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Item No. 15.1.3
Halifax Regional Council
March 25, 2025

TO: Mayor Fillmore and Members of Halifax Regional Council

FROM: Cathie O'Toole, Chief Administrative Officer

DATE: January 18, 2025

SUBJECT: Westwood Hills Egress Supplementary Report

ORIGIN

November 28, 2023 Halifax Regional Council (15.1.5 Westwood Hills Egress):

MOVED by Councillor Lovelace, seconded by Councillor Blackburn

THAT Halifax Regional Council direct the Chief Administrative Officer to:

1. Proceed with the planning, design, and stakeholder engagement required to develop an emergency-only connection to Highway 103 from the Westwood Hills subdivision.

2. Proceed with further investigation into the development of community connector roadways with landowners of adjacent communities including Highland Park and Upper Hammonds Plains and consider any necessary amendments to the Regional Plan and Regional Subdivision By-law to enable these specific neighbourhood egress routes.

MOTION AS AMENDED PUT AND PASSED UNANIMOUSLY.

EXECUTIVE SUMMARY

This report describes the planning and design process that was undertaken to investigate potential roadway connections aimed at improving emergency egress for the Westwood Hills subdivision following the wildfires that impacted the area in 2023. Functional design was completed for four emergency-only access / egress alignment options between Westwood Hills and Highway 103, and conceptual design was completed for two community connector road options connecting to the historic African Nova Scotian Community of Upper Hammonds Plains and to the Highland Park North subdivision. Design work for each alignment informed an understanding of the opportunities and constraints for roadway connections in the area as well as estimated construction costs. An evaluation methodology was used to quantify the relative benefit to subdivision egress provided by each emergency-only access / egress option, and cost-benefit analysis was completed to aid in comparing the options.

Staff are recommending that a 500m emergency-only access / egress connection between Westwood Boulevard and Highway 103 via PID 40742496 (Option 1 as described in this report) be advanced to

detailed design, property acquisition, and construction. The proposed connection provides a link to a high-capacity roadway that complements the subdivision's two closely spaced existing connections to Hammonds Plains Road. Though the proposed alignment itself is relatively close to the east end of the subdivision and the two existing access points, it provides a more practical alternative to other alignments that were investigated further west that are longer, more complex, and considerably more expensive to construct. Costs for design, environmental assessments / approvals, property acquisition, and construction for implementation of the recommended egress road (Option 1) have been estimated to total $2.7 million. It is anticipated that it can be constructed in 2026.

Although the recommended option improves egress for Westwood Hills overall, it is noted that it does not directly address potential vulnerability for the northern portion of the subdivision if an area blockage were to occur closer to its center. The two community connector roads to Upper Hammonds Plains and Highland Park that were investigated have potential to mitigate this risk but are constrained by both land use policy and a need for community engagement. Staff are recommending that further planning and engagement related to the following take place before a decision is made on potential community connector roadways:

- Since the area is subject to land use policy that imposes growth restrictions due to transportation constraints, HRM would need to either fund construction of a community connector road itself or ease these restrictions and enable developers to construct the road in exchange for development rights. Enabling additional residential development would increase the number of people living in the Wildland Urban Interface, putting more residents at risk, and placing additional demand on Hammonds Plains Road.
- Staff are currently working with the Upper Hammonds Plains community on a Community Action Plan as part of the African Nova Scotian Road to Economic Prosperity initiative. This Action Plan strives to enable the Upper Hammonds Plains community to establish and achieve a community vision. It is important that engagement occur with residents of the Upper Hammonds Plains community to develop an understanding of how a potential new roadway connection could impact the community before consideration is given to developing one.

Staff are also recommending that a Region-wide Subdivision Egress Review be completed to enable better understanding of egress vulnerabilities in the regional roadway network.

RECOMMENDATION

It is recommended that Halifax Regional Council direct the Chief Administrative Officer (CAO) to:

1. Advance the planning, design, land acquisition, and construction required to develop an emergency-only roadway connection between the Westwood Hills subdivision and Highway 103 via PID 40742496 (Option 1 as described in this report).
2. Continue to investigate connector road options between the Westwood Hills subdivision and nearby communities including Highland Park North and the historic African Nova Scotian Community of Upper Hammonds Plains. Ensure that engagement with potentially impacted communities is undertaken, including the Upper Hammonds Plains Community as part of its ongoing Planning Strategy Review and African Nova Scotian Community Action Plan.
3. Complete a Region-wide Subdivision Egress Review Study to identify areas that are vulnerable to access/egress challenges, and based on its findings, establish a multi-year implementation strategy that prioritizes subdivisions for remediation.

BACKGROUND

In May 2023, a 788-hectare wildfire swept through Hammonds Plains and Upper Tantallon, destroying more than 150 structures and inflicting major damage to several more. Soon after wildfires started on the afternoon of May 28, mandatory evacuation orders were put in place and were expanded geographically

as the fire continued to burn out of control. A local state of emergency was declared on the evening May 28 in the Hammonds Plains / Upper Tantallon area, impacting approximately 16,400 residents.

Westwood Hills, a residential subdivision with over 700 dwellings, was significantly impacted by the wildfires. Although no serious human injury or fatality resulted from the fires, many homes were lost and residents fleeing the area were exposed to life threatening conditions. As the situation rapidly worsened, constraints in the roadway network (limited subdivision access points and roadway capacity on Hammonds Plains Road) made evacuation a significant challenge.

On June 6, 2023, Regional Council requested a staff report on developing egress options for the Westwood Hills subdivision. In response, staff worked with a consultant to conduct a review of potential access improvement options – this access review identified routing options for new egress roads and assessed them based on their technical feasibility and effectiveness in improving emergency egress for the community.

On November 28, 2023, staff recommended further investigation into an emergency-only connection to Highway 103 from the Westwood Hills subdivision. Regional Council approved this recommendation and also directed staff to investigate community connector routes between the Westwood Hills subdivision and the Upper Hammonds Plains and Highland Park communities.

DISCUSSION

This section provides an overview of the current access configuration in Westwood Hills, the options that have been investigated to improve it, and the recommended approach.

Westwood Hills: Existing Access Configuration

HRM's *Municipal Design Guidelines* (2021) stipulate that every lot in a subdivision must have two or more street connections to the surrounding road network, and these accesses shall be at opposite ends of the subdivision. The focus of this requirement is both to improve connectivity of new subdivisions to surrounding neighbourhoods and to provide for access and egress in the event of an emergency that blocks one access. One of the drawbacks of the current design guidelines is they do not specify the classification of a street to which a new development must have a second access, and this connectivity may not help with a mass evacuation. Westwood Hills has two separate street connections to Hammonds Plains Road (via Westwood Boulevard and Winslow Drive); however, there are limitations associated with the existing street network that can potentially compromise access/egress in the event of an emergency:

- The proximity of the two access points (300m apart on Hammonds Plains Road and as close as 170m apart near the St. Margaret's Centre) increases the potential that both could be impacted simultaneously, in which case access to/from the subdivision would be compromised (the subdivision predates the *Municipal Design Guidelines* (2021) requirement that a subdivision's two connections to the external road network are on opposite ends).
- Both subdivision access points are to Hammonds Plains Road, which has capacity constraints that could create a bottleneck and limit the ability of people to evacuate in a timely manner.
- Limited internal connectivity in some parts of the subdivision can increase the risk of isolation if road closures occur.

