HILLSIDE DISTRICT PLAN – White Paper

ROAD CONNECTIVTY

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REPORT CONTENTS

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ROAD CONNECTIVITY

"A Balancing Act: Connecting roadways for system efficiency and safety access while maintaining the Hillside's rural character"

Overview

The Municipality of Anchorage (MOA) held three public workshops in March 2007, to solicit community input for the development of the Hillside District Plan (HDP). The HDP is a geographic-specific plan in support of Anchorage 2020; a comprehensive development plan for the entire "Anchorage Bowl" area. The HDP will refine the broad policy direction provided by Anchorage 2020. In addition it will address issues such as residential densities, water and sewer service, drainage, roads, trails and open space on the Hillside. The end product of the HDP is to guide planning and development in the Hillside area. The transportation study is just one component of the HDP. Connectivity of roads and trails was a concern expressed at the workshop series held in March 2007.

The purpose of this document is to provide background information on the issue of roadway connectivity and the relationship between land use patterns and roadway development. The intent of the document is to:

1. Explore the importance of road connectivity,
2. Describe the relationship between road connectivity and land development, and
3. Describe the issues and problems that arise from poor connectivity or development that does not adequately address connectivity.

Principles of Roadway Connectivity

Street connectivity is defined as the number and quality of connections in the roadway network. The design of the street network determines how direct or indirect the travel path a traveler must take to complete a trip and how many route choices exist. A grid network provides relatively direct connections and multiple route choices (high connectivity). High connectivity can help balance high volumes of trips. Curvilinear streets and cul-de-sacs provide more indirect paths and fewer choices and are therefore considered to have lower connectivity. The density of the road network should be related to the intensity of the land development that it must serve. Low density areas do not require as extensive a road system to support that development. Higher intensity land uses generally require a more refined road grid. Downtown areas for instance, typically have short block structures and full connectivity to support highly urban densities of employment or housing.

The spacing of arterials and collector roads is also related to the density of development. In urban areas the rule of thumb is that arterial roads be spaced at roughly one mile intervals and collector roads at approximately one-half mile intervals. In rural areas this spacing may be larger and in higher intensity areas it may need to be closer.

Hillside Context

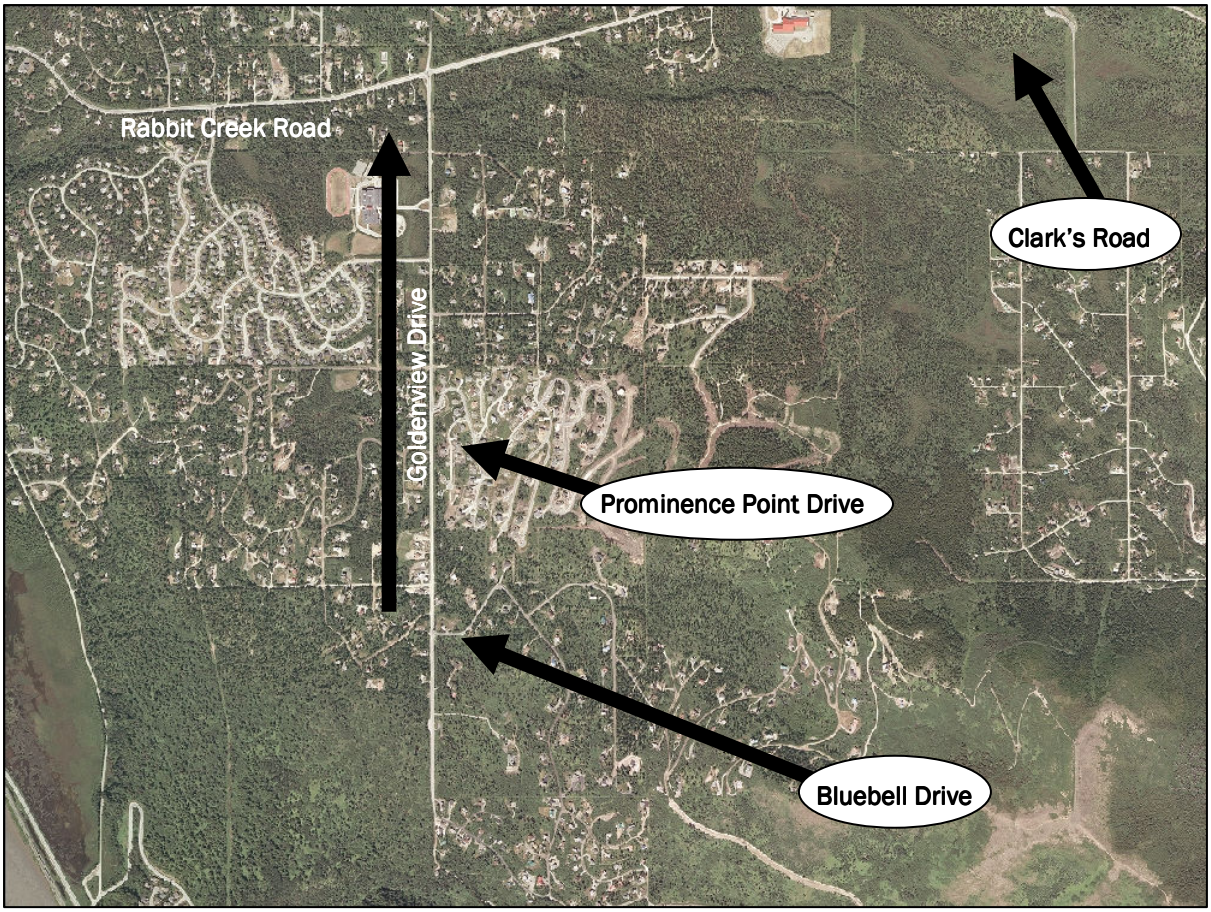
The northern half of the Hillside developed its primary road network on a one mile grid layout which generally follows section lines. See attached figure. Most of that mile grid is complete. There are, however, some exceptions, notably Abbott Loop Road between Abbott Road and O'Malley Road; Birch Road to De Armoun Road; and Huffman Road between Birch Road and Hillside Drive. At low levels of development, this spacing generally suffices.

