

October 28, 2019

Tarren Barrett
Knoxville-Knox County Planning
400 Main Street
Suite 403
Knoxville, TN 37902
(865) 215-3826



**RE: Dowell Springs Behavioral Health Hospital
Traffic Study Comment Response Letter
11-E-19-UR**

Tarren,

Below are our responses to comments received on 10/18/2019.

1. The Traffic Study Letter provided was not what the review team had expected or thought was agreed upon during the conference call. The submittal of a brief letter administering the trips per bed rate of a previous TIS to the proposed development, and a Draft Traffic Study for a development in California is not what the team considered as meeting the intent of a Transportation Impact Letter for this development. The review team thought the Traffic Letter would include many elements and discussion that was in the California Traffic Study. Having a table to better describe the Trip Generation assumptions with comparisons of the previous TIS to the current proposal, a section on sight distance evaluation for all access points (including landscaping considerations), and a section comparing the previous Traffic Impact Study projections and recommendations is recommended. I have recently found the previous Transportation Impact Study for this development and I have attached it within this email. It looks like the previous TIS was based upon 500,000 sf of Office Park, 200 bed Congregate Care Facility, and 120 condo/townhouse. Also, I have attached the TMC for the Old Weisgarber Rd at Middlebrook Pike for you to compare the previous Future traffic projections (2003) to the Existing traffic (2019).

Response: A revised traffic letter is provided with this submittal that meets the requests outlined in this comment and as discussed on the phone. The existing Dowell Springs Traffic Study and the provided TMC for Old Weisgarber Rd and Middlebrook Pike have been included in the traffic letter along with additional references to the sealed traffic study that was originally submitted.

2. Attached is an example letter format to follow. Unfortunately, we do not have an example that perfectly matches your type of development with existing traffic signals and lane designations at the main road (Middlebrook Pike) that are not expected to change in the next few years. This TIL gives a good idea as to some of the explanations and data we are looking for.

a) Please include an appendix with the TIL that includes any data that was discussed or used.

Response: The traffic letter has been set up in a similar format to the example provided. Appendices have been added for references made in the traffic letter.

3. Please correct "the Knoxville Planning Department" to "Knoxville-Knox County Planning".

Response: All references to "the Knoxville Planning Department" have been revised to "Knoxville-Knox County Planning".

We believe that all comments have been addressed and we request for approval of our plans. If you have any questions or need additional information, please contact me.

Thank you.

A handwritten signature in blue ink, reading "Adam Crunk". The signature is fluid and cursive, with the first name "Adam" and last name "Crunk" clearly distinguishable.

Adam Crunk
Crunk Engineering LLC
615-873-1795
adam@crunkeng.com



October 25, 2019

Tarren Barrett
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(865) 215-3826

**RE: Dowell Springs Behavioral Health Hospital
Traffic Study Comment Response Letter
11-E-19-UR**

Tarren,

On behalf of our client, Acadia Healthcare, and the current property owner, we are submitting a Use on Review plan for a new 138 bed behavioral health hospital located at 0 Old Weisgarber Road in Dowell Springs. Ninety (90) beds are to be initially constructed with the potential addition of 48 beds to be constructed in the future. As requested, we have analyzed the trip generation estimates from the original development plan to the current projections for Dowell Springs and our specific site.

The original traffic impact study for Dowell Springs was prepared by Barge, Waggoner, Sumner, and Cannon, Inc. in 1998. Trip generation projections can be found in Table 2 in the original study and are summarized in Table 1 below. The 1998 study included the proposed development of 500,000 sq-ft of office park, 120 condominium/townhouse units, and a 200-unit congregate care facility. Referenced material from this study can be found in Appendix B attached. The 1998 trip generation estimates were based on Trip Generation, 6th Edition, published by the Institute of Transportation Engineers (ITE).

