Stantec Consulting Michigan Inc.
3754 Ranchero Drive, Ann Arbor MI 48108-2771

March 31, 2020
File: 2075001316

Attention: Ms. Mandy Grewal, Township Supervisor
Pittsfield Charter Township
201 West Michigan Avenue
Ann Arbor, Michigan 48108

Dear Supervisor Grewal,

Reference: Carbon Footprint Review, State Street Crossing Units 4, 5, & 6

Stantec has evaluated the carbon footprint of two (2) alternative site layouts for State Street Crossing Units 4, 5, & 6. The Township has received an application to develop the three (3) units as a multiple tenant commercial space. Unit 4 is encumbered with a conservation easement for protection of existing trees. The conservation easement was placed on this parcel as part of the State Street Crossings Final Site Plan approved in 2003. Originally, the applicant had submitted two (2) site plans with two independent building sites, one (1) located on Unit 4 and one (1) on Units 5 & 6 with associated parking. This configuration works around the existing easement. This development of the units is referred to as Site Plan A. Working with the Township Planning Consultant to address planning concerns, the applicant prepared and submitted for approval an alternative layout to combine and develop all three (3) outlots as a cohesive development. This combined layout is referred to as Site Plan B. This configuration reduces the size of the existing "on-site" conservation easement and mitigates trees both "on-site and "off-site" and relocates the easement "off-site" to Unit 1. Site Plan B has been reviewed and approved by the Township Planning Commission.

The Preliminary Site Plan, CSPA 18-26 State Street Crossing Lots 4-5-6, (Site Plan B) was presented to the Planning Commission on October 17, 2019 under New Business. The Planning Commission voted 7:0 to postpone action on the plan for the following conditions:

1. Provide additional tree protection measures as directed by ECT.
2. Provide Heritage Tree mitigation as required by Section 14.08.F. Provide additional replacement trees or provide payment to the Township Tree Fund.
3. Update parking calculations based on Section 12.05 as noted above.
4. Planning Commission to consider waiver from loading space requirement.
5. Provide two (2) additional drive-through stacking spaces.
6. Review of site access and circulation by the Township Engineer and Fire Department.
7. Revise Landscape Plan.
8. Provide dumpster enclosure detail.
9. Address Planning Commission comments, regarding flexibility of Conservation Easement and preserving Heritage Trees.

A Revised Preliminary Site Plan was presented to the Planning Commission on November 7, 2019 under Old Business. The revised plan was approved by the Township Planning Commission on November 7, 2019. The motion was approved 6:1 with the following conditions:

1. Township Board to approve the relocation of the conservation easement.
2. Provide dumpster enclosure detail.

Reference: Carbon Footprint Review, State Street Crossing Units 4, 5, & 6

Stantec has looked at four (4) aspects of the respective site plans: 1.) Carbon Sequestration of Trees, 2.) Area of Open Space, 3.) Area of Conservation Easement and, 4.) Modality. We find that the carbon footprint of Site Plan B is less than A based on these 4 criteria. Over time, the carbon sequestration of the trees on Site Plan B will increase while Site Plan A decreases. The area of open space on Site Plan B is less than Site Plan A. The conservation easement area on Site Plan B is greater than Site Plan A. The ease of non-motorized mobility on Site Plan B is greater than Site Plan A both within the site and adjacent movement.

1. **Carbon Sequestration of Trees**: Biological carbon sequestration (BCS) is the assimilation and storage of atmospheric carbon (in the form of carbon dioxide, CO2) into vegetation, soils, woody products, and aquatic environments as defined by the United States Geological Survey. We compared the biological sequestration of the existing trees within the easement saved on Site Plan A versus that of the saved and mitigated trees on Site Plan B.

	Year 1 Total CO2 Stored (pounds/year)	Year 15 Total CO2 Stored (pounds/year)	Year 20 Total CO2 Stored (pounds/year)
Site Plan A	1,226	1,313	1,330
Site Plan B	1,037	1,269	1,456
Difference	-189	-44	126

