Village of New Minas
Commission Meeting
April 13, 2026 @ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

1. Call to Order
2. Approval of the Agenda
3. Disclosure of Conflict of Interest
4. Approval of Minutes:
    a. February 9, 2026, Village Commission Meeting
5. Presentations:
    a. Municipality of the County of Kings – Planning – Application to Rezone PID 55210884 from R3 to R4
    b. Village of New Minas Strategic Plan – Craig Kennedy
6. Business Arising from Minutes:
    a. Aggressive Coyote Season Notification – No Response from Department of Natural Resources
7. Comments from the Chair
8. Public Input Specific to Agenda Topics
9. Committee Reports:
    a. Beautification Committee — Draft Minutes included in the package
    b. Finance & Audit Committee — No meeting since last report
    c. Access and inclusion Working Group — Draft notes not available at this time
    d. New Minas Water Commission — Draft minutes included in package
    e. Regional Sewer Committee — Draft notes not available at this time
10. Staff Reports:
    a. Clerk Treasurer/CAO — Report included in package
    b. Director of Public Works — Report included in package
    c. Manager of Finance — Report included in package
    d. Director of Recreation – Report included in Package
11. New Business:
    a. Briefing – Provincial Budget 2026-27: Impacts on Municipal Grant Programs
    b. RFD – Request for Village Tax Exemption – Valley Roots Housing Cooperative
    c. Discussion – Timeline, Event and Process for Volunteer Appreciation Selections

12. Correspondence:

13. General Public Input

14. Closed Session
    a. Personnel

15. Adjournment

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AGENDA

4. Minutes

Village of New Minas
Commission Meeting
February 9, 2026 @ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
DRAFT MINUTES

Commissioners Present:

- Dave Chaulk, Chair
- James Redmond, Vice Chair
- Mary Munroe
- Debra Windle-Smith
- Quentin Hill

Commissioners Absent:

Staff Present:

- Jeff Lawrence, Clerk Treasurer/CAO
- John Ansara, Director of Recreation and Community Development
- Cory Palmer, Director of Public Works

Others Present:

- Christina Sappington
- Maynard Stevens

1. **Call to Order:**

   Dave Chaulk called the meeting to order at 7:00pm, welcoming those in attendance.

2. **Disclosure of Conflict of Interest:**

   No conflicts of interest were declared.

3. **Approval of the Agenda:**

   Motion:
   THAT the Agenda for the February 9, 2026, Commission Meeting be approved with the following additions:

   - Under Presentations - 20 Years Service Recognition – Shelly Palmer
   - Under New Business – Coyote Concern
   - Under In-Camera – Personnel matter

   M/Q. Hill
   S/ J. Redmond
   Motion Carried

4. **Approval of Minutes:**

   a. **January 12, 2026, Village Commission Meeting**

   Motion:
   THAT the Minutes for the January 12, 2026, Village Commission Meeting be approved.

   M/J. Redmond
   S/ Q. Hill
   Motion Carried

5. **Presentations:**

   a. **20 Years Service Recognition – Shelly Palmer**

   Chair D. Chaulk presented Shelly Palmer, Manager of Finance, with a certificate recognizing her 20 years service. Chair Chaulk took the opportunity to speak to Shelly Palmer's strong work-related attributes and thanked her for her service.

6. **Business Arising from Minutes:**

   a. **Strategic Planning Update**
   J. Lawrence updated the Commission regarding the status of the strategic planning project.

   b. **IT Audit Actions**
   J. Lawrence updated the Commission regarding the status of the IT audit.

7. **Comments from the Chair:**

8. **Public Input Specific to Agenda Topics:**

9. **Committee Reports:**

   a. **Beautification Committee**

   D. Windle-Smith provided a verbal summary of the draft minutes included in the February 9th, 2026, Commission agenda package.
   In addition, D. Windle spoke to welcoming the new members to the committee, the change to April 1st for the next committee meeting date, and the change in length for committee meetings from 60 to 90 minutes.

Motion:
THAT the draft minutes for the Beautification Committee be received as included in the February 9th, 2026, Commission agenda package and as verbally summarized by D. Windle-Smith.

M/D. Windle Smith
S/ J. Redmond
Motion Carried

b. Access and Inclusion Working Group

J. Ansara provided a review of the Access and Inclusion Working Group Report that is included in the agenda package.

Motion:
THAT the report for the Access and Inclusion Working Group be received as included in the February 9th, 2026, Commission agenda package and as verbally summarized by J. Ansara.

M/Q. Hill
S/ J. Redmond
Motion Carried

c. New Minas Water Commission

James Redmond provided a verbal summary of the draft minutes included in the February 9th, 2026, Commission agenda package.

Motion:
THAT the draft minutes for the New Minas Water Commission be received as included in the February 9th, 2026, Commission agenda package and as verbally summarized by J. Redmond.

M/J. Redmond
S/ Q. Hill
Motion Carried

d. Regional Sewer Committee

J. Redmond provided a verbal summary of the draft minutes included in the February 9th, 2026, Commission agenda package.

Motion:
THAT the draft minutes for the Regional Sewer Committee meeting be received as included in the February 9, 2026, Commission agenda package and as verbally summarized by J. Redmond.

M/J. Redmond
S/ D. Windle Smith
Motion Carried

10. Staff Reports:

a. CAO/ Clerk Treasurer

CAO/ Clerk Treasurer Lawrence provided a brief synopsis of the CAO/ Clerk Treasurer Report.

Motion:
THAT the CAO/ Clerk Treasurer report be received as included in the February 9, 2026, Commission agenda package.

M/D. Windle-Smith
S/ Q. Hill
Motion Carried

b. Public Works

The Director of Public Works provided a brief synopsis of the public works report. Additional points discussed included:

- The new hire will start with the department on February 10th.
- Zack Alcorn has resigned and we will begin the hiring process to replace him.
- The advertisements for the foreman position will be posted shortly.

Motion:
THAT the Director of Public Works report be received as included in the February 9, 2026, Commission agenda package.

M/M. Munroe
S/ D. Windle-Smith
Motion Carried

c. Finance

Motion:
THAT the Manager of Finance report be received as included in the February 9, 2026, Commission agenda package.

M/ J. Redmond
S/ Q. Hill
Motion Carried

d. Recreation and Community Development

The Director of Recreation provided a brief synopsis of the recreation report.

Motion:
THAT the Director of Recreation report be received as included in the February 9, 2026, Commission agenda package.

M/ Q. Hill
S/ D. Windle-Smith
Motion Carried

11. New Business:

a. Veteran's Service Recognition Book – Advertising Support Request

J. Lawrence presented an RFD for advertising funding support for the Veteran's Service Recognition Book from the Nova Scotia/Nunavut Command of the Royal Canadian Legion.

MOTION
THAT the Village of New Minas approve the purchase of a 1/10-page full-colour business card advertisement in the 2026 Veteran's Service Recognition Book at a total cost of $315, funded from the 2026/27 operating budget.

M/Q. Hill
S/ J. Redmond
Motion Carried

b. Coyote Concern

M. Munroe spoke to community concerns around aggressive coyotes in the area, especially during their mating season.
The CAO indicated that he would ask the Recreation Coordinator to post information regarding the concern on social media. It was suggested that the coordinator contact DNR to have them review the communique in advance of posting.

12. Correspondence:

13. General Public Input:

a. **Councillor Christina Sappington**
- The recent village hosted coasting event was well received by those that participated.
- On February 12th Kings County will host a planning information meeting. A potential rezoning of the New Minas Connector Road from resource to institutional, and a potential expansion of the New Minas Growth Centre are on the agenda.
- Information regarding the NSFM funding portal.

14. Closed Session:

Dave Chaulk indicated that there was a need for an in-camera session to deal with a personnel matter.

At 7:30pm, the Commission adjourned to move into a closed session.

Motion:
THAT the Commission adjourn to move into closed session.

M/J. Redmond
S/ D. Windle-Smith
Motion Carried

Motion:
THAT the Commission adjourn from the closed session.

M/ Q. Hill
S/ J. Redmond
Motion Carried

At 8:10pm the Commission reconvened the open session of the meeting.

15. Adjournment

There being no further business, Dave Chaulk called for a motion to adjourn at 8:12pm.

Motion:
THAT the meeting be adjourned.

M/ J. Redmond
S/ D. Windle-Smith
Motion Carried

Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
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AGENDA

5. Presentations

MUNICIPALITY of the COUNTY of KINGS

Municipality of the County of Kings
Report to the New Minas Village Commission

Application to rezone a property located on Commercial Street (PID 55210884), New Minas, from the Residential Mixed Density (R3) Zone to the Residential Multi-unit (R4) Zone.

File: 26-07

DATE: April 13, 2026

Prepared by: Planning Services

Applicant	Morgan Zwicker
Landowner	Eastern Acres Development Ltd.
Location	Commercial Street (PID 55210884), New Minas
Lot Area	~ 65,697 Sq.ft (1.5 Acre(s))
Designation	Residential Designation
Current Zone	Residential Mixed Density (R3) Zone
Surrounding Uses	Residential uses
Proposal	To rezone the subject property from the Residential Mixed Density (R3) Zone to the Residential Multi-unit (R4) Zone to enable the development of a multi-unit dwelling containing more than 12 units.
Reason for rezoning	The applicant intends to develop a single multi-unit dwelling on the subject property containing up to 34 units. This is not permitted by the current zoning. The property's current zoning permits multi-unit dwellings; however, the dwellings are limited to a maximum of 12 units per dwelling and require a minimum lot area of 2,000 sq.ft. per unit. Based on these requirements, the property's 65,697 sq.ft. area could only accommodate up to 32 units, which would have to be developed within three or more multi-unit dwellings. Rezoning to the Residential Multi-unit (R4) Zone could enable the proposal, as the zone permits multi-unit dwellings with no limit on the number of units per dwelling and an area requirement of 1,800 sq.ft. per unit, permitting up to 36 units on the property, which could be accommodated within a single multi-unit dwelling.
Enabling Policy	Policy 5.3.3 of the Municipal Planning Strategy (MPS) enables Council to consider rezoning land from one zone enabled in a designation to another enabled within the same designation. The property is located within the Residential Designation, and both the Residential Mixed Density (R3) Zone and the Residential Multi-unit (R4) Zone are enabled within the Residential Designation; as a result, Council is able to consider this rezoning.

Appendix

Maps

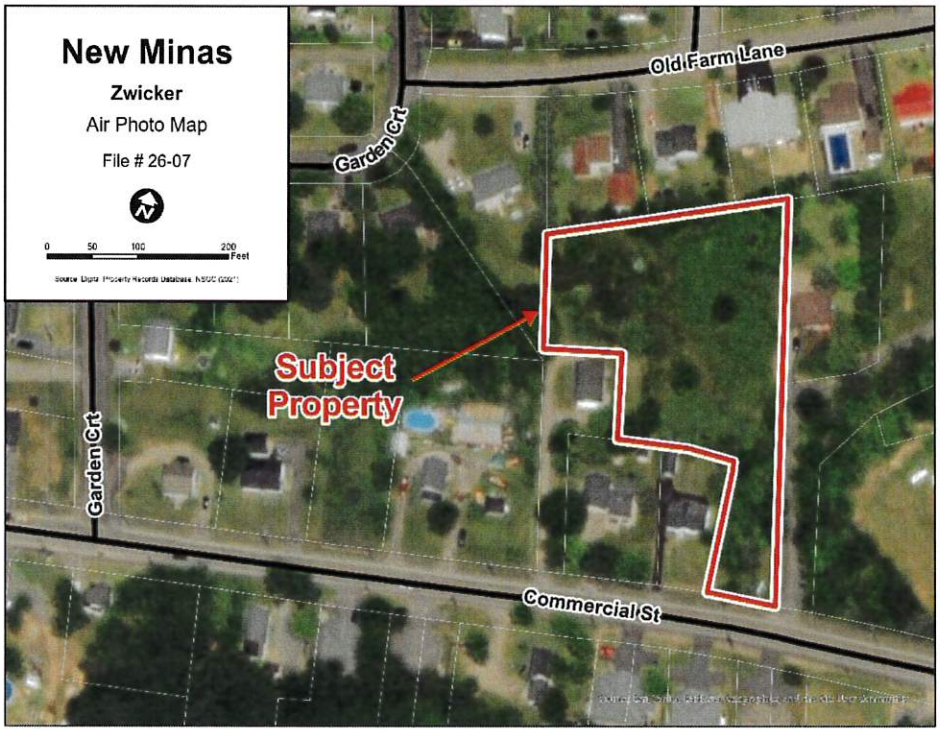


Figure 1: Aerial View of the subject property

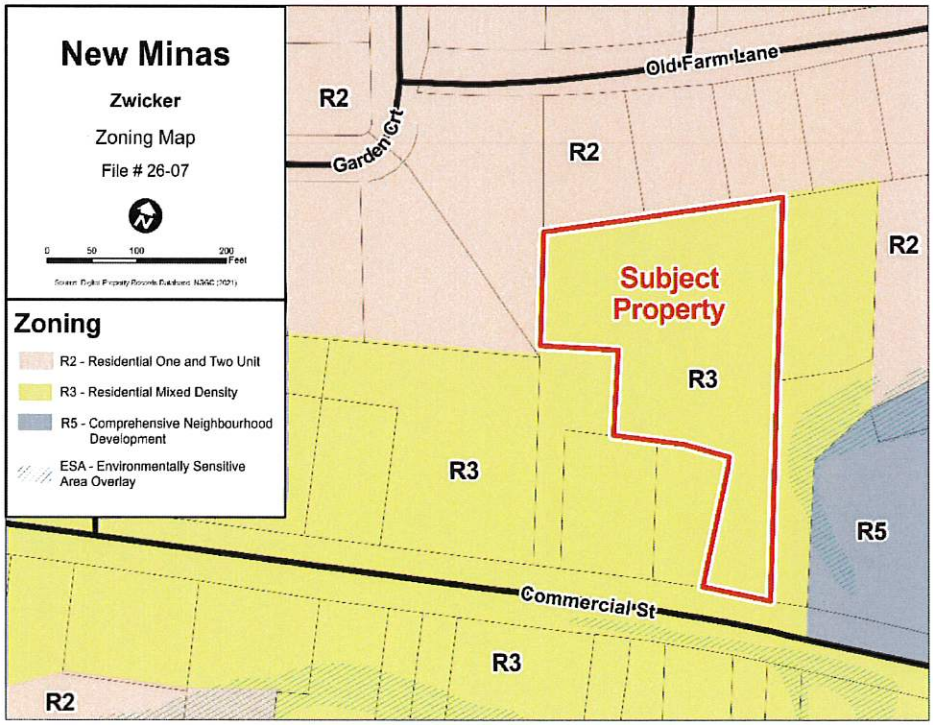


Figure 2: Zoning map

Land Use By-law Map Amendment/Rezoning

Commercial Street (PID 55210884), New Minas

Meeting: New Minas Village Commission
Date: April 13, 2026
Presenter: Alice Jacob, Planner

MUNICIPALITY of the COUNTY of KINGS

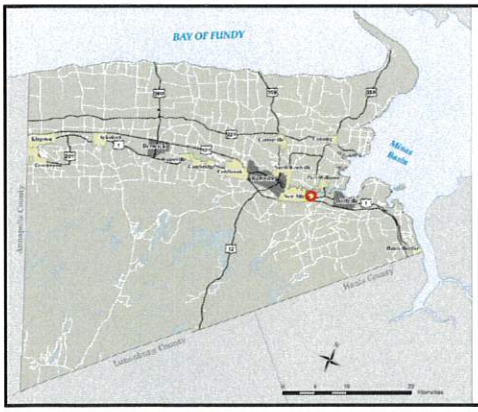
1

Application Process

1. Complete Application Received
2. PIM
3. Staff Review
Village Commission Meeting
4. Planning Advisory Committee
5. First Reading
6. Public Hearing
7. Second Reading
8. 14-day appeal period

2

2



Location

Commercial Street (PID 55210884), New Minas

3

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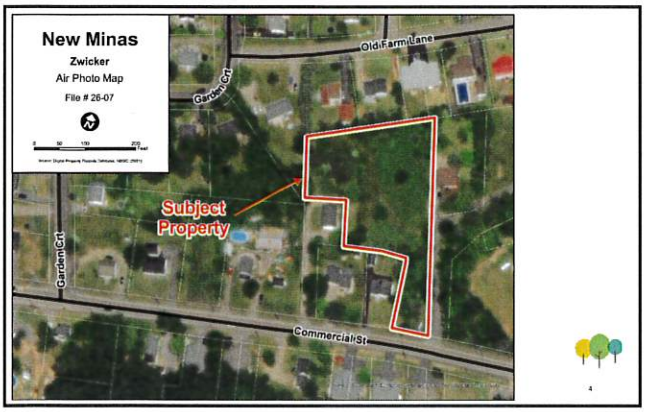

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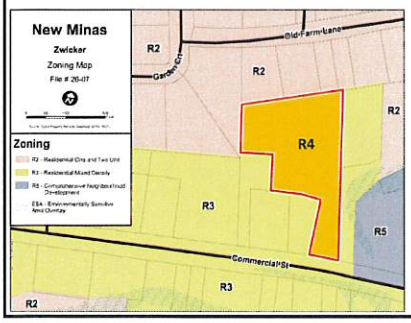
Proposal



- Intends to develop a multi-unit dwelling with approximately 34 units
- Not permitted in the current R3 Zone
- Proposed R4 Zone would enable the development

5

Proposal

Current (R3) Zone	Proposed (R4) Zone
One Unit dwelling	One Unit dwelling
Two Unit dwelling	Two Unit dwelling
Semi-detached dwelling	Semi-detached dwelling
Townhouses	Townhouses
Grouped dwellings	Grouped dwellings
Multi-unit dwelling - Max 12 units/dwelling	Multi-unit dwelling - No cap/dwelling

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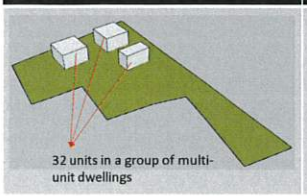
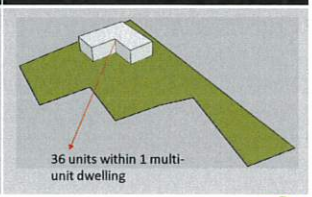
6

Proposal

Current (R3) Zone - 2000 Sq. Ft./unit – Maximum 32 units	Proposed (R4) Zone - 1800 Sq. Ft./unit – Maximum 36 units
	
32 units in a group of multi-unit dwellings	36 units within 1 multi-unit dwelling

Note: Images for reference only, do not represent the proposed development.

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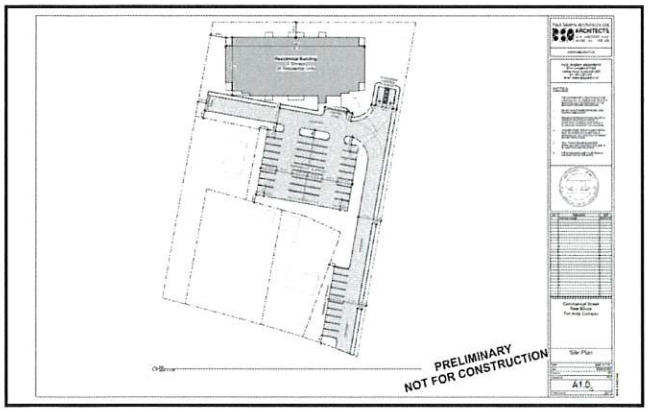

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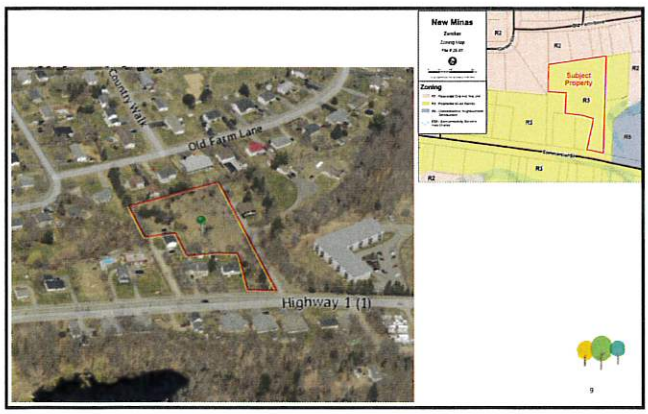

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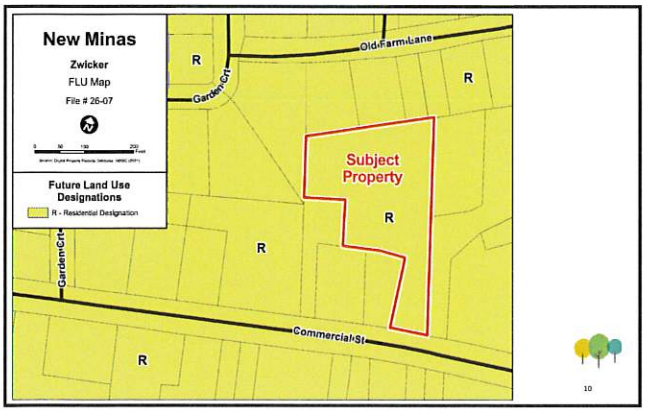

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Enabling Policy

- **Policy 5.3.3** - enables Council to consider rezoning land from one zone enabled in a designation to another enabled within the same designation.
- The Residential Mixed Density (R3) Zone and the Residential Multi-unit (R4) Zone are both enabled within the Residential Designation
- Council is able to consider the rezoning

11

11

Questions and Comments

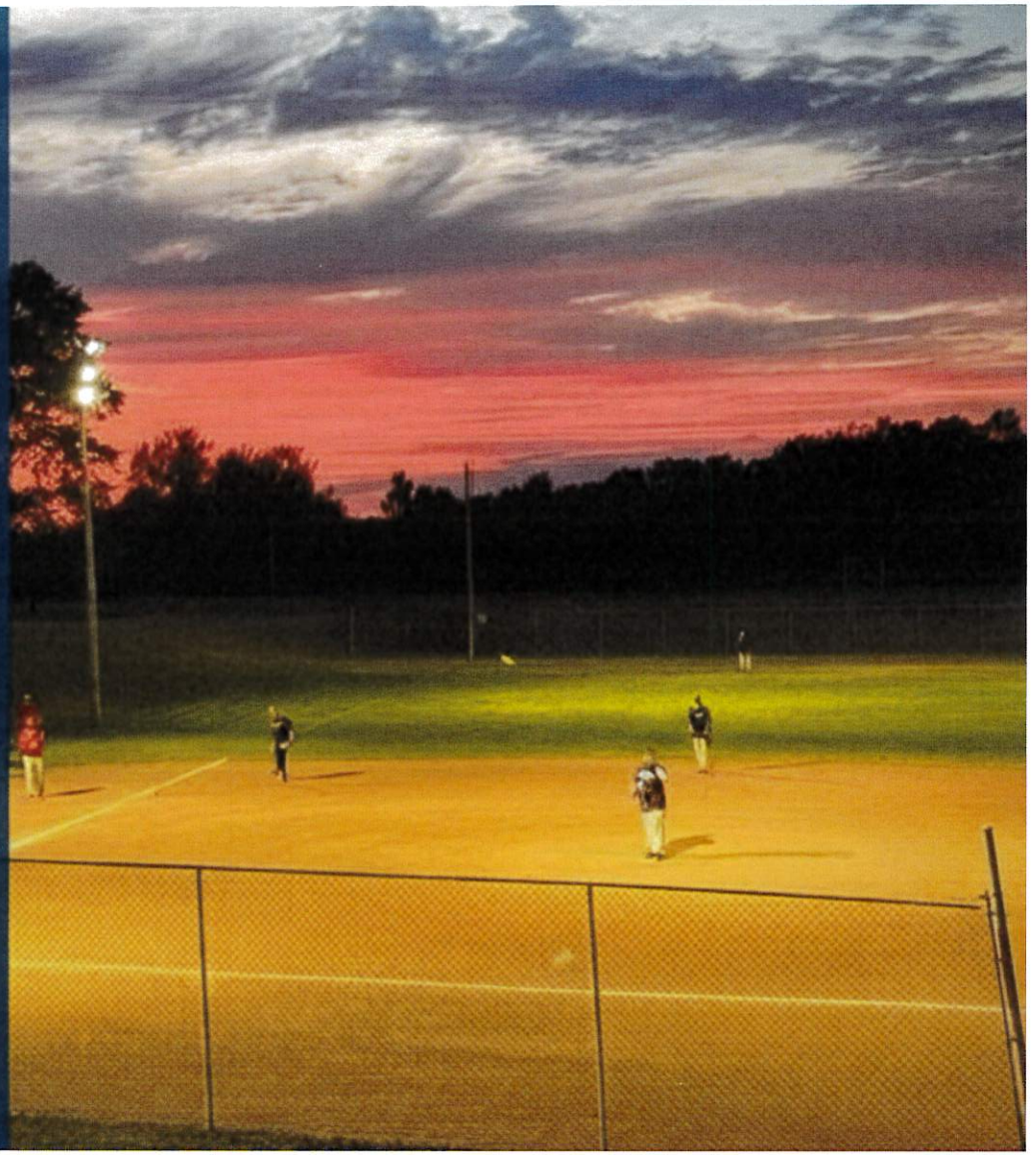
12

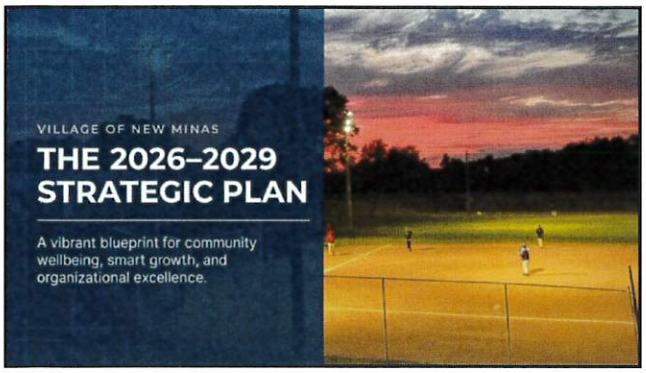
12

VILLAGE OF NEW MINAS

THE 2026–2029 STRATEGIC PLAN

A vibrant blueprint for community wellbeing, smart growth, and organizational excellence.





1

A Welcome from the Village Commission Chair

As Chair of the Village Commission, I am pleased to present the Village of New Minas Strategic Plan (2026–2029)—a roadmap that reflects our community's priorities and our commitment to responsible, forward-looking leadership. This plan builds on our shared vision of "a safe, welcoming, and vibrant community where families and businesses thrive—making New Minas the preferred place to live, shop, and play in the Annapolis Valley." It represents months of collaboration, reflection, and careful planning by staff, Commissioners, and community partners.

Insert Photo of Dave

The Strategic Plan outlines clear goals and measurable actions across four pillars: Governance & Organizational Excellence, Communication & Community Engagement, Community Development & Wellbeing, and Infrastructure & Smart Growth. Guided by our mission "to deliver reliable and cost-effective services, strengthen community wellbeing, and support sustainable growth through transparent, innovative, and collaborative governance," this plan ensures that our decisions remain grounded in strong values and long-term thinking. Each action item is designed to strengthen our organization, enhance service delivery, and support the continued growth and vitality of our Village.

