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EXECUTIVE SUMMARY

The project involves a land use and transportation analysis for the US Route 19 Corridor in Washington County. The limits of study are from the City of Washington to the Allegheny County line and include North Strabane, South Strabane and Peters Townships. US Route 19 connects to the regional highway system and serves as a principal arterial to major destination points in and beyond the project area. The study was initiated to investigate the need for future improvements and to assess the need for changes to current land use and development policies. The overall goal of the study is to identify ways to preserve the operational effectiveness of the US 19 Corridor while improving safety and managing future community growth.

US Route 19 in this area is typically a four lane facility with a variety of continuous and designated turn lanes, and a curbed median without turn lanes in certain areas. There are numerous traffic signals as well as areas that provide free flowing travel conditions. The land adjacent to US Route 19 is zoned and used primarily for commercial development. US Route 19 is the primary commercial zone for each of the three municipalities in the study area. Undeveloped land in the corridor is under heavy development pressure and is anticipated to be developed in the future.

This analysis estimates the existing and future travel demand on US Route 19 and recognizes the need to maintain regional mobility by managing access and improving travel efficiency, operations, and safety. The following issues are needed currently or are likely to become a major issue in the future:

- Transportation linkages to existing and future development and a better understanding of development impacts on the transportation system;
- Coordination and management of development through better planning, such as improved access management principals and other management initiatives;
- Management of traffic signals and driveway connections in select areas to help maximize the operational efficiency of US Route 19;
- Management of congestion and delay in areas where development has occurred and development is planned;
- Upgrades at key intersections to improve access to US Route 19 and through-travel efficiency;
- Aesthetics throughout the corridor;
- Safety at high accident locations, particularly the US Route 19/I-70 Interchange; and,
- Local and state coordination, relative to transportation and development, to better understand impacts from development.

Future development was projected based on discussions with local officials. There is substantial development underway or planned throughout the corridor. The future land use scenario that was developed for this study considers the year 2025 and shows an increase in commercial and residential development in the corridor area. The analysis identified the types and general location of proposed development and the adequacy of

the supporting transportation system. Future travel demand was determined through a linear yearly increase and from trip generation calculations for planned developments. This enables future demand to consider general traffic increases as well as the effect of specific developments.

The analysis of key intersections is an important indicator of the efficiency of the overall route. Existing and future intersection operations (PM peak hour) at key intersections throughout the corridor were analyzed. Existing traffic conditions are for the year 2005 and the design year/future scenario is 2025. Intersections that operate poorly in 2005 and are projected to operate poorly in 2025 include: McMurray Road; McClelland/Galley Roads; Weavertown Road; Strabane Square; and Oak Springs Road. Valleybrook Road, Crosswinds Drive, and Manifold/Cameron Road currently operate at acceptable levels of service, but are projected to operate below acceptable service levels in 2025.

The development of alternatives for this project involves both transportation and management initiatives. A variety of options could include small transportation improvements; land use planning; congestion management measures; and access management initiatives. Other management initiatives include: denser mixed use developments; transit oriented development; development in areas where infrastructure costs are less severe; and incorporation of agricultural preservation and open space. These measures are a means to mitigate development induced traffic impacts and control infrastructure costs. Developing areas can incorporate these elements through a number of means including planned residential developments, traditional neighborhood design, and transfer of development rights provisions.

A concept for US Route 19 was developed that considers a variety of management and design options. The overall strategic approach to US Route 19 includes a corridor-wide focus on management options. Successful implementation of these techniques would help alleviate the need for future widening, which would be very costly and have significant impacts throughout the corridor. This approach provides a cost-effective way to manage and maintain the operational effectiveness of US Route 19 for the long term.

SUMMARY OF FINDINGS				
Issue	Findings	Benefit	Implementation Difficulty*	Responsibility
MANAGEMENT / PROCESS**				
GENERAL				
Congestion Management	Further develop “A” and “B” rated measures noted in SPC regional CMS including access management and other specifics shown below.	Lower cost management measures assist in overall management of congestion along US 19.	Low – lower cost, less expensive, less controversial measures that are effective.	SPC, PennDOT SPC to lead CMS initiatives – others to assist as appropriate.
Access Management	Manage access through local ordinance.	Cost-effective techniques provide high benefit relative to other options.	Low to medium – Allows for gradual improvement over time.	Municipalities to lead – PennDOT to assist as appropriate.
SPECIFIC				
Manage Curb Cuts	Access management standards to manage curb cuts over time through non-conforming reuse. Retrofit/redesign of existing access could be further studied.	Allows status quo and provides for change over time. Redesign/retrofit option provides shorter term benefit.	Low – Allows for gradual improvement over time.	Municipalities to lead – PennDOT, others can assist through supporting driveway standards and participate with any redesign effort.
Signalized Intersection Spacing Criteria	Establish spacing criteria (>1/2 mile) to better manage traffic flow (US 19). Management approach to use existing signal access points prior to adding signals.	Provides standard for signal spacing to manage efficient through travel – balance access needs. Allows for new signals through a management approach.	Low –less controversial in developing area since it does not eliminate existing signals.	Municipalities to lead – PennDOT to assist.
Intersections / Signal Coordination	Further develop needed improvements at key intersections. Develop signal interconnect plan in Peters and South Strabane Townships.	Improves access to US 19 and maximizes efficiency of through travel. Will help to separate through traffic and turning traffic.	Low - “A” rated CMS strategy.	PennDOT to lead design changes. Municipalities to lead signal interconnect plan.
Aesthetics / Gateways	Develop gateway improvements through partnership approach. Further evaluate aesthetic improvements as a mechanism to modify access to US 19.	Benefits include improved aesthetics, land values, and access management.	Low - cost can be shared through partnerships.	PennDOT and municipalities need to partner with local interest groups
PennDOT/Local Coordination	State to review traffic studies/ impacts for projects affecting state roads to improve state/local coordination.	Improved decision making. Better transportation - land use management	Medium – state may need additional staff.	PennDOT and municipalities

SUMMARY OF FINDINGS				
Issue	Findings	Benefit	Implementation Difficulty*	Responsibility
Management of Development	Other management options are higher density mixed use developments, transit-oriented developments, conservation, and agricultural preservation. PRD's, TND's, TDR provisions.	Lower cost management option that creates long term sustainable benefits. Development oriented toward managing traffic impacts, reduce costs. Creates traditional design.	Medium – requires additional effort to develop. Likely to encounter resistance from development community.	Municipalities to lead. PennDOT, SPC, Washington County to support initiatives. Potential North Strabane development is emphasized.
Funding	Evaluate partnership districts and impact fees.	Provides revenues for needed projects. Helps move initiatives forward. Reduces relying on state funding for project costs.	Medium – requires effort to implement, but helps address funding limitations.	Municipalities – PennDOT, SPC, Washington County to assist.
DESIGN				
GENERAL				
Typical Road Section(s)	Establish two typical sections. 1) Two-way center turn lane in high driveway density area. 2) Median to manage turns and enable access to adjacent land uses.	Utilizes existing configuration and minimizes cost. Modifies median where needed. Allows center turn lane to limit controversy.	Medium - requires some costs to modify median. May incur some public opposition.	PennDOT
SPECIFIC				
Interchange Improvements (Valleybrook, PA 519, I-79/70)	Proceed with studies at Valleybrook Road and PA Route 519. Evaluate problems at I-70.	Interchanges handle higher traffic volumes, reduce delays, and can increase safety. Improves access to US 19 and through travel.	High Potential costs involved are high.	PennDOT –
North-South Connector	Further study the concept of the North-South Connector (if North Strabane development moves forward). Further evaluate a connection to proposed S. Beltway.	Connector would serve as a parallel service road to US 19 and serve potential development. Connection to S. Beltway will alleviate traffic demand on US 19.	High Costs will be high and funding is limited.	PennDOT Municipalities can assist through impact fees.

* Ease of implementation considers likely costs, impacts, and community receptiveness to the technique.

