



Washtenaw County Department of Planning & Environment

TO: Planning Advisory Board Members

FROM: Anya Dale, Associate Planner

DATE: February, 2007

SUBJECT: Gravel Road Capacity Analysis

Introduction

As population growth and development continue to expand into rural areas, so increases the demand for services to these areas. Residential development and associated traffic can overburden gravel roads, raising safety issues and requiring ever more maintenance with limited resources. Without proper planning, rural residential development can have a sprawling effect, threatening the rural character many communities strive to preserve, as well as threatening natural resources such as water quality.

A study of gravel road capacities and impervious surfaces as a means to manage growth in rural and suburban communities was prepared by the Huron River Watershed Council in partnership with Planning & Zoning Center, Inc., Livingston County Department of Planning, Washtenaw County Department of Planning & Environment, and the Livingston and Washtenaw County Road Commissions. The product is a guidebook titled "How Much Development is Too Much" which coaches communities on how to determine the traffic capacity of gravel roads as well as the degree to which local streams can handle increasing impervious surface area. Its purpose is to provide a means for communities to "match levels of development to the natural system's ability to absorb runoff and to the gravel roads' ability to handle traffic." (pg 3) By considering the determined capacity for each gravel road, communities are able to make more informed land use decisions regarding location, provisions and limits for development, as well as prioritize roads for improvement and maintenance.

The Importance of Considering Gravel Road Capacity

Without the consideration of gravel road capacity and impervious surfaces associated with the development of rural land, development of these areas can quickly become unsustainable for communities. By conducting a build-out analysis, the impact of development and traffic on gravel roads can be predicted and roads which are currently or which would become over capacity can be identified. Many communities find that should development occur to the extent allowed by their existing zoning ordinance, most roads either are, or soon will be over capacity. However, County Road Commissions often have limited funds for road maintenance and paving and are thus unable to keep pace with development.

Increasing development in rural areas often necessitates paving gravel roads to safely accommodate traffic. Paved roads, like other impervious surfaces such as rooftops, increase runoff; associated flooding and erosion deposits sediment and pollutants into waterways. Consequently, rural watersheds are experiencing less groundwater recharge, more flooding and more pollution. By determining road capacities, communities are better able to direct growth in a manner to lessen impact on gravel roads and on the environment. Directing development to areas already served by paved roads, or techniques such as clustering can reduce the cost of gravel road maintenance or road paving. Such patterns also reduce impervious surfaces and protect water quality as well as open space. This can help to preserve the rural character of communities, as well as better manage funds for roads and utilities.

Overview of Gravel Road Capacity Analysis

Gravel Road Capacity: the limit of use above which there is a noticeable degradation in quality or level of service of the road.

Buildout Capacity: future capacity a community will experience if the land is developed according to community planning and zoning

