September 22, 2016

Board of City Commissioners
Bismarck, ND

Dear Commissioners:

The Board of City Commissioners is scheduled to meet in regular session on Tuesday, September 27, 2016 at 5:15 p.m. in the Tom Baker Meeting Room, City/County Office Building, 221 North Fifth Street, Bismarck, North Dakota.

Invocation will be presented by a Chaplain from the Bismarck Police Department.

Future City Commission meetings are scheduled as follows:

- October 11 & 25, 2016
- November 8 & 22, 2016
- December 13 & 27, 2016

BOARD OF HEALTH

1. Call to order - President Seminary
2. Emergency Preparedness Month - Crystalynn Kuntz, Emergency Preparedness & Response Coordinator
3. Tobacco Prevention Program Update - Sue Kahler, Tobacco Prevention & Control Coordinator
4. Adjourn

Documents:

City Board of Health 092716.pdf

BOARD OF CITY COMMISSIONERS

1. Consider approval of the minutes of the regular meeting on September 13, 2016.
2. CONSENT AGENDA
   A. Consider approval of expenditures.

B. Consider approval of personnel actions.

Documents:

Personnel Actions Sept 27 BCC Meeting.pdf.pdf

C. Consider the following requests from the Administration Department:

- Approval of the appointment of Rochelle Williams and Barnie Botone to the Human Relations Committee.
- Approval of request to hold Human Relations Committee Diversity University Cultural Dinner Event.

Documents:

Appointment of two Human Relations Committee members.pdf
Human Relations Committee Diversity University cultural dinner event.pdf

D. Consider approval of the tax abatement application for Calculation Error for 2015 & 2016.

*NOTE: The attachment for this item was revised on 9/27/16. The applications were omitted from the original posting.*

Documents:

Abatement application for 2015 2016 calculation error_revised 092716.pdf

E. Consider request from the Bismarck Airport to approve Contract Change Order 1 - Final with Mariner Construction Inc. for a reduction of $29,342.09 with the parking lot rehabilitation projects.

Documents:

Change Order 1-Final with Mariner Construction Inc..pdf

F. Consider the following requests from the Engineering Department:

- Approval of Encroachment Easement and Waiver with Heritage Development, Inc. for Heritage Park Addition.
- Approval of Encroachment Easement and Waiver with 100 West Main Limited Partnership for work in the public right-of-way at North First Street and Main Avenue.
- Approval of Sidewalk Easement with Alvie R. Jarratt, Jr.

Documents:

Encroachment Easement and Waiver Heritage Development Inc.pdf
Encroachment Easement and Waiver 100 West Main Limited Partnership.pdf
Sidewalk easement with Alvie R Jarratt Jr.pdf

G. Consider request from the Finance Department for the approval of and bring Resolutions Directing Special Assessments to be Levied before the Special Assessment Commission on September 29 & 30, 2016.

Documents:

Resolution Directing Special Assessments to be Levied.pdf

H. Consider the following requests from the Public Works Service Operation Department:

- Approval of request for the reallocation of funds to replace carpet in the hallway on first floor in the City/County Building.
- Approval of Engineering Contract with Houston Engineering, Inc. for a Suitable Plant Growth Material Survey and Report for the Solid Waste Division.

Documents:

Reallocation of funds to replace first floor hallway carpet in City County Building.pdf
Contract with Houston Engineering for Public Works Solid Waste Division.pdf

I. **Addendum Item: Consider the following requests from the Event Center:**

- **Receive and award quotes for companies to recaulk various areas around the Belle Mehus with sealants.**
- **Receive and award quotes for companies to recaulk with sealants and make repairs to sidewalks around the Event Center.**

**Documents:**

Recaulk around Belle Mehus with sealants.pdf
Recaulk and repairs around Event Center.pdf

J. **Addendum Item: Consider request for approval of Change Order G-6 with PKG Contracting, Inc. on the Bismarck West End Reservoir Expansion Project.**

**Documents:**

Change Order G-6 with PKG for West End Reservoir Expansion Project.pdf

REGULAR AGENDA

3. PUBLIC HEARING on the 2017 Budget Ordinance (Ordinance 6233).

Preliminary 2017 Budget (Full version)

Documents:

Introduction of 2017 budget ordinance_revised 091316.pdf

4. PUBLIC HEARING on the request to transfer a Class D liquor license from SHU, Inc. to Tonka Group, Inc. at 115 South 5th Street (dba The Elbow Room).