Access Improvement Options for Westwood Hills

Access improvement options that are under consideration for Westwood Hills include four emergency-only access / egress roads and two community connector roads (see Figure 1):

Emergency-only Access / Egress Roads:

- Option 1: Intersects with Westwood Boulevard via a short existing gravel road just west of Hemlock Drive. The site has been partially cleared in preparation for proposed development. Approximate distance to Highway 103 is 500m.

- Option 2: Intersects with Westwood Boulevard via a short existing gravel road approximately 600m north of Hemlock Drive. Approximate distance to Highway 103 is 950m.
- Option 3: Located on Westwood Boulevard immediately opposite High Timber Drive. The site is currently being developed as a long-term care facility. Approximate distance to Highway 103 is 1.12km.
- Option 4: Undeveloped site located at the end of the Rockfield Drive cul-de-sac. Approximate distance to Highway 103 is 1.65km.

Community Connector Roads:

- Option A: Approximately 2.5km north-south connection between the end of Westwood Boulevard and Anderson Road in Upper Hammonds Plains.
- Option B: Approximately 2.5km east-west connection between Wyndham Drive and the Highland Park subdivision.

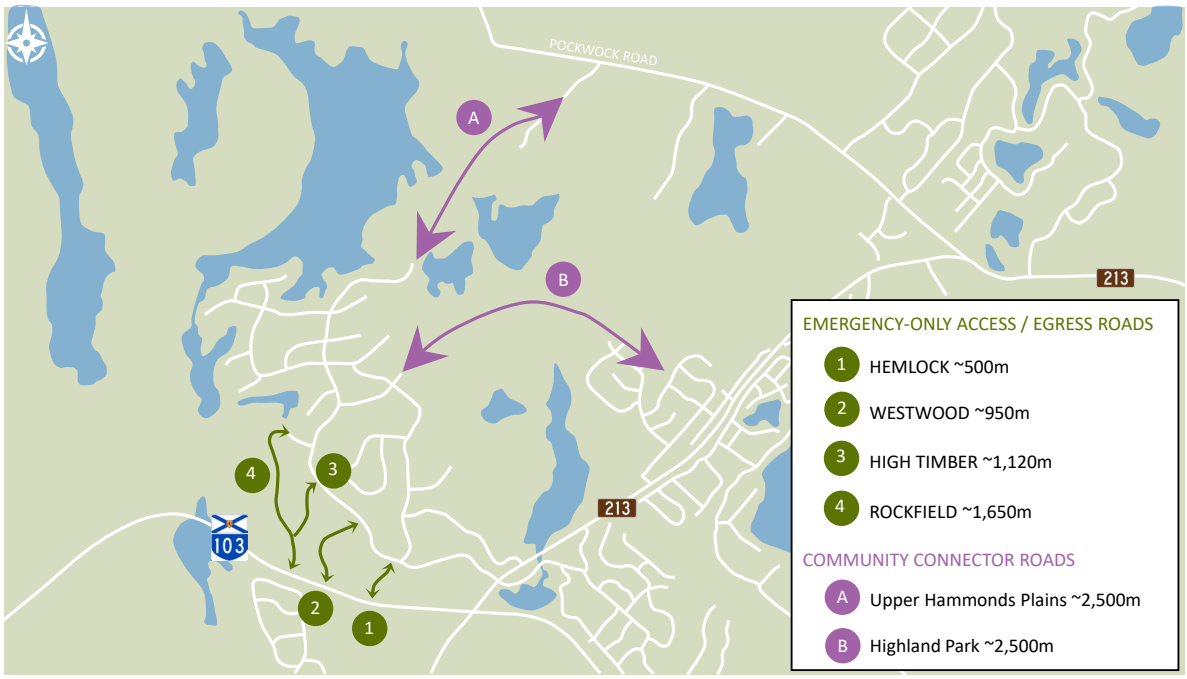

Figure 1 – Emergency-Only Access / Egress and Community Connector Road Options

Emergency-Only Access / Egress Roads

Emergency-only access / egress roads are intended solely for use during emergencies, providing an alternative route for residents to evacuate danger and for emergency responders to gain access when attending to emergency situations. For the Westwood Hills subdivision, all emergency-only access / egress route options under consideration connect directly to nearby Highway 103, leveraging its high capacity to accommodate traffic flow during evacuations. The emergency-only roadway would connect to Highway 103 at-grade, and gated access points on either end would prohibit access by unauthorized vehicles and limit its use to emergency situations only.

Highway 103 is a provincially owned, access-controlled highway that is designed to prioritize high-speed, uninterrupted traffic flow. Best practice in highway design and operations aims to limit the number of access points, and discourage at-grade intersections for both safety and efficiency. Despite this, at-grade connections are permitted on rare occasions where they are necessary to provide access to otherwise inaccessible features (i.e., power/water infrastructure) or to augment access/egress for existing roadway networks with connectivity challenges. Through engagement with Nova Scotia Public Works (NSPW) as part of this planning process, staff have received endorsement in principle of the concept of an emergency-

only access / egress road to Highway 103. Despite a general reluctance to allow access to its 100-series highways, NSPW has recognized the unique connectivity challenges in Westwood Hills.

Functional level (~30%) design was completed for the four alignment options between Westwood Hills and Highway 103, and descriptions of each route are provided in **Attachment A**. The following are relevant observations and considerations related to the design options:

- *Design Standard*: HRM's *Municipal Design Guidelines* (2021) do not currently include a standard detail for an emergency-only access / egress road. This project assumed a road cross-section similar to HRM's Rural Local Road detail, including two 3m lanes with 2m gravel shoulders on either side. A maximum allowable grade of 8% was assumed for each alignment for accessibility by people and vehicles, especially oversize vehicles and heavy equipment.
- *Property Ownership*: The majority of each of the proposed routes are located on private property. To proceed with any option, HRM would need to partially of fully acquire the relevant properties.
- *Topography*: The area between Westwood Boulevard and Highway 103 is mostly wooded, rolling terrain. The area is undeveloped but there are large areas where clearcutting has taken place, and there are some rough access roads that were developed during tree clearing that remain in place.
- *Connection Length*: The length of the connection is an important consideration, as it has a significant impact on the construction cost, property requirements, and ongoing maintenance needs. Increased distance for an emergency connection also has important implications for public safety, particularly through a wooded area – if the connection is made through an area that is susceptible to wildfires or potential blockages, the connection itself could pose a risk to residents attempting to evacuate.
- *Land Use Planning*: The lands between Highway 103 and Westwood Hills are designated Rural Commuter under the Regional Plan. The Regional Subdivision By-law regulates the subdivision of land and creation of new public roads and new lots. Subdivision approval may not be required for a municipally owned emergency-only access / egress road; however, creation of these roads could impact development rights for the surrounding lands. Depending on the approach, amendments may be required to the Regional Plan and/or the Regional Subdivision By-law.
- *Environmental Impacts*: There are several minor watercourses and a few relatively small mapped and unmapped wetlands in the area. Option 1 would cross a drainage area that appears to be a wetland to connect to Highway 103. Wetland delineation and alteration permitting would likely be required, which takes approximately 6-8 months to complete, and may require habitat compensation,
- *Estimated Construction Costs*: Class 'D' cost estimates were prepared for each option using HRM's most recent unit price data. There is significant site work required to achieve a maximum slope of 8% for the proposed egress roads. While the proposed egress routes follow sections of existing gravel roads previously used for logging and other site work, these roads will require significant regrading to achieve the 8% maximum grade. Estimated construction costs for each option are summarized in Table 1.

Table 1: Summary of Emergency-only Access / Egress Road Options

	Option 1 (Hemlock)	**Option 2 (Westwood)**	**Option 3 (High Timber)**	**Option 4 (Rockfield)**
Length	500m	950m	1,120m	1,650m
Property	1 parcel /1 owner 11,770 m^2 (total area)	5 parcels / 4 owners 19,600 m^2 (total area)	4 parcels / 2 owners 24,300 m^2 (total area)	4 parcels / 1 owner 38,200 m^2 (total area)
Class D Construction Cost Estimate	$1.4 million	$5.3 million	$10 million	$6.7 million

Community Connector Roads

A community connector roadway would provide a general-purpose connection between existing communities. Unlike emergency-only routes, community connector roads can support general purpose traffic and improve local road network connectivity on a full-time basis, while also enhancing access and egress in emergency conditions. For the Westwood Hills subdivision, a community connector road to an adjacent community (i.e., Upper Hammonds Plains, Highland Park) could offer significant benefits by

providing additional access routes and improving network redundancy. Concept level (~10%) design was completed for two alignment options between Westwood Hills and Upper Hammonds Plains / Highland Park. The following are relevant observations and considerations related to these design options:

- *Design Standard*: Due to the length of potential connector roads to Highland Park and Upper Hammonds Plains and the heavily wooded surrounding terrain, their use as emergency-only connections is not appropriate and the design standard would need to be in accordance with HRM's *Municipal Design Guidelines*. Special consideration would also be required for such a roadway (and surrounding land uses, if applicable) to incorporate wildfire resistance best practices including vegetation management, fuel breaks, and fire-resistant building materials.

- *Property Ownership*: The lands required to make either of these connections are privately owned; therefore, the municipality would need to purchase land to serve as a right-of-way corridor, and design and build the roadway and any associated infrastructure. Alternatively, the municipality could consider an agreement with the owners and/or property developers to have them construct the roadway on the basis that the abutting lands be subdivided into lots with development rights.

- *Land Use Planning*: At present, the lands that are likely candidates for these potential connector roads are subject to growth control mechanisms that limit subdivision in the Beaver Bank / Hammonds Plains areas. The Regional Plan contains direction under Policy S-24 that limits residential subdivision activity in these areas until transportation infrastructure capacity is increased. The policy also prohibits the creation of new roads that generate residential development except where new roads can be demonstrated to improve traffic safety or achieve better regional network connectivity. Policy S-24 is implemented through Sections 11(1) and 11(1a), and Schedule J of the Regional Subdivision By-Law.

  As part of the Regional Plan Review, several requests for development have been received regarding potential development of properties located within the Schedule J area. In accordance with the approach endorsed by Regional Council on June 20, 2023, staff do not recommend amending Regional Plan policy to permit additional residential development on lands within Schedule J until further study of future community development and required infrastructure in this area is completed together with a Strategic Growth and Infrastructure Priority Plan.

  Enabling additional residential development for the purpose of improving access to Westwood Hills could inadvertently have adverse consequences for public safety. It would increase the number of people living in the Wildland Urban Interface, putting more residents at risk. Further development in this area without broader expansion of the transportation network would also place additional demand on Hammonds Plains Road, increasing the potential for traffic congestion in the area and further exacerbating the risk to residents in the event of an emergency evacuation.

  Upper Hammonds Plains Planning Strategy Review and Community Action Plan: As directed by Regional Council in September 2024, a Community Action Planning process has begun with the historic African Nova Scotian community of Upper Hammonds Plains. In recent decades, the expropriation of 300+ acres of communal land for the Pockwock Watershed (1974), the ensuing 'Water Fight' (1996), and development pressures (2020) have damaged the community's relationship with Halifax Water and HRM (for further information and sources, see Attachment D of the staff report dated August 16, 2024). During the Planning Strategy Review and Community Action Plan process, staff will work with the Upper Hammonds Plains community to identify community needs and priorities, develop a vision, and develop an Action Plan that may require changes to land use planning policy, and identify needs for additional investments in infrastructure. This work formally began with Council's direction in September 2024, with initial deliverables expected later in 2025.

  Emergency egress has been raised frequently by Upper Hammonds Plains residents in discussions with staff. Recent development activity has seen permits for over 900 new residential units approved on Pockwock Road, which has access only from Hammonds Plains Road. The potential

for a new community connector road to provide additional connections to Upper Hammonds Plains is an important consideration and it is imperative that the community is directly engaged as part of any efforts to explore such a connection.

- *Estimated Construction Costs*: Class 'D' cost estimates were prepared for each option using HRM's most recent unit price data and are summarized in Table 2.

Table 2: Summary of Community Connector Road Options

	Option 1 (Anderson Road)	**Option 2 (Highland Park)**
Length	2.5km	2.5km
Property	2 parcels / 2 owners 41,800 m^2 (total area)	8 parcels / 4 owners 63,900 m^2 (total area)
Class D Construction Cost Estimate	$4.3 million	$7.3 million

Although a potential community connector road between Westwood Hills and Upper Hammonds Plains does appear to have potential benefits to connectivity and access/egress, there is a need to engage with the community as part of the Upper Hammonds Plains Planning Strategy Review and Community Action Plan before further consideration proceeds. Recognizing the need to delay further consideration of a community connector road to Upper Hammonds Plains until after this community engagement has occurred, the balance of this report focuses on advancing the emergency-only access / egress component of Council's November 2023 direction, deferring the evaluation of community connector road options until the necessary engagement with impacted communities can occur.