** Issues are shown as management or design-oriented, however some include elements of both.

I. INTRODUCTION

The study involves a land use and transportation analysis for the US Route 19 Corridor in Washington County. The study limit extends from the City of Washington to the Allegheny County line and includes North Strabane, South Strabane and Peters Townships (see Figure 1). US Route 19 is a principal arterial oriented north-south providing interconnectivity to the regional highway system. Arterials typically serve regional travel while accommodating local land access. However, development patterns along these arterials often make it difficult for these roadways to serve their primary purpose. Thus, developing a transportation-land use plan often requires compromise and extensive efforts for consensus. This study was initiated to investigate the need for future transportation improvements and to assess any changes to current land use and development policies in relation to the US Route 19 Corridor. The overall goal of the study is to identify ways to preserve the operational effectiveness of the US Route 19 Corridor while improving upon safety and managing future community growth.



US Route 19 looking north towards Crossroads

A further description of study objectives include:

- Achieving maximum efficiency and safety of the transportation system along the US Route 19 Corridor.
- Managing development and addressing future land development scenarios.
- Making recommendations to promote access management and other sound transportation planning principles.



US Route 19 at Demar Road

A strategic approach was developed through discussions with the project steering committee. Regular meetings were the focal point of the project and the basis of decisions. The approach/methodology emphasized collaborative consensus building and included the following steps:

- Finalize goals and objectives;
- Identify existing transportation deficiencies and needs;
- Identify existing and future land use plans;

- Develop conceptual strategic solutions;
- Analyze strategies and compare to goals, deficiencies, and land development plans;
- Conduct steering committee meetings to gather information and gauge support for various management options; and
- Develop recommendations and actions for future activities.

II. EXISTING CONDITIONS

i. Socioeconomics

Socioeconomic data was reviewed for the three townships in the corridor. SPC's Cycle 7 Forecasts for population, housing, and employment were analyzed. The Southwestern Pennsylvania Commission (SPC) develops future socioeconomic data through the Cycle 7 forecasting. Historical population, housing, and development trends were also reviewed. The area was well established as a growth area prior to 2000 with growth exceeding the county average. Peters Township has shown growth for every 10-year census from 1920 to 2000, usually more than 20 percent. There was a 137 percent increase in population in the 1960's and a 50 percent increase in the 1970's. The 2000 census indicated a 21 percent increase of 3,000 persons. North Strabane Township's population increased between 1990 and 2000 by 23 percent or 1,900 persons. Its 2000 population was 7,987 persons. South Strabane Township's population grew from 7,389 to 7,676 (13%) between 1980 and 1990 and to 7,781 in 2000 (1%). Household populations also grew by similar percentages. The data shows significant historical development within the corridor and the current development trends include continued development pressures.

There was also a high number of building permits issued for the area over the past 15 years. Peters Township averages between 100 and 200 residential building permits and up to 30 commercial permits per year. Over 2000 residential and 150 commercial building permits were issued since 1989. North Strabane Township had between 76 and 276 sewer tap-ins per year between 1994 and 2003. Residential building permits between 1995 and 2003 ranged from 75 to 150 and commercial permits have averaged about 10 per year. South Strabane Township had between 10 and 50 residential and business permits per year between 1994 and 2001 and this increased to 123 in 2002. The number of permits is expected to continue to increase due to future development pressures. Building permits include additions and renovations and do not necessarily represent a new residential unit.

Socioeconomic data is used to determine historical trends and to develop an understanding of how the existing conditions resulted. Future socioeconomic conditions (see Section III.i) expand on the data analysis and help to determine the future development scenario. The data shows a history of population and housing increases and development pressure that creates increased demand for infrastructure in the corridor.

ii. Land Use

Existing land use in the corridor was determined through a review of current land use and zoning maps, field views, and through discussions with local officials. Existing land use is determined and used as a benchmark for determining areas of future development. The existing land use map is shown as Figure 2. The corridor is predominantly zoned commercial and business for the areas adjacent to US Route 19 in Peters Township and South Strabane Township. North Strabane Township is also predominantly commercial,

but has some vacant and agricultural uses mixed in. This area is under development pressure and is likely to develop in the future. The areas adjacent to the commercial corridor of US Route 19 are mostly residential with single family units and a variety of multifamily units.

US Route 19 is the primary north-south arterial in the area. Interstate 79 also enhances land value and development potential in the central Washington County area. A review of the socioeconomic data and land development in the corridor reveals the importance of these routes. This area has available sewer and water infrastructure in addition to the transportation network provided by US Route 19 and I-79. The result has been a development spike that is much greater than that of the rest of the county. The development has created an increased transportation demand on US Route 19 and on the secondary roadway system.

Development in the corridor has occurred in different stages. Peters Township and the section south of the I-70/79 Interchange developed earlier and more densely than other areas. More recent large commercial developments have occurred near Waterdam Road and south to Weavertown Road. The area just north of the I-70/79 Interchange has also had several large commercial developments. The area between Racetrack Road and Weavertown Road is less developed but under development pressure.

Comprehensive plans were also reviewed for this analysis. The Peters Township Plan specifically identifies problems with US Route 19 that include excessive curb cuts, lack of signal coordination, and lack of defined access at intersections. It notes that US Route 19 serves the commercial district, which is an important economic base for the area. It also notes the challenges of curb cuts, lack of innovative design, sign clutter, lack of consistent streetscape, landscaping, and lack of parking flexibility. The transportation goal in the plan is to improve safety, traffic flow, and reduce congestion by promoting US Route 19 as a premiere commercial corridor that includes managing access points and intersection conflicts.

The North Strabane Township Plan recommends controlling access to US Route 19 through access management to decrease congestion and enhance safety. The Plan notes the need to optimize the efficiency of the existing road network. The Southern Beltway is proposed through the Township and the plan recommends a north-south connector roadway located east of US Route 19 to alleviate traffic pressure and to connect to the proposed Southern Beltway. This concept could assist US Route 19 as it is proposed in an area with significant development potential that otherwise would impact US Route 19.

South Strabane Township notes the need for orderly growth bordering US Route 19 through zoning and access controls. Growth pressures are noted for land adjacent to US Route 19. Recent developments along US Route 19 north of I-70/79 include Strabane Square and Trinity Point. Other developments have occurred along US Route 19 in South Strabane. These developments have resulted in additional demand for access to US Route 19 and have included the need for several additional traffic signals.

Existing land use through the corridor has developed in a manner that relies primarily on automobile use. Development has occurred in a manner that increases external vehicle trips. Alternative land use management plans such as higher density mixed-use developments; transit oriented development; conservation, open space and agricultural preservation; and other planning measures that would mitigate transportation demand and reduce external trips have not been effectively utilized.

iii. Transportation

The Township land areas are primarily served by the two principal north-south highway facilities: US Route 19 and Interstate 79. Other significant arterials include Racetrack Road (S.R. 1041), which is located along the border of North Strabane and South Strabane Township and serves east-west travel to and from I-79 and US Route 19; and PA Route 519, a minor arterial that serves the majority of the east-west travel in North Strabane Township. In Peters Township, McMurray Road (S.R. 1002) is an important and heavily traveled east-west roadway that links the community to US Route 19.

Functional Classification	Roadway
Limited Access Freeways	<ul style="list-style-type: none"> • Interstate 79 and 70
Urban Principal Arterials	<ul style="list-style-type: none"> • US Route 19 • Racetrack Road (S.R. 1041)
Urban/Rural Minor Arterials	<ul style="list-style-type: none"> • PA Route 519 • McMurray Road (S.R. 1002) • Valleybrook Road (S.R. 1010) east of US Route 19 • Waterdam Road (S.R. 1053) • McClelland Road (S.R. 1023) • Weavertown Road (S.R. 1025)
Urban Collectors	<ul style="list-style-type: none"> • Demar Road • Galley Road (S.R. 1023) • Manifold Road (S.R. 1047) • Valleybrook Road (S.R. 1010) west of US Route 19
Local Road	<ul style="list-style-type: none"> • Meadowbrook Road • Cameron Road • Fischer Road • Davis School Road

Source: Federal-Aid Functional Classification System Maps (SPC)

US Route 19 is classified as an urban principal arterial under the federal functional classification system. The characteristics of a principal arterial include: serving major centers of activity and regional travel; interconnecting and augmenting other arterials; providing important system linkage and continuity; carrying transit routes; and serving important mobility functions. A minor arterial has similar characteristics but emphasizes local land access to a greater degree than a principal arterial. A principal arterial emphasizes regional mobility over local land access. These two characteristics can

conflict with each other and result in an increase in the number of access points, signals, turning movements, and weaving areas. These features reduce mobility along the facility resulting in travel delay, congestion, and increased accidents.

