



June 3, 2022

Sarah Raposa, AICP – Town Planner
Town of Medfield
459 Main Street
Medfield, MA 02052

Re: Medfield State Hospital Redevelopment – Preliminary Traffic Peer Review

Dear Ms. Raposa:

BETA Group, Inc. (BETA) has conducted a preliminary transportation engineering peer review of the proposed Medfield State Hospital Redevelopment located north of Hospital Road in Medfield, Massachusetts. This letter has been prepared to outline findings, comments, and recommendations of the materials provided.

BASIS OF REVIEW

The following documents were received by BETA and formed the basis of the review:

- Draft Traffic Impact and Access Study (DTIAS) and Appendix Medfield State Hospital Redevelopment, Medfield Massachusetts, dated May 2022, prepared by Vanasse Hangen Brustlin, Inc. (VHB)

It is noted that Site Plans were not available for review.

PROJECT UNDERSTANDING

The existing Site is located on an 87-acre parcel of land owned by the Town of Medfield which formerly housed the Medfield State Hospital. The Site is zoned as "Medfield State Hospital," according to the Town of Medfield Zoning Map, revised for the May 9, 2022 Town Meeting. Access to the existing Site is accommodated at Hospital Road via Service Road (to the west) and Stonegate Drive (to the east). Stonegate Drive breaks off into Cottage Street which serves the center of the campus. The Site currently contains approximately 36 buildings that have been shuttered and abandoned since 2003. Access within the Site is accommodated by several small roadways and pedestrian pathways. It is understood that the area is well utilized as a recreational space, namely for dog walking. A parking area utilized for the storage of school buses is located on the eastern side of Service Drive, north of Hospital Road. The DTİAS notes that the long-term use of this site for school bus storage is not intended.

The Project will convert the existing buildings to provide 334 multi-family residential units and an 11,834 square foot clubhouse. In addition, the Bellforge Arts Center is expected to operate out of two buildings located in the center of the campus. It is understood that the Arts Center is being proposed as a separate project. It is understood that the Project will utilize the existing accesses to Hospital Road as well as existing on-site circulation. A Site Plan was not presented for review.

TRAFFIC IMPACT AND ACCESS STUDY

Review of the DTIAS found that it was conducted in accordance with the MassDOT Transportation Impact Assessment Guidelines and current standards of professional practices. The following comments are provided in response to the review.

STUDY AREA

The DTIAS defined the study area as seven unsignalized intersections along Hospital Road and Harding Street:

- N. Meadows Road (Route 27) at Hospital Road
- Hospital Road at Service Drive/McCarthy Park Driveway
- Hospital Road at Stonegate Drive
- Hospital Road at Harding Street
- Harding Street at West Mill Street
- Harding Street at West Street
- Harding Street at North Street

BETA finds the above study area and the relevant discussion of such to be appropriate.

TRAFFIC VOLUMES

Traffic volume was obtained via Automatic Traffic Recorder (ATR) on Hospital Road between the two Site Driveways (Service Drive and Stonegate Drive) for 48-hours on Tuesday, April 12, 2022 and Wednesday, April 13, 2022. Intersection Turning Movement Counts (TMC) were collected for all seven study intersections on Wednesday, April 13, 2022 from 7:00 to 9:00 AM and 4:00 to 6:00 PM.

BETA finds the data collection to be appropriate. Review of the ATR data found Wednesday volumes were higher than Tuesday volumes, generally suggesting that the Wednesday TMC is conservative.

SEASONAL ADJUSTMENTS

The DTIAS assessed the need to seasonally adjust the collected traffic volumes based on historical MassDOT data. This suggested that April volumes were slightly higher than average month volumes and as such no adjustment was made to provide a conservative assessment.

BETA finds this methodology to be appropriate. Recent guidance from MassDOT has suggested that recent traffic volume has increased to levels consistent or close to those pre-pandemic. In general, MassDOT considers 2022 traffic volume to represent "post-COVID" conditions and adjusting to represent pre-pandemic conditions is no longer required.