Options Evaluation: Emergency-Only Access / Egress Roadway Options

Subdivision Egress Assessment Index Methodology

To aid in the evaluation of egress conditions for subdivisions in HRM, a 'Subdivision Egress Assessment Index' methodology was developed in conjunction with a planning / engineering consultant (WSP Canada Inc.). This methodology develops a score-based index to estimate the extent to which a subdivision is vulnerable to evacuation challenges in the event of an emergency event. The Subdivision Egress Assessment Index score is developed based on the following factors (further detail is provided in **Attachment B**):

- *Number of Access Points*: The number of access roads connecting the subdivision to the regional roadway network, ranking from one to more than two.
- *Access Road Type*: The type of roadways that connect the subdivision to the regional roadway network, ranging from emergency-only access / egress roads to multi-lane roadways.
- *Access Road Intersection Level of Service*: The available capacity at the intersection where the subdivision access roads ties into the regional roadway network. Scores are based on the assessed intersection level of service.
- *Separation Between Exit Roadways*: The distance between exit points to the subdivision. Increased separation is beneficial as it reduces potential for overlap and inefficiency.
- *Impact of Closure Event*: An estimate of the number of residential units that are potentially isolated by a point closure in the roadway network. Scores are assigned based on the percentage of units isolated by a closure, which could result from incidents such as vehicle collision, a road failure, a watermain break, a flood, or a wildfire.
- *Longest Best Escape Route*: the shortest driving distance that any one residential unit needs to access the regional roadway network. The longest, best escape route is the longest of any of these routes (typically for a residential unit farthest from the subdivision exit).

Results of the Subdivision Egress Assessment Index are provided in Table 3 (a higher index value indicates increased egress benefit) and summarized below (further detail in **Attachment C**):

- Under existing conditions, the Egress Assessment Index score for Westwood Hills is 36. This score is based on the following:
    - Two access points, both of which are two-lane paved roadways and with intersection Level of Service ranging from A-E.
    - Less than 400m separating subdivision access roads.
    - Vulnerability to an area closure in the roadway network that could isolate up to 300 units.
    - A longest best escape route that exceeds 5km.
- The analysis indicates that all four emergency-only access / egress road options result in an increased index score. Option 1 increases the index score from 36 to 60, and options 2-4 all increase the index score to 66 points.
- The increase in score for all four options results primarily from the addition of a new connection to the roadway network. Options 2-4 have a marginal improvement over Option 1 as they reduce the longest best escape route below 5km.
- A key shortcoming of the improvement options that is reflected in the evaluation is that none of the four options reduce the vulnerability of the subdivision to area closures in the northern part of the subdivision.

Table 3 - Summary of Egress Assessment Index Analysis

	Egress Index Score	Change in Egress Index Score	Sources of Score Improvement
Existing	36	--	--
Option 1	60	+24	Added roadway connection to Highway 103
Option 2	66	+30	Added roadway connection to Highway 103 Reduced length of longest best escape route
Option 3	66	+30	
Option 4	66	+30	

Benefit-Cost Analysis

Benefit-cost analysis was completed to evaluate the potential emergency-only access / egress options based on their estimated construction costs and impact on the Egress Assessment Index – the analysis relates the increase in Egress Assessment Index (the benefit) to the estimated costs for property acquisition and construction. Benefit-cost analysis results are summarized in Table 4. This analysis highlights Option 1 as the most cost-effective emergency-only access / egress solution, offering the highest benefit-cost ratio while improving evacuation safety. Given that the benefits of all four options are very similar, this highlights how the significant difference in cost impacts the results. It is important to consider that land acquisition costs were not included in the Benefit-Cost analysis; given that Option 1 requires considerably less property acquisition than Options 2-4, if land costs were included it is likely that Option 1 would have an even higher relative score.

Table 4 - Summary of Benefit-Cost Analysis

	Estimated Benefit (Change in Egress Index Score)	Estimated Construction Cost	Benefit-Cost Ratio
Option 1	+24	$1.4M	17.1
Option 2	+30	$5.3M	5.7
Option 3	+30	$10M	3.0
Option 4	+30	$6.7M	4.5

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Other Considerations

In addition to the evaluation methodology discussed above, the following are relevant to consider when comparing the options:

- A key benefit of all proposed emergency-only access / egress connections to Highway 103 is that they provide a connection to a high-capacity roadway and an alternative to Hammonds Plains Road, which has capacity constraints and can become congested (as experienced during the 2023 wildfires). Although community connector road options could provide egress benefit for Westwood Hills, they need to would access the regional roadway network via Hammonds Plains Road.
- The proximity of the subdivision's two access points to Hammonds Plains Road could leave the subdivision vulnerable to egress challenges if an area closure were to block both roads closer to Hammonds Plains Road. An emergency-only connection to Highway 103 would help to mitigate this risk.
- Despite the overall improvement to egress expected from the emergency-only access / egress roads, it is important to note that they do not directly address a potential vulnerability for the northern portion of the subdivision if an area blockage were to simultaneously impede Westwood Boulevard and Hemlock Drive in the vicinity of Windbreak Run or Wyndham Drive. This scenario did in fact occur during the 2023 wildfires and left some residents trapped for a period during the evacuation.
- Given that all current access to Westwood Hills is concentrated at the east end of the subdivision at Hammonds Plains Road, intuitively it seems that an emergency-only access / egress connection would be most beneficial from a network perspective the further west it is located. However, the western end of the subdivision is considerably farther from Highway 103 than the eastern end, significantly increasing the egress route length and construction costs. With alignment lengths ranging from 950m to 1.65km and running through wooded, rolling terrain, options 2-4 are not considered to be suitable as egress roads and could in fact represent a potential hazard for residents evacuating in the case of an emergency.
- If a community connector road to Upper Hammonds Plains were to be constructed in the future, an emergency-only access / egress road to Highway 103 would still provide value for the Westwood Hills subdivision as an alternative connection that does not connect to Hammonds Plains Road.

Proposed Approach

This section outlines proposed next steps to carry out staff's recommendations.

Proceed with Emergency-Only Access / Egress Option 1

The proposed approach recommends advancing the design and initiating official property negotiations for the emergency-only connection from Westwood Hills to Highway 103 via PID 40742496 (Option 1). This approach balances the need for safety enhancements with the practical constraints of property acquisition and wetland/watercourse alteration permitting. While this alignment has limitations (i.e., proximity to existing southern access points and limited coverage for the northern portion of the subdivision), it provides a high-capacity connection to Highway 103 that would provide an alternative to Hammonds Plains Road. It can also be implemented relatively quickly due to its shorter length.