US Route 19 is a four-lane facility with a variety of undivided, divided, and continuous center turn lanes. The section from the Allegheny County line south to McMurray Road has a five-lane cross section with a center turn lane. The section from McMurray Road south to Weavertown Road has a four-lane cross section with selected left turn lanes. Intersection turning lanes are separated by mountable concrete curbs (a median barrier exists south of Weavertown Road). The section from Weavertown Road to Racetrack Road includes a mountable concrete median with intersection breaks for the local connecting streets and driveways. Left turns are completed without separate turn lanes at these unsignalized intersections. The section south of Racetrack Road has a mountable concrete median with selected left and right turn lanes (see Figure 3 - Typical Sections).

Table 1 summarizes the design criteria for an urban principal arterial. Throughout the corridor there are a number of locations where the road does not meet the desirable horizontal and vertical grade criteria, minimum shoulder width criteria, and the adequate clear zone offset distances. However, US Route 19 has a reasonably good alignment.

The project area also has three interchange areas that have substandard features. The Valleybrook Road interchange/intersection configuration is currently under study by PennDOT due to substandard features and congestion. The PA Route 519 Interchange also has substandard interchange features (insufficient merge and diverge ramp lengths, undersized ramp radii, and severely skewed intersection approaches at the ramp termini with PA Route 519). This interchange should be considered for further study since this is an area of existing and future development and potential future access problems. The I-79/70 Interchange does not meet current PennDOT highway design standards (insufficient merge and diverge ramp lengths and add/drop lane lengths). With high volumes and driveways located adjacent to the interchange ramps along US Route 19, the interchange operational deficiencies are compounded with limited area for geometric improvements. The result is a high accident area, particularly for rear end and angle collisions, indicative of the lack of sufficient weaving lengths and turning traffic conflicts. The primary concern is the development and access points that have occurred in proximity to the interchange ramps.

TABLE 1 - Urban Design Criteria for Principal Arterials

	Minimum	Desirable
Design Speed	40 mph	60 mph
Pavement Width	11 ft (12 ft adjacent to curb)	12 ft (14 ft adjacent to curb)
Shoulder Width	8 ft (right shoulder) 4 ft (left shoulder with median)	10 ft (right shoulder) 4 ft (left shoulder with median)

	Minimum	Desirable
Vertical Grade	8% maximum grade (rolling terrain)	Not Applicable
Horizontal Radius	510 feet	1340 feet
Stopping Sight Distance ⁽¹⁾	305 feet (40 mph) 570 feet (60 mph)	NA
Intersection Sight Distance ^{(1) (2)}	500 feet (40 mph) 750 feet (60 mph)	NA

Notes:

- (1) Minimum Stopping Sight Distances and Intersection Sight Distances can vary depending on the roadway approach grades (increase distance for downgrades and decrease for upgrades).
- (2) Minimum Intersection Sight Distance for Passenger car.

Source: PennDOT Publication 13M, Design Manual 2 (DM-2)

Accident data was reviewed for the period from 1997 to 2003. Accident areas are shown on Figure 4. The accident data is summarized and included in Appendix A. Accident data was analyzed for nine segments within the corridor. Generally, a variety of accidents occur throughout the project area. The majority of these occur under no adverse conditions (459 of the 602 reported). Three fatalities were indicated. The accident rate calculated per million vehicle miles traveled for each segment varies but is below 1.0, except for the section near the I-79/70 Interchange from the signalized intersection of Oak Springs Road with US Route 19 to just north of the I-79/70 Interchange. This segment has a high accident rate of 10.24, more than ten times that of the other segments. The type of accidents include a high incident of rear end and angle collisions. Contributing factors also include tailgating, running red lights, sudden slowing or stopping, and traveling too fast for prevailing roadway conditions.

Figure 4 identifies various characteristics and deficiencies throughout the corridor segments. The segments north of Weavertown Road and south of Manifold Road are higher density commercial areas with a higher number of access points with US Route 19. The segment located mostly within North Strabane Township has a lower development density but is planned for future development. This area also includes a number of poorly configured access driveways, which allow left turns from the left through lane at several locations. The driveway geometrics do not conform to PennDOT driveway standards because of a lack of defined curb return or radius. Site driveways that are in close proximity to interchanges are also noted at each interchange. These deficiencies result in reduced effectiveness of US Route 19 and congestion and safety concerns.

III. FUTURE CONDITIONS

i. Socioeconomics

The Cycle 7 forecasts show 2000 population for Peters Township (17,566), North Strabane Township (10,057), and South Strabane Township (7,987). These are projected to be 17,249, 13,569, and 11,381 respectively in 2025. This shows substantial increase of 30 to 40 percent in North and South Strabane Townships and stable population growth in Peters Township. The Peters Township projections actually increase through 2010 and then decline slightly. This decline is projected due to a build out scenario and there is some disagreement whether any decline will occur. Table 2 summarizes and compares the population and household growth trends.

TABLE 2 - Socioeconomics SPC Cycle 7 Forecasts

	Population		Households	
	2000	2025	2000	2025
Peters Township	17,566	17,249	6,026	8,508
N. Strabane Township	10,057	13,569	3,975	6,331
S. Strabane Township	7,987	11,381	3,320	4,623
Washington County	202,897	215,327 plus	81,130	89,011 plus

The number of households is also projected to increase between 25 and 60 percent from 2000 to 2025 in North and South Strabane, with a substantial part of this occurring in North Strabane Township. Significant public infrastructure investment (sanitary system) will likely induce development and push the number of households well above these projections. The data, combined with a review of the historical trends and analysis of planned development, reveals a highly developing corridor where the pace of residential and commercial development has accelerated.

The comprehensive plan for each township was reviewed to identify their vision for the future and objectives related to land use and transportation issues. The Peters Township vision presented in the Comprehensive Plan includes an efficient transportation system that meets the needs of the community. The goal is to improve the roadway and intersection safety, flow of traffic and reduce overall traffic congestion. North Strabane Township notes the need to address increased traffic congestion and sustain growth in the Comprehensive Plan. It describes the need to optimize the benefits of the transportation system, specifically managing the number and frequency of driveway access points to US Route 19. The South Strabane Township Plan identifies the goal of creating and managing orderly development patterns. It notes the importance of maintaining the quality, adequacy, and safety of the arterial highway system.

ii. Land Use

Future development was projected based on a review of zoning ordinances and future land use maps. Discussion with local officials assisted in identifying a variety of developments that are underway or planned, as well as indicating new phases to existing developments. In addition to discussing these with the local officials, SPC maintains a development monitoring database and this was reviewed to help develop a future land use scenario. The future land use scenario considers the horizon year 2025 to coincide with the traffic design year. Most of the planned projects are anticipated to occur within the next ten years and other projects may well develop that are not readily apparent today. The future land use scenario considers past development rates and trends, planned development, and other development that may occur prior to the horizon year of 2025.

Peters Township

The future land use scenario shows an increase in commercial and residential development in the study area. The Peters Township section is already highly developed with commercial and residential uses. However, additional commercial development is planned along US Route 19, which includes ten expansions and new buildings in 2004. There are also several developments for new single family units and additional phases of ongoing developments that total approximately 600 lots. Several large multifamily units are proposed that total approximately 300 units.

North Strabane Township

North Strabane Township has experienced substantial commercial and residential development, particularly along US Route 19 in its northern section adjacent to Peters Township. Other commercial development has occurred in the southern part of the Township adjacent to Racetrack Road, and a number of significant commercial and residential developments are planned and anticipated for the future. Industrial park expansions in the area are anticipated to employ 3,000 people. It is significant that in the central area of North Strabane Township, zoned primarily for agricultural use, substantial residential development may occur. Extensive investment in a sewer system expansion and upgrade is projected within this area just east of the US Route 19 Corridor. Projections of 4,500 additional residential units are anticipated by 2025, which exceeds the current total household units of 3,975 (2000) in the Township. The 4,500 number is currently not included in the SPC Cycle 7 projections.

There is some discussion as to the benefits of developing this agricultural area. This development has the potential to adversely affect roads that connect to US Route 19 as well as the local street network. The scale of development will result in creating significant costs to upgrade the transportation network. Funding options for needed improvements will need to consider nontraditional measures since the Transportation Improvement Program (TIP) currently has more projects than funding available for the required design, right-of-way, and construction of such projects. Moving additional projects forward through the TIP will be extremely difficult.

