asphalt Concrete Surface</td>
<td>3”</td>
</tr>
<tr>
<td></td>
<td>Untreated aggregate base</td>
<td>8”</td>
</tr>
<tr>
<td></td>
<td>Aggregate sub-base</td>
<td>-</td>
</tr>
<tr>
<td>Medium CBR 9-17</td>
<td>Asphalt Concrete Surface</td>
<td>3”</td>
</tr>
<tr>
<td></td>
<td>Untreated Aggregate base</td>
<td>8”</td>
</tr>
<tr>
<td></td>
<td>Aggregate sub-base</td>
<td>-</td>
</tr>
<tr>
<td>Good Excellent</td>
<td>Asphalt Concrete Surface</td>
<td>3”</td>
</tr>
<tr>
<td>CBR +17</td>
<td>Untreated Aggregate base</td>
<td>8”</td>
</tr>
<tr>
<td></td>
<td>Aggregate sub-base</td>
<td>-</td>
</tr>
<tr>
<td>Traffic Class</td>
<td>Maximum EAL Equivalent Axle load</td>
<td>Type of Street</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>I</td>
<td>5000</td>
<td>Light traffic cul-de-sac</td>
</tr>
<tr>
<td>II</td>
<td>10,000</td>
<td>Residential Streets</td>
</tr>
<tr>
<td>III</td>
<td>100,000</td>
<td>Collector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minor Collector</td>
</tr>
<tr>
<td>IV</td>
<td>1,000,000</td>
<td>Minor Arterial or Arterial</td>
</tr>
</tbody>
</table>

VIII. Sidewalk / curb & gutter / waterways/driveways
A. Curb & gutter shall be placed on each side of developed streets.
   1. The standard curb & gutter is placed 12.5 feet from the property line on subdivision streets with 7.5 foot park strips, 9.5 feet from property lines with 4.5 foot park strips.
   2. The top of the curb is placed level from one side of the street to a point perpendicular on the other side of the street.
   3. If a "cross-slope" is proposed to match existing contours, the maximum top of curb differential shall be equal to the pavement width times 2.0%. The developer shall obtain special approval for a ‘cross slope’ street at the preliminary plan stage.
   4. The maximum percent of slope allowed around a corner radius shall be 12%.
   5. The back of curb radius for residential and minor collector streets shall be 25 feet.
   6. The back of curb radius for collector streets shall be 35 feet.
   7. The back of curb radius for minor arterial and arterial streets shall be 40 feet.
   8. The curb & gutter shall be placed on a minimum of 6 inches of compacted roadbase material.

B. Sidewalk shall be placed on each side of developed streets.
   1. All sidewalks will be placed on a minimum of 6 inches of compacted gravel roadbase material.
   2. 5-foot wide sidewalks shall be installed in all areas of the city with park strips. Typically there shall be a 7.5-foot park or planter strip (or 4.5 foot park strip when required) placed between the back of curb and the sidewalk.
      a. The street edge of the sidewalk shall be a minimum of 0.10 feet above the top back of curb.
      b. The street edge of the sidewalk shall be a maximum of 0.25 feet above the top back of curb ONLY if the City Engineer has issued prior approval.
      c. The sidewalk shall have 0.10 feet of slope from the property side to the street side of the sidewalk
   3. 6-foot wide sidewalks shall be installed in sensitive lands residential areas where no park strip is provided or as approved by the City Engineer.
developer shall obtain special approval for abutting sidewalk at the preliminary plan stage, and shall demonstrate the impending need and that all other alternatives have been exhausted.)

a. The sidewalk shall be placed abutting the back of the curb & gutter.
b. The street edge of the sidewalk shall be a flush with the top back of curb.
c. The sidewalk shall have 0.10 feet of slope from the property side to the street side of the sidewalk.
d. The placement of mailboxes will be allowed near the driveway, where the sidewalk will be placed at the back of the drive approach (typical 7.5’ park strip location) to meet ADA standards.
e. In locations where the sidewalk abuts the curb & gutter, the public utility easement shall be increased from 7 feet to 10 feet.

4. The sidewalk in a cul-de-sac shall have the standard park strip for the street width (4.5’) through the entire “bubble” portion of the cul-de-sac. Abutting sidewalk will not be allowed.

5. The minimum thickness for sidewalk shall be 4 inches except through a drive section where it shall be 6 inch thick.

6. “Disabled Ramps,” with ADA paver sections (truncated domes), shall be constructed at each street corner, and other locations as determined by the City Engineer. The color of truncated domes shall be “brick red.”

C. Waterways in public streets are not allowed unless approved by the City Engineer and Fire Department.

D. Driveways

1. Drive approaches shall be 50 feet from intersections on minor subdivision streets.
2. Drive approaches shall be 80 feet from intersections on collectors or arterial streets.
3. Drive approaches shall be 20 feet from property line on commercial sites.
4. Drive approaches shall be at least 200 feet from intersection where traffic signals are present, or will be constructed in the future.

IX. Cul-de-sac / Turn-around requirements

A. Streets terminating in cul-de-sacs shall be no longer than five hundred feet (500’) to the end of the turn-around. Exceptions to the length of a cul-de-sac length may be granted in the Foothill Development area where it is determined that no other form of development is practical due to topography. See standard drawing ST-ST-15.

