

April 16<sup>th</sup>, 2011  
Malahat Incident

## Traffic Management & Communication Review

Completed May 13, 2011  
Dave Duncan, Assistant Deputy Minister



Ministry of  
Transportation  
and Infrastructure

## FORWARD

*Moving people, goods and services safely is at the core of the mandate of the Ministry of Transportation and Infrastructure. When crashes occur that impact this movement, the ministry and its contractors mobilize to support emergency responders, secure the site and keep others safe, as well as manage traffic in an effort to minimize interruptions and communicate with the public so they can make informed travel decisions.*

*This review of the Ministry of Transportation and Infrastructure's traffic management and public communication in relation to the April 16<sup>th</sup>, 2011 crash on Highway 1 in Goldstream Park has been undertaken with the intent of identifying opportunities for improvement going forward.*

*My mandate for this review was to look at what happened during the response to the crash of April 16<sup>th</sup> and determine how we can improve early identification of detours and alternate routes available to travellers and ensure public communication both to those in traffic queues and those still planning their travel.*

*Staff had the opportunity to be on site after the crash and to observe, first hand, the hard work of the emergency responders and others in trying to ensure safety, protect the environment and restore traffic. I want to thank everyone involved for all that they did over those 22 hours.*

*I would also like to thank all of the ministry staff, agencies, contractors, stakeholders and individual citizens that we have had the opportunity to connect and work with during this review. Their review of the actions during the response and suggestions for improvement has been extremely helpful in developing the report's recommendations.*

*The recommendations from this report are intended to support the work of emergency responders by ensuring actions are taken to improve traffic management and public communication, so those on site can focus on the efforts of emergency response.*

*Dave Duncan  
Assistant Deputy Minister, Highways Department  
Ministry of Transportation and Infrastructure*

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## EXECUTIVE SUMMARY

On April 16, 2011 a crash of a fuel tanker closed Highway 1 in Goldstream Park for a period of 22 hours. The crash, and resulting fuel spill, posed serious safety and environmental risks. Emergency responders worked hard to assess the hazards, investigate the crash and remove the truck while ensuring the safety of those on and near the site and attempting to limit the impacts ecologically sensitive surroundings.

This report is not focused on the emergency response but on the actions taken to manage the resulting traffic impacts and to communicate with the travelling public so they could make informed travel related decisions. We have undertaken this review in an effort to learn from this experience.

The Ministry of Transportation and Infrastructure would like to thank the many men and women that responded to this crash for their dedication, professionalism and tireless work effort throughout the event. It was the hard work and combined efforts of all those on-site that allowed this unfortunate event to be dealt with while keeping the public and the workers safe. It is understood that it was a very unique and challenging situation.

As part of the review, the team spoke with emergency response agencies, community representatives, key stakeholders and individuals to ascertain the events during and the impacts of the closure. The ministry would like to thank all of those who have taken the time to speak with us during this review. This feedback has allowed us to better understand the response activities pertaining to the crash and the effect it has had on individuals, their families and businesses in the area.

It is important to note that this review has confirmed that the ministry has the capacity, infrastructure and resources in place to respond effectively to these types of incidents on the highway system and to effectively manage traffic and communications. With more than 800 ministry operational staff supported by over 2,000 maintenance contractor staff and more than 2,000 traffic control persons throughout the Province, traffic management and communication during incidents such as this is undertaken regularly and effectively across BC.

However, the review also found that although significant effort was put into traffic management and communication throughout the closure, the ministry and maintenance contractor personnel did not adequately ensure site coordination for traffic management and public communications throughout the closure. This was due, in part, from underestimating the length of the closure and the severity of the impact on the transportation network as well as delays in decision making and resourcing regarding traffic management.

The review has resulted in eight key recommendations for future improvement. They are:

1. Provide additional training for ministry staff and maintenance contractor personnel and review existing procedures to ensure that a Traffic Management Command Centre approach is implemented based on the BC Emergency Management Systems (BCERMS) for all closures along the Malahat corridor.
2. Enhance communications procedures to augment information reported on [www.drivebc.ca](http://www.drivebc.ca) with additional, more detailed information updates. This includes using other means of communicating information regarding route alternatives and delay estimates.
3. Improve integration of both ministry staff and maintenance contract personnel in the on-site Incident Command Centre and in the larger Emergency Operations Centre to ensure traffic management impacts and considerations are part of the incident discussion and that site closure estimates and recovery options are current and accurate.
4. Ensure all ministry staff and maintenance contractor personnel attending highway closures and incident scenes are easily identifiable and fully equipped to respond to the event, including integrated communications equipment.
5. Dispatch a minimum of six traffic control personnel (TCPs) immediately for all closures of the Malahat Highway.
6. Ensure at least one TCP walks the traffic queue in each direction ensuring all travellers are aware of the events, options, estimated time of opening and ensuring the safety of those in the traffic queue.
7. Ensure, where traffic queues cannot be cleared within 60 minutes, additional TCPs walk the queue to ensure travellers are kept informed and that any health issues or safety issues that may arise are tended to, as well as to provide water and other provisions and services as needed.
8. Lead full debriefs for any closures of Highway 1 that last longer than six hours to ensure potential opportunities for improvement can be captured and incorporated in any future response efforts.

