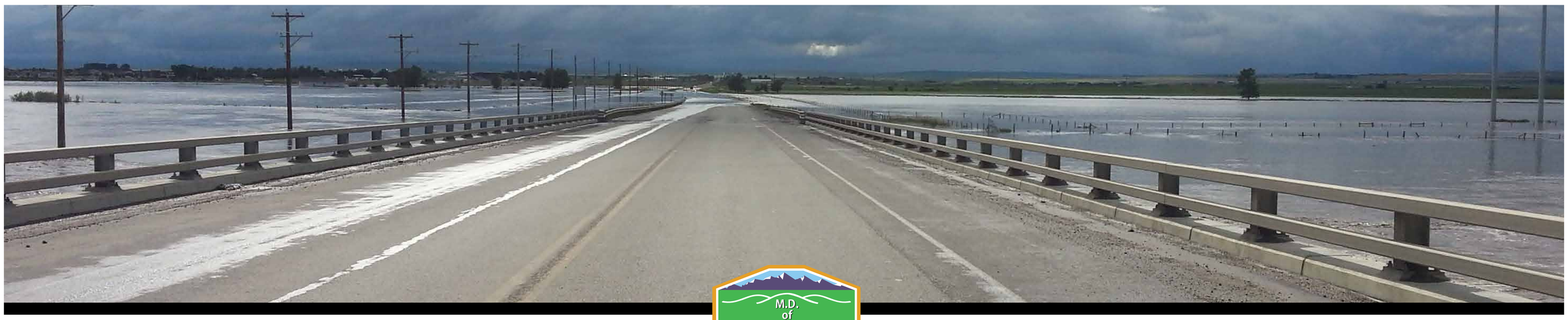
Welcome

This information session presents the findings of the *Phase 1 Scoping Study* that has been undertaken over the past 18 months by AMEC Foster Wheeler Environment & Infrastructure and Advisian WorleyParsons Group.

Tonight we are providing an overview of the results of this study including the changes in the flow split between the Highwood and Little Bow Rivers as a result of mitigation completed in and around the Town of High River. Boards with maps showing the modelled flood hazard along both Rivers are here for you to review also. We are asking for feedback on the study, it's findings and the proposed next steps as we present them here.

It should be noted that this study has been done based on the mitigation that has been already completed with the addition of the "hockey stick" or 12th Avenue - Centre Street dike protecting the southwest portion of the Town. The on-going work that the Town is doing with respect to the proposed south-west dike is a separate project and is not addressed here.

Regretably, due to time and personnel constraints, we are not able to discuss results specific to individual properties at this meeting. This will be addressed through individual meetings with landowners to be held over several weeks following the information session. You are able to book an individual meeting tonight.



Background

Following the major flood of 2013; as mitigation projects within and around the Town of High River proceeded, it became clear that detailed study was required to determine the impact that the mitigation measures would have on MD of Foothills residents on the Highwood and Little Bow Rivers. There was also concern that the flood event may have created potential areas of concern upstream from the Town on the Highwood River.

The MD of Foothills Council has taken the position that MD residences should be protected to the same level as the town of High River residences. This protection would be to 2013 mitigated levels plus a meter of Freeboard.