Documents:

The Elbow Room liquor license transfer.pdf

5. Consider request from the Public Works Service Operations Department to receive a presentation of the Solid Waste Management Collection System Evaluation study by HDR Engineering Inc.

Documents:

Solid Waste Management Collection System Evaluation study by HDR Engineering Inc.pdf

6. Consider request of Jeff Anderson to appeal the decision of the Board of Adjustment to deny a variance to increase the maximum sidewall height of an accessory building to sixteen (16) feet for Lot 4, Block 3, High Top Acres Second Subdivision.

Documents:

Appeal for Lot 4 Block 3 High Top Acres Second Subdivision.pdf

7. Consider request from Public Works Service Operations Department to receive and consider disposition of bids for server room air conditioning.

Documents:

Bids for server room air conditioning.pdf

8. Consider request from Public Works Service Operations Department to receive and consider disposition of bids for snow removal at the City/County Building sidewalks and parking lot, Public Health sidewalks and parking lot, Public Library sidewalks and parking lot, and Bismarck Event Center sidewalks and parking lots for 2016 - 2017.

Documents:

Snow removal bids at various city properties for 2016 to 2017.pdf

9. Consider request from the Public Works Service Operations Department for the reallocation of funds to be used to address sewer plumbing and air handling in the City/County Building.

Documents:

Reallocation of funds sewer plumbing and air handling City County Building.pdf

10. Consider request from the Bismarck Airport to receive and consider disposition of bids for the Security Checkpoint Reconfiguration Phase 1.

Documents:

Bids for Security Checkpoint Reconfiguration.pdf

11. Consider request of River Road Partners, LLC for assistance from the CORE Technical Assistance Bank grant program for the building at 212 East Main Avenue. The property is owned by River Road Partners, LLC and is legally described as Lot 12, Block 52, Original Plat. The Renaissance Zone Authority recommends approval.

Documents:

CORE Facade Incentive Grant for improvements to 212 East Main Avenue.pdf

12. Consider request of Vold Tire Company, LLC for assistance from the CORE Facade Improvement grant program for the building at 214-216 East Main Avenue. The property is owned by Vold Tire Company, LLC and is legally described as Lot 10-11, Block 52, Original Plat. The Renaissance Zone Authority recommends approval.

Documents:

CORE Facade Incentive Grant for improvements to 214 to 216 East Main Avenue.pdf

13. Consider request from the Engineering Department for approval of Contract Change Order No 14 with Mariner Construction for Street Improvement District 15-491, Unit 1.

Documents:

Contract change order 14 with Mariner Construction Street Improvement Dist 15 491 Unit 1.pdf

14. Consider request from the Engineering Department for approval of the consultant agreement with Short Elliot Hendrickson Inc. relating to the geotechnical evaluation of the East Century Avenue bridge approaches.

*NOTE: The attachment for this item was revised on 9/27/16.*

Documents:

Consultant agreement with SEH geotechnical evaluation East Century Ave bridge approaches_revised.pdf

15. Receive project update on North Washington Street.

*(No attachment)*

16. Consider other business.

*(No attachment)*

Bismarck *Bismarck-Burleigh Public Health*

**City of Bismarck**
**Board of Health Meeting**
**Agenda**
**September 27, 2016**
**5:15 PM**

**I. Call to Order**
*Mayor Seminary*

**II. Emergency Preparedness Month**
*Crystalynn Kuntz, Emergency Preparedness & Response Coordinator*

**III. Tobacco Prevention Program Update**
*Sue Kahler, Tobacco Prevention & Control Coordinator*

**IV. Adjourn**

## Emergency Preparedness Month – Crystalynn Kuntz

September is national preparedness month and we are busy promoting preparedness activities and would like to take a minute to review them with you.
The theme for 2016 is:
"**Don't wait communicate**; **make your emergency preparedness plan now!**"

Follow these four easy steps:

1. Know your local threats
2. Make a plan
3. Build a kit
4. Take action.

As you think about taking action, another flu season is upon us. As a preparedness step don't forget to get vaccinated for influenza. Please visit BBPH for your flu vaccine this year to stay healthy and prepared for the coming winter.