With Council's approval of this approach, implementation of the Highway 103 connection would involve the following approach:

- *Engagement with Nova Scotia Public Works (NSPW)*: NSPW have agreed in principle to permit an emergency-only access / egress road to Highway 103, subject to a collaborative design process that establishes appropriate design standards and any necessary agreements governing operations and maintenance of the roadway.
- *Engagement with Nova Scotia Environment (NSE)*: Option 1 would cross a drainage area or unmapped wetland to connect to Highway 103, requiring environmental permitting applications and potential habitat compensation.
- *Design Process*: The 30% design completed to date would be advanced to detail design, which would include detailed the following general steps:
    - Field Investigation: Topographic survey and geotechnical/environmental investigations to establish detailed information on existing conditions.
    - Design Standard: Establish an appropriate design standard for an emergency-only access

/ egress, which will determine appropriate cross-section elements (i.e., roadway width) and construction materials (i.e., type/depth of gravels, roadway surface). This work is ongoing in conjunction with anticipated updates to the *Municipal Design Guidelines* in 2025.
    - Detailed Design: Develop detailed design drawings and cost estimates for the roadway connection. Staff in Public Works (Design & Construction) lead this work, and it is expected that an engineering consultant will be retained to provide technical support.
- *Property Acquisition*: Staff will engage with the owner of the subject property to negotiate a purchase and sale agreement that allows HRM to construct the egress road.
- *Tendering and Construction*: It is anticipated that tendering will be carried out following completion of the design and land acquisition process. Assuming that design, environmental permitting and land acquisition can be completed in 2025, construction would be completed as early as 2026.

Complete a Region-Wide Subdivision Egress Study

Staff intend to complete a region-wide assessment of residential subdivisions that will identify locations with egress challenges and develop an understanding of how those challenges could potentially be addressed (i.e., through new roadway connections). The study will aim to develop a list of constrained locations that is prioritized based on risk exposure and likelihood of exposure to climate-related events. The anticipated outcome of the region-wide egress study will be a prioritized list of locations and remedial measures (with cost estimates) that can be used to inform capital planning.

Continue Consideration of Community Connector Road Alternatives for Westwood Hills and Adjacent Communities

The potential for a connector roadway between Westwood Hills and Upper Hammonds Plains should be assessed with consideration of the following:

- Community Engagement: Complete engagement with the Upper Hammonds Plains Community related to a potential community connector road as part of the Upper Hammonds Plains Community Action Plan. This engagement should aim to better understand the community's perspective on such a connection and how it could impact its residents.
- Road Network Analysis: A review of the area road network focused on Hammonds Plains and the communities that are accessed by it should be completed to develop a more holistic understanding of network capacity and connectivity. The review should consider traffic demand projections based on the anticipated buildout potential of the area.
- Based on the findings of the proposed Region-Wide Subdivision Egress Study described above, consider how a potential connection ranks in priority relative to other vulnerable locations in the roadway network.

FINANCIAL IMPLICATIONS

Costs for design, environmental permitting, property acquisition, and construction for implementation of the recommended egress road (Option 1) have been estimated to total $2.7 million. The *Draft 2025-26 Capital Budget* includes $1.2 million in the 2025-26 fiscal year within 'Roads 6 – Subdivision Egress Roads' for planning / design and land acquisition, and $1.5 million to fund construction in fiscal 2026-27. Ongoing maintenance costs will also need to be estimated as part of the design process and reflected in future capital budgets.

There are no immediate financial implications associated with continuing to investigate the potential for community connector roads (Recommendation 2). Any estimated costs will be identified as part of future capital budgets.

The Draft *2025-26 Capital Budget* has included $300,000 in the 2025-26 fiscal year within 'Roads 6 – Subdivision Egress Roads' for consulting fees to support completion of the Region-wide Subdivision Egress Review.

RISK CONSIDERATION

Risks associated with staff recommendations include:

- There is a risk that the recommended emergency-only access / egress road option does not provide a secondary egress option for all subdivision residents depending on the location, timing, and nature of future emergency situations. Though the probability of this risk is deemed to be low, the risk impact could potentially be significant.

- There is a risk that the Region-wide Subdivision Egress Review proposed to be completed in 2025-26 may determine that recommended improvements for Westwood Hills are not among the top priority locations. This risk is considered to have a low probability given the unique configuration of Westwood Hills, and the risk impact is also low.

- There is a risk that NSPW will not agree to permit an emergency-only access / egress road connection to Highway 103. This is considered a low probability as staff have approval in principle from Provincial officials to make this connection and plan to engage closely with NSPW during the design process.

- The ecological significance of the wetland within the alignment of the recommended (Option 1) emergency access/egress road is unknown. If species at risk are identified, these is a risk that environmental approvals may not be granted by the province for wetland alteration and alternate alignments would have to be investigated.

- There is a schedule risk that property acquisition and environmental permitting, which are outside of HRM staff's full control, will take longer than 9 months to complete. Delay in these activities would result in delayed delivery of the design and tendering of the work, which would also impact construction timing.

COMMUNITY ENGAGEMENT

Staff have engaged directly impacted property owners regarding the emergency-only access / egress options under consideration. Initial feedback has been positive, with property owners understanding the necessity of improved evacuation routes.

As part of the proposed approach for community connector roads, future engagement will prioritize the Upper Hammonds Plains community to ensure alignment with the Upper Hammonds Plains Planning Strategy Review and the Community Action Plan.

ENVIRONMENTAL IMPLICATIONS

The recommended emergency-only access / egress alternative (Option 1) involves crossing an existing wetland to connect to Highway 103. The ecological significance of this wetland is currently undetermined. Before any construction can proceed, environmental permitting applications will be required, including an application for wetland alteration. This process will evaluate the potential ecological importance of the wetland and determine any necessary mitigation measures, including compensation and post-disturbance monitoring requirements.

ALTERNATIVES

Regional Council could choose to recommend that some or all staff recommendation not be approved. A

potential alternative is identified below:

1. Regional Council may direct the CAO to delay advancing the design and property negotiations for an emergency-only access / egress from Westwood Hills to Highway 103 until the completion of the Regional Subdivision Egress Review Study. This alternative would delay the egress improvements by at least one year.

2. Regional Council may direct the CAO to delay advancing the design and property negotiations for an emergency-only access / egress from Westwood Hills to Highway 103 until further review of the potential community connector roadway options is completed. This alternative would delay the egress improvements by at least one year.

3. Regional Council may direct the CAO to abandon efforts to create an emergency-only access / egress road to Highway 103 and immediately proceed with planning and design for a community connector roadway to Upper Hammonds Plains. This alternative would delay egress improvements indefinitely, potentially circumvent the future findings of the African Nova Scotian Community Action Plan for the community of Upper Hammonds Plains, and increase development pressure in the Wildland Urban Interface.

4. Regional Council may direct the CAO to advance the planning, design, land acquisition, and construction required to develop one of the alternative emergency-only roadway connections between the Westwood Hills subdivision and Highway 103 identified in this report. This alternative is not recommended as options 2, 3 and 4 are significantly more costly than option 1 and provide minimal additional benefit.

