

Use of Rights of Way on Low Volume Roads for Agriculture

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ABSTRACT

The Saskatchewan Ministry of Highways and Infrastructure (SMHI), working in partnership with several smaller urban and rural municipalities, recently reconstructed a low volume (< 1000 AADT) 40 kilometer long Provincial Highway corridor in Central Saskatchewan. As part of this partnership, the local communities offered to secure the required right of way to reconstruct the corridor to an upgraded standard. An impediment to procuring the right of way was the desire of a majority of the property owners along the corridor to not reduce the number of productive acres in their agricultural land base.

SMHI prepared a proposal for the communities use in negotiating with the landowners that provided a method whereby the majority of lands required outside of the roadway embankment footprint could remain in agricultural production. This entailed first modifying the cross section geometric elements that were contained in the typical design standards to provide for reasonable and safe traversing of the lands with all types of agricultural equipment. Contingent to providing these elements was the ability to secure consent of individual landowners for the use of, and to modify lands outside the right of way proper during construction. Participating landowners were required to obtain and retain a valid permit authorizing their use of the right of way for agricultural purposes. The permit contained the terms by which they were bound in return for the Province allowing the ongoing use of the right of way for agricultural production. These terms included: 1) items necessary to ensure the safety and ongoing operation of the corridor; 2) terms and conditions for the use of the right of way that would not inhibit SMHI's control of the right of way for maintenance of the roadway surface, embankment, and associated appurtenances; 3) items to ensure the rights of way's continued use as a corridor for the installation, operation and maintenance of utilities; and 4) items to ensure the positive conveyance of water to maintain natural drainage patterns and protect the embankment. The proposal was established on a pilot project basis and is now in its 3rd year of operation.

There are multiple benefits of this approach including the environmental sustainability and continuing economic benefit due to the continued productive use of the lands for agricultural production, reduced expenditures for the procurement cost of the right of way, control of noxious weeds, and annual savings to SMHI in reductions in the effort required for right of way maintenance. Based on the success of this pilot project, a second pilot project on a 44 kilometer corridor reconstruction project is currently underway.