Most importantly, this plan reflects our commitment to the people of New Minas. It provides a framework that will guide our work, support accountability, and ensure progress is visible and meaningful. With this plan, we reaffirm our dedication to integrity, fiscal stewardship, inclusivity, and innovation—values that will continue to shape New Minas as a vibrant and resilient community for years to come.

Dave Chauk, Chair, Village Commission

2

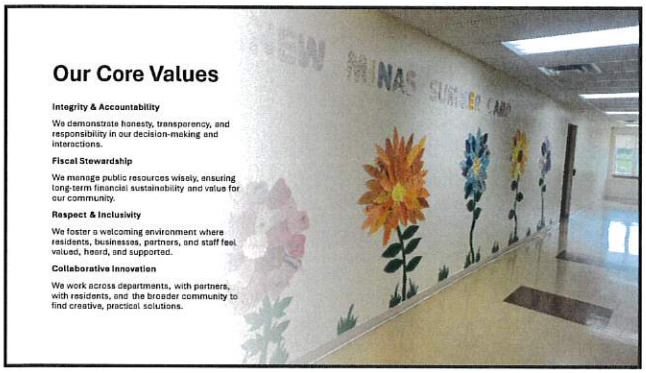
Our Vision

A safe, welcoming, and vibrant home for families and businesses, further establishing New Minas as the preferred destination to live, shop, and play in the Annapolis Valley

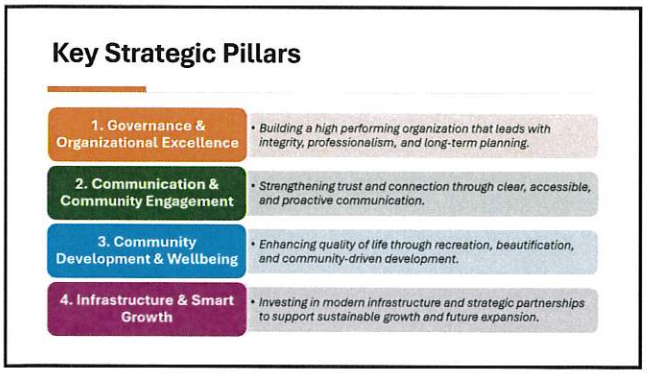
3


Our Mission
To serve our residents with reliable and cost-effective services, strengthen community wellbeing, and champion opportunities for growth and development in the Village of New Minas.

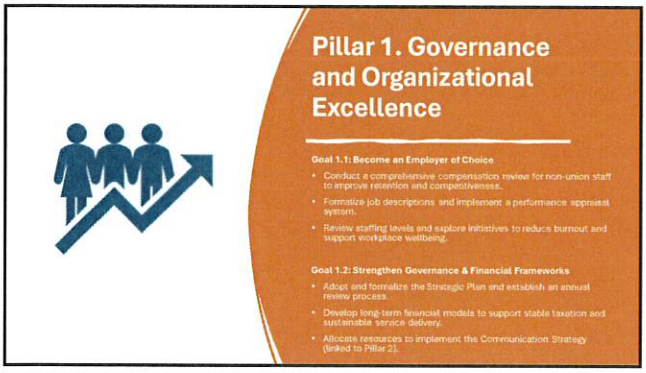
4


Our Core Values
Integrity & Accountability
We demonstrate honesty, transparency, and responsibility in our decision-making and interactions.
Fiscal Stewardship
We manage public resources wisely, ensuring long-term financial sustainability and value for our community.
Respect & Inclusivity
We foster a welcoming environment where residents, businesses, partners, and staff feel valued, heard, and supported.
Collaborative Innovation
We work across departments, with partners, with residents, and the broader community to find creative, practical solutions.

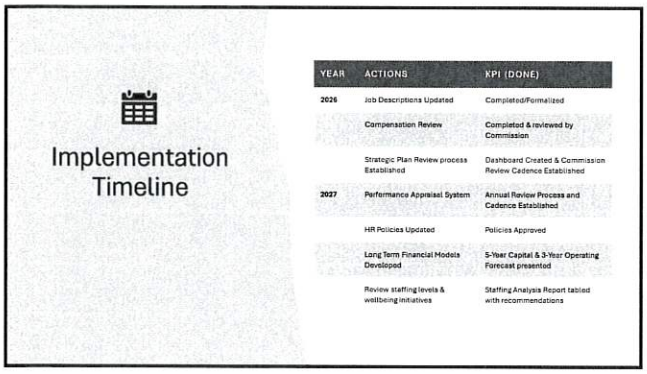
5


Key Strategic Pillars
1. Governance & Organizational Excellence
• Building a high performing organization that leads with integrity, professionalism, and long-term planning.
2. Communication & Community Engagement
• Strengthening trust and connection through clear, accessible, and proactive communication.
3. Community Development & Wellbeing
• Enhancing quality of life through recreation, beautification, and community-driven development.
4. Infrastructure & Smart Growth
• Investing in modern infrastructure and strategic partnerships to support sustainable growth and future expansion.

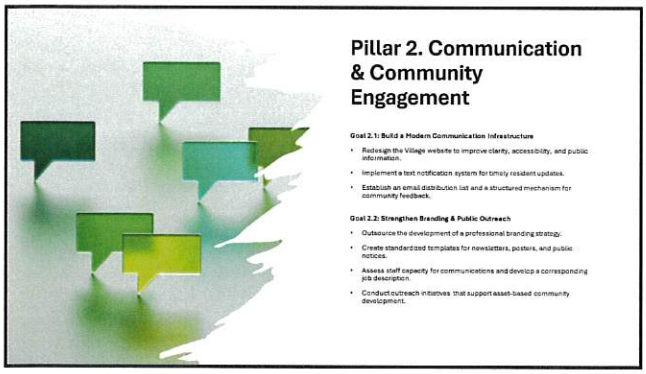
6


Pillar 1. Governance and Organizational Excellence
Goal 1.1: Become an Employer of Choice
• Conduct a comprehensive compensation review for non-union staff to improve retention and competitiveness.
• Formalize job descriptions and implement a performance appraisal system.
• Review staffing levels and explore initiatives to reduce burnout and support workplace wellbeing.
Goal 1.2: Strengthen Governance & Financial Frameworks
• Adopt and formalize the Strategic Plan and establish an annual review process.
• Develop long-term financial models to support stable taxation and sustainable service delivery.
• Allocate resources to implement the Communication Strategy (linked to Pillar 2).

7


Implementation Timeline
YEAR
ACTIONS
KPI (DONE)
2026
Job Descriptions Updated
Completed/Formalized
Compensation Review
Completed & reviewed by Commission
Strategic Plan Review process Established
Dashboard Created & Commission Review Cadence Established
2027
Performance Appraisal System
Annual Review Process and Cadence Established
HR Policies Updated
Policies Approved
Long Term Financial Models Developed
5-Year Capital & 3-Year Operating Forecast presented
Review staffing levels & wellbeing initiatives
Staffing Analysis Report tabled with recommendations

8


Pillar 2. Communication & Community Engagement
Goal 2.1: Build a Modern Communication Infrastructure
• Redesign the Village website to improve clarity, accessibility, and public information.
• Implement a text notification system for timely resident updates.
• Establish an email distribution list and a structured mechanism for community feedback.
Goal 2.2: Strengthen Branding & Public Outreach
• Outsource the development of a professional branding strategy.
• Create standardized templates for newsletters, posters, and public notices.
• Assess staff capacity for communications and develop a corresponding job description.
• Conduct outreach initiatives that support asset-based community development.

9

Implementation Timeline

YEAR	ACTIONS	KPI (DONE)
2026	Staff Capacity for Communications Determined	Assessment/ID Complete & Business Case Decision Made (if required)
	Communications Strategy Resources Cost Determined	Business Case is Approved
2027	Text Notification System	Platform implemented; 500 residents subscribed
	Email Distribution List	System active; First Quarterly Newsletter sent
	Professional Branding Strategy Development	Brand Strategy & Visual Identity Guide approved by Commission
	Standardized Templates Developed	Template Library (Posters, Memos) accessible to all staff
2028-29	Website Redesigned	New Site is Launched
	Conduct Asset-Based Community Outreach	3 Outreach Sessions held

10

Pillar 3: Community Development & Wellbeing

Goal 3.1: Develop a Community Development & Recreation Master Plan

- Establish a working group with the Municipality of Kings (MoK).
- Create a community engagement plan for development and recreation initiatives.
- Complete an inventory of parks and greenspaces to identify infrastructure needs.
- Identify and pursue grant opportunities to support recreation and community development.

Goal 3.2: Enhance Streetscaping & Beautification

- Provide education to businesses on the economic benefits of walkability and attractive streetscapes.
- Identify underutilized spaces and form a working group to develop improvement strategies.
- Hire a consultant to assess active transportation needs and develop a wayfinding strategy.

11

Implementation Timeline

YEAR	ACTIONS	KPI (DONE)
2026	MOK Working Group Formalized	Terms of Reference/Mandate Formalized
	New Mines Controlled Underutilized Spaces Identified	Inventory Established
	Community Engagement Plan	Plan is completed and improved
	Park and Greenspaces Identified	Inventory Established
	Rec and Culture Development Grants Pursued	Regular report format and cadence established to report of grants applied for and outcome
2027	Business Education - Walkability/Streetscapes	2 Workshops Held
	Consultant Hired - Active Transportation/Wayfinding	Consultant Report is Presented
	Update and implement the long term park improvement plan in coordination with the Municipality of Kings	Updated 5-Year Capital Plan Approved (Jointly with MoK)
	Community Development & Recreation Master Plan	Plan Approved by Commission
2028-29	Year one of 5 year cap plan (ex: sport pads at two neighbourhood parks)	Project for year one complete
	Action items from plan (ex: Wayfinding signage throughout Village)	Year one projects completed

12

Pillar 4: Infrastructure & Smart Growth

Goal 4.1: Upgrade Critical Utility Infrastructure

- Review existing studies, secure funding, and proceed to design engineering for water and sewer upgrades.
- Actively participate on the Regional Sewer Commission to address and eliminate sewer odors.

Goal 4.2: Improve Transportation & Traffic Flow

- Collaborate with MoK and the Province to conduct a traffic study and identify congestion solutions.
- Engage in federal, provincial and municipal consultations to advocate for transportation and infrastructure needs.

Goal 4.3: Strengthen Inter-Municipal Partnerships

- Build strong working relationships with MoK department heads and ensure consistent communication.
- Update and implement the long-term Park Improvement Plan in coordination with MoK.

Goal 4.4: Establish the Foundation for New Minas South

- Conduct pre-development studies to reduce uncertainty and support landowner engagement.
- Secure external funding for studies and early infrastructure planning.
- Establish governance and stakeholder coordination mechanisms to guide future development.

13

Implementation Timeline

YEAR	ACTIONS	KPI (DONE)
2026	Water and Sewer Upgrade Studies and Design	Use study reports to make a priority list and have the top priority design completed
	Collaborate with MoK and the Province to conduct a traffic study and identify congestion solutions	3 Meetings held in 2026, Quarterly thereafter and reports back
	Actively participate on Regional Sewer Commission	Meetings attended, Reports back to Commission
	NMS Pre Development Studies Initiated	Needs Assessment Complete
2027	Secure External Funding for NMS Studies	Studies Funded/Started
	Water and sewer infrastructure designs and construction	Top priority in construction and second priority in the design phase
2028-29	Establish Governance & Stakeholder Coordination for Future Development	Stakeholder MoU's signed for New Minas South
	Water and sewer infrastructure designs and construction	Second priority under construction and third priority in the design phase

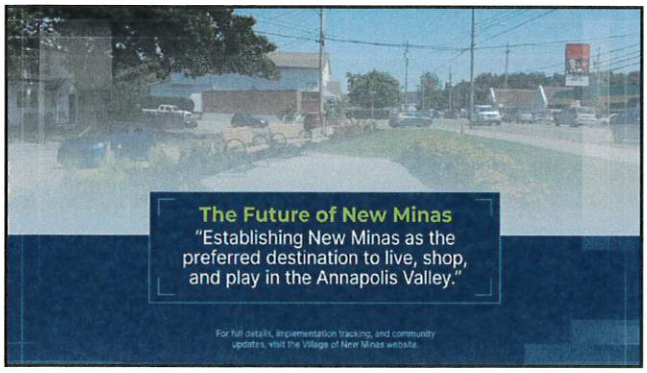
14

Village of New Minas Commission

Insert Photo of Commission

From left to right: insert names of commissioners

15


The Future of New Minas
"Establishing New Minas as the preferred destination to live, shop, and play in the Annapolis Valley."
For full details, implementation tracking, and community updates, visit the Village of New Minas website.

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Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

6. Business Arising from the Minutes

Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

9. Committee Reports

Village of New Minas
Beautification Committee
April 1, 2026 @ 10:30 AM
Commission Room, LMCC
New Minas, Nova Scotia
DRAFT MINUTES

Members Present:

- Debra Windle-Smith, Commission Member & Chair
- Mary Munroe, Commission Member
- Linda Martin, Citizen Member
- Michelle Coleman, Business Representative
- Cory Palmer, Director of Public Works
- John Ansara, Director of Recreation & Community Development

Members Absent:

Staff Present:

- Jeff Lawrence, Clerk Treasurer/ CAO

Others Present:

1. **Call to Order:**

   The Chair called the meeting to order at 12:34pm.

2. **Approval of the Agenda:**

   Motion:
   THAT the Agenda for the April 1, 2026, Beautification Committee Meeting be approved.

   M/ J. Ansara
   S/ M. Coleman
   Motion Carried

3. **Approval of Minutes:**

   a. January 21, 2026, Beautification Committee Meeting

      Motion:
      THAT the Minutes for the January 21, 2026, Beautification Committee Meeting be approved as circulated.

   M/ C. Palmer
   S/ J. Ansara
   Motion Carried

4. **Business Arising from Minutes:**

   a. January 21, 2026

      i. Bench Dedication Policy – D. Windle-Smith indicated that she would bring a revised draft of the policy to the May meeting.

      ii. Prospect Park Update – Anchor Rock – C. Palmer informed the Committee that the work will be undertaken in April.

      iii. Sign at Lonnie Milne – C. Palmer indicated that the Milne family wished to maintain the memorial park name but that the style would be left to the Committee. There was consensus to revisit this after branding and wayfinding undertakings have been completed (2027).

5. **Comments from the Chair**

   D. Windle-Smith had no additional comments to add.

6. **New Business**

   a. Beautification Strategic Plan Review – D. Windle-Smith reviewed the 2025-2028 Beautification Strategic Plan. A discussion ensued.

   b. Budget – Preliminary Discussion – Item tabled.

   c. 2025/26 Budget Update – Item tabled.

6. **Next Meeting Date:**

   May 20, 2026.

7. **Adjournment:**

   There being no further business, the Chair called for a motion to adjourn at 2:05pm.

   Motion:
   THAT the meeting be adjourned.

   M/ C. Palmer

Draft Village of New Minas
New Minas Water Commission
March 3, 2026 @ 3:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
DRAFT MINUTES

Members Present:

- Mary Munroe, Commission Member
- Bruce MacArthur, Citizen Member
- Dave Chaulk, Commission Member & Vice Chair

Members Absent:

- James Redmond, Commission Member & Chair
- Maynard Stevens, Citizen Member

Staff Present:

- Jeff Lawrence, Clerk Treasurer/CAO
- Cory Palmer, Director of Public Works

Others Present:

- None

1. **Call to Order:**

   The Vice Chair called the meeting to order at 3:10pm, welcoming those in attendance.

2. **Approval of the Agenda:**

   Motion:

   THAT the Agenda for the March 3, 2026, Water Commission Meeting be approved as circulated

   M/ B. MacArthur
   S/ M. Munroe
   Motion Carried

3. **Approval of Minutes:**

   a. January 27, 2026, Water Commission Meeting

      Motion:
      THAT the Minutes for the January 27, 2026, Water Commission Meeting be approved as circulated.

   M/ M. Munroe
   S/ B. MacArthur
   Motion Carried

4. Business Arising from Minutes:

a. New Minas Water Utility Taxation Status

J. Lawrence provided a draft of a letter requested by the Water Commission at its January meeting building the case for exempting Village of New Mians water assets from municipal taxation.

J. Lawrence further noted that the letter is addressed to Kings County Council, but a similar letter would be drafted to provincial stakeholders recommending an amendment to the Assessment Act exempting Village Water Utilities from property tax.

J. Lawrence finally indicated that the original draft was shared with the Clerk Treasurers for the Village of Port Williams and the Village of Canning, and the recommendation from the Clerk Treasurer is that the letter be cosigned by all three Villages.

There was consensus around the table that the letter should be signed by D. Chaulk as Chair of the Village Commission.

J. Lawrence indicated that he would circulate the letter to Village Commissioners and ask if there were any concerns with D. Chaulk signing.

b. Water Infrastructure study

C. Palmer updated the Commission regarding the status of the study.

5. Comments from the Chair:

The Vice Chair indicated that he had no additional comments.

6. Staff Reports:

a. Water Operations Report

C. Palmer provided a review of the highlights from the water operator's report.

In addition, C. Palmer spoke to the process and time required to allow public works employees to obtain their water certification as well as challenges with the Cornwallis Well motors.

Motion:

THAT the Water Operations Report be received as circulated prior to the February 24, 2026, Water Commission meeting and as verbally summarized by the Director of Public Works.

M/ B. MacArthur
S/ M. Munroe
Motion Carried

7. New Business

8. **Correspondence:**

   There was no correspondence

9. **Other Business**

10. **Public Input:**

    There was no public input.

11. **Adjournment:**

    There being no further business, the Chair called for a motion to adjourn at 3:20pm.

    Motion:
    THAT the meeting be adjourned.

    M/ B. MacArthur
    S/ M. Munroe
    Motion Carried

Draft Village of New Minas
New Minas Water Commission
March 24, 2026 @ 3:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
DRAFT MINUTES

Members Present:

- Mary Munroe, Commission Member
- Bruce MacArthur, Citizen Member
- Dave Chaulk, Commission Member & Vice Chair
- James Redmond, Commission Member & Chair
- Maynard Stevens, Citizen Member

Members Absent:

Staff Present:

- Jeff Lawrence, Clerk Treasurer/CAO
- Cory Palmer, Director of Public Works

Others Present:

- None

1. **Call to Order:**

   The Vice Chair called the meeting to order at 3:02pm, welcoming those in attendance.

2. **Approval of the Agenda:**

   Motion:

   THAT the Agenda for the March 24, 2026, Water Commission Meeting be approved as circulated

   M/ M. Stevens
   S/ D. Chaulk
   Motion Carried

3. **Approval of Minutes:**

   a. March 3, 2026, Water Commission Meeting

      Motion:
      THAT the Minutes for the March 3, 2026, Water Commission Meeting be approved as circulated.

   M/ D. Chaulk
   S/ B. MacArthur
   Motion Carried

4. Business Arising from Minutes:

a. New Minas Water Utility Taxation Status

J. Lawrence asked if there were any questions regarding the letters included in the agenda package lobbying for commercial taxes not to be applied to water utility assets.

b. Water Infrastructure study

C. Palmer updated the Commission regarding the status of the study.

C. Palmer spoke to the following regarding the water study:

- The final report will be available the end of this week/ early next week.
- The limiting factors for water supply are the transmission lines and well capacity.
- C. Palmer will forward a copy of the final report to the Water Commission.

5. Comments from the Chair:

The Chair indicated that he had no additional comments.

6. Staff Reports:

a. Water Operations Report

C. Palmer presented an overview of the key points from the water operator's report. He also noted that Pepsico had supplemented its well supply with Village water without providing prior notice to the Village. C. Palmer emphasized the need for the Village to consider measures to prevent Pepsico from drawing more water than the utility is able to sustainably provide.

Motion:
THAT the Water Operations Report be received as circulated prior to the March 24, 2026, Water Commission meeting and as verbally summarized by the Director of Public Works.

M/ M. Stevens
S/ B. MacArthur
Motion Carried

7. New Business

8. Correspondence:

There was no correspondence

9. Other Business

10. Public Input:

There was no public input.

11. Adjournment:

There being no further business, the Chair called for a motion to adjourn at 3:28pm.

Motion:
THAT the meeting be adjourned.

M/ D. Chaulk
S/ M. Munroe
Motion Carried

Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

10. Staff Reports

Information Report
To: Village Commission
By: Jeff Lawrence, Clerk Treasurer/CAO
Meeting Date: April 13, 2026
Subject: Monthly Report — Clerk Treasurer/CAO

Monthly Report — Clerk Treasurer/CAO

Highlights of the Past Month:

- Concluded the strategic planning project.
- With the critical components listed in the IT audit now tackled, we are finalizing the costs to address the remaining shortfalls identified in the audit and the recommended camera installation for budget purposes.

Regularly Scheduled Meetings:

In the past month, I attended the following regularly scheduled meetings:

- Individual meetings with Department Heads
- Beautification
- Water Commission
- Health and Safety

Other Notable Meetings:

- Advertised for and filled the vacant Administrative Assistant position
- Held budget discussions with Jeff Hanshaw, Custom Page Media and Consulting Inc, regarding the close out of the IT upgrades project and the budget for a security camera install.
- Continued to meet with Natalie Palmer and Craig Kennedy (Peak Experience) to conclude the Village Strategic Planning project.
- Attended the Regional Sewer Regional and Technical Committee meetings
- Held discussions with solicitors regarding ongoing HR issues
- Met with CAOs/ Clerk Treasurers of Port Williams and Kingston on areas of common concern around water utility taxation. Drafted letters to Kings County and the Minister of the Department of Municipal Affairs requesting relief from the tax burden.
- The above CAOs/ Clerk Treasurers met with Kings County administration to discuss the taxation of water utility assets.
- Met with Kenwo representatives and the Director of Public Works to discuss the golf course's long-term plans for village water usage
- Met with local union reps regarding management/ staff relations
- Continue developing the budget

Professional Development:

- N/A

Outlook for Next Month:

The planned focus for the next month will be as follows:

- Work to integrate the strategic plan in the budget and operations
- Work to finalize the budget
- Secure Quotes from three vendors for a camera installation
- Attend Commission and Committee meetings
- Attend Department Head meetings (collective and individual)

Sincerely,

Jeff Lawrence
Clerk Treasurer/Chief Administrative Officer
902-681-0430 | cao@newminas.com

Village of New Minas
9489 Commercial Street
New Minas, NS B4N 3G3
newminas.com

Information Report
To: Village Commission
By: Cory Palmer
Meeting Date: April 13, 2025
Subject: Monthly Report — Director of Public Works

Monthly Report — Director of Public Works

Staff Update:

- We have made an offer to fill the position of foreperson. The candidate is working through the necessary checks before the position can be filled. The open water position is being posted on April 13.

Current Projects/Work:

- Plowing and salting are winding down.
- We have removed most of the equipment for the old chlorine gas system from the Busch Lane tank. We are trying to clean up any equipment that is no longer required.
- We are preparing for spring activities. The Public Works team met and developed a list of activities that need to be completed to prepare for spring.
- The lawn mowers, blowers and trimmers have been serviced to ensure they are ready for spring.
- All the picnic tables have been repaired and painted. We have started putting some in the smaller parks but are waiting to place them in LRP until the leaf and branch cleanup is complete.
- Toy boxes have been repaired and put out in the parks.
- An audit of the sidewalks has been completed and will prioritize work that needs to be completed.

Long-Term Projects:

- Dillon Consulting has completed the water model. Overall distribution is good for domestic use, but we have issues with meeting the fire fighting capacity in several areas including some of the new proposed developments. Upsizing lines in these areas are required for fire fighting purposes. The main issue with water delivery is the transmission line to Busch Lane tank.
- The sewer capacity study initial report was received. We have some current sections of the sewer system that are at full capacity and future developments will increase the flow in these areas. The area by the Irving in the round about are at full capacity without any future developments in this area. With the new developments, we have other areas of the sewer system that will be over capacity as well. I have asked the consultant to provide capacities for the existing developments in the last year combined with the next 2 years, and then 5 years out. This will allow us to see the impact in phases so we can determine what is critical.
- We had 2 companies provide quotes on the confined space entry procedures and we have added the lowest quote to the 2026-2027 budget.

Information Report
To: Village Commission
By: Cory Palmer
Meeting Date: April 13, 2025
Subject: Monthly Report — Director of Public Works

Professional Development:

- Andrew has completed fall protection, generic confined space, trenching and excavating, and first aid training.
- Nelson Coleman completed generic confined space and first aid training.
- Steve Vernie completed generic confined space training.
- Shawn Cornelius will be scheduled for traffic signing course in 2026.
- The remainder of the staff will require confined space training in first half of 2026.

Outlook for Upcoming Months:

- Hire a new foreperson and start the training.
- Get the water department position posted and filled.
- Schedule training for the employees for the 2026-2027 budget year.
- Ensure we are ready for the spring activities and have all the supplies in stock.
- Getting parks and sports fields ready for summer activities.
- Spring hydrant flushing.

Memo

To: Cory Palmer, Director of Public works

From: Matt Rodgers, Associate

Date: March 27, 2026

Subject: Water Distribution System Hydraulic Modelling Assessment

Our File: File #24-7875-5000

Executive Summary

The Village of New Minas (New Minas) engaged Dillon Consulting Ltd. (Dillon) to conduct a hydraulic update of the municipal water distribution model. The primary objective was to evaluate the system's current performance and determine its capacity to support a significant volume of proposed future developments. This assessment involved a steady-state analysis of the pipe network, storage tanks, and pumping infrastructure under average, maximum day, and peak hour demand scenarios, alongside a evaluation of available fire flows.

Key Findings:

- **Current System Capacity:** The existing network effectively manages daily domestic demands; however, it exhibits significant fire flow deficiencies. Key areas, including Canaan Heights and several residential dead-ends, currently fall below the 3,300 L/min residential fire flow requirement set by ACWWA and Halifax standards.
- **Development Impact:** While the proposed developments (totaling an additional 25.52 L/s Average Day Demand) do not cause widespread pressure failures for daily use, they exacerbate existing fire flow bottlenecks. Without infrastructure intervention, the majority of the new residential and commercial units will not meet minimum fire safety requirements.
- **Capital Requirements:** To resolve existing service gaps and facilitate the planned community expansion, Dillon recommends three critical capital projects totaling an estimated $4,560,000. These include the upsizing of the Prospect Road transmission main ($2.310M), a new fire and domestic booster station for Canaan Heights ($1.5M), and local upsizing in the Jenifer/Kara Anne Court area ($0.750M).

Background

The Village of New Minas (New Minas) engaged Dillon Consulting Ltd. (Dillon) to update the existing hydraulic model of the municipal water distribution system and assess its capacity to accommodate future developments. The community has a population of approximately 5,000. The baseline model was originally developed as part of a Utility System Assessment Report (SNC Lavalin, 2020). Dillon's scope

included updating the pipe network and re-allocating demands based on current and future growth projections.

The distribution system is supplied by nine (9) wells feeding two storage tanks, which in turn supply the Village via transmission mains ranging from 150 mm to 350 mm. The system utilizes two pressure reducing valves (PRVs) to manage low-elevation zones along Commercial Street and one booster station serving the Canaan Heights subdivision.