City of Bismarck Employee Walk-in Flu Clinic dates are as follows:

| DATE | TIME | LOCATION | OPEN TO: |
|---|---|---|---|
| **10/4/2016** | **3:00 pm - 6:30 pm** | **Public Health** | **All Departments + Families** |
| **10/19/2016** | **8:30 am - 4:30 pm** | **Event Center** | **All Departments** |

Flu clinics for the public are scheduled throughout the month of October. You can contact our office at 355-1540 for dates and times and additional information regarding the flu vaccine.

# Bismarck-Burleigh Tobacco Prevention & Control Program Highlights 2015-2016
## By: Sue Kahler

- In October of 2015, Bismarck Burleigh Public Health (BBPH) hosted the Bismarck Tobacco Prevention Youth Summit for area middle and high school students. There were approximately 60 attendees. The intent of the Bismarck Youth Summit is to provide students with the latest information about tobacco prevention and policy and in return, they educate their peers. Students learned about *CDC Best Practices* to reduce youth tobacco rates by increasing the price of tobacco products, comprehensive tobacco-free park policy and the current trends in tobacco products such as the e-cigarette.

- 14 out of 14 school districts have adopted a comprehensive tobacco free policy. This makes a total of 100% of Bismarck and Burleigh area. [1]

- ND Legislature passed an age restriction on E-cigarettes in 2015. BBPH worked with the Bismarck City Commission to update the current city ordinances to include stronger definitions for tobacco products, all tobacco products, including electronic smoking devices must be located behind the counter, and requirement for electronic smoking device shops to have a tobacco retail license as of October 27, 2015. BBPH conducted site visits with tobacco retail owners to educate them about the new law and city ordinance to ensure business had everything they needed to comply.

- We provide signage for the ND Smoke Free Law and information. On regular basis, BBPH conducts educational visits to ensure the business has the correct information.

- BBPH assists property managers, owners and tenants interested in adopting a 100% smoke free building policy. BBPH has promoted this through an educational campaign with newspaper and radio ads. There are 154 buildings and 1,498 units covered by smoke free policies in Bismarck. For more information visit www.smokefreehousingND.com

- Bismarck/Burleigh's residents enrollment in the ND Tobacco Quitline has increased 19% from 2014-2015 to 2015-2016. (527 enrolled to 628). In addition, BBPH continues to provide individual cessation counseling to community members.

[1] Missouri Valley Montessori School is a new policy (3/31/16). Three school policies have been upgraded to comprehensive tobacco free policies: Wing Public School District (4/13/15), Bismarck Public School District (11/23/15) and Dakota Adventist Academy (12/13/15).

# Goals 2016-2017

The Tobacco Prevention and Control Program is funded by BreatheND. We are responsible for implementing North Dakota's comprehensive state tobacco prevention plan: *Saving Lives, Saving Money,* is based on proven best practices established by the Centers for Disease Control and Prevention (CDC).

**Goal 1: Prevent the initiation of tobacco use among youth and young adults.**

- Conduct school assessments on the (14) school district tobacco free policy. Maintain comprehensive tobacco free policy and provide current educational resources on latest tobacco products and cessation services.
- Continue our partnership for the area colleges by providing technical support for their tobacco free policy and trainings.
- Organize the 10th Bismarck Prevention Youth Summit on Oct. 12th
- Educate and provide information on the E-cigarette Law/Ordinance. Monitor compliance.