Table A: Carbon Sequestration of Trees

To determine the carbon sequestration, we utilized the on-line i-Tree tool. Since 2006, i-Tree has been a cooperative effort between the USDA Forest Service, Davey Tree Expert Company, The Arbor Day Foundation, Society of Municipal Arborists, International Society of Arboriculture, Casey Trees, and SUNY College of Environmental Science and Forestry. The i-Tree tool is based on the CUFR Tree Carbon Calculator (CTCC) Excel spreadsheet, developed by the USDA Forest Service. The i-Tree tool is site specific and adjusts the CURF average CO2 emissions factors to the Midwest climate zone. As the mitigated trees are specified in either caliper (which is typically smaller than dbh for the same tree) or height, a conversion factor to dbh was utilized. The tree location, species and dbh of the existing trees to be saved on Site Plan A was inputted into the i-Tree tool to calculate CO2 stored per year (pounds/year). The location, species and dbh of the existing trees to remain and the proposed mitigation trees were inputted to calculate CO2 stored for Site Plan B. From there, the years were increased until the total CO2 stored reached value of Site Plan A. This happens between year 15 and 20. We did not discount the sequestration of the existing trees over time due to decline. The applicant has noted the existing trees are in “fair” to “poor” condition which was confirmed by the Township’s woodland consultant.

There are 14 existing trees within the conservation easement with a total DBH of 275”. These trees will be saved on Site Plan A. Site Plan B will save 8 of these trees for a total DBH of 147”. The trees to be removed will be mitigated with fifty-seven (57) additional trees (18 “on-site” and 39 in the “off-site” easement), with a total of 182” caliper (equivalent of 130” dbh). The mitigated trees are in addition to the required landscape trees. We would recommend alternative species to the proposed Hemlock as they do not thrive in heavy soils or exposed conditions. Likewise, native species as opposed to cultivars should be used per Township Standards.

	Existing Trees		Trees Preserved		Tree Mitigation	
	No.	Total DBH	No.	Total DBH	No.	Total DBH*
Site Plan A	14	275”	14	275”	0	N/A
Site Plan B	14	275”	8	147”	57	130”

*A caliper to DBH conversion factor has been applied

Table B: Conservation Area Trees & Mitigated Trees

2. **Area of Open Space:** As biological sequestration is not limited to trees, the area of open space which allows for storage in vegetative biomass (including lawn and mulch areas) and soils was compared.

	Open Space (Square feet)
Site Plan A	74,500
Site Plan B	61,470

Table C: Area of Open Space

Site Plan A provides more open space. Comparing the “on-site” open space, there is an additional 26,400 square feet of open space on Site Plan A. Considering the open space in the new “off-site” conservation easement for Site Plan B, the difference is reduced to 13,030 square feet.

3. **Area of Conservation Easement**: The areas in conservation easements were compared.

On Site Plan A, the area of existing conservation easement on Unit 4 will remain; this is divided into two (2) areas which will be separated by a drive isle. On Site Plan B, an “off-site” conservation easement is proposed on Unit 1 of State Street Crossing. The “off-site” conservation easement is separated by an existing storm sewer easement for Unit 1. We recommend the area within the storm sewer easement not be considered as mitigation for the conservation easement. Disturbance of this area may be necessary to develop Unit 1 and for maintenance.

	Conservation Easement (Square Feet)
Site Plan A	11,493
Site Plan B	13,370

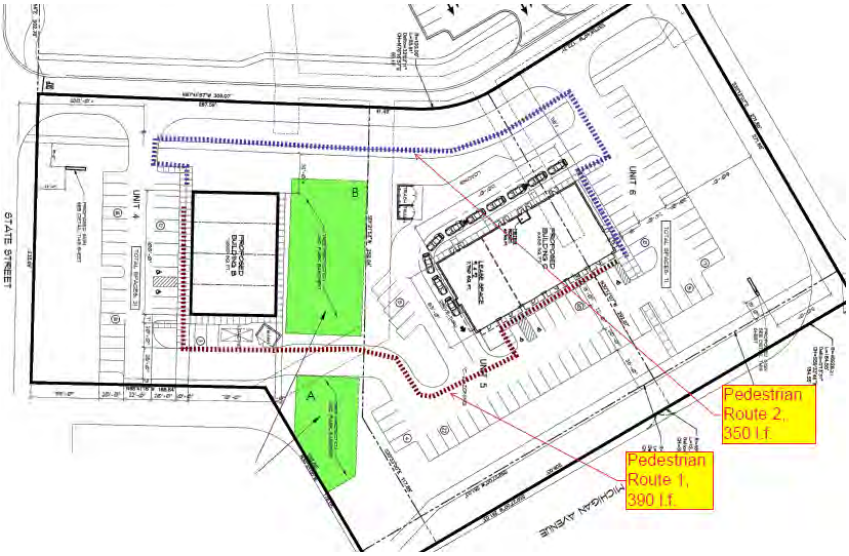
Table D: Area of Conservation Easement

We would suggest for Site Plan B that an “on-site” easement be preserved in the area of the trees to remain, and that the proposed storm sewer be re-routed outside of the preserved tree area. The building and sidewalk should be moved away from the trees. This will be reviewed at final site plan to verify construction is outside of the dripline of the existing trees proposed to remain.