For the most part, the one-half mile collector system does not exist on the Hillside, meaning the arterials form "superblocks" bounded by the arterial network. Many of the interior areas of the arterial grids were developed in a curvilinear fashion. Often times these roads connect only at one access point onto the adjacent arterial. Where these roads do connect through the interior of the square mile superblocks, they were typically not designed nor intended to serve as collector roads. Because of the traveling public's desire to take the most direct route, these cut-through routes have in cases developed into de facto collector roads. At low levels of development this pattern generally suffices from a roadway capacity function. It does, however, set up relatively inefficient travel patterns for some trips. Generally trips up and down the hillside (east-west) are well accommodated but north-south trips are not. The lack of connectivity does have implications for emergency access and efficiency of travel for those needing to travel from superblock to superblock or within superblocks (e.g. school buses, garbage trucks, mail delivery, etc.).

In the south half of the study area (south of De Armoun Road), there is little to no arterial development of the mile arterial grid. There is very low connectivity of the grid, particularly for north-south travel. Primary routes tend to funnel traffic up and down hill. These "travelsheds", functioning much like a stream's watershed, drain large areas of traffic, eventually routing it downhill to the same arterials or intersections. The aerial photo on the next page depicts these travelsheds. The lack of north-south connectivity in the southern half of the study area more acutely limits mobility which in turn affects travel efficiency. Once again, at very low levels of development, this system would suffice, but as growth has occurred, pinch points have developed – areas like Goldenview Drive and Rabbit Creek Road have become congested. Such single access routes can be thought of as very long cul-de-sacs. Such road systems, with no alternative routing have potentially serious implications for emergency access (either getting emergency vehicles in, or for routing traffic out). Evacuation or emergency vehicle access could be severely hampered were the road to be blocked during a fire, earthquake, or other emergency.

Benefits of and Issues with Current Context

As mentioned earlier, at rural and low levels of development the density of the road network need not be as connected. Such a network can contribute to the rural feel and character of an area. Often curvilinear networks and cul-de-sacs can be desirable to residents, because travel speeds tend to be slower and cut-through traffic is low, meaning such areas can be safer and less noisy. A low connectivity network, even in a low density area, is still not as efficient, nor is it as safe during emergencies. But when trip volumes are low, such inefficiencies are tolerated and are expected in rural areas. Expectations and demand for service (fire protection, garbage hauling, emergency access times, etc) are generally lower in rural areas than more developed areas.



Examples of Hillside 'Travelsheds' – travelers channeling into one road

As development densities increase, travel volumes increase. At some point growth can overload the road system. When development occurs in an uncoordinated or unplanned fashion, the road network often evolves in an ad hoc fashion which leads to conflicts. In these cases, quite often current homeowner expectations do not match the resultant traffic. There are areas on the Hillside where such development is occurring and the resultant travel patterns are causing issues. The travelshed associated with Goldenview Drive is one such example. Subdivisions uphill have occurred without connectivity

downhill aside from Goldenview Drive which has connectivity only to Rabbit Creek Road. As subdivisions are added uphill, downhill areas experience the traffic growth. In this case, travel has grown at the intersection at Rabbit Creek and Goldenview, which has become congested. When the increased traffic is on roads that are neither intended nor designed for it, safety is compromised. In this case, the grades, site distance, and road design for roads like Bluebell Drive and Prominence Point Drive were not designed as major collectors but they are being forced to act as such as uphill growth contributes to traffic.