**Goal 2: Eliminate exposure to secondhand smoke.**

- Promote and provide information on multi-unit smoke free policy.
- On a regular basis, conduct educational visits on the ND Smoke-free Law/Ordinance to ensure the business has the correct information.
- Educate on tobacco free parks policy.

**Goal 3: Promote quitting among adults & youth.**

- Provide technical assistance and training on AAR (Ask, Advise, and Refer for Tobacco users) for BBPH staff and healthcare settings.
- Conduct BBPH chart AAR Audit.
- Provide individual cessation services to Bismarck/Burleigh county residents. Refer and promote to ND Quits program.
- Partner with schools, colleges and community partners with education on cessation resources.

**Goal 4: Identify & eliminate tobacco related disparities among populations.**

- Continue the partnership with United Tribes Technical College with education and resources to support their tobacco free policy.
- Community outreach to disparity populations.

# PERSONNEL ACTIONS FOR THE MEETING ON Sept. 27, 2016

## Full-Time and Part-Time Appointments

| | | |
|---|---|---|
| Roberson-Kitzman, Joseph<br>Transportation Planner | Com Development | Part time appointment<br>@ $25.61/hr. 9/19/2016 |
| Duffy, Georgie<br>Concessions | Event Center | Part time appointment<br>@ $12.00/hr. 9/13/2016 |
| Kluth, Kimberly<br>Maintenance Attendant I | Event Center | Part time appointment<br>@ $15.50/hr. 9/19/2016 |
| Setterlund, Kathy<br>Concessions | Event Center | Part time appointment<br>@ $12.00/hr. 9/13/2016 |
| Uran, Misty<br>Concessions | Event Center | Part time appointment<br>@ $12.00/hr. 9/12/2016 |

## Separations

| | | |
|---|---|---|
| Geisinger, Steve<br>Engineering Technician III | Engineering | Resigned. 9/12/2016 |
| Bella, Mosio<br>Concessions | Event Center | Resigned. 9/14/2016 |
| Haymon, Lisa<br>Concessions | Event Center | Resigned. 9/14/2016 |
| Hopfauf, Lynda<br>Concessions | Event Center | Resigned. 9/14/2016 |
| Vollan, Ernest<br>Maintenance Attendant I | Event Center | Retired. 9/2/2016 |

## Others

| | | |
|---|---|---|
| Johnsrud, Ryan<br>Firefighter | Fire | Resume active duty schedule<br>9/25/2016 |
| Liebert, Al<br>Acting Fire Captain | Fire | Salary adj. for Acting position<br>@ $22.32/hr. 8/27 – 9/5/2016 |
| Jones, Nicholas<br>Police Officer | Police | Administrative Leave<br>9/4 – 9/10/2016 |
| Schaf, Johnathan<br>Police Officer | Police | Leave w/out pay.<br>9/23/2016 pay period |

# ADMINISTRATION

**DATE:** September 21, 2016

**FROM:** Gloria David, Public Information Officer

**ITEM:** Appointment of two Human Relations Committee members

## REQUEST

Consider the appointment of the following individuals to the Human Relations Committee to fill two vacancies on the committee:

Rochelle Williams to an unexpired term that ends January 2018
Barnie Botone to an unexpired term that ends January 2019

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

Not applicable.

## RECOMMENDED CITY COMMISSION ACTION

Approve for appointment to Human Relations Committee.

## STAFF CONTACT INFORMATION

Gloria David, Public Information Officer
Phone: 701-355-1306
Email: gdavid@bismarcknd.gov

# ADMINISTRATION

**DATE:** September 21, 2016

**FROM:** Gloria David, Public Information Officer

**ITEM:** Request to hold Human Relations Committee Diversity University Cultural Dinner Event

## REQUEST

The Human Relations Committee is requesting approval to partner with the Legacy High School Culinary Arts program (Bismarck Public Schools), to hold a Diversity University 4th quarter cultural dinner event. The event is designed to recognize and celebrate the value of a diverse community.