EXISTING TRAFFIC VOLUME

The 2022 existing volumes were summarized to show Hospital Road carries an average daily volume of 2,400 vehicles per day (in both directions) with approximately 270 vehicles in the morning peak hour and 260 vehicles in the evening peak hour. Vehicle volume had a higher eastbound split in the morning and westbound split in the evening. Turning movement diagrams generally suggest eastbound traffic in the morning travels from Route 27 to West Mill Street and North Street. A similar reverse pattern is apparent in the weekday evening.

1. BETA notes that the traffic volume summary and turning movement diagrams (for all design years) appear to round volumes to the nearest five (5). This overcompensates and undercompensates for some movements.
2. Review of the ATR data found the roadway sees traffic volume spikes consistent with school arrival and dismissal. The PM (afternoon) peak hour, as reported in the table, occurs between 3:15-4:15PM. Volume

MULTI-MODAL TRANSPORTATION

The DTIAS summarized the locations of existing pedestrian and bicycle facilities as well as the existing public transportation systems. BETA finds the discussion to be adequate.

CRASH HISTORY

Crash history was assessed via the MassDOT database for the most recent five years of closed data (2015-2019) at each of the study area intersections. BETA examined the MassDOT database and finds the methodology and data presented in the DTIAS to be appropriate.

The assessment found 10 crashes occurred at the intersection of Route 27 and Hospital Road. These were predominantly single vehicle (5) and rear-end (3) type crashes. While not stated in the DTIAS, it is noted that one of the rear-end crashes was reportedly related to the adjacent railroad crossing, three of the single vehicle crashes involved deer, and two of the single vehicle crashes involved guardrail. This intersection was found to have a crash rate higher than the MassDOT averages.

The assessment found 19 crashes at the intersection of Harding Street and North Street. These were primarily angle (13) and sideswipe (4) type crashes, generally consistent with the complex geometry of the intersection. This intersection was also found to have a crash rate higher than the MassDOT averages.

No study area intersections were defined as Highway Safety Improvement Program high crash clusters. BETA concurs.

3. The DTIAS references an Intersections Evaluations report conducted by Nitsch Engineering in January 2021 that was not provided for review.
4. Crash rate calculations utilize a weekday PM K-Factor of 0.10 which is consistent with the Hospital Road ATR data collection, however this K-Factor may not apply for Harding Street intersections. MassDOT guidance has historically been to utilize a K-Factor of 0.09 in these cases. The difference in crash rate based on K-Factor is not significant.

FUTURE CONDITIONS

Future traffic volume conditions were assessed by applying a background growth rate over seven years, applying traffic volume associated with nearby projects, and by adjusting for changes to the existing site.

BACKGROUND GROWTH

The DTIAS utilized a 1% per year annual growth rate applied over seven years. BETA finds this methodology to be acceptable.

ADJACENT PROJECTS

The DTIAS identified three nearby developments in coordination with the Town. One such development was noted to be "mostly completed." These include:

- Chapel Hill Landing Condominiums – 49 Units with 44 occupied as of April 2022
- Aura at Medfield Apartments – 56 apartments to open in Summer 2022
- Hinkley South Age-Restricted Housing – 24 age restricted units

Based on the evaluation of the above developments, the DTIAS incorporated trips generated for the Aura at Medfield Apartments. The Chapel Hill Landing and Hinkley South developments were noted to have small impacts to the study area given they are either already largely occupied or generate low volumes. As such, these two were assumed to be included in the 1% per year growth rate.

BETA finds the above to be acceptable but notes that backup material was not provided to confirm.

ROADWAY IMPROVEMENTS

No roadway improvement projects in the study area were identified.

SITE USE CHANGES

The DTIAS noted that the existing bus parking area alongside Service Drive at Hospital Road would not serve as a long-term use and therefore should be removed from the Future volume conditions. The DTIAS defined the existing use as 20 buses entering the Site and 20 personal vehicles departing the Site in the morning peak hour. No bus traffic was found in the evening peak hour.