Table 1
Trip Generation Projections for Original Traffic Study
(Data from 1998 Traffic Study for Dowell Springs)

Land Use	ITE Land Use Code	Size/Units	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Office Park	750	500,000 SF	5,710	842	713
Condos/Townhomes	230	120 units	703	59	71
Congregate Care Facility	252	200 units	430	12	34
Total			6,843	913	818

The proposed update to the Dowell Springs Development Plan includes a 138 bed Behavioral Health Hospital. The proposed hospital is in "Parcel 7" from Figure 2 from the original 1998 traffic study and can be found in Appendix B attached. This parcel was originally planned to be a part of the development dedicated to office park. The proposed development is only a portion of parcel 7 and the proposed site has been rezoned from O-3 to O-1 to allow for a Behavioral Health Hospital. The proposed updated site development plan is as follows:

- 500,000 sq-ft of Office Park (a part of the original development plan)
- 120 Condo/Townhome Units (a part of the original development plan)
- 200 Units Congregate Care Facility (a part of the development original plan)
- 138 Bed Behavioral Health Hospital (proposed addition to the development plan)

Based on the updated development plan for Dowell Springs, an additional trip generation analysis was conducted in order compare the updated development plan to the original traffic study from 1998. Acadia has built many behavioral health hospitals in different locations across the country. Attached is a traffic study for a project of similar scope to the proposed project, which is a 120-bed behavioral health hospital in Indio, CA. The project is an initial 80 bed buildout with an additional 40 beds to be constructed at a later time. The study was performed by Mizuta Traffic Consulting in 2018. The anticipated trip generation is analyzed in section 4.2 on page 10 of the traffic study. The ITE Trip Generation Manual, 10th Edition was used to determine the weekday average daily trips and AM and PM peak hour rates. There is not an ITE code the directly correlates with a Behavioral Health Hospital, but the Nursing Home land use (620) best matched the description to the proposed use and resulted in a higher trip rate than other similar land uses. Additional information can be found in the study provided in Appendix E. Trip generation estimates for the new development plan can be found in Table 2 below.

Table 2
Trip Generation Projections for Proposed Development
(Behavioral Health Hospital Data from California Traffic Study)

Land Use	ITE Land Use Code	Size/Units	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Office Park	750	500,000 SF	5,710	842	713
Condos/Townhomes	230	120 units	703	59	71
Congregate Care Facility	252	200 units	430	12	34
Behavioral Health Hospital	620*	138 beds	423	21	25
Total			7,266	934	843

*Nursing Home land use best matched the description of the proposed use.

The status of the existing and future development totals for the office park, condos/townhomes, and congregate care facility are not known, but the expected average daily trip generation is significantly less than the 750 trips/day rate which is what requires a traffic study per the Knoxville Planning Department. Table 3 shows a comparison of trip generation between the original 1998 traffic study and the proposed development. The increase in trips is very minor and will have an insignificant affect on the total future buildout of Dowell Springs.

Table 3
Comparisons of Trip Generation Projections for Proposed Development

Summary	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
1998 Traffic Study	6,843	913	818
Proposed Development	7,266	934	843
Percent Difference	+6.2%	+2.3%	+3.1%

From the 1998 traffic study, a projected traffic count was established for the affected intersections for the future completed buildout of Dowell Springs that was anticipated in 2003, please see Appendix B attached. In March of 2019, a traffic count was performed for the intersection of Old Weisgarber Rd and Middlebrook Pike, please see Appendix C attached. The intersection of Old Weisgarber Rd and Middlebrook Pike will receive the majority of the trips generated by the proposed Behavioral Health Hospital. In Table 4 below, a comparison is shown between the originally anticipated traffic counts for future buildout and what the traffic counts are currently. A section has been added that includes the projected traffic counts for the intersection with the addition of the Behavioral Hospital. The projected peak hour rates are from The ITE Trip Generation Manual, 10th Edition was used to determine the weekday average daily trips and AM and PM peak hour rates. There is not an ITE code the directly correlates with a Behavioral Health Hospital, but the Nursing Home land use (620) best matched the description to the proposed use and resulted in a higher trip rate than other similar land uses. The In:Out ratio for the AM Peak is 0.72:0.28 respectively. The In:Out

ratio for the PM Peak is 0.33:0.67 respectively. These ratios were applied to the Peak Hour trips calculated from Table 2. Please note, the Dowell Springs Development has not been completed in full.

