ROCKY VIEW COUNTY

SPRINGBANK CONTEXT STUDY

(2285-048-00)



July, 2013

CORPORATE AUTHORIZATION

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EXECUTIVE SUMMARY

This study reviews existing engineering documents that support numerous Area Structure Plans and related planning documents in the Springbank area of Rocky View County. Springbank is located immediately west of the City of Calgary limits, generally along the Highway 1 corridor. This study provides Rocky View County (RVC or the County) with recommendations on the scope, focus, and priority areas within Springbank for the purpose of identifying the usefulness of existing engineering documents and the need for updated engineering documents in support of the existing Springbank Area Structure Plans.

The current Springbank demographics, growth rates, and land availability reflect that the community is in a position to meet current market demands. Continuing development in Springbank fuels the need for appropriate policies and procedures regarding infrastructure development.

The existing planning documents, Rocky View County policies, and engineering documents regarding transportation, potable water, wastewater, and stormwater are reviewed and discussed.

Special considerations for development near the Springbank Airport and to protect gravel resource areas are also discussed.

GENERAL PLANNING CONSIDERATIONS

Although this study is primarily a review of existing technical (engineering) support documents, from a review of the existing planning documents, a number of recurring themes are identified and summarized here. Addressing and assessing these are beyond the scope of this document, but are summarized for consideration by the County's planning staff.

- 1. Reference any new or updated technical documents, upon their approval, within any new or revised Springbank Area Structure Plans.
- Preservation of agricultural land is stated as a goal in the Central Springbank Area Structure Plan (CSASP).
- 3. From a cost effective infrastructure / engineering perspective it makes sense to prioritize by focussing new development in current planned areas, and to consider phasing. As stated in the



2009 Springbank Context Study, and proposed in the new County Plan consider encouraging full build-out of specific Conceptual Schemes individually rather than spreading the growth out over the entire study area.

- 4. As recommended in the CSASP, if gravel deposit protection is a County value then any new or revised Area Structure Plan (ASP) will require developments to identify any gravel deposit, define the possible mining activity, and phase the development appropriately.
- 5. As recommended in the North Springbank Area Structure Plan, future land use considerations are to acknowledge the future Springbank Airport expansion plans and ensure compatible land uses are developed adjacent to the airport. Conceptual Schemes could be required to identify any constraints due to the airport's land use consideration surfaces and the noise exposure forecast. The Springbank Airport's land use considerations could potentially affect both the North Springbank Area Structure Plan (NSASP) and the CSASP.
- 6. A number of engineering studies are recommended in this report and many of these studies will likely lead to upgrades required to the existing infrastructure in Springbank. A few mechanisms that the County may consider using to implement these studies and upgrades are:
 - a. Cost recoveries from developers based on development triggered studies.
 - b. Studies paid for by developers.
 - c. Cost recoveries (capital and interest) for infrastructure upgrades via an off-site levy.
 - d. Cost contribution agreements with developers for RVC to recover costs for infrastructure upgrades triggered by development with provisions to recover costs from future developers.

ENGINEERING CONSIDERATIONS

A number of engineering (i.e. technical) considerations are put forth below. A list of the available technical (engineering) support documents reviewed can be found in Section 9.0 and organized by category in each of the following tables:

- Transportation *Table 4.1* and *Table 4.2*
- Water Table 5.1 and Table 5.2
- Wastewater –*Table 6.1* and *Table 6.2*
- Stormwater Table 7.1 and Table 7.3



Based upon this review, the current master transportation document is relatively up to date and relevant to upcoming growth in the area. As growth continues, site specific plans should be prepared by each new development.

The current master water document is outdated given it is over ten years old, has not been in regular use by the County, and considers mainly franchise agreements. An update to this water system master plan would be beneficial to address the current issues facing the many small water systems in Springbank.

The current master wastewater document could be used as a base document to create a revised and updated wastewater system master plan. The current master wastewater document is over ten years old, not widely used by the County, and considers mainly franchise agreements. The amount of growth and development in Springbank over the last ten to fifteen years is the primary factor required to update the wastewater system master plan. This plan would present a regional wastewater servicing strategy for Springbank.

The current master stormwater document is a regional master drainage plan. More detailed sub-basin master drainage plans that include conveyance assessments of the major drainage routes are recommended to support the County's stormwater management efforts.

Specific suggestions for each category of infrastructure facility are listed below.

TRANSPORTATION

- Continue to follow the existing master transportation plan (*Greater Springbank Functional Study* (GSFS), Urban Systems and iTrans Consulting Inc., 2008).
- Require Traffic Impact Assessments with any future Conceptual Schemes.
- Compare actual development versus growth assumptions every five years to confirm validity of the GSFS and consequentially, the Transportation Off-Site Levy Bylaw.
- Consider updating the GSFS if the new County Plan limits growth to less than that assumed in the GSFS, or if the overall County transportation model is updated.
- Consider updating the Transportation Off-Site Levy Bylaw if Item 4 is considered.
- Consider updating the non-conforming CSs to recognize the GSFS.



WATER

- 1. Using the existing *Springbank Area Water System Master Plan* (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Water System Master Plan to address the issues discussed in this study, particularly developing a regional water servicing strategy, coordinating with RVC's new Servicing Standards, and mitigating the County's limited capacity to upgrade, maintain, or replace water system infrastructure due to the current fractured ownership of the Springbank water systems.
- 2. Reference Bylaw C-7152-2012 of Rocky View County (Fire Hydrant Water Suppression) as well as the new RVC Servicing Standards in any new or revised ASP.
- 3. Continue to promote water conservation and water consumption reduction measures in any new ASP in order to maximize water service efficiencies and optimize capital expenditures.

WASTEWATER

- 1. Using the existing Springbank Area Wastewater System Master Plan (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Wastewater System Master Plan to be consistent with Policy and Procedure 449 (Wastewater Treatment) and address the issues discussed in this study, particularly developing a regional wastewater servicing strategy, harmonizing with the County's Servicing Standards, and recognizing the County's recent efforts to mitigate a number of issues identified in the 2002 document with respect to Springbank's existing wastewater systems, namely, poor maintenance, minimal secondary treatment, and general deterioration.
- Develop criteria to determine where spray irrigation of treated effluent is most appropriate and include setback requirements, which may be based on those already in place with Alberta Environment and Sustainable Resource Development for lagoons and other wastewater treatment facilities.

STORMWATER

- 1. Prepare a Master Drainage Plan for Springbank which builds upon the *Report on Drainage Strategies for Springbank* (Westhoff Engineering, 2004). The Master Drainage Plan would:
 - a. Set general policies for all of the sub-basins identified on *Figure 9*,



- b. Reference current County stormwater policies for new developments to adhere to and reference the newest RVC Servicing Standards,
- c. Develop specific policies for specific sub-basins given each sub-basin's unique situation, including allowable release rates and volume targets,
- d. Document the existing problem areas,
- e. Prioritize the problem areas to be addressed first,
- f. Recommend more detailed Stormwater Conveyance Plans for one or more sub-basin conveyance routes, based upon the developments proposed as well as the problem issues identified. Each plan would identify in more detail obstructions to flow, potential solutions, and estimates of cost to remedy.
- 2. Prepare a Stormwater Conveyance Plan for each sub-basin on a prioritized basis. Each would be equivalent to a "storm trunk" study and would be similar in format to the Bearspaw Drainage Assessments carried out for the Meadow Drive and Bearspaw Hills areas. Upon completion, each Stormwater Conveyance Plan would be used to create a capital improvement plan. This capital plan could be used to develop a levy or cost contribution mechanism to recover County costs associated with improving conveyance routes.
- Until such time as a broader Conveyance Plan is in place for any particular area, a review of downstream constraints (culvert restrictions, conveyance issues) should be required of Stormwater Management Plans in new developments.
- 4. Stormwater Management Plans for individual developments should include:
 - a. A requirement that an easement (generally six metre wide minimum) should be provided along all stormwater conveyance routes through the development at the time of subdivision. For off-site easements downstream of any particular development site, developers and the County may cooperate in securing appropriate easements in critical locations.
 - b. A requirements to adopt BMPs (and LIDs) as appropriate within new developments, as stated in the Central Springbank ASP.
 - c. A requirement to identify water testing requirements, standards, and engineering specifications, including reference to the County's latest standards and policies.
- 5. The local ASPs should be amended to reference any updated County document, such as the Master Drainage Plan proposed or other documents.



6. The County should continue to require a Stormwater Management Plan, or at least a well developed Stormwater Management Concept, be submitted along with any new Conceptual Schemes. The document should be prepared by an engineering professional experienced in stormwater management.

ENGINEERING STUDIES

Table E.1 summarizes the studies and updates suggested within this report.

Table E.1:	Suggested	Studies
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Suggestion	Timing			
PLANNING				
1. Update the non-conforming CSs to meet	To be considered at the next stage of development for			
the GSFS assumptions	each non-conforming CS			
TRANSPORTATION				
1. Update the Master Transportation Plan	To be considered if updated County Plan shows actual or estimated growth is significantly different from the assumptions of the GSFS. This is likely, as the population forecasts will likely be reduced.			
2. Update the Transportation Off-Site Levy Bylaw	To be considered if the GSFS is updated.			
3. Traffic Impact Assessments	Suggested to be required with each CS submission.			
WATER & WASTEWATER				
1. Update the Springbank Water System Master Plan	Due for consideration to update 2002 report.			
2. Update the Springbank Wastewater System Master Plan	Due for consideration to update 2002 report.			
STORMWATER & DRAINAGE				
1. Prepare a Springbank Master Drainage Plan	Due for consideration to update 2004 report.			
2. Prepare Stormwater Conveyance Plans for	To be considered as part of or upon completion of a			
each sub-basin or groups of aggregated sub-	Springbank Master Drainage Plan and prioritized based			
basins	on areas with drainage issues as well as existing and			
	ongoing development pressures			
3. Stormwater Management Plans	Suggested to be required with CS submission			

The requirements of these suggested studies, their timing, and the triggers that identify their need are further explained in the body of this report.



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LIST OF ABBREVIATIONS

ASP	Area Structure Plan
BMP	Best Management Practice
CS	Conceptual Scheme
CSASP	Central Springbank Area Structure Plan
GSFS	Greater Springbank Functional Study (Transportation)
IDF	Intensity-Duration-Frequency (for rainfall events)
LID	Low Impact Development
MDP	Master Drainage Plan
NSASP	North Springbank Area Structure Plan
ROW	Right of Way
RVC	Rocky View County (the County)
SWMP	Stormwater Management Plan
SWMHYMO	Stormwater Management Hydrologic Model
ΤΙΑ	Traffic Impact Assessment
WWTP	Wastewater Treatment Plant



1.0 INTRODUCTION

1.1 Objective

This study provides Rocky View County with recommendations on the scope, focus, and priority areas within Springbank for the purpose of identifying the usefulness of existing engineering documents and the need for updated engineering documents in support of the existing Springbank Area Structure Plans. The County has authorized MPE Engineering Ltd. to perform a review of the technical aspects and current technical (engineering) support documents for the Springbank Area Structure Plans, the approved Conceptual Schemes in Springbank, and existing RVC policies, procedures, strategies, and standards.