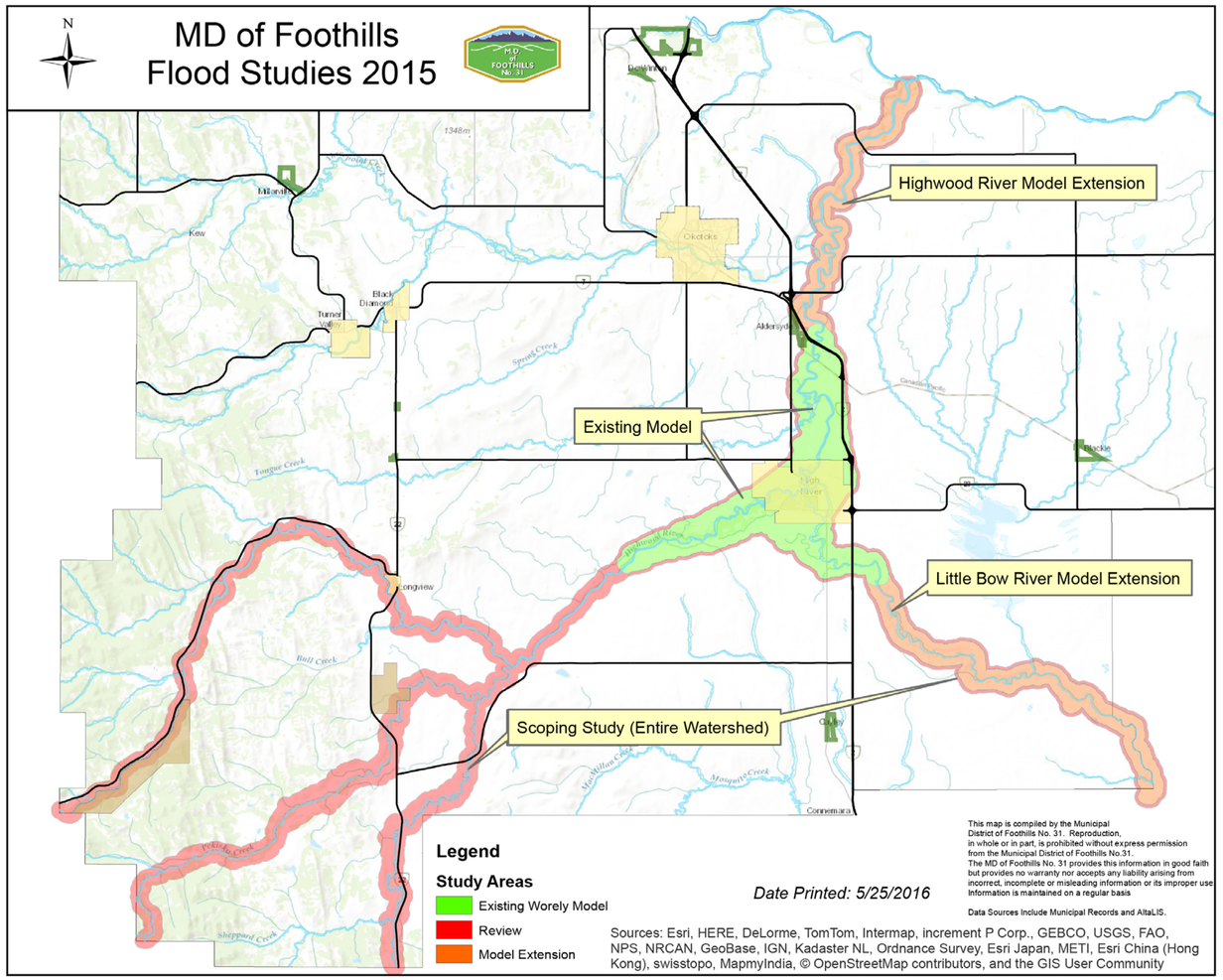
The MD, with support from the Province of Alberta commissioned the *Phase 1 Scoping Study of Flood Related Areas of Concern on The Highwood River and Little Bow River Within The Municipal District Of Foothills*. The purpose of this work was to:

- identify potential areas of concern along the Highwood River upstream from the Town of High River;
- gain full understanding of the impact of a 2013 equivalent flood event on landowners along the Highwood and Little Bow Rivers in the MD of Foothills;
- determine how flood mitigation that is either planned or has already been completed in the High River Area may change those impacts; and
- complete a high level cost benefit analysis comparing the 2013 conditions to the mitigated conditions in an event of the same magnitude as the 2013 event.

Modeling and Scoping Study Areas

To support the Scoping Study, the Advisian WorleyParsons Group was asked to extend the flood model that they had already completed in the High River area to include areas downstream on the Highwood River and downstream on the Little Bow River.