The ministry is committed to making continued improvements and many of the recommendations contained in this report are either already underway or will be actioned in the near future. These lessons learned will also provide a basis for improving our response not only to crashes of this sort on Highway 1 on the Malahat corridor, but throughout the province.

## INTRODUCTION

On Saturday, April 16, 2011 at approximately 18:00 a fuel truck crashed in the vicinity of Goldstream Park while heading south bound on Highway 1 along a segment known as the “Malahat Highway”. The tanker overturned, rupturing the tank and ultimately releasing an estimated 40,000 litres of fuel onto the highway and the surrounding ecologically sensitive area.

The crash resulted in serious concerns from emergency responders about the potential for both ignition near or within the crash zone and for health hazards from the concentrated fumes.

It also resulted in serious concerns about environmental impacts to the sensitive Goldstream River and surrounding park area. As such, emergency responders cordoned off the crash site until such time as the hazards presented by the fuel spill could be mitigated and the fuel truck removed from the roadway. The highway closure lasted twenty-two hours with the highway being reopened to single alternating traffic at approximately 15:45 on April 17, 2011.

In the days that followed the crash, the ministry received feedback that many of the travellers and businesses impacted were dissatisfied with the management of traffic at or near the site, the communication with the public about the closure and the detour routing information provided throughout the closure.

The Ministry of Transportation and Infrastructure’s key priority when responding to crashes and other incidents on the highway is to ensure the safety of workers and the travelling public. The ministry and its contractors mobilize to support emergency responders, secure the site and keep others safe, as well as manage traffic in an effort to minimize interruptions and communicate with the public so they can make informed travel decisions.

## PURPOSE

This report has been commissioned on behalf of the Minister of Transportation and Infrastructure to critically assess how this closure was handled and to determine what can be improved pertaining to traffic management and public communication during future emergencies on Highway 1. On April 19<sup>th</sup>, 2011 the Minister of Transportation and Infrastructure issued the following statement:

*“As Minister responsible for our provincial highways, I have called for a review of the closure of Highway 1 on Vancouver Island this past weekend.*

*This review will build on the internal audit that Ministry of Transportation and Infrastructure has already begun, and will focus on the speed at which alternate routes were established, and on the communication to the travelling public.”*

A review team was assembled that consisted of:

*Dave Duncan  
ADM, Highways Department*

*Shanna Mason  
Executive Director, Highway Operations*

*Sandra Toth Nacey  
Director, Business Management Services*

*Reg Fredrickson  
Director, Highway Maintenance Contracts*

In undertaking this review, interviews took place with emergency responders, key stakeholders and agencies, as well as some members of the public who were affected by this closure.

This report provides a chronology of events pertaining to the management of traffic in and around the crash zone, including public communication efforts and identifies key findings and recommendations aimed at improving our response during future incidents.

The scope of this review is not intended to examine the dedicated efforts of the emergency responders attending to the crash site.



## BACKGROUND

### 1.0 Malahat Highway

The Ministry of Transportation and Infrastructure operates Highway 1 that connects the communities along Vancouver Island. This corridor is the island's primary north/south connector and is used by more than 20,000 vehicles per day along the peak commuter segments. Highway 1 is a mix of both two lane and four lane sections with posted speeds ranging between 50 km/hr and 90 km/hr.