1.2 Study Scope

The study area is depicted on *Figure 1* and encompasses the North Springbank Area Structure Plan (NSASP), the Central Springbank Area Structure Plan (CSASP), the Moddle ASP, and the Harmony Conceptual Scheme. The study area is approximately 28,000 acres and borders the City of Calgary to the east, the Bow River to the north, the Elbow River to the south, and varies between Range Road 40 and Range Road 34 to the west.

Each adopted Conceptual Scheme (CS) reviewed in this study is depicted on *Figure 2*.

The focus of this study is to review the technical aspects of the following documents and outline commonalities, conflicts, and technical gaps:

- Springbank Area Structure Plans and Conceptual Schemes
- County policies, procedures, standards, and strategies
- Other relevant Springbank reports, studies, and data

The following planning aspects of the documents are summarized for background information only:

- Demographics and Growth
- Land Use



The following technical (engineering) aspects of the documents are focused on:

- Transportation
- Water supply, treatment, and distribution
- Wastewater collection, treatment, and disposal
- Stormwater management and discharge
- Regulatory requirements



2.0 DEMOGRAPHICS AND GROWTH

The population of Springbank was 5,930 in 2006, representing 17% of Rocky View County's total population. This population represents the Springbank area as a whole which is larger than the study area; however, the study area contains the vast majority of the population in Springbank. The remaining area is mainly undeveloped agricultural land as depicted on *Figure 3* showing the locations of the existing neighborhoods.

Future growth in Springbank will be based on the currently adopted Conceptual Schemes as shown on *Figure 2*. Adopted Conceptual Schemes within the study area encompass 5,198 acres of land, which is approximately 19% of the study area. Each adopted Conceptual Scheme (CS) supports country residential development with the exception of the Harmony CS and the Bingham Crossing CS.

In addition to the adopted Conceptual Schemes shown, there are also the proposed Conceptual Schemes of Pradera Springs, Springbank Glenn, and a Springbank Creek CS amendment which have not been approved by Council. The adopted Conceptual Schemes represent large development areas spread out throughout the study area.

On average, 38 residential permits were issued each year in Springbank between 2004 and 2008. At this current absorption rate for country residential units, the adopted and proposed CS areas will not buildout for a very long period of time (>100 years). As stated in the 2009 Springbank Context Study, an alternative would be to encourage focused growth on one concentrated area to achieve full build-out, one location at a time. From a cost effective infrastructure / engineering perspective it makes sense to prioritize by focussing new development in current planned areas, and to consider phasing. This concept is also proposed in the County Plan. The currently adopted Conceptual Schemes are further detailed in *Table 2.1*, below.



Conceptual Scheme	Approval Date	Area (Acres)	Projected Parcels	Projected Population	Development
Barnard	October 25, 2005	199	76	258	Country Residential 2 acre lots (R-1)
Bingham Crossing	September 12, 2012	296	Unknown	220-260 Seniors Units	Retail/Mixed Use
Grand View Estates	January 18, 2005	457	182	619	Country Residential Minimum 2 acre lots
Harmony	February 13, 2007	1,749	3,500	11,900	Employment Centre, Golf Course, Mixed-Use Town Core, Single Detached Residential
Lariat Loop	February 14, 2006	185	73	248	Country Residential Minimum 2 acre lots
Montebello	September 27, 2005	464	185	629	Country Residential 2 acre lots (R-1)
Murray Lands	February 8, 2005	276	103	343	Country Residential 2 acre lots (R-1) and 4 acre lots (R-2)
Partridge View	June 12, 2007	320	71	241	Country Residential 2 acre lots
Robinson Road	July 3, 2007	84	18	61	Country Residential Minimum 2 acre lots
Springbank Creek ¹	June 12, 2007	928	376	150	Country Residential Minimum 1 acre lots and K-12 Private School Campus
Timberstone	June 14, 2005	80	26	83	Country Residential (R-1) Minimum 2 acre lots and Agricultural Holdings District (AH) Minimum 20 acre parcels
Wilson	June 26, 2007	160	60	204	Country Residential 2 acre lots
PROJECTED TO (approximate)	TALS	5,198	4,670	15,000	

Source: Adopted from the 2009 Springbank Context Study. ¹The Springbank Creek Conceptual Scheme adopted June 12, 2007 was reviewed for this study, however, a proposal to amend this area into a revised Conceptual Scheme was submitted to Rocky View County in September, 2012 and has yet to be adopted by Council.



The lot inventory completed by RVC in September 2012 presented the following summary of existing developments, *Table 2.2*, within the Study Area.

Policy Document / Area	Built	Build Ready	Build Approved	Policy Approved	Potential New Dwellings
Central Springbank ASP	1,604	525	339	3,224	4,088
Harmony CS	0	9	3,385	0	3,394
Moddle ASP	49	0	0	0	0
North Springbank ASP	24	28	64	832	924
Totals	1,677	562	3,788	4,056	8,406

Table 2.2: Development Capacity

Source: Rocky View County, 2012; "Land Inventory and Residential Development Capacity", September 5, 2012.

The lot inventory concludes that, based on a projected 20-year development rate of 344 units per year, land availability in Rocky View County is in a position to meet market demands. As noted previously, recent growth has not met this projected rate. Noted in the lot inventory document is the "decline in overall residential development in Rocky View County since 1995. This trend may be a consequence of economic changes in the Calgary region or may represent a saturation of the country residential market" (Rocky View County, 2012).



3.0 LAND USE

The documents reviewed regarding planning or general County policies are listed in *Table 3.1* and referenced in Section 9.0.

Table 3.1:	Planning	Documents
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Document Name	Author	Year	Comment
County Plan	Rocky View County	2013	June 25, 2013 First Reading Copy provides strategic growth direction, overall guidance for land use planning, and service delivery policy.
Servicing Standards	Rocky View County	2013	Adopted May 28, 2013
2013 Servicing Standards Overview Presentation	Rocky View County	2013	Outlines changes expected with revised Servicing Standards
Bylaw C-7186-2012 DC 148	Rocky View County	2012	Bingham Crossing Direct Control Land Use Bylaw
Policy 318 Pathways and Trails	Rocky View County	2012	Purpose is to effectively administer public pathways and trails
Land Inventory and Residential Development Capacity	Rocky View County	2012	Provides estimate of amount of housing that will be built if development proceeds according to approved County plans and policies
Rural Growth Management	Rocky View County	2012	Discussion paper that includes development and planning topics including Harmony, Springbank, Springbank Airport, and stormwater and utility servicing
Intermunicipal Development Plan	Rocky View County and City of Calgary	2012	Fundamental purpose is to identify areas of mutual interest and minimize land use conflicts across municipal borders – includes topics of growth, communication, parks, stormwater management, transportation, aggregate extraction, and utilities
Parks and Open Space Master Plan	County and AECOM	2011	Guide for parks and open space planning in Rocky View County



Document Name	Author	Year	Comment
Policy 436 Utility Placement within Municipal Road Allowances	Rocky View County	2011	Defines the County roles, responsibilities, and practices regarding utility lines within municipally owned road allowances
Policy 443 Road Allowance Closure and Disposal	Rocky View County	2010	Purpose is to administer a fair and consistent formal process to dispose of undeveloped Road Allowance right-of-ways within the County
Policy 416 Infrastructure Land Acquisition	Rocky View County	2010	Defines a formal process for acquisition of land in conjunction with County infrastructure construction
Policy 313 Disposal of Reserve Land, Former Reserve Land, and Fee Simple Land by Sale	Rocky View County	2010	Purpose is to administer a fair and consistent formal process
Bylaw C-6584-2009 DC 141	Rocky View County	2010	Reviewed as an example direct control land use bylaw
2009 Springbank Context Study	Rocky View Municipal District	2009	Provides an overview of spatial, statistical, technical, and policy information
Growth Management Strategy	Team ISL	2009	Proposed land use vision for <i>Rocky View 2060</i> to be superseded by the new County Plan
Springbank Airport Master Plan 2009-2029	Calgary Airport Authority	2009	Discusses land use considerations and future upgrades
Springbank Airport Noise Contour Update	Calgary Airport Authority	2008	Depicted on Figure 4
Policy 406 Infrastructure Cost Recovery	Rocky View County	2008	To be used with development where infrastructure is required that benefits more than the land being developed
Springbank Airport Environmental Management Systems Manual	Calgary Airport Authority	2006	Discusses future upgrades and land use planning recommendations
Economic Development Strategy	Municipal District of Rocky View No. 44	2003	Discusses water and sewer infrastructure as opportunity to promote development in locations desired by the County
Central Springbank Area Structure Plan (CSASP)	Municipal District of Rocky View No. 44	2001	Discusses planning, natural environment, infrastructure, land use, and development



Document Name	Author	Year	Comment
North Springbank Area Structure Plan (NSASP)	Municipal District of Rocky View No. 44	1999	Discusses planning, infrastructure, and land use
Municipal Development Plan	Municipal District of Rocky View No. 44	1998	To be superseded by County Plan

Source: Prepared by MPE based upon review of the documents available.

The County Plan (June 25, 2013 First Reading Copy) is the County's highest level planning document and principal statutory plan. Policy guidance items found in this version that are deemed pertinent to Springbank and this Context Study are listed below:

- high density forms of residential development are directed to adjacent urban municipalities
- on-site and off-site hard infrastructure costs related to new development are the developer's responsibility
- Low Impact Development (LID) is encouraged and supported as an approach to treat and manage stormwater
- potable water conservation measures are encouraged for all users of public and private water systems
- encourage the development of the Hamlet of Harmony as a full service rural community providing a range of land uses, housing types, and rural services
- development of new country residential Area Structure Plans or the expansion of existing Area Structure Plans is not contemplated until the existing plans reach build-out
- a Regional Business Centre and a Highway Business Area are noted within Springbank and business development is directed to locate in these identified business areas
- support the environmentally responsible management and extraction of natural resources in a manner that balances the needs of residents, industry, and society
- RVC's long range transportation network is mapped and discussed
- prepare Master Plans for existing and future water servicing, wastewater collection and treatment, and stormwater management systems where required in existing and proposed growth areas



- construction and connection to a regional or decentralized wastewater treatment system shall be required when the density of development exceeds thresholds identified in *County Policy*
- stormwater shall be conveyed downstream in a manner that protects downstream properties and, where required, proponents of new development shall identify and secure the downstream stormwater conveyance system
- firefighting water strategy to be prepared and implemented over the long-term and private water suppliers are to be encouraged to construct water distribution systems designed for fire suppression
- develop a stormwater offsite levy bylaw for the construction of regional stormwater infrastructure in required areas.