Reference: Carbon Footprint Review, State Street Crossing Units 4, 5, & 6

4. **Modality**: Pursuant to EPA 2015 Green House Gas Inventory, the movement of personal vehicles through the built environment contributes more than 20% of CO2 nationally. We evaluated the two (2) site plans on non-motorized movement. We looked at pedestrian and bicycle features or barriers within the site area and for ingress and egress to the adjacent area.

   A. Ease of movement within the site: How walkable is the site, i.e. how likely is someone to walk between the buildings? Site Plan A has more barriers to non-motorized movement and therefore encourages additional vehicular movement if someone planned to patronize both buildings. As illustrated below, to walk from one building to the other, patrons would either need to walk along the parking drive in front of the loading and dumpster areas and cross the drive-thru exit (Pedestrian Route 1) or along the entrance to the public sidewalk and cross the que of the drive-thru (Pedestrian Route 2).



Pedestrian Route Site Plan A

A continuous sidewalk is provided on Site Plan B as illustrated below (Pedestrian Route 3).

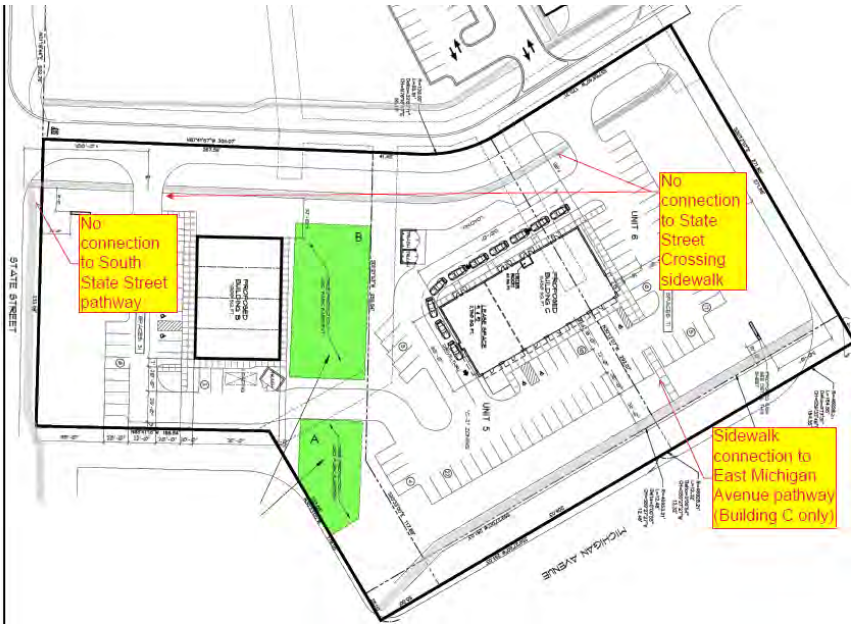
Pedestrian Route Site Plan B

	Sidewalk Between Buildings	Drive Isles Crossed	Distance Walked (Feet)
Site Plan A	No	2	350
Site Plan B	Yes	0	480

Table E: Ease of Movement within Site

B. Ease of adjacent movement: Does the site encourage walking or biking, i.e. how likely is someone to walk/bike to or from the site from the nearby neighborhoods or adjacent commercial uses? There are existing pathways/sidewalks along East Michigan Avenue, South State Street and the interior State Street Crossing drive to the north. We looked at the access to these walks. As illustrated below, Site Plan A provides connection to the pathway along East Michigan Avenue for one of the two buildings. There is no sidewalk connection to the State Street Crossing sidewalk or the State Street pathway.