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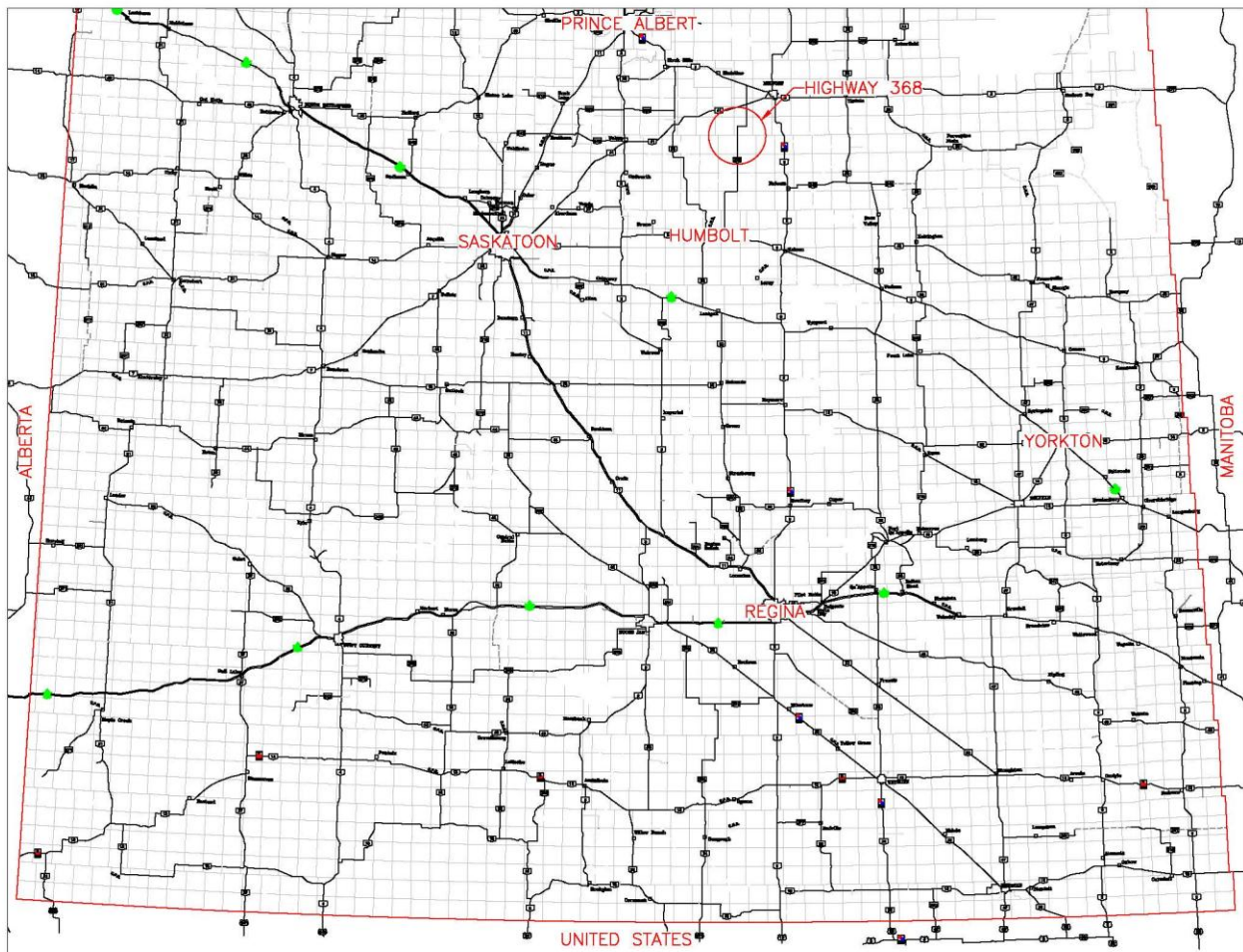
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1.0 INTRODUCTION

1.1 Project Location

Highway 368 is located in East Central Saskatchewan approximately 160 kilometers Northeast of Saskatoon; approximately 270 kilometers north of Regina. It is a corridor 80 kilometers in length connecting Saskatchewan Provincial Highways Number 5 and Number 3, passing through the small urban communities of the Village of Lake Lenore and the Town of St. Brieux, plus the Rural Municipalities of St. Peter #369, Humboldt #370, Lake Lenore #399, and Three Lakes #400. See Figure 1 below. Traffic volumes on this corridor range between a high of 1,040 AADT nearer the northerly end to a low of 400 AADT nearer the southerly end. The Highway is located in what is considered the Parkland area of the Province with a level to gently rolling topography. The natural landscape generally consists of post glaciation landforms of a shallow knob and kettle variety. Currently an estimated 90% of the land base is cultivated for agricultural uses, with the remainder consisting of a few small wetland areas and several minor mostly intermittent streams surrounded by stands of aspen and willow.