This modeling enables us to compare what would likely occur now, with mitigation in place, to what happened in 2013 if we were to experience a similar flood.



PHASE 1 SCOPING STUDY

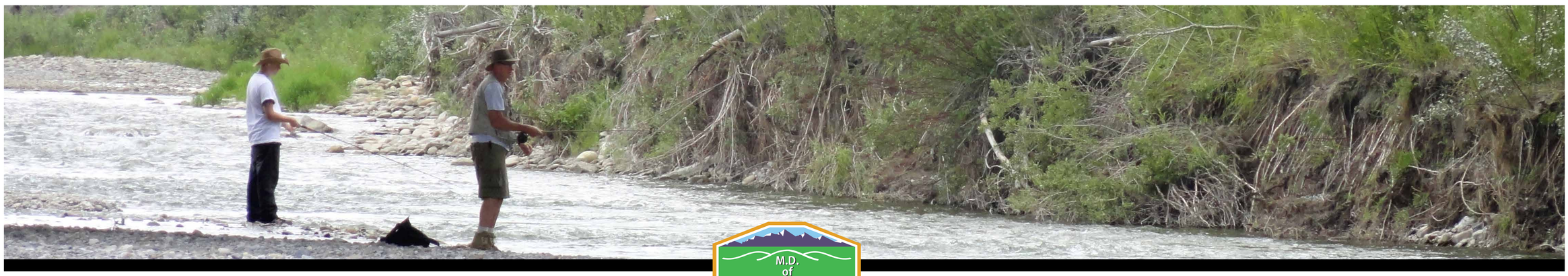
Hazard Identification - Upstream from High River

WOMEN'S COULEE CANAL INLET

- The Woman's Coulee Canal Inlet was damaged during the 2013 flood and subsequently repaired. There may be upgrades to the intake in the future and it is important that any work not adversely affect the main channel and floodplain flow paths and flow distribution, because this would have an impact downstream and could negatively affect the Hoeh Dike and residential properties.
- No mitigation work for the Woman's Coulee Canal inlet area was identified. The channel is subject to ongoing erosion of the south bank. However, the potential for the river moving into the south floodplain area has been deemed relatively low by the scoping team based on preliminary assessment.

HOEH DIKE

- The Hoeh Dike was overtopped in during the 2013 flood, and the area behind the dike was subject to inundation due to water going around the dike at the upstream end allowing a significant quantity of water to be conveyed in the floodplain behind the dike. When this situation occurs, it does help equalize water levels on the river side and floodplain side of the dike, minimizing breaching risk.
- Modelling of Hoeh Dike failure scenarios indicates that dike failure appears to have significant local effects, but only minimal regional effects (e.g., effects are negligible at the Town).
- The structure is currently serving an important purpose, but should not be raised or lowered, because this will have regional effects. For example lowering could result in increased frequency of flooding into Baker Creek.
- One recommendation is to reinforce the back side of the existing structure.



Highwood and Little Bow Flow Split

Historically, during significant flood events on the Highwood River, water has overtopped the banks and flooded the southern flood plain and the Town of High River. Some of this water would flow east and south entering the Little Bow River watershed. Diking within the Town has impacted the amount of water that is able to overflow to the Little Bow changing the flow split.

