STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

June 18, 2012

Mr. Carl Wilson, Jr.
The Traffic Group, Inc.
9900 Franklin Square Drive
Suite H
Baltimore, MD 21236

Dear Mr. Wilson:

The enclosed Traffic Impact Study (TIS) review letter for the **Worship Christian Center** has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They reviewed the TIS, which was found to conform to DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access and other accepted practices and procedures for such studies. DelDOT accepts the TIS and concurs with the recommendations found in the enclosed letter. We will provide a copy of this letter to the Kent County Department of Planning Services in fulfillment of our joint agreement with the County regarding the review of TIS.

If you have any questions concerning this letter or the enclosed letter, please contact me at (302) 760-2167.

Sincerely,

Troy E. Brestel
Project Engineer

TEB:km
Enclosure
cc with enclosure: Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Richard K. Vetter, Dover/Kent County MPO
Mr. J. Michael Riemann, Becker Morgan Group
Ms. Sarah E. Keifer, Kent County Department of Planning Services
Mr. Kelly Crumpley, Kent County Department of Planning Services
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.

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Marco K. Boyce, Planning Supervisor, Statewide & Regional Planning
T. William Brockenbrough, County Coordinator, Development Coordination
J. Marc Coté, Subdivision Engineer, Development Coordination
Todd Sammons, Kent County Subdivision Coordinator, Development Coordination
W. Paul Hogge, Project Engineer, Development Coordination
Kevin Hickman, Johnson, Mirmiran & Thompson, Inc.

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

June 15, 2012

Mr. T. William Brockenbrough, P.E.
County Coordinator
DelDOT Division of Planning
P O Box 778
Dover, DE 19903

RE: Agreement No. 1528
Traffic Impact Study Services
Task 9A-Worship Christian Center

Dear Mr. Brockenbrough:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for the Worship Christian Center, prepared by The Traffic Group, Inc. dated March 2012. This review was assigned Task Number 9A. The Traffic Group, Inc. prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of the Worship Christian Center church development which is proposed to be constructed on the north side of South State Street (US Route 113A/Kent Road 27) and the east side of Locust Grove Road (Kent Road 362) in Kent County. Farmland occupies the property and there are no access points provided along South State Street or Locust Grove Road. As part of the proposed development, a 20,000 square feet church facility would be constructed. The subject property is located on a 144-acre parcel that is zoned AC (Agricultural Conservation). The proposed church would occupy about 25 acres of the property and would be developed under the same zoning. Access would be provided via one full access driveway along Locust Grove Road. Construction is anticipated to be completed in 2014.

Section 5.3.k.2 of the Kent County Adequate Public Facilities Ordinance (APFO) states: "The specific traffic mitigation measures shall be chosen based on their ability to reduce the impact of traffic generated by the proposed subdivision or land development, in order to achieve and maintain the Level of Service standards for a minimum of two (2) years for roadway segments and intersections within the area of influence." Based on an April 14, 2008 meeting between DelDOT and Kent County Planning regarding the interpretation of the APFO, JMT has been instructed to perform the future two-year Level of Service maintenance analysis, for a date two years from when construction of the development is anticipated to be complete. The two-year Level of Service maintenance analysis results (referred to as Case 4) are contained in this final TIS letter.

DelDOT has a relevant project in the study area, the South State Street Land Use and Transportation Plan, initiated in June 2003 as a joint effort between DelDOT and Kent County. The study area, approximately 32 square miles, consists of South State Street from Delaware Route 1 in the south to US Route 13 in the north and is bounded by US Route 13 in the west and

US Route 113/Delaware Route 1 in the east. The purpose of the plan was to develop a set of integrated transportation and land use strategies to support the area's designation as a Growth Zone while maintaining or improving the quality of life for its residents. A number of potential capacity, safety and multi-modal facility improvements and land use growth strategies have been preliminarily identified and classified as short-range (2010), mid-range (2020), and long range (2030) improvements. The proposed improvements include roadway widening, adding auxiliary lanes at intersections, signalization and the installation of pedestrian and bicycle facilities, as well as providing pedestrian access to existing DART bus stop locations. Four study intersections were included in this DelDOT report, the South State Street intersections with Sorghum Mill Road, Locust Grove Road, Banning Road, and Brookdale Road/Ponderosa Drive. Within these study intersections, the report recommended the installation of separate left turn and right turn lanes along Sorghum Mill Road, the installation of a separate right turn lane along Locust Grove Road, the installation of a separate right turn lane along Banning Road, and the installation of separate right turn lanes along Brookdale Road and Ponderosa Drive. The provisions of pedestrian improvements (sidewalks, crosswalks, and lighting) were also recommended at these intersections. Out of all the study intersections, only South State Street and Sorghum Mill Road is currently in DelDOT's Capital Transportation Program (2012-2017) and is described in more detail below.

The South State Street and Sorghum Mill Road intersection was evaluated under DelDOT's 2008 Hazard Elimination Program (HEP f.k.a. Highway Safety Improvement Program) as part of the Site Z study. The study reported capacity deficiencies at the intersection including queuing problems. In addition, DelDOT's South State Street Land Use & Transportation Plan reported pedestrian and bike facility deficiencies at the intersection. The eastbound and westbound Sorghum Mill Road approaches provide one shared through/left turn/right turn lane, and the northbound and southbound South State Street approaches provide one left turn lane, one through lane, and one right turn lane. Under the DelDOT South State Street & Sorghum Mill Road Intersection Improvements project (DelDOT # T200900804), the eastbound Sorghum Mill Road approach will be widened to provide one left turn lane and one shared through/right turn lane, and the westbound Sorghum Mill Road approach will be widened to provide one left turn lane, one through lane, and one right turn lane. In addition, signalized pedestrian crossings will be provided along the northbound and westbound approaches to the intersection. Bike lanes will also be added along the eastbound, westbound, and northbound approaches. Construction is anticipated to be completed by winter of 2012.

DelDOT also has one maintenance project (Contract T201206501) in the study area that involves that installation of thin overlay along South State Street from US Route 13 to Delaware Route 1. The project is scheduled to start in the Summer of 2012 and would take approximately two weeks to complete.

