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**The Promenade Development - Public Hearing Follow Up
Dresher Triangle Traffic Operations**

MEMORANDUM

To: Paul Leonard, Upper Dublin Township Manager
From: Jack Smyth Jr., PE, Project Engineer
Date: December 1, 2016

At the 11/22/16 Public Hearing for The Promenade development proposed by BT Dreshertown at Welsh Road and Dreshertown Roads there were questions regarding traffic operations at the Dresher Triangle and traffic projections from the proposed development on Dreshertown Road. The following is follow up information from specific questions raised by residents at the meeting:

1. Question Regarding Dresher Triangle Levels of Service before Virginia Drive detour

We analyzed the Dresher Triangle based on 2015 traffic count data for the morning and afternoon peak hours which was before the Virginia Drive detour. In the morning peak hour the overall Dreshertown Road & Limekiln Pike intersection operated at a Level of Service D with the average motorist delayed approximately 50 seconds. When analyzing just the Dreshertown Road approach, the Level of Service is F with an average delay of approximately 97 seconds. The overall Virginia Drive & Susquehanna Road intersection operated at a Level of Service D (average delay 45 sec). The overall Limekiln Pike and Susquehanna Road intersection operated at a Level of Service C (34 sec).

For the afternoon peak hour based on 2015 traffic count data, the overall Dreshertown Road & Limekiln Pike intersection operated at a Level of Service D with the average motorist delayed approximately 47 seconds. However, when analyzing just the Dreshertown Road approach, the Level of Service is D with an average delay of approximately 49 seconds. Virginia Drive & Susquehanna Road intersection operated at a Level of Service D (average delay 39 sec). The overall Limekiln Pike and Susquehanna Road intersection operated at a Level of Service C (20 sec).

After the Virginia Drive detour was established, the Township directed the adaptive signal software developer (Rhythm Eng.) to analyze the Dresher Triangle intersections and make timing adjustments accordingly. This can be done because of the video cameras on the mast arms that detect vehicle information and the equipment in the controller cabinet that processes the information. The first round of timing adjustments made in late summer of this year were not effective. Our firm was asked to review the operations in October and coordinate with the adaptive software developer to make further adjustments. Instead of doing traffic counts, we went out and watched the traffic operations. It became apparent that vehicles on Dreshertown Road were not able to proceed through to Virginia Drive after receiving a green light for a significant portion of the green time provided to them. This was because the signal at Virginia & Susquehanna did not turn green such that traffic was clearing out of the area between the signals - basically Dreshertown Road traffic was blocked from passing through. We relayed this information to the Township and software developer (Rhythm Eng.). Based on this information further adjustments were just made to the Virginia & Susquehanna

and Dreshertown & Limekiln signals within the last week to 10 days. We went back out this week in the morning peak and there was improvement such that the amount of time Dreshertown Road traffic was blocked was reduced.

I mention the above because we have Level of Service information for the pre-detour condition but not for the detour condition since we utilized direct field observation as opposed to the traffic simulation software which requires traffic count data.

2. Question Regarding Traffic Generations and Projections on Dreshertown Road

A Transportation Impact Study was prepared in March, 2016 by McMahon Associates. Among other information, the study presented the estimated number of trips which are forecast for the different proposed uses (ie. apartment, coffee shop, restaurant, retail). This trip generation was derived from the latest edition of the ITE Trip Generation Manual which is the industry standard methodology. We reviewed the study and provided a Review Letter on 7/18/16 (Exhibit T15) which commented on the amount of trips generated by the proposed development and the distribution of the trips on the existing roadway network. In response, McMahon Associates provided additional information to justify the estimate of New Trips.

As discussed at the meeting, the ITE Manual estimates the total number of trips. In the Weekday Morning Peak Hour this equates to 773 trips based on the proposed uses. From there, ITE notes that a certain percentage of the total trips were already passing by the site. Based on calculations verified from the ITE Manual, 127 trips are estimated to be pass-by. Lastly, on a site with multiple uses, it is assumed that a certain number of trips will be internal to the site (ie. stopped at a retail store then went to the restaurant which would equal two trips in and two trips out). It is estimated that 186 trips are internal. Based on the above 460 of the 773 trips would be considered New Trips after subtracting the 127 pass-by and 186 internal trips.

Regarding the Trip Distribution, McMahon Associates developed a gravity model based on populations from the surrounding area municipalities. The percentages of trips distributed along Welsh Road, Dresher Road, Jarrettown Road and Dreshertown Road are reflective of this analysis. Based on the gravity model, 20% of New Trips heading to and from the proposed development are forecast to use Dreshertown Road. In the Weekday Morning Peak Hour there are an estimated 460 New Trips entering and exiting the development. Therefore 92 of these trips are forecast to utilize Dreshertown Road, 55 heading out of the development towards the Dresher Triangle and 37 heading into the development from the Dresher Triangle. In the Afternoon Peak Hour there are an estimated 699 trips which would then forecast 140 New Trips on Dreshertown Road, 62 heading towards Dresher Triangle and 78 coming from the Dresher Triangle.

From the above Question 1 response, the Weekday Morning Peak Hour has a worse Level of Service for the Dreshertown Road approach at Limekiln Pike (overall Level of Service D with an average intersection delay of 50 seconds and delay of 97 seconds for Dreshertown Road approach). When adding the 55 New Trips to Dreshertown Road

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heading towards the Dresher Triangle, the Level of Service remains at D and the delays remain the same after shifting two seconds of green time from Limekiln Pike.

As a final analysis, if 20% of the 773 Total Weekday Morning Trips (includes New Trips, Pass-By and Internal Trips) is used, then 93 vehicles would be heading towards the Dresher Triangle. After shifting four seconds of green time to Dreshertown Road, the intersection Level of Service remains at D and the Dreshertown Road delay remains the same.