

INITIAL TRAFFIC CALMING PLAN

Pennoni Associates Inc. was retained by Ferguson Township to provide engineering consultant services to evaluate East Park Hills Avenue, in the Park Hills Neighborhood, for warranting traffic calming measures per the Township's Traffic Calming Policy. The request for a study was made by residents of the neighborhood, and approved by the Ferguson Township Board of Supervisors. The request by the residents listed five problems to be examined, with the two main concerns being speed of traffic and the volume of vehicles along East Park Hills Avenue. Pedestrian safety, sight-distance, truck volumes, and cut-through trips were also listed as perceived issues to be examined.

Traffic data was collected along East Park Hills Avenue at the beginning of October, and used to evaluate the traffic calming warrants for volume control and speed control measures per Ferguson Township's Traffic Calming Policy. In addition, field measures and observation were made to examine all the concerns raised by the resident's petition. A Technical Memorandum dated October 28th was submitted to Ferguson Township that discussed the evaluation of the traffic data and field data, and provided a recommendation to proceed with an Initial Plan identifying volume control measures for East Park Hills Avenue. The Township Engineer issued a concurrence with the recommendation on October 31st.

Identification of Volume Control Measures

Current traffic calming practices as suggested by the Institute of Transportation Engineers, Federal Highway Administration and the Pennsylvania Department of Transportation (PennDOT) were considered when determining the volume control measures that would be most effective for East Park Hills Avenue. Traffic calming measures intended to reduce speeds (such as bulb-outs, chicanes, and speed humps) were not considered because the evaluated traffic data did not show that speeding was an issue along the subject road. Other options dismissed were the installation of all-way (multi-way) stop control at intersections along East Park Hills Avenue, specifically the intersection with Park Lane, and the option of making East/West Park Hills Avenue a one-way link.

Multi-way stop control was dismissed because it was unwarranted based upon PennDOT and Manual on Uniform Traffic Control Devices (MUTCD) guidelines. The current traffic volumes do not meet the volume thresholds of 500 vehicles entering the intersection per hour for any eight (8) hours of an average day for the main street, and 200 vehicles for the side street. Unwarranted multi-way stop control installations can be particularly dangerous and can result in increased speeding from the stop and commonly traffic will rarely come to a complete stop, both of which impact the perceived sense of security for residents along the street.

The option of converting East/West Park Hills Avenue to a one-way link was dismissed as being too restrictive to all the residents within the Park Hills Neighborhood. In addition, speeds would be expected to increase with this option due to fewer conflicts and wider travel lanes. It would likely be necessary to also install speed control measures to mitigate the potential for the increased speeding; such as bulb-outs, chicanes, and speed humps.

The focus for identifying the selected traffic calming measures was to address (reduce) the overall traffic volumes along East Park Hills Avenue. The evaluation of the traffic data indicated that a portion of the total volume along the subject roadway could be considered pass-through trips. The chosen traffic calming measures that were evaluated directly impact traffic volumes by restricting turning movements or diverting specific traffic movements. Each of the options has impacts, with consideration given to police and emergency service providers, State College Area School District (SCASD), and the Centre Area Transportation Authority (CATA). In addition, other factors considered in the evaluation of each option were snow removal, reduction of on-street parking, overall effectiveness of the option, potential impacts to residents and surrounding streets within the Park Hills Neighborhood, and cost.

The following five (5) traffic calming volume control measures were evaluated:

- Option 1: Southbound Park Lane Partial Diverter at intersection with Aaron Drive.
- Option 2: Northbound Park Lane Partial Diverter at intersection with East Park Hills Avenue.
- Option 3: Park Lane Full Diverter at intersection with East Park Hills Avenue.
- Option 4: Glenwood Circle Diverter.
- Option 5: Cherry Hill Road Diverter.

In addition, a seventh option for installation of a pork-chop median island along East Park Hills Avenue at the intersection with Circleville Road was considered. This concept would permit only right turn movements at the intersection with Circleville Road. Although a relatively low cost decision, this option was dismissed because of the known ineffectiveness a small median island would have on the volumes along the study area. Past experience has demonstrated driver's non-compliance over time for similar installations and would require changes along Circleville Road to prevent, which was determined to be outside the scope of this project.