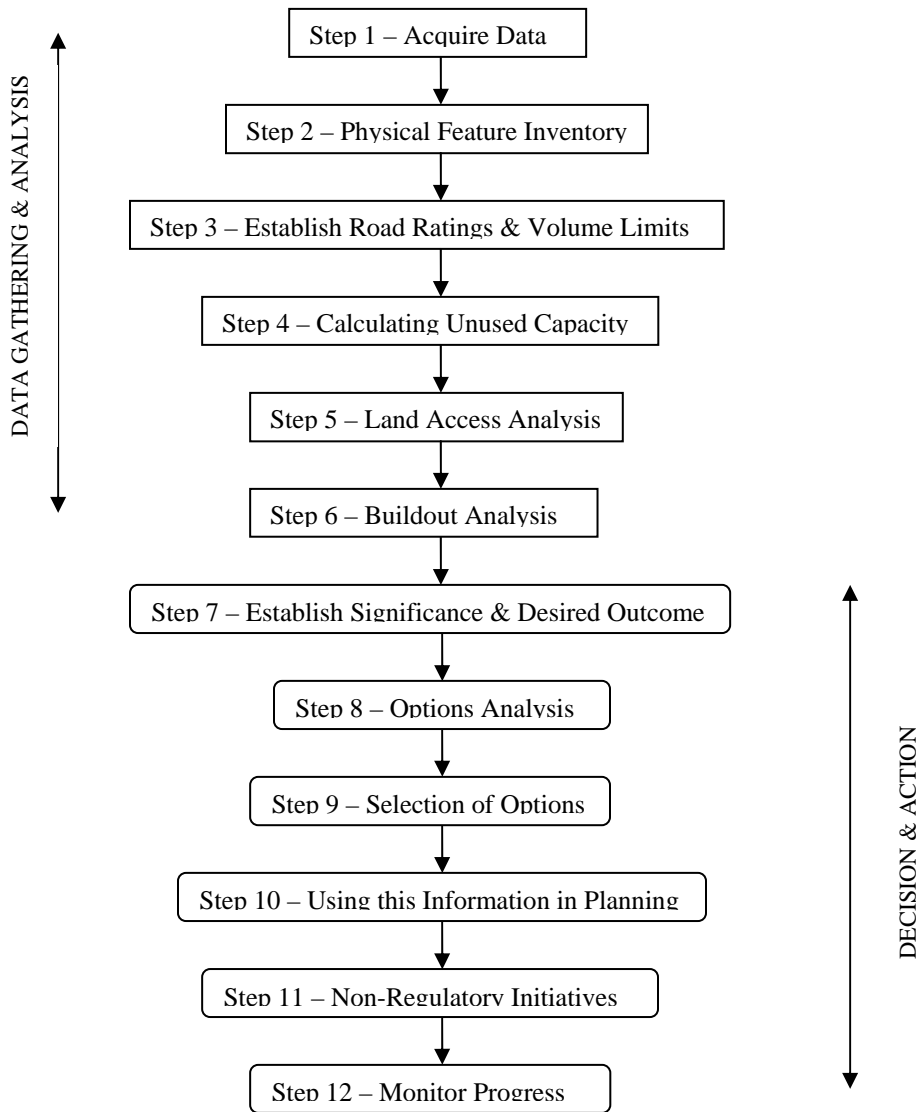
Unused Capacity: “available” buildable area before reaching capacity

The Gravel Road Capacity Analysis begins with gathering traffic volume and road condition data for all gravel roads within the study area. In the model study, the Washtenaw County Road Commission gathered this information and established the existing conditions for each segment. Road conditions were logged by completing a “Gravel Road Inventory Field Worksheet” for each segment, requiring details such as width, surface type, roadside vegetation, clear zone, and drainage adequacy. This information is used to form a classification system to rate each road based on existing conditions.

After acquiring data on traffic volumes and establishing road ratings, capacity limits at which the road integrity and safety can be maintained are identified. For gravel roads which have not yet reached capacity, unused capacity can be calculated to determine the amount of traffic increase or the number of dwelling units each segment of road can accommodate. At this point communities may include a Land Access Analysis by considering each parcel to see if primary access is from a gravel or paved road, and whether that road is over capacity. Capacity and access information is used to calculate the amount of buildable acreage with access to road segments before reaching capacity.

Using zoning maps, the buildout analysis for the area is determined, showing the extent to which the area will be developed per the current zoning ordinance. The number of dwelling units that can be accommodated with the amount of unused capacity, or buildable acreage, is compared to the number of dwelling units allowed within the zoning ordinance. In many cases, the unused capacity on a gravel road segment is not enough to accommodate the densities the zoning ordinance allows. In comparing the gravel road capacity with the buildout analysis, communities may identify potential problems and make suitable adjustments.

12 STEPS TO INTEGRATING GRAVEL ROAD CAPACITY ANALYSIS INTO LOCAL PLANS AND ZONING



Source: Planning and Zoning Center, Inc.

The Guidebook “How Much Development is Too Much?,” which models the gravel road capacity, analyzed pilot communities Webster and Northfield Townships of Washtenaw County and Putnam and Green Oak Townships of Livingston County. Upon completion, meetings were held to present the report to the townships, discuss the findings, and consider possible remedies. Webster Township has since included language regarding the importance of considering gravel road capacity in their most recent Master Plan

update. The Township also uses the information gained from the study when reviewing rezoning requests.