Based on our review, we have the following comments and recommendations:

The intersection of South State Street with Banning Road/Golden Oak Drive would operate with acceptable levels of service (LOS) under all future conditions. Other developments, located closer to this intersection, are responsible for funding the installation of a traffic signal, the

provision of pedestrian facilities, and the modification of the northbound South State Street approach to have one left turn lane and one shared through/right turn lane. Additionally, the intersection of South State Street with Ponderosa Drive/Brookdale Road would also operate with acceptable LOS under all future conditions. Similarly other developments are responsible for funding improvements, which include the installation of a traffic signal and the provision of pedestrian facilities at this intersection. While the subject development would add traffic to these intersections, it would add traffic primarily during the Sunday morning peak and would add negligible traffic on weekdays. Since these intersections would operate at acceptable LOS on Sunday mornings with the construction of the proposed church and based on the existing geometry, we do not recommend that this developer be required to participate in any intersection improvements.

In addition, all of the other study area intersections would continue to operate at acceptable levels of service with the construction of the proposed church development under future 2014 and 2016 conditions.

Should the County approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. All applicable agreements (i.e. letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The developer should improve Locust Grove Road from the north limits of the site entrance construction to the intersection of South State Street and Locust Grove Road to meet DelDOT's local road standards. These standards include, but are not limited to, two eleven-foot travel lanes and two five-foot shoulders. The developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer if necessary.

2. The developer should construct a full access site entrance for the proposed church on Locust Grove Road to be consistent with the proposed lane configurations as shown in the table below.

Approach	Current Configuration	Proposed Configuration
Eastbound Locust Grove Road	One through lane	One through lane and one right turn lane
Westbound Locust Grove Road	One through lane	One shared through/left turn lane and one bypass lane
Northbound Site Entrance	Approach does not exist	One shared left turn/right turn lane

Based on DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access,* the recommended minimum storage lengths (excluding taper) are 50 feet for the eastbound right turn lane and 40 feet for the westbound bypass lane. The

storage lengths based on the HCS analysis provide shorter queues than these minimum lengths.

3. The following bicycle, pedestrian, and transit improvements should be included:

   a. A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along South State Street to be used as a multi-use path in the future.
   b. A minimum ten-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Locust Grove Road to be used as a sidewalk in the future.
   c. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier or signage should be added to eliminate vehicular overhang onto the sidewalk.
   d. Bicycle Warning signs (W11-1) should be placed on the frontage along Locust Grove Road and South State Street.

4. Due to the proximity of the proposed development to the Dover Air Force Base, we recommend that deed restrictions be required similar to the attached Aviation Nuisance Easement and Non-Suit Covenant. The applicant should contact Mr. Michael Kirkpatrick at (302) 760-2153 of DelDOT's Statewide and Regional Planning Section to determine whether the proposed development is within the Runway Protection Zone. If so, restrictions may apply.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues could be identified and need to be addressed through DelDOT's subdivision review process.

Improvements in this TIS may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DelDOT's Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

David DuPlessis, P.E.
cc: Mir Wahed, P.E., PTOE
Enclosure

General Information

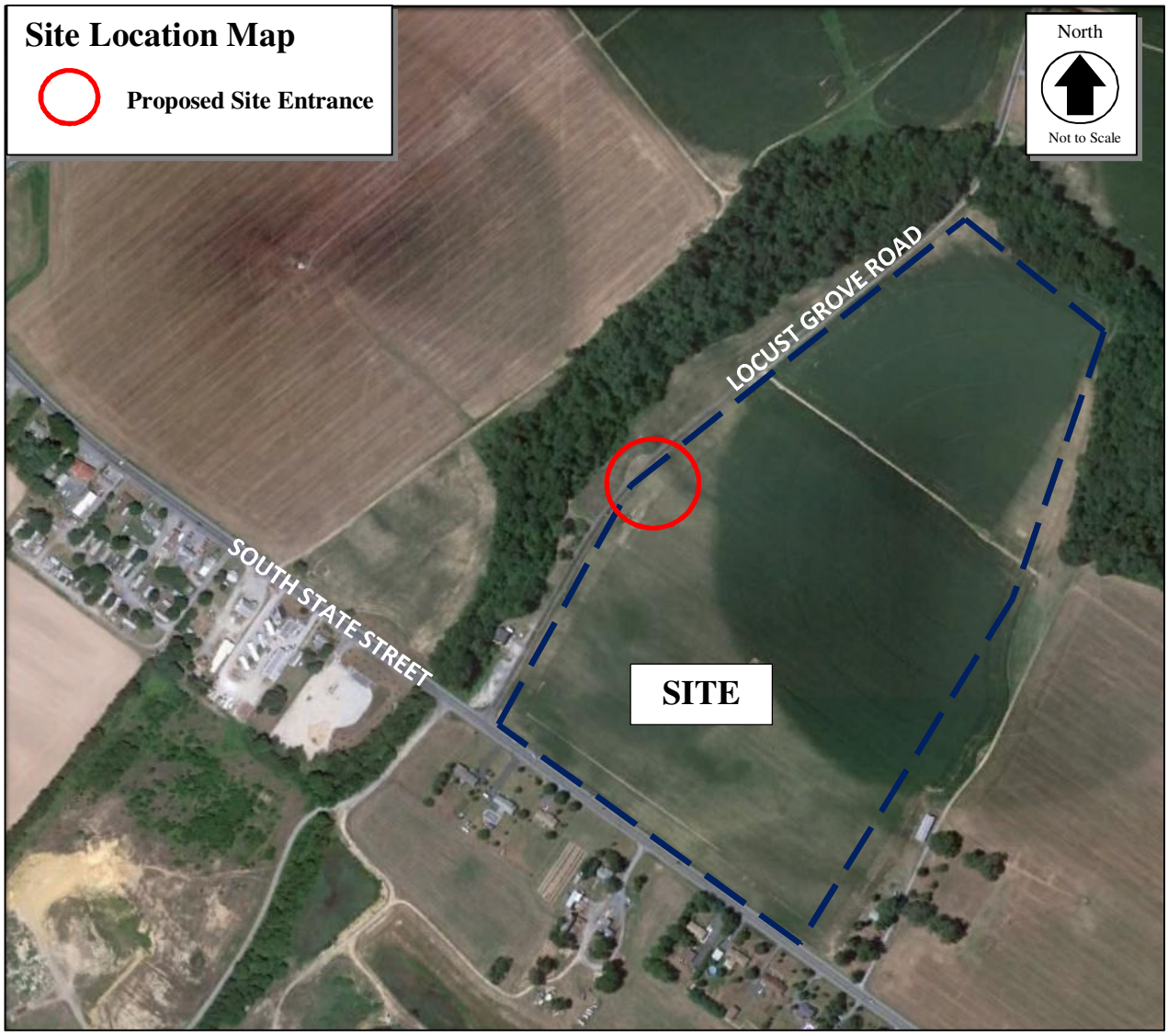
Report date: March 2012.
Prepared by: The Traffic Group, Inc.
Prepared for: Becker Morgan Group.
Tax Parcels: 7-00-10400-01-7500-00001
Generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*: Yes.