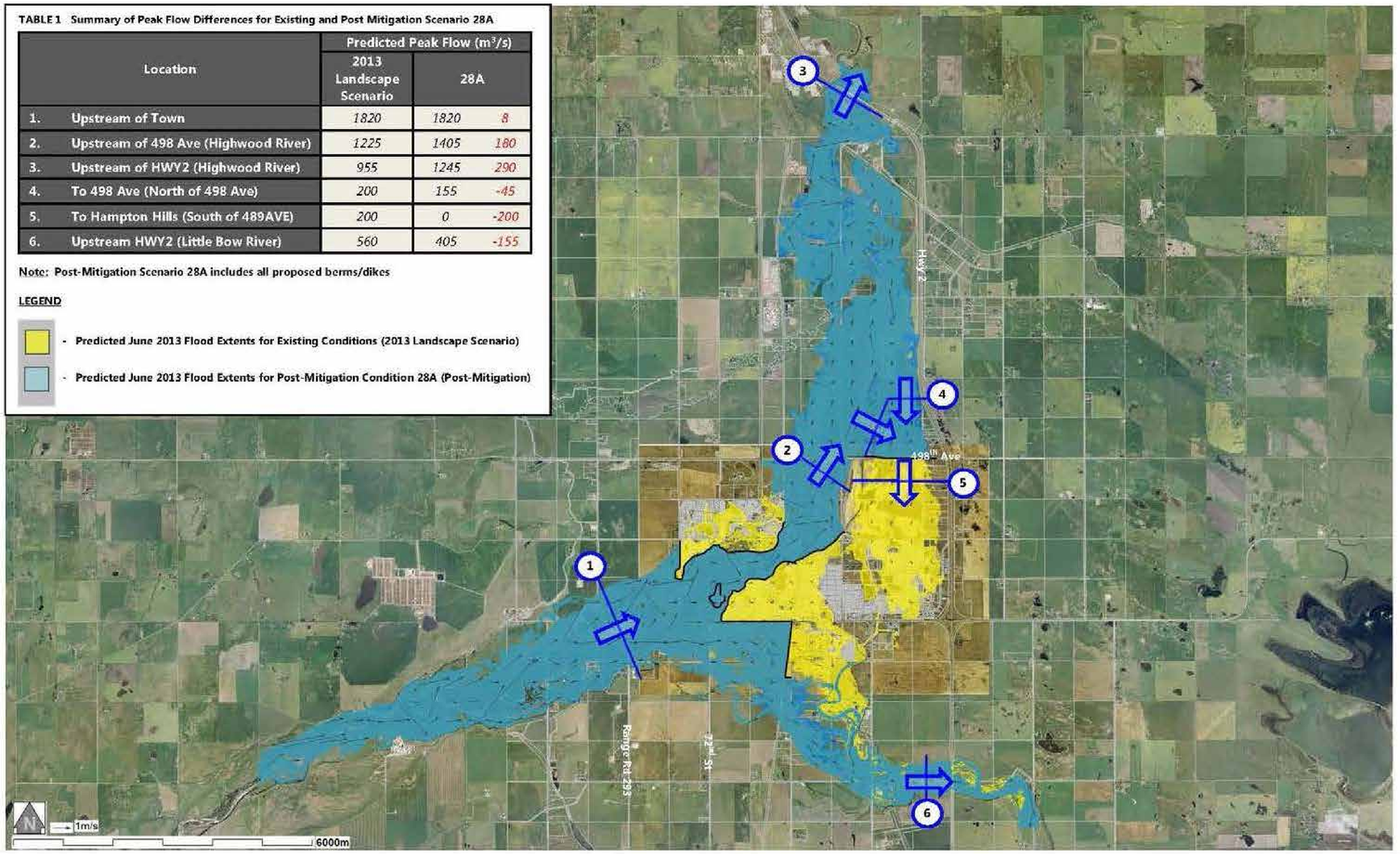
TABLE 1 Summary of Peak Flow Differences for Existing and Post Mitigation Scenario 28A

Location		Predicted Peak Flow (m^3/s)		
		2013 Landscape Scenario	28A	
1.	Upstream of Town	1820	1820	8
2.	Upstream of 498 Ave (Highwood River)	1225	1405	180
3.	Upstream of HWY2 (Highwood River)	955	1245	290
4.	To 498 Ave (North of 498 Ave)	200	155	-45
5.	To Hampton Hills (South of 489AVE)	200	0	-200
6.	Upstream HWY2 (Little Bow River)	560	405	-155