Figure 1: Project Location Map

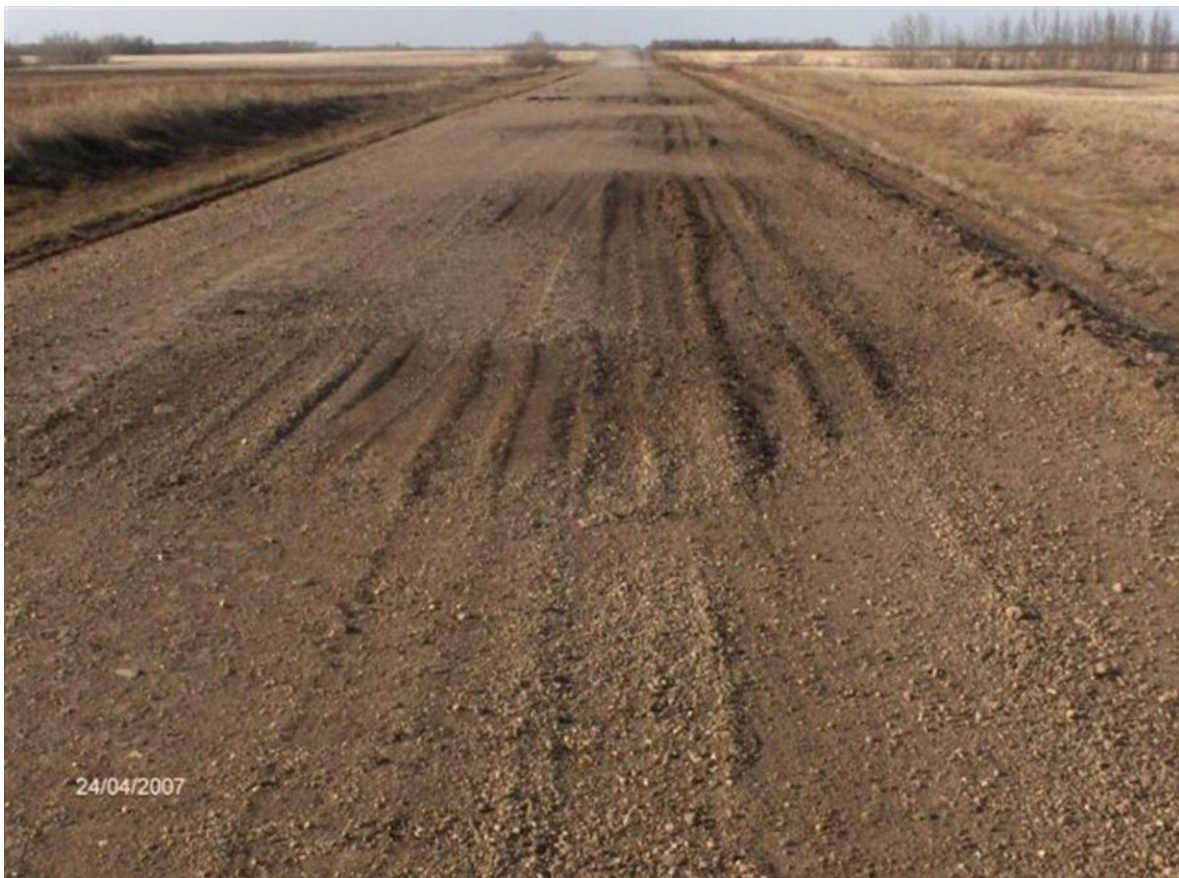


1.2 Project Background

The roadway was originally constructed on a 31 meter wide right of way as a gravel surfaced roadway by the various local rural municipalities through which the corridor was located. Years later, in 1967, SMHI took over jurisdiction and responsibility for maintenance of the roadway and designated it Highway 368. A thin lift of cold mix bituminous asphalt was placed on the roadway between 1971 and 1974 to provide a dust free surface suitable for light traffic. This served the needs of the community for several years providing a reasonable level of service. In 1996 the portion of the corridor from 6 kilometers south of St Brieux to the north was reconstructed to a paved standard. This was primarily to support the traffic demand created by Bourgeault Industries Inc., an agricultural equipment manufacturing company with its' head office located in St. Brieux. Their St. Brieux manufacturing facilities measure 500,000 square feet, and in 2013 Bourgeault Industries Inc. had a staff of 630 employees headquartered in St Brieux. They also have a manufacturing facility in Minot, North Dakota, and sales / service offices in Kiev, Ukraine and Australia.