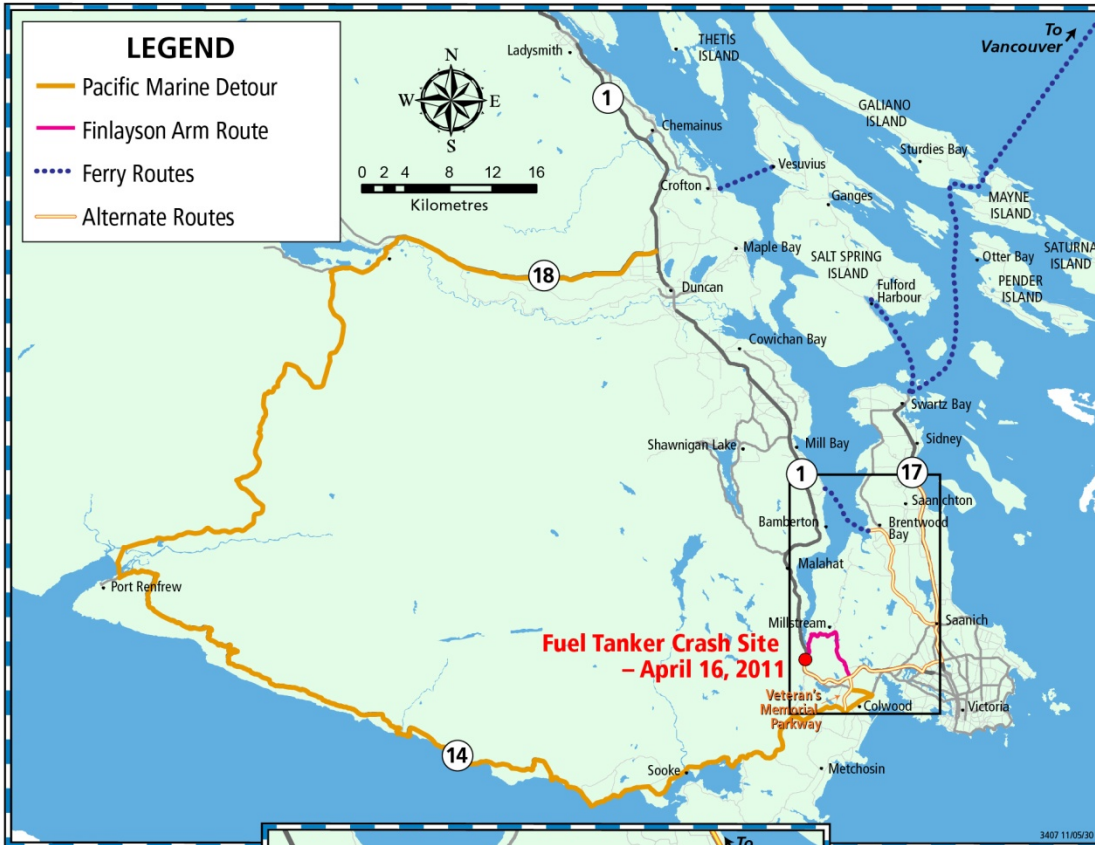
The southern portion of Highway 1 is known as the "Malahat Highway" and traverses a large mountain range. It is a high use commuter corridor connecting Greater Victoria with communities like Duncan, Ladysmith and Nanaimo. At the southern end of the Malahat Highway is Goldstream Provincial Park, an ecologically sensitive and geographically constrained area.

The Malahat Highway through the park is a two lane, winding highway which is known for its steep grades. As a high use corridor, crashes do occasionally occur; however, closure durations for most serious crashes are between four and six hours. It is very unusual to have closures for a longer duration (since 2000, there have been approximately 80 crashes on the Malahat Highway, with only six with a closure duration longer than six hours).

The Malahat Highway is supplemented by a number of other secondary routes connecting the south island to communities north of the Malahat Highway. Those routes include (see Map 1: Alternate Routes):

- Mill Bay/Brentwood Bay Ferry - hours of operation of 7:30 am to 6:30 pm (Sundays 8:40 am)
- Finlayson Arm Road - a narrow, paved low usage road from Goldstream Park to Millstream Road in Langford suitable for light vehicles and approximately 30 minutes in driving time. Steep grades and sharp corners make this route unsuitable for large vehicles.
- Pacific Marine Circle Route – a hard-surfaced scenic route connecting with Highway 14 near Port Renfrew east to Lake Cowichan and adds approximately three hours to the north/south route
- BC Ferries Routing – offers a number of routes between Vancouver Island, Gulf Islands and the Mainland that can be used as alternate routing to connect north and south Vancouver Island. E.g. Swartz Bay to Salt Spring to Crofton

Map 1: Alternate Routes



## 2.0 Motor Vehicle Incident Response

In 2009, the Ministry of Transportation and Infrastructure, in partnership with other primary vehicle crash response agencies, developed a provincial Motor Vehicle Incident Response Strategic Protocol. The purpose of the protocol was to set out a multi-agency framework to ensure a safe, coordinated, efficient and effective response to highway crashes. This protocol includes the Ministries of Transportation and Infrastructure, Environment, Health, Public Safety and Solicitor General; as well as the RCMP, the Municipal Chiefs of Police of British Columbia and the Fire Chiefs Association of British Columbia.

This protocol agreement establishes the primary roles of agencies involved to ensure a clear understanding of each party's responsibility when responding to incidents. Some of these key roles include:

- **RCMP** – secure the crash site and investigate cause
- **Fire Department** – assess the scene, identify hazards, and implement plan to respond
- **BC Ambulance Service** – assess the scene, ensure scene safety, and provide patient care
- **Ministry of Environment** – Manage response to hazardous materials and environmental response
- **Ministry of Transportation and Infrastructure** – Overall traffic management coordination, traffic safety around the site, and traveller information and communication around closure/wait times/alternate routes

In addition to roles and responsibilities, the protocol also promotes the use of the British Columbia Emergency Response Management System (BCERMS) model to establish an incident command structure and ensure a shared and unified approach to responding to roadway incidents and emergencies.