Physical attributes (pipes, tanks, pumps, and PRVs) from the 2020 model were assumed accurate, though Dillon added missing infrastructure in the Greenwich and Canaan Heights areas using record drawings. This study utilized a steady-state analysis to calculate hydraulic behavior (pressures, flows, and velocities) under constant boundary conditions.

Modelling Parameters

Design parameters were established using the Atlantic Canada Water Supply Guidelines 2022 (ACWWA) and Halifax 2025 Design Specifications. Where standards differed, the most conservative values were applied. Key parameters are summarized in **Table 1**.

Table 1: Water System Design Parameters

Parameter	Value
Flow Demands	375 L/cap/day (Residential) (Halifax Standard) 67,000 L/ha/day (Commercial) 61,000 L/ha/day (Industrial) 100 L/student/Day (School) (ACWWA) 900 L/bed/day (Hospital/Nursing Homes) (ACWWA) 225 L/bed/day (Hotels) (ACWWA)
Peaking Factors	1.65 Residential (Max Day) (Halifax) 1.1 Industrial (Max Day) (Halifax) 1.1 Commercial (Max Day) (Halifax) 1.1 Institutional (Max Day) (Halifax) 3.0 Entire System (Peak Hour) (ACWWA)
Friction Factors (C-Factor)	100-140 (Varies based on size and testing)
Fire Flow	3,300 L/min (Residential) (Halifax)

Parameter	Value
	13,620 L/min (Commercial/Industrial/Institutional) (Halifax)
Velocity	1.5 m/s Maximum During Non-Fire Events (ACWWA) 3.0 m/s During Fire Flows (ACWWA)
System Pressures	275 kPa (40 PSI) Minimum Operating Pressure (ACWWA) 700 kPa (100 PSI) Maximum Operating Pressure (ACWWA) 140 kPa (20 PSI) Minimum Residual Pressure During Fire Flow (ACWWA)

Existing demands were distributed using Google aerial imaging to verify housing counts and commercial footprints. Population units were calculated at 3.35 people/unit for single/semi-detached homes and 2.25 people/unit for apartments, per Halifax standards.

Water Demands

Existing System

Average Day Demands (ADD) were calculated for the population of 5,000. Max Day (MDD) and Peak Hour (PHD) demands were determined by multiplying the respective peaking factors from **Table 1**. These demands are summarized in **Table 2.**

Table 2: Existing Residential, Commercial, Industrial and Institutional Demands

Category	Average Day Demand (ADD) (L/s)	Max Day Demand (MDD) (L/s)	Peak Hour Demand (PHD) (L/s)
Residential	22.23	33.68	66.69
Commercial	16.63	17.73	49.89
Industrial	3.17	3.49	9.51
Institutional	2.44	2.68	7.32
Total	**44.47**	**57.58**	**133.41**

Future Developments

Additional demands for identified future developments were allocated to the model junctions closest to the respective sites. These are outlined in **Table 3.**

Table 3: Future Developments

Junction	Development Description	ADD (L/s)	MDD (L/s)	PHD (L/s)
J135	500 Apartments	4.88	8.05	14.64
FH202	24 Apartments	0.23	0.38	0.69
FH203	139 Apartments	1.36	2.24	4.08
J137	75 Houses	1.09	1.80	3.27
FH197	350 Apartments	3.42	5.64	10.26
J138	250 Apartments and 10 Duplexes	2.73	4.50	8.19
FH190	6 Duplexes	0.17	0.28	0.51
FH141	Plumbing Shop and 4 Apartments	0.09	0.15	0.27
J130	53 Duplexes	1.54	2.54	4.62
J131	18 Small Homes	0.26	0.43	0.78
FH135	8 Apartments	0.08	0.13	0.24
FH130	3 Apartments	0.03	0.05	0.09
J132	200 Apartments	1.95	3.22	5.85
FH123	26 Apartments	0.25	0.41	0.75
FH123	56 Apartments	0.55	0.91	1.65
FH21	Commercial Unit	0.05	0.08	0.15
J133	60 Apartments	0.26	0.43	0.78
J134	500 Apartments	2.17	3.58	6.51
J128	32 Apartments	0.31	0.51	0.93
J129	46 Apartments w/ 2 Commercial Units	0.54	0.89	1.62

Junction	Development Description	ADD (L/s)	MDD (L/s)	PHD (L/s)
FH58	11 Apartments	0.08	0.13	0.24
FH58	6 Apartments	0.06	0.10	0.18
J126	30 Apartments	0.29	0.48	0.87
J125	300 Apartments	2.93	4.83	8.79
J127	20 Apartments	0.20	0.33	0.60
Total	**Subtotal**	**25.52**	**42.10**	**76.56**

Model Analysis

Analysis results vary depending on storage tank operating levels:

- Woodvale Tank: Max 116.0 m, Min 102.60 m
- Busch Lane Tank: Max 119.30 m, Min 102.60 m

Minimum levels create negative pressures in the system which halts the software from completing the analysis. Therefore, a minimum elevation of 107.0 m was assumed for the worst-case scenario.

Model Validation

Flow and pressure information was truthed against field recorded observations from May 19, 2019. Tank levels were iteratively adjusted to 115 m to match pressures under static conditions. Model constraints were finalized as follows:

- PRVs set to 55 PSI.
- C-Factors of 300mm transmission mains (Prospect Rd to Commercial St) adjusted from 110 to 140.
- C-Factors of Commercial St and Highland Ave adjusted from 110 to 140.
- C-Factors of 300mm pipe from Forsythe Rd S adjusted to 140.

The results of the model calibration are summarized in **Table 4.**

Table 4: Hydraulic Model Validation versus Hydrant Flow Test Results

Hydrant No. and Flow (L/min)	Field Static Pressure (PSI)	Model Static Pressure (PSI)	Static Pressure Difference (PSI)	Measured Residual Pressure (PSI)	Modelled Residual Pressure (PSI)	% Error	Pressure Difference (PSI)
FH2 (10,038)	82	85	3	68	62	9.7	6
FH14 (14,125)	70	73	3	64	63	1.6	1
FH144 (14,125)	70	77	7	64	62	3.2	2
FH131 (13,379)	104	110	6	90	Negative	N/A	N/A
FH134 (9,287)	78	74	4	64	60	6.7	4
FH26 (7,528)	72	64	8	58	56	3.6	2
FH115 (10,506)	104	98	6	84	74	13.5	10
FH51 (7,901)	60	58	2	50	Negative	N/A	N/A
FH178 (14,606)	71	77	6	66	60	10.0	6
FH180 (11,583)	72	71	1	64	59	8.5	5
FH53 (11,874)	60	57	3	55	Negative	N/A	N/A

The model validation threshold follows ±15% Acceptable, ±10% Good, and ±5% Very Good. The negative pressures results from **Table 4** were from dead-end locations at Jones Road and from the lower pressure zone in the Prospect Road area. The differences in modelled results and the field testing could be attributed to several factors including but not limited to:

- Open or closed valves during flow testing;
- Differences in the modelled pipe sizes compared to actual size (confirmation of all pipe sizes in the existing model were not part of the scope of this study); and
- Differences in operational settings of elements such as tank levels and PRVs, which were not recorded during field testing.

Existing System Results

The system satisfies ADD, MDD, and PHD demands with normal tank operating levels (107.0 m to 116.0 m). However, the system cannot provide adequate fire flows throughout the entire system. Residential fire flow (3,300 L/min) cannot be provided in the following areas outlined in **Table 5**.

Table 5: Failed Fire Flow Results

Location	Available Flow (L/min)	Residual Hydrant Pressure (PSI)	Minimum System Residual Pressure (PSI)	Maximum Pipe Velocity (m/s)
Location				
Valley View Drive	3,154	46	27	3.0
Thistle Crescent	3,169	31	27	3.0
Memory Lane	3,180	68	27	3.0
Highland Court	3,170	56	27	3.0
Castle Loma Drive	3,131	57	27	3.0
Colonial Crescent	3,132	58	27	3.0
Kara Anne Court	2,322	22	27	2.2
Jenifer Court	2,812	22	21	2.7
Kentucky Court	3,165	57	27	3.0
Roy Ave	3,163	24	27	3.0
Dow Road	1,947	22	27	1.9
Greg Ave/Turner Dr	2,723	22	27	2.6
King Arthur Road	2,083	22	27	1.9
Marina Drive	3,010	22	27	2.9
Cloverleaf Drive	2,594	22	27	2.6
Evergreen Ave	3,107	22	27	2.9
Maple Drive	3,153	39	27	3.0
Jill Street W	3,152	33	27	3.0
Orchard Drive	3,180	38	27	3.0

Location	Available Flow (L/min)	Residual Hydrant Pressure (PSI)	Minimum System Residual Pressure (PSI)	Maximum Pipe Velocity (m/s)
Forsythe Road N	3,180	32	27	3.0
Canaan Heights	388	20	20	1.7

The available fire flows in the community are generally limited by either the maximum allowable velocity requirement of 3.0 m/s or due to the flow creating residual system pressures lower than the allowable minimum of 22 PSI at the flow hydrant or 20 PSI elsewhere in the system.

Several high and low-pressure locations were noted during ADD and PH scenario analysis and are shown in **Table 6**.

Table 6: High and Low Pressure Locations

Location	Min Tank Level Pressure Range (PSI)	Max Tank Level Pressure Range (PSI)	Scenario
Catherine Crescent	44-25	54-36	ADD
Catherine Crescent	42-24	54-35	PHD
Canaan Heights	54-20	70-31	ADD
Canaan Heights	51-17	63-28	PHD
Busch Lane-Forsythe Rd	51-14	63-25	ADD
Busch Lane-Forsythe Rd	49-14	61-25	PHD
Woodvale Place-Evergreen Ave	25-16	36-27	ADD
Woodvale Place-Evergreen Ave	24-15	35-26	PHD
Mine Ave	45-36	56-46	ADD
Mine Ave	43-34	54-45	PHD
Cloverleaf Drive	37-31	48-43	ADD

Location	Min Tank Level Pressure Range (PSI)	Max Tank Level Pressure Range (PSI)	Scenario
Cloverleaf Drive	36-30	47-42	PHD
Jones Road	107	110	ADD
Jones Road	107	107	PHD
Commercial St Main	105	117	ADD
Commercial St Main	104	115	PHD

Future Developments Results

Proposed future developments show no pressure issues under standard ADD, MDD, and PHD scenarios outside of identified low-pressure zones. The proposed future developments are outlined in **Table 7.**

Table 7: Future Development Pressure Results (All Junctions)

Junction	Development Description	Pressure Range under ADD (PSI)	Pressure Range under MDD (PSI)	Pressure Range under PHD (PSI)
J135	500 Apartments	67-56	65-54	55-44
FH202	24 Apartments	63-51	61-50	55-43
FH203	139 Apartments	61-49	60-48	53-42
J142	75 Houses	63-51	61-49	51-40
FH197	350 Apartments	60-49	59-48	51-40
J138	250 Apartments and 10 Duplexes	59-48	58-47	51-40
FH190	6 Duplexes	66-66	66-66	65-65
FH141	Plumbing Shop and 4 Apartments	83-83	83-83	81-81
J130	53 Duplexes	90-88	88-86	86-84
J131	18 Small Homes	94-94	93-93	92-92
FH135	8 Apartments	67-67	67-67	66-66
FH130	3 Apartments	100-100	100-100	98-98

Junction	Development Description	Pressure Range under ADD (PSI)	Pressure Range under MDD (PSI)	Pressure Range under PHD (PSI)
J132	200 Apartments	75-75	75-75	74-74
FH123	26 Apartments	78-78	78-78	76-76
FH123	56 Apartments	78-78	78-78	76-76
FH21	Commercial Unit	78-78	77-77	76-76
J133	60 Apartments	71-71	70-70	69-69
J134	500 Apartments	73-73	73-73	71-71
J128	32 Apartments	70-70	70-70	69-69
J129	46 Apartments w/ 2 Commercial Units	74-74	73-73	72-72
FH58	11 Apartments	98-86	97-85	93-82
FH58	6 Apartments	98-86	97-85	93-82
J126	30 Apartments	79-79	79-79	78-78
J125	300 Apartments	86-86	85-85	84-84
J127	20 Apartments	86-86	85-85	84-84

The fire flow plus MDD scenario identifies several developments that cannot meet the residential requirement of 3,300 L/min with existing system configurations. These are outlined in **Table 8.**

Table 8: Future Development Fire Flow Results (All Junctions)

Junction	Development Description	Available Fire Flow (L/min)	Residual Hydrant Pressure (PSI)	Minimum System Residual Pressure (PSI)	Maximum Pipe Velocity (m/s)
J135	500 Apartments	3,727	22	22	2.3
FH202	24 Apartments	3,269	23	20	1.8
FH203	139 Apartments	2,975	22	24	1.7
J142	75 Houses	762	22	27	1.1

Junction	Development Description	Available Fire Flow (L/min)	Residual Hydrant Pressure (PSI)	Minimum System Residual Pressure (PSI)	Maximum Pipe Velocity (m/s)
FH197	350 Apartments	4,039	33	20	1.8
J138	250 Apartments and 10 Duplexes	4,039	29	20	2.3
FH190	6 Duplexes	2,785	22	21	2.7
FH141	Plumbing Shop and 4 Apartments	6,038	67	26	3.0
J130	53 Duplexes	5,052	59	26	3.0
J131	18 Small Homes	4,890	64	26	3.0
FH135	8 Apartments	4,653	48	26	3.0
FH130	3 Apartments	8,328	64	26	3.0
J132	200 Apartments	5,462	56	26	3.0
FH123	26 Apartments	7,640	54	26	3.0
FH123	56 Apartments	7,640	54	26	3.0
FH21	Commercial Unit	12,655	62	24	3.0
J133	60 Apartments	14,059	48	24	3.0
J134	500 Apartments	5,440	58	26	3.0
J128	32 Apartments	5,623	51	26	3.0
J129	46 Apartments w/ 2 Commercial Units	5,601	64	26	3.0

Junction	Development Description	Available Fire Flow (L/min)	Residual Hydrant Pressure (PSI)	Minimum System Residual Pressure (PSI)	Maximum Pipe Velocity (m/s)
FH58	11 Apartments	9,842	85	24	3.0
FH58	6 Apartments	9,842	85	24	3.0
J126	30 Apartments	5,625	69	25	3.0
J125	300 Apartments	5,365	74	25	3.0
J127	20 Apartments	5,636	67	25	3.0

Recommended Upgrades & Opinion of Probable Costs

Capital projects are required to resolve fire flow deficiencies and accommodate the proposed growth. **Table 9** provides budgetary cost estimates for the capital upgrades required.

Table 9: Project Breakdown

Project ID	Description	Primary Benefit	Est. Quantity	Est. Total Cost
UG-01	Prospect Road Upsizing (200mm to 250mm)	Resolves fire flow for 163+ new units	770 m	$2,310,000
UG-02	Canaan Heights Booster & Fire Pump Station	Services 75 new homes and 200 existing homes	1 LS	$1,500,000
UG-03	Jenifer/Kara Anne Court Upsizing (to 200mm)	Resolves deficiency for new duplexes	250 m	$750,000

Summary and Recommendations

The hydraulic assessment confirms that while the Village of New Minas distribution system currently sustains domestic demands, it lacks the necessary fire flow capacity to support substantial future growth without strategic infrastructure investment. The identified bottlenecks on Prospect Road and the pressure limitations in Canaan Heights represent the most critical constraints.

Execution of the recommended $4,560,000 capital plan will not only provide the required fire protection for over 1,500 new apartment and housing units but will also significantly improve service reliability for hundreds of existing residents currently experiencing low-pressure conditions.

Sincerely,

DILLON CONSULTING LIMITED

Matt Rodgers

TECHNICAL MEMO

Village of New Minas Sanitary Sewer Study

SUBJECT	PROJECT NO.	DATE
Sanitary Sewer Study	707598	06 March 2026

AUTHOR	DISTRIBUTION	REPRESENTING
M. Fortier	C. Palmer	Village of New Minas

DOCUMENT REFERENCE

707598-ATR-000-000-RPT-CIV-0001_P01.01

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft Report Sanitary Sewer Study	MF	dl	dl	MF	06 March 2026

Client signoff

Client	Cory Palmer		
Project	Village of New Minas Sanitary Sewer Study	**Project No.**	707598
Client signature / date			

1. Introduction

AtkinsRéalis Canada Inc. (AtkinsRéalis) was retained by the Village of New Minas (the Village) to complete an updated sanitary sewer study to evaluate the impacts of multiple new residential and commercial developments on the existing wastewater collection system. This work builds upon the Village's existing sanitary sewer model, originally developed in 2020 (Utility System Assessment Report for the Village of New Minas) and subsequently calibrated in 2024 using monitored flow data (Sanitary Model Report – Sanitary Flow Collection).

The purpose of this memo is to summarize the updates made to the model, assess the system's performance under both current and future loading conditions, and identify infrastructure upgrades required to support the anticipated development.

The study was completed using SewerCAD, consistent with previous modeling efforts undertaken by AtkinsRéalis for the Village. The approach involved applying sanitary point loads at the manholes associated with each new development area identified by the client during the kickoff meeting and later confirmed at the design brief meeting. These development areas and manhole connections were provided in the background information supplied by the Village. To ensure consistency with prior studies, the same wastewater generation assumptions were used. A residential flow rate of 225 L/capita/day was used to align with the previous study. It was advised by the Village that they preferred to increase the per residential unit loading factor of 2.4 persons/unit vs. the 2.24 persons/unit loading factor previously used in the 2024 and 2020 studies. The 2.4 persons/unit was only applied to the developments and not the original model.

Two scenarios were modeled to assess network capacity and identify locations requiring upgrades:

- Current conditions including new developments
- Future conditions with new developments

The analysis results, upgrade recommendations, and order of magnitude cost estimates are summarized in the following sections.

2. Background Information

2.1 Existing Sewer Model

The existing sanitary sewer model for the Village was originally developed in 2020 and represents the current configuration of the wastewater collection system. Sanitary sewer that was installed between 2020 and present was requested but has not been provided. The model was calibrated in 2024 using monitored flow data to ensure it accurately reflected theoretical generation rates used in the 2020 baseline.

The existing model was the foundation for which additional analysis was performed for the new/existing developments. All existing system assumptions including, but not limited to, network layout, flow generation and future conditions established in the previous reports were used in this report.

The model uses all previously established wastewater generation assumptions applied in prior studies, including a 225 L/capita/day flow rate (from the 2024 study). The exception is the generation rate for the new developments for which a rate of 2.4 persons/unit was used at the request of the Village.

2.2 Client Provided Information

The village provided the details for all new and planned residential and commercial developments to be incorporated into the future model scenario. The list is provided in Appendix A. This information provided the basis for preparing the model point loads, assigning flows to the appropriate locations within the network.

2.3 Assumptions Limitations & Exclusions

The sewer study was completed under all assumptions, limitations, and exclusions consistent with the proposal and previous modeling work for the Village. They consist of:

- The study assumes that the 2020 sewer model, calibrated in 2024, remains accurate for representing existing system conditions, including loading assumptions and network routing.
- The wastewater generation rates used in previous work remain the same.
- The future conditions remain the same.
- The wastewater treatment plant (WWTP) and lift station capacities are excluded.
- The scope of this study in as outlined in the proposal (Document number 699355-25-CD-SN0447263-VNM-Package 1) and Design Brief (Document number 707598-0001-T-41-DBS-000-0001_C01).

3. Scope of Work

AtkinsRéalis completed the sewer study for the Village in accordance with the scope outlined in the proposal and the Design Brief. The objective of the study was to evaluate the impacts of multiple new residential and commercial developments on the Village's wastewater collection system using the most current SewerCAD model. The scope of work included the following tasks:

- Review all background information provided by the Village. This included the original 2020 Utility System Assessment, the 2024 Sanitary Flow collection report and the Village supplied development updates.
- Convert residential and commercial unit counts to sanitary flow inputs. Note that there was a change from 2.24 persons/unit to 2.4 persons/unit in accordance with the Village requirements.
- Apply point loads to the appropriate manholes throughout the collection system, as identified in the Villages updated development mapping.

- Model both existing and future scenarios. The existing scenario considers the peak sanitary flow with the developments. Model the future scenario under peak conditions including the new developments as well as a future 50-ha development South of Highway 101.
- Prepare a draft technical memo summarizing the findings.
- Final technical memo incorporating any client feedback.

4. New Developments in the Model

New residential and commercial developments identified by the Village were incorporated into the future modeling scenario. These developments were confirmed during the client kickoff meeting and design brief meeting and summarized in a spreadsheet. The spreadsheet includes development type, unit counts, capita equivalents, flow contributions, associated manhole connections, sub-basin assignments, and any clarifying notes. This spreadsheet is included in appendix A.

The new development areas include a mixture of duplexes, apartment-style units, townhouses, subdivisions, and commercial properties distributed throughout multiple sub-basins. These developments are connected to manholes across Lift Stations 1, 2, 5, 6, and 8 service areas, reflecting anticipated growth throughout the Village.

5. Scenarios Modeled

Two modelling scenarios were evaluated as part of this study to assess the performance of the existing sewer network under varying hydraulic conditions:

- Current Peak Flow Conditions with Developments – Applying peaking factors to the demand scenario to evaluate system performance under the most conservative loading conditions with developments.

- Future Peak Flow Conditions Developments – Applying peaking factors to the future demand scenario to evaluate system performance under the most conservative loading conditions. The future flow scenario from the 2020 model assumed a 50-ha residential development south of Highway 101, generating approximately 1,150 new residents and adding about 20.6L/s of peak sanitary flow, routed through LS#5 basin.

6. Results

6.1 Current Peak Flow Conditions with Development

Table 6-1 represents pipes with flows that are greater than 90% of the total capacity. Table 6-2 represents pipe capacities between 75% - 90%.

All pipe capacities for current conditions are in Appendix B. Mapping indicating the location of pipes with capacity concerns is in Appendix C.

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
CO-61	MH142B	27.88	MH142C	27.87	34.7	0.006	250	41.01	4.51	908.3
CO-51	MH12	5.44	MH16	5.42	54	0.044	300	64.47	20.39	316.2
10121	MH141	29.04	MH140	29.03	19.7	0.061	250	39.24	14.66	267.7
CO-59	MH139	29.07	MH138	29	90.7	0.072	250	39.54	15.92	248.3
CO-62	MH142C	27.86	MH55	27.8	37	0.157	250	41.01	23.55	174.1
10312	MH345	33.89	MH344	33.34	100.9	0.546	200	42.12	24.24	173.8
10319	MH352	34.1	MH345	33.88	38.2	0.581	200	42.12	25.01	168.4
10311	MH344	33.37	MH343	32.78	76.6	0.769	200	45.2	28.76	157.2
10310	MH343	32.78	MH427	31.97	81.1	1.005	200	45.2	32.89	137.4
CO-60	MH142	28.07	MH142B	27.88	68.1	0.279	250	41.01	31.41	130.6
10316	MH349	38.37	MH348	37.63	88.5	0.838	200	36.12	30.03	120.3
10385	MH427	31.4	MH428	30.98	116	0.359	300	69.03	57.91	119.2
10124	MH145	27.24	MH146	26.81	91.2	0.466	200	26.56	22.38	118.7
10313	MH346	34.71	MH352	34.11	68.1	0.875	200	36.12	30.67	117.8
10387	MH430	27.11	MH45	26.8	64.9	0.464	300	75.98	65.85	115.4
10315	MH348	37.63	MH347	36.75	90.8	0.961	200	36.12	32.15	112.3
10282	MH312	75.38	MH310	74.43	184	0.517	200	26.4	23.58	112
10120	MH140	29	MH139	28.9	26.3	0.373	250	39.24	36.31	108.1
10359	MH395	29.82	MH401	29.6	74	0.296	200	18.79	17.84	105.4
10284	MH314	76.1	MH313	75.61	69.3	0.7	200	26.4	27.45	96.2
CO-55	MH138	28.52	MH142	28.07	90.4	0.498	250	40.13	41.96	95.6

Table 6-1 – Pipe capacities greater than 90%

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
10041	MH43	22.07	MH46	21.44	75.9	0.827	300	78.88	87.95	89.7
10002	MH2	20.78	MH3	20.37	58.9	0.697	250	43.5	49.63	87.6
10363	MH404	31.99	MH402	31.25	132.1	0.558	200	20.44	24.5	83.5
10125	MH146	26.75	MH147	26.09	69.5	0.957	200	26.56	32.08	82.8
10317	MH350	40.27	MH349	38.37	93.7	2.035	200	36.12	46.78	77.2
10314	MH347	36.75	MH346	34.71	97.3	2.099	200	36.12	47.51	76
10322	MH356	53.56	MH355	50.44	170	1.835	200	33.43	44.43	75.2

Table 6-2 – Pipe capacities between 75% - 90%

6.2 Future Peak Flow Conditions with Developments

With the developments and a 50-ha development south of highway 101 Table 6-3 represents the pipes with flows that exceed 90% of the total capacity, and Table 6-4 represents the pipes with flows between 75% - 90% of the total capacity.

All pipe capacities for future conditions are in Appendix B. Mapping indicating the location of pipes with capacity concerns is in Appendix C.

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
CO-61	MH142B	27.88	MH142C	27.87	34.7	0.006	250	49.56	4.51	1,097.70
CO-51	MH12	5.44	MH16	5.42	54	0.044	300	73.02	20.39	358.1
10121	MH141	29.04	MH140	29.03	19.7	0.061	250	47.79	14.66	326
CO-59	MH139	29.07	MH138	29	90.7	0.072	250	48.09	15.92	302
CO-62	MH142C	27.86	MH55	27.8	37	0.157	250	49.56	23.55	210.4
10312	MH345	33.89	MH344	33.34	100.9	0.546	200	42.12	24.24	173.8
10319	MH352	34.1	MH345	33.88	38.2	0.581	200	42.12	25.01	168.4
CO-60	MH142	28.07	MH142B	27.88	68.1	0.279	250	49.56	31.41	157.8
10311	MH344	33.37	MH343	32.78	76.6	0.769	200	45.2	28.76	157.2
10310	MH343	32.78	MH427	31.97	81.1	1.005	200	45.2	32.89	137.4
10120	MH140	29	MH139	28.9	26.3	0.373	250	47.79	36.31	131.6
10316	MH349	38.37	MH348	37.63	88.5	0.838	200	36.12	30.03	120.3
10385	MH427	31.4	MH428	30.98	116	0.359	300	69.03	57.91	119.2
10124	MH145	27.24	MH146	26.81	91.2	0.466	200	26.56	22.38	118.7
10363	MH404	31.99	MH402	31.25	132.1	0.558	200	28.99	24.5	118.4
10313	MH346	34.71	MH352	34.11	68.1	0.875	200	36.12	30.67	117.8
CO-55	MH138	28.52	MH142	28.07	90.4	0.498	250	48.68	41.96	116
10387	MH430	27.11	MH45	26.8	64.9	0.464	300	75.98	65.85	115.4
10315	MH348	37.63	MH347	36.75	90.8	0.961	200	36.12	32.15	112.3
10282	MH312	75.38	MH310	74.43	184	0.517	200	26.4	23.58	112
10359	MH395	29.82	MH401	29.6	74	0.296	200	18.79	17.84	105.4
10002	MH2	20.78	MH3	20.37	58.9	0.697	250	52.05	49.63	104.9
10284	MH314	76.1	MH313	75.61	69.3	0.7	200	26.4	27.45	96.2

Table 6-3 - Pipe capacities greater than 90% for future conditions.