Note: Post-Mitigation Scenario 28A includes all proposed berms/dikes

LEGEND

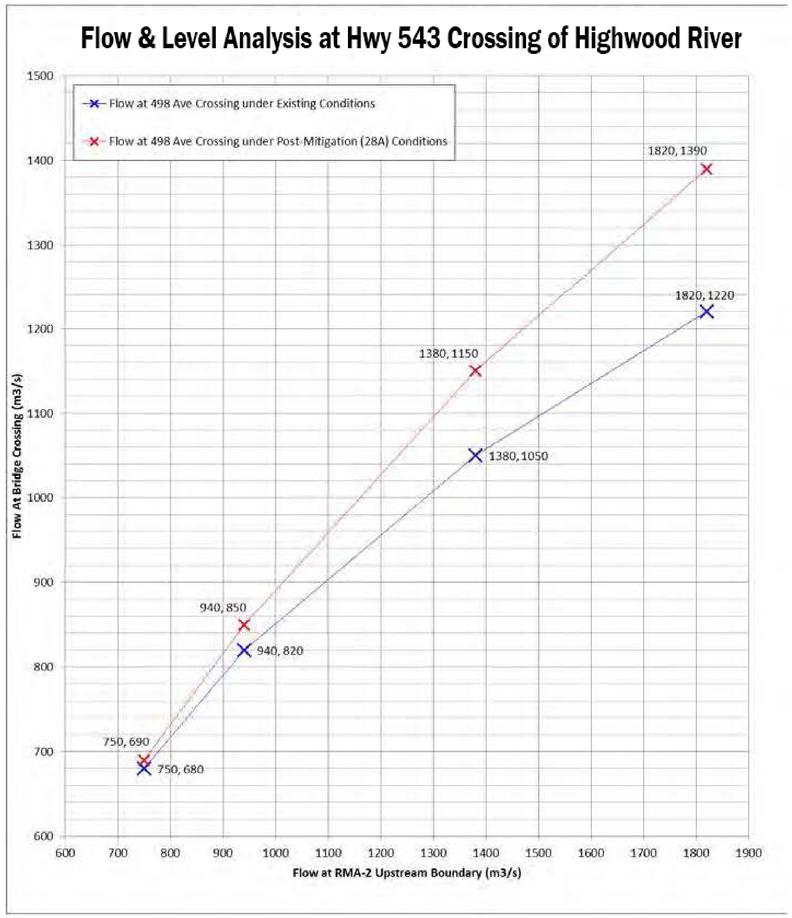
- Predicted June 2013 Flood Extents for Existing Conditions (2013 Landscape Scenario)
- Predicted June 2013 Flood Extents for Post-Mitigation Condition 28A (Post-Mitigation)