Also presented was the concept for providing pavement markings along East Park Hills Avenue. This is a low-cost traffic calming method the Township may wish to consider for helping to address residents' concerns if the volume control options do not get approval for installation. Basic pavement markings designating a shoulder are beneficial to pedestrians and motorists. This option is presented as an alternative measure to address concerns from residents along East Park Hills Avenue if there is no consensus and approval of any of the volume control measures presented.

Figures depicting each of the options in a visual format are included with this report.

Initial Traffic Calming Plan Options

Option 1: Southbound Park Lane Partial Diverter

In order to prohibit southbound pass-through trips in the Park Lane to East Park Hills Avenue direction, this traffic volume control measure would close off half of Park Lane from just south of the intersection with Aaron Drive. Approximately 90 feet of Park Lane between two residential driveways would become a one-way northbound link to the intersection with Aaron Drive. Access to homes along Park Lane would be only from the south via East Park Hills Avenue. Additional signage such as "Do Not Enter" and/or "One-Way" may be necessary to enforce the change and discourage motorists traveling the wrong direction.

This option would have an impact on the daily traffic volumes along East Park Hills Avenue as the convenience of a through route is removed. Based upon assumptions from the traffic data collected, this option would potentially remove on average approximately 980 vehicles from Park Lane between Aaron Drive and East Park Hills Avenue. It is reasonable to assume that reduction in southbound volumes along Park Lane that would be entering East Park Hills Avenue would then also translate to a similar reduction in the southbound volumes along East Park Hills Avenue. This volume reduction would bring the total daily traffic volumes along East Park Hills Avenue closer to the 1,000 vehicles per day threshold in the Traffic Calming Policy, which represents the total volume that should be expected along a residential sub-collector street.

Prohibiting access to southbound Park Lane from the Aaron Drive intersection would have negative impacts for both CATA and SCASD bus routes. SCASD has a bus route for Park Forest Middle School that would be impacted, and CATA's A Route would be restricted and would result in a reduction in service. On-street parking along Park Lane would also need to be restricted within approximately 100 feet of the intersection with Aaron Drive.

The Ballpark Cost Estimate for Option 2 is \$7,800

Option 2: Northbound Park Lane Partial Diverter

A landscaped bulb-out would be proposed that would reduce the width of Park Lane by half, prohibiting access to Park Lane from East Park Hills Avenue. Access from southbound Park Lane to East Park Hills Avenue would still be permitted. Additional signage, such as "Do Not Enter" and/or "One-Way" may be necessary to enforce the change in vehicle access along Park Lane. This option does have an impact to an existing storm water inlet that would need to be reset.

This option would remove on average approximately 1,100 vehicles from the northbound direction of Park Lane between East Park Hills Avenue and Aaron Drive. It is reasonable to assume that this change in volume, coming from East Park Hills Avenue, would also directly result in a reduction of the northbound volume along the portion of East Park Hills Avenue between the Park Lane intersection and the Circleville Road intersection. A reduction of approximately 500 vehicles along this portion of East Park Hills Avenue would result in a total traffic volume closer to the 1,000 vehicles per day threshold for residential sub-collector streets that warrants consideration of volume control measures.

This option would have no impact to regional emergency services providers and to the bus routes for SCASD. However, this option would directly impact CATA's A Route (Park Forest Village) which has five (5) trips scheduled daily during the week that use this portion of Park Lane to East Park Hills Avenue. The route can be manipulated to continue service, but it would impact several bus stops at Park Lane, Princeton Drive and Wiltshire Drive that would increase patrons ride time to or from downtown State College and the Penn State campus.

Additional impacts would be the need to restrict on-street parking, snow removal, and vehicle trips diverting to alternative routes through the Park Hills Neighborhood. A parking restriction would be necessary along Park Lane between the East Park Hills Avenue intersection and the residential driveway along Park Lane, approximately 85 feet north of the intersection, because of the reduced roadway width. The partial closure would also impact snow removal operations to clear the section of Park Lane north of the partial closure to Aaron Drive. There is also the potential for a portion of the northbound Park Lane volumes that were destined for the Park Forest Neighborhood (Devonshire Drive) to divert to utilizing Princeton Drive to Wiltshire Drive, therefore increasing traffic along those routes as a side effect of the access restriction to Park Lane.

A Ballpark Cost Estimate for Option 1 is \$13,500

Option 3: Park Lane Full Diverter

This option would completely close the intersection of Park Lane with East Park Hills Avenue to vehicular through traffic. As with Option 1 and Option 2 there would be minor impacts to storm water as two existing inlets would need to be removed or relocated. Signage along Park Lane would be necessary indicating "No Outlet" for the remaining link of Park Lane south of the intersection with Aaron Drive. A vehicle turn-around, or small cul-de-sac, would need to be considered in design and may require minor property take to accommodate.

