



City of Pflugerville, Texas

DATE: June 1, 2011

TO: Planning & Zoning Commission
City Council

FROM: Jeremy Frazzell, Senior Planner

RE: Subdivision Street Design Requirements

BACKGROUND

Recently the Planning Department was encouraged to look into the City's subdivision requirements for street design to evaluate how they compare with other communities and whether existing regulations impose or restrict a specific design (grid vs. curvilinear). This report is intended to provide a brief overview of the findings and offer points to consider.

HISTORICAL

Established by the Greeks and Romans, transportation networks historically utilized a straight grid pattern to efficiently move people, goods, and the military throughout a city. Through that grid, a hierarchy of streets was formed and is still generally used today. The grid pattern was utilized to establish the American city and allowed for an ease of dividing land and generating uniform standards. The use of the grid pattern effectively created neighborhoods and cities, but offered little regard to existing topography and eventually established monotony. As the automobile was introduced and the suburban movement began, designers introduced a curvilinear design with curving streets, cul-de-sacs, parks and open space pockets.

The City of Pflugerville's first subdivision was created in 1904 and contained a rigid grid network of blocks and streets, which is evident throughout Old Town. Except for a few exceptions, the grid pattern continued predominantly until the late 1970's when the now typical curvilinear and cul-de-sac residential design was established through the Brookhollow subdivision. From that point forward, residential subdivisions have continued with a block pattern but the rigid grid design has predominantly been replaced by curving streets, cul-de-sacs and elbows.

CURRENT REQUIREMENTS

The subdivision requirements outlined in the Unified Development Code consist of a network of roads, blocks and lots. The zoning specifies the minimum lot size requirements for a subdivision and the number of lots allowed to be grouped together is dependent on block length. Blocks are predicated by road spacing and road design is based on the Engineering Design Standards.

Road Spacing

The road spacing requirements establish an expectation or hierarchical structure for how the transportation network will connect and function. In Pflugerville, the minimum and maximum distances between intersections of thru streets define the block length. The distance requirement ensures breaks are provided within the development and in theory establishes a road network with additional options for moving through the development and ultimately the City.

Block Length

A block is typically defined as a two tiered group of lots located between thru streets. As mentioned, blocks in the city are defined by intersection spacing requirements. Defining a maximum block length allows for a break in lots and may increase pedestrian mobility and connectivity. There are differing opinions on how long a block should be, however in the Central Texas area, typical suburban residential blocks are generally not greater than 1200 feet (see table below). More urban and Traditional Neighborhood subdivisions contain shorter blocks to create greater connectivity and pedestrian opportunities. Traditional Neighborhood Development standards (including the CL3-CL5) have a block standard between 600-800 feet. Currently there are no subdivision requirements addressing uninterrupted blocks.

COMPARISON

Staff investigated surrounding cities to determine how our basic subdivision design standards compare to other communities. What was found is most communities have a similar block length standard which dictates road spacing. On average, blocks are measured along their face (vs. perimeter) and have a maximum length of 1200 feet.

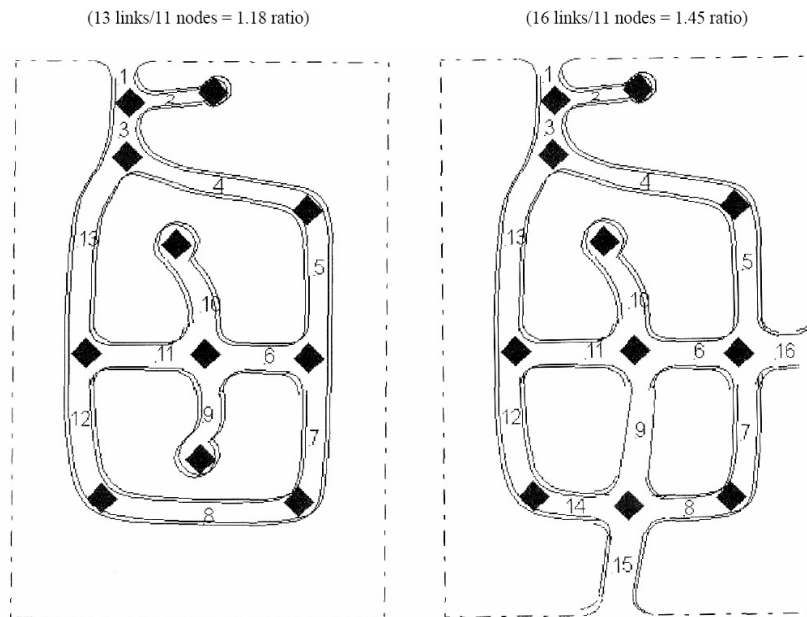
| City | Min Block Local | Max Block Local | Block Measured | Traffic Calming Req'd | Connectivity Index |
|---------------------|------------------------|------------------------|-----------------------|------------------------------|---------------------------|
| <i>Pflugerville</i> | 150' | 1200' | Face | NO | NO |
| <i>Georgetown</i> | NA | 20 lots or 1320' | Face | NO | YES |
| <i>Round Rock</i> | NA | NA | NA | NO | NO |
| <i>Cedar Park</i> | 500' | 1200' | Face | NO | NO |
| <i>Leander</i> | NA | 3500' & 6000' | Perimeter | YES | NO |
| <i>Hutto</i> | NA | 1200' | Face | NO | YES |
| <i>Sugarland</i> | 500' | 1200' | Face | NO | NO |
| <i>Plano</i> | NA | 1200' | Face | NO | NO |
| <i>McKinney</i> | 600' | 1200' | Spine | NO | NO |
| <i>Frisco</i> | NA | 1400' | Face | NO | NO |