Project Description and Background

Description: 20,000 square feet church.
Location: The project is proposed on the north side of South State Street and the east side of Locust Grove Road.
Amount of Land to be developed: The property is approximately 144 acres and the proposed church will occupy about 25 acres of the land.
Land Use approval(s) needed: New church facility approval.
Proposed completion date: 2014
Proposed access locations: One full access point along Locust Grove Road, operating under stop control.
Daily Traffic Volumes:

- 2011 Average Annual Daily Traffic on South State Street (US Route 113A): 11,653 vehicles per day.
- 2011 Average Annual Daily Traffic on Locust Grove Road: 1,282 vehicles per day.

Site Map



**Graphic is an approximation as there is no Site Plan currently available.*

Relevant and On-going Projects

DelDOT has a relevant project in the study area, the South State Street Land Use and Transportation Plan, initiated in June 2003 as a joint effort between DelDOT and Kent County. The study area, approximately 32 square miles, consists of South State Street from Delaware Route 1 in the south to US Route 13 in the north and is bounded by US Route 13 in the west and US Route 113/Delaware Route 1 in the east. The purpose of the plan was to develop a set of integrated transportation and land use strategies to support the area's designation as a Growth Zone while maintaining or improving the quality of life for its residents. A number of potential capacity, safety and multi-modal facility improvements and land use growth strategies have been preliminarily identified and classified as short-range (2010), mid-range (2020), and long range (2030) improvements. The proposed improvements include roadway widening, adding auxiliary

lanes at intersections, signalization and the installation of pedestrian and bicycle facilities, as well as providing pedestrian access to existing DART bus stop locations. Four study intersections were included in this DelDOT report, the South State Street intersections with Sorghum Mill Road, Locust Grove Road, Banning Road, and Brookdale Road/Ponderosa Drive. Within these study intersections, the report recommended the installation of separate left turn and right turn lanes along Sorghum Mill Road, the installation of a separate right turn lane along Locust Grove Road, the installation of a separate right turn lane along Banning Road, and the installation of separate right turn lanes along Brookdale Road and Ponderosa Drive. The provision of pedestrian improvements (sidewalks, crosswalks, and lighting) were also recommended at these intersections. Out of all the study intersections, only South State Street and Sorghum Mill Road is currently in DelDOT's Capital Transportation Program (2012-2017) and is described in more detail below.

The South State Street and Sorghum Mill Road intersection was evaluated under DelDOT's 2008 Hazard Elimination Program (HEP f.k.a. Highway Safety Improvement Program) as part of the Site Z study. The study reported capacity deficiencies at the intersection including queuing problems. In addition, DelDOT's South State Street Land Use & Transportation Plan reported pedestrian and bike facility deficiencies at the intersection. The eastbound and westbound Sorghum Mill Road approaches provide one shared through/left turn/right turn lane, and the northbound and southbound South State Street approaches provide one left turn lane, one through lane, and one right turn lane. Under the DelDOT South State Street & Sorghum Mill Road Intersection Improvements project (DelDOT # T200900804), the eastbound Sorghum Mill Road approach will be widened to provide one left turn lane and one shared through/right turn lane, and the westbound Sorghum Mill Road approach will be widened to provide one left turn lane, one through lane, and one right turn lane. In addition, signalized pedestrian crossings will be provided along the northbound and westbound approaches to the intersection. Bike lanes will also be added along the eastbound, westbound, and northbound approaches. Construction is anticipated to be completed by winter of 2012.

DelDOT also has one maintenance project (Contract T201206501) in the study area that involves that installation of thin overlay along South State Street from US Route 13 to Delaware Route 1. The project is scheduled to start in the Summer of 2012 and would take approximately two weeks to complete.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2010)

Location with respect to the Strategies for State Policies and Spending Map of Delaware: The proposed development is located within Investment Level 2.

Investment Level 2

These areas can be composed of less developed areas within municipalities, rapidly growing areas in the counties that have or will have public water and wastewater services and utilities, areas that are generally adjacent to or near Investment Level 1 Areas, smaller towns and rural villages that should grow consistently with their historic character, and suburban areas with public water, wastewater, and utility services. They serve as transition areas between Level 1 and

the state's more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings.

In Investment Level 2 Areas, like Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investments should encourage departure from the typical single-family dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Level 2 Areas share similar priorities as with the Level 1 Areas where the aim remains to: make context sensitive transportation system capacity enhancements, preserve existing facilities, make safety enhancements, make transportation system capacity improvements, create transit system enhancements, ensure ADA accessibility, and close gaps in the pedestrian system, including the Safe Routes to School projects. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

Proposed Development's Compatibility with Livable Delaware:

The proposed church falls within Investment Level 2. According to Livable Delaware, the use of the land located within Investment Level 2 areas should enhance community identity and integrity. Specifically, the facilities and services encouraged to be developed within Investment Level 2 areas should promote a sense of community. Therefore, this proposed church development appears to be generally consistent with the 2010 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans
(Source: Kent County, 2007 Comprehensive Plan)

Kent County Comprehensive Plan:

The proposed development is situated within Kent County and the parcel is currently zoned as AC (Agricultural Conservation), and it will maintain the same zoning classification in the future. The Kent County Comprehensive Plan designation for this land in the future is Low Density.