### 3.0 Ministry of Transportation and Infrastructure Response Team

In order to fulfill its responsibilities when responding to highway crashes and closures, the Ministry of Transportation and Infrastructure has a number of resources available to ensure site coordination, traffic management and safety, and public communication services are provided. These include:

**Local ministry staff** – Over 800 operational staff around the province are dedicated to ensuring the safety of and service to the travelling public and are available to respond to emergency situations such as crashes, slides, floods and storm events. Ministry staff are responsible for the overall assessment, management and coordination of the traffic management and communications response in emergency events affecting the highway system. Ministry staff have access to numerous resources to assist in this response, including specially equipped vehicles, a dedicated radio communication systems, traffic control personnel, hired equipment and maintenance contractor personnel and equipment.

**Highway Maintenance Contractors (MCs)** – 28 MCs provide over 2,000 field personnel and over 2,000 traffic control resources to respond immediately to incidents impacting the travelling public. The maintenance contractor is dedicated to patrolling and maintaining BC’s provincial road network including the provision of on-site emergency traffic management response. The MC can also respond with specialized vehicles and equipment, two-way and network compatible radio resources and traffic control devices such as signs and barricades.

**MoTI’s Provincial Highway Communication Centre (PHCC)** - Monitors our web cam, weather and changeable message board systems (such as the overhead signs in place on Highway 1 on either side of the Malahat Highway). The PHCC is the first point of contact for staff, maintenance contractors and emergency personnel for communicating information through [www.drivebc.ca](http://www.drivebc.ca) and monitoring the quality of information posted.

[www.drivebc.ca](http://www.drivebc.ca) - A public website operated and maintained by ministry staff, voice messaging and twitter feed that regularly reports traveller information such as road & weather conditions and highway closure information.

## SUMMARY OF EVENTS

The following summary outlines the chronology of key events and actions taken by site Ministry of Transportation and Infrastructure representatives specific to traffic management at and around the crash site, as well as communication with the travelling public about the duration of the incident and alternate travel options.

This summary of events does not closely examine the key events and actions taken by the emergency responders on-site but refers to those actions where response, investigation or recovery activities impacted Highway opening.

Approx Time	Actions / Considerations /Related Information
18:00	April 16, 2011 public call 911 reporting a fuel tanker crashed approx. 500 metres south of Finlayson Arm Road, near the entrance to Goldstream Park.
18:10	The Langford Fire Department and West Shore RCMP arrive at the scene of the crash.
	Emergency responders immediately secure the crash site, attend to the driver, assess the hazards present and determine a significant hazard exists to the travellers, responders and the surrounding ecologically sensitive area due to the fuel spill.
	Emergency responders contact the highway maintenance contractor, Mainroad South Island Contracting Ltd. "Mainroad", requesting sand in an effort to contain the fuel spill. Initial field estimates were that the highway would be reopened in four to five hours.
	As the crash site was located approximately 500 metres south of the Finlayson Arm Road, those travellers north of the crash site, close to the front of the traffic queue and aware of the route, detoured via this route. Additionally, travellers on the southern end also began using this route.
18:45	Two Mainroad personnel arrive on site with a load of sand and begin placing it for fuel containment. The initial focus of the maintenance contractor is on assisting in the containment of the leaking fuel.
	Shortly after arrival, Mainroad personnel discuss the situation with emergency responders and contact the Provincial Highway Conditions Centre (PHCC), to post the highway closure on <a href="http://www.drivebc.ca">www.drivebc.ca</a> and notify ministry personnel.
19:00	Mainroad marshalls Traffic Control Personnel (TCPs) establish highway closures at either end of the crash site to control traffic approaching the end of the existing traffic queues. Additionally, Commercial Vehicle Safety & Enforcement (CVSE) inspectors were dispatched to assess the fuel truck.
19:00	Closure was posted on <a href="http://www.drivebc.ca">www.drivebc.ca</a> reading " <i>Highway 1 on Vancouver Island</i>

Approx Time	Actions / Considerations /Related Information
	<i>Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 11 pm. Confidence level: LOW. No detour available. Next update: 8 pm.</i> ” and subsequently tweeted through the Ministry’s @DriveBC .
19:30	Two TCPs arrive south bound at the Malahat Summit and one arrives north bound at West Shore Parkway. They establish road closures on Highway 1 at locations where traffic can turn around.
19:40	Mainroad marshals additional TCPs to control traffic at either end of the Finlayson Arm Road and to initiate single lane alternate traffic flow as a detour around the crash site. TCPs were required to ensure the volume of traffic on Finlayson Arm Road did not reach a point of over loading the route due to the narrow lane widths, sharp corners and in some areas steep grades.
19:45	Traffic at the south end (Victoria) of the crash site was turned around or given the option to wait on Highway 1, south of West Shore Parkway, along the shoulder of the highway.
	Traffic at the north end of the crash site up to the Malahat Summit was unable to move due to the divided highway. On-site discussions began about how to clear the traffic on the north end.
19:45	Overhead Changeable Message Signs (CMS) updated on both sides of the Malahat with a message indicating the highway was closed ahead.
19:56	Reports received by RCMP that the Finlayson Arm Road congested with opposing traffic that is having difficulty passing due to the limited width of the road. It was determined that the closure would need to be established on either end of Finlayson Arm Road and the opposing traffic would need to be cleared before it could support single lane alternating traffic.
	RCMP set up closures at either end of Finlayson Arm Road, until TCPs could arrive, to clear congestion and establish the single lane alternating detour.
20:00	First responders express concern regarding the potential for fumes migrating downstream to pose an ignition risk. Fumes at the crash site were concentrated and not dissipating well and negatively impacting the ability of responders to work in the area of the crash without SCUBA. As a result, responders began discussing if using Finlayson Arm Road was a viable detour and continue to monitored how the fumes were dissipating.
	RCMP began sweeping Finalyson Arm Road to clear traffic in preparation of single lane alternating piloted traffic.
20:30	TCPs arrive at Millstream Road and Finlayson Arm Road and assume responsibility for the road closure from the RCMP and prepare for single lane alternating traffic.
21:01	Emergency responders and hazardous materials experts further assess the site and revise the estimated time of opening to 1am. <a href="http://www.drivebc.ca">www.drivebc.ca</a> updated and reflecting a 1am opening with no detour established from the previously reported 11pm opening.

