



APPENDIX 8

Functional Internal Traffic Study (FITS)

**Township of King
Design Criteria and Standard Detail Drawings**

APPENDIX 8 - FUNCTIONAL INTERNAL TRAFFIC STUDY (FITS OUTLINE)

Outline of Requirements for a Functional Internal Traffic Study

The Functional Traffic Study is intended to balance appropriate urban design guidelines with a detailed assessment of internal transportation and traffic geometric design including opportunities for traffic calming, off-street or driveway parking issues, signalization warrants, roadway capacity, lane configurations, boulevard requirements (i.e., snow storage and utility corridors and buy-in from utilities), transit and pedestrian requirements, vehicle decision making criteria and intersection vehicle sight lines, medians and entrance features.

The information presented below is a check list which is to be followed during the subdivision review process. The transportation and traffic review process examines the details of such submissions and evaluates these details against the applicable standards.

The following items help to determine the ultimate vehicle demand flows, confirms the roadway network types and classifications, and ensures that the critical design elements of the road network are confirmed. The list is further complemented by items which deal with the provision of adequate parking, proper access for major attractors and generators, and formulation of satisfactory traffic control plans. Depending upon the circumstance, additional items can be added which deal with traffic calming measures and devices.

Associated with each item are specific criteria which require measurement, calculation and/or demonstration of adherence to standards and operating parameters. It is recognized that not all items may be applicable to all applications.

Items identified with an asterisk (*) indicate that this item must be completed at the initial stages of any Draft Plan submissions. Other items may be deferred, subject to the Township's concurrence, but it must be emphasized that a proper geometric and standards fit must occur. Otherwise, a significant number of conditions and red-lining of plans may occur.

Traffic Study Items**1. Road Network Layout and Design Volumes ***

The built-out traffic flows are to be determined on each internal road (especially collector roads) for the typical weekday AM and PM peak hours. In addition, if the development application contains a collector road which forms an intersection with another collector road or a bounding arterial road, the typical weekday AM and PM peak hour turning volumes must be identified. It is imperative that any associated exclusive turning lanes, particularly left-turns are provided with their ultimate storage and taper length dimensions. It is understood that collector roads at intersections with other collector roads and arterial roads may require a right-of-way widening to permit the introduction of necessary vehicle turning lanes and proper sight triangles, as determined through a Traffic Impact Study and/or to meet the requirements set out in the Official Plan or Zoning By-Law of the Municipality.

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2. Internal Road Classification and Right-of-Way *

Standards are available from accredited associations (e.g., Transportation Association of Canada, TAC) identifying the acceptable range of traffic flows that a type of road can satisfactorily accommodate, either in a 24-hour period or during the weekday roadway peak hours. The road type and classification being considered must be capable of serving the traffic flow demand within the identified level.

3. Horizontal and Vertical Geometry *

Acceptable standards pertaining to horizontal curves, vertical curves, intersection angles and Safe Vehicle Stopping and turning decision criteria are contained in Manuals available from the Ontario Ministry of Transportation, the Transportation Association of Canada and Institute of Transportation Engineers. All road elements are to be evaluated and made to conform to the applicable criteria. The most conservative criteria should be used where these standards differ, unless analysis can be provided to justify otherwise.

4. Intersection Spacing *

Standards are available from accredited associations that identify the minimum spacing of intersections from each other. The development application must meet these minimum standards.

5. Intersection Warrants – Turning Lanes, Traffic Signals, Traffic Circles or Roundabouts *

The forecast demand volumes, intersection turning movements, Level of Service/Dealy and queuing requirements will dictate the appropriate traffic control device as well as the intersection lane configuration. The forecast demand volumes will be used to calculate required storage and taper lengths for any turning lanes. If a traffic signal is to be considered then signal warrant analysis must be conducted, in accordance with the requirements of Book 12 of the Ontario Traffic Manual. A neighbourhood traffic circle, mini-roundabout or full roundabout can be considered as an alternative to a traffic signal at collector road and collector road intersections. Functional design plans may be required to confirm the geometric requirements of intersections, with more detailed plans provided as part of the detailed design phase.