Table 4
Comparisons of Traffic Counts for Proposed Development

	Entering		Exiting	
	AM	PM	AM	PM
2003 Projections, 1998 Study	380	86	65	337
2019 Traffic Counts	269	50	34	233
Proposed Increase from Hospital	15	6	8	17
Projected 2019 Counts	284	56	42	250
Percent Difference	-25.3%	-34.9%	-35.4%	-25.8%

Sight Distance Analysis

Table 12-3 from the City of Knoxville Land Development Manual was used to determine compliance with the minimum stopping sight distance for the proposed driveway connections for the Behavioral Health Hospital. Table 12-3 is taken from "A Policy on Geometric Design of Highways and Street" (AASHTO). There are two driveway connections proposed to Old Weisgarber Rd, which are the northwest connection and the southeast connection. These proposed connections are 506 L.F. apart. The northwest connection ties into an existing slope in Old Weisgarber Rd of 12.5% to the west and east directions. There is not a posted speed limit so the speed limit is assumed to be 35 mph. According to Table 12-3, the minimum stopping sight distance for a car travelling uphill on Old Weisgarber Rd at greater than 10% is 221 L.F. and the minimum stopping sight distance downhill at greater than 10% is 299 L.F.

The southeast connection ties into an existing slope in Old Weisgarber Rd of 4.3% to the west and 2.5% to the east. There is not a posted speed limit so the speed limit is assumed to be 35 mph. According to Table 12-3, the minimum stopping sight distance for a car travelling uphill on Old Weisgarber Rd at 5% or less is 233 L.F. and the minimum stopping sight distance downhill at 5% or less is 269 L.F. Appendix D shows these minimum sight distances being met in the corresponding Use on Review Submittal for this site.

Old Weisgarber Rd transitions from 12.5% slope on the west end to 2.5% on the east end. There are no obstructions from to the vertical profile except where Old Weisgarber Rd terminates at the top of the hill at Dowell Springs Blvd. Adequate sight distance of 299 L.F. is provided as shown in Appendix D. There are large trees planted on both sides of Old Weisgarber Rd at approximately 45' on center and they are setback approximately 10 L.F. from the back edge of the curb. There are also light poles that are staggered on both sides of Old Weisgarber Rd that are approximately 180' on center and approximately 10 L.F. from the back edge of the curb. The placement and height of the trees and light poles are such that there is very little to no impact on sight distance for traffic in both directions.

We believe there is sufficient evidence in this existing traffic study for a similar project in California that results in a trip generation that is well under the threshold for the need for a site specific traffic study to be performed. If you have any questions or need additional information please do not hesitate to contact me at adam@crunkeng.com or 615-873-1795.

Sincerely,

Adam Crunk, PE
Crunk Engineering LLC



Appendix A

Vicinity Map



Not to Scale

Appendix B

1998 Dowell Springs Traffic Impact Study **Referenced Pages**

INTRODUCTION

The purpose of this study is to determine the traffic impact on the adjacent street system for the proposed development named Dowell Springs.

Dowell Springs is intended to be an office park with some residential components to be located on the north side of Middlebrook Pike east of Dick Lonas Road and west of Old Weisgarber Road. The property on which Dowell Springs is planned consists of two tracts, the Dowell farm of 119.7 acres and an adjacent parcel of 9.3 acres, for a total development of 129 acres.

The proposed development will consist of a 500,000 sf. office park, 120 condominium/townhouse units and a 200 unit congregate care facility. The office park use is unknown at this time. A vicinity map, showing the project location with respect to major roadways in the area, is provided on Figure 1. All access to the site will be from Middlebrook Pike with a driveway to be located between Dick Lonas Road and Old Weisgarber Road and a driveway to be located on Old Weisgarber Road north of Middlebrook Pike. The exact driveway locations have not been determined at this time. A copy of the project site plan is provided on Figure 2.