Legacy High School would provide in-kind services for the cultural dinner event of the facilities, janitorial services, security, and labor in the form of culinary students. The Human Relations Committee would lead ticket sales, manage the marketing and program for the evening's event. The cost for the event would be $25.00 per person to cover food and dining supply expenses. Ticket sales would take place in City Administration. As advised by Finance, a separate activity for the event would be set up in the Government Grants and Contracts fund for Administration to account for the ticket sales and expense transactions.

Thank you for your consideration.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

Not applicable.

## RECOMMENDED CITY COMMISSION ACTION

Request approval.

## STAFF CONTACT INFORMATION

Gloria David, Public Information Officer
Phone: 701-355-1306
Email: gdavid@bismarcknd.gov

Karel Sovak
Chair, Human Relations Committee
Email: ksovak@umary.edu

**Abatements for September 27, 2016 City Commission Meeting**

- 3400 Stonewall Dr (1359-006-045) – 2015 & 2016 – Calculation error

# ASSESSING DIVISION

**DATE:** September 6, 2016

**FROM:** Debi Goodsell, City Assessor

**ITEM:** Applications for Abatement

## REQUEST

Applications for Abatement for 2015 & 2016
Property Owner – Stacey A Kessler
Property Address – 3400 Stonewall Dr. (1359-006-045)

Please place this item on the next City Commission meeting.

## BACKGROUND INFORMATION

The Assessing Division has determined an error in calculating the completion of basement finish in this property value.

## RECOMMENDED CITY COMMISSION ACTION

The Assessing Division recommends approval of the application for abatement as presented.

## STAFF CONTACT INFORMATION

Dawn Wetzstein, Real Property Technician, dwetzstein@bismarcknd.gov, 701-355-1630

# Application For Abatement Or Refund Of Taxes

North Dakota Century Code § 57-23-04

File with the County Auditor on or before November 1 of the year following the year in which the tax becomes delinquent.

**State of North Dakota** **Assessment District** 1

**County of** BURLEIGH **Property I.D. No.** 1359-006-045

**Name** STACEY A KESSLER **Telephone No.**

**Address** 3400 STONEWALL DR, BISMARCK ND 58503-5837

**Legal description of the property involved in this application:**

LOT 10, BLOCK 6, SATTLER'S SUNRISE 5TH ADDITION

**Total true and full value of the property described above for the year** 2015 **is:**

| | |
|---|---|
| Land | $ 42,000 |
| Improvements | $ 206,800 |
| Total | $ 248,800 (1) |

**Total true and full value of the property described above for the year** 2015 **should be:**

| | |
|---|---|
| Land | $ 42,000 |
| Improvements | $ 195,200 |
| Total | $ 237,200 (2) |

**The difference of $** 11,600.00 **true and full value between (1) and (2) above is due to the following reason(s):**

- ☐ 1. Agricultural property true and full value exceeds its agricultural value defined in N.D.C.C. § 57-02-27.2
- ☐ 2. Residential or commercial property's true and full value exceeds the market value
- ☐ 3. Error in property description, entering the description, or extending the tax
- ☐ 4. Nonexisting improvement assessed
- ☐ 5. Complainant or property is exempt from taxation. Attach a copy of Application for Property Tax Exemption.
- ☐ 6. Duplicate assessment
- ☐ 7. Property improvement was destroyed or damaged by fire, flood, tornado, or other natural disaster (see N.D.C.C. § 57-23-04(1)(g))
- ☐ 8. Error in noting payment of taxes, taxes erroneously paid
- ☐ 9. Property qualifies for Homestead Credit (N.D.C.C. § 57-02-08.1) or Disabled Veterans Credit (N.D.C.C. § 57-02-08.8). Attach a copy of the application.
- ☑ 10. Other (explain) error in calculation of completion of basement finish.

The following facts relate to the market value of the residential or commercial property described above. For agricultural property, go directly to question #5.