6. Street Elbows *

Certain internal local roads may have centre line radii greater than 90 degrees in order to facilitate lot fabric. At these locations, pavement width analysis must be conducted to ensure that opposing vehicles (automobiles, as well as an opposing automobile and emergency service vehicle) can negotiate the manoeuvre without impacts. In addition, individual driveways must be located such that the road manoeuvring area and sidewalk are not compromised. Formation of land use patterns incorporating such street elbows are not encouraged.

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7. Rear Laneways *

The laneway layout and operation must be thoroughly addressed. This includes pavement widths, shoulder treatments, garage (building) set-backs (including ability to manoeuvre one large and one mid-sized automobile into and out of the garage), automobile, emergency vehicle and garbage truck circulation and turning movement capability. The assessment must be undertaken along a typical cross-section of the laneway as well as at each intersection or bend formed by a laneway. Bends in laneways are discouraged.

8. Temporary Turn-Arounds and Cul-de-Sacs *

Any proposed temporary turn-around or cul-de-sac must be capable of satisfactorily accommodating service and emergency vehicle turning capability.

9. On-Street Parking *

Locating on-street parking must be carried out in a consultative manner with all disciplines involved in the preparation of the development application. The location of on-street parking will be guided by many factors including adjacent land uses, roadway geometrics and traffic demand flows. It is expected that there will be no parking in laneways. It is expected that parking will only be permitted on one side of local roads. It is expected that parking will be introduced in a sensitive manner on collector roads. Additional pavement on collector roads must not encourage speeding or diminish the operation of future transit. Consideration of parking bays (indent parking) with protected intersection conditions minimizing pedestrian walking distances are considered appropriate.

The development application must demonstrate through scaled plans that the required parking supply for residents and visitors can be achieved. On street parking must respect vehicle sight line requirements, parking space width and length, clearance to hydrants, emergency vehicle needs, snow storage and intersection setbacks. No portion of a vehicle parked in a driveway can protrude onto the curb or across a sidewalk.

10. Traffic Calming

Development applications must demonstrate how speeding has been addressed in design and be in accordance with the Township's *Traffic Calming Strategy (WSP, November 2022)* and *Active Transportation Strategy (October 2020)*.

All roadway cross-sections must consider pavement widths that are conducive to reducing vehicle speeds. On-street parking should be strategically placed such that the additional pavement does not encourage greater vehicle speeds. If necessary, traffic calming devices can be considered excluding speed bumps or humps or other devices that are not acceptable to transit or emergency service vehicles. Should further traffic

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calming features be desired, traffic tables, medians and boulevard treatments can be considered. The Developer may be accountable for traffic calming needs identified within the maintenance and warranty period of the development.

11. Headlight Screening

“Window Streets” or other internal roads may parallel a bounding arterial road. Vehicle headlight movements must be examined on the local road and preventative measures must be brought forth which prevent headlight glare from reaching the eye level of drivers on the bounding arterial road.

12. Service and Emergency Vehicle Circulation

All internal roads including any laneways must demonstrate that the available driving service is capable of efficiently accommodating the free flow movement of emergency and service vehicles.

13. Curb Radii

Curb radii can be introduced to reduce vehicle speeds and benefit pedestrians. The curb radii must demonstrate to scale that sufficient capacity is provided for vehicle turning demands and that all service and emergency vehicles can efficiently negotiate turns.

14. Corner Daylighting and Sight Distances

Each intersection must be examined to verify that the clear vehicle sight lines are available, to provide the required stopping sight distance, intersection turning sight distance and approach sight distance. Daylighting or rounding should be provided at the intersections to maintain acceptable sight distances. Any special circumstances must be justified.

15. Pedestrian and Handicapped Accommodation

Sidewalks must be available to serve primary pedestrian flows. At curb locations grading must be provided to accommodate wheelchair movements.