This option would significantly impact traffic volumes along East Park Hills Avenue as approximately 2,080 vehicles per day (on average) use Park Lane between East Park Hills Avenue and Aaron Drive. However, the net reduction in trips along East Park Hills may be offset because of additional internal Park Hills Neighborhood Trips now diverting to East Park Hills Avenue to Circleville Road. In addition, this option would increase the likelihood that Wiltshire Drive and Princeton Drive will have increases in traffic volumes from Park Forest Neighborhood (Devonshire Drive) that are bypassing the restriction. Regardless of the diverted trips and remaining vehicle trips that will continue to utilize East Park Hills Avenue, this option would be expected to reduce the overall traffic volumes along East Park Hills Avenue to below the 1,000 vehicles per day threshold because the convenience of a direct access to Aaron Drive will have been removed.

A full-closure of Park Lane could have significant impacts to emergency providers, CATA and SCASD busing. This option could be implemented without physically removing the roadway, but instead installing bollards to create a bus-only link. Signage and increased enforcement would be required to prohibit personal vehicle access, but this would eliminate any access concerns for emergency providers and impacts to bus routes, while still providing an effective vehicle control measure. Design of this option would also need to consider impacts to snow removal operations, especially if implemented as full closure to all vehicular traffic.

The Ballpark Cost Estimate for Option 3 is \$22,100

Option 4: Glenwood Circle Diverter

This option is like the prior option with regards to the impacts to access for residents and to traffic volumes along East Park Hills Avenue. East Park Hills Avenue would be closed off north of the intersection with Glenwood Circle between two residential driveways along the east-side of the road. A turn-around would need to be constructed at the north-side of the closure for vehicles servicing the homes along that portion of East Park Hills Avenue, which may require minimal property take to construct. "No Outlet" signage would also be necessary to alert motorists that the road is no longer a through route at the intersection with Park Lane. A bonus for this option would be the ability to create a green space and new pedestrian access path to Tudek Park. The path through the green space would be useful as an access for emergency service providers as well.

As previously mentioned, the impacts for this option would be the same as the prior option and would create a smaller pocket neighborhood. Impacts to existing and future service operations for CATA and SCASD would be the same. The only trips remaining along East Park Hills Avenue would be trips to the residential homes. While traffic volumes would be greatly reduced along East Park Hills Avenue, daily traffic volumes along West Park Hills Avenue would increase because of the divided access. Also, the issue with trips passing through to Park Lane would not be directly addressed, although as with the prior option the reduction in convenience by eliminating a direct pass-through route would result in some overall reduction of daily traffic volumes.

The Ballpark Cost Estimate for Option 6 is \$33,500

Option 5: Cherry Hill Road Diverter

For this option, a traffic diverter is proposed to be installed along East Park Hills Avenue immediately north of the intersection with North Cherry Hill Road. Like the traffic diverters installed in the College Heights Neighborhood in State College Borough, this diverter would effectively close off all access north of this intersection and create a small pocket neighborhood. This option would require additional signage to be installed indicating "No Outlet" along East Park Hills Avenue south of the Glenwood Circle intersection. A turn-around would also be necessary, which may require minimal property take to construct.

The installation of a diverter would reduce traffic to only being local destination trips along East Park Hills Avenue, and it would significantly alter the access options for homes on either side of the diverter with the Park Hills Neighborhood. The design of the diverter would need to be done in a manner that would accommodate emergency service providers, to allow them to pass through if necessary for response time. CATA transit operations would not currently be impacted by this option, however future expansion plans to service the Park Hills Neighborhood could be impacted if the diverter is constructed. The school bus routes for SCASD would be impacted by this option and would require re-mapping the service routes for Radio Park Elementary, Park Forest Middle, and State College High School.

While this option would reduce traffic to only being local trips along East Park Hills Avenue, it would significantly alter the access options for homes on either side of the diverter within the Park Hills Neighborhood. All homes along North-South Cherry Hill Road and along East Park Hills Avenue south of the diverter would only have access from Circleville Road. This option would be expected to result in an increased traffic demand along West Park Hills Avenue to its terminus with Circleville Road. Also, the diverter would not address the issue of trips passing through to Park Lane, although the option does reduce the convenience which would result in some overall reduction in daily traffic volumes entering and exiting East Park Hills Avenue at the Park Lane intersection.