3.1 Springbank Airport

The Springbank Airport covers an area of 1,040 acres and borders Township Road 250 to the south and Range Road 33 to the east. *Figure 4*, Airport Land Use Considerations, depicts the airport location in Springbank as well as the imaginary surfaces through which buildings, structures, or other objects are, by regulation, not allowed to penetrate. These include:

- Transitional Surfaces: imaginary inclined planes which extend out from the side of the runways including sloping surfaces that run parallel to the runways.
- Approach Surfaces: imaginary inclined planes extending out from the runway ends:
 - The runway 16/34 approach surface extends over 15,240 metres from the runway ends at a slope of 2% up and away.
 - The runway 07-25 approach surface extends over 2,530 metres from the runway ends at a slope of 2.5% up and away.
 - The runway 16R-34L approach surface is in place to protect for the development of a future parallel north-south runway.
- Outer Surface Limits: an imaginary horizontal plane surrounding the airport fixed at 45 metres (1,243 metres above sea level) above the Springbank Airport's reference point (elevation 1,198 metres above sea level).



There is very little existing development beneath any of the transitional or approach surfaces. The few developments south of the airport that fall beneath the runway 16/34 approach surface, namely Mountain Vista Estates and Vantage Ridge Estates, must not penetrate the imaginary surface, the lowest point of which is estimated to be approximately 60 meters above the developments.

The runway 07-25 approach surface overlaps with Barnard CS and the lowest point is estimated to be approximately 38 meters high at that point. The Barnard CS does acknowledge the airport's proximity and some land use constraints, but does not specifically mention this approach surface.

There are numerous developments and neighborhoods that are encompassed by the airport's outer surface limits. These developments must not build any structure which penetrates an elevation of 1,243 metres (approximately 45 metres high at the airport).

The Harmony CS is affected by all five of the defined airport surfaces. The Harmony developer will be required to work with the Airport Authority to ensure that no building, structure, or other object penetrates these surfaces.

The Noise Exposure Forecast (NEF) contour identified on *Figure 4* can be used by the County in their planning documents to implement land use controls that reduce the impact of aircraft noise.

Land uses planned in the vicinity of the Springbank Airport must consider the compatibility with the airport, including identifying safety hazards such as bird activity from agricultural operations, wetlands, open space areas, or parks. Hay is listed as a preferable crop because it is less attractive to birds (*Springbank Airport Environmental Management Systems Manual*, 2006).

The North Springbank Area Structure Plan (NSASP) states that the community's preference would be to not have additional infrastructure such as lengthened runways or construction of additional runways. However, both of these are planned for the Springbank Airport in the next 15 years. Airport planning is a federal regulated jurisdiction.



3.2 Gravel Extraction

Identifying and protecting known gravel deposits and mining operations is stated as a goal for the Springbank region in the Central Springbank Area Structure Plan (CSASP). *Figure 5* depicts the existing gravel extraction areas as well as the known gravel deposits within the CSASP, overlaid on the neighborhood and CS areas. The pit operators believe there are sufficient deposits to continue gravel extraction in Springbank for five to 20 years, depending on the amount of reserve and market demand.

Existing and future extraction sites are encouraged in the CSASP to retain a "good neighbor policy" with adjacent land uses. The Grand View Estates and Springbank Creek Conceptual Schemes overlap the existing gravel deposits; however neither mentions the extraction potential of this natural resource in their development proposals. Further, there are 16 existing neighborhoods developed on identified gravel deposits in Springbank.

If the existing goals on gravel deposits stated in the CSASP are still relevant and true to the County, then these policies would continue to be encouraged as part of any new or revised Springbank ASP. The CSASP encourages those CS areas adjacent to known gravel deposits to identify the resource, define the possible mining activity, and phase the proposed development appropriately. This will allow the County to take advantage of its natural resources while implementing policies to protect the natural environment, and will allow development to occur in the most advantageous fashion for the County as a whole. To date, numerous existing developments and built neighbourhoods have not specifically addressed gravel deposits, effectively eliminating the potential for future extraction.

3.3 Suggestions

Although this study is primarily a review of existing technical (engineering) support documents, from a review of the existing planning documents a number of recurring themes regarding land use are identified and summarized above. Addressing and assessing these are beyond the scope of this document, but are summarized for consideration by the County's planning staff.

As recommended in the North Springbank Area Structure Plan, future land use considerations are to acknowledge the future Springbank Airport expansion plans and ensure compatible land uses are developed adjacent to the airport. Conceptual schemes could be required to identify any constraints



due to the airport's land use consideration surfaces and the noise exposure forecast. The Springbank Airport's land use considerations could potentially affect both the NSASP and the CSASP.

As recommended in the CSASP, if gravel deposit protection is a County value, then any new or revised ASP will require developments to identify any gravel deposit, define the possible mining activity, and phase the development appropriately.



4.0 TRANSPORTATION

4.1 Capital Improvement and Developer Contribution

A comprehensive study of the Springbank transportation network was completed in May, 2008 by Urban Systems Ltd. and iTRANS Consulting Inc. on behalf of the County entitled *Greater Springbank Functional Study* (GSFS) (USL & iTrans, 2008). The GSFS identifies the transportation requirements at build-out for Springbank, based on a Greater Springbank Area build-out population of 115,000 to 135,000 people.

The GSFS was then used to inform the development of the County's Transportation Off-Site Levy Bylaw passed by Council on October 23, 2012. The Transportation Off-Site Levy Bylaw consists of a Base Levy that applies to the County as a whole, as well as Special Area Levies that apply to specific areas within the County in addition to the Base Levy. One of the Special Area Levies identified is for Springbank.

The GSFS is referenced in the Springbank Special Area Levy calculation. In summary, a capital improvement plan for Springbank has been completed, and developer contributions to the required transportation upgrades are governed by the new Transportation Off-Site Levy Bylaw.

The documents reviewed pertaining to transportation as a whole for Springbank are listed in **Table 4.1** and referenced in Section 9.0.



Document Name	Author	Year	Comment
Servicing Standards	Rocky View County	2013	Adopted May 28, 2013 - covers TIA's, design guidelines, construction, intersections, and specific road standards
Transportation Off-Site Levy Bylaw C-7195-2012	Rocky View County	2012	References the GSFS and includes a County Base Levy as well as a Springbank Special Area Levy
Policy 412 Servicing Requirements	Rocky View County	2010	Ensures developments are designed and constructed in accordance with the County's Servicing Standards
Policy 410 Road Access Control	Rocky View County	2010	Purpose is to provide access control to lands to and from the County road network
Background Servicing Study	Team ISL	2008	Provides technical transportation background to the 2009 Team ISL <i>Growth Management Strategy</i> – covers the entire County, not specific to Springbank
Greater Springbank Functional Study (GSFS)	USL and iTrans	2008	Comprehensive Springbank transportation network study
Servicing Standard 400.0 Road Design Guidelines	Municipal District of Rocky View No. 44	2004	Superseded by new Servicing Standards
Transportation Network Study for the Central Springbank Planning Area	UMA Engineering	2000	Superseded by the GSFS
Policy 304 Roadway Linkages in New Subdivision	Rocky View County	1996	Purpose is to maximize efficiency of County road networks

Table 4.1: Transportation Policy and Standards Docur	nents
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Source: Prepared by MPE based upon review of the documents available.

4.2 Adopted Conceptual Scheme Review

The adopted Conceptual Schemes in Springbank are reviewed and compared to the GSFS and the Transportation Off-Site Levy Bylaw. The transportation policies outlined by each document are summarized in *Table 4.2.* The documents reviewed are referenced in Section 9.0. Requiring a Traffic Impact Assessment (TIA) at the CS stage would be useful. This would ensure that the road and intersection upgrades necessary are identified and completed as they are triggered by development.



Development	Document Type	Author	Year	Transportation Policies
Barnard	CS	Collins Development Consultants	2005	Refers to 2002 Eagle Engineering TIA
	TIA	Eagle	2002	Consistent with 2008 GSFS
		Engineering		recommendations
	CS	Urban Systems	2012	Refers to 2012 Bunt & Associates TIA
	TIA	Bunt &	2012	Consistent with 2008 GSFS
Bingham Crossing		Associates		recommendations
Dingham Crossing	TIA	Urban Systems	2009	Superseded by 2012 Bunt & Associates TIA
	TIA	Urban Systems	2007	Superseded by 2012 Bunt & Associates TIA
Grand View Estates	CS	Municipal District of Rocky View No. 44	2005	TIA to be required during preparation of Outline Plans. Acknowledges CSASP. Considers only additional traffic due to development not the potential surrounding future developments as recommended in newer 2008 GSFS
	TIA	Urban	2011	Further refinement of 2008 Urban Systems
		Systems		TIA – consistent with GSFS
	TIA	Urban Systems	2008	Stage 1 TIA with a 5 year time horizon – provides further detail built upon the 2006 Urban System TIA
Harmony	CS	Elbow River Land Corporation and Bordeaux Developments	2007	Refers to 2006 Urban Systems TIA
	TIA	Urban Systems	2006	Consistent with 2008 GSFS recommendations except no traffic signal required at mid-west entrance; however, only 10 year horizon considered so further studies required as phases are built
Lariat Loop	CS	Focus	2006	Consistent with 2008 GSFS (refers to CSASP)

Table 4.2:	Springbank	Transportation	Review



Development	Document Type	Author	Year	Transportation Policies
Moddle	ASP	Municipal District of Rocky View No. 44	1998	Ultimate traffic volumes not consistent with newer 2008 GSFS
	TIA	Bunt & Associates	2009	Update to 2002 Bunt & Associates TIA – ultimate traffic volumes not consistent with 2008 GSFS
Montebello	CS	Brown & Associates Planning Group	2005	Refers to the 2002 Bunt & Associates TIA
	TIA	Bunt & Associates	2002	Ultimate traffic volumes not consistent with newer 2008 GSFS
	CS	C2W Planning + Design	2005	Refers to 2003 and 2004 Eagle Engineering TIA's
Murray Lands	TIA	Eagle Engineering	2004	Ultimate traffic volumes not consistent with newer 2008 GSFS
	TIA	Eagle Engineering	2003	Ultimate traffic volumes not consistent with newer 2008 GSFS
Partridge View	CS	Torus Engineering	2007	Acknowledges that TIA required as per CSASP and subject to Transportation Off Site Levy Bylaw (at Subdivision stage)
Pobinson Pood	CS	Croft Engineering	2007	Refers to the 2007 D.A. Watt Consulting TIA
KODITISOTI KOdu	TIA	D.A. Watt Consulting	2007	Ultimate traffic volumes not consistent with newer 2008 GSFS
Springbank Airport	Design Report	MPE Engineering and EBA Engineering	2009	Acknowledges that TIA required and to be consistent with 2008 GSFS especially with regards to proximity to Harmony
Springbank Creek	CS	Brown & Associates and Westhoff Engineering Resources	2007	Acknowledges 2008 GSFS and further TIA requirement at tentative plan stage
Timberstone	CS	Timberstone Development Corp.	2005	Acknowledges TIA required as per CSASP and subject to Transportation Off Site Levy Bylaw
Wilson	CS	Municipal District of Rocky View No. 44	2007	Acknowledges TIA required as per CSASP and subject to Transportation Off Site Levy Bylaw

Source: Prepared by MPE based upon review of the documents available.