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
10041	MH43	22.07	MH46	21.44	75.9	0.827	300	78.88	87.95	89.7
10005	MH5	18.85	MH6	17.72	90.5	1.254	250	56.26	66.59	84.5
10004	MH4	19.95	MH5	18.86	85.7	1.264	250	56.26	66.87	84.1
CO-50	MH15	7.63	MH12	5.46	98.5	2.199	250	73.02	88.19	82.8
10125	MH146	26.75	MH147	26.09	69.5	0.957	200	26.56	32.08	82.8
10001	MH1	21.86	MH2	20.78	94.1	1.146	250	52.05	63.66	81.8
10006	MH6	17.76	MH13	16.5	93.6	1.343	250	56.26	68.93	81.6
10003	MH3	20.35	MH4	19.96	27.5	1.445	250	56.26	71.5	78.7
10317	MH350	40.27	MH349	38.37	93.7	2.035	200	36.12	46.78	77.2
10052	MH55	27.78	MH54	24.47	81.6	4.057	200	50.87	66.07	77
10314	MH347	36.75	MH346	34.71	97.3	2.099	200	36.12	47.51	76
10322	MH356	53.56	MH355	50.44	170	1.835	200	33.43	44.43	75.2

Table 6-4 - Pipe capacities between 75% - 90% for future conditions

6.3 Pipe Capacity Exceedances and Upgrade Priorities

6.3.1 Current Scenario

A summary of the pipe lengths that have capacity concerns are tabled in 6-5 below.

Diameter (mm)	Length (m)
200	962.7
250	366.9
300	234.9

Table 6-5 – Pipe lengths with capacity issues (≥90%) under current conditions

The following figures show the areas within the Village that are experiencing capacity issues according to the model. Pipe segments highlighted in red indicated that the capacity is ≥90%. Yellow represents pipe capacities between 75% - 90% and green represents pipes are less than 75%.

Figure 6-1 is the area on Commercial Street and the easement from Commercial Street to Cornwallis Avenue. The figure shows that the easement is under capacity concerns. This easement has already been identified as an area of concern with, and reports have been issues to the Village regarding a concept design

Figure 6-2 has one (1) section of pipe on Crescent Drive, one (1) section of pipe on Commercial Street and then multiple sections along Highbury Road. Highbury Road has had the greatest effect due to the new developments along Prospect Road.

Figure 6-3 shows multiple sections of pipe with capacity issues along Prospect Road. Prospect Road has received the largest additional flow due to the multiple large apartment unit complexes that are being developed/proposed.

Figure 6-4 shows one (1) section of pipe with capacity issues in the easement off Commercial Street before entering the lift station.

Figure 6-5 shows one (1) section of pipe with capacity issues before entering the lift station at the bottom of Jones Road. This is the final lift station prior to being sent to the wastewater treatment plan.

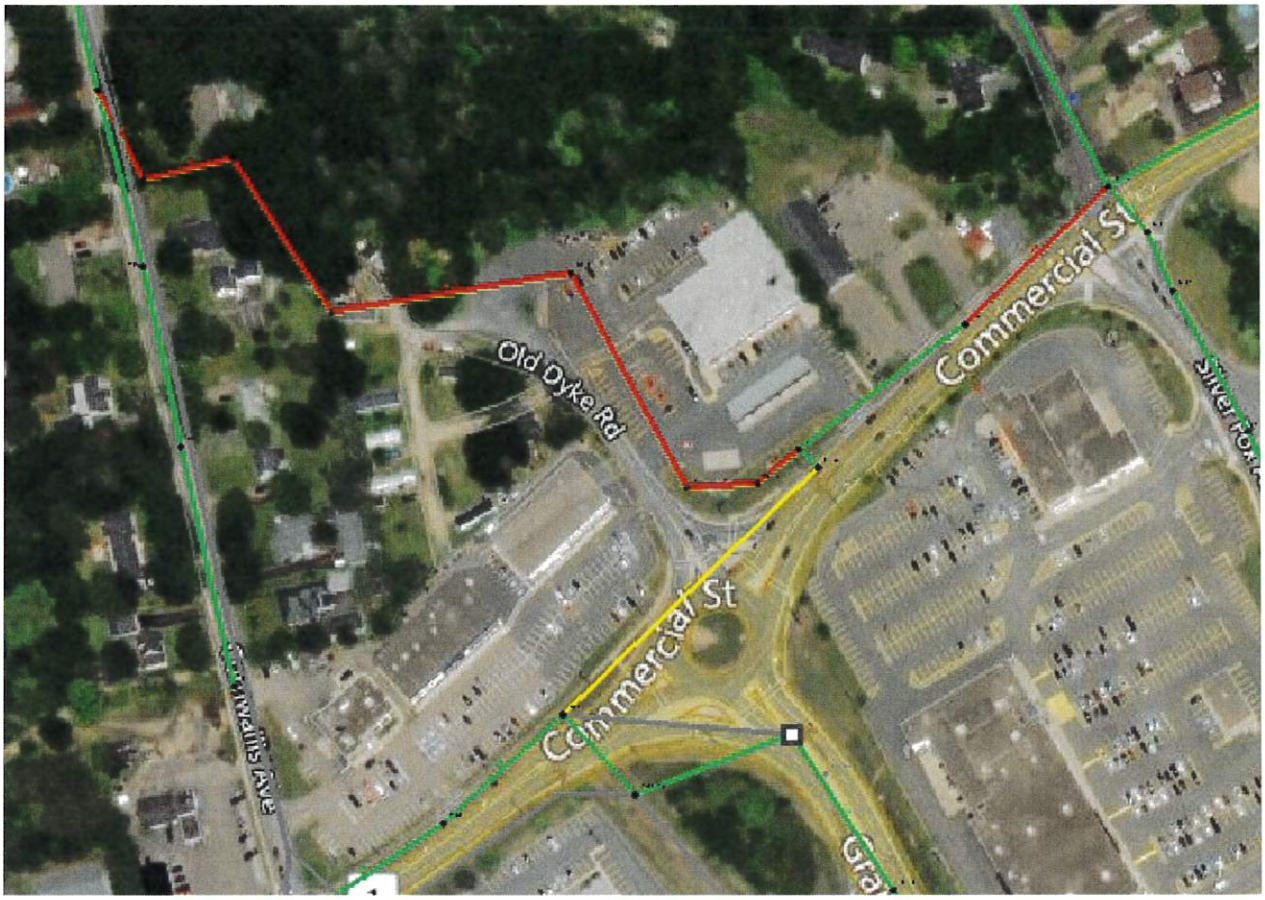

Figure 6-1 – Under capacity pipes in area of Commercial Street and the Easement to Cornwallis Avenue. (LS#6 sub basin)

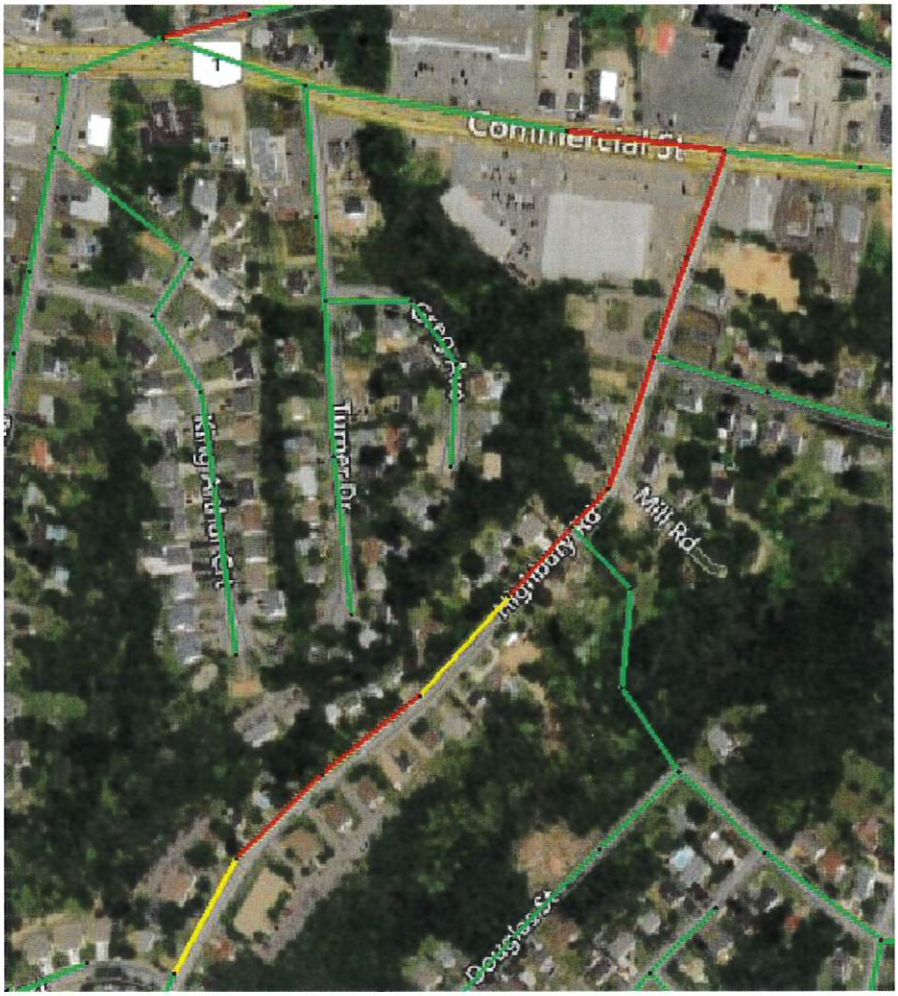

Figure 6-2 - Capacity issues along Crescent Drive, Commercial Street and Highbury Road (LS#5 sub basin).

Figure 6-3 - Capacity issues along Prospect Road (LS#5 sub basin)

Figure 6-4 - Capacity issues off Commercial Street in easement (LS #8 sub basin).

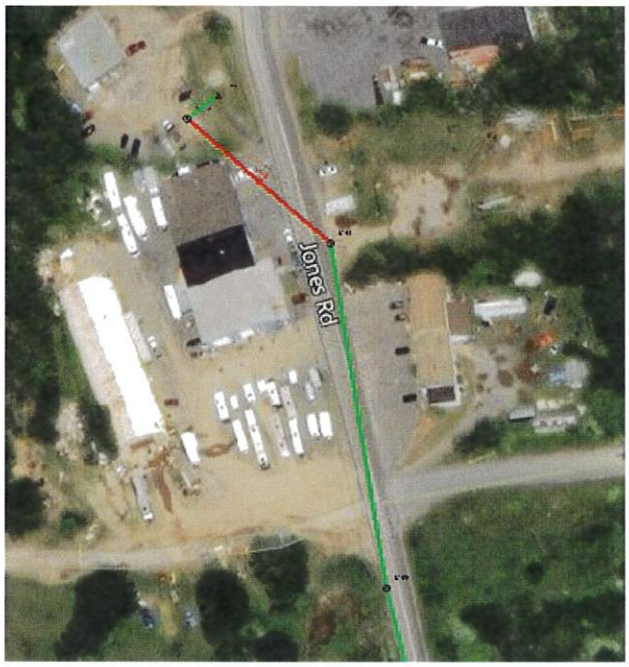

Figure 6-5 - Capacity issues along Jones Road (LS #6 sub basin).

6.3.2 Future Scenario

A summary of the pipe lengths that have capacity concerns are tabled 6-6 below.

Diameter (mm)	Length (m)
200	1094.8
250	425.8
300	234.9

Table 6-6 - Pipe lengths with capacity issues (≥90%) under future conditions

The following figures show the areas within the Village that are experiencing capacity issues according to the model. Figures 6-1 to 6-5 still apply but new pipe segments along the same route are now showing capacity issues. This is particularly happening in the Lockhart Drive area as shown in figure 6-6.

Figure 6-6 - Lockhart Drive (LS #6 sub basin) showing capacity between 75% - 90%.

7. Cost Estimates for System Upgrades

To consider worst case scenario the estimate of probable cost is based on the future scenario including the developments and the 50-ha development South of Highway 101. The 50-ha development only affects lift station #6 which is the sub-basin location for RG3 as per the 2020 report. The current conditions and future conditions remain the same for LS#5 which is the sub-basin location for RG4 as per the 2020 report and LS#8 which is the sub-basin location for RG1 as per the 2020 report.

The estimate of probable cost includes upgrading pipe sizes, road removal, road reconstruction, engineering and contingency. The estimate of probable cost is based off the main assumption that for any upstream pipe segment that requires upsizing, all downstream pipes must be at least the same diameter, or larger, as the system flows from the top of the basin to the bottom. For example, several pipe segments on Prospect Road have been identified as having capacity deficiencies and will need to be upsized. Because this basin continues onto Highbury Road, the downstream segments on Highbury that are currently shown in green will also need to be upgraded to a diameter that is at least equal to the new pipe sizes proposed on Prospect Road.

The estimate of probable cost will be broken down for each lift station basin that requires changes due to the capacity concerns. These include.

- LS #5 Sub Basin – Prospect Road, Highbury Road, Commercial Street, Crescent Drive.

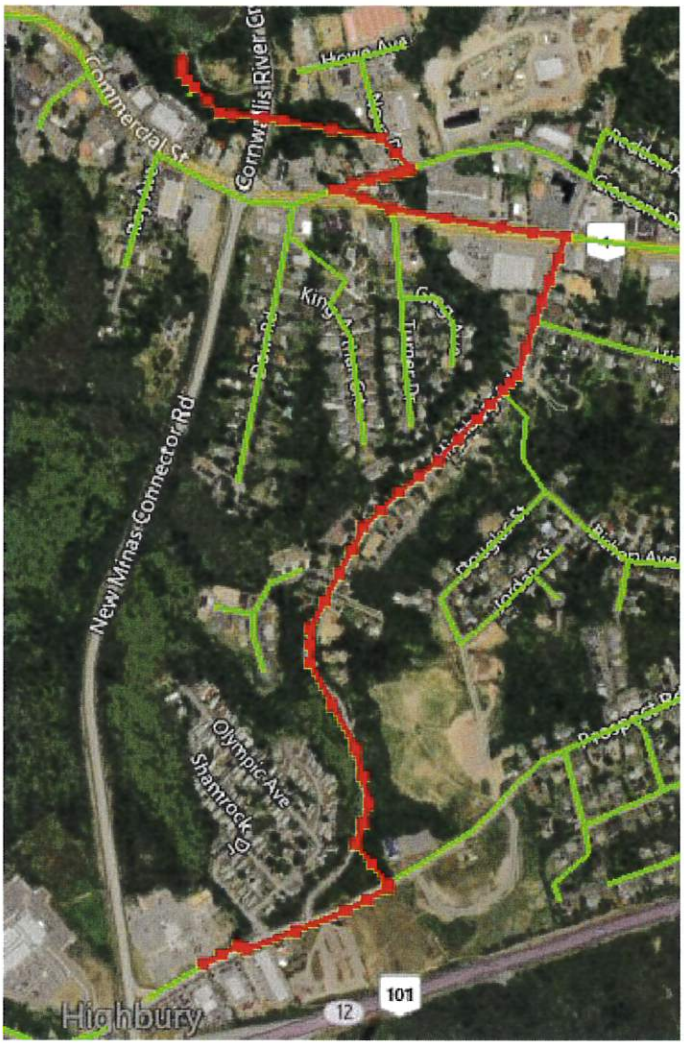

Figure 7-1 – LS #5 Sub Basin

- LS #6 Sub Basin – Commercial Street, Old Dyke Easement, Cornwallis Avenue, Lockhart Drive and Jones Road.

Figure 7-2 – LS #6 Sub Basin

- LS #8 Sub Basin – Easement near Fairbanks Avenue

Figure 7-3 – LS #8 Sub Basin

The assumptions for cost estimating include the following:

- Manhole inverts/pipe conduit inverts have not changed. Only pipe diameters are considered for resizing.
- Average sewer depth of 3.5m
- 20% rock
- All pipe bedding imported
- Services included on both sides of road every 15m
- Manhole spacing at 85m
- Class A thickness of 75mm for road reconstruction
- Class B thickness of 150mm for road reconstruction
- Asphalt thickness of 38mm per lift for road reconstruction (2 lifts: 1 base and 1 surface course asphalt)
- Road width of 6m for road reconstruction
- Curb, gutter and sidewalk (one side)
- Adjustment factor of 3.0

7.1 LS #5 Sub Basin

The required upgrades for LS#5 are in table 7-1

Existing Vs. New Design along LS#8					Existing	New		Existing	New	Existing	New	Existing	New
Label	Start Node	Stop Node	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)	Flow / Capacity (Design) (%)	Material	Material
10284	MH314	MH313	69.3	0.7	200	200	26.4	27.45	27.45	90.3	90.3	PVC	PVC
10283	MH313	MH312	17	1.169	200	200	26.4	35.46	35.46	69.9	69.9	PVC	PVC
10282	MH312	MH310	184	0.517	200	250	26.4	23.58	42.76	105	57.9	PVC	PVC
10280	MH310	MH309	89.4	1.518	200	250	26.62	40.4	73.26	61.8	34.1	Concrete	PVC
10279	MH309	MH308	7.6	2.229	200	250	27.46	48.97	88.78	52.6	29	Concrete	PVC
10278	MH308	MH358	87.7	9.597	200	250	33.43	101.61	184.22	30.9	17	Concrete	PVC
10324	MH358	MH357	74.7	5.957	200	250	33.43	80.05	145.15	39.2	21.6	Concrete	PVC
10323	MH357	MH356	101.5	3.897	200	250	33.43	64.74	117.39	48.4	26.7	Concrete	PVC
10322	MH356	MH355	170	1.835	200	250	33.43	44.43	80.55	70.6	38.9	Concrete	PVC
CO-36	MH355	MH351	60.5	9.02	200	250	33.43	98.5	178.6	31.8	17.6	PVC	PVC
10318	MH351	MH350	107.1	4.084	200	250	35.29	66.29	120.18	50	27.6	Concrete	PVC
10317	MH350	MH349	93.7	2.035	200	250	36.12	46.78	84.83	72.4	40	Concrete	PVC
10316	MH349	MH348	88.5	0.838	200	250	36.12	30.03	54.45	112.9	62.2	Concrete	PVC
10315	MH348	MH347	90.8	0.961	200	250	36.12	32.15	58.3	105.4	58.1	Concrete	PVC
10314	MH347	MH346	97.3	2.099	200	250	36.12	47.51	86.15	71.3	39.3	Concrete	PVC
10313	MH346	MH352	68.1	0.875	200	250	36.12	30.67	55.62	110.5	60.9	Concrete	PVC
10319	MH352	MH345	38.2	0.581	200	250	42.12	25.01	45.35	158	87.2	Concrete	PVC
10312	MH345	MH344	100.9	0.546	200	250	42.12	24.24	43.95	163	89.9	Concrete	PVC
10311	MH344	MH343	76.6	0.769	200	250	45.2	28.76	52.14	147.5	81.3	Concrete	PVC
10310	MH343	MH427	81.1	1.005	200	250	45.2	32.89	59.62	129	71.1	Concrete	PVC
10385	MH427	MH428	116	0.359	300	375	69.03	57.91	105	111.9	61.7	Concrete	PVC
CO-27	MH428	MH429	194.8	1.141	300	375	69.03	103.31	187.32	62.7	34.6	Concrete	PVC

Existing Vs. New Design along LS#8					Existing	New		Existing	New	Existing	New	Existing	New
Label	Start Node	Stop Node	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)	Flow / Capacity (Design) (%)	Material	Material
10386	MH429	MH430	109.1	1.222	300	375	70.25	106.89	193.8	61.7	34	Concrete	PVC
10387	MH430	MH45	64.9	0.464	300	375	75.98	65.85	119.4	108.3	59.7	Concrete	PVC
10043	MH45	MH44	54.8	6.854	300	375	75.98	253.17	459.02	28.2	15.5	Concrete	PVC
10042	MH44	MH43	21.1	1.701	300	375	75.98	126.12	228.68	56.5	31.2	Concrete	PVC
10041	MH43	MH46	75.9	0.827	300	375	78.88	87.95	159.47	84.1	46.4	Concrete	PVC
CO-33	MH46	MH329	176.2	2.485	300	375	80.41	152.43	276.38	49.5	27.3	PVC	PVC
CO-34	MH329	MH143	67.6	5.81	350	375	80.41	351.61	422.63	21.5	17.9	Concrete	PVC
CO-35	MH143	MH333	47.1	7.575	350	375	80.41	401.45	482.54	18.8	15.6	Concrete	PVC
10300	MH333	MH331	63.5	1.829	350	375	80.41	197.3	237.15	38.2	31.8	Concrete	PVC
10298	MH331	MH330	33.1	3.277	350	375	80.43	264.04	317.37	28.6	23.8	PVC	PVC
CO-29	MH330	O-5	30.9	2.959	350	375	80.43	250.89	301.57	30.1	25	PVC	PVC

Table 7-1 – LS #5 Sub Basin Required Upgrades – Existing vs. New Design

From table 7-1 we can see that 1,617.7m of 200mm sewer main needs to be upgraded to 250mm and 1,055m of 300mm and 350mm sewer main needs to be upgraded to 375mm sewer main. The estimate of probable cost for these changes is included in table 7-2

Item	Cost ($)*
Sewermain (1,617.7m of 250mm)	$2,297,000.00 ($1,420.00/m)
Sewermain (1,055m of 375mm)	$1,609,000.00 ($1,525.00/m)
Road Removal (m)	$187,000.00 ($70.00/m)
Road Reconstruction (m)	$1,871,000.00 ($700.00/m)
Engineering (15%)	$895,000.00
Subtotal	$6,859,000.00
Contingency (30%)	$2,058,000.00
HST (15%)	$1,337,000.00
Total	$10,254.000.00

Table 7-2 - Estimate of probable cost for LS#5 Sub Basin
***Rounded to nearest $1,000.00**

7.2 LS #6 Sub Basin

The required upgrades for LS#5 are in table 7-3.

Existing Vs. New Design along LS#8					Existing	New		Existing	New	Existing	New	Existing	New
Label	Start Node	Stop Node	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)	Flow / Capacity (Design) (%)	Material	Material
10363	MH404	MH402	132.1	0.558	200	250	28.99	24.5	44.42	118.4	61.2	Concrete	PVC
10359	MH395	MH401	74	0.296	200	250	18.86	17.84	32.34	105.4	54.7	Concrete	PVC
CO-21	MH401	MH141	77.9	0.666	250	250	18.86	48.53	48.53	38.7	36.5	PVC	PVC
10362	MH402	MH141	9.9	1.619	250	250	28.99	75.66	75.66	38.3	36	PVC	PVC
CO-59	MH139	MH138	90.7	0.072	250	450	48.15	15.92	76.34	302	59.2	PVC	PVC
10121	MH141	MH140	19.7	0.061	250	450	47.85	14.66	70.28	326	63.9	PVC	PVC
10120	MH140	MH139	26.3	0.373	250	450	47.85	36.31	174.07	131.6	25.8	PVC	PVC
CO-55	MH138	MH142	90.4	0.498	250	450	48.74	41.96	201.15	116	22.7	PVC	PVC
CO-60	MH142	MH142B	68.1	0.279	250	450	49.62	31.41	150.59	157.8	30.9	Concrete	PVC
CO-61	MH142B	MH142C	34.7	0.006	250	525	49.62	4.51	32.65	1,097.70	*142.6	Concrete	PVC
CO-62	MH142C	MH55	37	0.157	250	525	49.62	23.55	170.32	210.4	27.3	Concrete	PVC
10052	MH55	MH54	81.6	4.051	200	525	50.93	66.07	865.61	77	5.5	Concrete	PVC
10051	MH54	MH1	77.5	3.379	250	525	50.93	108.68	790.53	46.8	6	Concrete	PVC
10001	MH1	MH2	94.1	1.146	250	525	52.11	63.66	460.38	81.8	10.6	Concrete	PVC
10002	MH2	MH3	58.9	0.697	250	525	52.11	49.63	358.94	104.9	13.6	Concrete	PVC
10003	MH3	MH4	27.5	1.445	250	525	56.32	71.5	517.06	78.7	10.2	Steel	PVC
10004	MH4	MH5	85.7	1.264	250	525	56.32	66.87	483.57	84.1	10.9	Steel	PVC
10005	MH5	MH6	90.5	1.254	250	525	56.32	66.59	481.59	84.5	11	Steel	PVC
10006	MH6	MH13	93.6	1.343	250	525	56.32	68.93	498.47	81.6	10.6	Steel	PVC
10013	MH13	MH14	102.8	4.535	250	525	62.68	126.64	915.84	49.4	6.4	Steel	PVC
10014	MH14	MH15	123.8	3.395	250	525	73.03	109.57	792.37	66.6	8.6	Steel	PVC
CO-50	MH15	MH12	98.5	2.199	250	525	73.08	88.19	637.76	82.8	10.8	Concrete	PVC

CO-51	MH12	MH16	54	0.044	300	525	73.08	20.39	90.68	358.1	75.6	Concrete	PVC
CO-52	MH16	O-6	11.1	2.319	300	525	73.08	147.26	654.91	49.6	10.5	PVC	PVC

Table 7-3 – LS #6 Sub Basin Required Upgrades – Existing vs. New Design
***The pipe section still has capacity >90% and would not correct itself under the rules of the model. This could be an anomaly and would be worked out at the pre-design stage for the project when site specific information is available.**

From table 7-3 we can see that 206.1m of 200mm pipe needs to be upgraded to 250mm. 295.2m of 250mm pipe needs to be upgraded to 450mm and 1,071.3m of 250mm and 350mm pipe needs to be upgraded to 525mm pipe. The estimate of probable cause for these upgrades along LS#6 are included in table 7-4 below.

Item	Cost ($)*
Sewermain (206.1m of 250mm)	$293,000.00 ($1,420.00/m)
Sewermain (295.2m of 450mm)	$480,000.00 ($1,625.00/m)
Sewermain (1,071.3m of 525mm)	$1,854,000.00 ($1,730/m)
Road Removal (m)	$110,000.00 ($70.00/m)
Road Reconstruction (m)	$1,101,000.00 ($700/m)
Engineering (15%)	$576,000.00
Subtotal	$4,412,000.00
Contingency (30%)	$1,324,000.00
HST (15%)	$861,000.00
Total	$6,597,000.00

Table 7-4 - Estimate of probable cost for LS#6 Sub Basin
***Rounded to nearest $1,000.00**

7.3 LS #8 Sub Basin

The required upgrades for LS#8 sub basin are included in table 7-5 below.