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, SNS 2008, c. 39

61(5) The Municipality may … (a) acquire property, including property outside the Municipality, that the Municipality requires for its purposes or for the use of the public;

322(1) The Council may design, lay out, open, expand, construct, maintain, improve, alter, repair, light, water, clean, and clear streets in the Municipality.

Public Highways Act, RSNS 1989, c. 371

22(1) Where a highway or portion thereof or any land has been designated as a controlled access highway, no person shall, without a written permit from the Minister, … (a) construct, use or allow the use of, any private road, entrance-way or gate which or part of which is connected with or opens upon the controlled access highway;

22(5) For the purposes of this Section, the expression “private road” includes a street, road or highway in a city, town or municipality other than a highway to which this Act applies.

ATTACHMENTS

Attachment A: Summary Table – Emergency-only Access / Egress Roadway Options
Attachment B: Subdivision Escapability Assessment Methodology (WSP, February 2023)
Attachment C: Escapability Index Evaluation of Egress Options (HRM, October 2024)

Report Prepared by: Mike Connors, MScE, P.Eng., Manager – Transportation Planning, Planning & Development, 902.817.0795

Attachment A: Summary of Proposed Emergency-only Access / Egress Routes **January 17, 2025**
Westwood Hills Egress Supplementary Report

	Option 1 (Hemlock)	Option 2 (Westwood)	Option 3 (High Timber)	Option 4 (Rockfield)
Length	500m	950m	1,120m	1,650m
Topography	Generally flat off Hemlock Drive for 150m, before steeply increasing in elevation with a slope of 10%. The elevation undulates for 175 m with some steep rises and drops before decreasing at approximately 5% grade towards Highway 103.	Slope steeply decreases off Westwood Boulevard at roughly 25% grade before leveling out with a gently decreasing slope of 6% grade towards Highway 103.	Slope decreases off Westwood Boulevard between 25% and 35% grade for roughly 200m before a gentle slope between 5% and 15% grade for 600 m. A steep rise for 100 m follows with grades between 30% and 50%, before a gentle slope downwards towards Highway 103	This route gently slopes from Rockfield Drive downwards for roughly 600m at a grade of roughly 6%. Grades alternate with some steep drops and rises for the next 700m with grades ranging from 10% to 50%. The final stretch of the alignment gently slopes towards Highway 103.
Property	1 parcel /1 property owner 11,770 m^2 (total area)	5 parcels / 4 property owners 19,600 m^2 (total area)	4 parcels / 2 property owners 24,300 m^2 (total area)	4 parcels / 1 owner 38,200 m^2 (total area)
Land Use Considerations	Property has mostly been clear cut in preparation for future planned development. This could present a potential integration opportunity with landowner.	Limited apparent development interest or integration opportunities.	Preparations for a planned LTC facility along this route offer opportunities to coordinate the design and construction of an egress road with ongoing development.	Limited apparent development interest or integration opportunities.
Environmental	The route would cross a drainage area or unmapped wetland, requiring environmental permitting applications and potential habitat compensation	The route would cross a mapped wetland, requiring environmental permitting applications and potential habitat compensation	Some minor watercourse crossings were identified along the proposed alignment.	Some minor watercourse crossings were identified along the proposed alignment.
Class D Construction Cost Estimate	$1.4 million	$5.3 million	$10 million	$6.7 million
Constructability	Majority of the route has been cleared and a gravel road is in place for most of the alignment. To connect to Highway 103, an approximately 100m extension would be required across an unmapped wetland / drainage area.	No known integration opportunities. Majority of route requires clearing.	Integration opportunity with long-term care facility for approximately 100-200m. Approximately 400m of the route is a pre-existing gravel road used for clearcutting Substantial borrowed material required; represents approximately half of construction costs.	Approximately 1km of the route is a pre-existing gravel road used for clearcutting Significant rock formations at the end of Rockfield Drive will require careful blasting and grading. Substantial excavation and grading required
Other Considerations	The proposed connection to Westwood Hills Boulevard does not meet the minimum 150m intersection spacing requirement as per Municipal Design Guidelines Location on Highway 103 has sight distance limitations.	Location on Highway 103 has sight distance limitations.	Preferable connection location on Highway 103 in terms of sight distance.	Preferable connection location on Highway 103 in terms of sight distance.

HALIFAX REGIONAL MUNICIPALITY

SUBDIVISION ESCAPABILITY ASSESSMENT METHODOLOGY

Project CA0003143.1174
February 21, 2023

TABLE OF CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

Connectivity of subdivision roads into adjacent subdivisions and to the regional roadway network is important in day-to-day activities. Good connectivity reduces travel times, minimizes the creation of congestion points and helps to unify communities. More recently, a focus on subdivision connectivity has arisen from the perspective of creating redundancy in escape routes for events such as wildfires.

It is clear that better connectivity is needed in a number of subdivisions, to varying degrees, to ensure that the subdivision can be evacuated in a robust and timely manner. Like all municipal infrastructure, however, these solutions must compete for scarce funding. Therefore, it is critical that spending on connectivity improvement projects be prioritized based on sound evidence and not on reactions to pressure.

Access requirements for new developments are identified in Section 2.2.1 (Network Layout) of the HRM Municipal Design Guidelines (2021). These requirements stipulate that:

(k) Where there is an approved phasing plan and subdivision agreement in place confirming that a second street access will be provided within a specified time approved by the Municipal Engineer, up to 300 lots containing a maximum of 300 dwelling units may be approved prior to the second access being provided.

(l) Where, in the opinion of the Municipal Engineer, it is impractical to provide a second access, up to 100 lots containing a maximum of 100 dwelling units may be approved with a single access.

1.2 PROJECT OBJECTIVE

While the HRM Municipal Guidelines provide some assurance that evacuation of a subdivision will be facilitated by having a second egress point, or that subdivisions with only one access will be small enough that risk is minimized, assessing the ability of residents to escape a subdivision when needed can be much more complicated that simply counting exit points.

The goal of this project is to develop a methodology to rank the relative risk involved with evacuating a specific subdivision given the internal roadway network and its connection to the regional transportation network. The methodology will also allow for the comparison of connectivity improvement projects based on the degree of risk reduction it achieves. This process must be replicable across the region, and based on sound principles of risk reduction. Objectives of the project will be to:

- Research best practices in emergency roadway escape routes
- Develop a procedure for calculating an escapability index for any subdivision or portion of a subdivision
- Develop a procedure for combining the escapability index with the number of dwelling units and business affected to deliver a priority rating
- Select five candidate subdivisions and apply the two procedures to help calibrate and test them
- Develop alternative connectivity improvement scenarios for each of the five selected subdivisions, reassess the escapability index, and determine an order-of-magnitude cost of each scenario
- Develop a priority ranking that integrates the escapability index with the size of the subdivision as an indicator of relative risk

- Evaluate the practicality of integrating the escapability index calculation into the HRM Municipal Standards

1.3 CURRENT PRACTICE ELSEWHERE

A scan of how other jurisdictions handle redundancy in subdivision exit routes (Table 1) reveals that requiring a second exit is fairly common practice, but specifying the quality and functionality is not. Calgary's Fire Department Access Standard is the only guideline we found that emphasizes the importance of separating the two access points. Similarly, the Red Deer standard requires the two accesses to be "on two different sides of the neighbourhood".