Many of the currently adopted Conceptual Schemes acknowledge that a TIA will be completed at a future stage. As many of the earlier TIAs are inconsistent with the GSFS, updated TIAs may be requested at the next development stage.

4.3 Future Transportation Network

The new County Plan predicts growth patterns in the Springbank area that differ from the assumptions used in the GSFS and the Transportation Off-Site Levy Bylaw. Therefore, these documents may require review if the assumptions used for growth, population, and developments are significantly different from actual growth, development, and population. *Figure 6* is adopted from the GSFS and depicts the four (4) road corridors and eight (8) intersections that may experience capacity issues at build-out of the Greater Springbank Area (with build-out as assumed in the GSFS document). The GSFS states that these capacity issues are expected to persist after all the road and intersection upgrades are completed as modelled.

The road and intersection upgrades recommended and modelled in the GSFS for these high capacity transportation elements include:

- Major Road (Divided) classification with six lanes, 36 to 51 metre right-of-way.
- Minimum intersection spacing of 300 metres.
- Maximum dual left turn lanes.
- Channelizing right turn lanes.
- Maximum 150 metres of storage length for all turning movements.

As development occurs over time, actual traffic may be compared with the growth assumptions modelled. Then, if capacity issues persist beyond these maximum practical upgrade recommendations, the GSFS promotes the following mitigation measures be considered:

- Land Use Policy or Development Policy that promotes travel within Springbank (Live, Work, Play) rather than commuting out of the area.
- Sustainable Transit such as bus, high occupancy vehicle lanes, or extension of the Calgary Light Rail Transit system.
- Additional Highway 1 interchange, connection, overpass, and/or crossing.
- Bridge crossing of the Elbow River.



From recent discussions with the author of the GSFS, it is understood that the overall County traffic model is currently being considered for update. This model is used to determine the specific traffic impacts throughout the County, including the Springbank area. There are a number of reasons that the model is being considered for update:

- The County Plan will likely result in significant population change from the original assumption (potentially a reduction by 1/2 to 2/3 from the original 115,000 to 135,000).
- The original model was linked to an older version of the City of Calgary traffic model. This was a relatively conservative model with relatively high traffic counts. The newer Plan It Calgary model is based upon a new set of traffic and usage assumptions that show significantly lower traffic generation. The County must decide which set of assumptions to adopt.
- Basic traffic information has to be verified to allow recalibration of the model. Inputs such as an inventory of current and proposed land use, and the base traffic scenario should be reviewed.

Given the preceding, it appears the current transportation model for the County, and intern the Springbank area, is being considered for review. In the meantime, the existing master transportation plan for Springbank should be followed until such time as a decision is made with respect to updating the overall model.

4.4 Suggestions

- 1. Continue to follow the existing master transportation plan (*Greater Springbank Functional Study* (GSFS), Urban Systems and iTrans Consulting Inc., 2008).
- 2. Require Traffic Impact Assessments with any future Conceptual Schemes.
- 3. Compare actual development versus growth assumptions every five years to confirm validity of the GSFS and consequentially, the Transportation Off-Site Levy Bylaw.
- 4. Consider updating the GSFS if the new County Plan limits growth to less than that assumed in the GSFS, or if the overall County transportation model is updated.
- 5. Consider updating the Transportation Off-Site Levy Bylaw if Item 4 is considered.
- 6. Consider updating the non-conforming CSs to recognize the GSFS.



5.0 WATER SUPPLY, TREATMENT, AND DISTRIBUTION

5.1 Overview

The documents reviewed pertaining to potable water as a whole for Springbank are listed in *Table 5.1* and referenced in Section 9.0.

Document Name	Author	Year	Comment
Servicing Standards	Rocky View County	2013	Adopted May 28, 2013 - covers cost feasibility and sustainability analyses, groundwater requirements, hydrant standards, valves, pipe, and fitting standards, and treatment design criteria
Bylaw C-7152-2012 Fire Hydrant Water Suppression Bylaw	Rocky View County	2012	Regulates fire suppression water supply, private hydrants, and private water systems
Policy 415 Domestic Potable Water System Servicing	Rocky View County	2010	Provides direction on protection of potable water resources over the long-term
Policy 411 Residential Water and Sewer Requirements	Rocky View County	2010	Provides direction on the servicing requirements of subdivisions with respect to private water supply
Policy 412 Servicing Requirements	Rocky View County	2010	Ensures developments are designed and constructed in accordance with the County's Servicing Standards
Background Servicing Study	Team ISL	2008	Provides technical water system background to the 2009 Team ISL <i>Growth</i> <i>Management Strategy</i> – covers the entire County, not specific to Springbank
Policy 600 Water Conservation	Rocky View County	2005	Purpose is to ensure a safe and reliable water supply
Servicing Standard 600.0 Water Supply and Waterworks	Municipal District of Rocky View No. 44	2004	To be superseded by new Servicing Standards

Table 5.1: Potable Water Policy and Standards Documents



Document Name	Author	Year	Comment
Springbank Area Water System Master Plan	Morrison Hershfield	2002	Update recommended
Central Springbank Area Structure Plan (CSASP)	Municipal District of Rocky View No. 44	2001	Provides policies on water wells, water treatment, and water distribution as well as discusses shifting water servicing from private systems to regional systems
Servicing Standard 800.0 Private Water Wells	Municipal District of Rocky View No. 44	1999	To be superseded by new Servicing Standards
North Springbank Area Structure Plan (NSASP)	Municipal District of Rocky View No. 44	1999	Discusses the provision of water to subdivisions and provincial government guidelines as well as encourages fire suppression

Source: Prepared by MPE based upon review of the documents available.

Existing neighborhoods and developments in Springbank are provided potable water service by individual wells, water co-ops, or private water utilities. There are no regional water systems in the Springbank area. Urban standard fire protection (i.e. pressurized fire hydrants) is not available though a number of new developments propose such. Most proposed developments recognize the requirement to connect to a regional water system once one becomes available. Harmony Conceptual Scheme is the only proposed development that considers forming the backbone of a future regional water treatment and distribution system. *Table 5.2* provides proposed or existing water system and fire suppression information for Springbank developments based on the documents reviewed as listed.

Figure 7 portrays the existing water co-ops and private water utilities that currently exist in Springbank. The majority of these water systems serve over 100 connections. This disjointed private water infrastructure limits the County's capacity to upgrade, maintain, or replace infrastructure. As well, the fractured ownership can hinder comprehensive regional solutions. Systems that lack adequate maintenance or operational personnel can be a liability to the County.



Development	Document Type	Author	Year	Water System	Fire Suppression
Barnard	CS	Collins Development Consultants	2005	North Springbank Water Co-op	CS simply states to meet County requirements
Bingham Crossing	CS Water Servicing Report	Urban Systems Urban Systems	2012	Calalta Waterworks Ltd. (existing water system serving Calaway Park)	Fully charged hydrant system proposed in CS
Grand View Estates	CS	Municipal District of Rocky View No. 44	2005	CS simply states to meet CSASP (see Table 5.1)	CS simply states to meet County requirements
Harmony	CS	Elbow River Land Corporation and Bordeaux Developments	2007	Proposed communal potable water system from Bow River to raw water reservoir and treatment plant including MOU to service Springbank Airport	Fully charged hydrant system proposed in CS
Lariat Loop	CS	Focus	2006	CS simply states to meet CSASP (see Table 5.1) and requirement to connect to regional system when available	No specific detail provided
Moddle	ASP	Municipal District of Rocky View No. 44	1998	Westridge Water Utility Ltd.	No specific detail provided
Montebello	CS	Brown & Associates Planning Group	2005	Piped system proposed in CS and CS simply states to meet CSASP (see Table 5.1)	CS simply states to meet CSASP (see <i>Table 5.1</i>)
Murray Lands	CS	C2W Planning + Design	2005	Plan to tie to future regional system by County proposed in CS	CS states to meet County's future regional system requirements

Table 5.2:	Springbank Water	Servicing - Summa	ry of Water Supp	oly for Developm	ents
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Partridge View	CS	Torus Engineering	2007	Poplar View Water Co- op (combination of licensed surface distribution system and individual water wells until County regional system implemented)	No specific detail provided
Robinson Road	CS	Croft Engineering	2007	CS states awaiting regional strategy, interim to be simply piped water to meet CSASP (see Table 5.1); silent on water system	CS simply states to meet CSASP (see Table 5.1)
Springbank Airport	Design Report	MPE Engineering and EBA Engineering	2009	Underground reservoir, piped water system, treated water trucked in from Cochrane	Fire flow storage in use
Springbank Creek	CS	Brown & Associates and Westhoff Engineering Resources	2007	CS proposes piped water system ready to accommodate regional system; silent on water system	CS simply states to meet County requirements
Timberstone	CS	Timberstone Development Corp.	2005	Poplar View Water Co- op and requirement to connect to regional system when available stated in CS	No specific detail provided
Wilson	CS	Municipal District of Rocky View No. 44	2007	Individual water wells and requirement to connect to regional system when available stated in CS	CS simply states to meet CSASP (see Table 5.1)

Source: Prepared by MPE based upon review of the documents available.

Many of the proposed developments encourage water consumption reduction and water conservation measures, as promoted by the Central Springbank ASP.

The most recent, overriding technical document is the *Springbank Area Water System Master Plan* (Morrison Hershfield, 2002). It states that the problems facing the municipal water supply systems in Springbank are:



- Deterioration
- Deferred maintenance
- Unreliable water delivery methods
- Under-pricing of services
- Little or no filtration (except the larger co-ops and utilities)
- Inconsistent or non-existent disinfection (except the larger co-ops and utilities)
- Poor recordkeeping and maintenance practices (except the larger co-ops and utilities)
- Insufficient levels of fire protection
- Fractured ownership

In general, this is a very comprehensive document but it is becoming outdated, especially given more recent development policies adopted by the County.

5.2 Updates Required

The *Springbank Area Water System Master Plan* (Morrison Hershfield, 2002) could be used as a background document to create a revised and updated water system master plan for Springbank. The 2002 document outlines the existing known systems, projected water demands, and future water development options, all of which could be updated based on the County's latest information and goals.

New developments must abide by Rocky View County's new Fire Hydrant Water Suppression Bylaw (C-7152-2012). This is recommended to be reflected in any new or revised Springbank ASP.

The North Springbank ASP does not promote water conservation and water consumption reduction as thoroughly as the Central Springbank ASP. These are important topics for any new or revised Springbank ASP as a moratorium has been placed on new surface water diversion licenses (including shallow aquifers under the influence of surface water) in the Bow River Basin. There are a number of potential connections for water from surrounding municipalities (i.e. Cochrane, Calgary, etc.); however, this study comments strictly on internal RVC solutions.