Following the completion of “How Much Development is Too Much?” Livingston County completed a Gravel Road Capacity Analysis for the remaining townships not included in the pilot study. For each township, three maps were made. The first presents all of the townships gravel roads with assigned classification based on existing conditions. The second map illustrates all of the road segments current capacity status. The third shows segments that will exceed capacity at build-out, meaning the density allowable through zoning is greater than the maximum allowable density based on the capacity of the gravel road. Creating such maps offers a way to visualize the potential impacts of maintaining current zoning provides an opportunity to modify existing zoning or policy to avoid future problems and directs growth and road maintenance funds in a way that is sustainable.

Low density residential development in rural areas often overburdens gravel roads and county road commission resources. Communities can use Gravel Road Capacity Analysis to identify roads which are over capacity and more effectively plan for growth by coordinating findings with their zoning ordinance and mater plans. For example, communities can refine land use plans and development regulations to limit development along roads which are over capacity. Rural subdivision access points can be located in order to minimize conflicts. The information could also be used in capitol improvement plans linking master plans and road improvement plans to coordinate decision making and project funding. Additionally, gravel road ratings can be used to review proposed site plans or rezoning requests, and to set maintenance priorities for the road commission.

With a variety of ways in which the Gravel Road Capacity Analysis can benefit a community, the inclusion and consideration of gravel road capacity is an important part of effective planning. With proper planning, communities can preserve rural character and natural resources, better plan for road improvements by ensuring necessary infrastructure is available prior to development, thus minimizing the financial and environmental costs of development.

Recommendations

- Consider rezoning areas to create higher density along existing paved roads, and limit further development that would push roads already over capacity further.
- Add incentives in zoning ordinances to concentrate development or transfer development rights where facilities are adequate and provide strong incentives for cluster development where access is not along paved roads.
- Use Gravel Road Capacity Analysis of relationship to Impervious Surface Analysis, as outlined in the “How Much Development is Too Much” guidebook.
- Coordinate between local units of government responsible for planning and approving development and the Road Commission responsible for maintaining roads.
- Enhance permit coordination between local unit of government (LUG) and Road Commission to ensure new development won't exceed gravel road capacity, or

improvements are included in the plans to accommodate additional traffic. For example, a municipality agrees not to approve any site plan before the county Road Commission can review the driveway permit application and vice versa. Each conditions the approval on the grant of a permit by the other. This allows the road commission to reference existing volumes, physical conditions and future plans for the road.

- Integrate the Gravel Road Capacity Analysis into local plans and zoning ordinances.
- Adopt a public facilities ordinance with a focus on infrastructure, including gravel roads. All new development should be required to be served by adequate public facilities before development can occur.
- Reduce allowable development density until road capacity improvements occur and shift development to areas where roads are paved and other urban services are available. (p19)
- Build Up and In, Not Out (p20): Encourage higher densities where services exist (water, sewer & paved roads) and keep density low in rural areas (at levels that won't exceed capacity of gravel road). Establish rural densities consistent with natural resource management, rural character preservation, environmental quality and the availability of public facilities and services.
- Educate landowners and developers about the purposes, benefits and procedures associated with considering infrastructure/roads, etc before development
- Begin or enlarge participation in land conservancy, PA116 or farmland PDR programs.
- Prepare and annually update capital improvement programs (CIP) for gravel roads and coordinate with county Road Commission. Establish a CIP that identifies priority improvements and funding sourcing including federal, state, local and private contribution. Recommendation 3.2, Ch 10
- Adequate Public Facilities approach requires a community to adopt a CIP to have a basis for future development decisions in presently undeveloped areas. The CIP would refer to the plan for the community to identify where future planned growth for the community would be and where growth should be limited due to inadequate facilities.

Attachment

“How Much Development is Too Much? A Guidebook to Using Impervious Surface and Gravel Road Capacity Analysis to Manage Growth in rural and Suburban Communities.”
By the Huron River Watershed Council and Planning & Zoning Center, Inc. August 2003
http://www.hrwc.org/pdf/PAL_Guidebook.pdf