The purpose of this study is to evaluate the impact of this commercial development on the roadway system in the vicinity of the site and determine what, if any, off-site improvements are required to accommodate the development. The study will analyze the existing traffic operations

28 percent from Middlebrook Pike west bound

7 percent from Weisgarber Road

2.) P.M. - 36 percent from Middlebrook Pike east bound

50 percent from Middlebrook Pike west bound

14 percent from Weisgarber Road

These percentages are based on the traffic distribution obtained from the traffic count data. The resulting entering and exiting percentages for all of the analysis intersections are summarized on Figure 4.

SITE TRAFFIC GENERATION

The number of trips attributable to this development was determined by using the procedures outlined in the Sixth Edition of Trip Generation, published by the Institute of Transportation Engineers (I.T.E.). Table 2 summarizes the trip generation information for this development.

Table 2. Trip Generation Summary For Commercial Development
(Percent of total trips)

I.T.E. Land Use Code	Period	Enter	Exit	Total
Office Park (750) Avg. Weekday Trips = 5710	A.M. Peak	749 (89%)	93 (11%)	842
	P.M. Peak	100 (14%)	613 (86%)	713

I.T.E. Land Use Code	Period	Enter	Exit	Total
Residential Condo/Townhouse (230) Avg. Weekday Trips = 703	A.M. Peak	10 (17%)	49 (83%)	59
	P.M. Peak	48 (67%)	23 (33%)	71
Congregate Care Facility (252) Avg. Weekday Trips = 430	A.M. Peak	7 (61%)	5 (39%)	12
	P.M. Peak	19 (56%)	15 (44%)	34
TOTALS	A.M. Peak	766 (84%)	147 (16%)	913
	P.M. Peak	167 (20%)	651 (80%)	818

Source: Sixth Edition of Trip Generation, published by I.T.E.

SITE TRAFFIC

The total number of trips expected to be generated by this complex, shown in Table 2, may be applied to the approach and departure percentages shown on Figure 4. The result is the volume of site traffic expected at each of the analysis intersections. These resulting volumes are summarized on Figure 5.

FUTURE TRAFFIC

The 2003 existing traffic is derived from counts obtained from the Tennessee Department of Transportation. The growth factor of 2.29% was determined using counts the from 1991 and 1997.

The site traffic, shown on Figure 5 may be combined with the 2003 existing traffic, shown on Figure 3A. The result is the future traffic expected following full build out of the site at each of