Where homeowner expectations for traffic levels on "their" street were not anticipated or planned for, understandably there is both driver and local residential frustration. On the Hillside, this occurs where development has created demands for north-south connections where none have been provided (particularly in the southern half of the study area). A prominent example is South High School. The southern half of the school's boundary (south of De Armoun Road) is not connected by any north-south arterials. This causes inefficient travel, whereby trips to and from the high school must go downhill to the Seward Highway to complete their journey. Some travelers had discovered they can cut through using East 142nd Avenue and East 140th Avenue. As that route has become more and more known, the traffic levels have grown and the usage characteristics of the road change. This is an example where there is a missing collector/arterial road.

Travelers use local roads, such as E. 140th and E. 142nd, for thoroughfares.

The subsequent effect is a local road functioning other than its intended purpose (of providing access to people's properties). Neither of these streets is intended for nor designed to accommodate arterial or collector traffic. Homeowners on this street also had no expectation that this street would become the de facto arterial serving north-south trips within the southern half of the district.

The most serious issue for poor connectivity is the threat of wildfire. Numerous subdivisions have only one way in and one way out. If these roads were ever to be cut off by fire, evacuation in and out and emergency vehicle access for fire fighting would be severely hampered. Bear Valley Residents, Golden View, and upper Potter Valley are all examples of the Hillside where the road network essentially functions like a long cul-de-sac. The MOA Fire Department plans to adopt the 2006 International Fire Code in January 2008, which deals with such fire access issues. The policy, which will replace the 2003 fire code, states that where a wild land fire risk exists and there are 30 or more dwelling units on a single public or private fire apparatus road, two access points will be required.

Residents have expressed frustration because it appears that traffic patterns are generated by developers and are not planned. Residents are concerned that development is driving the road construction, whereas the roads should be planned coincidently or before big blocks of development are allowed. The term "leap frog development" is used to describe development that gets out ahead of planned infrastructure. In such cases, the concern is that the full cost of the development is not borne by the developer or subsequent buyers. Often the city or utility ends up bearing the costs of extending or upgrading service levels caused by the unplanned growth. Other unintended consequences can also occur. Early subdivisions might get approved, but as cumulative impacts occur, at some point development decisions will get turned down. Latter owners may then end up with expensive costs to mitigate impacts because they caused the impacts to go over the tipping point or they get turned down altogether. The ad hoc nature of growth is generally not equitable and provides a reason to promote good planning.

Considerations in Moving Forward

Guidelines to use to make connectivity improvements should include an assessment of travel patterns and the potential of a proposed road segment's capability to improve access to major Hillside areas as well as improving access to and from the Hillside for planned growth. Major connectivity should be planned in conjunction with planned growth and support densities envisioned in the plan.

Residents worry about making new connections in established areas for fear that such connections will rapidly increase traffic levels within their neighborhoods. In an area like the Hillside with low connectivity, such a concern is likely warranted. Because of the poor connectivity, any new connections could tend to be a relief valve that would rapidly fill up where congestion or inefficient routing currently frustrates drivers. Additional connections should be carefully planned and be of sufficient density to support planned development and resident expectations.

Hillside residents expressed the need for roadway connectivity, but in doing so, neighborhoods should not be divided or degraded. As for design, Hillside residents expressed that they don't necessarily want faster and wider roads. The tendency for cut-through traffic should be mitigated with appropriate design measures. For example, the Elmore road extension project, constructed in 2004, improved connectivity to several schools and increased the ability for emergency response and fire safety on the Hillside. Many Hillside residents said Elmore Road was an example of a good road design. A narrow lane-width and single lanes in each way were maintained.

The ability to provide connectivity is closely tied to issues of road ownership and maintenance. In many areas of the Hillside (outside of the Anchorage Roads and Drainage Service Area), the MOA does not have the authority to take ownership or develop new road connectivity. The state is unlikely to have funding or manpower to develop new road connections in these areas that are generally considered to be a local responsibility (like the low volume arterials and collectors between subdivisions on the Hillside). Limited Road Services Areas (LRSAs) do not have the authority to develop new roads or make major capital improvements to roads. Developers do not have eminent domain authority to make new connections across private property they do not own. To achieve better connectivity as additional development occurs, we will need to find solutions to these ownership/management issues.