Existing Vs. New Design along LS#8					Existing	New		Existing	New	Existing	New	Existing	New
Label	Start Node	Stop Node	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)	Flow / Capacity (Design) (%)	Material	Material
10124	MH145	MH146	91.2	0.466	200	250	26.56	22.38	40.58	118.7	61.4	Concrete	PVC
10125	MH146	MH147	69.5	0.957	200	250	26.56	32.08	58.17	82.8	42.8	Concrete	PVC
CO-49	MH147	O-8	16.2	6.825	200	250	26.56	85.69	155.36	31	16	PVC	PVC

Table 7-5 – LS #8 Sub Basin Required Upgrades – Existing vs. New Design

From table 7-5 we can see that 176.9 of 200mm sewer main needs to be upgraded to 250mm. The estimate of probable cost for the upgrades along LS#8 sub basin are included in table 7-6 below

Item	Cost ($)*
Sewermain (176.9 of 250mm)	$252,000.00 ($1,420.00/m)
Engineering (15%)	$38,000.00
Subtotal	$289,000.00
Contingency (30%)	$87,000.00
HST (15%)	$56,000.00
Total	$432,000.00

Table 7-6 - Estimate of probable cost for LS#8 Sub Basin
***Rounded to nearest $1,000.00**

7.4 Summary of Cost

The table below is the total summary of cost for upgrading the sub-basins.

Area	Cost
Sub-Basin LS#5	$10,254,000.00
Sub-Basin LS#6	$6,597,000.00
Sub-Basin LS#8	$432,000.00
Total	$17,283,000.00

Table 7-7 – Summary of costs

8. Conclusion and Recommendations

The updated sanitary sewer analysis for the Village evaluated the impacts of several new residential and commercial developments on the existing wastewater collection system under both current and future peak loading conditions. Using the most recent version of the Village's SewerCAD model, the study updated population equivalents for the new developments and assessed performance during peak flow conditions.

The results indicate that several pipe segments within the collection system are currently operating at or above the 90% capacity. These capacity constraints are in the sub basins for lift station #5, lift station #6 and lift station #8. Under future conditions which include all developments plus an assumed 50-ha development south of Highway 101, additional pipes exceed capacity, particularly within the LS#5 service area and downstream trunk sections.

The assessment confirms that the anticipated growth will place demands on the existing collection system beyond the existing pipe capacity, and localized upgrades will be required to maintain acceptable levels of service and accommodate projected development. Order-of-magnitude cost estimates have been prepared to support planning and budgeting efforts.

Recommendations based on the results of the modelling exercise include:

- Review specific sections of pipe in the figures and mapping presented here to observe flow capacity issues during peak times and wet weather events. This may include opening manhole covers and observing the system.
- Proceed with planning for increased system capacity in the identified sub basins to undertake pre-design and detailed engineering for system upgrading.

Appendix A. Development List

Category		Capita Equivalent	Capita Roundup	Residential Flow (L/d)	Residential Flow (L/s)	Manhole Number	Sub-Basin	Street	Drawing	Notes
6 duplexes	12	28.8	29	6,525	0.076	MH288	Lift Station 1	Jennifer Crescent	CV104	Proceed
500 Units	500	1200	1200	270,000	3.125	MH316	Lift Station 5	New Minas Connector Road	CV102	Will go into 316. Proceed
24 Units	24	57.6	58	13,050	0.151	MH324	Lift Station 2	Prospect Road	CV102	Proceed
139 Units	139	333.6	334	75,150	0.870	MH325	Lift Station 2	Prospect Road	CV102	Proceed
200 Homes	200	480	480	108,000	1.250	MH315	Lift Station 5	Prospect Road	CV102	South of Highway. Point Load onto Prospect Road. Proceed
192 Units	192	460.8	461	103,725	1.201	MH193	Lift Station 5	Jordan Street	CV102	Proceed
12 Duplexs	24	57.6	58	13,050	0.151	MH193	Lift Station 5	Jordan Street	CV102	Proceed
350 Units	350	840	840	189,000	2.188	MH305	Lift Station 5	Prospect Road	CV102	Proceed
32 units	32	76.8	77	17,325	0.201	MH344	Lift Station 5	Highbury Road	CV105	Proceed
46 Units	46	110.4	111	24,975	0.289	MH428	Lift Station 5	Commercial Street	CV105	Proceed
2 Commercial Units		0	0	-	-	MH428	Lift Station 5	Commercial Street	CV105	What commercial buildings? Coin operated laundry mat for tenants
11 Units	11	26.4	27	6,075	0.070	MH228	Lift Station 5	Perrier Drive	CV105	Proceed
6 Units	6	14.4	15	3,375	0.039	MH386	Lift Station 5	Perrier Drive	CV105	Proceed
30 Units	30	72	72	16,200	0.188	MH378	Lift Station 8	Commercial Street	CV105	Proceed
300 Units	300	720	720	162,000	1.875	MH145	Lift Station 8	Easement off Commercial Street	CV105	No asbuilts in this area or on Commercial Street. Proceed
20 Units	20	48	48	10,800	0.125	MH146	Lift Station 8	Easement off Commercial Street	CV105	No asbuilts in this area or on Commercial Street. Proceed
2 Restaurants		0	50	3,500	0.041	MH295*	Lift Station 6	Granite Drive	CV105	Firehouse sub and popeyes chicken. Proceed
500 units	300	300	300	67,500	0.781	MH298	Lift Station 6	Commercial Street	CV105	or 300 senior bed comptex (likely complex). Assuming going to Commercial
50 units	50	120	120	27,000	0.313	MH391	Lift Station 6	Commercial Street	CV105	Proceed
56 units	56	134.4	135	30,375	0.352	MH142	Lift Station 6	Cornwallis Avenue	CV105	Proceed
26 units	26	62.4	63	14,175	0.164	MH58	Lift Station 6	Cornwallis Avenue	CV105	Proceed
200 Units	200	480	480	108,000	1.250	MH9	Lift Station 6	Castle Loma Drive	CV105	Proceed
8 Units	8	19.2	20	4,500	0.052	MH19	Lift Station 6	Jones Road	CV105	Proceed
18 Homes	18	43.2	44	9,900	0.115	MH334	Lift Station 6	Jones Road	CV105	Proceed
3 units	3	7.2	8	1,800	0.021	MH15	Lift Station 6	Jones Road	CV105	Proceed
53 Duplexs	106	254.4	255	57,375	0.664	MH341	Lift Station 6	Barron Drive	CV105	Barron Drive Easement. Proceed
6 plumbing	12	28.8	29	6,525	0.076	MH36	Lift Station 6	Barron Drive	CV105	Barron Drive Easement

Residential Flow	225	L/cap/day
Capita/Unit	2.4	
restaurant	70	l/cap/day

Appendix B. Pipe Capacities

Current Conditions with Development										
Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
CO-61	MH142B	27.88	MH142C	27.87	34.7	0.006	250	41.01	4.51	908.3
CO-51	MH12	5.44	MH16	5.42	54	0.044	300	64.47	20.39	316.2
10121	MH141	29.04	MH140	29.03	19.7	0.061	250	39.24	14.66	267.7
CO-59	MH139	29.07	MH138	29	90.7	0.072	250	39.54	15.92	248.3
CO-62	MH142C	27.86	MH55	27.8	37	0.157	250	41.01	23.55	174.1
10312	MH345	33.89	MH344	33.34	100.9	0.546	200	42.12	24.24	173.8
10319	MH352	34.1	MH345	33.88	38.2	0.581	200	42.12	25.01	168.4
10311	MH344	33.37	MH343	32.78	76.6	0.769	200	45.2	28.76	157.2
10310	MH343	32.78	MH427	31.97	81.1	1.005	200	45.2	32.89	137.4
CO-60	MH142	28.07	MH142B	27.88	68.1	0.279	250	41.01	31.41	130.6
10316	MH349	38.37	MH348	37.63	88.5	0.838	200	36.12	30.03	120.3
10385	MH427	31.4	MH428	30.98	116	0.359	300	69.03	57.91	119.2
10124	MH145	27.24	MH146	26.81	91.2	0.466	200	26.56	22.38	118.7
10313	MH346	34.71	MH352	34.11	68.1	0.875	200	36.12	30.67	117.8
10387	MH430	27.11	MH45	26.8	64.9	0.464	300	75.98	65.85	115.4
10315	MH348	37.63	MH347	36.75	90.8	0.961	200	36.12	32.15	112.3
10282	MH312	75.38	MH310	74.43	184	0.517	200	26.4	23.58	112
10120	MH140	29	MH139	28.9	26.3	0.373	250	39.24	36.31	108.1
10359	MH395	29.82	MH401	29.6	74	0.296	200	18.79	17.84	105.4
10284	MH314	76.1	MH313	75.61	69.3	0.7	200	26.4	27.45	96.2
CO-55	MH138	28.52	MH142	28.07	90.4	0.498	250	40.13	41.96	95.6
10041	MH43	22.07	MH46	21.44	75.9	0.827	300	78.88	87.95	89.7
10002	MH2	20.78	MH3	20.37	58.9	0.697	250	43.5	49.63	87.6
10363	MH404	31.99	MH402	31.25	132.1	0.558	200	20.44	24.5	83.5
10125	MH146	26.75	MH147	26.09	69.5	0.957	200	26.56	32.08	82.8
10317	MH350	40.27	MH349	38.37	93.7	2.035	200	36.12	46.78	77.2
10314	MH347	36.75	MH346	34.71	97.3	2.099	200	36.12	47.51	76
10322	MH356	53.56	MH355	50.44	170	1.835	200	33.43	44.43	75.2
10283	MH313	75.6	MH312	75.4	17	1.169	200	26.4	35.46	74.5
CO-50	MH15	7.63	MH12	5.46	98.5	2.199	250	64.47	88.19	73.1
10005	MH5	18.85	MH6	17.72	90.5	1.254	250	47.71	66.59	71.6
10004	MH4	19.95	MH5	18.86	85.7	1.264	250	47.71	66.87	71.3
10364	MH405	32.32	MH404	32	60	0.54	200	16.81	24.1	69.8
10006	MH6	17.76	MH13	16.5	93.6	1.343	250	47.71	68.93	69.2
10001	MH1	21.86	MH2	20.78	94.1	1.146	250	43.5	63.66	68.3
10086	MH101	30.98	MH95	29.1	105.4	1.783	200	29.73	43.8	67.9
CO-27	MH428	30.98	MH429	28.76	194.8	1.141	300	69.03	103.31	66.8
10003	MH3	20.35	MH4	19.96	27.5	1.445	250	47.71	71.5	66.7
10280	MH310	71.92	MH309	70.57	89.4	1.518	200	26.62	40.4	65.9
10386	MH429	28.67	MH430	27.34	109.1	1.222	300	70.25	106.89	65.7
10379	MH421	33.29	MH422	33.21	27.6	0.304	250	21.02	32.81	64.1
10052	MH55	27.78	MH54	24.47	81.6	4.057	200	42.32	66.07	64.1
CO-53	MH87	15.37	O-7	14.59	70.4	1.109	250	39.74	62.62	63.5
10377	MH419	33.92	MH420	33.66	85	0.312	250	20.69	33.2	62.3
10381	MH423	32.73	MH425	32.41	93.7	0.34	250	21.02	34.7	60.6
10365	MH406	32.84	MH405	32.33	70.5	0.717	200	16.81	27.76	60.5
10285	MH315	78.28	MH314	76.19	117.5	1.777	200	26.4	43.72	60.4
10336	MH373	28.01	MH145	27.28	89.1	0.818	200	17.9	29.66	60.3
10042	MH44	22.53	MH43	22.17	21.1	1.701	300	75.98	126.12	60.2
10014	MH14	11.83	MH15	7.63	123.8	3.395	250	64.42	109.57	58.8
10068	MH76	21.79	MH77	21.34	52.4	0.851	250	31.9	54.86	58.2
10384	MH426	32.02	MH427	31.52	99.5	0.504	250	23.83	42.23	56.4
10279	MH309	70.56	MH308	70.39	7.6	2.229	200	27.46	48.97	56.1
10383	MH425	32.4	MH426	32.02	91.7	0.419	250	21.02	38.49	54.6
10072	MH85	20.83	MH86	20.38	77.4	0.587	300	39.74	74.07	53.6
10380	MH422	33.19	MH423	32.73	104.1	0.438	250	21.02	39.36	53.4
10318	MH351	44.63	MH350	40.25	107.1	4.084	200	35.29	66.29	53.2
CO-33	MH46	21.44	MH329	17.06	176.2	2.485	300	80.41	152.43	52.7
10323	MH357	57.51	MH356	53.56	101.5	3.897	200	33.43	64.74	51.6
CO-3	MH102	34.8	MH101	31.53	104	3.145	200	29.56	58.16	50.8
10069	MH77	21.31	MH85	20.83	69.8	0.683	300	39.74	79.94	49.7
CO-41	MH244	62.61	MH-D1	62.55	119.8	0.051	200	3.63	7.4	49.1
10080	MH95	28.97	MH94	26.58	64.4	3.715	200	30.61	63.22	48.4
10288	MH318	77.53	MH319	77.02	99.5	0.506	200	10.91	23.32	46.8
CO-44	MH326	69.55	O-2	69.45	11.6	0.833	200	13.84	29.93	46.3
10378	MH420	33.66	MH421	33.29	63.5	0.571	250	20.69	44.95	46
10295	MH325	69.98	MH326	69.57	51.8	0.8	200	13.46	29.33	45.9
10366	MH407	33.21	MH406	32.82	67.5	0.579	200	11.26	24.96	45.1
CO-24	MH408	34.04	MH407	33.22	136.1	0.607	200	11.26	25.55	44.1
CO-52	MH16	5.39	O-6	5.13	11.1	2.319	300	64.47	147.26	43.8
10290	MH320	76.64	MH321	76.11	91	0.582	200	10.91	25.03	43.6
10013	MH13	16.5	MH14	11.84	102.8	4.535	250	54.06	126.64	42.7
10324	MH358	61.98	MH357	57.53	74.7	5.957	200	33.43	80.05	41.8
10289	MH319	77	MH320	76.65	54.8	0.638	200	10.91	26.2	41.6
10388	MH431	27.24	MH430	27.2	76.3	0.054	250	5.73	13.79	41.6
10300	MH333	9.39	MH331	8.23	63.5	1.829	350	80.41	197.3	40.8
10367	MH409	34.35	MH408	34.05	39.5	0.752	200	11.26	28.43	39.6
10301	MH334	12.36	MH14	11.88	121.5	0.396	200	8.11	20.64	39.3
10051	MH54	24.44	MH1	21.85	77.5	3.34	250	42.32	108.68	38.9

CO-21	MH401	29.57	MH141	29.05	77.9	0.666	250	18.79	48.53	38.7
10074	MH88	16.32	MH87	15.41	71.3	1.272	300	39.74	109.05	36.4
10291	MH321	76.1	MH322	75.7	45.5	0.879	200	10.91	30.75	35.5
CO-45	MH398	5.39	O-4	5.39	6.1	0.086	200	2.96	8.4	35.2
CO-38	MH355	50.13	MH351	44.67	60.5	9.02	200	33.43	98.5	33.9
10348	MH384	47.95	MH385	47.9	71.7	0.073	200	2.93	8.83	33.2
10278	MH308	70.4	MH358	61.98	87.7	9.597	200	33.43	101.61	32.9
CO-29	MH330	7.13	O-5	6.22	30.9	2.959	350	80.43	250.89	32.1
10092	MH109	35.76	MH102	34.75	116.5	0.874	300	28.78	90.41	31.8
10091	MH108	36.49	MH109	35.76	82.6	0.877	300	28.58	90.55	31.6
CO-49	MH147	25.81	O-8	24.7	16.2	6.825	200	26.56	85.69	31
10268	MH331	8.23	MH330	7.14	33.1	3.277	350	80.43	264.04	30.5
CO-7	MH94	26.55	MH76	21.9	153.4	3.032	250	31.53	103.54	30.4
10043	MH45	26.8	MH44	23.05	54.8	6.864	300	75.98	253.17	30
10287	MH317	78.69	MH318	77.54	87.7	1.321	200	10.91	37.7	28.9
10286	MH316	78.94	MH317	78.69	18.7	1.333	200	10.91	37.86	28.8
10327	MH363	42.07	MH362	41.71	12.8	2.87	200	15.4	55.57	27.7
10320	MH353	34.36	MH352	34.14	61.3	0.347	200	5.35	19.33	27.7
10073	MH86	20.36	MH88	16.37	177.9	2.241	300	39.74	144.77	27.4
10362	MH402	29.21	MH141	29.05	9.9	1.619	250	20.44	75.66	27
10265	MH296	30.56	MH396	30.43	23.6	0.585	200	6.6	25.08	26.3
10090	MH107	37.35	MH108	36.49	75.4	1.147	300	27.23	103.58	26.3
10292	MH322	75.69	MH323	74.98	43.9	1.618	200	10.91	41.72	26.1
10369	MH411	34.85	MH410	34.76	21.2	0.419	200	5.46	21.23	25.7
10326	MH362	41.64	MH361	40.11	43.6	3.511	200	15.4	61.46	25.1
CO-39	MH360	37.01	MH419	33.93	81.9	3.757	200	15.4	63.57	24.2
10333	MH370	68.36	MH369	68.1	51.7	0.501	200	5.42	23.23	23.3
10328	MH364	44.91	MH363	42.08	67.7	4.184	200	15.4	67.09	23
CO-34	MH329	16.95	MH143	13.03	67.6	5.81	350	80.41	351.61	22.9
10089	MH106	39.28	MH107	37.37	124.5	1.529	300	27.23	119.57	22.8
10368	MH410	34.75	MH409	34.37	67.5	0.563	200	5.46	24.6	22.2
10294	MH324	72.29	MH325	69.99	91.1	2.521	200	11.28	52.08	21.7
10356	MH392	34.64	MH393	33.44	91.2	1.314	200	8.04	37.6	21.4
10264	MH295	31.13	MH296	30.6	59.1	0.889	200	6.6	30.92	21.3
10263	MH294	32.14	MH295	31.54	63.1	0.955	200	6.56	32.65	20.5
10118	MH136	30.33	MH137	30.01	47.1	0.675	200	5.5	26.94	20.4
10306	MH339	21.21	MH338	20.84	76.1	0.486	200	4.63	22.86	20.2
CO-35	MH143	12.97	MH333	9.4	47.1	7.575	350	80.41	401.45	20
10276	MH305	74.24	MH306	73.49	91.2	0.829	200	5.97	29.87	20
10305	MH338	20.82	MH337	20.5	64.3	0.499	200	4.63	23.17	20
10267	MH298	36.1	MH297	35.02	106.7	1.01	200	6.56	32.97	19.9
10266	MH297	34.94	MH293	33.84	108.1	1.022	200	6.56	33.15	19.8
10355	MH391	36.08	MH392	34.65	91.9	1.557	200	8.04	40.93	19.7
10332	MH369	68.09	MH368	67.45	69.9	0.713	200	5.42	27.7	19.6
10262	MH293	33.28	MH294	32.18	104.1	1.051	200	6.56	33.63	19.5
10358	MH394	31.44	MH395	29.85	100.2	1.584	200	8.04	41.28	19.5
10357	MH393	33.46	MH394	31.44	120.6	1.679	200	8.04	42.49	18.9
10337	MH374	28.38	MH373	27.93	49.9	0.902	200	5.5	31.15	17.7
10325	MH361	40.11	MH360	37.04	43.2	7.104	200	15.4	87.42	17.6
10163	MH193	56.61	MH192	56.19	88.6	0.47	200	3.96	22.5	17.6
10334	MH371	66.67	MH370	66.4	34.8	0.783	200	5.1	29.01	17.6
10215	MH243	62.95	MH244	62.62	78	0.422	200	3.63	21.3	17.1
CO-8	MH137	30	MH374	28.42	157.8	1.001	200	5.5	32.81	16.8
10308	MH341	22.45	MH340	21.93	104.5	0.492	200	3.8	23	16.5
10307	MH340	21.87	MH339	21.32	107.1	0.518	200	3.8	23.61	16.1
10103	MH120	31.47	MH121	31.34	36.4	0.357	250	5.5	35.54	15.5
10123	MH144	27.65	MH145	27.27	92.6	0.41	200	3.16	21.01	15
CO-36	MH365	48.46	MH364	45.25	115.1	2.781	200	8.16	54.7	14.9
10389	MH432	27.49	MH431	27.28	75.4	0.28	200	2.53	17.35	14.6
10293	MH323	74.95	MH324	72.3	50.4	5.26	200	10.91	75.22	14.5
10354	MH390	38.18	MH391	36.05	90.7	2.344	200	7.26	50.22	14.5
10360	MH396	30.39	MH395	30.25	22.3	0.613	250	6.6	46.57	14.2
10024	MH26	36.68	MH27	36.43	55.1	0.465	200	3.1	22.36	13.9
10246	MH274	40.7	MH273	40.13	61.7	0.918	200	3.96	31.43	12.6
10237	MH265	38.95	MH266	38.2	115.6	0.644	200	3.29	26.33	12.5
10117	MH135	30.79	MH136	30.33	79.8	0.56	250	5.5	45.29	12.2
10276	MH306	73.45	MH307	72.48	40.4	2.386	200	5.97	50.66	11.8
10104	MH121	31.34	MH135	30.8	80.6	0.67	250	5.5	48.68	11.3
10151	MH180	36.03	MH181	35.5	106.5	0.497	200	2.58	23.12	11.1
10161	MH191	54.74	MH190	53.33	91.5	1.543	200	4.52	40.74	11.1
10162	MH192	56.15	MH191	54.74	91.7	1.544	200	4.52	40.75	11.1
10071	MH79	22.26	MH78	21.5	78.8	0.962	250	5.42	58.31	11
10025	MH27	36.4	MH28	35.83	76.1	0.744	200	3.1	28.29	11
10391	MH434	29.02	MH433	28.48	107.4	0.502	200	2.53	23.23	10.9
10248	MH277	55.45	MH278	54.84	59.3	1.042	200	3.63	33.48	10.9
10268	MH299	72.93	MH372	70.66	109.9	2.062	200	5.1	47.1	10.8
10241	MH269	36.63	MH268	36.1	42.3	1.241	200	3.96	38.53	10.8
10259	MH290	33.89	MH289	33.16	69.3	1.047	200	3.63	33.57	10.8
10026	MH28	35.81	MH19	35.22	77.7	0.762	200	3.1	28.63	10.8
10152	MH181	35.52	MH182	34.96	107.3	0.528	200	2.58	23.82	10.9
10335	MH372	70.63	MH371	68.67	90.6	2.169	200	5.1	48.3	10.6
CO-1	MH289	33.14	CKPT1053	32.73	62.2	0.855	200	3.63	34.5	10.5

10277	MH307	72.47	MH308	70.96	50.6	2.991	200	5.87	56.73	10.5
10375	MH416	34.5	MH417	34.44	16.2	0.346	200	2.01	19.3	10.4
10153	MH182	34.98	MH183	34.46	91	0.572	200	2.58	24.8	10.4
10302	MH335	12.91	MH334	12.36	96.9	0.572	250	4.63	44.97	10.3
CO-2	CKPT1053	32.48	MH404	31.99	40.1	1.188	200	3.63	35.71	10.2
10160	MH190	53.33	MH189	51.84	80.6	1.844	200	4.52	44.54	10.2
10371	MH413	35.77	MH412	35.39	89.7	0.428	200	2.17	21.45	10.1
10329	MH366	54.04	MH365	48.58	91.2	5.993	200	8.07	80.29	10
10373	MH414	35.21	MH415	34.87	91.6	0.374	200	2.01	20.07	10
10016	MH18	25.59	MH17	22.39	90.3	3.544	200	6.08	61.74	9.9
10331	MH368	67.47	MH367	62.74	72.7	6.512	200	8.07	83.7	9.6
10102	MH119	31.99	MH120	31.77	21.2	1.059	200	3.25	33.76	9.6
10193	MH221	73.53	MH299	73.36	24.9	0.668	200	2.55	26.8	9.5
10033	MH35	22.93	MH341	22.45	101.6	0.473	200	2.14	22.57	9.5
10070	MH78	21.47	MH77	21.35	25.5	0.49	300	6.42	67.7	9.5
10029	MH31	20.12	MH22	19.92	23.9	0.862	200	2.85	30.45	9.3
10106	MH123	33.34	MH122	32.83	76.2	0.665	200	2.48	26.75	9.2
10244	MH272	39.2	MH271	38.76	24.4	1.829	200	3.96	44.35	8.9
10261	MH292	36.41	MH291	35.54	55.9	1.558	200	3.63	40.94	8.9
10154	MH183	34.46	MH344	33.75	88.1	0.801	200	2.58	29.36	8.8
10374	MH415	34.87	MH416	34.5	75.4	0.488	200	2.01	22.91	8.8
10239	MH267	35.33	MH409	34.44	46.7	1.911	200	3.96	45.34	8.7
10243	MH271	38.76	MH270	37.61	59.9	1.919	200	3.96	45.43	8.7
10242	MH270	37.6	MH269	36.67	47.8	1.937	200	3.96	45.65	8.7
10372	MH-D2	35.71	MH414	35.22	98.9	0.499	200	2.01	23.18	8.7
10376	MH417	34.44	MH419	33.95	97.6	0.5	200	2.01	23.19	8.7
10245	MH273	40.09	MH272	39.23	43.7	1.984	200	3.96	45.97	8.6
10321	MH354	36.99	MH353	34.39	72.1	3.618	200	5.35	82.38	8.6
10240	MH268	36.1	MH267	35.38	34.3	2.105	200	3.96	47.59	8.3
10361	MH397	8.64	MH398	6.26	30.3	1.232	200	2.96	36.41	8.1
10009	MH9	32.55	MH8	31.1	74.2	1.958	200	3.73	45.9	8.1
10136	MH164	28.36	MH431	27.79	39.5	1.45	200	3.2	39.49	8.1
CO-14(2)	MH-D12	35.56	MH61	34.73	63.9	1.298	200	3.01	37.36	8.1
10271	MH302	75.12	MH301	74.64	49.9	0.977	200	2.55	32.42	7.9
10330	MH367	62.62	MH366	54.04	85.9	9.974	200	8.07	103.68	7.8
10218	MH247	63.33	MH243	63.01	77.5	0.418	200	1.61	21.2	7.6
10393	MH437	22.74	MH438	21.82	64	1.438	200	2.96	39.33	7.5
10370	MH412	35.38	MH411	34.86	62.4	0.837	200	2.17	30.01	7.2
10349	MH385	47.6	MH386	46.35	79.1	1.579	200	2.93	41.21	7.1
10105	MH122	32.83	MH119	32.01	73.3	1.119	200	2.46	34.7	7.1
10135	MH163	28.85	MH164	28.37	14.5	1.899	200	3.2	45.2	7.1
10390	MH433	28.48	MH432	27.49	79.6	1.244	200	2.53	36.57	6.9
10260	MH291	35.44	MH290	33.89	59.9	2.584	200	3.63	52.72	6.9
10342	MH379	36.17	MH378	35.68	111.6	0.437	250	2.69	39.32	6.8
10017	MH19	34.37	MH18	25.6	117.5	7.46	200	6.08	89.58	6.8
10270	MH301	74.64	MH300	74.17	35.1	1.327	200	2.55	37.78	6.8
10272	MH303	75.57	MH302	75.18	41.1	0.947	200	2.15	31.93	6.7
10177	MH206	75.02	MH221	73.51	112	1.352	200	2.55	38.13	6.7
10303	MH336	15.68	MH335	12.91	60.7	4.56	200	4.63	70.04	6.6
10343	MH380	36.57	MH379	36.21	73.7	0.482	250	2.69	41.28	6.5
10149	MH177	41.85	MH178	40.99	55.3	1.547	200	2.58	40.79	6.3
10273	MH304	76.24	MH303	75.56	61.9	1.1	200	2.15	34.4	6.2
10345	MH382	39.15	MH381	36.94	122.5	1.802	200	2.69	44.03	6.1
CO-9	MH378	35.66	MH3767	35.11	97.7	0.562	250	2.69	44.59	6
10238	MH266	38.18	MH411	34.91	111.4	2.941	200	3.29	56.24	5.8
10040	MH42	24.03	MH43	22.12	89.4	2.145	200	2.8	48.04	5.8
CO-57	MH112	34.93	MH113	34.84	60.5	0.152	200	0.74	12.79	5.8
CO-31	MH436	24.22	MH437	22.75	60	2.448	200	2.96	51.32	5.8
10350	MH386	46.35	MH387	43.39	121.6	2.429	200	2.93	51.12	5.7
10008	MH8	30.91	MH7	26.35	115.9	3.935	200	3.73	65.06	5.7
10180	MH209	76.76	MH213	76.42	85.8	0.393	200	1.18	20.56	5.7
10018	MH20	35.3	MH19	34.4	64	1.408	200	2.17	38.91	5.6
10176	MH205	75.95	MH206	75.04	75.4	1.209	200	2.01	36.06	5.6
10304	MH337	20.45	MH338	15.6	72.9	6.649	200	4.63	84.58	5.5
10059	MH64	23.88	MH59	23.56	115.9	0.283	200	0.94	17.45	5.4
10019	MH21	36.69	MH20	35.32	88.9	1.539	200	2.17	40.69	5.3
10339	MH376	34.77	MH375	31.82	89.4	3.297	200	3.16	59.56	5.3
10352	MH388	40.79	MH389	39.3	52.3	2.834	200	2.93	55.22	5.3
10007	MH7	26.37	MH3	20.41	99.1	6.003	200	4.21	80.36	5.2
10351	MH387	43.38	MH388	40.76	89.8	2.904	200	2.93	55.89	5.2
10021	MH23	25.28	MH30	22.69	86.5	2.787	200	2.85	54.56	5.2
10353	MH389	39.35	MH390	38.18	40.1	2.937	200	2.93	56.21	5.2
10130	MH158	49.99	MH159	48.88	107.8	1.038	200	1.73	33.42	5.2
10309	MH342	14.29	MH334	12.32	55.3	3.57	200	3.19	61.97	5.2
10249	MH276	64.85	MH279	52.84	42	4.779	200	3.63	71.7	5.1
10107	MH124	34.58	MH123	33.34	92.8	1.342	200	1.92	38	5.1
10184	MH213	76.41	MH205	75.97	84.8	0.518	200	1.18	23.6	5
10258	MH288	38.63	MH292	36.41	44.8	4.955	200	3.63	73.01	5
10269	MH300	74.18	MH299	72.95	50	2.459	200	2.55	51.43	5
CO-10	MH3767	35.06	MH376	34.77	31.5	0.934	250	2.69	57.48	4.7
10026	MH30	22.89	MH31	20.14	75.1	3.655	200	2.85	62.7	4.5
10250	MH279	52.78	MH280	48.39	72.9	6.006	200	3.63	80.38	4.5