5.3 Consistency in Standards

Rocky View County's draft *Servicing Standards* require a minimum water main size of 200 mm in diameter for a water main in a residential area with connection to a hydrant lead; however, the Fire Suppression Bylaw requires a minimum main of 150 mm in any private water system. This distinction between a water main that connects to a hydrant lead and one that does not should be clarified. Any new or revised Springbank ASP ought to refer to the updated RVC *Servicing Standards*.

The Springbank Area Water System Master Plan (Morrison Hershfield, 2002) recommends the County adopt the *City of Calgary Specifications for Waterworks*; however, the County adopted new *Servicing Standards* on May 28, 2013. The County, therefore, will continue to maintain their own standards. The County's new *Servicing Standards* do refer to the *City of Calgary Design Guidelines and Specifications* where necessary.

5.4 Suggestions

- 1. A revised Springbank Water System Master Plan is recommended that considers regional water servicing options that include charged hydrant fire protection and addresses the following current issues:
 - a. Hindered development of comprehensive regional solutions due to fragmented existing water systems comprised of many small co-ops and utility owners.
 - b. County liability issues.
 - c. Economics of fire suppression in low density development versus high density clusters.
 - d. County's limited capacity to upgrade, maintain, or replace water system infrastructure due to fractured ownership.
- 2. A revised Springbank Water System Master Plan should also consider the six (6) largest proposed or existing water systems in Springbank, each of which may have potential to become a regional system:
 - a. Harmony Conceptual Scheme
 - b. Bingham Crossing Conceptual Scheme / Calalta Waterworks Ltd.
 - c. Emerald Bay Water & Sewer Co-op Ltd.
 - d. North Springbank Water Co-op Ltd.
 - e. Poplar View Utilities Ltd. (Country Estates Water System)



f. Westridge Water Utility Ltd.

These potential regional water systems are highlighted on *Figure 7*.

3. The County should consider recovering the applicable cost of a Springbank Water System Master Plan from future developments via an off-site levy or other cost recovery mechanism.

In summary, the suggestions regarding water servicing in Springbank are:

- 1. Using the existing *Springbank Area Water System Master Plan* (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Water System Master Plan to address the issues discussed in this study, particularly developing a regional water servicing strategy, coordinating with RVC's new Servicing Standards, and mitigating the County's limited capacity to upgrade, maintain, or replace water system infrastructure due to the current fractured ownership of the Springbank water systems.
- 2. Reference Bylaw C-7152-2012 of Rocky View County (Fire Hydrant Water Suppression) as well as the new RVC Servicing Standards in any new or revised ASP.
- 3. Continue to promote water conservation and water consumption reduction measures in any new ASP in order to maximize water service efficiencies and optimize capital expenditures.


6.0 WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

6.1 Overview

The documents reviewed pertaining to wastewater as a whole for Springbank are listed in *Table 6.1* and referenced in Section 9.0.

Document Name	Author	Year	Comment
Servicing Standards	Rocky View County	2013	Adopted May 28, 2013 - covers submissions, financial feasibility and sustainability, design requirements, regional systems and connections, decentralized systems, and private systems
Policy 430 Communal Wastewater System Management	Rocky View County	2011	Defines County roles, responsibilities, and practices regarding ownership, operation, and maintenance of communal wastewater systems
Policy 449 Performance Requirements for Wastewater Treatment Systems	Rocky View County	2011	Provides guidance for sewage disposal options
Procedure 449 Performance Requirements for Wastewater Treatment Systems	Rocky View County	2011	Provides alternatives for sewage disposal options
Policy 411 Residential Water and Sewer Requirements	Rocky View County	2010	Provides direction on the servicing requirements of subdivisions with respect to private sewage disposal methods
Policy 412 Servicing Requirements	Rocky View County	2010	Ensures developments are designed and constructed in accordance with the County's Servicing Standards
Background Servicing Study	Team ISL	2008	Provides technical wastewater background to the 2009 Team ISL <i>Growth Management Strategy</i> – covers the entire County, not specific to Springbank

Table 6.1: Wastewater Policy and Standards Documents



Document Name	Author	Year	Comment
Springbank Area Wastewater System Master Plan	Morrison Hershfield	2002	Update recommended
Central Springbank Area Structure Plan (CSASP)	Municipal District of Rocky View No. 44	2001	Provides policies on private sewage disposal systems and wastewater collection and treatment systems as well as discusses shifting wastewater servicing from private systems to regional systems
Servicing Standard 500.0	Municipal District of	1999	To be superseded by new Servicing
Sanitary Sewerage	Rocky View No. 44		Standards
North Springbank Area Structure Plan (NSASP)	Municipal District of Rocky View No. 44	1999	Recommends provincial government guidelines as well as municipality standards applied on a site-specific basis

Source: Prepared by MPE based upon review of the documents available.

Currently, Springbank wastewater collection, treatment, and disposal systems are all private systems. There are no regional wastewater systems in Springbank.

Each of the current Conceptual Schemes requires each lot to have a caveat notifying the owner of the requirement to decommission their private system and connect to the County's regional wastewater system at the lot owner's cost if and when a regional system becomes available. The wastewater systems proposed by the majority of the current Conceptual Schemes are interim solutions pending the development of a regional servicing option.

Table 6.2 summarizes the wastewater policies stated in the respective Conceptual Schemes and other documents.



Development	Document Type	Author	Year	Wastewater System
Barnard	CS	Collins Development Consultants	2005	Proposes individual septic tanks / fields
Bingham Crossing	CS Wastewater Servicing Report	Urban Systems Urban Systems	2012 2012	Proposes communal collection with nearby schools, treatment plant, and disposal (spray irrigation)
Grand View Estates	CS	Municipal District of Rocky View No. 44	2005	CS simply states to meet CSASP (see Table 6.1)
Harmony	CS	Elbow River Land Corporation and Bordeaux Developments	2007	Proposes communal sewer system, on-site effluent treatment, spray irrigation, MOU to service Springbank Airport
Lariat Loop	CS	Focus	2006	Proposes individual septic and tile field systems
Moddle	ASP	Municipal District of Rocky View No. 44	1998	Proposes individual septic tank and tile fields
Montebello	CS	Brown & Associates Planning Group	2005	Proposes on-site septic tanks and fields or pump-out tanks
	CS	C2W Planning + Design	2005	Refers to 2004 Jubilee Engineering report
Murray Lands	Sanitary Sewer Servicing Report	Jubilee Engineering	2004	Proposes private sewage disposal systems (septic tanks and fields) including decommissioning plan for future connection to County regional system
Partridge View	CS	Torus Engineering	2007	Proposes private sewage disposal systems (septic tank and dispersal field) until regional system implemented then connection at lot owners cost
Robinson Road	CS	Croft Engineering	2007	Proposes individual septic and tile field systems
Springbank Airport	Design Report	MPE Engineering and EBA Engineering	2009	Existing lift stations, sanitary mains, and dual sewage lagoons with spray irrigation of effluent (eventual removal of the lagoons and connection to a regional or decentralized system is recommended to accommodate future development)

Table 6.2:	Springbank	Developments	Wastewater	Servicing
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Development	Document Type	Author	Year	Wastewater System
Springbank Creek	CS	Brown & Associates and Westhoff	2007	Proposes communal advanced Orenco system pending regional system connection
		Resources		
Timberstone	CS	Timberstone Development Corp.	2005	Proposes private sewage system (septic tank and field)
Wilson	CS	Municipal District of Rocky View No. 44	2007	Proposes private sewage system (septic tank and field) and requirement to connect to regional system when available

Source: Prepared by MPE based upon review of the documents available.

A number of regional wastewater servicing options may result from the Harmony development or the Bingham Crossing development, as each of these Conceptual Schemes proposes a communal wastewater treatment system that could be expanded to a regional system. These two proposed communal wastewater treatment sites are depicted on *Figure 8*.

The most recent, overriding technical document is the *Springbank Area Wastewater System Master Plan* (Morrison Hershfield, 2002). It states the following issues with the existing wastewater systems in Springbank:

- In some cases, poorly maintained
- In some cases, poorly conceived
- In some cases, simply ignored
- Mainly primary treatment, very little secondary treatment
- Deterioration
- Deferred maintenance
- Unreliable wastewater treatment with disposal in drainage ditches with outfalls to Bow and Elbow Rivers
- Under-pricing of services

In general, this is a very comprehensive document but it is becoming outdated, especially given more recent development policies adopted by the County.



As put forward in RVC's Policy 449, the economic feasibility of proposed wastewater systems or wastewater servicing strategies will need to account for the life-cycle costs required to reach a breakeven point, including the following factors:

- construction
- operation
- maintenance
- replacement
- projected utility rates
- number and type of users

The flow chart in **Table 6.3** illustrates the requirements and options for developers for wastewater treatment systems based on Rocky View County's Policy 449. Policy and Procedure 499, as well as RVC's new Servicing Standards, outline the "cost and sustainability feasibility report" required to be submitted to the County for proposed wastewater treatment systems. This "cost and sustainability feasibility report", prepared by the developer, is to provide the County with information on the following:

- Timing of facility transfer to the County,
- Utility billing costs for connecting users,
- Expandability of the system,
- Identification of the "affordable utility billing rate" for the proposed development,
- Minimum number of connecting users to achieve affordability,
- Design life,
- Ease of maintenance and operation,
- Full life-cycle cost including construction, operation, maintenance, and replacement, and
- Number and type of users required to reach the breakeven point.







Notes:

- 1. Feasibility is based on Rocky View County's Policy 449 and Procedure 449.
- Ultimately, the feasibility of a proposed system is determined at RVC Council's discretion.



6.2 Updates Required

A regional wastewater servicing strategy is suggested to plan for efficiently servicing the proposed development expected in Springbank. The *Springbank Area Wastewater System Master Plan* (Morrison Hershfield, 2002) could be used as a base document to create a revised and updated wastewater system master plan. The original 2002 document outlines the existing systems, projected sewer flows, and estimated costs for future wastewater collection options. All of these could be updated based on the County's latest information and goals.

This wastewater servicing strategy would identify and delineate where regional or decentralized systems are best suited. The location and timing of future regional or decentralized wastewater systems would depend on the economic feasibility as well as the actual development and growth pattern in Springbank. This will ensure that a new or revised Springbank ASP references a wastewater servicing strategy that is consistent with Rocky View County's Policy 449, *Performance Requirements for Wastewater Treatment Systems*.

The definition of "feasibility" required to effectively use the flow diagram (*Table 6.3*) could be refined in a new regional wastewater servicing strategy. Ultimately, the feasibility of a proposed system is determined at RVC Council's discretion.

A regional wastewater servicing strategy would identify the location of a regional wastewater treatment plant(s) and the trunk forcemain(s). Currently, new developments have a requirement to plan for connection to a future regional system, but have no direction as to where and at what elevation to install their gravity sanitary mains and future lift station(s). A regional wastewater servicing strategy would provide capital costs estimates for input into an off-site levy or cost contribution mechanism. Preparation of the regional wastewater servicing strategy itself could be included in the levy costs.