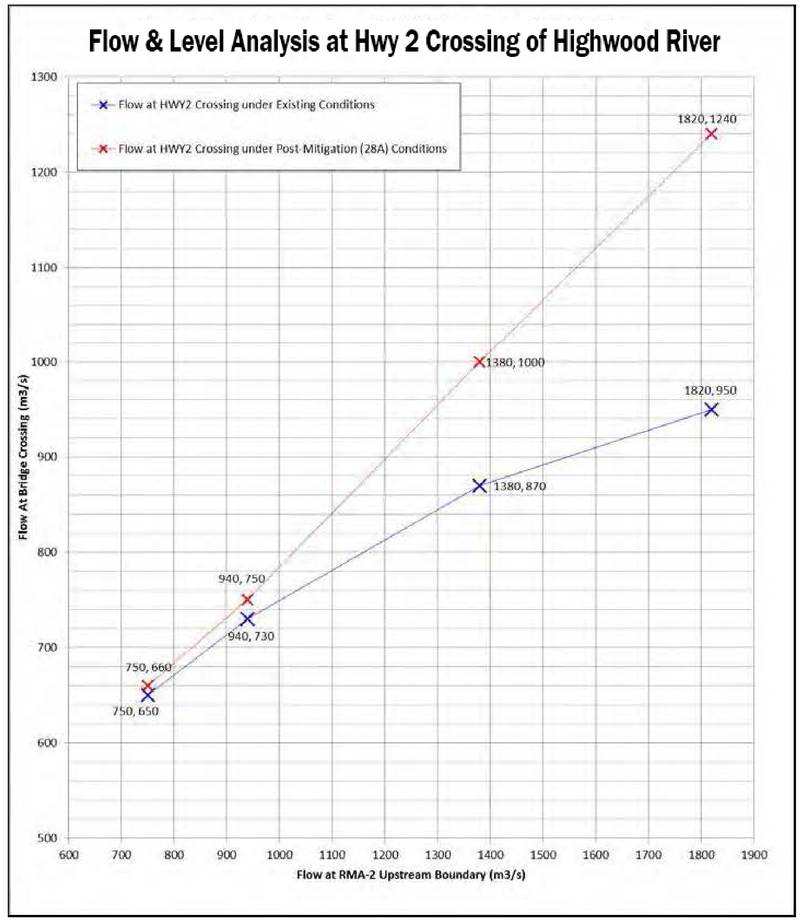


Advisian WorleyParsons Group	Created By: TDG Reviewed By: JB	amec foster wheeler	Municipal District of Foothills No. 31 Highwood River – Little Bow River Estimated Flow Split Scenarios		
			Date: April 15, 2016	File Path: 307074-02030\12.0_Reports\12.2 Final\Scoping Study\Figures	Figure No: 2.1 Rev: 0

Change in Flood Hazard Levels Downstream of 498 Avenue

Raising 498 Avenue E was undertaken to protect the east side of the Town, including the neighbourhoods of Hampton Hills, Sunshine, and Sunrise. This has resulted in the loss of floodplain storage and has altered expected flood peak magnitudes downstream of 498 Avenue. This impact appears to only be significant for flood peaks above approximately 1,000 m3/s.





Municipal District of Foothills No. 31					
Flow Relationship; Highwood River Above Woman's Coulee Inlet vs Highwood River At Crossing Downstream of Town of High River					
Advisian WorleyParsons Group	Created By: TDG Reviewed By: JB	amec foster wheeler	Date: May 18, 2016	File Path: 307074-02030\12.0_Reports\12.2 Final\Scoping Study\Figures	Figure No: 2.4 Rev: 1
This figure is prepared for the use of the contractual customer of WorleyParsons Canada Services Ltd. (WorleyParsons) and Amec Foster Wheeler Environment and Infrastructure (AMEC). WorleyParsons and AMEC have exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this information, but makes no guarantees or warranties as to the accuracy or completeness of this information. WorleyParsons and AMEC assume no liability to any other party for any representations contained within.					

Change in Flood Hazard Levels on Little Bow River

The figure to the right shows the predicted rating curve for flows to the Little Bow River comparing the *1993 AENV High River Flood Report* curve to three other scenarios.

- The dashed red curve shows the results of the 1993 study.
- The blue curve represents the flow for conditions as they were in 2013 as predicted by the RMA-2 Model.
- The green curve represents the predicted flow if a dike with the 38A (S-curve) alignment, which is the subject of the Town's current application with Alberta Environment and Parks, were added to existing mitigation.
- The solid red curve represents the predicted flow down the Little Bow if a dike with the 28A (12th Ave and Centre Street) alignment were added to existing mitigation to protect the south west side of High River. The 28A scenario has been used by the Town and the MD as a base scenario that creates a flow split considered to be the worst acceptable scenario for the Highwood River.
- The predicted flow rating curves for the 28A and 38A scenarios are not materially different over the full range of flows.