10037	MH39	32.06	MH40	31.79	83.3	0.324	200	0.82	16.68	4.4
10392	MH435	25.58	MH436	24.22	62.8	2.162	200	2.1	48.23	4.4
CO-30	MH438	21.81	MH439	9.64	270.7	4.496	200	2.96	69.54	4.3
10344	MH381	36.94	MH380	36.58	31.5	1.156	250	2.69	63.93	4.2
10257	MH287	43.58	MH288	38.65	66.7	7.399	200	3.63	89.22	4.1
10251	MH280	48.41	MH287	43.92	60.7	7.407	200	3.63	89.27	4.1
10394	MH439	9.61	MH397	6.64	59.3	5.017	200	2.96	73.47	4
10023	MH25	33.65	MH24	30.85	86.7	3.233	200	2.34	58.97	4
10234	MH262	47.77	MH261	47.57	49.5	0.408	200	0.82	20.95	3.9
10235	MH263	43.03	MH265	38.97	69.2	6.865	200	3.29	85.94	3.8
10076	MH90	36.16	MH91	35.96	37.6	0.543	200	0.92	24.17	3.8
10077	MH91	35.93	MH92	35.65	51.9	0.544	200	0.92	24.19	3.8
10200	MH228	47.01	MH364	44.93	35.4	5.855	200	2.96	79.38	3.8
10347(2)	MH-D4	47.85	MH383	43.38	88.7	5.042	200	2.69	73.85	3.7
10159	MH189	51.81	MH354	37.02	73.6	20.102	200	5.36	147.05	3.6
10198	MH226	56.59	MH227	54.9	66.4	5.554	200	2.61	77.3	3.6
10150	MH178	40.67	MH180	36.06	97.8	4.716	200	2.58	71.23	3.6
10346	MH383	43.37	MH382	39.17	81.2	5.17	200	2.69	74.58	3.6
10232	MH260	48.65	MH261	47.15	34.2	4.386	200	2.47	68.69	3.6
10233	MH261	47.08	MH263	43.12	49.5	7.996	200	3.29	92.74	3.5
CO-28	MH41	30.3	MH42	24.03	106.7	5.876	200	2.8	79.51	3.5
10030	MH32	34.74	MH25	33.68	86.1	1.229	200	1.26	35.36	3.5
10075	MH89	36.58	MH90	36.16	63.4	0.662	200	0.92	25.69	3.4
10194	MH222	73.9	MH223	73.11	93.8	0.846	200	1.03	30.16	3.4
10109	MH126	36.77	MH125	35.75	84.3	1.211	200	1.21	36.1	3.4
10020	MH22	19.92	MH342	14.31	66.1	8.47	200	3.19	95.45	3.3
10128	MH156	32.18	MH157	31.43	121.8	0.613	200	0.85	25.68	3.3
10092	MH69	22.39	MH68	20.97	105.1	1.351	200	1.24	38.13	3.3
10091	MH68	20.77	MH65	19.48	93.6	1.381	200	1.24	38.55	3.2
10219	MH248	64.46	MH247	63.33	48.5	2.319	200	1.61	49.95	3.2
10015	MH17	22.38	MH13	16.51	58.4	10.057	250	6.08	188.59	3.2
CO-15	MH61	34.69	MH395	30.25	93.6	4.746	250	4.15	129.55	3.2
10178	MH208	77.9	MH209	76.79	87.3	1.274	200	1.18	37.02	3.2
10110	MH127	37.44	MH126	36.79	46.3	1.398	200	1.21	38.78	3.1
10199	MH227	54.31	MH228	47.49	90.6	7.54	200	2.81	90.06	3.1
10213	MH241	72.35	MH242	68.62	95	3.931	200	2.02	65.03	3.1
10185	MH214	75.51	MH222	73.9	157.3	1.025	200	1.03	33.2	3.1
10108	MH125	35.75	MH124	34.6	76.2	1.502	200	1.21	40.2	3
CO-42	MH-D1	62.5	MH364	45.3	106.2	16.198	200	3.97	132	3
10138	MH166	32.07	MH163	29.01	129.6	2.363	200	1.47	50.42	2.9
10338	MH375	31.82	MH144	27.64	36.3	11.525	200	3.16	111.34	2.8
10212	MH240	77.12	MH241	72.37	99	4.793	200	2.02	71.8	2.8
10228	MH256	72.24	MH257	69.2	76	4.005	200	1.83	65.64	2.8
10063	MH70	23.22	MH69	22.43	42.7	1.856	200	1.24	44.68	2.8
10145	MH173	45.66	MH172	44.82	115	0.73	200	0.76	28.03	2.7
10022	MH24	30.82	MH23	25.34	78.6	6.968	200	2.34	86.58	2.7
10141	MH169	47.4	MH168	43.9	124.6	2.806	200	1.47	54.94	2.7
10221	MH250	76.12	MH249	71.94	121.5	3.44	200	1.61	60.83	2.7
10097	MH114	34	MH120	31.54	129.4	1.903	200	1.2	45.25	2.6
10134	MH162	32.37	MH163	28.69	91.3	4.033	200	1.73	65.87	2.6
10230	MH258	64.1	MH259	59.41	56.6	8.294	200	2.47	94.46	2.6
CO-26(2)	MH-D9	36.69	MH32	34.77	84.4	2.277	200	1.26	49.49	2.6
10211	MH239	82.52	MH240	77.12	91	5.941	200	2.02	79.95	2.5
10187	MH216	76.07	MH224	71.68	118.3	3.714	200	1.57	63.21	2.5
10231	MH259	59.47	MH260	48.7	113.5	9.49	200	2.47	101.04	2.4
10222	MH251	80.51	MH250	76.14	105.5	4.141	200	1.61	66.75	2.4
10131	MH159	48.88	MH180	44.38	92.2	4.877	200	1.73	72.43	2.4
10096	MH113	34.81	MH114	34.04	84.1	0.911	200	0.74	31.3	2.4
10045	MH48	24.81	MH47	23.94	72.3	1.209	250	1.53	65.4	2.3
10214	MH242	68.61	MH243	62.94	79.3	7.143	200	2.02	87.66	2.3
10197	MH225	65.86	MH226	58.61	105.5	6.884	200	1.97	86.06	2.3
10032	MH34	25.4	MH35	22.86	58.7	4.095	200	1.51	66.37	2.3
10127	MH154	25.58	MH436	24.47	85.7	1.298	200	0.85	37.37	2.3
10143	MH171	34.14	MH170	32.48	60.6	2.737	200	1.22	54.26	2.2
10133	MH161	35.83	MH162	32.35	61.1	5.704	200	1.73	78.34	2.2
CO-6	MH105	40.01	MH106	39.32	80.3	0.858	200	0.67	30.38	2.2
10137	MH165	34.19	MH166	32.13	49.5	4.167	200	1.47	66.95	2.2
10126	MH153	28.31	MH154	25.6	50	1.423	200	0.85	39.13	2.2
10142	MH170	32.45	MH429	29.29	95.9	3.3	200	1.22	59.58	2
10095	MH100	35.98	MH99	35.66	77.6	0.41	200	0.42	21	2
10091	MH96	30.86	MH95	29.12	97.2	1.792	200	0.88	43.9	2
10196	MH224	71.66	MH225	65.9	101	5.705	200	1.57	78.34	2
10049	MH52	32.92	MH51	32.57	77.5	0.452	200	0.43	22.04	2
10056	MH59	23.52	MH65	19.44	54.1	7.534	200	1.77	90.03	2
CO-56	MH207	81.48	MH208	79.51	58.6	3.364	200	1.18	60.16	2
CO-45	MH66	19.21	O-3	19.12	3.8	2.703	300	3.01	158.88	1.9
10088(2)	MH-D11	40.01	MH104	37.99	129.1	1.564	200	0.78	41.01	1.9
10031	MH33	31.52	MH34	25.43	102.3	5.951	200	1.51	80.01	1.9
10229	MH257	69.22	MH258	64.11	56.3	9.062	200	1.83	98.73	1.9
10220	MH249	71.9	MH248	64.46	104.8	7.1	200	1.61	87.39	1.8
CO-2	MH103	36.43	MH102	34.8	97.3	1.675	200	0.78	42.45	1.8
10253	MH283	37.94	MH282	36.98	63.1	1.514	200	0.74	40.36	1.8

10382	MH424	33.42	MH37	33.1	69.9	0.446	200	0.39	21.91	1.8
10132	MH160	44.09	MH161	35.85	91.5	8.997	200	1.73	98.38	1.8
10169	MH198	75.86	MH206	75.05	154.3	0.527	200	0.41	23.81	1.7
10048	MH51	32.57	MH39	32.06	87.4	0.58	200	0.43	24.98	1.7
10087	MH104	38	MH103	36.45	82.7	1.876	200	0.78	44.92	1.7
10139	MH167	38.88	MH165	34.24	65.4	7.055	200	1.47	87.12	1.7
CO-16	MH71	38.24	MH61	34.95	75.8	4.341	200	1.14	68.33	1.7
10038	MH38	32.58	MH39	32.07	101.4	0.498	200	0.39	23.14	1.7
10114	MH132	37.97	MH133	37.19	80.5	0.97	200	0.54	32.3	1.7
10140	MH168	43.87	MH167	38.86	67.5	7.439	200	1.47	89.46	1.6
10064	MH72	42.34	MH71	38.32	88.7	4.635	200	1.14	70.61	1.6
10112	MH129	47.43	MH128	43.18	82.1	5.191	200	1.21	74.73	1.6
10186	MH215	75.96	MH214	75.53	90.9	0.464	200	0.36	22.35	1.6
10111	MH128	43.16	MH127	37.43	106.1	5.408	200	1.21	76.27	1.6
10129	MH157	31.42	MH434	29.07	85.6	2.749	200	0.85	54.38	1.6
10173	MH202	87.06	MH203	84.28	104.2	2.673	200	0.83	53.62	1.6
10035	MH37	33.11	MH38	32.55	95.9	0.581	200	0.39	24.99	1.5
10038	MH40	31.76	MH41	30.31	55.3	2.622	200	0.82	53.11	1.5
10084	MH99	35.65	MH97	34.88	104.8	0.736	200	0.42	28.14	1.5
10192	MH220	86.87	MH219	85.39	90.6	1.631	200	0.63	41.88	1.5
10175	MH204	79.42	MH205	75.98	118.1	2.914	200	0.83	55.99	1.5
10050	MH53	33.4	MH52	32.83	59	0.793	200	0.43	29.2	1.5
10195	MH223	73.04	MH368	67.87	116.5	4.437	200	1.03	69.09	1.5
10078	MH92	36.62	MH93	32.74	78.8	3.655	200	0.92	62.71	1.5
10156	MH185	66.72	MH186	65.15	73.7	2.141	200	0.7	47.99	1.5
10164	MH194	57.99	MH193	56.67	87.3	1.514	200	0.58	40.36	1.4
10165	MH195	59.38	MH194	57.99	90.9	1.523	200	0.58	40.47	1.4
10224	MH252	89.94	MH251	80.53	95.3	9.878	200	1.47	103.08	1.4
10155	MH184	68.39	MH185	66.72	74.2	2.253	200	0.7	49.23	1.4
10046	MH49	26.25	MH48	24.85	79.8	0.499	250	0.59	42	1.4
10256	MH286	38.38	MH283	37.96	71.5	0.598	200	0.34	25.14	1.4
10226	MH254	78.64	MH255	75.81	116.4	3.299	200	0.79	59.57	1.3
10174	MH203	84.23	MH204	80.18	108.4	3.73	200	0.83	63.34	1.3
10168(2)	MH-D5	76.35	MH302	75.16	133.5	0.891	200	0.41	30.96	1.3
10082	MH97	34.83	MH96	30.86	92.2	4.312	200	0.88	66.11	1.3
10167	MH197	60.35	MH196	59.43	67.7	1.367	200	0.48	36.35	1.2
10083	MH98	35.89	MH97	34.83	84.7	1.252	200	0.48	36.7	1.2
10287	MH328	71.42	MH327	70.86	62.5	0.898	200	0.39	31.08	1.2
10060	MH65	19.42	MH66	19.23	2.8	6.424	300	3.01	245.1	1.2
10189	MH217	78.39	MH216	76.62	71.4	2.481	200	0.63	51.66	1.2
10227	MH255	75.77	MH256	72.24	89.6	3.935	200	0.79	65.07	1.2
10188	MH-D7	76.62	MH216	75.97	80.4	0.817	200	0.36	29.65	1.2
10146	MH174	35.36	MH171	34.5	63.1	1.367	200	0.46	38.34	1.2
10053	MH56	29.73	MH55	27.8	67.6	2.866	200	0.65	55.52	1.2
10044	MH47	23.95	MH46	22.6	73.6	1.831	300	1.53	130.85	1.2
10079	MH93	32.72	MH94	26.83	101.4	5.81	200	0.92	79.05	1.2
10027	MH29	20.87	MH22	20.52	60.2	0.587	200	0.29	25.12	1.2
CO-18	MH62	35.39	MH63	29.12	100.2	6.255	200	0.94	82.03	1.1
10101	MH118	35.24	MH119	32.05	71.9	4.438	200	0.79	69.1	1.1
10054	MH57	31.93	MH56	29.82	68.2	3.09	200	0.65	57.65	1.1
10201	MH229	66.7	MH230	62.8	125.9	3.099	200	0.64	57.73	1.1
CO-19	MH63	28.06	MH64	23.99	74.8	6.777	200	0.94	85.38	1.1
10274(2)	MH-D6	76.27	MH305	74.21	106.3	1.938	200	0.5	45.66	1.1
CO-37	MH186	64.31	MH188	58.61	105.4	5.402	200	0.83	76.23	1.1
10183	MH212	68.56	MH370	68.41	19.5	0.801	200	0.31	29.36	1.1
10113	MH131	38.55	MH116	35.24	106.2	3.114	200	0.61	57.67	1.1
10202	MH230	62.78	MH226	58.92	111.8	3.449	200	0.64	60.91	1.1
10296	MH327	70.81	MH326	70.36	34.7	1.292	200	0.39	37.29	1
10115	MH133	37.18	MH134	35.31	87.6	2.765	200	0.54	54.54	1
10010	MH10	30.41	MH11	27.85	112.6	2.273	200	0.49	49.45	1
10012	MH11	27.86	MH7	26.67	53.5	2.416	200	0.49	50.98	1
10116	MH134	35.31	MH123	33.39	62	3.092	200	0.54	57.66	0.9
10158	MH188	58.61	MH189	51.84	86.4	7.834	200	0.83	91.8	0.9
10191	MH219	85.37	MH218	80.35	105.2	4.775	200	0.63	71.67	0.9
10190	MH218	80.36	MH217	78.4	35.5	5.609	200	0.63	76.98	0.8
10236	MH264	70.94	MH258	64.11	121	5.647	200	0.64	77.94	0.8
10057	MH60	36.36	MH59	23.71	125.6	10.073	200	0.82	104.09	0.8
10098	MH115	35.43	MH114	34.04	82.1	1.695	200	0.34	42.71	0.8
10210	MH238	87.09	MH239	82.54	68.3	6.661	200	0.65	84.65	0.8
10144	MH172	44.82	MH171	34.14	112.6	9.479	200	0.76	100.98	0.8
10099	MH116	37.73	MH115	35.38	121.1	1.937	200	0.34	45.65	0.7
CO-54	MH237	94.72	MH238	87.12	101.5	7.489	200	0.65	89.75	0.7
10047	MH50	26.02	MH48	24.81	112.9	1.073	250	0.43	61.81	0.7
CO-64	MH58	32.77	MH57	31.93	91.1	0.922	304.8	0.65	96.85	0.7
10205	MH233	77.76	MH232	74.7	89.2	3.425	200	0.4	60.7	0.7
10203	MH231	67.8	MH225	65.9	54.7	3.476	200	0.4	61.15	0.7
10157	MH187	64.72	MH186	64.32	89	0.46	200	0.13	22.24	0.6
10094	MH111	38.73	MH110	37.8	87.2	1.066	200	0.2	33.87	0.6
10147	MH175	38.57	MH174	35.36	56.4	5.687	200	0.46	78.21	0.6
CO-43	MH282	36.48	O-1	35.35	5.8	19.344	200	0.83	144.25	0.6
10148	MH176	42.89	MH175	38.58	74	5.826	200	0.46	79.17	0.6
10181	MH210	75.36	MH211	71.53	99.9	3.831	200	0.31	84.2	0.5

10204	MH232	74.69	MH231	67.83	106	6.477	200	0.4	83.47	0.5
10170	MH199	76.54	MH198	75.86	49.5	1.392	200	0.18	38.89	0.5
CO-40	MH245	65.25	MH-D1	62.6	47.3	5.61	200	0.34	77.69	0.4
10281	MH311	74.34	MH310	71.91	91.6	2.649	200	0.22	53.38	0.4
10206	MH234	77.84	MH216	76.32	58.2	2.609	200	0.22	52.98	0.4
10182	MH211	71.52	MH212	68.49	54.6	5.545	200	0.31	77.23	0.4
10100	MH117	38.55	MH118	35.24	68.2	1.914	200	0.17	45.38	0.4
10166	MH196	59.89	MH195	59.41	63.3	0.771	200	0.1	28.79	0.4
10067	MH75	24.09	MH76	22.06	43.6	4.674	200	0.25	70.91	0.4
10216	MH-D8	65.25	MH246	62.92	72.4	3.221	200	0.2	58.87	0.3
10034	MH36	25.92	MH35	23.01	91.7	3.177	200	0.19	58.46	0.3
10264	MH284	40	MH283	37.95	34.8	5.901	200	0.25	79.67	0.3
10093	MH110	37.73	MH109	36.04	39.6	4.286	200	0.2	67.74	0.3
10225	MH253	81.57	MH251	80.55	48.1	2.119	200	0.14	47.75	0.3
10066	MH74	34.3	MH75	24.11	137.5	7.413	200	0.25	89.3	0.3
10255	MH285	45.41	MH284	40.01	70.2	7.691	200	0.25	90.96	0.3
CO-5	MH-D10	36.01	MH101	31.05	100.7	4.929	200	0.17	72.82	0.2
10208	MH236	96.1	MH235	92.32	47.7	7.919	200	0.22	92.3	0.2
10217	MH248	62.8	MH226	58.65	58.3	7.117	200	0.2	87.5	0.2
10171	MH200	85.13	MH199	76.53	82.9	10.375	200	0.18	105.64	0.2
10252	MH281	38.3	MH282	36.5	58.7	3.069	200	0.1	57.46	0.2
10172	MH201	88.57	MH200	85.16	30	11.349	200	0.18	110.49	0.2
10207	MH235	92.28	MH234	77.83	84.6	17.092	200	0.22	135.6	0.2
10299	MH332	9.99	MH331	8.48	16.7	9.097	200	0.02	98.92	0
CO-23	MH289	33.14	MH404	32.01	85.3	1.331	200	(N/A)	37.85	(N/A)
CO-3	CKPT1051	33.62	CKPT1053	32.51	64.9	1.72	200	(N/A)	55.91	(N/A)
CO-4	CKPT1046	35.29	CKPT1051	33.64	64.9	2.538	200	(N/A)	67.92	(N/A)
CO-5	CKPT1053	32.46	MH-8	0	28.1	115.619	304.8	(N/A)	1,084.74	(N/A)
CO-6	MH-8	0	MH-9	0	86.1	0	304.8	(N/A)	1.01	(N/A)
CO-7	MH-9	0	MH-10	0	41.8	0	304.8	(N/A)	1.01	(N/A)
CO-8	MH-10	0	MH-11	0	89.7	0	304.8	(N/A)	1.01	(N/A)
CO-9	MH-11	0	MH-12	0	91.5	0	304.8	(N/A)	1.01	(N/A)
CO-10	MH-12	0	MH-13	0	88.7	0	304.8	(N/A)	1.01	(N/A)
CO-13	MH-13	0	MH54	24.48	101.9	-24.025	304.8	(N/A)	494.48	(N/A)
CO-14	MH406	32.82	MH-10	0	29.5	111.143	304.8	(N/A)	1,063.54	(N/A)

Future Conditions with Development										
Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Diameter (mm)	Flow (L/s)	Capacity (Full Flow) (L/s)	Flow / Capacity (Design) (%)
CO-61	MH142B	27.88	MH142C	27.87	34.7	0.006	250	49.56	4.51	1,097.70
CO-51	MH12	5.44	MH16	5.42	54	0.044	300	73.02	20.39	358.1
10121	MH141	29.04	MH140	29.03	19.7	0.061	250	47.79	14.66	326
CO-59	MH139	29.07	MH138	29	90.7	0.072	250	48.09	15.92	302
CO-62	MH142C	27.86	MH55	27.8	37	0.157	250	49.56	23.55	210.4
10312	MH345	33.89	MH344	33.34	100.9	0.546	200	42.12	24.24	173.8
10319	MH352	34.1	MH345	33.88	38.2	0.581	200	42.12	25.01	168.4
CO-60	MH142	28.07	MH142B	27.88	68.1	0.279	250	49.56	31.41	157.8
10311	MH344	33.37	MH343	32.78	76.6	0.769	200	45.2	28.76	157.2
10310	MH343	32.78	MH427	31.97	81.1	1.005	200	45.2	32.89	137.4
10120	MH140	29	MH139	28.9	26.3	0.373	250	47.79	36.31	131.6
10316	MH349	38.37	MH348	37.63	88.5	0.838	200	36.12	30.03	120.3
10385	MH427	31.4	MH428	30.98	116	0.359	300	69.03	57.91	119.2
10124	MH145	27.24	MH146	26.81	91.2	0.466	200	26.56	22.38	118.7
10363	MH404	31.99	MH402	31.25	132.1	0.558	200	28.99	24.5	118.4
10313	MH346	34.71	MH352	34.11	68.1	0.875	200	36.12	30.67	117.8
CO-55	MH138	28.52	MH142	28.07	90.4	0.498	250	48.68	41.96	116
10387	MH430	27.11	MH45	26.8	64.9	0.464	300	75.98	65.85	115.4
10315	MH348	37.63	MH347	36.75	90.8	0.961	200	36.12	32.15	112.3
10282	MH312	75.38	MH310	74.43	184	0.517	200	26.4	23.58	112
10359	MH395	29.82	MH401	29.6	74	0.296	200	18.79	17.84	105.4
10002	MH2	20.78	MH3	20.37	58.9	0.697	250	52.05	49.63	104.9
10284	MH314	76.1	MH313	75.61	69.3	0.7	200	26.4	27.45	96.2
10041	MH43	22.07	MH46	21.44	75.9	0.827	300	78.88	87.95	89.7
10005	MH5	18.85	MH6	17.72	90.5	1.254	250	56.26	66.59	84.5
10004	MH4	19.95	MH5	18.86	85.7	1.264	250	56.26	66.87	84.1
CO-50	MH15	7.63	MH12	5.46	98.5	2.199	250	73.02	88.19	82.8
10125	MH146	26.75	MH147	26.09	69.5	0.957	200	26.56	32.08	82.8
10001	MH1	21.86	MH2	20.78	94.1	1.146	250	52.05	63.66	81.8
10006	MH6	17.76	MH13	16.5	93.6	1.343	250	56.26	68.93	81.6
10003	MH3	20.35	MH4	19.96	27.5	1.445	250	56.26	71.5	78.7
10317	MH350	40.27	MH349	38.37	93.7	2.035	200	36.12	46.78	77.2
10052	MH55	27.78	MH54	24.47	81.6	4.057	200	50.87	66.07	77
10314	MH347	36.75	MH346	34.71	97.3	2.099	200	36.12	47.51	76
10322	MH356	53.56	MH355	50.44	170	1.835	200	33.43	44.43	75.2
10283	MH313	75.6	MH312	75.4	17	1.169	200	26.4	35.46	74.5
10364	MH405	32.32	MH404	32	60	0.54	200	16.81	24.1	69.8
10086	MH101	30.98	MH95	29.1	105.4	1.783	200	29.73	43.8	67.9
CO-27	MH428	30.98	MH429	28.76	194.8	1.141	300	69.03	103.31	66.8
10014	MH14	11.83	MH15	7.63	123.8	3.395	250	72.97	109.57	66.6
10280	MH310	71.92	MH309	70.57	89.4	1.518	200	26.62	40.4	65.9
10386	MH429	28.67	MH430	27.34	109.1	1.222	300	70.25	106.89	65.7
10379	MH421	33.29	MH422	33.21	27.6	0.304	250	21.02	32.81	64.1
CO-53	MH87	15.37	O-7	14.59	70.4	1.109	250	39.74	62.62	63.5
10377	MH419	33.92	MH420	33.66	85	0.312	250	20.69	33.2	62.3
10381	MH423	32.73	MH425	32.41	93.7	0.34	250	21.02	34.7	60.6
10365	MH406	32.84	MH405	32.33	70.5	0.717	200	16.81	27.76	60.5
10285	MH315	78.28	MH314	76.19	117.5	1.777	200	26.4	43.72	60.4
10336	MH373	28.01	MH145	27.28	89.1	0.818	200	17.9	29.66	60.3
10042	MH44	22.53	MH43	22.17	21.1	1.701	300	75.98	126.12	60.2
10068	MH76	21.79	MH77	21.34	52.4	0.851	250	31.9	54.86	58.2
10384	MH426	32.02	MH427	31.52	99.5	0.504	250	23.83	42.23	56.4
10279	MH309	70.56	MH308	70.39	7.6	2.229	200	27.46	48.97	56.1
10383	MH425	32.4	MH426	32.02	91.7	0.419	250	21.02	38.49	54.6
10072	MH85	20.83	MH86	20.38	77.4	0.587	300	39.74	74.07	53.6
10380	MH422	33.19	MH423	32.73	104.1	0.438	250	21.02	39.36	53.4
10318	MH351	44.63	MH350	40.25	107.1	4.084	200	35.29	66.29	53.2
CO-33	MH46	21.44	MH329	17.06	176.2	2.485	300	80.41	152.43	52.7
10323	MH357	57.51	MH356	53.56	101.5	3.897	200	33.43	64.74	51.6
CO-3	MH102	34.8	MH101	31.53	104	3.145	200	29.56	58.16	50.8
10069	MH77	21.31	MH85	20.83	69.8	0.683	300	39.74	79.94	49.7
CO-52	MH16	5.39	O-6	5.13	11.1	2.319	300	73.02	147.26	49.6
10013	MH13	16.5	MH14	11.84	102.8	4.535	250	62.61	126.64	49.4
CO-41	MH244	62.61	MH-D1	62.55	119.8	0.051	200	3.63	7.4	49.1
10080	MH95	28.97	MH94	26.58	64.4	3.715	200	30.61	63.22	48.4
10051	MH54	24.44	MH1	21.85	77.5	3.34	250	50.87	108.68	46.8
10288	MH318	77.53	MH319	77.02	99.5	0.506	200	10.91	23.32	46.8
CO-44	MH326	69.55	O-2	69.45	11.6	0.833	200	13.84	29.93	46.3
10378	MH420	33.66	MH421	33.29	63.5	0.571	250	20.69	44.95	46
10295	MH325	69.98	MH326	69.57	51.8	0.8	200	13.46	29.33	45.9
10366	MH407	33.21	MH406	32.82	67.5	0.579	200	11.26	24.96	45.1
CO-24	MH408	34.04	MH407	33.22	136.1	0.607	200	11.26	25.55	44.1