1. Purchase price of property: $_____ Date of purchase: _____
   Terms: Cash _____ Contract _____ Trade _____ Other (explain) _____
   Was there personal property involved in the purchase price? _____ (yes/no) Estimated value: $_____
2. Has the property been offered for sale on the open market? _____ (yes/no). If yes, how long? _____
   Asking price: $_____ Terms of sale: _____
3. The property was independently appraised: _____ (yes/no) Purpose of appraisal: _____
   _____ Market value estimate: $_____
   Appraisal was made by whom? _____
4. The applicant's estimate of market value of the property involved in this application is $_____
5. The estimated agricultural productive value of this property is excessive because of the following condition(s):_____

Applicant asks that my true & full value be reduced to $237,200.

By filing this application, I consent to an inspection of the above-described property by an authorized assessment official for the purpose of making an appraisal of the property. I understand the official will give me reasonable notification of the inspection. See N.D.C.C. § 57-23-05.1.

I declare under the penalties of N.D.C.C. § 12.1-11-02, which provides for a Class A misdemeanor for making a false statement in a governmental matter, that this application is, to the best of my knowledge and belief, a true and correct application.

Signature of Preparer (if other than applicant) Date Signature of Applicant Stacey A Kessler 31AUG2016 Date

24775
(2-2016)

## Recommendation of the Governing Body of the City or Township

Recommendation of the governing board of _____

On _____, _____, the governing board of this municipality, after examination of this application and the facts, passed a resolution recommending to the Board of County Commissioners that the application be _____

_____

_____

_____

Dated this _____ day of _____, _____.

_____
City Auditor or Township Clerk

## Action by the Board of County Commissioners

Application was _____ by action of _____ County Board of Commissioners.
Approved/Rejected

Based upon an examination of the facts and the provisions of North Dakota Century Code § 57-23-04, we approve this application. The taxable valuation is reduced from $ _____ to $ _____ and the taxes are reduced accordingly. The taxes, if paid, will be refunded to the extent of $ _____. The Board accepts $ _____ in full settlement of taxes for the tax year _____.

We reject this application in whole or in part for the following reason(s). Written explanation of the rationale for the decision must be attached. _____

_____

_____

_____

Dated _____, _____

_____ _____
County Auditor Chairperson

## Certification of County Auditor

I certify that the Board of County Commissioners took the action stated above and the records of my office and the office of the County Treasurer show the following facts as to the assessment and the payment of taxes on the property described in this application.

| Year | Taxable Value | Tax | Date Paid (if paid) | Payment Made Under Written Protest? |
|---|---|---|---|---|
| | | | | yes/no |

I further certify that the taxable valuation and the taxes ordered abated or refunded by the Board of County Commissioner are as follows:

| Year | Reduction in Taxable Valuation | Reduction in Taxes |
|---|---|---|
| | | |

_____ _____
County Auditor Date

**Application For Abatement Or Refund Of Taxes**

**Name of Applicant** Kessler Stanley

**County Auditor's File No.** 116-2014

**Date Application Was Filed With The County Auditor** 9-16-16

**Date County Auditor Mailed Application to Township Clerk or City Auditor** _____ (must be within five business days of filing date)

# Application For Abatement Or Refund Of Taxes

North Dakota Century Code § 57-23-04

File with the County Auditor on or before November 1 of the year following the year in which the tax becomes delinquent.

**State of North Dakota** **Assessment District** 1

**County of** BURLEIGH **Property I.D. No.** 1359-006-045

**Name** STACEY A KESSLER **Telephone No.** _____

**Address** 3400 STONEWALL DR, BISMARCK ND 58503-5837

**Legal description of the property involved in this application:**

LOT 10, BLOCK 6, SATTLER'S SUNRISE 5TH ADDITION

**Total true and full value of the property described above for the year** 2016 **is:**

| | |
|---|---|
| Land | $ 42,000 |
| Improvements | $ 216,800 |
| Total | $ 258,800 (1) |

**Total true and full value of the property described above for the year** 2016 **should be:**

| | |
|---|---|
| Land | $ 42,000 |
| Improvements | $ 204,700 |
| Total | $ 246,700 (2) |