The Ballpark Cost Estimate for Option 5 is \$17,300

ATTACHMENTS

Attachment A: Initial Traffic Calming Plan Options

Location of Volume Mitigation Options

Option 1: Southbound Park Lane Partial Diverter

Option 2: Northbound Park Lane Partial Diverter

Option 3: Park Lane Full Diverter

Option 4: Glenwood Circle Diverter

Option 5: Cherry Hill Road Diverter

East Park Hills Avenue Roadway Pavement Markings: Shoulder Striping

Attachment B: Evaluation Matrix

Attachment C: Cost Estimate Assumptions

ATTACHMENTS

Attachment A: Initial Traffic Calming Plans





2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Location of Volume Mitigation Options

PROJECT : FRGU1603
SCALE : NTS
DRAWN BY : JWS
DATE : 12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



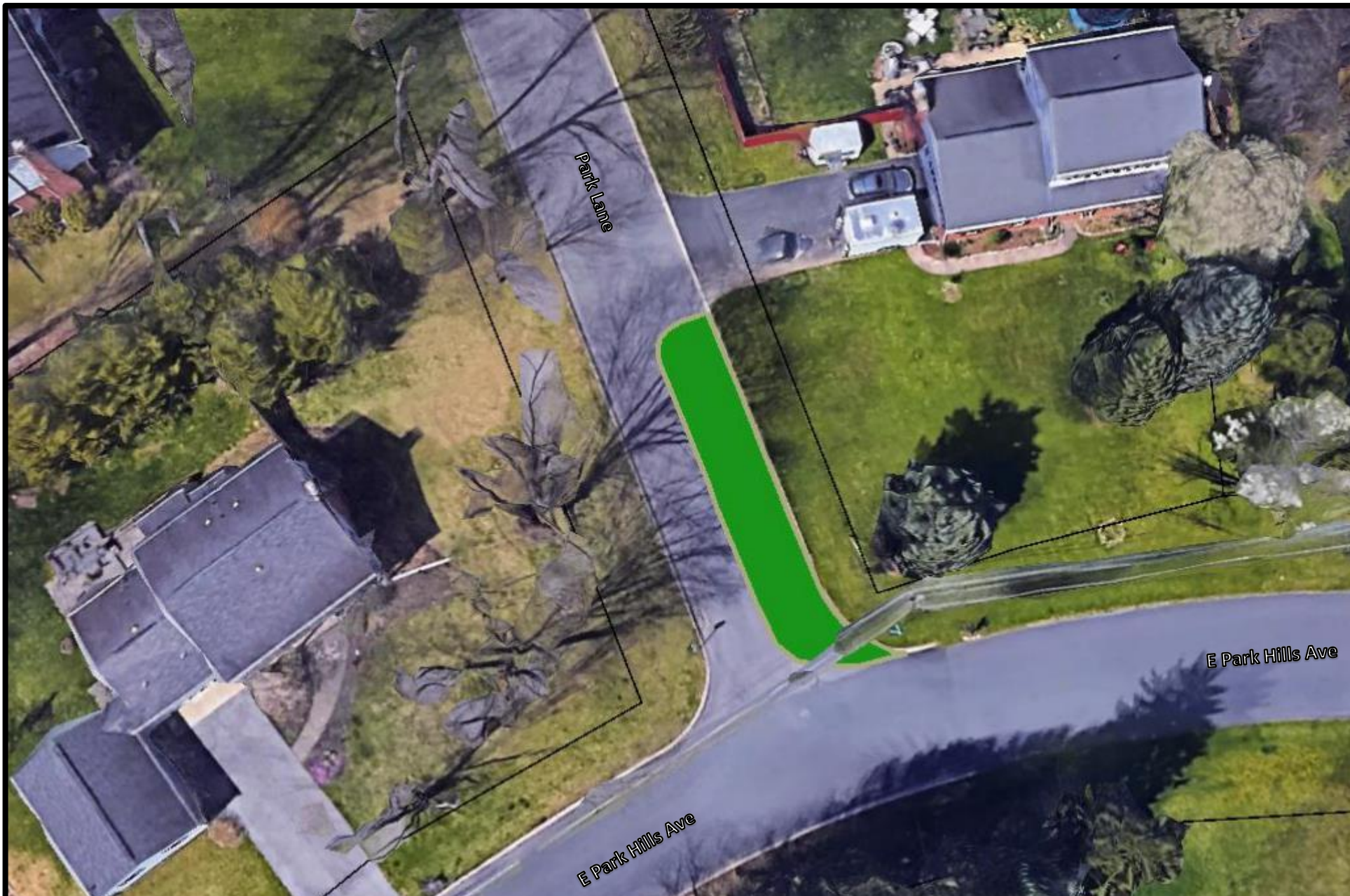
Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Option 1 : Southbound Park Lane
Partial Diverter