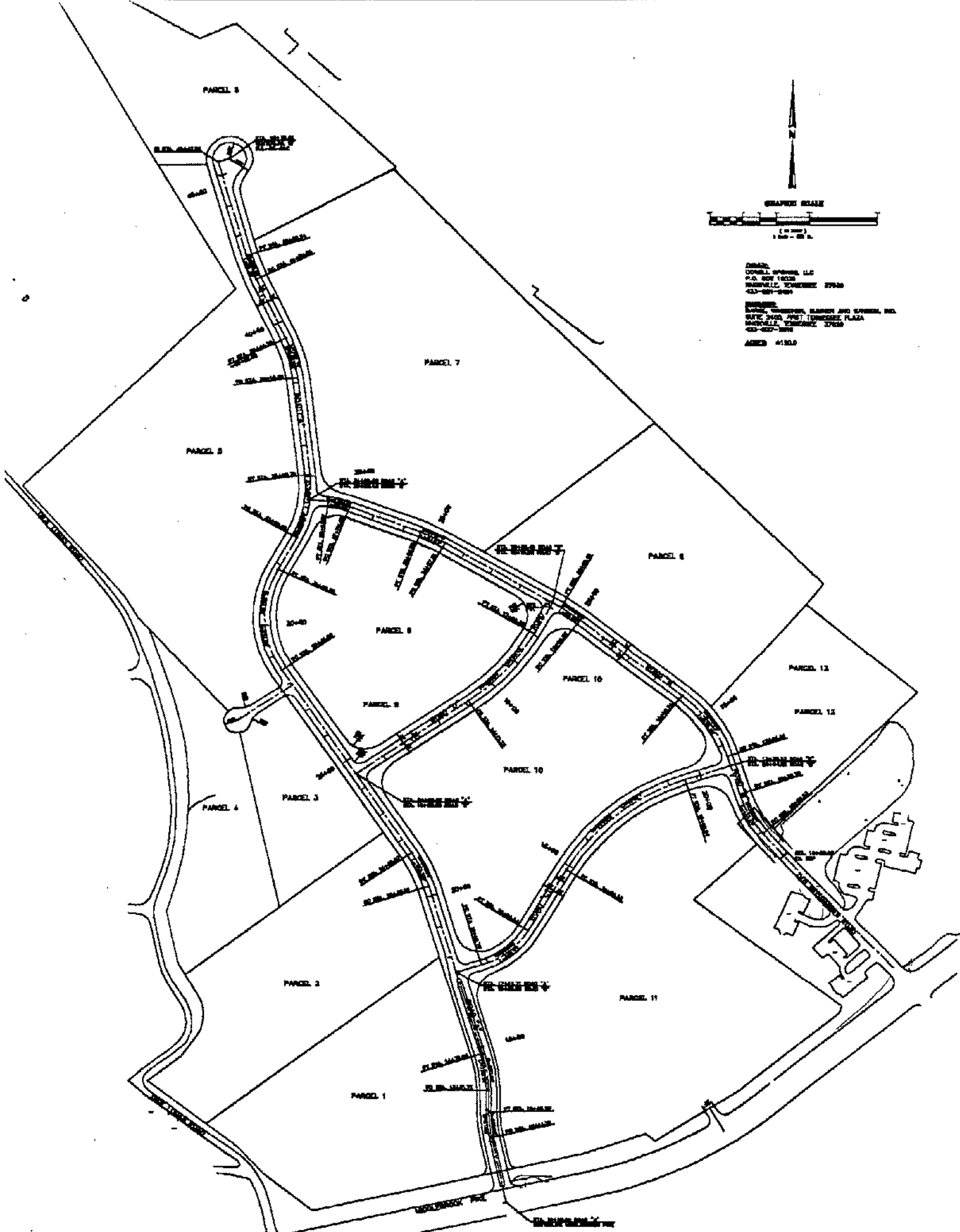