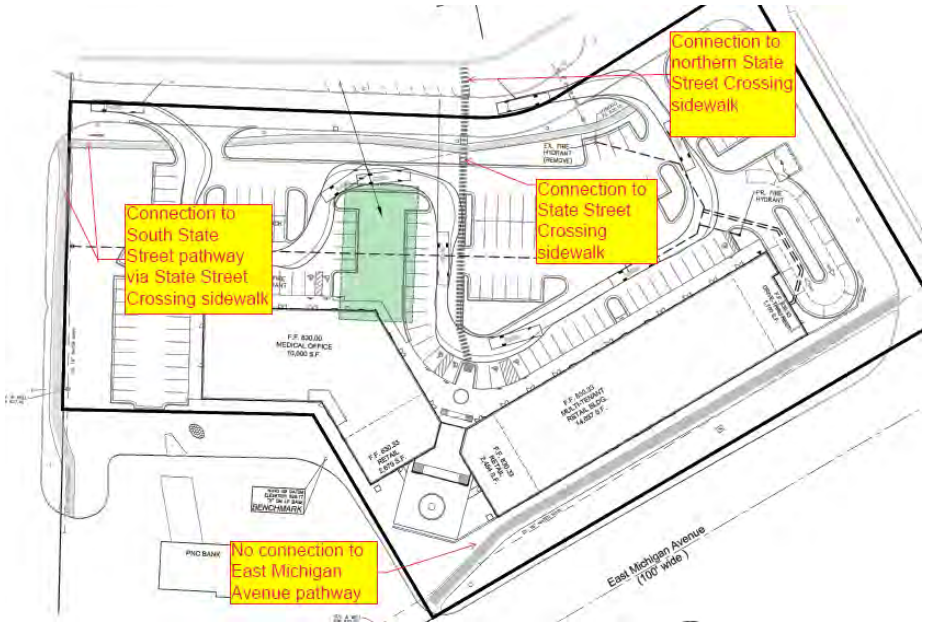
Reference: Carbon Footprint Review, State Street Crossing Units 4, 5, & 6



Adjacent Connections Site Plan A

Site Plan B provides sidewalk connections to both buildings as illustrated below. This connects to the State Street Crossing sidewalk. A connection is provided to the South State Street pathway following this sidewalk to the west. There will also be sidewalk connection to the north State Street Crossing sidewalk which connects to the existing buildings on Unit 2. The southern State Street Crossing sidewalk is to be re-rebuilt to allow for raingardens/green infrastructure between the road and parking lot. Furthermore, the plaza on Site Plan B is less than 30 feet from the walk along East Michigan Avenue, so a direct sidewalk connection could be incorporated. With this additional sidewalk, Site Plan B would be more encouraging of adjacent non-motorized movement.

Reference: Carbon Footprint Review, State Street Crossing Units 4, 5, & 6



Adjacent Connections Site Plan B

	South State Street Pathway	State Street Crossing Sidewalk	East Michigan Avenue Pathway
Site Plan A	No	No	Yes*
Site Plan B	Yes	Yes	No

* Connection to one building

Table F: Ease of Adjacent Movement

In summary, we have evaluated the carbon footprint of two (2) alternative site layouts for State Street Crossing Units 4, 5, & 6. These alternatives are: Site Plan A which preserves the existing easement with two independent building sites (i.e. one on Unit 4 and one on Units 5 & 6 with associated parking), and Site Plan B which combines and develops all three (3) outlots as a cohesive development. Looking at four (4) aspects of the respective site plans – Carbon Sequestration of Trees, Area of Open Space, Area of Conservation Easement and Modality – we have compared the two alternatives. We find that the carbon footprint of Site Plan B is less than A based on these 4 criteria. Over time, the carbon sequestration of the trees on Site Plan B will increase while Site Plan A decreases. The area of open space on Site Plan B is less than Site Plan A. The conservation easement area on Site Plan B is greater than Site Plan A. The ease of non-motorized mobility on Site Plan B is greater than Site Plan A both within the site and adjacent movement.

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	Site Plan A	Site Plan B
Carbon Sequestration of Trees	Short Term	**Long Term**
Area of Open Space	**74,500 s.f.**	61,470 s.f.
Area of Conservation Easement	11,493 s.f.	**13,370 s.f.**
Modality		
A. East of movement within the site	Limited	**Greater**
B. East of adjacent movement	Limited	**Greater**

Table G: Summary of Findings

If you have any questions regarding our findings, please contact us.

Regards,

Stantec Consulting Michigan Inc.