PROJECT : FRGU1603
SCALE : NTS
DRAWN BY : JWS
DATE : 12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
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Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Option 2 : Northbound Park Lane
Partial Diverter

PROJECT : FRGU1603
SCALE : NTS
DRAWN BY : JWS
DATE : 12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Option 3 : Park Lane Full Diverter

PROJECT : FRGU1603
SCALE : NTS
DRAWN BY : JWS
DATE : 12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Option 4 : Glenwood Diverter

PROJECT :	FRGU1603
SCALE :	NTS
DRAWN BY :	JWS
DATE :	12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Option 5 : Cherry Hill Road Diverter

PROJECT : FRGU1603
SCALE : NTS
DRAWN BY : JWS
DATE : 12.16.2016



2571 Park Center Blvd., Ste. 2
State College, PA 16801



Township of
FERGUSON
Pennsylvania

East Park Hills Traffic Calming Study

TITLE

Roadway Pavement Markings
Shoulder Striping

PROJECT :	FRGU1603
SCALE :	NTS
DRAWN BY :	JWS
DATE :	12.16.2016

Attachment B: Evaluation Matrix



Option	Pros	Cons	Cost Estimate
<u>Options 1</u> Southbound Park Lane Partial Diverter	<ul style="list-style-type: none"> Daily traffic volumes would be closer to 1,000 vehicles per day Southbound “pass-through” trips would be eliminated No impact to emergency service providers 	<ul style="list-style-type: none"> Potential to divert vehicles from Devonshire Drive -> Wiltshire Drive -> Princeton Drive Impacts to on-street parking along Park Lane Inconvenience to residents along Park Lane Reduced service for CATA Route A Impact to SCASD bus route for Park Forest Middle School 	\$7,800.00
<u>Option 2</u> Northbound Park Lane Partial Diverter	<ul style="list-style-type: none"> Daily traffic volumes would be closer to 1,000 vehicles per day Northbound “pass-through” trips would be eliminated No impact to emergency service providers No impact to SCASD bus routes 	<ul style="list-style-type: none"> Potential to divert vehicles to Princeton Drive -> Wiltshire Drive -> Devonshire Drive Impacts to on-street parking along Park Lane Inconvenience to resident at corner property Reduced service for CATA Route A 	\$13,500.00
<u>Option 3</u> Park Lane Full Diverter	<ul style="list-style-type: none"> Eliminate all “pass-through” trips to/from Park Lane Daily traffic volumes would be less than 1,000 vehicles per day 	<ul style="list-style-type: none"> Potential to divert vehicles to using Princeton Drive and Wiltshire Drive Impacts to on-street parking along Park Lane Inconvenience to resident at corner property Possible complete loss of CATA service Affects SCASD bus route for Park Forest Middle School Potential to delay emergency response providers Reduced access options to Park Hills Neighborhood 	\$22,100
<u>Option 5</u> Glenwood Circle Diverter	<ul style="list-style-type: none"> Eliminate all “pass-through” trips using East Park Hills Avenue Changes East Park Hills Avenue to a Residential Access Street Improved safety for pedestrians Option to improve Tudek Park entrance Diverter design can accommodate emergency response vehicles 	<ul style="list-style-type: none"> Does not directly address issue of “pass through” trips from Park Lane through neighborhood Traffic will increase along West Park Hills Avenue Restricts direct access for residents along East Park Hills Avenue from Circleville Road Impacts SCASD bus routing for Radio Park Elementary, Park Forest Middle, and High School Impacts future CATA service expansion options for Park Hills Neighborhood Reduced access options for residents along East Park Hills Avenue 	\$33,500
<u>Option 6</u> Cherry Hill Road Diverter	<ul style="list-style-type: none"> Eliminate all “pass-through” trips using East Park Hills Avenue Changes East Park Hills Avenue to a Residential Access Street Only local residential vehicle trips will use East Park Hills Avenue Diverter design can accommodate emergency response vehicles 	<ul style="list-style-type: none"> Impacts same as with Option 5. 	\$17,300