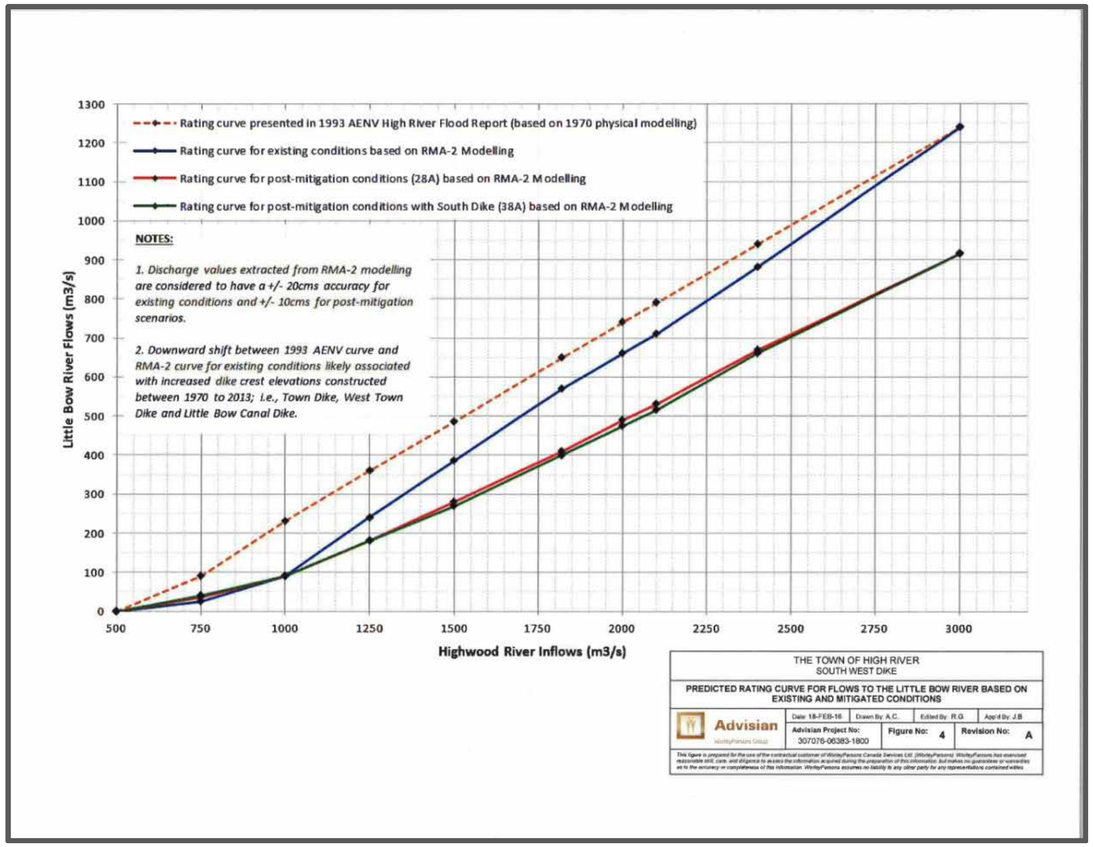


Figure from the Town of High River's supporting documentation for their application for approval of a proposed south west dike with the 38A model alignment

Statements of Support

Going forward, it will be important that efforts between the MD of Foothills, the Town of High River and the Government of Alberta are well coordinated.

Statement from the Government of Alberta:

The Government of Alberta supports the MD of Foothills moving forward with a second phase of the Scoping Study to determine the best solutions for flood impacted properties on the Highwood and Little Bow Rivers based on the results of Phase 1 of the Study. The focus of this work, and the first priority, will be addressing impacts to properties with residences along the Highwood River downstream from the Town of High River.

Statement from the Town of High River:

The Town of High River will continue to work with the MD of Foothills and the Province of Alberta to ensure that residents in the vicinity of the Town are treated fairly for impacts to their property that are a result of existing and proposed flood mitigation works within and around the Town.

Next Steps

Following are the MD of Foothills' suggested actions going forward:

- The MD will collect and compile the feedback we receive at this event and will address deficiencies with respect to the Scoping Study as appropriate;
- The MD will meet with individual land owners as requested, to discuss flood hazard on their property and potential options to address that hazard;
- The MD will undertake Phase 2 of Scoping study to further develop design alternatives and concepts and review feasibility to address flood risks;
- The MD will facilitate negotiations between landowners and the Province regarding preferred outcomes;
- The MD will request support from the Province to undertake Phase 3 of the Scoping Study to complete required detailed design work where required.