Additionally, the proposed development also lies within the fifth Transportation Improvement District (TID) called the *St. Jones Area.* TIDs are areas where rather than relying upon individual traffic impact studies, the County, DelDOT, the MPO, and the community will develop a more complete plan addressing a larger area for transportation improvements including road upgrades, interconnection of local roads, and bicycle and pedestrian facilities. These areas support the nodal concept of land development with the intention to develop a transportation network where residents can rely upon interconnected local roads for everyday needs such as work, school, and/or recreation. This will change the subdivision and land development approval process in these areas as the roadway infrastructure is identified ahead of the land use application.

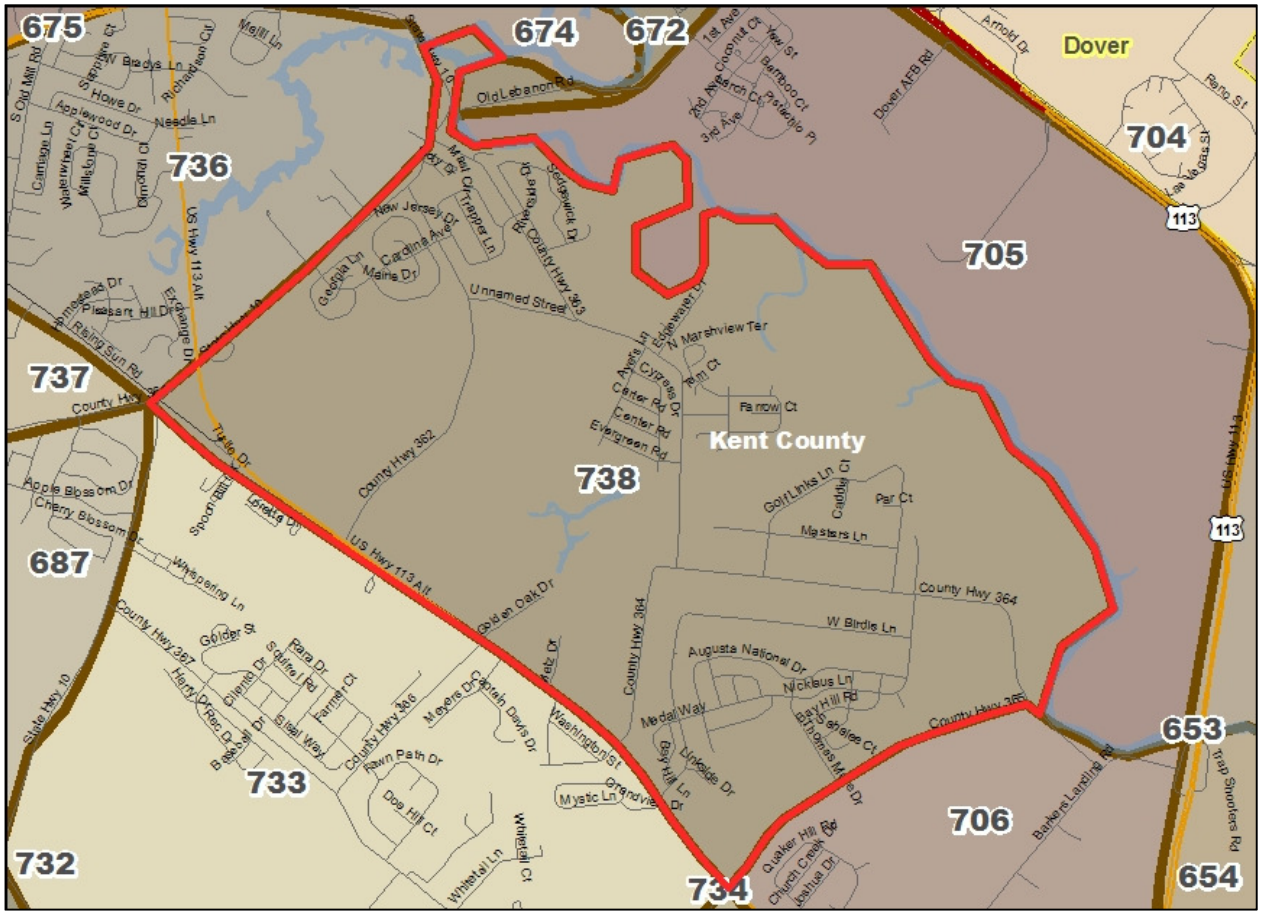
Proposed Development's Compatibility with the Kent County Comprehensive Plan:

The proposed development maintains the same zoning and will be consistent with the future plan of Kent County to provide a low density use on the parcel. The land is also within the Growth Zone Overlay area where needed services to serve residential development is encouraged. Land uses within the Growth Zone Overlay area should create a more livable and quality community. As such, the proposed church facility is generally compatible with Kent County's 2007 Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 738

TAZ Boundaries:



**Graphic has been taken from the Planning and Development Coordination Application.*
**TAZ738 is referred to as K224 as per Kent County MPO.*

Current employment estimate for TAZ: 288 in 2010
Future employment estimate for TAZ: 427 in 2040
Current Population estimate for TAZ: 3,394 in 2010
Future Population estimate for TAZ: 4,328 in 2040

Current household estimate for TAZ: 1,147 in 2010
Future household estimate for TAZ: 1,462 in 2040
Relevant committed developments in the TAZ: Point Landing, Champions Club, and Magnolia Crossing
Would the addition of committed developments to current estimates exceed future projections: Yes.
Would the addition of committed developments and the proposed development to current estimates exceed future projections: Yes.

Trip Generation

The trip generation for the proposed development was determined utilizing the rate contained in the *Trip Generation, 8th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 560 (Church).

The Sunday peak period trip generation for the proposed church based on the floor area of the facility is included in Table 1.