Approx Time	Actions / Considerations /Related Information
	Emergency responders determine that Finlayson Arm Road is now safe to use as an alternate route as fumes have dissipated and do not pose a risk to travellers using this route.
21:25	TCPs establish traffic control at the north end of Finlayson Arm Road at Highway 1, just north of the crash site and assume responsibility for the road closure from the RCMP and prepare for single lane alternating traffic.
	TCPs were delayed arriving to this end of Finlayson Arm Road as it was so close to the crash site that TCPs had difficulty making their way through the traffic queue to the site. In an effort to mobilize TCPs quickly to the north end of Finlayson Arm Road they drove straight to the site in their personal vehicles. However, the lack of markings and roto-lights contributed to difficulty getting through the traffic and to the north end of Finlayson Arm Road.
	Concerns arise regarding the ability of RCMP to communicate via radio directly with the Finlayson Arm Road detour TCPs in case in emergency arises. As such, Mainroad requests police band radios for TCPs and pilot vehicle and has to obtain these off site.
22:00	Ministry personnel began driving the traffic queue on Highway 1 to inform those waiting at the south end of the crash site of the alternate route using Finlayson Arm Road. Personnel drive from car to car to inform them of the detour and direct them to the alternate route. Some chose to wait for the 01:00 opening.
22:25	Police band radios arrive and vehicles begin being piloted through Finlayson Arm Road using single lane alternating traffic. Priority given to south bound traffic that has been unable to move. Very little north bound traffic waiting at the detour at this time.
	Only a dozen or so vehicles remain at the south end on Highway 1 waiting for the road opening as they are sleeping or do not want to take the Finlayson Arm Road detour or operate vehicles too large for the detour; the rest have opted for the detour route or turned around.
22:40	<a href="http://www.drivebc.ca">www.drivebc.ca</a> update to reflect opening of the detour route for light vehicles only using Finlayson Arm Road.
	Vehicles continue to be piloted with priority from north to south. Ministry personnel monitor south side traffic management of the crash and Mainroad staff monitor north side.
	Field progress update now estimates opening at 4am as RCMP have determined that criminal charges may be pending and need to undertake a more fulsome criminal investigation.
23:50	<a href="http://www.drivebc.ca">www.drivebc.ca</a> updated to reflect a 04:00 opening and detour route available for light vehicles only using Finlayson Arm Road from the previously reported 1am.
	South end traffic begins to build on Highway 1 so Ministry personnel again drive to each car and inform them it is now likely to be 04:00 and ensure they are

Approx Time	Actions / Considerations /Related Information
	aware of the detour using Finlayson Arm Road. Again, approximately a dozen cars stay while the rest use the Finlayson Arm Road detour or turn back.
	TCPs establish additional traffic control on Highway 1 south of the Millstream Interchange to inform travellers of the detour and direct them to it now that it is open and effectively moving traffic north/south.
overnight	Finlayson Arm Road continues to operate as a piloted single lane alternating detour throughout the night, meeting the traffic demands, as traffic volumes throughout the night are quite light.
	Emergency crews and hazardous materials experts work throughout the evening, assessing the remaining fuel risks, containing and cleaning up the fuel spilled and determining a course of action for removing the remaining fuel from the tanker and the tanker itself that was overturned and completely blocking both lanes of traffic.
	Difficulties obtaining specialized equipment necessary to drain the tank of the remaining fuel, given the potential for ignition, as well as the on-going criminal investigation slowed on site progress and required revision to the estimated time of opening three times from 04:00 to 09:00 estimated opening. Confidence level for opening time remained low.
	At morning light response crews further assessed the crash site and continued to work to contain the fuel spill, drain the fuel and up-right the tanker. Equipment is mobilized to the site to assist with up-righting the tanker.
06:01	Field progress report revises estimated time of opening to 12:00 based on the time required for the crane to arrive and up-right the tanker. <a href="http://www.drivebc.ca">www.drivebc.ca</a> is updated to reflect a 12:00 opening with detour route for light vehicles only using Finlayson Arm Road.
7:02	As the morning progressed, Mainroad assessed traffic volumes using the Finlayson Arm Road detour and determined traffic volumes were increasing beyond functional capacity of the road. Decision was made to try to inform the public that they should only use this route if travel was essential in order to keep traffic volumes at a manageable level. As a result, <a href="http://www.drivebc.ca">www.drivebc.ca</a> was updated to reflect detour route for “essential vehicles” only using Finlayson Arm Road.
	Mainroad observed traffic volumes becoming too high for on-highway information provision in advance of the Millstream Interchange due to the large volume of traffic that uses the Highway 1 corridor to access Millstream Interchange for shopping and other commercial activities. As such, information TCPs moved to the West Shore Blvd where the existing road closure was still in place. TCP’s also began informing north bound public of the Brentwood Bay Ferry and Pacific Marine Circle route options instead of the Finlayson Arm Road detour as the traffic queues for the Finlayson Arm road detour were building beyond.
09:30	Traffic volumes building beyond capacity of the Finlayson Arm Road detour as the