While there are a number of potential connections for wastewater from surrounding municipalities (i.e. Cochrane, Calgary, etc.), this study provides comment strictly on RVC solutions.



6.3 Consistency in Standards

Currently, proposed developments do not have a strong incentive to implement a regional wastewater treatment system. As well, spray irrigation of treated wastewater effluent is declared an inappropriate method of sewage disposal by the CSASP but not the NSASP. Both Harmony and Bingham Crossing are proposing spray irrigation of treated effluent and it is currently used at the Springbank Airport. It would be helpful to develop criteria to determine where spray irrigation of treated effluent will be approved including setbacks required, such as those put in place by Alberta Environment and Sustainable Resource Development for lagoons and other wastewater treatment facilities.

The Springbank Area Wastewater System Master Plan (Morrison Hershfield, 2002) recommends that the County adopt the City of Calgary Specifications for Sewers. Instead, the County is adopting new Servicing Standards this year, which refer to the City of Calgary Standards where necessary, for general consistency of construction and contractor understanding in the region.

6.4 Suggestions

- 1. Using the existing *Springbank Area Wastewater System Master Plan* (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Wastewater System Master Plan to be consistent with Policy and Procedure 449 (Wastewater Treatment) and address the issues discussed in this study, particularly developing a regional wastewater servicing strategy, harmonizing with the County's Servicing Standards, and recognizing the County's recent efforts to mitigate a number of issues identified in the 2002 document with respect to Springbank's existing wastewater systems, namely, poor maintenance, minimal secondary treatment, and general deterioration.
- Develop criteria to determine where spray irrigation of treated effluent is most appropriate and include setback requirements, which may be based on those already in place with Alberta Environment and Sustainable Resource Development for lagoons and other wastewater treatment facilities.



7.0 STORMWATER MANAGEMENT AND DISCHARGE

7.1 Stormwater Management

Stormwater management is an essential component of development. Managing runoff through defined drainage courses can improve residents' quality of life by managing flood risk, avoiding property damage, and maintaining infrastructure.

Stormwater systems are generally categorized in Alberta as *minor* and *major* systems. In a typical urban area the minor system is a buried pipe system with catch basin inlets. The minor system is typically designed to accommodate a five-year return period storm even (or less). The major system is the parallel system of roadways and overland conveyance routes that safely convey runoff from large storm events (i.e. 100-year return period). In Rocky View County, most developments consist of roadside ditches and culverts which act both as major and minor systems. To remain effective, these ditches and culverts must remain clear of blockages such as fill or ice, and should be protected by easements where appropriate.

7.2 Best Management Practices

Stormwater management practices in Alberta now implement Best Management Practices (BMPs). BMPs are general approaches based on known science that help achieve desired performance and environmental objectives. BMPs and guideline documents exist to help proposed development activities comply with legislation, regulations, and policies put in place by Rocky View County. Some examples of BMPs include:

- Using grassed swales and natural drainage courses for runoff.
- Keeping ground disturbance and slopes to a minimum to avoid erosion and sedimentation.
- Implementing sediment and erosion controls during and after construction.
- Constructing storage facilities to control runoff quantity and quality (i.e. ponds, wetlands, etc.).
- Adopting a unit area release rate (UARR) that sets a maximum allowable runoff flow from a new development.
- Starting to adopt volume targets to also control runoff volume from sites.



The unit area release rate (UARR) is established through hydrological modelling as a maximum allowable unit area flow that limits peak discharge from new developments given the increase in impervious surface area. The UARR is typically determined by modelling, often using a local hydrological model (for individual sites) or a frequency analysis where stream flow data is collected and analyzed (for larger catchments or basins). Regression equations are applied to the flow data, and the resulting UARR is calculated for the design rainfall event. Generally the intent is to limit flow rate to a pre-determined "pre-development" flow rate.

Similarly, in the past few years, numerous municipalities are also establishing volume controls, such that post-development runoff volumes more closely mimic pre-development conditions. New development not only increases runoff flow rates, but also increases runoff volume. Emerging Low Impact Development (LID) techniques are being developed and have recently been introduced in Alberta. Promising LID techniques such as rains gardens, thicker topsoil, and water re-use are being adapted for widespread use in Alberta. Large municipalities have recently developed LID guidance documents (i.e. City of Calgary), and some watershed plans have developed volume targets (i.e. Nose Creek).

7.3 Review of Stormwater Management Documents

Master Drainage Plans (MDPs) are prepared by municipalities and/or developers to outline the specific strategy for stormwater management in a specific area. The CSASP defines a MDP as "*a drainage plan for a sub-basin or watershed that identifies drainage management concepts within the existing topography, as well as the physical biological resources of the area*".

Stormwater Management Plans (SWMPs) are required by Rocky View County at the Conceptual Scheme stage. SWMPs address on-site storm water retention, demonstrate that post-development flows equal pre-development flows, and describe the method of on-site containment during a 1:100 year storm event. Recommended BMPs to improve water quality and address water quantity are suggested by the CSASP to be included in SWMPs.

The CSASP recommends "that Site Implementation Plans (SIPs) be submitted at the time of development permit application" (Municipal District of Rocky View No. 44, 2001). SIPs detail how



drainage and stormwater will be managed on a developed site in accordance with a MDP. SIPs detail site specific BMP implementation within a sub-basin.

A review of stormwater management guidelines adopted by the County for the Springbank area is carried out to assess the validity and sufficiency of the recommended stormwater policies, and to better understand if SWMPs for new subdivisions are meeting the general intent of the County's guidelines. *Table 7.1* summarizes the broader reference documents, while *Table 7.3* provides a comparison of various development studies. The various documents are further referenced in Section 9.0.

Two overriding documents, in particular, help to guide current stormwater management in the Springbank area:

- A Report on Drainage Strategies for Springbank (Westhoff Engineering, 2004), and
- Central Springbank Area Structure Plan Sub-Basin Study (Westhoff Engineering, 2001).

The other major policy and stormwater management documents are summarized in **Table 7.1**. These other overriding documents act as background documents to govern stormwater management in Springbank.

Document Name	Author	Year	Comment
Servicing Standards	Rocky View County	2013	Adopted May 28, 2013 - covers cost feasibility and sustainability, provincial approvals, studies, design parameters, construction, and LID
Policy 431 Stormwater System Management	Rocky View County	2011	Defines the County roles, responsibilities, and practices regarding ownership, operation, and maintenance of off-site stormwater facilities
Sub-Regional Stormwater Management Plan for Horizon View Road	Westhoff Engineering Resources	2011	Applies to the Timberstone CS as well as the existing neighborhood of Horizon View Estates. Adheres to the 2004 Westhoff Engineering recommendation of 1.7 L/s/ha UARR for the 1:100 year design

Table 7.1:	Stormwater Policy and Standards Documents
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Document Name	Author	Year	Comment
			storm event. This study was commissioned on account of concerns raised over proposed drainage systems put in place to alleviate drainage complications experienced during the 2005 flood.
Policy 419 Riparian Land Conservation and Management	Rocky View County	2010	States the requirement for various Stormwater Management Plans and erosion and sedimentation control plans for developments
Policy 420 Wetland Conservation and Management	Rocky View County	2010	States the requirement for various Stormwater Management Plans and erosion and sedimentation control plans for developments
Background Servicing Study	Team ISL	2008	Provides technical stormwater background to the 2009 Team ISL <i>Growth Management Strategy</i> – covers the entire County, not specific to Springbank
A Report on Drainage Strategies for Springbank	Westhoff Engineering Resources	2004	This is the current governing report on stormwater for Springbank. A UARR of 1.714 L/s/ha for the 1:100 year design storm event is recommended.
Central Springbank Area Structure Plan (CSASP)	Municipal District of Rocky View No. 44	2001	Details sub-basin management goals, SWMPs, SIPs, and BMPs. Requires a MDP and/or SIP including possible BMPs with CS applications.
Central Springbank Area Structure Plan Sub-Basin Study	Westhoff Engineering Resources	2000	Assesses the Central Springbank area in terms of stormwater management and delineates the sub-basins.
Servicing Standard 700.0 Stormwater Management	Municipal District of Rocky View No. 44	1999	To be superseded by new Servicing Standards
North Springbank Area Structure Plan (NSASP)	Municipal District of Rocky View No. 44	1999	Requires a SWMP at Development Permit application and encourages on-site retention of stormwater.

Source: Prepared by MPE based upon review of the documents available.

7.3.1 Central Springbank Area Structure Plan Sub-Basin Study (Westhoff Engineering, 2000)

The stormwater portion of the *Central Springbank Area Structure Plan Sub-Basin Study* (Westhoff Engineering, 2000) delineates the different catchment areas in Springbank and outlines policies and



procedures to be implemented at the site level to manage stormwater. Nine sub-basins are defined, four of which drain to the Bow River and five of which drain to the Elbow River. These same sub-basins have been adopted in this context study for continuity; however, two sub-basins, one for both the Bow River basin and the Elbow River basin, have been added using GIS information and Agriculture and Agri-Food Canada's *Watershed Delineation Tool* (see *Figure 9*). A number of principles are outlined in the sub-basin study:

- The need to maintain post-development rates of stormwater runoff that do not exceed predevelopment rates on both a regional and site specific basis.
- A stormwater management program for any new development should be implemented through the use of Master Drainage Plans (MDPs).
- MDPs should be adopted by RVC Council to provide direction for development within each subbasin.
 - a) MDPs will form the essence of stormwater management within each sub-basin.
 - b) MDPs are the responsibility of the municipality.
 - c) BMPs are to be introduced.
- Notable policies to be included in the MDPs:
 - a) Agricultural lands (new or expanded) are to incorporate BMPs.
 - b) Policies are to improve BMPs already in place.
 - c) Water flow measurements are to be recorded at confluences of water courses in each sub-basin.
 - d) Regular maintenance of ditches and culverts is to be defined.
 - e) Participation in discussions with stakeholders is to be required.
 - f) MDPs are to define management goals, identify constraints, develop management strategies, identify BMPs, and adopt UARRs estimated by sub-basin studies.

Site Implementation Plans are also introduced in the CSASP Sub-Basin Study. A number of policies are suggested:

- a) Peak discharge limits are introduced.
- b) Site implementation Plans are to be prepared by the developer in accordance with MDP. These plans are to identify methods by which post-development runoff will not exceed predevelopment rates of discharge.



c) *Site Implementation Plans* are to adopt sensitive grading and minimal disturbance to reduce sedimentation.

7.3.2 A Report on Drainage Strategies for Springbank (Westhoff Engineering, 2004)

The *Report on Drainage Strategies for Springbank* (Westhoff Engineering, 2004) provides a broader perspective on stormwater in the greater Springbank area, with the objective of better defining stormwater management goals and constraints. This study expands upon the *CSASP Sub-Basin Study* (Westhoff Engineering, 2000); formulating alternative solutions and management strategies as well as describing appropriate BMPs and their implementation. In addition, it suggests that specific concerns for Site Implementation Plans are to be identified.