Table 1
PROPOSED CHURCH TRIP GENERATION

Land Use	**Sunday Peak Hour**		
	In	Out	Total
20,000 Square Feet Church	117	118	235
Total Trips	**117**	**118**	**235**

Overview of TIS

Intersections examined:

1. Site Entrance and Locust Grove Road (Kent Road 362)
2. Sorghum Mill Road (Kent Road 26) and Locust Grove Road
3. Sorghum Mill Road and Cypress Branch Road (Kent Road 363)
4. Sorghum Mill Road and Delaware Route 10 (East Lebanon Road/Kent Road 356)
5. South State Street (US 113A/Kent Road 27) and Locust Grove Road
6. South State Street and Banning Road (Kent Road 366)/Golden Oak Drive
7. South State Street and Ponderosa Drive (Kent Road 364)/Brookdale Road
8. South State Street and Rising Sun Road (Kent Road 29)
9. South State Street and Sorghum Mill Road

Conditions examined:

1. Case 1 – 2012 Existing conditions
2. Case 2 – 2014 conditions without the development of the Worship Christian Center (No Build)
3. Case 3 - 2014 conditions with the development of the Worship Christian Center (Build)

4. Case 4 – 2016 conditions with the development of the Worship Christian Center (Post Build Kent County APFO Compliance)

Peak hours evaluated: Sunday Morning Peak

Committed Developments considered:

1. Point Landing (107 single-family detached houses)
2. Magnolia Crossing (55 townhouses)
3. Champions Club (263 single-family detached houses)
4. Loganberry Village (50 townhouses, 48 duplexes, 59 single-family detached houses)
5. Fox Hollow (33 single-family detached houses)
6. Reserve at Chestnut Ridge (243 single-family detached houses, 23 unbuilt)
7. The Meadows at Chestnut Ridge (56 single-family detached houses)
8. Laureltowne (68 single-family detached houses)

Intersection Descriptions

1. **Site Entrance and Locust Grove Road (Proposed Full Access)**
   Type of Control: proposed stop controlled intersection (T-intersection)
   Eastbound Approach: (Locust Grove Road) one shared through/right turn lane
   Westbound Approach: (Locust Grove Road) one shared through/left turn lane
   Northbound Approach: (Site Entrance) proposed one shared left turn/right turn lane, stop controlled

2. **Sorghum Mill Road and Locust Grove Road**
   Type of Control: stop controlled intersection
   Eastbound Approach: (Private Driveway) one shared through/left turn/right turn lane, stop controlled
   Westbound Approach: (Locust Grove Road) one shared through/left turn/right turn lane, stop controlled
   Northbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane
   Southbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane

3. **Sorghum Mill Road and Cypress Branch Road**
   Type of Control: stop controlled intersection
   Eastbound Approach: (Private Driveway) one shared through/left turn/right turn lane, stop controlled
   Westbound Approach: (Cypress Branch Road) one shared through/left turn/right turn lane, stop controlled
   Northbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane
   Southbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane

4. **Sorghum Mill Road and Delaware Route 10**
   Type of Control: yield controlled intersection (T-intersection)
   Eastbound Approach: (Delaware Route 10) one channelized yield controlled U-turn lane, two through lanes, and one right turn lane
   Westbound Approach: (Delaware Route 10) one channelized yield controlled left turn lane and two through lanes
   Northbound Approach: (Sorghum Mill Road) one right turn lane, yield controlled

5. **South State Street and Locust Grove Road**
   Type of Control: stop controlled intersection (T-intersection)
   Westbound Approach: (Locust Grove Road) one shared left turn/right turn lane, stop controlled
   Northbound Approach: (South State Street) one through lane and one right turn lane
   Southbound Approach: (South State Street) one shared through/left turn lane and one bypass lane

6. **South State Street and Banning Road/Golden Oak Drive**
   Type of Control: stop controlled intersection
   Eastbound Approach: (Banning Road) one shared through/left turn/right turn lane, stop controlled
   Westbound Approach: (Golden Oak Drive) one shared through/left turn/right turn lane, stop controlled
   Northbound Approach: (South State Street) one shared through/left turn lane and one bypass lane
   Southbound Approach: (Sorghum Mill Road) one shared through/left turn lane and one right turn lane
   Note: Golden Oak Drive is a small private street with a posted speed limit of 5 mph, slightly offset to the north of Banning Road.

7. **South State Street and Ponderosa Drive/Brookdale Road**
   Type of Control: stop controlled intersection
   Eastbound Approach: (Brookdale Road) one shared through/left turn/right turn lane, stop controlled
   Westbound Approach: (Ponderosa Drive) one shared through/left turn/right turn lane, stop controlled
   Northbound Approach: (South State Street) one shared through/left turn lane and one right turn lane
   Southbound Approach: (South State Street) one shared through/left turn lane and one right turn lane
   Note: In the scoping letter Ponderosa Drive is referred to as Ponderosa Road. However, the intersection is signed as Ponderosa Drive.

8. **South State Street and Rising Sun Road**
   Type of Control: stop controlled intersection
   Eastbound Approach: (Rising Sun Road) one stop controlled left turn lane and one channelized yield controlled right turn lane

Westbound Approach: (School Driveway) one stop controlled left turn lane and one channelized right turn lane
Northbound Approach: (South State Street) one left turn lane, one through lane, and one right turn lane
Southbound Approach: (South State Street) one left turn lane and one shared through/right turn lane

9. **South State Street and Sorghum Mill Road**
Type of Control: signalized intersection
Eastbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane
Westbound Approach: (Sorghum Mill Road) one shared through/left turn/right turn lane
Northbound Approach: (South State Street) one left turn lane, one through lane, and one right turn lane
Southbound Approach: (South State Street) one left turn lane, one through lane, and one right turn lane
Note: As part of the DelDOT intersection improvement project (DelDOT # T200900804), the eastbound Sorghum Mill Road approach will be reconfigured to provide one left turn lane and one shared through/right turn lane, and the westbound Sorghum Mill Road approach will be reconfigured to provide one left turn lane, one through lane, and one channelized right turn lane. The existing lane configurations will remain along the northbound and southbound South State Street approaches.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Existing DART Route 303 serving Dover, Milford, and Georgetown areas operates in the vicinity of the proposed development. The local route for this bus traverses South State Street and the express route traverses US Route 113/Delaware Route 1. Route 303 operates 10 round trips along South State Street Monday through Friday from 5:00 a.m. to 8:30 p.m.

Planned transit service: JMT and The Traffic Group, Inc. contacted Lisa Collins, Service Development Planner of the Delaware Transit Corporation (DTC). In an email dated March 5, 2012, she noted that there are no future service expansions planned or proposed in the study area.