16. Surface Treatments

As part of traffic calming at intersections and in an effort to accommodate major pedestrian flows consideration can be given to providing alternative surface treatments. These surface treatments are meant to give textural and noise signals to drivers that increased awareness is necessary.

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17. Roundabout and Traffic Circles

Neighbourhood traffic circles, mini-roundabouts or single lane roundabouts may be considered for intersection control, depending on design requirements and constraints. Any proposed roundabout must be designed to meet forecast traffic demands as well as the turning paths required for all municipal services including transit and emergency vehicles. Larger vehicles such as moving trucks should also be examined. Pedestrian crosswalks must be properly located to provide maximum visibility and safety to all users.

18. Driveway Locations

Driveways to individual uses must respect the adjacent traffic flow demands and resultant intersection lane configuration requirements. The driveway location must minimize impacts on the role and function of adjacent boundary lanes particularly turning lanes. At internal collector to collector road or collector to arterial road intersections, consideration should be given to a land use form that is served by rear laneways thereby reducing the impact on intersection lane functions. Similar considerations should be given to driveway locations where the collector road intersects with a bounding arterial road. Driveway locations should also provide for corner clearance requirements, as well as adequate stopping sight distance and intersection sight distance.

19. Sidewalks

The placement of sidewalks must conform to Municipal guidelines and the guidelines in Book 15 of the Ontario Traffic Manual. Continuity and connectivity are imperative to providing an environment which encourages walking. Special pedestrian crossing outside of intersection locations must be examined in detail and the justification for pedestrian actuated controls brought forward.

20. Bicycle Paths and Lanes

Bicycle paths and lanes must be in conformity with the Municipal goals and objectives and meet the guidelines in Book 18 of the Ontario Traffic Manual. Those bicycle routes whether lanes or paths must be clearly identified and the appropriate geometric standards incorporated into the roadway cross-sections or where bicycles cross a roadway.

21. Designated Car Pool Spaces

Upon defining the transit route network there could be numerous retail, commercial, office and institutional uses that are in close proximity to the transit service. An estimate of the number of parking spaces by use which can be provided to carpooling use is to be identified. If site plans are available, the preferred location of the car pool spaces can be denoted.

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22. Transit Route Pattern

Where directed by the Town, the primary transit route pattern to serve the development application will be identified and the following related items are to be addressed.

23. Bus Stop and Pedestrian Pad

Major bus stop locations along each route will be identified. At these locations the necessary concrete pad to serve boarding and de-boarding passengers will be identified and included in the development application.

24. Development Integration

Opportunities should be examined at significant locations where adjacent land uses can provide an integration opportunity with transit. This could range from integrated shelter/building conditions to a minor pick up and drop off area in the vicinity of the bus stop.

25. Major Public Generators & Attractors * – Driveway and Entrance Locations

Within the development application there could be uses such as public schools, high schools and community centres, parks, etc. These land uses generate unique vehicle circulation and parking demands. The vehicle flow demands should be examined in the context of planning driveway and entrance locations which minimize impacts on bounding intersections and major pedestrian flows. Strategies should be provided to minimize traffic congestion and reduce the potential for safety issues developing along the roads located in the areas of these major traffic generators.

26. Major Public Generators & Attractors * – On Street Parking Assessment

Many of these generators are also located next to parks. The bounding road network should be examined to determine if on-street parking can serve multiple parking demands. How the on-street parking is incorporated with the roadway cross-section should be examined in detail. However, creating a continuous widening of the asphalt surface area is discouraged, due to the potential to increase vehicle speeds.

27. Major Public Generators & Attractors * – Traffic Device Plan for Entrances Providing Direct Access

An appropriate traffic control device plan is to be provided to maintain safe access to land uses that generate significant traffic demands from the public. The accommodation of pedestrian flows must also be identified.

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28. Traffic Control Device Plan

The development application must provide the definition and location of all traffic control devices to be installed in accordance with the Ontario Traffic Manual and related specifications.