10290	MH320	76.64	MH321	76.11	91	0.582	200	10.91	25.03	43.6
10324	MH358	61.98	MH357	57.53	74.7	5.957	200	33.43	80.05	41.8
10289	MH319	77	MH320	76.65	54.8	0.638	200	10.91	26.2	41.6
10388	MH431	27.24	MH430	27.2	76.3	0.054	250	5.73	13.79	41.6
10300	MH333	9.39	MH331	8.23	63.5	1.829	350	80.41	197.3	40.8
10367	MH409	34.35	MH408	34.05	39.5	0.752	200	11.26	28.43	39.6
10301	MH334	12.36	MH14	11.88	121.5	0.396	200	8.11	20.84	39.3
CO-21	MH401	29.57	MH141	29.05	77.9	0.686	250	18.79	48.53	38.7
10362	MH402	29.21	MH141	29.05	9.9	1.619	250	28.99	75.66	38.3
10074	MH88	16.32	MH87	15.41	71.3	1.272	300	39.74	109.05	36.4
10259	MH290	33.89	MH289	33.16	69.3	1.047	200	12.18	33.57	36.3
10291	MH321	76.1	MH322	75.7	45.5	0.879	200	10.91	30.75	35.5
CO-1	MH289	33.14	CKPT1053	32.73	62.2	0.655	200	12.18	34.5	35.3
CO-46	MH398	5.39	O-4	5.39	6.1	0.066	200	2.96	8.4	35.2
CO-2	CKPT1053	32.46	MH404	31.99	40.1	1.186	200	12.18	35.71	34.1
CO-36	MH355	50.13	MH351	44.67	60.5	9.02	200	33.43	98.5	33.9
10348	MH384	47.95	MH385	47.9	71.7	0.073	200	2.93	8.83	33.2
10278	MH308	70.4	MH358	61.98	87.7	9.597	200	33.43	101.61	32.9
CO-29	MH330	7.13	O-5	6.22	30.9	2.959	350	80.43	250.89	32.1
10092	MH109	35.76	MH102	34.75	116.5	0.874	300	28.78	90.41	31.8
10091	MH108	36.49	MH109	35.76	82.6	0.877	300	28.58	90.55	31.6
CO-49	MH147	25.81	O-8	24.7	16.2	6.825	200	26.56	85.69	31
10298	MH331	8.23	MH330	7.14	33.1	3.277	350	80.43	264.04	30.5
CO-7	MH94	26.55	MH76	21.9	153.4	3.032	250	31.53	103.54	30.4
10043	MH45	26.8	MH44	23.05	54.8	6.854	300	75.98	253.17	30
10261	MH292	36.41	MH291	35.54	55.9	1.558	200	12.18	40.94	29.8
10287	MH317	78.69	MH318	77.54	87.7	1.321	200	10.91	37.7	28.9
10286	MH316	78.94	MH317	78.69	18.7	1.333	200	10.91	37.86	28.8
10327	MH363	42.07	MH362	41.71	12.6	2.87	200	15.4	55.57	27.7
10320	MH353	34.36	MH352	34.14	61.3	0.347	200	5.35	19.33	27.7
10073	MH86	20.36	MH88	16.37	177.9	2.241	300	39.74	144.77	27.4
10265	MH296	30.56	MH396	30.43	23.6	0.585	200	6.6	25.08	26.3
10090	MH107	37.35	MH108	36.49	75.4	1.147	300	27.23	103.56	26.3
10292	MH322	75.69	MH323	74.98	43.9	1.618	200	10.91	41.72	26.1
10369	MH411	34.85	MH410	34.76	21.2	0.419	200	5.46	21.23	25.7
10326	MH362	41.64	MH361	40.11	43.6	3.511	200	15.4	61.46	25.1
CO-39	MH360	37.01	MH419	33.93	81.9	3.757	200	15.4	63.57	24.2
10333	MH370	68.36	MH369	68.1	51.7	0.501	200	5.42	23.23	23.3
10260	MH291	35.44	MH290	33.89	58.9	2.584	200	12.18	52.72	23.1
10328	MH364	44.91	MH363	42.08	67.7	4.184	200	15.4	67.09	23
CO-34	MH329	16.95	MH143	13.03	67.6	5.81	350	80.41	351.61	22.9
10089	MH106	39.28	MH107	37.37	124.5	1.529	300	27.23	119.57	22.8
10368	MH410	34.75	MH409	34.37	67.5	0.563	200	5.46	24.6	22.2
10294	MH324	72.29	MH325	69.99	91.1	2.521	200	11.28	52.08	21.7
10356	MH392	34.64	MH393	33.44	91.2	1.314	200	8.04	37.6	21.4
10264	MH295	31.13	MH296	30.6	59.1	0.689	200	6.6	30.92	21.3
10263	MH294	32.14	MH295	31.54	63.1	0.955	200	6.56	32.05	20.5
10118	MH136	30.33	MH137	30.01	47.1	0.675	200	5.5	26.94	20.4
10306	MH339	21.21	MH338	20.84	76.1	0.486	200	4.63	22.86	20.2
CO-35	MH143	12.97	MH333	9.4	47.1	7.575	350	80.41	401.45	20
10275	MH305	74.24	MH306	73.49	91.2	0.829	200	5.97	29.87	20
10305	MH338	20.82	MH337	20.5	64.3	0.499	200	4.63	23.17	20
10267	MH298	36.1	MH297	35.02	106.7	1.01	200	6.56	32.97	19.9
10266	MH297	34.94	MH293	33.84	108.1	1.022	200	6.56	33.15	19.8
10355	MH391	36.08	MH392	34.65	91.9	1.557	200	8.04	40.93	19.7
10332	MH369	68.09	MH368	67.45	89.9	0.713	200	5.42	27.7	19.6
10262	MH293	33.28	MH294	32.18	104.1	1.051	200	6.56	33.63	19.5
10358	MH394	31.44	MH395	29.85	100.2	1.584	200	8.04	41.28	19.5
10357	MH393	33.46	MH394	31.44	120.6	1.679	200	8.04	42.49	18.9
10337	MH374	28.38	MH373	27.93	49.9	0.902	200	5.5	31.15	17.7
10325	MH361	40.11	MH360	37.04	43.2	7.104	200	15.4	87.42	17.6
10163	MH193	56.61	MH192	56.19	88.6	0.47	200	3.96	22.5	17.6
10334	MH371	68.67	MH370	68.4	34.8	0.783	200	5.1	29.01	17.6
10215	MH243	62.95	MH244	62.62	78	0.422	200	3.63	21.3	17.1
CO-8	MH137	30	MH374	28.42	157.6	1.001	200	5.5	32.81	16.8
10258	MH288	38.63	MH292	36.41	44.8	4.955	200	12.18	73.01	16.7
10308	MH341	22.45	MH340	21.93	104.5	0.492	200	3.8	23	16.5
10307	MH340	21.87	MH339	21.32	107.1	0.518	200	3.8	23.61	16.1
10103	MH120	31.47	MH121	31.34	36.4	0.357	250	5.5	35.54	15.5
10123	MH144	27.65	MH145	27.27	92.6	0.41	200	3.16	21.01	15
CO-38	MH365	48.46	MH364	45.25	115.1	2.781	200	8.16	54.7	14.9
10389	MH432	27.49	MH431	27.28	75.4	0.28	200	2.63	17.35	14.6
10293	MH323	74.95	MH324	72.3	50.4	5.26	200	10.91	75.22	14.5
10354	MH390	38.18	MH391	36.05	90.7	2.344	200	7.26	50.22	14.5
10360	MH396	30.39	MH395	30.26	22.3	0.613	250	6.6	46.57	14.2
10024	MH26	36.68	MH27	36.43	55.1	0.465	200	3.1	22.36	13.9

10245	MH274	40.7	MH273	40.13	61.7	0.918	200	3.96	31.43	12.6
10237	MH265	38.95	MH266	38.2	115.6	0.644	200	3.29	26.33	12.5
10117	MH135	30.79	MH136	30.33	79.8	0.58	250	5.5	45.29	12.2
10276	MH306	73.45	MH307	72.48	40.4	2.386	200	5.97	50.66	11.8
10104	MH121	31.34	MH135	30.8	80.6	0.67	250	5.5	48.68	11.3
10151	MH180	36.03	MH181	35.5	106.5	0.497	200	2.58	23.12	11.1
10161	MH191	54.74	MH190	53.33	91.5	1.543	200	4.52	40.74	11.1
10162	MH192	56.15	MH191	54.74	91.7	1.544	200	4.52	40.75	11.1
10071	MH79	22.26	MH78	21.5	78.8	0.962	250	6.42	58.31	11
10025	MH27	36.4	MH28	35.83	76.1	0.744	200	3.1	28.29	11
10391	MH434	29.02	MH433	28.48	107.4	0.502	200	2.53	23.23	10.9
10248	MH277	55.45	MH278	54.84	59.3	1.042	200	3.63	33.48	10.9
10268	MH299	72.93	MH372	70.66	109.9	2.062	200	5.1	47.1	10.8
10241	MH269	36.63	MH268	36.1	42.3	1.241	200	3.96	36.53	10.8
10026	MH28	35.81	MH19	35.22	77.7	0.762	200	3.1	28.63	10.8
10152	MH181	35.52	MH182	34.96	107.3	0.528	200	2.58	23.82	10.8
10335	MH372	70.63	MH371	68.67	90.6	2.169	200	5.1	48.3	10.6
10277	MH307	72.47	MH308	70.96	50.6	2.991	200	5.97	56.73	10.5
10375	MH416	34.5	MH417	34.44	16.2	0.346	200	2.01	19.3	10.4
10163	MH182	34.98	MH183	34.46	91	0.672	200	2.58	24.8	10.4
10302	MH335	12.91	MH334	12.36	96.9	0.572	250	4.63	44.97	10.3
10160	MH190	53.33	MH189	51.84	80.6	1.844	200	4.52	44.54	10.2
10371	MH413	35.77	MH412	35.39	89.7	0.428	200	2.17	21.45	10.1
10329	MH366	54.04	MH365	48.58	91.2	5.993	200	8.07	80.29	10
10373	MH414	35.21	MH415	34.87	91.6	0.374	200	2.01	20.07	10
10016	MH18	25.59	MH17	22.39	90.3	3.544	200	6.08	61.74	9.9
10331	MH368	67.47	MH367	62.74	72.7	6.512	200	8.07	83.7	9.6
10102	MH119	31.99	MH120	31.77	21.2	1.059	200	3.25	33.76	9.6
10193	MH221	73.53	MH299	73.36	24.9	0.668	200	2.55	26.8	9.5
10033	MH35	22.93	MH341	22.45	101.6	0.473	200	2.14	22.57	9.5
10070	MH78	21.47	MH77	21.35	25.5	0.49	300	6.42	67.7	9.5
10029	MH31	20.12	MH22	19.92	23.9	0.862	200	2.85	30.45	9.3
10106	MH123	33.34	MH122	32.83	76.2	0.665	200	2.46	26.75	9.2
10244	MH272	39.2	MH271	38.76	24.4	1.829	200	3.96	44.35	8.9
10154	MH183	34.46	MH344	33.75	88.1	0.801	200	2.58	29.36	8.8
10374	MH415	34.87	MH416	34.5	75.4	0.488	200	2.01	22.91	8.8
10239	MH267	35.33	MH409	34.44	46.7	1.911	200	3.96	45.34	8.7
10243	MH271	38.76	MH270	37.61	59.9	1.919	200	3.96	45.43	8.7
10242	MH270	37.6	MH269	36.67	47.8	1.937	200	3.96	45.65	8.7
10372	MH-D2	35.71	MH414	35.22	98.9	0.499	200	2.01	23.18	8.7
10376	MH417	34.44	MH419	33.95	97.6	0.5	200	2.01	23.19	8.7
10245	MH273	40.09	MH272	39.23	43.7	1.964	200	3.96	45.97	8.6
10321	MH354	36.99	MH353	34.39	72.1	3.618	200	5.35	62.38	8.6
10240	MH268	36.1	MH267	35.38	34.3	2.105	200	3.96	47.59	8.3
10361	MH397	6.64	MH398	6.26	30.3	1.232	200	2.96	36.41	8.1
10009	MH9	32.55	MH8	31.1	74.2	1.958	200	3.73	45.9	8.1
10136	MH164	28.36	MH431	27.79	39.5	1.45	200	3.2	39.49	8.1
CO-14(2)	MH-D12	35.56	MH61	34.73	63.9	1.298	200	3.01	37.36	8.1
10271	MH302	75.12	MH301	74.64	49.9	0.977	200	2.55	32.42	7.9
10330	MH367	62.62	MH366	54.04	85.9	9.974	200	8.07	103.58	7.8
10218	MH247	63.33	MH243	63.01	77.5	0.418	200	1.61	21.2	7.6
10393	MH437	22.74	MH438	21.82	64	1.438	200	2.96	39.33	7.5
10370	MH412	35.36	MH411	34.86	62.4	0.837	200	2.17	30.01	7.2
10349	MH385	47.6	MH386	46.35	79.1	1.579	200	2.93	41.21	7.1
10105	MH122	32.83	MH119	32.01	73.3	1.119	200	2.46	34.7	7.1
10135	MH163	28.65	MH164	28.37	14.5	1.899	200	3.2	45.2	7.1
10390	MH433	28.48	MH432	27.49	79.6	1.244	200	2.53	36.57	6.9
10342	MH379	36.17	MH378	35.68	111.6	0.437	250	2.69	39.32	6.8
10017	MH19	34.37	MH18	25.6	117.5	7.46	200	6.08	89.58	6.8
10270	MH301	74.64	MH300	74.17	35.1	1.327	200	2.55	37.78	6.8
10272	MH303	75.57	MH302	75.18	41.1	0.947	200	2.15	31.93	6.7
10177	MH206	75.02	MH221	73.51	112	1.352	200	2.55	38.13	6.7
10303	MH336	15.68	MH335	12.91	60.7	4.56	200	4.63	70.04	6.6
10343	MH380	36.57	MH379	36.21	73.7	0.482	250	2.69	41.28	6.5
10149	MH177	41.85	MH178	40.99	55.3	1.547	200	2.58	40.79	6.3
10273	MH304	76.24	MH303	75.56	61.9	1.1	200	2.15	34.4	6.2
10345	MH382	39.15	MH381	36.94	122.5	1.802	200	2.69	44.03	6.1
CO-9	MH378	35.66	MH3767	35.11	97.7	0.562	250	2.69	44.59	6
10236	MH266	38.18	MH411	34.91	111.4	2.941	200	3.29	56.24	5.8
10040	MH42	24.03	MH43	22.12	89.4	2.145	200	2.8	48.04	5.8
CO-57	MH112	34.93	MH113	34.84	60.5	0.152	200	0.74	12.79	5.8
CO-31	MH436	24.22	MH437	22.75	60	2.448	200	2.96	51.32	5.8
10350	MH386	46.35	MH387	43.39	121.6	2.429	200	2.93	51.12	5.7
10008	MH8	30.91	MH7	26.35	115.9	3.935	200	3.73	65.06	5.7
10180	MH209	76.76	MH213	76.42	85.8	0.393	200	1.18	20.56	5.7
10018	MH20	36.3	MH19	34.4	64	1.408	200	2.17	38.91	5.6

10176	MH205	75.95	MH206	75.04	75.4	1.209	200	2.01	36.06	5.8
10304	MH337	20.45	MH336	15.6	72.9	6.649	200	4.63	84.58	5.5
10059	MH64	23.88	MH59	23.56	115.9	0.283	200	0.94	17.45	5.4
10019	MH21	36.69	MH20	35.32	88.9	1.539	200	2.17	40.69	5.3
10339	MH376	34.77	MH375	31.82	89.4	3.297	200	3.16	59.56	5.3
10352	MH388	40.79	MH389	39.3	52.3	2.834	200	2.93	55.22	5.3
10007	MH7	26.37	MH3	20.41	99.1	6.003	200	4.21	80.36	5.2
10351	MH387	43.38	MH388	40.78	89.8	2.904	200	2.93	55.69	5.2
10021	MH23	25.28	MH30	22.89	86.5	2.757	200	2.85	54.56	5.2
10353	MH389	39.35	MH390	38.18	40.1	2.937	200	2.93	56.21	5.2
10130	MH158	49.99	MH159	48.88	107.8	1.038	200	1.73	33.42	5.2
10309	MH342	14.29	MH334	12.32	55.3	3.57	200	3.19	61.97	5.2
10249	MH278	54.85	MH279	52.84	42	4.779	200	3.63	71.7	5.1
10107	MH124	34.58	MH123	33.34	92.8	1.342	200	1.92	38	5.1
10184	MH213	76.41	MH205	75.97	84.8	0.518	200	1.18	23.6	5
10269	MH300	74.18	MH299	72.95	50	2.459	200	2.55	51.43	5
CO-10	MH3767	35.06	MH376	34.77	31.5	0.934	250	2.69	57.48	4.7
10028	MH30	22.89	MH31	20.14	75.1	3.655	200	2.85	62.7	4.5
10250	MH279	52.78	MH280	48.39	72.9	6.006	200	3.63	80.38	4.5
10037	MH39	32.06	MH40	31.79	83.3	0.324	200	0.82	18.68	4.4
10392	MH435	25.58	MH436	24.22	62.8	2.162	200	2.1	48.23	4.4
CO-30	MH438	21.81	MH439	9.64	270.7	4.496	200	2.96	69.54	4.3
10344	MH381	36.94	MH380	36.58	31.5	1.156	250	2.69	63.93	4.2
10257	MH287	43.58	MH288	38.65	66.7	7.399	200	3.63	89.22	4.1
10251	MH280	48.41	MH287	43.92	60.7	7.407	200	3.63	89.27	4.1
10394	MH439	9.61	MH397	6.64	59.3	5.017	200	2.96	73.47	4
10023	MH25	33.65	MH24	30.85	86.7	3.233	200	2.34	58.97	4
10234	MH262	47.77	MH261	47.57	49.5	0.408	200	0.82	20.95	3.9
10235	MH263	43.03	MH265	38.97	59.2	6.865	200	3.29	85.94	3.8
10076	MH90	36.16	MH91	35.96	37.6	0.543	200	0.92	24.17	3.8
10077	MH91	35.93	MH92	35.65	51.9	0.544	200	0.92	24.19	3.8
10200	MH228	47.01	MH364	44.93	35.4	5.855	200	2.98	79.36	3.8
10347(2)	MH-D4	47.85	MH383	43.38	88.7	5.042	200	2.69	73.85	3.7
10159	MH189	51.81	MH354	37.02	73.6	20.102	200	5.35	147.05	3.6
10198	MH226	58.59	MH227	54.9	66.4	5.564	200	2.81	77.3	3.6
10150	MH178	40.67	MH180	36.06	97.8	4.716	200	2.58	71.23	3.6
10346	MH383	43.37	MH382	39.17	81.2	5.17	200	2.69	74.58	3.6
10232	MH260	48.65	MH261	47.15	34.2	4.386	200	2.47	68.69	3.6
10233	MH261	47.08	MH263	43.12	49.5	7.996	200	3.29	92.74	3.5
CO-28	MH41	30.3	MH42	24.03	106.7	5.876	200	2.8	79.51	3.5
10030	MH32	34.74	MH25	33.68	86.1	1.229	200	1.26	36.36	3.5
10075	MH89	36.58	MH90	36.16	63.4	0.662	200	0.92	26.69	3.4
10194	MH222	73.9	MH223	73.11	93.8	0.846	200	1.03	30.16	3.4
10109	MH126	36.77	MH125	35.75	84.3	1.211	200	1.21	36.1	3.4
10020	MH22	19.92	MH342	14.31	66.1	8.47	200	3.19	95.45	3.3
10126	MH156	32.18	MH157	31.43	121.8	0.613	200	0.85	25.68	3.3
10062	MH69	22.39	MH68	20.97	105.1	1.351	200	1.24	38.13	3.3
10061	MH68	20.77	MH65	19.48	93.6	1.381	200	1.24	38.55	3.2
10219	MH248	64.46	MH247	63.33	48.5	2.319	200	1.61	49.95	3.2
10015	MH17	22.38	MH13	16.51	58.4	10.057	250	6.08	188.59	3.2
CO-15	MH61	34.69	MH395	30.25	93.6	4.746	250	4.15	129.55	3.2
10178	MH208	77.9	MH209	76.79	87.3	1.274	200	1.18	37.02	3.2
10110	MH127	37.44	MH126	36.79	46.3	1.398	200	1.21	38.78	3.1
10199	MH227	54.31	MH228	47.49	90.6	7.54	200	2.81	90.06	3.1
10213	MH241	72.35	MH242	68.62	95	3.931	200	2.02	65.03	3.1
10185	MH214	75.51	MH222	73.9	157.3	1.025	200	1.03	33.2	3.1
10108	MH125	35.75	MH124	34.6	76.2	1.502	200	1.21	40.2	3
CO-42	MH-D1	62.5	MH364	45.3	106.2	16.198	200	3.97	132	3
10138	MH166	32.07	MH163	29.01	129.6	2.363	200	1.47	50.42	2.9
10338	MH375	31.82	MH144	27.64	36.3	11.525	200	3.16	111.34	2.8
10212	MH240	77.12	MH241	72.37	99	4.793	200	2.02	71.8	2.8
10228	MH256	72.24	MH257	69.2	76	4.006	200	1.83	65.64	2.8
10063	MH70	23.22	MH69	22.43	42.7	1.856	200	1.24	44.68	2.8
10145	MH173	45.66	MH172	44.82	115	0.73	200	0.76	28.03	2.7
10022	MH24	30.82	MH23	25.34	78.6	6.968	200	2.34	86.58	2.7
10141	MH169	47.4	MH168	43.9	124.6	2.806	200	1.47	54.94	2.7
10221	MH250	76.12	MH249	71.94	121.5	3.44	200	1.61	60.83	2.7
10097	MH114	34	MH120	31.54	129.4	1.903	200	1.2	45.25	2.6
10134	MH162	32.37	MH163	28.69	91.3	4.033	200	1.73	65.87	2.6
10230	MH258	64.1	MH259	59.41	56.6	8.294	200	2.47	94.46	2.6
CO-26(2)	MH-D9	36.69	MH32	34.77	84.4	2.277	200	1.26	49.49	2.6
10211	MH239	82.52	MH240	77.12	91	5.941	200	2.02	79.95	2.5
10187	MH216	76.07	MH224	71.68	118.3	3.714	200	1.57	63.21	2.5
10231	MH259	59.47	MH260	48.7	113.5	9.49	200	2.47	101.04	2.4
10222	MH251	80.51	MH250	76.14	105.5	4.141	200	1.61	66.75	2.4
10131	MH159	48.88	MH160	44.38	92.2	4.877	200	1.73	72.43	2.4