Existing bicycle and pedestrian facilities: According to DelDOT's *Delaware Bicycle Facility Master Plan* (October 2005), South State Street is a designated Statewide Bicycle Route (Bicycle Route 2), Delaware Route 10 is a designated Regional Bicycle Route (Route K-4), and Sorghum Mill Road west of its intersection with South State Street is a designated recreational connector.

Per the *Kent County Bicycle Map,* the following bicycle routes exist in the vicinity of the site:

- A Statewide Bicycle Route runs along South State Street. The route enters Kent County along Delaware Route 9 and terminates at the Clapham Road intersection with Buffalo Road. This route traverses through five of the project's intersections along South State Street (Sorghum Mill Road, Rising Sun Road, Locust Grove Road, Banning Road, and Ponderosa Drive).

- A Regional Bicycle Route runs along Delaware Route 10. The route starts from the western edge of Kent County and terminates at the Dover Air Force Base. This route traverses through the Delaware Route 10 and Sorghum Mill Road study intersection.
- A Connector Bicycle Route runs along Sorghum Mill Road. The route begins at the Walnut Shade Road intersection with Tuxedo Lane and terminates at the Sorghum Mill Road intersection with South State Street. This route traverses through the Sorghum Mill Road and South State Street study intersection.

Planned bicycle and pedestrian facilities: JMT and The Traffic Group, Inc. contacted Mr. Marco Boyce, of DelDOT's Statewide and Regional Planning Section, and Mr. Anthony Aglio, DelDOT's Bicycle Coordinator. In an email dated April 26, 2012, Mr. Aglio recommended the addition of bike lanes along South State Street, at each South State Street study intersection.

Previous Comments

None.

General HCS Analysis Comments

(See table footnotes on the following pages for specific comments)

1) As per the *DelDOT Standards and Regulations for Subdivision Streets and State Highway Access*, JMT utilized an overall intersection peak hour factor within the analysis. However, the TIS utilized peak hour factors based on each lane group.

2) The *DelDOT Standards and Regulations for Subdivision Streets and State Highway Access* recommends using 3% heavy vehicles for each movement at unsignalized intersections and for each lane group at signalized intersections when there is a significant change in intersection volume. As all the intersections within the study area experiences some increase in volumes, JMT used 3% heavy vehicles for all the future traffic analysis. However, the TIS used existing truck percentages based on traffic counts for Cases 1, 2, and 3 at every study intersection. In addition, the TIS utilized truck percentages per movement at the signalized intersection of South State Street and Sorghum Mill Road whereas JMT utilized truck percentages per lane group which is consistent with DelDOT standards.

3) Since the proposed use is a church and heavy vehicles are not expected to travel to the site during the Sunday Peak, JMT used a 0% truck percentage for every movement at the proposed Site Entrance. The TIS also utilized a 0% truck percentage at the entrance.

4) In accordance with the Kent County APFO, JMT conducted a future two-year level of service analysis for a date two years from the date of the proposed construction to be completed. The two-year results are presented as Case 4.

Table 2
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[1] Two-Way Stop Control (T-intersection)	**LOS per TIS**	**LOS per JMT**
Site Entrance/Locust Grove Road[2]	Sunday Morning Peak	Sunday Morning Peak
2014 with Worship Christian Center (Case 3)		
Westbound Locust Grove Road – Through/Left	A (7.5)	A (7.5)
Northbound Site Entrance	A (10.0)	B (10.2)
2016 with Worship Christian Center (Case 4)		
Westbound Locust Grove Road – Through/Left	-	A (7.5)
Northbound Site Entrance	-	B (10.2)

[1] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[2] The TIS used a peak hour factor of 0.88. However, consistent with DelDOT guidelines, JMT utilized a peak hour factor of 0.80 since the total intersection volume would be less than 500 vph.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[3] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
Sorghum Mill Road/Locust Grove Road	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Westbound Locust Grove Road	A (9.1)	A (9.1)
Northbound Sorghum Mill Road	A (7.3)	A (7.3)
Southbound Sorghum Mill Road	A (7.5)	A (7.5)
2014 without Worship Christian Center (Case 2)[4]		
Westbound Locust Grove Road	A (9.2)	A (9.3)
Northbound Sorghum Mill Road	A (7.3)	A (7.4)
Southbound Sorghum Mill Road	A (7.5)	A (7.5)
2014 with Worship Christian Center (Case 3)[4]		
Westbound Locust Grove Road	A (9.3)	A (9.5)
Northbound Sorghum Mill Road	A (7.3)	A (7.4)
Southbound Sorghum Mill Road	A (7.5)	A (7.6)
2016 with Worship Christian Center (Case 4)[4]		
Westbound Locust Grove Road	-	A (9.5)
Northbound Sorghum Mill Road	-	A (7.4)
Southbound Sorghum Mill Road	-	A (7.6)

[3] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[4] The TIS used a peak hour factor of 0.88. However, consistent with DelDOT guidelines, JMT utilized a peak hour factor of 0.80 since the total intersection volume would be less than 500 vph.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[5] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
Sorghum Mill Road/Cypress Branch Road	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Westbound Cypress Branch Road	A (9.8)	A (9.8)
Northbound Sorghum Mill Road	A (7.3)	A (7.4)
Southbound Sorghum Mill Road	A (7.6)	A (7.6)
2014 without Worship Christian Center (Case 2)[6]		
Westbound Cypress Branch Road	A (9.8)	B (10.1)
Northbound Sorghum Mill Road	A (7.4)	A (7.4)
Southbound Sorghum Mill Road	A (7.6)	A (7.7)
2014 with Worship Christian Center (Case 3)[6]		
Westbound Cypress Branch Road	B (10.1)	B (10.5)
Northbound Sorghum Mill Road	A (7.5)	A (7.5)
Southbound Sorghum Mill Road	A (7.7)	A (7.8)
2016 with Worship Christian Center (Case 4)[6]		
Westbound Cypress Branch Road	-	B (10.5)
Northbound Sorghum Mill Road	-	A (7.5)
Southbound Sorghum Mill Road	-	A (7.8)