South Strabane Township

South Strabane Township has historically seen commercial development along the US Route 19 Corridor. US Route 19 is the northern “gateway” to the City of Washington and the area in the vicinity of I-70/79 Interchange has become highly commercialized. Murtland Avenue includes strip development and the Washington Mall area. More recently there has been a substantial increase in large commercial and residential development in the US Route 19 Corridor north of I-70. Strabane Square and Trinity Point are large commercial developments, and there are additional outparcels and future development expected in these areas. There is also a large multi-office development planned near Manifold Road, and a large commercial outlet and mixed use development proposed near Racetrack Road. There is also a number of multi-family and single family residential units proposed in the corridor totaling several hundred units. As previously noted, the population is anticipated to grow by 3,300 persons or 40 percent and households are projected to increase in 2025 by 1,300 or about 35 percent.

The future land use scenario for 2025, as shown on Figure 2, anticipates continued commercial and residential development in Peters Township with a leveling off as 2025 approaches. North Strabane Township will see a continued increase in commercial development and substantial increases in population and residential development, particularly in the vicinity of the US Route 19 Corridor. South Strabane Township will also see a continued increase in commercial development and residential development in the US Route 19 Corridor. The future scenario for US Route 19, if not properly designed and managed, includes major negative impacts to US Route 19.

The additional access demands, signalized intersections, and traffic growth from development will reduce the capacity and operational effectiveness in areas of US Route 19, specifically between the signalized intersections of Manifold Road and the I-70/79 Interchange area. The result may necessitate the need for capital improvements to US Route 19 to increase capacity in areas of higher density of access points and signalized intersections.

This analysis is used to analyze the development and the supporting transportation system, including US Route 19 and the secondary roads that connect the development to US Route 19. The traffic projections and growth scenario that is presented show that development will create additional future demand on US Route 19 and the secondary roadway system linking US Route 19 with the I-79 interchange system. Transportation money is very limited and solutions need to consider management options and other funding strategies.

Management options to mitigate the cost and demand created by this development include: denser mixed use developments; transit oriented development; preserving open space and agricultural land; and focusing development in areas best suited to handle the demand. Planned residential developments, traditional neighborhood design, and transferable development rights are initiatives that could help to manage development induced transportation impacts. These management options are further described under corridor management options.

iii. Transportation

Future travel demand was based on an applied yearly background traffic growth rate factor and from new trip generation data based on the proposed and current development projects in each of the three townships. Planned developments were identified by local officials and trip generation rates for the P.M. Peak Hour period (4:00 P.M. to 6:00 P.M.) were determined through the methodologies presented in the Trip Generation, 7th Edition published by the Institute of Transportation Engineers (ITE). New trips were assigned to each development and to the transportation system, based on a regional arrival and departure distribution and on the geographical location of the site development to US Route 19. This enables future demand to consider general traffic increase as well as the impact of the specific developments.

Traffic impact scenarios were not assumed for the inclusion of the Pennsylvania Turnpike Commission's Southern Beltway Project and the proposed north-south connector road proposed in North Strabane Township because of the level of analysis required and the complexities both these projects would have on the US Route 19 Corridor. A separate more detailed network traffic study was conducted for North Strabane Township with a more comprehensive list of land use scenarios. The results of that study, which consider a build out scenario for 2025, indicated that the surrounding roadway network connecting to US Route 19 will operate at Level of Services (LOS) E or F during the P.M. Peak Hour. Other proposed large development projects located within the vicinity of Racetrack Road and Manifold Road were included in the future scenario for this study. These development projects are currently being reviewed by both PennDOT and SPC to determine what specific impacts they will have on the US Route 19 Corridor and its connection with I-79 and I-70.

The Average Daily Traffic (ADT) volumes along US Route 19 currently range from 27,000 vehicles per day north of McMurray Road, 31,000 vehicles south of McMurray Road, and approximately 17,000 vehicles per day south of the PA Route 519 Interchange. These numbers are projected to reach 30,000, 35,000, and 22,000 vehicles per day, respectively, by the design year of 2025. Several connecting roads, such as Weavertown Road, Racetrack Road, and Manifold Road, linking US Route 19 with I-79, have daily traffic volumes that are also projected to significantly increase. The key intersecting cross routes are further analyzed and discussed under the intersection LOS summary table and on the land use figure.

Roadway Analysis Methodology

US Route 19 is projected to operate at acceptable LOS in 2025 with and without the future-build scenarios, based on the procedures in the HCM for multilane segment analysis. As previously mentioned, this measure of analysis is limited to, and intended for, roadway segments with uninterrupted traffic flow. Because many of the critical roadway segments along US Route 19 are located within a cluster of traffic signals, the desired analysis procedure selected was performed using the HCM methodology for signalized intersections. Signalized intersection analysis is dependent on a wider range

of operational characteristics in determining the LOS results, such as lane configuration, prevailing traffic conditions, signal cycle lengths, etc.

Although the analysis methodology for signalized intersections described in the HCM is sufficient in estimating the intersection delay at an isolated intersection, traffic queuing or “bottleneck” observations, signal timing optimization, and traffic signal coordination timings can be more accurately determined and observed by utilizing the traffic signal timing software and simulation tool Synchro/SimTraffic developed by Trafficware. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the 2000 HCM, but is more flexible in modeling grid networks typically found in urban environments with signalized and unsignalized intersections.

Additional signals within close proximity to an existing signal, or to a network of signals, are of the greatest concern since they reduce the capacity of US Route 19 and increase the total travel delay through the roadway segment. Several isolated intersections and intersections within a signal network are projected to operate at an unacceptable LOS. This may create the need to widen US Route 19 in order to reduce the congestion at the intersection or through the network of intersections. There is not likely to be funding available for this type of roadway mitigation. Therefore, there is a need to address future demand through management initiatives and selected transportation improvements.

Table 3 summarizes the forecasted trips to be generated by the proposed developments. Smaller developments, or a development that is not foreseeable at this time, are accounted for by the applied background traffic growth rate factors of 0.5 percent per year north of PA Route 519 and a 1.0 percent per year south of PA Route 519. The yearly background traffic growth rate factors were used to develop the design year 2025 traffic volumes without development, then the projected new vehicles trips were added to emulate 2025 traffic volume under a build-out scenario. Table 3 indicates the size, location, and land use of the developments for Peters Township, North Strabane Township, and South Strabane Township.

IV. PLANNED TRANSPORTATION PROJECTS

There are a number of planned transportation projects in the US Route 19 Corridor as shown on Figure 5. The main purpose is to include these projects as a part of the future land use and transportation scenario for the corridor. An additional project that was not on the TIP, but has been funded for study purposes, is the upgrade and redesign of the Valleybrook Road intersection with US Route 19. Figure 5 also describes other transportation projects that are not on the TIP. These include a network study by PennDOT in South Strabane Township along US Route 19 near the I-79/70 Interchange. Additional lanes on US 19 have been suggested in this area, however funding for this scale of a project is not available and PennDOT has reservations on what the specific improvements might be to improve the segment operations. This project is not shown on the SPC 2025 Development Plan or the Washington County Comprehensive Plan.

Figure 5 indicates the location and status of projects partially programmed on the TIP. These projects address some needs and deficiencies in the corridor on a localized scale. However, they do not address the broader needs of the corridor, including preserving of the operational effectiveness of US Route 19. These projects can also spur additional growth, creating additional future traffic demand. To further compound this, the TIP is burdened with more projects than available funds. Existing TIP projects are likely to be delayed. It is estimated that completion of the existing TIP projects will take until 2018. It is unlikely that additional funding will be available to add projects to the TIP, particularly costly improvements such as adding through lanes to US Route 19. Management options as well as innovative funding strategies are needed for the US Route 19 Corridor.

One other very important development factor is the proposed Southern Beltway, which is planned through the area (as shown) with a potential interchange configuration and an at-grade intersection access to US Route 19. Preliminary interchange concepts show an interchange just south of Waterdam Road and a connection to US Route 19 in a developed area. Access to and from an interstate to a principal arterial is desirable to facilitate regional travel and interconnectivity, however the effects on US Route 19 should be carefully analyzed by the Pennsylvania Turnpike Commission. The purpose of this study is to manage travel efficiency on US Route 19 in the future and a limited access highway connection creates some additional challenges. One scenario worth analyzing involves a proposed north-south connector with an interchange to the Southern Beltway that could provide traffic relief for US Route 19.