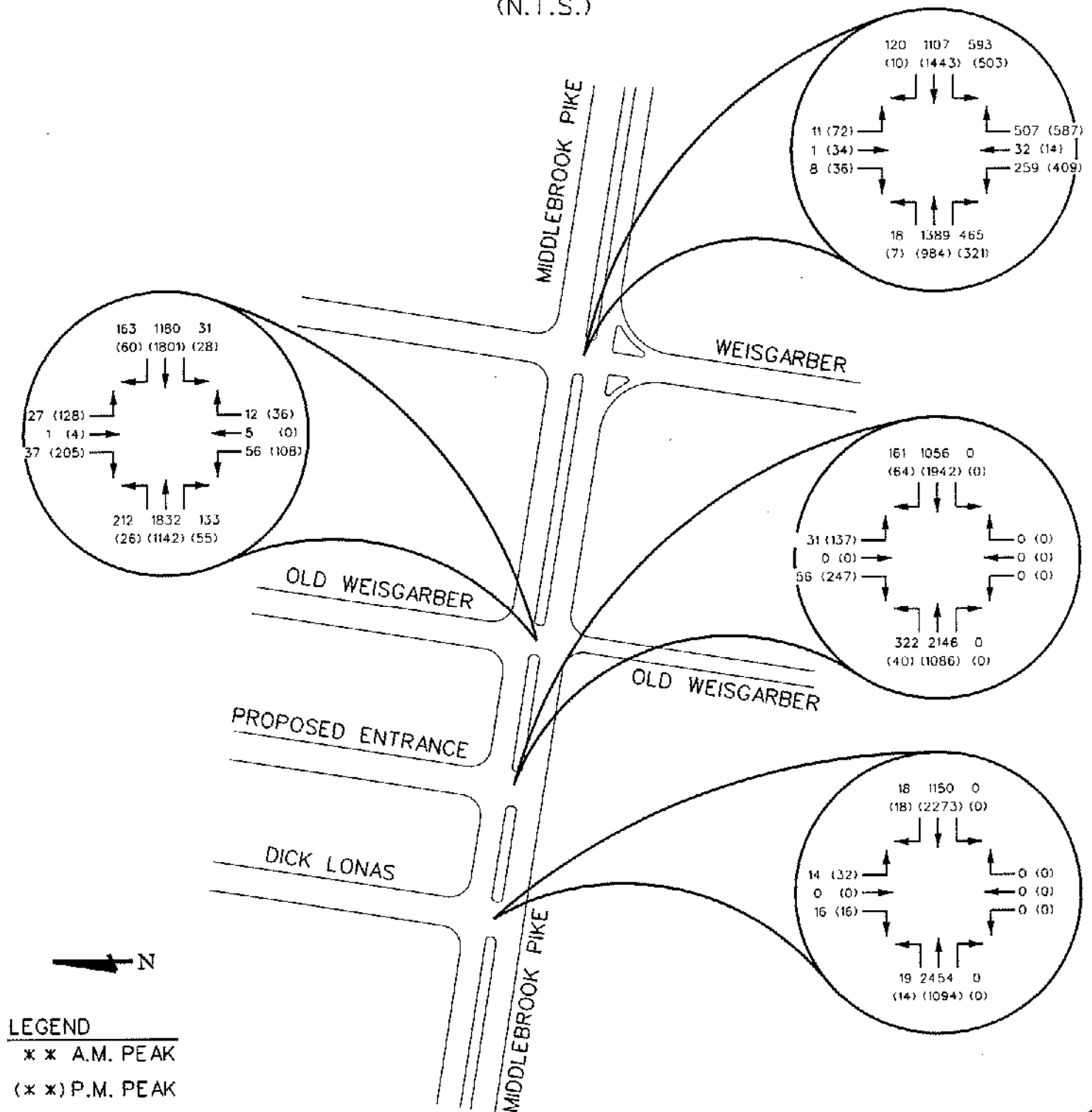