In 1999 the southern 23 kilometers of the corridor was constructed to a paved standard. The central 40 kilometer of this corridor remained as a dust free roadway but without a paved standard until 2007. Increased heavy haul combined with a higher than normal spring runoff and resulting high water table left this section of the highway in a nearly impassable condition, and as a result the dust free surface was removed and the highway was returned to a gravel surface standard. See Figure 2. It is this 40 kilometer section that is the subject location of this paper.

Figure 2: Dust Free Surface Removed



2.0 COMMUNITY PARTNERSHIP

2.1 Financial Support

The local governments and private industry along the Highway 368 corridor approached SMHI offering financial support in exchange for a commitment and advancement of a construction project to reconstruct the 40 kilometer corridor to a paved standard. The offer of financial support included items from direct financial contributions to services in lieu such as the provision of several hours of labour and earthmoving equipment to the project, supply of aggregate materials for pavement construction, supply and maintenance of municipal roadways for detour routes as required, and providing a widened right of way to 61 meters in width. The Town of St. Brieux and Village of Lake Lenore offered to act as the property acquisition agents to obtain consent and formal agreement from the adjacent landowners. The community offer of support was from the Village of Lake Lenore and the Town of St. Brieux, the Rural Municipalities of St. Peter #369, Humboldt #370, Lake Lenore #399, and Three Lakes #400, Bourgault Industries and the Lake Lenore Agro Co-op. In 2008 SMHI, the local communities and industry signed a formal agreement to proceed with the partnership for reconstructing the corridor. The detailed design and preparation of tender documents for reconstruction of the corridor followed immediately thereafter. The project was tendered and reconstruction of the corridor commenced in 2009 and was completed in 2013.