V. CORRIDOR MANAGEMENT OPTIONS

The future scenario that is presented for the US Route 19 Corridor should cause concern for officials. A variety of management options in the corridor could be utilized to address these concerns. They include relatively small transportation improvements; land use planning and access management initiatives, congestion management, and travel demand management efforts. Based on the project goals, needs, deficiencies, and local comprehensive plans, a concept for US Route 19 was developed that considers a variety of these elements. An overall corridor concept is presented; however, these recommendations could be considered a menu of options, where a municipality or agency could implement portions of various recommendations over the short and longer term. The strategy needs to find the proper balance of serving through-travel movement (a key characteristic of principal arterials) and providing necessary access to the adjacent commercial zones. In order to achieve this balance, a number of management options need to be considered.

The SPC conducts and maintains a regional congestion management system and evaluates the benefits of various strategies for congested corridors throughout the region, including the US Route 19 Corridor. This analysis serves as a good starting point to evaluate various management measures. SPC labels various measures as A, B, or C. Measure “A” strategies are low cost, highly effective on congestion, and not controversial. Measure “B” strategies have moderate cost, positive effects on congestion and low or moderate controversy. Measure “C” strategies have low positive effect on congestion, are highly controversial, or are generally inappropriate. Measure “A” and “B” strategies therefore have the best potential to manage congestion for a particular corridor. Appendix B includes a table of the results of the SPC Regional CMS issued in 2001.

“A” strategies in the US Route 19 Corridor include traffic signal improvements, intersection geometric improvements, and education for transportation support policies. “B” strategies include improved transit, park-n-ride/intermodal improvements, employer-based programs, pedestrian and bike improvements, Travel Demand Management (TDM) education, elimination of bottlenecks, access management, growth management, and transit-oriented development. A review of the transportation demand and land use confirms that these strategies are appropriate for this corridor. It is also noteworthy that lane additions and single-occupancy vehicle facilities are “C” strategies.

i. Traffic Signal Improvements/Signal Spacing Criteria

SPC’s regional CMS recommends traffic signal improvements in the US Route 19 Corridor. Table 4 under intersection improvements (V.ii) describes issues and preliminary recommendations at signalized intersections throughout the corridor. A traffic signal interconnect plan is recommended for the signal system network at McMurray Road, McDowell Lane, Crosswinds Drive, and Waterdam Road. In South Strabane Township an upgrade to the traffic signal interconnect plan is recommended for

Cameron/Manifold Road, Northgate Plaza and Trinity Place. North Strabane Township has a new signal at Meadowbrook Road and several other signals are possible.

The spacing of existing and future signals, to provide continuous progressive movement of traffic, is essential to preserve the quality of flow and safety. The objective is to achieve relatively uniform spacing with sufficient distance between signals to maintain the through-travel speeds and reduce vehicle delay. This is accomplished by allowing vehicles to progress through the intersection without stopping. The locations of the signalized intersections have a direct effect on the network timing plans for signal coordination. The optimum distance between signals depends on the cycle length and prevailing travel speed. An analysis of optimum spacing guidelines determined that a minimum distance is one-half (1/2) mile or greater. Spacing greater than a half mile is used for higher speeds and longer cycle lengths. The minimum spacing is less than the half-mile criteria at several existing signal locations. Other sections have spacing greater than one mile but are under future development pressure. Therefore, the spacing guide of at least a half mile should be used. Future signals, especially those within the half mile criteria, should first consider other options, including connections to existing signalized crossroads or a right turn “in/out only” access prior to the approval of any new signal installation. Vehicles can perform a “U-turn” at a downstream intersection (exclusive left turn storage lane provided).

A review of existing traffic signals in Peters Township near Donaldson’s Crossroads indicates system coordination, but based on a field view of the area, no coordination was observed. Peters Township should address this by a reanalysis of the signal system or at least by maintaining the traffic signal timing operations in accordance with the latest traffic signal permit plans.

ii. Intersection Improvements

The capacity analysis for the existing and future traffic conditions were analyzed along US Route 19 using the traffic analysis tool Synchro.

Table 4 summarizes and compares the LOS results experienced during the P.M. peak traffic periods. These are shown for the existing 2005 traffic conditions, the forecasted base 2025 traffic conditions (no-build scenario), and the forecasted 2025 traffic conditions (full-build scenario).

The focus is on the signalized intersections and any unsignalized intersection or ramp configuration that would affect through travel or create or exacerbate bottleneck areas. There are a number of other intersections throughout the corridor that would benefit from geometric modifications or signal timing adjustments, but the focus of this study is on key intersections that significantly impact travel along US Route 19.

The purpose at this stage is to identify problems and provide conceptual improvement alternatives and management techniques along the corridor. More detailed studies should

occur at these key locations. The following is a list of intersections under study and intersections with observable needs:

- ✓ The signalized intersection of Valleybrook Road and US Route 19 is planned for geometric and signal improvements. As of this writing, PennDOT is currently soliciting consultants to perform preliminary and final design documents for this intersection area.
- ✓ McMurray Road will operate at a LOS F and is expected to be over capacity by the design year 2025. In order to maintain through travel along US Route 19, a comprehensive corridor analysis and a complete traffic signal interconnect plan, with the adjacent signals, are recommended.
- ✓ The northbound, southbound, and eastbound left turn storage lanes at the signalized intersection of US Route 19 with McClelland Road will need to be lengthened.
- ✓ The signalized intersection at US Route 19 with Weavertown Road should include a southbound right turn decel lane on US Route 19, an eastbound left and right turn storage lane on Weavertown Road. Weavertown Road should also be widened to construct a westbound left turn storage lane into the Sheetz Plaza.
- ✓ The signalized intersection of US Route 19 with Manifold/Cameron Road is also currently under study. The intersection should include an eastbound and westbound left turn storage lane and an additional right turn storage lane on Manifold Road.
- ✓ The signalized intersection of US Route 19 with Strabane Square is near capacity with minimal opportunity for additional geometric modifications to improve the intersection capacity, with the exception of constructing an additional through lane along US Route 19. Suggested improvements would be to provide a strategic alternative access point for the site driveways for better internal and external access.
- ✓ Oak Springs Road should be reconfigured to eliminate the five-way approach configuration. This configuration requires the signal to operate with a longer cycle length causing the mainline traffic along US Route 19 to frequently queue beyond the interchange ramps.
- ✓ With the added development, future signalization is likely at the unsignalized intersection of US Route 19 with Fischer Road/Davis School Road.

Intersection improvements are an important component of corridor improvements. Improved intersections and signal coordination are a cost-effective way to improve access and travel efficiency. Table 4 describes issues and recommendations at key intersections throughout the corridor. Another important part of the traffic signal coordination strategy, that is often overlooked, is having a qualified person maintaining the operational settings of the traffic signal controllers. Once a traffic signal is installed through the PennDOT design and permit process, it is the responsibility of the Township to maintain the operations of the signal in accordance with traffic signal permit plan(s).

The timings and settings indicated on the traffic signal permit plan (coordinated or uncoordinated) are critical in the effective operations of the signal and should be inventoried and checked regularly. Minimizing the use of the traffic signal controllers creates intersection breakdowns and delays that can be avoided by maintaining the system operations.

iii. Education / Public Relations Activities

Education and public relations activities are an important strategy to management of the US Route 19 Corridor. Various activities can be used to educate officials, business leaders, and the public about the need and benefit of measures to manage land use and travel in the corridor. Information can be provided to local organizations through newsletters and discussed at meetings. Meetings with officials and local organizations can be used to present the benefits of corridor management strategies. It is also important to discuss the need to provide public testimony regarding existing and proposed TIP projects. The need and benefits of new funding strategies should be communicated to create positive momentum to implement these strategies.

iv. Access Management

Access management is a response to the congestion and safety problems associated with local land development and regional traffic growth. Access management controls the location, design, and operation of driveways and public street connections to roadways. For access management to be successful, land use planning and roadside development must be coordinated with transportation planning and design. The challenge is to develop effective access policies and standards that find a balance between land development plans and the preservation and the functional integrity of the roadway system.