10096	MH113	34.81	MH114	34.04	84.1	0.911	200	0.74	31.3	2.4
10045	MH48	24.81	MH47	23.94	72.3	1.209	250	1.53	65.4	2.3
10214	MH242	68.61	MH243	62.94	79.3	7.143	200	2.02	87.66	2.3
10197	MH225	65.88	MH226	58.61	105.5	6.884	200	1.97	86.06	2.3
10032	MH34	25.4	MH35	22.86	59.7	4.095	200	1.51	66.37	2.3
10127	MH154	25.58	MH436	24.47	85.7	1.298	200	0.85	37.37	2.3
10143	MH171	34.14	MH170	32.48	60.6	2.737	200	1.22	54.26	2.2
10133	MH161	35.83	MH162	32.35	61.1	5.704	200	1.73	78.34	2.2
CO-6	MH105	40.01	MH106	39.32	80.3	0.858	200	0.67	30.38	2.2
10137	MH165	34.19	MH166	32.13	49.5	4.167	200	1.47	66.95	2.2
10126	MH153	26.31	MH154	25.6	50	1.423	200	0.85	39.13	2.2
10142	MH170	32.45	MH429	29.29	95.9	3.3	200	1.22	59.58	2
10085	MH100	35.98	MH99	35.66	77.6	0.41	200	0.42	21	2
10081	MH96	30.86	MH95	29.12	97.2	1.792	200	0.88	43.9	2
10196	MH224	71.66	MH225	65.9	101	5.705	200	1.57	78.34	2
10049	MH52	32.92	MH51	32.57	77.5	0.452	200	0.43	22.04	2
10056	MH59	23.52	MH65	19.44	54.1	7.534	200	1.77	90.03	2
CO-56	MH207	81.48	MH208	79.51	58.6	3.364	200	1.18	60.16	2
CO-45	MH86	19.21	O-3	19.12	3.6	2.703	300	3.01	158.98	1.9
10088(2)	MH-D11	40.01	MH104	37.99	129.1	1.564	200	0.78	41.01	1.9
10031	MH33	31.52	MH34	25.43	102.3	5.951	200	1.51	80.01	1.9
10229	MH257	69.22	MH258	64.11	56.3	9.062	200	1.83	98.73	1.9
10220	MH249	71.9	MH248	64.46	104.8	7.1	200	1.61	87.39	1.8
CO-2	MH103	36.43	MH102	34.8	97.3	1.675	200	0.78	42.45	1.8
10253	MH283	37.94	MH282	36.98	63.1	1.514	200	0.74	40.36	1.8
10382	MH424	33.42	MH37	33.1	69.9	0.446	200	0.39	21.91	1.8
10132	MH160	44.09	MH161	35.85	91.5	8.997	200	1.73	98.38	1.8
10169	MH198	75.86	MH206	75.05	154.3	0.527	200	0.41	23.81	1.7
10048	MH51	32.57	MH39	32.06	87.4	0.58	200	0.43	24.98	1.7
10087	MH104	38	MH103	36.45	82.7	1.676	200	0.78	44.92	1.7
10139	MH167	38.86	MH165	34.24	65.4	7.055	200	1.47	87.12	1.7
CO-16	MH71	38.24	MH61	34.95	75.8	4.341	200	1.14	68.33	1.7
10038	MH38	32.58	MH39	32.07	101.4	0.498	200	0.39	23.14	1.7
10114	MH132	37.97	MH133	37.19	80.5	0.97	200	0.64	32.3	1.7
10140	MH168	43.87	MH167	38.86	67.5	7.439	200	1.47	89.46	1.6
10064	MH72	42.34	MH71	38.32	86.7	4.635	200	1.14	70.81	1.6
10112	MH129	47.43	MH128	43.16	82.1	5.191	200	1.21	74.73	1.6
10186	MH215	75.96	MH214	75.53	90.9	0.464	200	0.36	22.35	1.6
10111	MH128	43.16	MH127	37.43	106.1	5.408	200	1.21	76.27	1.6
10129	MH157	31.42	MH434	29.07	85.6	2.749	200	0.85	54.38	1.6
10173	MH202	87.06	MH203	84.28	104.2	2.673	200	0.83	53.62	1.6
10035	MH37	33.11	MH38	32.55	95.9	0.581	200	0.39	24.99	1.5
10038	MH40	31.76	MH41	30.31	55.3	2.622	200	0.82	53.11	1.5
10084	MH99	35.65	MH97	34.88	104.8	0.736	200	0.42	28.14	1.5
10192	MH220	86.87	MH219	85.39	90.6	1.631	200	0.63	41.88	1.5
10175	MH204	79.42	MH205	75.98	118.1	2.914	200	0.83	55.99	1.5
10050	MH53	33.4	MH52	32.93	59	0.793	200	0.43	29.2	1.5
10195	MH223	73.04	MH368	67.87	116.5	4.437	200	1.03	69.09	1.5
10078	MH92	35.62	MH93	32.74	78.8	3.655	200	0.92	62.71	1.5
10156	MH185	66.72	MH186	65.15	73.7	2.141	200	0.7	47.99	1.5
10164	MH194	57.99	MH193	56.67	87.3	1.514	200	0.58	40.36	1.4
10165	MH195	59.38	MH194	57.99	90.9	1.523	200	0.58	40.47	1.4
10224	MH252	89.94	MH251	80.53	95.3	9.878	200	1.47	103.08	1.4
10155	MH184	68.39	MH185	66.72	74.2	2.253	200	0.7	49.23	1.4
10046	MH49	25.25	MH48	24.85	79.8	0.499	250	0.59	42	1.4
10256	MH286	38.38	MH283	37.96	71.5	0.588	200	0.34	25.14	1.4
10226	MH254	79.64	MH255	75.81	116.4	3.299	200	0.79	59.57	1.3
10174	MH203	84.23	MH204	80.18	108.4	3.73	200	0.83	63.34	1.3
10168(2)	MH-D5	76.35	MH302	75.16	133.5	0.891	200	0.41	30.96	1.3
10082	MH97	34.83	MH96	30.86	92.2	4.312	200	0.88	68.11	1.3
10167	MH197	60.35	MH195	59.43	67.7	1.367	200	0.48	38.35	1.2
10083	MH98	35.89	MH97	34.83	84.7	1.252	200	0.46	36.7	1.2
10297	MH328	71.42	MH327	70.86	62.5	0.898	200	0.39	31.08	1.2
10060	MH65	19.42	MH66	19.23	2.8	6.424	300	3.01	245.1	1.2
10189	MH217	78.39	MH216	76.62	71.4	2.481	200	0.63	51.66	1.2
10227	MH255	75.77	MH256	72.24	89.6	3.935	200	0.79	65.07	1.2
10188	MH-D7	76.62	MH215	75.97	80.4	0.817	200	0.36	29.65	1.2
10146	MH174	36.36	MH171	34.5	83.1	1.367	200	0.46	38.34	1.2
10053	MH56	29.73	MH55	27.8	67.8	2.866	200	0.65	55.52	1.2
10044	MH47	23.96	MH46	22.6	73.6	1.831	300	1.53	130.85	1.2
10079	MH93	32.72	MH94	26.83	101.4	5.81	200	0.92	79.06	1.2
10027	MH29	20.87	MH22	20.52	60.2	0.587	200	0.29	25.12	1.2
CO-18	MH62	35.39	MH63	29.12	100.2	6.255	200	0.94	82.03	1.1
10101	MH118	35.24	MH119	32.05	71.9	4.438	200	0.79	69.1	1.1
10054	MH57	31.93	MH56	29.82	68.2	3.09	200	0.65	57.65	1.1
10201	MH229	66.7	MH230	62.8	125.9	3.099	200	0.64	57.73	1.1

CO-19	MH63	29.06	MH64	28.99	74.8	6.777	200	0.94	85.38	1.1
10274(2)	MH-D6	76.27	MH305	74.21	106.3	1.938	200	0.5	45.86	1.1
CO-37	MH186	64.31	MH188	58.61	105.4	5.402	200	0.83	76.23	1.1
10183	MH212	68.56	MH370	68.41	19.5	0.801	200	0.31	29.36	1.1
10113	MH131	38.55	MH118	35.24	106.2	3.114	200	0.61	57.87	1.1
10202	MH230	62.78	MH226	58.92	111.8	3.449	200	0.64	60.91	1.1
10296	MH327	70.81	MH326	70.36	34.7	1.292	200	0.39	37.29	1
10115	MH133	37.18	MH134	35.31	67.6	2.765	200	0.54	54.54	1
10010	MH10	30.41	MH11	27.85	112.6	2.273	200	0.49	49.45	1
10012	MH11	27.86	MH7	26.57	53.5	2.416	200	0.49	50.98	1
10116	MH134	35.31	MH123	33.39	62	3.092	200	0.54	57.68	0.9
10158	MH188	58.61	MH189	51.84	86.4	7.634	200	0.83	91.8	0.9
10191	MH219	85.37	MH218	80.35	105.2	4.775	200	0.63	71.67	0.9
10190	MH218	80.36	MH217	78.4	35.5	5.509	200	0.63	76.98	0.8
10236	MH264	70.94	MH258	64.11	121	5.647	200	0.64	77.94	0.8
10057	MH60	36.36	MH59	23.71	125.6	10.073	200	0.82	104.09	0.8
10098	MH115	35.43	MH114	34.04	82.1	1.695	200	0.34	42.71	0.8
10210	MH238	87.09	MH239	82.54	68.3	6.661	200	0.65	84.65	0.8
10144	MH172	44.82	MH171	34.14	112.6	9.479	200	0.76	100.98	0.8
10099	MH116	37.73	MH115	35.38	121.1	1.937	200	0.34	45.65	0.7
CO-54	MH237	94.72	MH238	87.12	101.5	7.489	200	0.65	89.75	0.7
10047	MH50	26.02	MH48	24.81	112.9	1.073	250	0.43	61.61	0.7
CO-64	MH58	32.77	MH57	31.93	91.1	0.922	304.8	0.65	96.85	0.7
10205	MH233	77.76	MH232	74.7	89.2	3.425	200	0.4	60.7	0.7
10203	MH231	67.8	MH225	65.9	54.7	3.476	200	0.4	61.16	0.7
10157	MH187	64.72	MH186	64.32	89	0.46	200	0.13	22.24	0.6
10094	MH111	38.73	MH110	37.8	87.2	1.066	200	0.2	33.87	0.6
10147	MH175	38.57	MH174	35.36	58.4	5.687	200	0.46	78.21	0.6
CO-43	MH282	36.48	O-1	35.35	5.8	19.344	200	0.83	144.25	0.6
10148	MH176	42.89	MH175	38.58	74	5.826	200	0.46	79.17	0.6
10181	MH210	75.36	MH211	71.53	99.9	3.831	200	0.31	64.2	0.5
10204	MH232	74.69	MH231	67.83	106	6.477	200	0.4	83.47	0.5
10170	MH199	76.54	MH198	75.85	49.5	1.392	200	0.18	38.69	0.5
CO-40	MH245	65.25	MH-D1	62.6	47.3	5.61	200	0.34	77.69	0.4
10281	MH311	74.34	MH310	71.91	91.6	2.649	200	0.22	53.38	0.4
10206	MH234	77.84	MH216	76.32	58.2	2.609	200	0.22	52.98	0.4
10182	MH211	71.52	MH212	68.49	54.6	5.545	200	0.31	77.23	0.4
10100	MH117	36.55	MH118	35.24	68.2	1.914	200	0.17	45.38	0.4
10166	MH196	59.89	MH195	59.41	63.3	0.771	200	0.1	28.79	0.4
10067	MH75	24.09	MH76	22.06	43.6	4.674	200	0.25	70.91	0.4
10216	MH-D8	65.25	MH246	62.92	72.4	3.221	200	0.2	58.87	0.3
10034	MH36	25.92	MH35	23.01	91.7	3.177	200	0.19	58.48	0.3
10254	MH284	40	MH283	37.95	34.8	5.901	200	0.25	79.67	0.3
10093	MH110	37.73	MH109	36.04	39.6	4.266	200	0.2	67.74	0.3
10225	MH253	81.57	MH251	80.55	48.1	2.119	200	0.14	47.75	0.3
10066	MH74	34.3	MH75	24.11	137.5	7.413	200	0.25	89.3	0.3
10255	MH285	45.41	MH284	40.01	70.2	7.691	200	0.25	90.96	0.3
CO-5	MH-D10	36.01	MH101	31.05	100.7	4.929	200	0.17	72.82	0.2
10208	MH236	96.1	MH235	92.32	47.7	7.919	200	0.22	92.3	0.2
10217	MH246	62.8	MH226	58.65	68.3	7.117	200	0.2	87.5	0.2
10171	MH200	85.13	MH199	76.53	82.9	10.375	200	0.18	105.64	0.2
10252	MH281	38.3	MH282	36.5	58.7	3.069	200	0.1	57.46	0.2
10172	MH201	88.57	MH200	85.16	30	11.349	200	0.18	110.49	0.2
10207	MH235	92.28	MH234	77.83	84.6	17.092	200	0.22	135.6	0.2
10299	MH332	9.99	MH331	8.48	16.7	9.097	200	0.02	98.92	0
CO-23	MH289	33.14	MH404	32.01	85.3	1.331	200	(N/A)	37.85	(N/A)
CO-3	CKPT1051	33.62	CKPT1053	32.51	64.9	1.72	200	(N/A)	55.91	(N/A)
CO-4	CKPT1046	35.29	CKPT1051	33.64	64.9	2.538	200	(N/A)	67.92	(N/A)
CO-5	CKPT1053	32.46	MH-8	0	28.1	115.619	304.8	(N/A)	1,084.74	(N/A)
CO-6	MH-8	0	MH-9	0	86.1	0	304.8	(N/A)	1.01	(N/A)
CO-7	MH-9	0	MH-10	0	41.9	0	304.8	(N/A)	1.01	(N/A)
CO-8	MH-10	0	MH-11	0	89.7	0	304.8	(N/A)	1.01	(N/A)
CO-9	MH-11	0	MH-12	0	91.5	0	304.8	(N/A)	1.01	(N/A)
CO-10	MH-12	0	MH-13	0	88.7	0	304.8	(N/A)	1.01	(N/A)
CO-13	MH-13	0	MH54	24.48	101.9	-24.025	304.8	(N/A)	494.48	(N/A)
CO-14	MH406	32.92	MH-10	0	29.5	111.143	304.8	(N/A)	1,063.54	(N/A)

Appendix C. Mapping

*To be sent with Final Report

Information Report (Agenda Item 9.c.)
To: Village Commission
By: Shelly Palmer, Manager of Finance
Meeting Date: April 13, 2026
Subject: Monthly Report — Manager of Finance

Monthly Report — Manager of Finance

Summary:

2025/26 Receipting and Accounts Payables are closed, closing the General Ledger is the last step the Yearend Process. Once Morse Brewster and Lake complete the 2025/26 Audit, which should be sometime in June, I will be able complete yearend.

Hope to have tax payment reminders sent out next week to clear up any overdue taxes.

Current Tasks/Projects:

- Focus now is completing the remaining bank reconciliations within the next few weeks.
- Fourth Quarterly Due to/from and HST, will be completed by the end of next week.

Budget Update:

Property Taxes	**Budgeted**	**Collected Year to Date March 31**
• Residential	$1,444,101	$1,416,935.81
• Commercial	$938,067	$866,099.15
• Resource	$8,570	$7,967347

Sewer	**Budgeted**	**Collected Year to Date March 31**
• Usage Charges	$776,000	$829,567.54

Water	**Budgeted**	**Collected Year to Date March 31**
• Metered Sales	$857,000	$868,144.32
• Sprinkler Service	$4,999	$5,051.63

Professional Development Summary:

Outlook for Next Month:

- Bank reconciliations
- Accounts payable
- Invoicing and receivables
- Payroll (bi-weekly)
- CRA remittance, Union fees and Pension
- RBC Pension
- PAD, tax and water

Information Report (Agenda Item 9.d.)
To: Village Commission
By: John Ansara, Director of Recreation & Community Development
Meeting Date: April 13, 2026
Subject: Monthly Report — Director of Recreation & Community Development

Monthly Report — Director of Recreation & Community Development

Summary:

- Received confirmation of successful Canada Summer Jobs application for $11,732
- March Break camp huge success! 70 enrolled
- Received $1,500 AMANS grant for SHIFT partnership programming
- Continued mentorship of Sophie Messom for 9-week placement from Acadia.
- March 25 program registration: 628 enrollments across 22 programs
- Submitted "Kings Vision" grant application for Milne Park Playground Project

Current Tasks/Projects:

- Spring Program delivery
- Summer Planning
- Budget work, long term plan

Long-Term Projects:

- Recreation Dept Strategic Planning, including capital forecast
- Village strategic plan

Meetings:

- Canoe procurement Webinar, March 10
- Inclusion and Access March 5, 2026
- Beautification April 1
- Valley Rec Summer Staff training (collaborative approach to training municipal recreation summer staff)

Professional Development Summary:

- Natalie attended Bike NS "Hop on Training", to facilitate cycling literacy programs in the community

Outlook for Next Month:

- Meet with Valley Soccer reps and Cory Palmer to discuss logistics for "Valley Kick Off" Soccer tournament
- Finish draft of operating + capital budget
- Work on spring programs, summer planning
- Mentor Acadia Student

Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

11. New Business

Village of New Minas

Briefing Note

Provincial Budget 2026–27: Impacts on Municipal Grant Programs
Prepared for: Village of New Minas Commission
Meeting Date: April 13, 2026
Prepared by: Jeffrey Lawrence, CAO/ Clerk Treasurer

1. Purpose

To brief the Commission on the Province of Nova Scotia's February 23, 2025, Budget 2026–27 announcement and outline implications for municipalities and villages resulting from the discontinuation of four major provincial grant programs.

2. Background

On **February 23, 2025**, the Province released **Budget 2026–27 – *Defending Nova Scotia***. The Deputy Minister of Municipal Affairs issued a letter on **February 24, 2025** advising that, due to fiscal pressures and reductions in the civil service and broader public sector, the Province is eliminating several discretionary municipal grant programs.

The letter states:
"Government is undertaking a number of measures including reducing the size of the civil service by 5%, reducing the size of the broader public service by 3% and reducing Government operating costs. We have also made the difficult decision to reduce discretionary grants."

The Deputy Minister further confirms:
"For the Department of Municipal Affairs, the following programs will end:

- Flood Risk Infrastructure Investment Program (FRIIP)
- Provincial Capital Assistance Program (PCAP)
- Municipal Innovation Program (MIP)
- Growth & Renewal for Infrastructure Development (GRID)"

The letter also notes:
"These program changes do not affect funding agreements in place for previous fiscal years."

3. Annual Provincial Budget Envelopes for Discontinued Programs

The following summarizes the typical annual funding envelopes for each program, based on provincial budget documents and program guidelines from 2021–2025.

3.1 Flood Risk Infrastructure Investment Program (FRIIP)

Annual Envelope: 25/26 Provincial Budget was $250K

- Funding supported flood mapping, risk assessments, and mitigation infrastructure.

3.2 Provincial Capital Assistance Program (PCAP)

Annual Envelope: 25/26 Provincial Budget was $1.69M

- One of the Province's longest-running municipal capital programs.
- Supported water, wastewater, stormwater, and drinking-water infrastructure.
- Typically funded 50% of eligible project costs.

3.3 Municipal Innovation Program (MIP)

Annual Envelope: 25/26 Provincial Budget was $578k

- Focused on regional collaboration, shared services, and municipal efficiency projects.
- Provided up to 75% funding for approved initiatives.

3.4 Growth & Renewal for Infrastructure Development (GRID)

Annual Envelope: 25/26 Provincial Budget was $15M

- Supported infrastructure related to growth, accessibility, and community renewal.
- Typically funded 50% of eligible project costs.

4. Implications for Municipalities and Villages

4.1 Loss of Future Provincial Funding Streams

The elimination of these programs removes several long-standing sources of capital and innovation funding that municipalities have relied on for:

- Water and wastewater upgrades
- Stormwater and flood-mitigation projects
- Regional collaboration and service-efficiency initiatives
- Infrastructure supporting growth, accessibility, and housing

4.2 Existing Agreements Remain Intact

The Deputy Minister confirms that previously approved funding agreements will continue unaffected.

4.3 Alternative Funding Sources

The Province notes that many projects previously eligible under these programs may still qualify under other funding envelopes, including:

- **Canada Community-Building Fund (CCBF)**
- **Green Infrastructure Stream (federal-provincial)**
- **Sustainable Communities Challenge Fund (SCCF)**
- **Future provincial capital programs as announced in subsequent budgets**

5. Recommended Actions

1. **Monitor provincial announcements** for replacement or transitional funding programs.
2. **Identify priority projects** that may be repositioned for federal or alternative provincial funding.

6. Appendices

A. 2026-02-24 Letter – Paul Lefleche – Deputy minister – Discretionary Grants Discontinuance

Appendix A.

NOVA SCOTIA
Municipal Affairs
Office of the Deputy Minister

PO Box 216
Halifax, Nova Scotia
Canada B3J 2M4

902 424-4100 T
902 424-0581 F
www.gov.ns.ca

February 24, 2025

To Mayors, Wardens, Village Chairs:

Yesterday, February 23, the Government of Nova Scotia released Budget 2026-27 - Defending Nova Scotia (https://novascotia.ca/budget).

Over the past five years, Government has made significant investments in programs and services to improve healthcare, strengthen our communities and support those who need it most.

In the face of continuing global uncertainty and slower revenue growth, we need to manage expenses carefully. Government is undertaking a number of measures including reducing the size of the civil service by 5%, reducing the size of the broader public service by 3% and reducing Government operating costs. We have also made the difficult decision to reduce discretionary grants.

For the Department of Municipal Affairs, the following programs will end:

- Flood Risk Infrastructure Investment Program (FRIIP)
- Provincial Capital Assistance Program (PCAP)
- Municipal Innovation Program (MIP)
- Growth & Renewal for Infrastructure Development (GRID)

Since 2021, this Government has committed nearly $500 million to municipalities to support critical projects such as drinking water, wastewater, disaster mitigation, accessibility, and transit. Today, the Department continues to support more than 250 active projects in communities across the province, bringing real value and ongoing benefits to municipalities.

I appreciate this may be concerning and I want you to know we continue to be focused on working with municipalities to drive growth.

Many of the projects that would have been eligible under these provincial grant programs will also be eligible for consideration under other programs.

As well, these program changes do not affect funding agreements in place for previous fiscal years. Should you have questions, I encourage you to contact Hardy Stuckless, Executive Director, at hardy.stuckless@novascotia.ca for further information.

Sincerely,

Paul LaFleche
Deputy Minister

c: Chief Administrative Officers
Village Clerk Treasurers
Juanita Spencer, NSFM
Jeff Sunderland, AMANS

Village of New Minas

Request for Decision

To: Village of New Minas Commission
Meeting Date: April 13, 2026
Subject: Response to Valley Roots Housing Cooperative – Request for Village Tax Exemption
Prepared by: Jeff Lawrence, CAO/ Clerk Treasurer

1. ISSUE

To obtain Commission direction regarding the Village's response to the February 26, 2026, request from Valley Roots Housing Cooperative Ltd. seeking exemption from the Village portion of property taxation for the 32-unit affordable housing development on Highbury Road.

2. BACKGROUND

Valley Roots Housing Cooperative has requested that the Village grant relief from the Village portion of property taxation for its affordable housing development currently under construction on Highbury Road. The Cooperative notes that the project will deliver "32 deeply affordable, accessible, and net-zero performance housing units" and that, as a non-profit, "all revenues are reinvested into operations, reserves, and long-term affordability."

The Cooperative asserts that tax relief would strengthen long-term sustainability and help maintain affordability for residents.

The Village of New Minas, however, faces significant structural and fiscal constraints relative to towns and rural municipalities. Villages do not have access to deed transfer tax, commercial development charges, or other revenue tools available to larger municipal units. The Village must fund most operations and infrastructure solely through its own source revenues.

The Village also did not receive federal affordable housing funding under recent programs, while neighbouring municipalities received substantial allocations:

- Municipality of the County of Kings: approx. $6.4 million
- Town of Wolfville: approx. $1.9 million
- Village of New Minas: $0

This inequity further limits the Village's ability to subsidize external or private developments.

3. DISCUSSION

3.1 Limited Fiscal Capacity of Villages

Villages in Nova Scotia operate with significantly fewer financial tools than towns or rural municipalities. Any exemption of Village taxes would directly reduce the Village's ability to maintain core services, including sidewalks, snow clearing, recreation, water distribution, sewer collection, and general operations.

3.2 Inequitable Access to Federal Housing Funding

Neighbouring municipalities received millions in federal housing support, while the Village received none. Expecting the Village to provide tax relief in the absence of external funding is not financially sustainable.

3.3 Precedent for Future Requests

Granting a tax exemption would establish a precedent that the Village is willing to subsidize private or non-profit developments. This could lead to additional requests that the Village is not financially equipped to support, creating long-term budget pressures.

3.4 Service Obligations to New Development

Regardless of ownership model, all development within the Village requires ongoing municipal services. The Village must provide the same level of service to this development as to any other. Exempting taxes for a development that will require long-term municipal servicing would shift costs onto other taxpayers.

3.5 Fiscal Responsibility

Given the Village's limited resources, lack of federal funding, and responsibility to maintain service levels, granting a tax exemption is not financially responsible.

4. OPTIONS

Option 1 – Decline the Request for Tax Exemption (Recommended)

Direct the CAO/ Clerk Treasurer to respond to Valley Roots Housing Cooperative indicating that the Village is unable to grant a tax exemption due to limited resources, inequitable access to federal funding, precedent concerns, and the Village's obligation to fund municipal services for all development.

Option 2 – Approve the request for Tax Exemption

Provide the exemption.
Not recommended due to the same structural and fiscal limitations.

Option 3 – Approve a Partial Exemption

Provide a reduced exemption amount.
Not recommended due to the same structural and fiscal limitations.

Option 4 – Defer Decision

Defer pending future regional discussions or potential funding opportunities.
Not recommended as no such opportunities are currently identified.

5. FINANCIAL IMPLICATIONS

A tax exemption would reduce Village revenues and could require either service reductions or increased taxation for other residents. This is not advisable given current budget pressures and the Village's responsibility to maintain service levels.

6. RECOMMENDATION

THAT the Commission direct the CAO to respond to Valley Roots Housing Cooperative indicating that the Village of New Minas is unable to provide a tax exemption for the Highbury Road development due to limited financial capacity, lack of federal funding support, the precedent such an exemption would set, and the Village's obligation to fund municipal services for all development within its boundaries.

7. Appendices

February 26, 2026, Letter – Valley Roots Housing Cooperative Limited – Request for Village Tax Exemption

Appendix A

VALLEY ROOTS HOUSING COOPERATIVE LTD.

479 Main Street, Kentville, NS B4N 3W4
valleyrootshousing@gmail.com

Village Commission of New Minas
c/o Village Office
9489 Commercial Street
New Minas, NS

February 26, 2026

Re: Request for Village Tax Exemption – Highbury Road Development

Dear Commissioners,

On behalf of Valley Roots Housing Cooperative Ltd., I am writing to respectfully request that the Village Commission consider granting relief from the Village portion of property taxation for our affordable housing development currently under construction on Highbury Road in New Minas.

The project will deliver 32 deeply affordable, accessible, and net-zero performance housing units, with completion scheduled for September 2026. As a non-profit housing cooperative, all revenues are reinvested into operations, reserves, and long-term affordability, with no distribution of profits.

This development aligns strongly with the Village's commitments to equity, inclusion, and planned, sustainable growth. By delivering deeply affordable housing within New Minas, it directly reduces barriers faced by residents who struggle in the local housing market and advances the broader housing objectives identified through Vision New Minas and Growth Centre planning. Stable, affordable housing is foundational to community wellbeing, enabling residents to more fully access local services, recreation, and amenities while supporting a more inclusive, vibrant, and resilient Village.

Because all units are deeply affordable, the cooperative operates within narrow financial margins. Relief from the Village portion of property taxation would materially strengthen its long-term sustainability, protect affordability for residents, and ensure that the full benefit of this housing initiative remains within the community.

Thank you for your consideration and for your leadership in supporting a welcoming and resilient New Minas.

Sincerely,

Carolyn Sloan
Executive Director

Village of New Minas
Commission Meeting
April 13, 2026@ 7:00 PM
Commission Room, LMCC
New Minas, Nova Scotia
AGENDA

12. Correspondence