The report identifies that UARRs for different catchments in the Springbank region should be determined by frequency analysis. The report includes a data collection program conducted to confirm general drainage characteristics, locate culverts, and determine drainage boundaries. Eight *Water Survey of Canada* gauges are used in a frequency analysis, where probability distribution functions are fitted to existing data. By applying regression analysis equations to the Springbank area flow rates for specific return periods, unit area release rates (UARRs) are obtained as summarized in *Table 7.2.*

	UARR (L/s/ha)					
Return Period (Years)	1:2	1:5	1:10	1:20	1:50	1:100
Average	0.581	0.947	1.152	1.328	1.546	1.714

Table 7.2: Unit Area Release Rates for the Springbank Area (L/s/ha)

Source: A Report on Drainage Strategies for Springbank, Westhoff Engineering, 2004.

The report recommends that RVC conduct flow monitoring at strategic locations in order to generate a local flow record, since the limited data available represents a degree of uncertainty. The proposed flow monitoring would help determine a more accurate UARR. Other recommendations from this study include:

- Conservation easements should be put in place along all existing drainage courses.
- Unit area release rate of 1.714 L/s/ha should be adopted for the 1:100 year design storm event discussed in the report.
- Appropriate BMPs should be included in an updated version of the County's Servicing Standards.



7.4 Review of Conceptual Schemes and Stormwater Management Plans

7.4.1 General

Local Area Structure Plans (ASPs), Master Drainage Plans (MDPs), and Conceptual Schemes (CSs) for the Springbank area are reviewed for consistency with the broader ASPs and stormwater policies adopted by RVC. Current County policy requires that developers first submit a Conceptual Scheme (CS) that may include a Stormwater Management Plan (SWMP). Analytical methods for developing the various SWMPs are compared for consistency. In general, most SWMPs follow the unit area release rate method described in the *Report on Drainage Strategies* (Westhoff Engineering, 2004). *Table 7.3* provides a summary of the SWMPs and the respective assumptions adopted in several Conceptual Schemes.

Methods of analysis for stormwater management were compared for consistency. Most Stormwater Management Plans have been following the unit area release rate method described in the *Report on Drainage Strategies* (Westhoff Engineering, 2004). See *Table 7.3* for a summary of the Stormwater Management Plans (SWMPs) and assumptions for several CSs.

7.4.2 Updates Required

While carrying out the comparative analysis summarized in **Table 7.3**, several inconsistencies in CS submission requirements are noted. Of the 13 Conceptual Schemes reviewed, four do not provide nor reference a Stormwater Management Plan for the development. The County should consider a requirement for Conceptual Schemes to be submitted with a Stormwater Management Plan, or at least a well developed Stormwater Management Concept Plan. This would better identify and develop mitigation measures for drainage issues early in the planning process, and allow the County to better identify impacts on downstream drainage courses. When multiple Conceptual Schemes are submitted, runoff from several areas may be directed to the same point and could cause conveyance issues downstream. *Figure 9* illustrates catchment areas in Springbank and locations of known drainage issues that will be discussed in the next section.



7.5 Known Stormwater and Drainage Issues

MPE met with Rocky View County Infrastructure and Operations personnel on February 28, 2013 to document known stormwater drainage issues in the area. A brief discussion of these areas follows. *Figure 9* identifies the locations of known drainage issues in the Springbank area.

The location of the drainage issues within each catchment can provide some insight as to whether the drainage issue is more local or regional in nature. If located at the bottom of a catchment, the problem is more regional, likely sourced to upstream development. If located at the top of a catchment, the problem is more local, likely remedied by improvements to local drainage courses and culverts.

A number of drainage issues are illustrated on *Figure 9* and a few are summarized here:

- Calling Horse Estates: Local slumping has occurred.
- Creek B1 and Bitonti Dam: In 2008 downstream of the Springbank Airport, the dam breached during a large storm event. The area continues to experience drainage and conveyance issues.
- Creek E4: experiences back up to the north, impacting residents
- Crocus Ridge: overflow drainage not available
- Edge School: saturated lands to the west
- Harmony: existing sloughs
- Huggard Road: A spring has developed in the area, homes have experienced basement flooding
- Murray Place: flooding and saturation since Morning Vista was developed
- Park Stables: high water table
- Range Road 31: South end has experienced local flooding in the rear yards of two acreages.
- Range Road 32: Ditches have experienced overflowing, road washout at Kestrel Ridge Farm
- Range Road 33: Flooding has occurred south of Springbank High School.
- Range Road 40: existing springs and sloughs
- Springbank Creek: Saturated lands including playing fields
- Various Locations: Stormwater issues such as springs, saturated land, and poor drainage routes
- Wilson CS: high water table and poor drainage



To avoid future drainage issues, it is important to not only analyze the on-site stormwater requirements (i.e. UARRs and Volume Limits), but to also look downstream to confirm the existing channels can properly carry the proposed flows. In some cases, existing downstream conditions are already restricted to a capacity that may be less than the upstream pre-development condition. In some cases, over the years, placement of private culverts or fill material within the downstream drainage course has created bottlenecks or diversions that could lead to flooding problems.

Should upstream development not recognize and plan for this, or mitigate downstream bottlenecks, then flooding and negative downstream consequences can occur. Dealing with the problem after the fact can result in a difficult situation involving developers, private landowners, the municipality, and the provincial regulator. Identifying and resolving this ahead of time provides more opportunity to avoid the issue in the planning and design stage, rather than during an emergency flood event. Good planning is a good solution. A downstream conveyance assessment should be carried out prior, ideally by the County as part of a larger comprehensive Stormwater Conveyance Plan, or by individual developments.

For example, at the Springbank Airport, a regional frequency analysis (McElhanney Consulting, 2008) determined an appropriate unit area release rate for the Springbank Airport area of 4.8 L/s/ha for the 1:100 yr storm. After field inspection of the downstream conveyance channel and identification of a 600 mm diameter culvert restricting flow, the adopted unit release rate from site was reduced to 0.8S L/s/ha (MPE 2009). This lower release rate was adopted in the detailed design.

In such cases, a value engineering decision may have to be made. The cost of upgrading the downstream channel versus sizing larger on-site upstream facilities is compared. A comprehensive Stormwater Conveyance Plan carried out ahead of time will provide valuable information and insight to determine the most practical and cost-effective solution.

With further development of country residential lots with individual septic fields for wastewater treatment expected, the importance for well defined drainage and conveyance plans is important. Along with the local soil conditions, septic fields add to the water balance and increase the drainage required. Septic fields mean more saturated soils and more water expected to run off.



In general, all the stormwater issues identified by the County to date should be further investigated, prioritized, and remediated as part of a broader Master Drainage Plan update.



Development	Year of SWMP	Consulting Firm for SWMP	Dwellings %Built as of September, 2012 ^[2]	Governing Study/Policy Referenced in SWMP	Release Rate Adopted	Storage Volume Modelling Approach	Notes on Downstream Conveyance Route	LID/BMPs Suggested in CS?
Barnard	2002	McElhanney Consulting Services Ltd.	3%	Mentions CSASP Sub- Basin Study (2000)	Uses predevelopment analysis	Uses different IDF parameters (894.425,3.004,0.769)	Flows to Crocus Ridge Estates and Un- named Creek B2.	BMPs
Bingham Crossing	2012	Urban Systems	0%	Springbank Drainage Strategies (2004)	1.714 L/s/ha	City of Calgary Water balance Spreadsheet and SWMHYMO	Flows to Calaway Park to the North branch of Springbank Creek.	BMPs and LIDs
Grand View Estates	No SWMP mentioned	No SWMP mentioned	100%	Springbank Drainage Strategies (2004)	No SWMP Mentioned	No SWMP Mentioned	Flows to bottom of Un-Named Creek E4 catchment leading to Elbow River. Passes through Montebello.	No SWMP Mentioned
Harmony	No SWMP mentioned	No SWMP mentioned	0%	No SWMP mentioned	No SWMP Mentioned	No SWMP Mentioned	Flows to un-named Creek B1.	No SWMP Mentioned
Lariat Loop	2005	Westhoff Engineering Resources Inc.	70%	Springbank Drainage Strategies (2004)	1.7 L/s/ha	Determined using SWMHYMO	Flows to Un-Named Creek B5, passes through Villosa Ridge.	BMPs
Montebello	No SWMP mentioned	No SWMP mentioned	100%	No SWMP mentioned	No SWMP mentioned	No SWMP Mentioned	Flows to bottom of Un-Named Creek E4 catchment leading to Elbow River.	No SWMP Mentioned
Murray Lands	2005	Jubilee Engineering Consultants Ltd.	100%	Springbank Drainage Strategies (2004)	1.7 L/s/ha	Determined using SWMHYMO	Flows to top of Branch of Cullen Creek catchment. Passes through Windhorse Manor.	BMPs
Partridge View	No SWMP mentioned	No SWMP mentioned	87%	No SWMP mentioned	No SWMP mentioned	No SWMP Mentioned	Flows to top of Cullen Creek Catchment. Passes through Country Estates, Cullen Creek Estates.	No SWMP Mentioned
Robinson Road	2007	Croft Engineering Ltd.	100%	Springbank Drainage Strategies (2004)	1.7 L/s/ha	Determined using SWMHYMO	Flows to top of Easterly branch of Cullen Creek.	BMPs
Springbank Airport	2009	MPE Engineering Ltd. and EBA Engineering Consultants Ltd.	N/A	Springbank Drainage Strategies (2004) and Downstream Culvert Capacity	0.85 L/s/ha	Determined using SWMHYMO	Flows to top of easterly branch of Un- Named Creek B1. Drainage issues downstream.	Storm Pond. Reduced outlet capacity.
Springbank Creek	2007	Westhoff Engineering Resources Inc.	2%	Springbank Drainage Strategies (2004)	1.7 L/s/ha	Determined using SWMHYMO	Flows to large subdivision at bottom of Springbank Creek catchment.	BMPs and LIDs
Timberstone	No SWMP mentioned	No SWMP mentioned	69%	No SWMP mentioned	No SWMP mentioned	No SWMP mentioned	Flows to top of Cullen Creek catchment.	No SWMP mentioned
Wilson	No SWMP mentioned	No SWMP mentioned	52%	No SWMP mentioned	No SWMP mentioned	No SWMP mentioned	Flows to north branch of Springbank Creek. Passes through Springbank Creek development.	No SWMP mentioned

Table 7.3: Com	parison of Stormwater	Analyses for Develo	pments in the Springbank Area
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 Sources:
 [1] Prepared by MPE based upon review of the individual Conceptual Scheme documents and Stormwater Management Plans available as well as GIS data provided by Rocky View County.

 [2] Percentage dwellings built based upon Rocky View County, 2012; "Land Inventory and Residential Development Capacity", September 5, 2012.