US Route 19 is a commercialized corridor that includes some unrestricted roadside access. This ultimately results in traffic congestion and safety problems. As growth in this corridor occurs, the cumulative effect of numerous driveways along the arterial causes congestion that impedes the flow of through traffic. Good access management includes the careful planning of land uses, driveways, and intersections in order to reduce accidents and increase travel efficiency.

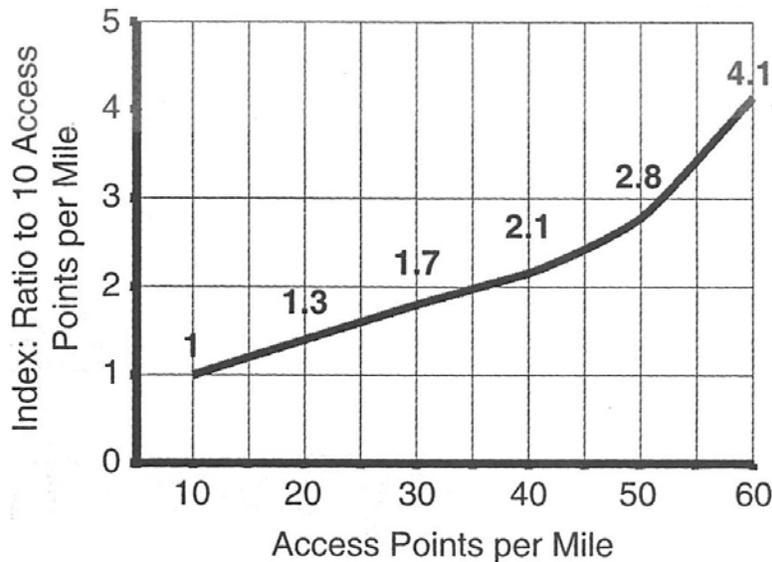
Many of the problems in the corridor relate to the access to US Route 19. Access management principles would be a cost effective strategy and provide opportunity for the long term management of US Route 19. A corridor overlay zone would put in place local development regulations to properly control and manage access to US Route 19 in a safe and efficient manner and facilitate regional travel. Appendix C includes a description of tools and techniques that should be further considered. Each municipality would need to adopt and enforce regulations. It is easier to prevent uncontrolled access prior to development than to attempt to modify access after it is established in a commercial zone. Several areas in the project area have frequent driveway connections and efforts to combine access points should be made. Developing areas, such as those in North Strabane Township, provide the best opportunity to develop proper access.

The benefits of access management to the US Route 19 corridor area include: extending road life; increased safety; reduced congestion; improved appearance; preservation of property values and economic viability; greater fuel efficiency, reduced vehicle-pedestrian conflicts and reduced vehicular emissions. Benefits are realized by:

- motorists (fewer decisions, increased safety, travel efficiency),
- pedestrians (safety and aesthetics),
- businesses (broader market area, stable property values, consistent development),
- freight industry (safety and efficiency),
- government (lower costs, improved intergovernmental coordination, efficiency), and
- communities (safer transportation, less disruption, attractive road corridors, reduced capital costs).

Without access management, major roadway corridors can deteriorate rapidly by increased accidents, reduced roadway efficiency, unsightly commercial strip development, increased commute times, disruption from road widening cycles, and cut-through traffic.

ACCIDENT RATE



Source: Transportation Research Board, Access Management Manual

An increase of 10 to 20 driveways per mile can increase crash rates up to 30 percent as shown on the accident rate chart. Access management can reduce accidents, increase traffic flow, travel efficiency, and capacity.

Traffic conflicts can be reduced by:

- Limiting the number of conflict points that a vehicle may experience traveling through the corridor,
- Separating conflict points as much as possible, and
- Removing the slower turning vehicles from the through travel lanes as efficiently as possible.



Right turn In/Out Only – No Left Turns



Area with Frequent Access

Access management addresses these traffic impacts by attempting to coordinate transportation and land use decision making. In terms of transportation, access management means:

- Driveway control (curb cut management),
- Traffic operations (regulation and signal systems), and
- Geometric design (exclusive median turn lanes, right in/out only, etc.).

Curb Cut Management

An effective means to manage access to arterials is to control curb cuts. While traffic generated by one development may appear small in proportion to mainline volumes, the aggregate turning volumes, particularly left turns, create delay and conflict. As road volumes increase, the number of gaps for turning movements decreases. Reducing the number of driveways will result in safer and more efficient travel. Focusing movements to a single location affords better definition of driveways and improved safety. Parking and site circulation can operate properly with single two-way driveways. In many cases, only minor modifications are needed to close unnecessary curb cuts. Curb cuts can be controlled by:

- Reducing driveway width, where entire frontage is open,
- Reducing the number of curb cuts through encouraging single access (except major developments) and shared driveways, and
- Proper driveway channeling.

The elimination of driveways for this project should focus on the section in Peters Township between McMurray Road and the Allegheny County line. Many driveways have inadequate design or are not properly defined. A lack of interconnectivity also exists. An improved curb cut plan, streetscaping and elimination/redesign of driveways, is possible in this section. Accidents in this area were predominantly rear end and angle collisions that typify turning conflicts. Further study is needed to identify specific issues of safety, liability, maintenance, technical feasibility, etc. If it is determined to not be practical to retrofit driveways at this time, or if minimal progress is made, then adoption of an access management ordinance will at least manage access from new development or revised site plans. The ordinance provides guidance for future driveways and the management and redesign of existing driveways can occur over time as non-conforming sites are redeveloped. This area would benefit from design standards developed in Appendix C to reduce the number of access points and improve driveway design. This area would also benefit from proper signal spacing criteria and other general circulation and access criteria.

South Strabane Township, south of Manifold Road, would benefit from proper signal spacing criteria and spacing between streets. Currently, signals are closely spaced in areas and signals and access points are in proximity to the I-70/79 Interchange. The high accident rate in this area can be attributed to the lack of adequate access management standards and to the pressures of development. Change in this area requires a retrofit approach since it is already developed. The area north of Manifold Road to Weavertown Road has a greater opportunity for effective management since this area is less developed but under development pressure. The signal spacing criteria and street spacing is important in this section since additional signals may be located here in the future. This area should also provide exclusive left turn lanes or “U” turns where median openings occur or the median openings should be closed.

Included in Appendix C is a discussion of various access management techniques, including a review of: access standards; site design; regulatory principles; access management policies; approach; and administrative provisions. Each municipality will need to review various access management techniques and measures and determine those that are appropriate. Appendix C includes a menu of techniques to be considered. The recommended approach is to develop a corridor overlay zone for areas adjacent to US Route 19 and better manage access to and from US Route 19 through these techniques. Ordinances can range from relatively simple to quite complex. It is necessary to implement these locally, due to the unique needs and preferences of local officials and the local control of land use.

v. Other

Several other corridor management options will assist in meeting the goals of the project. These include: improved state and local coordination; aesthetic improvements; travel demand management initiatives; management of development; and alternative funding options. Improved state and local coordination can be achieved through municipalities requesting a PennDOT review of trip generation and distribution for developments and

review of site access and circulation. This will assist with increased local and state coordination. It will enable municipalities to identify and consider PennDOT concerns and comments early on with a focus on the impact of development(s) on state roads and the adjacent local roadway system. PennDOT should also review developments that do not directly access state roads. This would expand the PennDOT role and require additional staff time. Considering the long term benefits, it is a cost effective management strategy. Municipalities should require a trip generation and distribution analysis for developments. On-site access and circulation should be included on preliminary plans submitted to the township. These should comply with access management provisions.

The corridor concept includes a potential boulevard or landscaped parkway. This fits architecturally with the important commercial zone adjacent to US Route 19.

More substantial improvements should also be made in the gateways that were noted throughout the corridor. These are in commercial areas where pedestrian amenities and improved aesthetics are of highest importance. The gateway areas could include more substantial decorative signage, art, landscaping, and other elements. Gateway areas are shown on Figure 6 and a concept is included for wayfinding signage. Wayfinding signage



can be used to improve aesthetics and to assist with directing motorists to the many destination points in the area. Gateway locations are suggested at the Allegheny County Line, Valleybrook Road, McMurray Road, the proposed Southern Beltway, Racetrack Road, and at I-70/79. The specifics at each gateway will need to be further studied and will depend on a number of issues including available space, local preferences, cost, and other matters.