B. Each cul-de-sac shall be terminated by a turn-around not less than one hundred feet in diameter, of which a minimum of eighty feet in diameter shall be surfaced.

C. Adequate catch basins and drainage easements shall be installed and secured by the sub-divider/developer.

D. Alternative cul-de-sac turnarounds allowable only in the sensitive lands area shall be specifically approved by the Fire Department.

X. Temporary turn-around

1. A temporary turn-around shall be required on any fire access road for future development that is more than 150 feet or two lot lengths (maximum of 200 feet) from an intersection. All distances in this section are measured from the face of the curb of the intersection.
2. An off-site temporary turn-around with a minimum 80 foot diameter
drivable surface may be located on abutting property with proper easements (see ST-ST-14). An on-site temporary turn-around with a minimum 80 foot diameter drivable surface may be located within the development as part of a building lot or future phase with proper easements and noted on the subdivision plat (see ST-ST-14). Any lots encumbered by an on-site temporary turn around must be designated as “R” lots on the plat. These lots will not be issued building permits until the future street is stubbed through and the temporary turn around improvements have been replaced with permanent improvements to match the through street. All cost associated with the removal and replacement of these improvements will be the responsibility of the owner of the lot at the time the future street is extended.

3. If a street extends more than 150 feet or two lot lengths (maximum of 200 feet) from an intersection and the Developer is not able to obtain an easement for a temporary turn-around from the adjacent property owner, the Developer will be required to install a fire suppression system meeting the requirements of the currently adopted NFPA 13(d) standard in all of the homes located greater than 150 feet or two lots from an intersection. All lots with fire suppression systems must be identified on the final site plan and plat.

4. The City Engineer and Fire Chief may approve a permanent turn-around with a future street tie in as shown in standard drawing ST-ST-14, for a street that extends more than 450 feet from an intersection and is planned to be extended in the future.

XI. Right of way slope requirements
A. The developer shall provide cross-section drawings of the right-of-way when the cut or fill exceeds 2 feet at the right-of-way line.
B. The developer shall provide slope easements on the dedication plat when the cut or fill exceeds 3 feet, or as required by City Engineer.
C. The developer shall provide engineering drawings (signed and stamped by a professional licensed engineer) for slope retain when the cut or fill requires retaining walls or structures, (typically over 4.0 feet).

XII. Street construction sequencing
A. Residential streets which are paved with the asphalt surface course one season following the utility construction season, (to allow a wet cycle to help consolidate the trench areas) will be required to conform to the following tests:
1. The soils report will identify the acceptability of the native material for consolidated backfill. The soils report will identify the appropriate method for backfilling, compaction, and consolidations.
2. The street area will not have gravel roadbase material placed during the winter season. Placement of select borrow material is required for all trench backfill between November 1 and April 1. This requirement may be extended by the Public Works inspector, dependant on the condition and quality of the native soils.
3. Prior to the placement of the gravel roadbase material the following tests results shall be provided.
   a. More than 75% of the utility trenches shall be tested and will have a minimum average test result of 92% at each lift of soil placement, as determined by the soils report.
b. The street sub-grade shall be compacted to a minimum average of 95% compaction. The random sampling shall be one test per 100 square yards or 3 tests per 100 feet of street.

4. Prior to the placement of the asphalt surface, and within five days of the asphalt placement, the gravel roadbase material shall be compacted with a minimum average of 95% maximum density, (no test below 92%). The random sampling shall be one test per 100 square years or 3 tests per 100 feet of street.

5. The minimum temperature for laying asphalt must be 50 degrees and rising. The asphalt surface shall be tested for compaction with the same density and frequency requirements as the gravel roadbase material.

B. Residential streets which are paved or have gravel roadbase placed to the final grade during the same season as utility construction shall conform to the following tests:

1. The soils report will identify the acceptability of the native material for compacted backfill. The soils report will identify the appropriate method for back filling and compaction, excluding consolidation.

2. The street area will generally have selected borrow material placed as trench backfill prior to the placement of the gravel roadbase material if the existing material is determined to be unsuitable for backfill and compaction at the time of excavation, as determined by the soils report, and the Public Works inspector. Placement of select borrow material is required for all trench backfill between November 1 and April 1. This requirement may be extended by the Public Works inspector, dependant on the condition and quality of the native soils.

3. Prior to the placement of the gravel roadbase material the following tests results shall be provided.
   a. More than 75% of the utility trenches shall be tested and will have a minimum average test result of 95% at each lift of soil placement as determined by the soils report.
   b. The street sub-grade shall be compacted to a minimum average of 95% compaction. The random sampling shall be one test per 100 square yards or 3 tests per 100 feet of street.

4. Prior to the placement of the asphalt surface, and within five days of the asphalt placement, the gravel roadbase material shall be compacted with a minimum average of 95% maximum density, (no tests below 92%). The random sampling shall be one test per 100 square yards or 3 tests per 100 feet of street.

5. The asphalt surface shall be tested for compaction with the same density and frequency requirements as the gravel roadbase material.