2.2 Property Acquisition

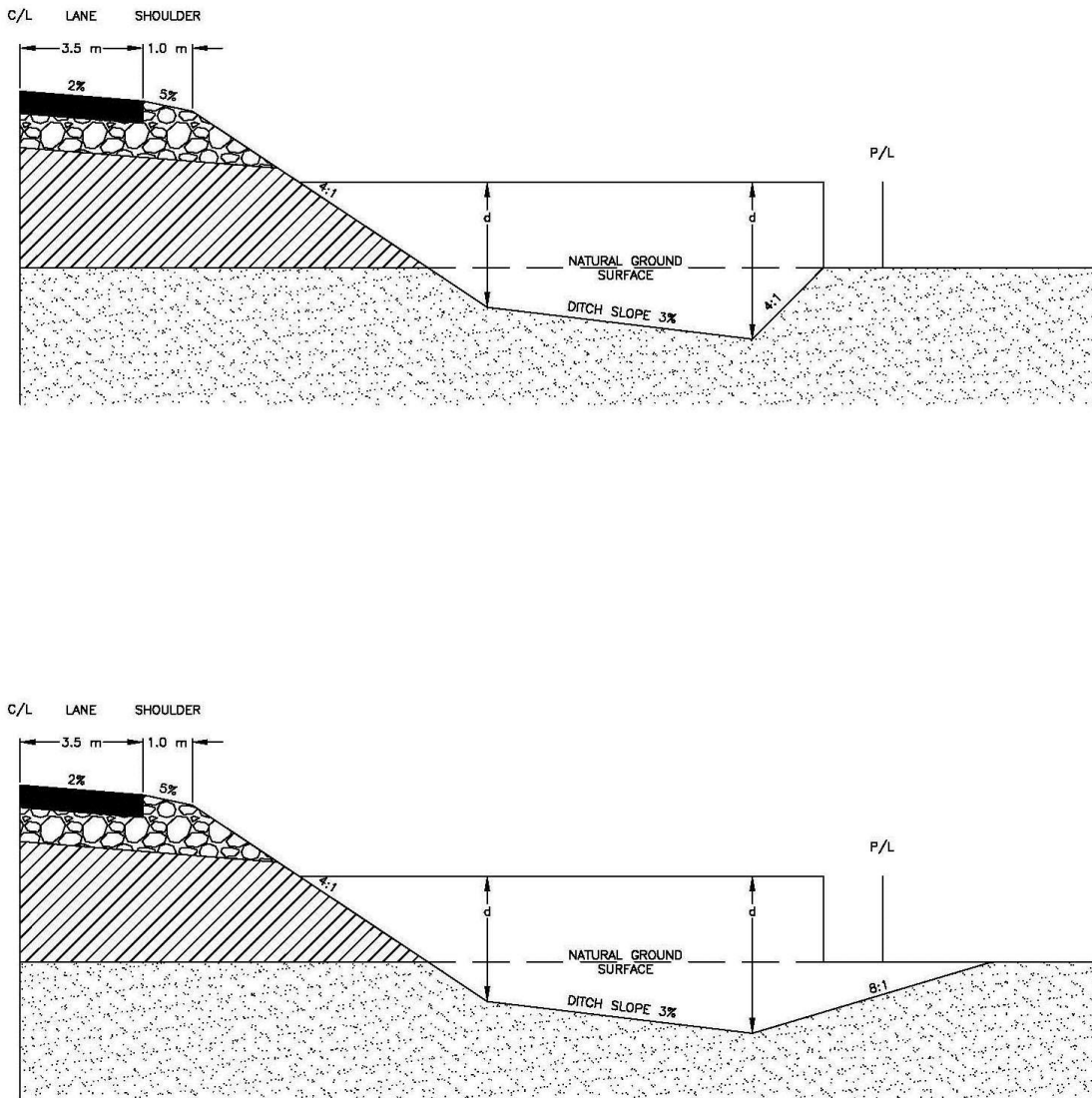
The Communities ran into several issues early in the land acquisition process. For the vast majority of landowners, the acquisition price was not the issue. In fact, with the strong desire for an upgraded highway, many landowners were prepared to provide additional right of way in return for payment of a nominal fee from the Communities. It was the loss of several acres of productive agricultural land that was most concerning to them. The right of way width proposed to meet SMHI's current standard required the acquisition of a 15 meter widening on each side of the existing highway. This translated into the loss of approximately 3 acres of agricultural land on each side of the highway for each 0.8 kilometer ($\frac{1}{2}$ mile) segment of the corridor, or roughly 300 acres over the 40 kilometer corridor to be upgraded. In consultation with the SMHI, the community looked for options to meet the desires of the landowners and advance the negotiations. Narrowing the right of way from the standard was considered as well as an option to allow agricultural use of a portion of the lands within the right of way. The latter was considered most worthy of consideration and led to detailed discussions with the Community representatives, SMHI, and legal representation from the Saskatchewan Ministry of Justice.

3.0 PARAMETERS FOR CONSIDERING USE OF RIGHTS OF WAY

3.1 Modification of Cross Section Elements

The design geometric standard cross section for Highway 368 included a 4 horizontal to 1 vertical (4:1) embankment side slope, a variable ditch width of from 5 to 8 meters with a 3% cross slope away from the toe of the embankment and a 3:1 back slope. In discussion with the community representatives and the agricultural community, a back slope of 8:1 or flatter, with no back slope steeper than 6:1, was suggested to ensure safe traversing the area with most common agricultural equipment. A comparison between the current standard and modified cross section elements is shown in Figure 3. To meet this modified cross section requirement, a construction footprint wider than the 61 meter provided in the standard right of way width would be required for much of the length of the corridor.

Figure 3: Modified Cross Section Elements



SMHI's current standard is to remove the topsoil prior to construction to a maximum depth of 150 millimeters across the widened footprint. Any additional topsoil is then to be placed within the embankment as described in the standard plans. For the Highway 368 construction standard, topsoil was permitted to a maximum depth of 300 millimeters within the embankment at a location at least 600 millimeters below the top of subgrade, and in an area under the haunches of the side slopes. The last stage in this type of reconstruction project is to replace topsoil on the footprint from the outer edge of pavement to the outside edge of the right of way to a maximum compacted depth of 75 millimeters. Since the intent was to construct the project such that portions within the right of way could be used for agricultural purposes, and recognizing the environmental value of topsoil, the project was designed to maximize the salvage and replacement of topsoil on the new widened right of way.