The aesthetic improvements can be developed as part of an access management plan to include changes in access, particularly where a high concentration of driveways occur (Peters Township). Aesthetic improvements can also be used to modify median treatments and modify access (North Strabane Township). This trade-off (access changes and aesthetic improvements) can be used to entice businesses to cooperate to achieve desired results.

Improved transit, ridesharing, park-n-ride facilities, transit oriented development, and other travel demand management initiatives should be further analyzed. The location and adequacy of park-n-ride facilities is under study by SPC. Park-n-ride and transit improvements can help manage travel demand throughout the corridor. The feasibility of various transit improvements should be analyzed in greater detail separately.

Coordinating transit, park-n-ride facilities and other travel demand management measures in areas of future development will assist in achieving the overall goal of managing and preserving the effectiveness of US Route 19.

A review of the 2000 census for work commutes shows a heavy reliance on driving alone, which is expected given the suburban nature of the project area. Table 5 shows the commuting data by municipality. Many of these commuters do not use US Route 19. However, the data reveals the trend of commuting preferences and how it changes through the corridor. All three municipalities have some similar commute characteristics, including a relatively low use of public transit. The percentage of drive alone commuters increases slightly and the use of public transit decreases further south in the corridor. However, the percentage of carpooling increases further south.

TABLE 5 Work Commute Percentage (2000 Census)

	Drive Alone	Carpool	Work at Home	Public Transit
Peters Township	83	5.6	6.8	3.4
N. Strabane Township	85.5	8.7	3	1.3
S. Strabane Township	86	10	3.5	0

Tools and techniques to address the impact of development can assist in the long-term management of the corridor. A decision should be made regarding the scale of the development that moves forward in the corridor. This applies to the entire corridor, but is of particular interest where large newer developments may occur. Planning should evaluate measures to mitigate the impacts if large scale development proceeds. These include: possible planning of denser mixed used developments; transit oriented development with transit improvements; open space, conservation and agricultural preservation; and other planning initiatives. Included at the end of Appendix D is a discussion of planned residential developments, traditional neighborhood design, and transferable development rights provisions. Each of these can be utilized to manage the impacts.

Funding limitations are a significant impediment to addressing the problems in the US Route 19 Corridor. The limitations of programming projects through the TIP were previously discussed. A management approach that includes selected project improvements presents the best strategy for the Corridor. It is not likely that new large scale projects will advance through the TIP. Smaller projects may even take time to program and advance. Therefore, a strategy that includes consideration of transportation partnership districts and impact fees would provide benefits to addressing issues. Appendix D includes a flow chart and description for preparing a transportation impact fee ordinance. A transportation district is also a mechanism to generate funds for improvements. The district is applied to adjacent land that benefits in value from

improvements. Taxes are redirected accordingly and the funds used to make needed improvements. These techniques would be useful to acquire funds to move projects forward and are applicable at several locations throughout the corridor. Each township should further evaluate these alternative funding options.

VI. CONCLUSIONS

The future scenario for the US Route 19 Corridor should concern planners and local officials. A combination of existing conditions (frequent driveways and signals), forecasted transportation demand, and development pressures will exacerbate existing deficiencies in the corridor. The result will be a dramatic reduction in the operational efficiency of US Route 19. A management approach to address these problems is preferred for several reasons. First, many management options present the best opportunity to address the causes of existing and future problems. Further, transportation funding required for major capital improvements is not likely to be available, rendering major construction alternatives unlikely. As development occurs, the transportation demands and costs are not likely to be solved by attempting to program additional projects through the TIP.

The conclusions of the study are that a variety of management options and improvements will effectively manage the traffic demand on US Route 19 and eliminate or reduce the need for other costly capital improvements. Table 6 describes various management options and a qualitative assessment of the benefits and the implementation difficulty. The findings and benefits presented in Table 6 are based on the project goals, deficiencies noted in Figure 4, and issues described in this report. Planners and local officials should further evaluate the following to address the findings of the study.

Management /Process Options

General

- Further develop congestion management measures defined in SPC's Regional CMS. These include access management, intersection improvements, signal coordination, and others. Congestion management is an approach to maximize the benefits of operational effectiveness of major routes. CMS measures are low to medium in implementation difficulty and cost. Several specific CMS recommendations are described below. CMS benefits the entire corridor. **(SPC, PennDOT)**
- Adopt access management overlay zone ordinance with modifications necessary for each municipality based on their specific needs. Due to the development pressures and transportation demand on US Route 19, this management option would provide a high benefit to improving operational effectiveness. The implementation difficulty (receptiveness/cost) is low to medium. Various techniques are applicable throughout the corridor. **(Municipalities)**

Specific

- Further develop and adopt a curb-cut plan/criteria and work to combine driveways between McMurray Road and the Allegheny County line. If minimal progress is possible, then adopt an ordinance that establishes properties as nonconforming to enable retrofit over time and to discourage additional driveways. Consider incentives to property owners to encourage driveway sharing. The benefit of improved curb cut management is high and an important element to managing US Route 19. The area from McMurray Road north to the Allegheny County line has the highest concentration of driveways and would receive the greatest benefit. However, the benefits extend to the entire corridor. Reducing and managing driveway access is important even with the center turn lane. Implementation difficulty is low for adopting standards and medium for efforts to redesign and retrofit existing driveway access points. **(Municipalities)**
- Implement the signal plan criteria which attempts to avoid adding new signals through the use of existing signalized access points. Additional signals should be added only according to spacing criteria (greater than ½ mile) where practical. This provides high benefits to the long-term management of US Route 19 through improved travel flow efficiency. Improved signal spacing increases road capacity without lane additions. North Strabane has several proposed signals and the criteria would be the most applicable to this area, but applies to any new signal in the corridor. Implementation difficulty (meeting the criteria) is low in areas where signals are proposed and high where existing signals are located (if any attempt is made to remove existing signals/redesign/combine road connections). **(Municipalities, PennDOT)**
- Pursue intersection improvements as noted to include further analysis of preliminary recommendations at several key intersections. This would have a benefit by providing safer, more efficient access while improving travel on US Route 19. The benefit was also noted in the SPC regional CMS and applies to intersections throughout the corridor. This is shown as a management approach since it includes a signal interconnect plan in Peters and South Strabane Townships. However, design tasks are needed at several intersections as noted. **(PennDOT, Municipalities)**
- Evaluate the proposed Southern Beltway connection to US Route 19 as it affects travel on US Route 19. There is a high benefit to analyze the connection since preliminary plans indicate a connection in a developed area with existing signals in close proximity (Waterdam Road area). Implementation difficulty for this management tool is low, requiring coordination with the Pennsylvania Turnpike Commission. **(PennDOT, SPC)**
- Incorporate aesthetics/gateway concept for US Route 19. Include a landscaped buffer zone adjacent to US Route 19 and site specific improvements at gateway/activity node locations to improve aesthetics and value in key commercial areas. Consider a wayfinding and decorative signage plan for the

corridor. Evaluate implementation through traditional transportation funding, enhancement money, and partnerships with local businesses. The benefit is medium, providing important aesthetic improvements throughout the corridor. The benefit would be high if the concept is incorporated into an overall plan to modify access, particularly north of McMurray Road. Implementation difficulty is low. However, the difficulty would be higher if access modifications are included. This is shown as a management issue, but would require some design to implement. (**PennDOT, Municipalities**)