All of the communities allow for a cul-de-sac design with varying restrictions on maximum permitted distances. Similarly, all require connections to existing or planned streets or unplatted tracts of land. Leander was the only community identified with a requirement for traffic calming:

“Straight sections of local streets and collector streets with single family or two family lots fronting on them shall not exceed one thousand three hundred (1,300) feet in length unless other traffic calming design is utilized as approved by the City or unless such design is approved by the City Engineer.”

The Leander requirement is intended to reduce speeds along residential streets and potentially discourage “cut through” traffic. In the same section of their code is a preference to residential collectors in lieu of neighborhood collector streets. With additional residential collectors, the need for spines of neighborhood collectors may be reduced and offer greater mobility options to the larger arterial street. Pflugerville currently prohibits local streets from connecting to arterial streets, and adding a provision such as this might allow for additional connections.

In addition to traditional block length requirements, the City of Hutto and Georgetown, have integrated a connectivity index in their Unified Development Codes to attain additional route options within a development and between destination points. A connectivity index measures the number of intersections or destination points (“nodes”) and the segments that connect those nodes in the subdivision (“links”). Dividing the total links by the nodes establishes a ratio which is then compared to a required minimum. A ratio of 1 represents few mobility options or low connectivity while a ratio of 2.5 represents a complete grid network and multiple options. The City of Hutto and Georgetown both require a minimum ratio of 1.20. The figures below are examples of the connectivity index that appear in both codes and represent the tool.



Integrating a connectivity index also requires a consistent interpretation and understanding of the community’s desired result. As explained in a Planning Advisory Service report titled “Planning for Street Connectivity”, it is important to determine whether external links and nodes at perimeter streets will be included or if the ratio will only be applicable to the internal subdivision network.

As described in that report, Cary, North Carolina does not include the node located at the intersection of the arterial street in the ratio calculation and therefore very different subdivision designs (grid vs. curvilinear) achieve a similar ratio. The City of Orlando, Florida however includes the node at the arterial street intersection and one external link beyond the last node. Using the Orlando calculation, a development with multiple connections to an arterial street (grid type pattern) would obtain a higher connectivity ratio than a development with only the

minimum number of arterial street connections. Both Hutto and Georgetown utilize the Cary method for calculating connectivity.

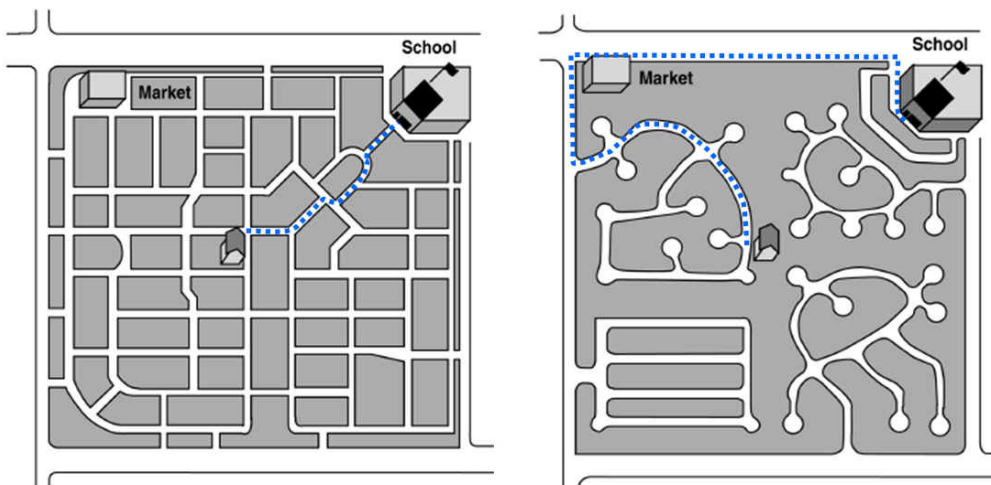
CONCLUSION AND SUGGESTIONS:

It was found that the subdivision requirements for street design in Pflugerville are similar to those in other communities. The requirements appear to be driven by historical usage, designer and developer input, expectations of the community, and likely a comparative integration. Block and road spacing have historically been used and continue to be an effective way to establish neighborhoods, mobility options, expectations and standards.