Approx Time	Actions / Considerations /Related Information
	traffic queues for the Finlayson Arm road detour were building at the south end to the extent that traffic was starting to impact other traffic along Millstream Road. Messaging developed for <a href="http://www.drivebc.ca">www.drivebc.ca</a> to try to reduce the volume of traffic using the detour.
	Throughout the day the responders on-site work to remove the tanker while minimizing further contamination. Recovery efforts were somewhat hampered by equipment failures and the specialized resources necessary to upright the tanker within the confined work area within the crash site. As a result the estimated time of opening is revised four more times between 0:900 and final opening at 15:46.
	Additionally, given the Finlayson Arm Road could not support large commercial trucks as a detour option, efforts were being made to create enough space through the crash site to allow commercial vehicles a short opening in order to clear those trucks that had been waiting overnight. Even though they never materialized, these potential openings for commercial vehicles only were posted on <a href="http://www.drivebc.ca">www.drivebc.ca</a> .
15:36	<a href="http://www.drivebc.ca">www.drivebc.ca</a> is updated to indicate Highway 1 is open.

## KEY FINDINGS

The crash and resulting fuel leak on the Malahat Highway on April 16, 2011 was a major safety and environmental concern. Addressing these issues was, appropriately, the priority focus for emergency responders. Emergency responders assumed control of the crash site to minimize the risk of ignition and injury and restricted access to the area.

In addition, as outlined in the Summary of Events, significant effort was made by ministry resources in an effort to safely manage traffic and provide updated information to the public on the status of Highway 1. However, clearly more could and should have been done to attend to those who were caught at the crash site and to provide travellers and businesses with the accurate timely information they needed to make informed travel choices.

The traffic management and public communications undertaken as a result of the crash on April 16<sup>th</sup> have been closely reviewed, including meeting with key agencies involved and hearing from individuals who were impacted.

A review of the actions taken during this closure, in addition to a review of how the ministry and its maintenance contractors typically respond to closures, determined that the ministry has the capacity, infrastructure and resources in place to respond effectively to these types of incidents on the highway system and to effectively manage traffic and communications. With more than 800 ministry operational staff supported by over 2,000 maintenance contractor staff and more than 2,000 traffic control persons throughout the Province, traffic management and communication during incidents such as this is undertaken regularly and effectively across BC.

While undertaking this review, it became clear that a number of factors specifically contributed to the delays and inconvenience travellers experienced over the duration of the Highway 1 closure. As a result, the following is a summary of key findings that impacted traffic management and public communications efforts throughout the closure.

1. The ministry response team did not adequately assume overall site coordination responsibility for traffic management and communications throughout the closure as outlined in the Motor Vehicle Incident Response Strategic Protocol. As a result:
  - a. Ministry staff and maintenance contractor personnel did not fully integrate with the incident command structure established by the emergency responders.
  - b. The projected length of the closure was not accurately estimated throughout the closure period.
  - c. Potential detour options were not sufficiently assessed or communicated.
  - d. Traffic control efforts on site were, at times, under resourced and not effectively coordinated.
  - e. Ministry staff and maintenance contractor personnel did not recognize the impact that the changing information on the duration of the closure had on the

ability of travellers to make informed decisions about their travel options such as turning around, waiting it out, or choosing an alternate route.

2. Ministry staff and maintenance contractor personnel were not clearly and easily identifiable on site, which at times led to difficulties communicating with other emergency responders and delays when travelling about the site.
3. Site traffic management personnel were not properly equipped with radios and other equipment, and communications devices such as radios were not fully integrated and inter-operable between traffic control personnel at either end of the incident site. As a result, it took longer than reasonable to establish the Finlayson Arm Road detour route on the evening of April 16, 2011.
4. Detour routes were not well signed throughout the closure and the presence of traffic control persons along the traffic queues was insufficient to ensure effective communication and that the needs of stranded travellers were being addressed.
5. Detour options were not well communicated to the public either on site or through the media to broader travellers. DriveBC was relied on as the sole tool to communicate with the public, and DriveBC was inadequate to effectively communicate the facts regarding the closure and various alternate routing.