- PennDOT/Local Coordination - It is recommended that the township request PennDOT to review both off and on site access and circulation for any development that could impact traffic conditions on area state roads. Municipalities should request a PennDOT review of trip generation and distribution numbers for projects in the US Route 19 Corridor. This includes projects that do not directly access a state road. This will provide early coordination during the permitting process of developments and facilitate better municipal interaction with the state. There needs to be a better understanding between PennDOT and the municipalities concerning driveway permits, access, and traffic impacts created by development. Municipalities that do not have traffic engineers to review traffic studies should utilize these services to analyze the impact of development. These costs can be made a part of the review process for developers. The benefit is high and will greatly assist in managing transportation and land use conflicts. This is considered by some steering committee members as the most important finding with the greatest long-term benefit. It requires staff time and commitments by PennDOT, who may not currently have adequate staff levels to handle this. The implementation difficulty is medium, requiring minimal cost. (**PennDOT, Municipalities**)
- Manage Development - Other management options could involve planning for denser mixed use development, transit-oriented development, or conservation and agricultural preservation to mitigate the impacts of the development and minimize external vehicle trips to the transportation system. Planned residential development, traditional neighborhood design, and transferable development rights are initiatives that can be considered. This would benefit the entire corridor, but is most applicable in developing residential areas of North Strabane. The implementation difficulty is medium. It does not require substantial costs, but additional efforts in planning practices and standards to promote their use. (**Municipalities**)
- Funding - Consider partnership districts and transportation impact fees to generate money for needed transportation improvements. The benefit includes raising needed funding and reducing reliance on state transportation money. It can also help to move projects forward. This applies to the entire corridor and the implementation difficulty is medium. (**Municipalities**)

Design Options

General

- Utilize two roadway typical sections. One includes a four lane section with center turn lane (existing) from the Allegheny County line to McMurray Road and the other is a four-lane section with exclusive left turn lanes and various median treatments (barrier, mountable curb) south of McMurray Road. This section includes closing of median openings where no exclusive turn lane is provided. This concept has the benefit of essentially maintaining the existing roadway section(s) with some improvements. The implementation difficulty is medium, utilizing the existing configuration with some design costs to modify the median either through closing openings (conversion to right turn in/out only) and providing left turn lanes or “U” turns at existing downstream signalized intersections. **(PennDOT)**

Specific

- Analyze and upgrade each of three interchanges to address substandard features and accommodate future traffic demand. This would have a high benefit to operational effectiveness, safety, and local access. Higher volumes of traffic can be moved through interchanges, compared to intersections. Each interchange is experiencing development pressures and long-term consequences of accidents, congestion, and inefficient operations will result if no action is taken. The implementation difficulty is considered high since cost and physical constraints present limitations. **(PennDOT)**
 - Valleybrook Road Intersection/Interchange – currently under study for potential improvements.
 - PA Route 519 Interchange – proposed study of entrance ramp lengths – should be expanded to analyze entire interchange under future build-out scenario (2025).
 - I-79/70/US Route 19 Interchange – US Route 19 improvements are under study in the area, although the interchange is not part of the study. Consider expanding US Route 19 Study to include issues of weaving and development in proximity to interchange ramps in order to identify the extent of the problem and develop further recommendations.
- Potential large-scale residential developments in North Strabane Township may necessitate upgrading local roads, particularly those that provide connection to US Route 19, and specifically PA Route 519. A proposed north-south connector would provide a parallel service road to US Route 19 and provide benefits to future travel and management of US Route 19, if development proceeds. The benefit of the connector would be high to the overall travel efficiency through the corridor and particularly beneficial in

North Strabane Township. The connector could reduce the need for other transportation improvements and potential new signals at US Route 19. The implementation difficulty is high. **(PennDOT)**

Several additional strategies are included, addressing the conclusions of the study.

- **Steering Committee** – The committee should continue meeting at regular intervals in order to maintain the momentum from this study and to assist in the continued regional approach to managing US Route 19 issues. This will also assist in state/regional/county/local coordination.
- **Technical Studies** – Consider conducting additional studies internally or through consultant services to further develop recommendations related to specific recommendations requiring further study and design. These include: modifications to the median in areas of US Route 19; wayfinding signage; development of gateways; driveway reductions; and alternatives designs for proposed future traffic signals.
- **Municipalities** – Work with planning commission and solicitors to develop corridor access management plans that meet the needs of each municipality. Work with SPC and PennDOT to facilitate coordination on items related to development and transportation.
- **Partnerships** – Evaluate feasibility of developing partnerships with businesses, and other interested parties, to address access issues, aesthetic improvements, wayfinding signage, and transportation districts. Obtaining revenue through impact fees, partnership districts, and other mechanisms will help to move recommendations forward and reduce the reliance on state money.

TABLE 6 - SUMMARY OF FINDINGS

Issue	Findings	Benefit	Implementation Difficulty*	Responsibility
MANAGEMENT / PROCESS**				
GENERAL				
Congestion Management	Further develop “A” and “B” rated measures noted in SPC regional CMS including access management and other specifics shown below.	Lower cost management measures assist in overall management of congestion along US 19.	Low – lower cost, less expensive, less controversial measures that are effective.	SPC, PennDOT SPC to lead CMS initiatives – others to assist as appropriate.
Access Management	Manage access through local ordinance.	Cost-effective techniques provide high benefit relative to other options.	Low to medium – Allows for gradual improvement over time.	Municipalities to lead – PennDOT to assist as appropriate.
SPECIFIC				
Manage Curb Cuts	Access management standards to manage curb cuts over time through non-conforming reuse. Retrofit/redesign of existing access could be further studied.	Allows status quo and provides for change over time. Redesign/retrofit option provides shorter term benefit.	Low – Allows for gradual improvement over time.	Municipalities to lead – PennDOT, others can assist through supporting driveway standards and participate with any redesign effort.
Signalized Intersection Spacing Criteria	Establish spacing criteria (>1/2 mile) to better manage traffic flow (US 19). Management approach to use existing signal access points prior to adding signals.	Provides standard for signal spacing to manage efficient through travel – balance access needs. Allows for new signals through a management approach.	Low –less controversial in developing area since it does not eliminate existing signals.	Municipalities to lead – PennDOT to assist.
Intersections / Signal Coordination	Further develop needed improvements at key intersections. Develop signal interconnect plan in Peters and South Strabane Townships.	Improves access to US 19 and maximizes efficiency of through travel. Will help to separate through traffic and turning traffic.	Low - “A” rated CMS strategy.	PennDOT to lead design changes. Municipalities to lead signal interconnect plan.
Aesthetics / Gateways	Develop gateway improvements through partnership approach. Further evaluate aesthetic improvements as a mechanism to modify access to US 19.	Benefits include improved aesthetics, land values, and access management.	Low - cost can be shared through partnerships.	PennDOT and municipalities need to partner with local interest groups
PennDOT/Local Coordination	State to review traffic studies/ impacts for projects affecting state roads to improve state/local coordination.	Improved decision making. Better transportation - land use management	Medium – state may need additional staff.	PennDOT and municipalities

TABLE 6 - SUMMARY OF FINDINGS

Issue	Findings	Benefit	Implementation Difficulty*	Responsibility
Management of Development	Other management options are higher density mixed use developments, transit-oriented developments, conservation, and agricultural preservation. PRD's, TND's, TDR provisions.	Lower cost management option that creates long term sustainable benefits. Development oriented toward managing traffic impacts, reduce costs. Creates traditional design.	Medium – requires additional effort to develop. Likely to encounter resistance from development community.	Municipalities to lead. PennDOT, SPC, Washington County to support initiatives. Potential North Strabane development is emphasized.
Funding	Evaluate partnership districts and impact fees.	Provides revenues for needed projects. Helps move initiatives forward. Reduces relying on state funding for project costs.	Medium – requires effort to implement, but helps address funding limitations.	Municipalities – PennDOT, SPC, Washington County to assist.
DESIGN				
GENERAL				
Typical Road Section(s)	Establish two typical sections. 1) Two-way center turn lane in high driveway density area. 2) Median to manage turns and enable access to adjacent land uses.	Utilizes existing configuration and minimizes cost. Modifies median where needed. Allows center turn lane to limit controversy.	Medium - requires some costs to modify median. May incur some public opposition.	PennDOT
SPECIFIC				
Interchange Improvements (Valleybrook, PA 519, I-79/70)	Proceed with studies at Valleybrook Road and PA Route 519. Evaluate problems at I-70.	Interchanges handle higher traffic volumes, reduce delays, and can increase safety. Improves access to US 19 and through travel.	High Potential costs involved are high.	PennDOT –
North-South Connector	Further study the concept of the North-South Connector (if North Strabane development moves forward). Further evaluate a connection to proposed S. Beltway.	Connector would serve as a parallel service road to US 19 and serve potential development. Connection to S. Beltway will alleviate traffic demand on US 19.	High Costs will be high and funding is limited.	PennDOT Municipalities can assist through impact fees.

* Ease of implementation considers likely costs, impacts, and community receptiveness to the technique.

** Issues are shown as management or design-oriented, however some include elements of both.