[5] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[6] The TIS used a peak hour factor of 0.88. However, consistent with DelDOT guidelines, JMT utilized a peak hour factor of 0.80 since the total intersection volume would be less than 500 vph.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[7] Two-Way Stop Control (T-intersection)	**LOS per TIS**	**LOS per JMT**
Sorghum Mill Road/Delaware Route 10/ East Lebanon Road[8]	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Eastbound Delaware Route 10 -U-Turn	A (8.7)	A (8.5)
Westbound Delaware Route 10 - Left	A (8.6)	A (8.6)
Northbound Sorghum Mill Road	B (11.2)	B (11.0)
2014 without Worship Christian Center (Case 2)[9]		
Eastbound Delaware Route 10 -U-Turn	A (8.4)	A (8.4)
Westbound Delaware Route 10 - Left	A (8.7)	A (8.7)
Northbound Sorghum Mill Road	B (11.3)	B (11.1)
2014 with Worship Christian Center (Case 3)[9]		
Eastbound Delaware Route 10 -U-Turn	A (8.4)	A (8.4)
Westbound Delaware Route 10 - Left	A (8.9)	A (8.9)
Northbound Sorghum Mill Road	B (11.7)	B (11.5)
2016 with Worship Christian Center (Case 4)[9]		
Eastbound Delaware Route 10 -U-Turn	-	A (8.5)
Westbound Delaware Route 10 - Left	-	A (8.9)
Northbound Sorghum Mill Road	-	B (11.6)

[7] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[8] The northbound right turn lane along the Sorghum Mill Road approach operates under yield control. However, as the HCS doesn't allow yield control analysis, both the TIS and JMT took a more conservative approach and modeled the northbound right turn lane as stop controlled.
[9] The TIS used a peak hour factor of 0.88. However, consistent with DelDOT guidelines, JMT utilized a peak hour factor of 0.92 since the total intersection volume would be over 1,000 vph.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[10] Two-Way Stop Control (T-intersection)	**LOS per TIS**	**LOS per JMT**
South State Street/Locust Grove Road[11]	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Westbound Locust Grove Road	C (15.0)	B (14.6)
Southbound South State Street - Left	A (8.5)	A (8.4)
2014 without Worship Christian Center (Case 2)		
Westbound Locust Grove Road	C (16.8)	C (17.0)
Southbound South State Street - Left	A (8.6)	A (8.6)
2014 with Worship Christian Center (Case 3)[12]		
Westbound Locust Grove Road	C (19.0)	C (18.1)
Southbound South State Street - Left	A (8.9)	A (8.9)
2016 with Worship Christian Center (Case 4)[12]		
Westbound Locust Grove Road	-	C (18.7)
Southbound South State Street - Left	-	A (9.0)

[10] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[11] Based upon field conditions, the southbound South State Street approach contains a bypass lane. As such, both the TIS and JMT modeled the approach in HCS with one left turn lane and one through lane.
[12] The TIS used a peak hour factor of 0.88. However, consistent with DelDOT guidelines, JMT utilized a peak hour factor of 0.92 since the total intersection volume would be over 1,000 vph.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[13] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
South State Street/Banning Road/ Golden Oak Drive[14]	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Eastbound Banning Road	C (16.8)	C (16.2)
Northbound South State Street - Left	A (7.8)	A (7.8)
Southbound South State Street –Through/Left	A (8.4)	A (8.3)
2014 without Worship Christian Center (Case 2)		
Eastbound Banning Road	C (19.4)	C (19.6)
Northbound South State Street - Left	A (8.0)	A (8.0)
Southbound South State Street – Through/Left	A (8.5)	A (8.6)
2014 with Worship Christian Center (Case 3)		
Eastbound Banning Road	C (21.2)	C (21.4)
Northbound South State Street - Left	A (8.1)	A (8.1)
Southbound South State Street – Through/Left	A (8.6)	A (8.7)
2016 with Worship Christian Center (Case 4)		
Eastbound Banning Road	-	C (22.4)
Northbound South State Street - Left	-	A (8.1)
Southbound South State Street – Through/Left	-	A (8.7)

[13] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[14] Based upon field conditions, the northbound South State Street approach contains a bypass lane. As such, both the TIS and JMT modeled the approach in HCS with one left turn lane and one through/right turn lane.

Table 8
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[15] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
South State Street/Ponderosa Drive/ Brookdale Road	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Eastbound Brookdale Road	C (15.8)	C (15.7)
Westbound Ponderosa Drive	B (14.4)	B (14.4)
Northbound South State Street – Through/Left	A (7.7)	A (7.7)
Southbound South State Street – Through/Left	A (8.4)	A (8.3)
2014 without Worship Christian Center (Case 2)		
Eastbound Brookdale Road	C (17.4)	C (17.5)
Westbound Ponderosa Drive	C (15.5)	C (15.6)
Northbound South State Street – Through/Left	A (7.9)	A (7.9)
Southbound South State Street – Through/Left	A (8.4)	A (8.5)
2014 with Worship Christian Center (Case 3)		
Eastbound Brookdale Road	C (18.2)	C (18.3)
Westbound Ponderosa Drive	C (16.1)	C (16.2)
Northbound South State Street – Through/Left	A (7.9)	A (8.0)
Southbound South State Street – Through/Left	A (8.5)	A (8.6)

[15] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 8 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[16] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
South State Street/Ponderosa Drive/ Brookdale Road	Sunday Morning Peak	Sunday Morning Peak
2016 with Worship Christian Center (Case 4)		
Eastbound Brookdale Road	-	C (18.9)
Westbound Ponderosa Drive	-	C (16.8)
Northbound South State Street – Through/Left	-	A (8.0)
Southbound South State Street – Through/Left	-	A (8.6)

[16] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 9
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[17] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
South State Street/Rising Sun Road/ School Driveway	Sunday Morning Peak	Sunday Morning Peak
2011 Existing (Case 1)		
Eastbound Rising Sun Road	A (10.0)	A (9.9)
Westbound School Driveway	B (10.4)	B (10.2)
Northbound South State Street -Left	A (7.8)	A (7.9)
Southbound South State Street - Left	A (8.0)	A (8.0)
2014 without Worship Christian Center (Case 2)		
Eastbound Rising Sun Road	B (10.5)	B (10.4)
Westbound School Driveway	B (10.8)	B (10.8)
Northbound South State Street - Left	A (8.1)	A (8.1)
Southbound South State Street - Left	A (8.2)	A (8.2)
2014 with Worship Christian Center (Case 3)		
Eastbound Rising Sun Road	B (11.0)	B (10.9)
Westbound School Driveway	B (11.1)	B (11.1)
Northbound South State Street - Left	A (8.2)	A (8.3)
Southbound South State Street - Left	A (8.3)	A (8.3)

[17] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 9 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Unsignalized Intersection[18] Two-Way Stop Control	**LOS per TIS**	**LOS per JMT**
South State Street/Rising Sun Road/ School Driveway	Sunday Morning Peak	Sunday Morning Peak
2016 with Worship Christian Center (Case 4)		
Eastbound Rising Sun Road	-	B (11.0)
Westbound School Driveway	-	B (11.2)
Northbound South State Street - Left	-	A (8.4)
Southbound South State Street - Left	-	A (8.4)

[18] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 10
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Worship Christian Center
Report dated March 2012
Prepared by The Traffic Group, Inc.