## RECOMMENDATIONS

Based on assessment of the events that unfolded on April 16<sup>th</sup> and 17<sup>th</sup> surrounding the traffic management and public communications efforts related to the Malahat fuel truck crash, the following is a list of key recommendations identified by the review team. The intent of these recommendations is to learn from the approach taken when responding to this incident, both what worked and what did not, and to ensure we improve on how we manage traffic and keep the public informed in the event of future closures. These lessons learned have also provided a basis for improving our response to crashes both on the Malahat highway and throughout the province.

These eight recommendations include:

1. Provide additional training for ministry staff and maintenance contractor personnel and review existing procedures to ensure that a Traffic Management Command Centre approach is implemented based on the BC Emergency Management Systems (BCERMS) for all closures along the Malahat corridor.
2. Enhance communications procedures to augment information reported on [www.drivebc.ca](http://www.drivebc.ca) with additional, more detailed information updates. This includes using other means of communicating information regarding route alternatives and delay estimates.
3. Improve integration of both ministry staff and maintenance contract personnel in the on-site Incident Command Centre and in the larger Emergency Operations Centre to ensure traffic management impacts and considerations are part of the incident discussion and that site closure estimates and recovery options are current and accurate.
4. Ensure all ministry staff and maintenance contractor personnel attending highway closures and incident scenes are easily identifiable and fully equipped to respond to the event, including integrated communications equipment.
5. Dispatch a minimum of six traffic control personnel (TCPs) immediately for all closures of the Malahat Highway.
6. Ensure at least one TCP walks the traffic queue in each direction ensuring all travellers are aware of the events, options, estimated time of opening and ensuring the safety of those in the traffic queue.

7. Ensure, where traffic queues cannot be cleared within 60 minutes, additional TCPs walk the queue to ensure travellers are kept informed and that any health issues or safety issues that may arise are tended to, as well as to provide water and other provisions and services as needed.
8. Lead full debriefs for any closures of the Trans-Canada Highway 1 that last longer than six hours to ensure potential opportunities for improvement can be captured and incorporated in any future response efforts.

## DriveBC Event Report for April 16th - 17th, 2011

### APPENDIX 1

Start: 2011-04-16 0:01  
 2011-04-17  
 End: 18:00  
 District:  
 Contract Area: South Island CA  
 Event Type: Incident  
 Traffic Pattern:

Road Name	Accepted Time	Advisory Message
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 19:02	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 11 pm. Confidence level: LOW. No detour available. Next update: 8 pm. Updated on Sat Apr 16 at 7:02 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 20:28	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 11 pm. Confidence level: LOW. No detour available. Next update: 9pm. Updated on Sat Apr 16 at 8:28 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 21:01	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 1 am Sunday April 17. Confidence level: LOW. No detour available. Next update: 9:30pm. Updated on Sat Apr 16 at 9:01 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 21:27	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 1 am Sunday April 17. Confidence level: LOW. No detour available. Next update: 10pm. Updated on Sat Apr 16 at 9:27 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 22:00	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 1 am Sunday April 17. Confidence level: LOW. No detour available. Next update: 10:30 pm. Updated on Sat Apr 16 at 10:00 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 22:40	Closed in both directions at Goldstream Provincial Park because of

Road Name	Accepted Time	Advisory Message
		Collision. Estimated opening: 1 am Sunday April 17. Confidence level: LOW. Next update: 11 pm. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles only. Updated on Sat Apr 16 at 10:40 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 23:48	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 1 am Sunday April 17. Confidence level: LOW. Next update: 1 am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles only. Updated on Sat Apr 16 at 11:48 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 16, 2011 23:50	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 4 am Sunday April 17. Confidence level: LOW. Next update: 1 am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sat Apr 16 at 11:50 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 00:58	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 6 am Sunday April 17. Confidence level: LOW. Next update: 3 am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sun Apr 17 at 12:58 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 02:41	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 6 am Sunday April 17. Confidence level: LOW. Next update: 3 am. Northbound Detour: Millstream to Finlayson Arm

Road Name	Accepted Time	Advisory Message
		Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sun Apr 17 at 2:41 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 02:57	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 8 am Sunday April 17. Confidence level: LOW. Next update: 5 am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sun Apr 17 at 2:57 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 04:30	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 9 am Sunday April 17. Confidence level: LOW. Next update: 7 am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sun Apr 17 at 4:30 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 06:01	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: LOW. Next update: 8am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and only available to light vehicles. Updated on Sun Apr 17 at 6:01 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 07:02	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: LOW. Next update: 8am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on



Road Name	Accepted Time	Advisory Message
		Sun Apr 17 at 7:02 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 07:05	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: LOW. Next update: 8am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 7:05 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 08:01	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: LOW. Next update: 9am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 8:01 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 09:01	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: LOW. Next update: 10am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 9:01 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 09:15	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: MODERATE. Next update: 10am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 9:15 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 09:59	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 12 noon Sunday April 17. Confidence level: MODERATE. Next update: 11am.