3.2 Access to Private Lands

To construct the modified cross section with the flatter back slopes, construction would need to take place along much of the 40 kilometer corridor outside the standard 61 meter right of way. Historical SMHI practice had been to compensate landowners with an allowance for disruption plus at a rate equal to fair market value for any area of land disturbed by construction outside the acquired right of way needed to either meet the geometric cross section elements or to obtain additional earth materials for embankment construction. Along the Highway 368 corridor, community representatives obtained permission from the participating agricultural landowners to access private lands outside but adjacent the required right of way at no cost to SMHI for purposes of removing and stockpiling topsoil, excavating the required earth materials to construct the flattened back slope, and replacing the salvaged topsoil.

3.3 Safety

The modified cross section elements with flatter back slopes provided for a recovery area outside the travelled surface of the highway much safer in the event of run off the road type accidents. There was some concern expressed, particularly from the legal representatives, of several safety issues associated with allowing private individuals and equipment to work inside the highway right of way. To address these concerns, several conditions were attached to the permission given to agricultural landowners when working inside the right of way. While topsoil was replaced on the entire footprint, agricultural landowners were only provided access to the portion from the edge of right of way to a point 0.5 meters away from the toe of the embankment. This was not only to protect the integrity of the embankment but to keep working agricultural equipment a safe distance away from both the sign posts and the travelled surface. Landowners were allowed to cultivate the topsoil replaced in the right of way with tillage equipment, but not to excavate or remove any earth materials other than any rocks or stones with a diameter of 75 millimeters or greater that might get dislodged and pulled to the surface on cultivation. This was to ensure that either depressions or raised objects that could create a safety hazard weren't created or left present in the right of way after cultivation. Farming activity in the right of way was restricted to daylight periods only. Lights from agricultural equipment so close to the highway embankment could prove confusing to the highway traveler and disorient them as to position on the roadway. Agricultural equipment was not allowed to be parked within the right of way to keep the recovery area as a clear zone and not present a hazard in the event of off the road type accidents.

3.4 Utilities

The rights of way on roadways are desired and commonly utilized for the placement of infrastructure for utilities. In Saskatchewan, electrical transmission, telephone, natural gas and some water utilities are owned by the Crown, and each Crown Agency has its' own legislation providing it the right to place infrastructure within Crown lands used for right of way. The lands are provided at no cost to the utility; however the utility must first obtain permission from SMHI, and comply with any conditions SMHI may require regarding the placement. Other utilities including some private water authorities and cable networks are sometimes also permitted within the right of way but at the discretion of SMHI, and in accordance with any conditions that might be required. Several conditions were attached to the permission given to agricultural landowners for use of the right of way concerning the utilities. The landowners had to agree to provide permitted utility agencies full access to the lands whenever required, and to absolve SMHI and the permitted utility agencies from any damages to crops as a result of any work performed by the utility to their infrastructure in the right of way.

3.5 Maintenance

As in the case of the utility agencies, the landowners had to agree to provide SMHI and its' authorized agents full access to the right of way lands whenever required, and to absolve SMHI from any claim for damages to crops as a result of any construction or maintenance work performed in the right of way. Besides SMHI maintenance staff, agents were described to include any contractors hired by the Ministry, private vehicles that might leave the roadway in an accident, and/or tow trucks employed to rescue such vehicles. As well, the agricultural landowners had to agree to not disturb, by causing the elevation to be changed, the natural drainage systems within the right of way and to protect and not obstruct the flow of water through any culverts along the highway. For both snow clearance purposes and to leave the right of way in a neat appearance, another requirement was all vegetation from the edge of the right of way to 0.5 meters from the toe of the embankment was to be no higher than 100 millimeters by October 15 each year.