7.6 Summary of Stormwater Findings

Major findings after reviewing the available documents pertaining to stormwater management in the Springbank area are as follows:

- 1. There are a number of problem drainage areas along existing conveyance routes.
- 2. A number of Conceptual Schemes do not have an accompanying Stormwater Management Plan.
- 3. Most of the currently approved Stormwater Management Plans for a number of Conceptual Schemes adopt 1.7 L/s/ha as a unit area release rate as proposed by the *Springbank Drainage Strategies* (Westhoff Engineering, 2004), but downstream channel restrictions have not been field confirmed to verify this capacity exists along all outfall channels.
- 4. The majority of the currently approved Stormwater Management Plans use the hydrological model SWMHYMO exclusively to calculate the required stormwater pond storage volumes, rather than also confirming with a continuous model such as QHM.
- 5. RVC Servicing Standards with regards to stormwater management and wetland conservation are not explicitly referenced in a number of Stormwater Management Plans.

7.7 Suggestions

- 1. Prepare an updated Master Drainage Plan for Springbank which builds upon the *Report on Drainage Strategies for Springbank* (Westhoff Engineering, 2004). The Master Drainage Plan would:
 - a. Set general policies for all of the sub-basins identified on *Figure 9*.
 - b. Reference current County stormwater policies for new developments to adhere to and reference the newest RVC Servicing Standards.
 - c. Develop specific policies for specific sub-basins given each sub-basin's unique situation, including allowable release rates and volume targets.
 - d. Document the existing problem areas.
 - e. Prioritize the problem areas to be addressed first.
 - f. Recommend more detailed Stormwater Conveyance Plans for one or more sub-basin conveyance routes, based upon the developments proposed as well as the problem issues identified. Each plan would identify in more detail obstructions to flow, potential solutions, and estimates of cost to remedy.
- 2. Prepare a Stormwater Conveyance Plan for each sub-basin on a prioritized basis. Each plan would be equivalent to a "storm trunk" study and would be similar in format to the Bearspaw

Drainage Assessments carried out for the Meadow Drive and Bearspaw Hills areas. Upon completion, each Stormwater Conveyance Plan would be used to create a capital improvement plan. This capital plan could be used to develop a levy or cost contribution mechanism to recover County costs associated with improving conveyance routes.

- 3. Until such time as a broader Conveyance Plan is in place for any particular area, a review of downstream constraints (culvert restrictions, conveyance issues) should be required of Stormwater Management Plans in new developments.
- 4. Stormwater Management Plans for individual developments should include:
 - a. A requirement that an easement (generally 6 metre wide minimum) should be provided along all stormwater conveyance routes through the development at the time of subdivision. For off-site easements downstream of any particular development site, developers and the County may cooperate in securing appropriate easements in critical locations.
 - b. A requirements to adopt BMPs (and LIDs) as appropriate within new developments, as stated in the Central Springbank ASP.
 - c. A requirement to identify water testing requirements, standards, and engineering specifications, including reference to the County's latest standards and policies.
- The local ASPs should be amended to reference any updated County document, such as the Master Drainage Plan proposed or other documents.
- 6. The County should continue to require a Stormwater Management Plan, or at least a well developed Stormwater Management Concept, be submitted along with any new Conceptual Schemes. The document should be prepared by an engineering professional experienced in stormwater management.



8.0 SUMMARY OF SUGGESTIONS

GENERAL PLANNING CONSIDERATIONS

Although this study is primarily a review of existing technical (engineering) support documents, from a review of the existing planning documents a number of recurring themes are identified and summarized here. Addressing and assessing these are beyond the scope of this document, but are summarized for consideration by the County's planning staff.

- 1. Reference any new or updated technical documents, upon their approval, within any new or revised Springbank Area Structure Plans.
- 2. Preservation of agricultural land is stated as a goal in the Central Springbank Area Structure Plan (CSASP) and the County Plan (June 25, 2013 First Reading Version).
- 3. From a cost effective infrastructure / engineering perspective it makes sense to prioritize by focussing new development in current planned areas, and to consider phasing. As stated in the 2009 Springbank Context Study, and proposed in the new County Plan, consider encouraging full build-out of specific Conceptual Schemes individually rather than spreading the growth out over the entire study area.
- 4. As recommended in the CSASP, if gravel deposit protection is a County value, then any new or revised ASP will require developments to identify any gravel deposit, define the possible mining activity, and phase the development appropriately.
- 5. As recommended in the North Springbank Area Structure Plan, future land use considerations are to acknowledge the future Springbank Airport expansion plans and ensure compatible land uses are developed adjacent to the airport. Conceptual Schemes could be required to identify any constraints due to the airport's land use consideration surfaces and the noise exposure forecast. The Springbank Airport's land use considerations could potentially affect both the NSASP and the CSASP.
- 6. A number of engineering studies are recommended in this report and many of these studies will likely lead to upgrades required to the existing infrastructure in Springbank. A few mechanisms that the County may consider using to implement these studies and upgrades are:
 - a. Cost recoveries from developers based on development triggered studies.
 - b. Studies paid for by developers.
 - c. Cost recoveries (capital and interest) for infrastructure upgrades via an off-site levy.
 - d. Cost contribution agreements with developers for RVC to recover costs for infrastructure upgrades triggered by development with provisions of "endeavours to assist" to recover costs from future developers.



ENGINEERING CONSIDERATIONS

TRANSPORTATION

- 1. Continue to follow the existing master transportation plan (*Greater Springbank Functional Study* (GSFS), Urban Systems and iTrans Consulting Inc., 2008).
- 2. Require Traffic Impact Assessments with any future Conceptual Schemes.
- 3. Compare actual development versus growth assumptions every five years to confirm validity of the GSFS and consequentially, the Transportation Off-Site Levy Bylaw.
- 4. Consider updating the GSFS if the new County Plan limits growth to less than that assumed in the GSFS, or if the overall County transportation model is updated.
- 5. Consider updating the Transportation Off-Site Levy Bylaw if Item 4 is considered.
- 6. Consider updating the non-conforming CSs to recognize the GSFS.

WATER

- Using the existing Springbank Area Water System Master Plan (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Water System Master Plan to address the issues discussed in this study, particularly developing a regional water servicing strategy, coordinating with RVC's new Servicing Standards, and mitigating the County's limited capacity to upgrade, maintain, or replace water system infrastructure due to the current fractured ownership of the Springbank water systems.
- 2. Reference Bylaw C-7152-2012 of Rocky View County (Fire Hydrant Water Suppression) as well as the new RVC Servicing Standards in any new or revised ASP.
- 3. Continue to promote water conservation and water consumption reduction measures in any new ASP in order to maximize water service efficiencies and optimize capital expenditures.

WASTEWATER

- 1. Using the existing Springbank Area Wastewater System Master Plan (Morrison Hershfield, 2002) as a base, prepare an updated Springbank Wastewater System Master Plan to be consistent with Policy and Procedure 449 (Wastewater Treatment) and address the issues discussed in this study, particularly developing a regional wastewater servicing strategy, harmonizing with the County's Servicing Standards, and recognizing the County's recent efforts to mitigate a number of issues identified in the 2002 document with respect to Springbank's existing wastewater systems, namely, poor maintenance, minimal secondary treatment, and general deterioration.
- 2. Develop criteria to determine where spray irrigation of treated effluent is most appropriate and include setback requirements, which may be based on those already in place with Alberta



Environment and Sustainable Resource Development for lagoons and other wastewater treatment facilities.

STORMWATER

- 1. Prepare a Master Drainage Plan for Springbank which builds upon the *Report on Drainage Strategies for Springbank* (Westhoff Engineering, 2004). The Master Drainage Plan would:
 - a. Set general policies for all of the sub-basins identified on *Figure 9*.
 - b. Reference current County stormwater policies for new developments to adhere to and reference the newest RVC Servicing Standards.
 - c. Develop specific policies for specific sub-basins given each sub-basin's unique situation, including allowable release rates and volume targets.
 - d. Document the existing problem areas.
 - e. Prioritize the problem areas to be addressed first.
 - f. Recommend more detailed Stormwater Conveyance Plans for one or more sub-basin conveyance routes, based upon the developments proposed as well as the problem issues identified. Each plan would identify in more detail obstructions to flow, potential solutions, and estimates of cost to remedy.
- 2. Prepare a Stormwater Conveyance Plan for each sub-basin on a prioritized basis. Each plan would be equivalent to a "storm trunk" study and would be similar in format to the Bearspaw Drainage Assessments carried out for the Meadow Drive and Bearspaw Hills areas. Upon completion, each Stormwater Conveyance Plan would be used to create a capital improvement plan. This capital plan could be used to develop a levy or cost contribution mechanism to recover County costs associated with improving conveyance routes.
- 3. Until such time as a broader Conveyance Plan is in place for any particular area, a review of downstream constraints (culvert restrictions, conveyance issues) should be required of Stormwater Management Plans in new developments.
- 4. Stormwater Management Plans for individual developments should include:
 - a. A requirement that an easement (generally 6 metre wide minimum) should be provided along all stormwater conveyance routes through the development at the time of subdivision. For off-site easements downstream of any particular development site, developers and the County may cooperate in securing appropriate easements in critical locations.
 - b. A requirements to adopt BMPs (and LIDs) as appropriate within new developments, as stated in the Central Springbank ASP.
 - c. A requirement to identify water testing requirements, standards, and engineering specifications, including reference to the County's latest standards and policies.
- 5. The local ASPs should be amended to reference any updated County document, such as the Master Drainage Plan proposed or other documents.
- 6. The County should continue to require a Stormwater Management Plan, or at least a well developed Stormwater Management Concept, be submitted along with any new Conceptual



Schemes. The document should be prepared by an engineering professional experienced in stormwater management.

ENGINEERING STUDIES

Table8.1 summarizes the studies and updates suggested within this report.

Table 8.1: Suggested Studies

Suggestion	Timing
PLANNING	
1. Update the non-conforming CSs to meet	To be considered at the next stage of development for
the GSFS assumptions	each non-conforming CS
TRANSPORTATION	
1. Update the Master Transportation Plan	To be considered if updated County Plan shows actual or estimated growth is significantly different from the assumptions of the GSFS. This is likely, as the population forecasts will likely be reduced.
2. Update the Transportation Off-Site Levy Bylaw	To be considered if the GSFS is updated.
3. Traffic Impact Assessments	Suggested to be required with each CS submission.
WATER & WASTEWATER	
1. Update the Springbank Water System Master Plan	Due for consideration to update 2002 report.
2. Update the Springbank Wastewater System Master Plan	Due for consideration to update 2002 report.
STORMWATER & DRAINAGE	
1. Prepare a Springbank Master Drainage Plan	Due for consideration to update 2004 report.
2. Prepare Stormwater Conveyance Plans for each sub-basin or groups of aggregated sub- basins	To be considered as part of or upon completion of a Springbank Master Drainage Plan and prioritized based on areas with drainage issues as well as existing and ongoing development pressures
3. Stormwater Management Plans	Suggested to be required with CS submission

Note: For further information on the requirements of these suggested studies, their timing, and the triggers that identify their need please refer to the main body of this report.



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FIGURES


