Table 1: Practice in Other Jurisdictions

Location	Document	State of Practice
Riverview	Subdivision Development Procedures, Standards and Guidelines[1]	2.3.1.3 The street system must be integrated with the existing street network such that there are at least two access points to each street, with the exception of a cul-de-sac.
New Brunswick	Minimum Standards for Construction of Subdivision Roads and Streets[2]	All roads need two ways out except cul-de-sacs which can be no more than 360m long
Fredericton	Subdivision By-Law sec 2.03[3]	Subdivisions require 2 accesses, 200m maximum cul-de-sac
Moncton	Subdivision Development Guidelines[4]	Same as NB
Calgary	Fire Department Access Standard[5]	An emergency access route is required when the distance from the centre line of the primary access street to the closest point of the access route at a building's principal entrance exceeds 120 m but is less than 200 m and/or the total number of residential households exceeds 100. The second public access is to be installed as remote from the primary access as possible or practical. Residential projects with one to 100 households require one primary access point. Residential projects with 101 to 600 households require two access points. 601 households or more require three access points.
Calgary	Complete Streets Policy[6]	Every subdivision should be connected to every other adjacent subdivision
Red Deer	Neighbourhood Planning and Design Standards[7]	Every neighbourhood must have two connections on two different sides of the neighbourhood

The Lakes District (BC)	Neighbourhood Plan[8]	Every neighbourhood must have two connections, one of which may be a dedicated emergency exit
Lake County, California	Code of Ordinances - Chapter 17[9]	Cul-de-sac and dead-end streets shall be not longer than 1000 feet. […] No cul-de-sac or dead-end street, or combination thereof, shall serve or provide access to more than thirty (30) lots.
Halifax	Municipal Design Guidelines[10]	Where there is an approved phasing plan and subdivision agreement in place confirming that a second street access will be provided within a specified time approved by the Municipal Engineer, up to 300 lots contain a maximum of 300 dwelling units may be approved prior to the second access being provided. Where, in the opinion of the Municipal Engineer, it is impractical to provide a second access up to 100 lots containing a maximum of 100 dwelling units may be approved with a single access.

Sources

1 https://www.townofriverview.ca/sites/default/files/documents/related/subdivision_development_procedures_standards_and_guidelines_second_edition.pdf

2 https://www2.gnb.ca/content/dam/gnb/Departments/trans/pdf/en/Publications/Minimum_Standards_for_the_Construction_of_Subdivision_Roads_and_Streets_May_2017.pdf

3 https://www.fredericton.ca/sites/default/files/2023-05/Bylaws-Zoning-Z4.pdf

4 https://www5.moncton.ca/docs/Subdivision_Development_Guidelines.pdf

5 https://www.calgary.ca/content/dam/www/csps/fire/documents/fire-department-access-standard.pdf

6 https://www.calgary.ca/content/dam/www/ca/city-clerks/documents/council-policy-library/tp021-complete-streets-policy.pdf

7 https://www.reddeer.ca/media/reddeerca/business-in-red-deer/planning-and-development-of-property/planning/June-2022---FINAL-Updated-NPDS.pdf

8 https://library.municode.com/ca/lake_county/codes/code_of_ordinances?nodeId=COOR_CH17SURE

9 https://www.halifax.ca/transportation/streets-sidewalks/municipal-design-guidelines-red-book

2 ESCAPABILITY INDEX

2.1 PURPOSE

The purpose of the Escapability Index is to evaluate the ability of a subdivision to be evacuated relative to other subdivisions. Several elements were selected for inclusion in the calculation and are described in Section 2.2 along with the number of "points" assigned. There is no separate weighting of the elements, the weighting is built into the number of points assigned. A higher score indicates better escapability.

2.2 ELEMENTS OF THE CALCULATION

NUMBER OF ACCESS POINTS

What it is	Access roads are those that connect the subdivisions internal street network to the regional roadway network.	
Why its important	Having multiple access points provides flexibility in choosing an escape route should one or more of the access roadways become impassible.	
How its assessed	The number of roadway access points can be determined from mapping or field observation. An access point can be either a public roadway or an emergency-only roadway although no more than one emergency-only roadway can be used in the evaluation.	
How its scored		10 points for two or more access points 5 points for two access points 0 points for one access point

ACCESS ROAD TYPE

What it is	Access roads are those that connect the subdivision's internal street network to the regional roadway network.	
Why its important	The type of roadway can dictate how quickly and/or reliably a subdivision can be evacuated. A roadway with a hard asphalt surface is likely to be less prone to the effects of overland water flow (i.e. washouts) than gravel roads. Unmaintained roads, used only for emergency evacuation, are not designed for high exit speeds or high traffic volumes and may have elevated likelihood of being affected by overland water flow. Some roadway types may be less susceptible to a point blockage. On a four-lane roadway or a roadway with lanes separated by a median, additional space may allow for localized by-passing of a point incident.	
How its assessed	The roadway type can be determined by mapping or field observation. Points are allocated cumulatively for up to three access points.	
How its scored		10 points for four-lane roadway 7 points for two-lane paved roadway 4 points for two-lane unpaved roadway 0 points for emergency-only access

ACCESS ROAD INTERSECTION LEVEL OF SERVICE

What it is	At some point, a subdivision access road will intersect with the regional roadway network. This intersection point could be signal-controlled or stop-sign-controlled. The Highway Capacity Manual allows for the rating of a signal- or stop-controlled intersection to show how well it operates (essentially minimizing vehicle delay) given its typical peak traffic volumes. This rating is called Level of Service and is expressed as a grade between "A" (mostly free-flow traffic with minimal delay) to "F" (heavily congested with lengthy delay).	
Why its important	A poor level of service can result in longer evacuation times particularly since exiting traffic volumes will be substantially higher than during normal daily peak periods. When an evacuation is planned and managed, it may be possible to implement police-control at intersections to provide more exiting priority from the subdivision, but even this will be hampered by an intersection that already has a poor level of service. A planned evacuation may also allow for traffic on the regional roadway to be blocked, thereby eliminating traffic conflicts at the intersections, but for worst-case and early-minutes considerations this is not considered in the evaluation. For emergency-only access points, level of service is less of an issue, but concern arises regarding the safe merging of exiting traffic into existing flow when the access connects to a high-speed 100-series highway. Although an intersection can have an overall weighted level of service, this calculation uses only the level of service calculated for the approach exiting the subdivision.	
How its assessed	Recent PM peak hour turning movement counts are required. The volumes can then be input into any analysis software that uses the HCM methodology, normally SYNCHRO. If traffic count data is unavailable, someone well-experienced in intersection level of service analysis can estimate the level of service. Points are allocated cumulatively for up to three access points.	
How its scored	For a public road:	6 points for level of service A-C 4 points for level of service D 2 points for level of service E 0 points for level of service F
	For an emergency-only road:	3 points when connecting to a public roadway that is not a 100-series highway 0 points when connecting to a 100-series highway