The turning counts confirm that 20 buses entered Service Drive from the east, turning right into the Site. Given they did not depart, it is a correct assumption that personal vehicles departed, however the data does not specify to which direction they departed.

The Bellforge Arts Center was noted to be a future use that would operate on the Site and is currently being proposed by a separate entity. No traffic was associated for this land use as part of the DTIAS.

5. Recommend the Town consider the impacts of the Arts Center which will likely overlap with peak period operations of the residential uses, particularly during the evening peak period.

NO-BUILD VOLUMES

The future No-Build traffic volume were summarized in Figures 5 and 6 of the DTIAS.

BETA notes that turning movement diagrams round volumes to the nearest five (5).

6. The effect of removing the bus traffic at Service Drive could not be confirmed. The figures suggest that traffic volumes increase rather than decrease.

BUILD CONDITIONS

TRIP GENERATION

The DTIAS assessed the exiting Site Trips observed as part of the Turning Movement Count exercise. This suggested an existing Site volume of 90 trips in the morning and 94 trips in the afternoon. In both peak hours, 10 trips were associated with Stonegate Drive noting that motorists park in front of the existing gate that blocks entry to the Site.

7. Review of Figure 3 of the DTIAS suggests Service Drive only has 35 exiting vehicles in the morning peak hour. This may be related to the rounding stated previously. Clarify the volumes for Figure 3 and Table 3.

Proposed Site trip generation was evaluated based on the Institute of Transportation Engineers' Trip Generation Manual, 11th Edition for Land Use Code 220 (Multi-Family Housing – Low-Rise). This land use is associated with multi-family housing in structures with three or fewer stories. The DTIAS states that the existing buildings on Site will be repurposed. Review of the existing buildings suggests this land use is appropriate. No Site Plan was provided to confirm.

The Trip Generation exercise found the proposed residential use is projected to generate 2,216 trips per day with 126 in the morning peak hour and 164 in the evening peak hour. BETA finds these calculations to be acceptable. It was noted that these new trips were added to the existing traffic volume, less the School Bus related traffic, generally assuming the recreational traffic to the Site would continue. BETA finds this methodology to be acceptable.

MODE SPLIT

The DTIAS assumed no changes to the Trip Generation for Mode Split, generally assuming all trips are vehicle trips. BETA finds this to be appropriate.

TRIP DISTRIBUTION

Trips were distributed based on US Census Journey to Work data for the Town of Medfield. This resulted in 25% of trips to the north via Route 27, 15% to the north via Harding Street, 15% to the north via North Street, 15% to the south via Route 27, 5% to the south via West Mill Street, and 25% to the south via North Street.

BETA finds this methodology to be acceptable. The 10% of Site Trips oriented to West Mill Street represent an addition of 7-8 trips in each peak hour with five (5) in one direction. These trips were associated only for in-town trips, e.g., work and reside in Medfield. It is expected that this is conservative given online mapping services typically recommend other routes such as North Street or Route 27.

BUILD TRAFFIC VOLUME

The future build traffic volume was developed by assigning trip generation to the network in accordance with the distribution percentages.

BETA found the trip assignment and Build Traffic Volume networks to be acceptable.

SITE CIRCULATION

Site circulation is expected to remain similar to existing conditions. The DTIAS noted that the site roadways will "continue to remain as pedestrian-oriented as possible to maintain the existing pedestrian and dog friendly environment." BETA supports this recommendation, but not Site Plan was provided to confirm.

SIGHT DISTANCE

Sight distance was evaluated for the two primary Site accesses based on a travel speed for Hospital Road of 45 miles per hour (mph) eastbound and 41 mph westbound. This results in a required stopping sight distance of 360 feet (eastbound) and 315 feet (westbound). The observed sight distance was found to be greater than required when approaching the Site Drives given the straight trajectory of the roadway. It is noted that sight lines are impeded to the Service Road driveway given a vertical curve west of Service Drive.