In Pflugerville, ultimate design of a subdivision remains in the developer’s hands. If the market demands a product for curving roads, the current requirements do not appear to limit the opportunity. However, if a design is proposed with serpentine roads and no connections are provided to address blocks or road spacing, then the current requirements will limit this type of development. Adding provisions to require curves in the design may become problematic as typical design is based on the contours of the land to prevent cut and fill and address utility requirements.

Integrating a connectivity index may assist in obtaining additional connectivity, however retaining the provision for street stubs into adjacent tracts of land does achieve a similar effect. A connectivity index is less intuitive than the traditional block standard and may be more difficult to implement. If a connectivity index is considered, it is encouraged to consider a ratio calculation similar to Orlando in order to obtain additional connections to the major thoroughfare system. Further consideration will also be needed to determine the desired minimum ratio.

Addressing connectivity may yield in reduced congestion and the need for costly expansions to major thoroughfares. Travel and time delays and distances are also reduced as connections are increased. This may not only have a positive impact to the residents, but also to services such as life safety and refuse. In contrast, when a pattern is not maintained, then traffic is forced to find an alternative route and forces all, including the residents within the subdivision onto adjoining streets and subdivisions (see illustration below).



Source: Street Connectivity Zoning and Subdivision; Kentucky Transportation Cabinet Division of Planning Model Ordinance

If additional connectivity is considered, then mitigation measures may also be needed to reduce fears of possible cut through traffic. This was recently reflected with the request to not provide a road connection from Stone Hill to the street stub in the Highland Park North subdivision. Adding provisions for distances of uninterrupted blocks might be a way to address these types of concerns, however this requirement was not found in any of the other ordinances. Although speculative, the Highland Park North subdivision does not have a continuous road network from the point where the connection would have been made, and may have assisted with the residents concerns, however this is unknown. Similarly, adding traffic calming requirements per a specified distance, like Leander, might assist with these types of concerns and provide the connections that ultimately help serve the residents of the subdivision.

As the City continues to grow and further impact is added to the major road network, it will be important to continue to evaluate whether adjustments should be made to the current requirements. It appears there may be proactive options to increase connectivity and address potential concerns. It is suggested to further evaluate these options and establish a stakeholder group to vet the considerations further.

Sources:

1. Cedar Park, City of. 2010. Subdivision Regulation. [Accessed May 16, 2011] Available at <http://z2.franklinlegal.net/cedarpark-flp/>
2. Frisco, City of. 2009. Subdivision Ordinance. [Accessed May 16, 2011] Available at <http://www.friscotexas.gov/departments/planningDevelopment/zoningSubdivision/Pages/SubdivisionOrdinance.aspx>
3. Georgetown, City of. 2003. Unified Development Code. [Accessed May 16, 2011] Available at <http://udc.georgetown.org/files/2008/10/UDC-Chapter-12-Pedestrian-and-Vehicle-Circulation.pdf>
4. Griffin, Robin. 2011. Planner for the City of Leander. Telephone conversation and email.
5. Handy, Susan, Robert G. Patterson, and Kent Butler. 2003. "Planning for Street Connectivity: Getting from Here to There." Planning Advisory Service Report No. 515
6. Hutto, City of. 2011. Unified Development Code. [Accessed May 16, 2011] Available at <http://www.huttotx.gov/index.aspx?nid=312>
7. Kentucky Transportation Cabinet Division of Planning. 2009. Street Connectivity Zoning and Subdivision Model Ordinance. [Accessed May 16, 2011] Available at <http://congestion.kytc.ky.gov/AccessManagement/Kentucky%20Connectivity%20Model%20Ordinance%20FINAL.pdf>
8. McKinney, City of. 2008. Subdivision Ordinance [Accessed May 16, 2011] Available at http://library.municode.com/HTML/14250/level3/SPBDERE_CH142SURE_ARTIVDEST.html#SPBDERE_CH142SURE_ARTIVDEST_S142-100BL
9. Plano, City of. 2009. Subdivision Ordinance [Accessed May 16, 2011] Available at <http://pdf.plano.gov/planning/Planning%20Documents/subord.pdf>
10. Sugarland, City of. 2000. Subdivision Regulations. [Accessed May 16, 2011] Available at <http://library.municode.com/index.aspx?clientID=13286&CtateID=43Texas>