Signalized Intersection[19]	**LOS per TIS**	**LOS per JMT**
South State Street/Sorghum Mill Road[20,21,22]	Sunday Morning Peak	Sunday Morning Peak
2012 Existing (Case 1)	B (18.2)	B (19.7)
2014 without Worship Christian Center (Case 2)	B (18.5)	C (20.2)
2014 without Worship Christian Center (Case 2) *with Improvements*[23]	-	B (19.4)
2014 with Worship Christian Center (Case 3)	B (19.0)	C (20.4)
2014 with Worship Christian Center (Case 3) *with Improvements*[23]	-	B (19.6)
2016 with Worship Christian Center (Case 4) *with Improvements*[23]	-	B (19.8)

[19] For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[20] The *DelDOT Standards and Regulations for Subdivision Streets and State Highway Access* recommends using a base saturation flow rate of 1,750 pcphgpl for signalized intersections south of the Chesapeake and Delaware (C&D) Canal. As such, JMT applied this to the Sunday peak hour analysis. However, the TIS utilized the default HCS value of 1,900 pcphgpl base saturation flow rate at the intersection.
[21] Signal runs under free operation 24 hours a day, 7 days a week. The TIS used a 60 second cycle length whereas JMT used a 90 second cycle length. The 90 second cycle length utilized by JMT was based on field observations where cycle lengths ranging from 70 seconds to 120 seconds were noted.
[22] JMT applied RTOR number as provided in the traffic counts and cross referenced with the off peak midday intersection operation.
[23] As part of the DelDOT intersection improvement project the eastbound Sorghum Mill Road approach would provide one left turn lane and one shared through/right turn lane, and the westbound Sorghum Mill Road approach would provide one left turn lane, one through lane, and one channelized right turn lane. As part of these improvements JMT analyzed eastbound and westbound approaches with protected/permissive left turn lane.

Avigation Nuisance Easement & Non-Suit Covenant

This indenture made this _____ day of _____, 20_____, by and between _____, hereinafter referred to as Grantor, and _____ hereinafter referred to as Grantee, witnesseth:

WHEREAS the Grantor is the owner in fee of a certain parcel of land ("the Property") in the County of _____, State of Delaware; and

WHEREAS said parcel of land is near or adjacent to _____, an operating airport ("Airport"); and

WHEREAS the Grantee is the owner of said airport; and

WHEREAS the Grantor proposes to make a use of said Property and to develop thereon the following:

_____
_____

_____
_____
, which use and development require approval by Municipal and County authorities subject to the applicable provisions of law; and

WHEREAS the Grantor has been advised that the subject Property is located adjacent to the Airport; that the present and future impacts of Airport operations might be considered annoying to users of the Property for its stated purpose and might interfere with the unrestricted use and enjoyment of the Property in its intended use; that these Airport impacts might change over time, for example and not by way of limitation by an increase in the number of aircraft using the Airport, louder aircraft, seasonal variations, and time-of-day variations; that changes in Airport, air traffic control operating procedures or in Airport layout could result in increased noise impacts; and that the Grantor's and users' own personal perceptions of the noise exposure could change and that his or her sensitivity to aircraft noise could increase;

NOW, THEREFORE, for and in consideration of the mutual covenants, agreements and conditions contained herein, the parties hereto agree as follows:

Grantor does hereby grant a permanent nuisance and avigation easement ("Easement") to Grantee over all of the following described real estate:

By virtue of this agreement, the Grantor, for and on behalf of himself and all successors in interest to any and all of the real property above described, waives as to Grantee or any successor agency legally authorized to operate said airport, any and all claims for damage of any kind whatsoever incurred as a result of aircraft using the Easement granted herein regardless of any future changes in volume or character of aircraft overflights, or changes in airport design and operating policies, or changes in air traffic control procedures.

The Grantor, for and on behalf of himself and all successors in interest to any and all of the real property above described, does further hereby covenant and agree with the Grantee, its successors and assigns, that it will not, from and after the effective date hereof, sue, prosecute, molest, or trouble the Grantee, its successors and assigns, in

These covenants and agreements shall run with the land of the Grantor, as hereinabove described, for the benefit of the Grantee, and its successors and assigns in the ownership, use and operation of the aforesaid Airport.

Grantee, its successors and assigns, shall have and hold said Easement and all rights appertaining thereto until said Airport shall be abandoned and shall cease to be used for airport purposes.

If any provision of this Easement or any amendments hereto, or the application thereof to any person, thing or circumstances is held invalid, such invalidity shall not affect the provisions or application of this Easement or such amendments that can be given effect without the invalid provisions or application, and to this end the provisions of this Easement and such amendments are declared to be severable.

IN WITNESS WHEREOF, the Grantor has hereunto set its hand and seal the day and year first above written.

_____(SEAL)

_____(SEAL)

NOTARY ACKNOWLEDGEMENT

STATE OF DELAWARE

ss.

COUNTY OF KENT

BE IT REMEMBERED that on this _____ day of _____, 20_____ personally, came before me, the subscriber, a Notary Public for the State and County aforesaid, _____, party(ies) to this Indenture, known to me personally to be such, and acknowledged this Indenture, to his/her (their) act or deed.

GIVEN under my Hand and Seal of office the day and year first above written.

_____

Notary Public, State of Delaware

My Commission Expires _____