Intersection sight distance was also evaluated which found a desirable sight distance of 500 feet for vehicles exiting the Site. This is largely available save for vehicles departing Service Drive given the vertical curve.

TRAFFIC OPERATIONS

Traffic operations were assessed for the seven unsignalized study intersections using Synchro software. The exercise found Hospital Road operates with Level of Service (LOS) C or better conditions under all scenarios with minimal increases in delay as a result of the project. The two Site Driveways were found to operate with LOS B or better conditions in all scenarios. The intersection of Harding Street at North Street was found to operate with the poorest conditions, where the eastbound left turn sees LOS F conditions in the morning with queues of approximately 300 feet. The southbound through movement was found to degrade from LOS D to LOS F in the weekday evening no-build scenario, doubling in delay and queue. As a result of the Project, the operations maintain LOS F with a volume to capacity ratio exceeding 1.0.

BETA finds this methodology and summary to be acceptable.

MITIGATION

The DTIAS outlined several potential mitigation measures including a Transportation Demand Management (TDM) program, site access improvements, and study area intersection improvements.

The TDM program highlighted techniques such as:

- Disseminate information on alternative modes of transportation
- Provide bicycle racks and storage on-site
- Provide parking for low-emitting fuel-efficient vehicles and/or electric vehicle charging stations
- Develop transportation-related marketing and educational materials
- Host an annual mobility management educational meeting for residents.

BETA generally supports the measures outlined in the TDM program.

8. Define the locations of bike racks and dedicated parking on the Site Plan.

SITE ACCESS

The DTIAS noted the Site's Master Plan indicated the installation of raised intersections be considered for the Site Driveways at Hospital Road. This was noted to both slow speed and also provide a crossing area for pedestrians to the McCarthy Park.

9. The installation of raised devices on Hospital Road is typically acceptable given the low daily volume observed, however, a less intrusive measure should be considered prior to implementing any raised devices. Since the observed 85th percentile speeds are between 41 and 45 miles per hour (mph) in the area with a posted speed of 30 mph, consideration should be given to developing an incremental or step by step safety measure implementation approach consisting of signage and markings such as speed check signs and Rectangular Rapid Flashing Beacons (RRFBs)
10. Neither Hospital Road, nor the Site Driveways, provide any existing pedestrian infrastructure. Should crossings be provided, ensure that adequate sidewalk and accessible ramps are provided on both sides of Hospital Road and alongside the Site Driveway(s).

STUDY AREA INTERSECTION IMPROVEMENTS

The DTIAS addressed geometric reconfigurations defined in a report by Nitsch Engineering in January 2021 for the intersections of Harding Street at North Street and West Street, and Harding Street at Hospital Road. The intersections function as a three-legged triangle with all three legs providing two-way traffic. Adequate signage is not provided to control the intersection. It was recommended that the two intersections be reconfigured to traditional T-shaped intersections to simplify movements and reduce the number of conflict points. The DTIAS stated the Proponent will work with the Town to determine the feasibility of the improvements.

BETA supports these intersection reconfiguration measures. It is noted that the southbound traffic receives a STOP sign at both intersections, despite being the continuous roadway. It is expected that this is due to the higher left turn and right turn movement and obstructions to sight lines for vehicles departing the side street.

11. The crash data confirmed that the intersection of Hospital Road and Route 27 has experienced a crash rate higher than the MassDOT statewide and district averages. Approximately 40% of traffic to and from the site will impact the intersection, therefore consideration should be given to assessing safety improvements for the intersection.
12. The proposed project is anticipated to generate over 2,000 vehicle trips per day. Approximately 20-25% of the daily traffic is anticipated to impact several intersections outside of the study area. Consideration should be given to providing a financial contribution to the future improvements of the following impacted signalized intersections:
 - Route 109 at North Street
 - Route 27 at West Street
 - Route 27 at Route 109

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.



Tyler de Ruiter, PE, PTOE
Senior Project Engineer

cc: Jaklyn Centracchio, PE, PTOE – BETA
Kien Ho, PE, PTOE – BETA
File

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