SEPARATION BETWEEN EXIT ROADWAYS

What it is	Subdivisions that have multiple exit roads will have multiple points where these roadways intersect with the regional roadway network. In some cases, these intersections may be on different roads within the regional network.	
Why its important	When high volumes of traffic are being evacuated on an exit road, it will have an impact on the operation of the regional road it intersects due to the abnormal traffic volumes being added to it. If two exit roadways intersect in close proximity to one another on the same regional road, the effects of that may overlap and compound. The best performance is achieved when exit roadways intersect with two different roadways within the regional network.	
How its assessed	Intersection separation distance can be easily measured on mapping products like Explore HRM and GoogleEarth.	
How its scored	For secondary access road:	12 points for intersection on different road than primary 6 points for intersection on same road as primary with intersection separation > 400m 0 points for intersection on same road as primary with intersection separation < 400m 0 polnts for no secondary access road
	For tertiary access road:	6 points for intersection on different road than primary and secondary 4 points for intersection on same road as primary or secondary (but not both) 0 points for intersection on same road and primary and secondary 0 points for no tertiary access road

IMPACT OF CLOSURE EVENT

What it is	A closure event is an incident that prevents traffic from using an exit roadway. It can take the form of a point closure (where one point on a particular roadway is closed) to an area closure (where an area of land, possibility involving multiple roadways, occurs). A closure event is unplanned and may be the result of a vehicle collision, a road failure, a watermain break, a flood, or a wildfire.
Why its important	Road closures can prevent vehicles from exiting the subdivision.
How its assessed	Point closures are assessed by scanning the roadway network for locations where closure of a single point on the roadway network will isolate some, or all, of the subdivision from the regional roadway network. Even subdivisions with two separate exit roadways may have a point within the network that a closure would result in some. If such a point is found, determine how many housing

	units are isolated by closure of that point as a percentage of the total units within the entire subdivision. If there are multiple such points, assess the point that isolated the most units. Area closures are assessed for areas of a both a 100m radius and a 200m radius. Superimpose a circular area of both sizes on the roadway network and determine if they can be placed in a location that isolates some, or all, of the subdivision from the regional roadway network. If such a point is found, determine how many housing units are isolated by closure of that point as a percentage of the total units within the entire subdivision. If there are multiple such points, assess the point that isolated the most units. Point closures can be expected to have the highest expectancy, followed by 100m radius area closures, then 200m radius area closures. This affects the relative number of priority points assigned to each.	
How its scored	For point closures:	12 points if < 5% of units become isolated with closure 8 points if 5% - 30% of units become isolated with closure 4 points if 30% - 60% of units become isolated with closure 0 points if > 60% of units become isolated with closure
	For 100m radius area closures:	10 points if < 5% of units become isolated with closure 7 points if 5% - 30% of units become isolated with closure 4 points if 30% - 60% of units become isolated with closure 0 points if > 60% of units become isolated with closure
	For 200m radius area closures:	7 points if < 5% of units become isolated with closure 5 points if 5% - 30% of units become isolated with closure 3 points if 30% - 60% of units become isolated with closure 0 points if > 60% of units become isolated with closure

LONGEST BEST ESCAPE ROUTE

What it is	A best escape route is the shortest driving distance that any one residential unit needs to access the regional roadway network. The longest best escape route is the longest of any of these routes (typically for a residential unit farthest from the subdivision exit).	
Why its important	A long drive to get through the subdivision to reach the regional roadway network will affect evacuation time. In general, a longer, indirect network of roadways can be more problematic that straighter, direct connections.	
How its assessed	Mapping tools like Explore HRM and GoogleEarth can be used to determine escape routes. For the purpose of this calculation, any of the access roads (even if emergency-only) can be used to determine the best escape route.	
How its scored	Length of escape route:	6 points if 0km – 1km long 5 points if 1km – 2km long 4 points if 2km – 3km long 3 points if 3km – 4km long 2 points if 4km – 5km long 1 point if 5km – 6km long 0 points if greater than 6km long

2.3 ESCAPABILITY INDEX WORKSHEET

To aid in the assessment and documentation of the escapability index, an excel worksheet was developed as part of this study. The worksheet allows for input values to be entered for each element of the calculation and the corresponding value filled in automatically along with a running total. It is provided as an Annex to this document.

Attachment C: Summary of Subdivision Egress Assessment Index Methodology Results **January 17, 2025**
Westwood Hills Egress Supplementary Report

		Existing Conditions	Emergency-Only Egress (Gravel)			
			Option 1	Option 2	Option 3	Option 4
Number of Accesses		Two access points	Two or more access points	Two or more access points	Two or more access points	Two or more access points
Primary Access Road	Type	Two-lane paved	Two-lane paved	Two-lane paved	Two-lane paved	Two-lane paved
	Exit LOS	A-C	A-C	A-C	A-C	A-C
Secondary Access Road	Type	Two-lane paved	Two-lane paved	Two-lane paved	Two-lane paved	Two-lane paved
	Exit LOS	E	E	E	E	E
	Separation	Same road as Primary <400m separation	Same road as Primary <400m separation	Same road as Primary <400m separation	Same road as Primary <400m separation	Same road as Primary <400m separation
Tertiary Access Road	Type	None	Emergency-only	Emergency-only	Emergency-only	Emergency-only
	Separation	No Tertiary Access	Different road than Primary and Secondary	Different road than Primary and Secondary	Different road than Primary and Secondary	Different road than Primary and Secondary
Emergency Access		No Emergency-only access	Connects to 100-series highway	Connects to 100-series highway	Connects to 100-series highway	Connects to 100-series highway
Impact of Closure Event	Point Closure	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure
	100m Radius Area	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure	<5% of units become isolated with closure
	200m Radius Area	30-60% of units become isolated with closure	30-60% of units become isolated with closure	30-60% of units become isolated with closure	30-60% of units become isolated with closure	30-60% of units become isolated with closure
Longest Best Escape		5 km - 6 km	5 km - 6 km	4 km - 5 km	4 km - 5 km	4 km - 5 km
Total Escapability Points		**36**	**60**	**66**	**66**	**66**