FIGURE 2

FUTURE TRAFFIC 2003

(N.T.S.)



Barge Waggoner Summer and Cannon, Inc.

**DOWELL SPRINGS DEVELOPMENT
TRAFFIC STUDY**

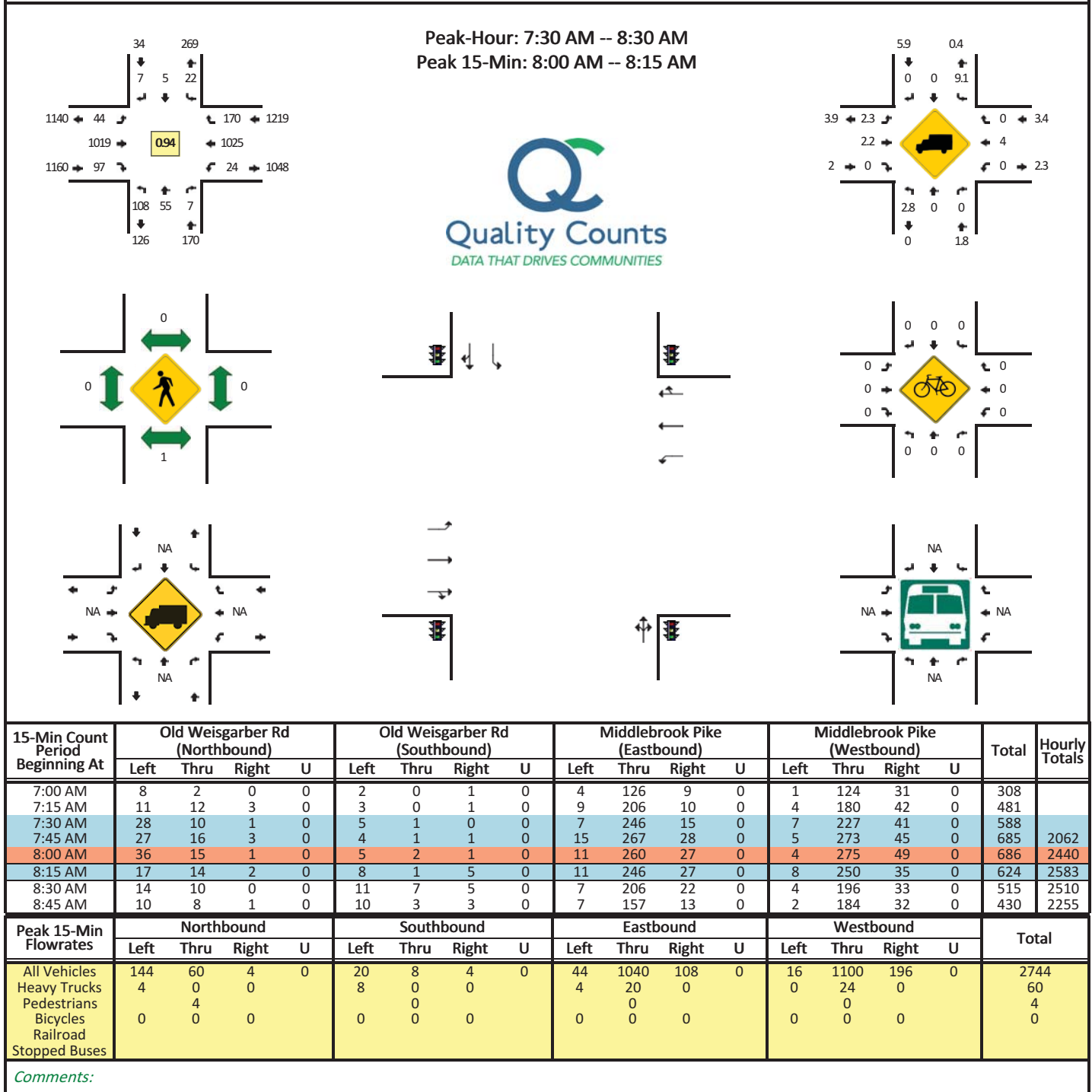
**6
FIGURE**

Appendix C

Quality Counts – March 2019 Parking Counts **Old Weisgarber Rd & Middlebrook Pike**