Attachment C: Cost Estimate Assumptions



Cost Estimate Assumptions

Option 1: Southbound Park Lane Partial Diverter

Concrete Curb [\$20.00/LF] x 200 LF = \$4,000.00
Earthwork, assuming 2 FT depth, includes: excavation, topsoil, seeding [\$25.00/CY] x 90 CY = \$2,250.00
Signs [\$250.00/EA] x 2 EA = \$500.00
~15% Contingency = \$1,013
TOTAL = \$7,800

Option 2: Northbound Park Lane Partial Diverter

Concrete Curb [\$20.00/LF] x 200 LF = \$4,000.00
Earthwork, assuming 2 FT depth, includes: excavation, topsoil, seeding [\$25.00/CY] x 90 CY = \$2,250.00
Removal of Existing Inlets [\$5,000.00 LS] x 1 LS Task = \$5,000
Signs [\$250.00/EA] x 2 EA = \$500.00
~15% Contingency = \$1,763
TOTAL = \$13,500

Option 3: Park Lane Full Diverter

Concrete Curb [\$20.00/LF] x 225 LF = \$4,500.00
Earthwork, assuming 2 FT depth, includes: excavation, topsoil, seeding [\$25.00/CY] x 60 CY = \$1,500.00
Removal of Existing Inlets [\$5,000 LS] x 1 LS Task = \$5,000.00
Roadway includes: excavation, grading, subbase, base course and wearing course

- Excavation [15.00/CY] x 53 CY = \$795.00
- Subbase [\$30.00/TON] x 2 TON/CY x 13 CY (6 IN Depth) = \$780.00
- Base Course [\$125.00/TON] x 79 SY x 6 IN x 0.06 TON/SY/IN = \$3,625.00
- Wearing Course [\$125.00/TON] x 79 SY x 1.5 IN x 0.06 TON/SY/IN = \$875.00

Path/Sidewalk [\$50.00/LF] x 22 LF = \$1,100.00
Signs [\$250.00/EA] x 2 EA = \$500.00
~15% Contingency = \$2,728
TOTAL = \$22,100.00

Option 4: Glenwood Circle Diverter

Concrete Curb [\$20.00/LF] x 286 LF = \$5,720.00
Earthwork, assuming 2 FT depth, includes: excavation, topsoil, seeding [\$25.00/CY] x 160 CY = \$4,000.00
Storm water mitigation [\$5,000 LS] = \$5,000.00
Roadway includes: excavation, grading, subbase, base course and wearing course

- Excavation [15.00/CY] x 82 CY = \$1,230.00
- Subbase [\$30.00/TON] x 2 TON/CY x 21 CY (6 IN Depth) = \$1,260.00
- Base Course [\$125.00/TON] x 123 SY x 6 IN x 0.06 TON/SY/IN = \$5,535.00
- Wearing Course [\$125.00/TON] x 123 SY x 1.5 IN x 0.06 TON/SY/IN = \$1,384.00

Path/Sidewalk [\$50.00/LF] x 80 LF = \$4,000.00
Signs [\$250.00/EA] x 4 EA = \$1,000.00
~15% Contingency = \$4,400.00
TOTAL = \$33,500.00

Cost Estimate Assumptions (continued)

Option 5: Cherry Hill Diverter

Concrete Curb [\$20.00/LF] x 161 LF = \$3,220.00

Earthwork, assuming 2 FT depth, includes: excavation, topsoil, seeding [\$25.00/CY] x 61 CY = \$1,525.00

Storm water mitigation [\$5,000 LS] = \$5,000.00

Roadway includes: excavation, grading, subbase, base course and wearing course

- Excavation [15.00/CY] x 28 CY = \$420.00
- Subbase [\$30.00/TON] x 2 TON/CY x 14 CY (6 IN Depth) = \$420.00
- Base Course [\$125.00/TON] x 41 SY x 6 IN x 0.06 TON/SY/IN = \$1,845.00
- Wearing Course [\$125.00/TON] x 41 SY x 1.5 IN x 0.06 TON/SY/IN = \$461.00

Path/Sidewalk [\$50.00/LF] x 22 LF = \$1,100.00

Signs [\$250.00/EA] x 4 EA = \$1,000.00

~15% Contingency = \$2,300.00

TOTAL = \$17,300.00