Road Name	Accepted Time	Advisory Message
		Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 9:59 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 10:03	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated opening: 1pm Sunday April 17. Confidence level: LOW. Next update: 11am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound Detour: Finlayson Arm Road to Millstream. Both Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 10:03 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 10:57	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time opening to Single Lane Alternating -Commercial Vehicles ONLY: 12:00 pm, confidence level moderate. Estimated time opening to ALL traffic: 4:00 pm, confidence level moderate. Next update: 11:15am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound: Finlayson Arm Road to Millstream. Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 10:57 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 11:07	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time opening to Single Lane Alternating -Commercial Vehicles ONLY: 12:00 pm, confidence level moderate. Estimated time opening to ALL traffic: 4:00 pm, confidence level moderate. Next update: 11:15am. Northbound Detour: Millstream to Finlayson Arm Road. Southbound: Finlayson Arm Road to Millstream. Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 11:07 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 11:12	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time opening to

Road Name	Accepted Time	Advisory Message
		Single Lane Alternating -Commercial Vehicles ONLY: 1:00 pm, confidence level moderate. Estimated time opening to ALL traffic: 4:00 pm, confidence level moderate. Next update: 12:00pm. Northbound Detour: Millstream to Finlayson Arm Road. Southbound: Finlayson Arm Road to Millstream. Detour routes are pilot car controlled and essential vehicles only. Updated on Sun Apr 17 at 11:12 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 11:49	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening to Single Lane Alternating Traffic - Commercial Vehicles ONLY: 1:00 pm, confidence level moderate. Detour via Millstream Rd and Finlayson Arm Road. Detour routes are pilot car controlled and essential vehicles only. Alternate detour: circle route via Hwy 14 through Lake Cowichan to Hwy 18 - 3 hour delay. Next update: 12:00pm. Updated on Sun Apr 17 at 11:49 am. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 12:02	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening to Single Lane Alternating Traffic - Commercial Vehicles ONLY: 3:00 pm, confidence level moderate. Detour via Millstream Rd and Finlayson Arm Road. Detour routes are pilot car controlled and essential vehicles only. Alternate detour: circle route via Hwy 14 through Lake Cowichan to Hwy 18 - 3 hour delay. Next update: 1:00 pm. Updated on Sun Apr 17 at 12:02 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 13:05	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening to Single Lane Alternating Traffic - Commercial Vehicles ONLY: 3:00 pm, confidence level moderate. Detour via Millstream Rd and Finlayson Arm Road. Detour routes are pilot car controlled and essential vehicles only. Alternate detour: circle route via Hwy 14 through Lake Cowichan to Hwy 18 - 3 hour delay. Next update: 2:00 pm.

Road Name	Accepted Time	Advisory Message
		Updated on Sun Apr 17 at 1:05 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 13:57	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening to Single Lane Alternating Traffic is 3:00 pm, confidence level moderate. Until highway is open, detour with pilot car via Millstream Rd and Finlayson Arm Road for passenger vehicles only. Northbound traffic 30 min delay; Southbound traffic 2 hour delay. Next update: 3:00 pm. Updated on Sun Apr 17 at 1:57 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 15:11	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening to Single Lane Alternating Traffic is 5:00 pm, confidence level moderate. Until highway is open, detour with pilot car via Millstream Rd and Finlayson Arm Road for passenger vehicles only. Northbound traffic 30 min delay; Southbound traffic 2 hour delay. Next update: 4:00 pm. Updated on Sun Apr 17 at 3:11 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 15:26	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening All Traffic is 3:45 pm, confidence level moderate. Until highway is open, detour with pilot car via Millstream Rd and Finlayson Arm Road for passenger vehicles only. Northbound traffic 30 min delay; Southbound traffic 2 hour delay. Next update: 3:45 pm. Updated on Sun Apr 17 at 3:26 pm. (ID# 115347)
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 15:29	Closed in both directions at Goldstream Provincial Park because of Collision. Estimated time of opening All Traffic is 3:45 pm, confidence level High. Until highway is open, detour with pilot car via Millstream Rd and Finlayson Arm Road for passenger vehicles only. Northbound traffic 30 min delay; Southbound traffic 2 hour delay. Next update: 3:45 pm. Updated on Sun Apr 17 at 3:29 pm. (ID# 115347)

Road Name	Accepted Time	Advisory Message
Highway 1 on Vancouver Island Both Directions	Apr 17, 2011 15:46	Road reopened at Goldstream Provincial Park. Updated on Sun Apr 17 at 3:46 pm. (ID# 115347)