4.0 BENEFITS

4.1 Maintenance Savings

Excluding the paved highway surface lanes and shoulders, the embankment side slopes, and the 0.5 meter restricted zone adjacent the toe of the embankment on each side of the highway, there remains approximately 8 acres per 0.8 kilometer ($\frac{1}{2}$ mile) of the right of way available for agricultural production. On the 40 kilometer corridor this represents up to 400 acres of land within the right of way available for agricultural production.

SMHI outsources its ditch mowing through tendered contracts. In 2013, the average unit bid price was \$27.47 per acre. Each full mowing of the right way on this 40 kilometer corridor would represent a maintenance expenditure of almost \$11,000. SMHI's current policy is to mow the entire right of way width once every three years, thus cost savings through mowing no longer required on a large portion of the right of way on this corridor represent a savings of almost \$3600 annually. In addition, the overall level of service and appearance of the right of way is enhanced by the vegetation removed every fall instead of once every three years. See Figure 4.

Saskatchewan legislation requires all landowners, including the Crown, to control noxious weeds on their properties. Practically, for SMHI, this is done in reaction to any complaint that is registered of the presence of noxious weeds in the right of way. In the last two years alone, SMHI incurred an average expense of \$412,000 per year for noxious weed control on the highway system. Whenever possible, if the complaint is registered by an agricultural landowner, SMHI requests the landowner perform the necessary work to control the noxious weeds, and invoice SMHI for the cost of the work. Through the agricultural cultivation of these lands, and/or the application of chemicals, noxious weeds are controlled at the expense of the landowner as part of the normal operations for weed control on the adjacent private lands. Besides the potential for cost savings given the Crown's liability for noxious weed control, there is the added benefit of the potential for complaints due to noxious weeds being eliminated on this corridor.

Figure 4: Right of Way after Fall Harvest

4.2 Agricultural Production

In this area of the Province of Saskatchewan where the corridor is located, average production yields for two of the most common crops grown in the area, wheat and canola, are, respectively, 55 and 37 bushels per acre¹. Of the 400 acres of right of way available for agricultural production, an estimated 90% is suitable to support agricultural production. The estimated 10% balance of land within the right of way consists of lands immediately adjacent residential farm yard sites with landscaping where a flattening of the back slope was not possible, or in areas with permanent wetlands, thus unavailable or unsuitable for agricultural production.

¹ From the Government of Saskatchewan, Ministry of Agriculture, Statistics, Crop Yields by Municipality, 2013 Crop Year.

Current most common agricultural practice for crop production in Saskatchewan consists of continuous cropping through crop rotation; summer fallow being an almost non-existent practice. Using 90% of these lands within the right of way as available for agricultural production, they are capable of annually producing 19,800 bushels of wheat or 13,320 bushels of canola. This represents an annual value of \$101,000 for wheat or \$154,000 for canola².

Figure 5: Canola Crop, grown in the Right of Way



² From the Government of Saskatchewan, Ministry of Agriculture, Statistics, Market Trends, Grain – Saskatchewan Cash Prices, as at April 9, 2014.

5.0 CONCLUSIONS

Modifying the design standards during construction of low volume roads to allow the use of the right of way for agricultural production has considerable benefits for both the adjacent landowners and the right of way owner. The adjacent landowners gain the opportunity to continue productive use of the lands resulting in significant economic benefit. The right of way owner can continue to fulfill their purpose of providing a safe corridor for the travelling public, along with a corridor for the placement and maintenance of utilities, while reducing their maintenance costs and potentially reducing the cost for right of way acquisition.

Based on the success of this pilot project, a second pilot project in Central Saskatchewan is currently under construction, and should be completed allowing agricultural production within the right of way by spring 2015.