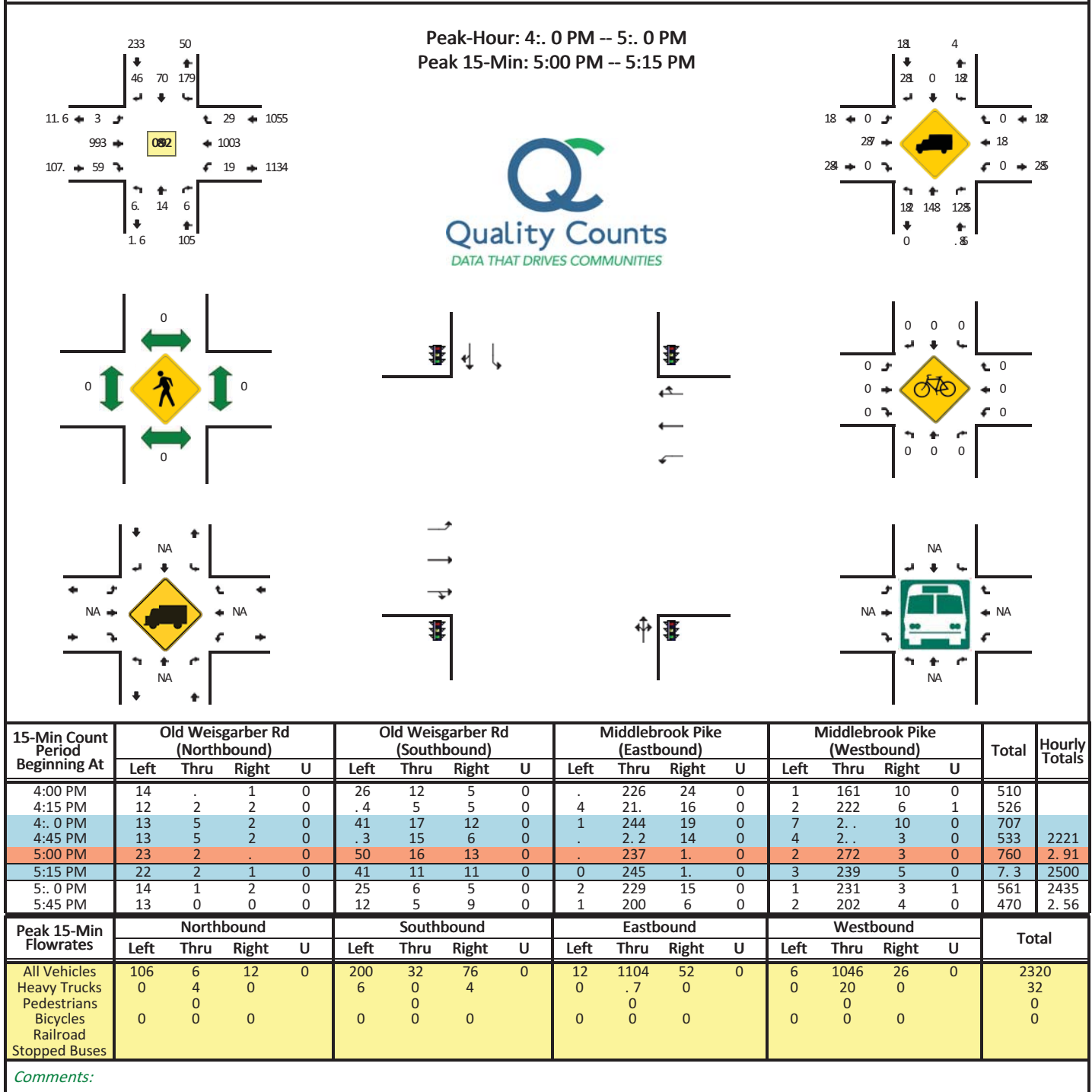
LOCATION: Old Weisgarber Rd -- Middlebrook Pike
CITY/STATE: Knoxville, TN

QC JOB #: 14915009
DATE: Tue, Mar 5 2019



LOCATION: Old Weisgarber Rd -- Middlebrook Pike
CITY/STATE: Knoxville, TN

QC JOB #: 14915010
DATE: Tue, Mar 5 2019



Appendix D

Sight Distance Exhibit



STENGEL-HILL
ARCHITECTURE

612 West Main Street

Louisville, Kentucky 40202

002.870.1075

802.893.1875 fax

Civil Engineering



Structural Engineering



Mechanical/Electrical Engineering



SIGHT DISTANCE
NEW BEHAVIORAL HEALTH HOSPITAL
DOWELL SPRINGS BEHAVIORAL HEALTH
KNOWVILLE, TENNESSEE

25 OCTOBER 2019
AHC1905

C2 3

C2.3

11

USE ON REVIEW SUBMITTAL - NOT FOR CONSTRUCTION - PLANNING FILE #11-E-19-JR

ACADIA

NOTE:
THE SIGHT DISTANCE REQUIREMENTS ARE BASED OFF OF THE CITY OF KNOXVILLE LAND
DEVELOPMENT MANUAL TABLE 12-3 "STOPPING SIGHT DISTANCE" FOR A 35 MPH ROAD.

Appendix E

Mizuta Traffic Consulting Study **Indio, California 2018**