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Attachment: Site Plan A and Site Plan B Comparison

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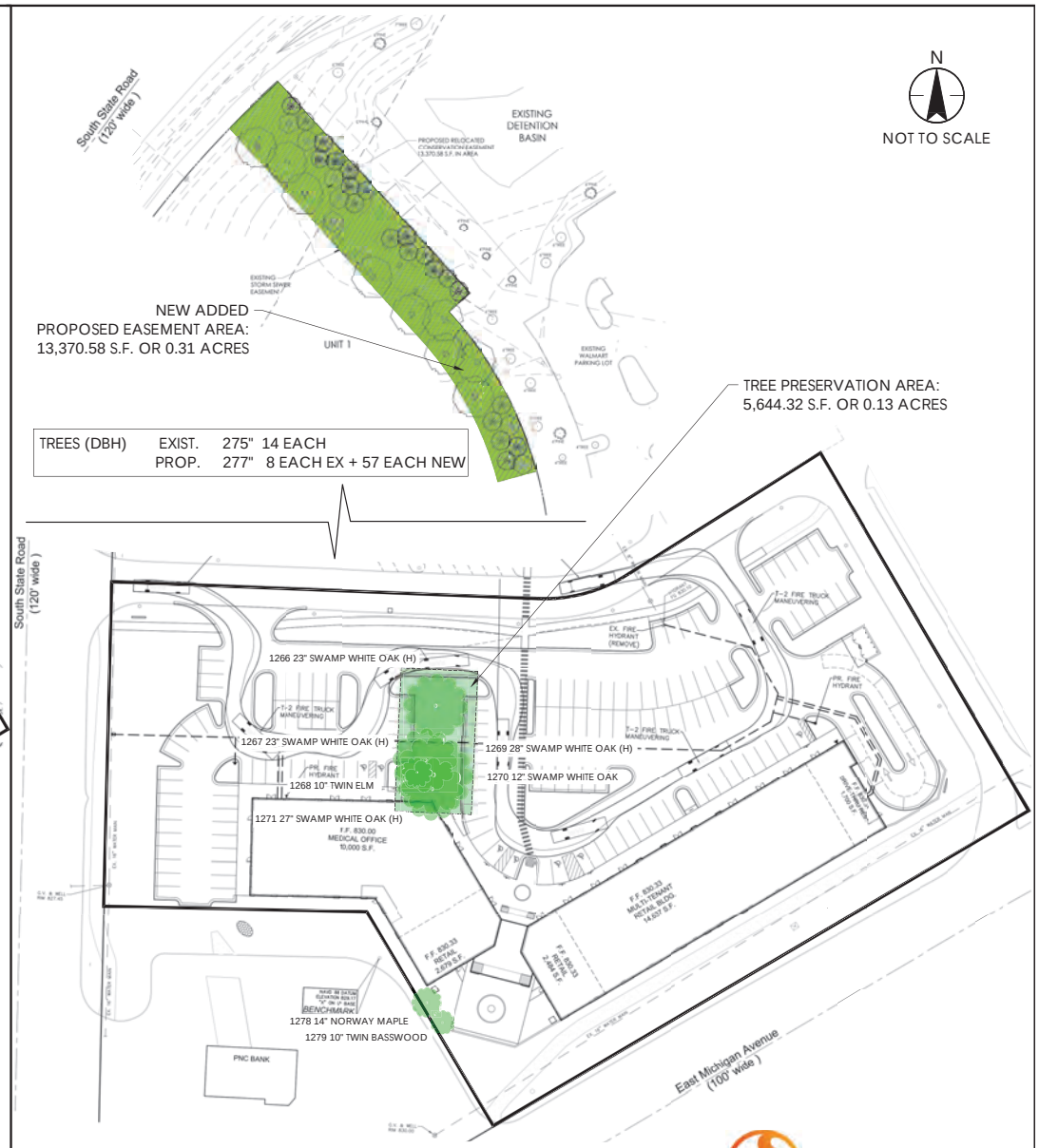
TREES (DBH)			
	EXIST.	275"	14 EACH
	PROP.	275"	14 EACH

SITE PLAN A
(ORIGINAL - PRESERVE EXISTING EASEMENT)



TREES (DBH)			
	EXIST.	275"	14 EACH
	PROP.	277"	8 EACH EX + 57 EACH NEW

SITE PLAN B
(REVISED LAYOUT AND EASEMENTS)

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STATE STREET CROSSING
MARCH, 2020
PROJECT #2075001316