**The difference of $** 12,100.00 **true and full value between (1) and (2) above is due to the following reason(s):**

- ☐ 1. Agricultural property true and full value exceeds its agricultural value defined in N.D.C.C. § 57-02-27.2
- ☐ 2. Residential or commercial property's true and full value exceeds the market value
- ☐ 3. Error in property description, entering the description, or extending the tax
- ☐ 4. Nonexisting improvement assessed
- ☐ 5. Complainant or property is exempt from taxation. Attach a copy of Application for Property Tax Exemption.
- ☐ 6. Duplicate assessment
- ☐ 7. Property improvement was destroyed or damaged by fire, flood, tornado, or other natural disaster (see N.D.C.C. § 57-23-04(1)(g))
- ☐ 8. Error in noting payment of taxes, taxes erroneously paid
- ☐ 9. Property qualifies for Homestead Credit (N.D.C.C. § 57-02-08.1) or Disabled Veterans Credit (N.D.C.C. § 57-02-08.8). Attach a copy of the application.
- ☑ 10. Other (explain) error in calculation of completion of basement finish.

The following facts relate to the market value of the residential or commercial property described above. For agricultural property, go directly to question #5.

1. Purchase price of property: $_____ Date of purchase: _____
   Terms: Cash _____ Contract _____ Trade _____ Other (explain) _____
   Was there personal property involved in the purchase price? _____ (yes/no) Estimated value: $_____
2. Has the property been offered for sale on the open market? _____ (yes/no). If yes, how long? _____
   Asking price: $_____ Terms of sale: _____
3. The property was independently appraised: _____ (yes/no) Purpose of appraisal: _____
   _____ Market value estimate: $_____
   Appraisal was made by whom? _____
4. The applicant's estimate of market value of the property involved in this application is $_____
5. The estimated agricultural productive value of this property is excessive because of the following condition(s):_____

Applicant asks that my true & full value be reduced to $246,700.

By filing this application, I consent to an inspection of the above-described property by an authorized assessment official for the purpose of making an appraisal of the property. I understand the official will give me reasonable notification of the inspection. See N.D.C.C. § 57-23-05.1.

I declare under the penalties of N.D.C.C. § 12.1-11-02, which provides for a Class A misdemeanor for making a false statement in a governmental matter, that this application is, to the best of my knowledge and belief, a true and correct application.

Signature of Preparer (if other than applicant) _____ Date _____ Signature of Applicant Stacey A Kessler 31AUG2016 Date

24775
(2-2016)

## Recommendation of the Governing Body of the City or Township

Recommendation of the governing board of _____

On _____, _____, the governing board of this municipality, after examination of this application and the facts, passed a resolution recommending to the Board of County Commissioners that the application be _____

_____

_____

_____

Dated this _____ day of _____, _____.

_____
City Auditor or Township Clerk

## Action by the Board of County Commissioners

Application was _____ by action of _____ County Board of Commissioners.
Approved/Rejected

Based upon an examination of the facts and the provisions of North Dakota Century Code § 57-23-04, we approve this application. The taxable valuation is reduced from $ _____ to $ _____ and the taxes are reduced accordingly. The taxes, if paid, will be refunded to the extent of $ _____. The Board accepts $ _____ in full settlement of taxes for the tax year _____.

We reject this application in whole or in part for the following reason(s). Written explanation of the rationale for the decision must be attached. _____

_____

_____

_____

Dated _____, _____

_____ _____
County Auditor Chairperson

## Certification of County Auditor

I certify that the Board of County Commissioners took the action stated above and the records of my office and the office of the County Treasurer show the following facts as to the assessment and the payment of taxes on the property described in this application.

| Year | Taxable Value | Tax | Date Paid (if paid) | Payment Made Under Written Protest? |
|---|---|---|---|---|
| | | | | yes/no |

I further certify that the taxable valuation and the taxes ordered abated or refunded by the Board of County Commissioner are as follows:

| Year | Reduction in Taxable Valuation | Reduction in Taxes |
|---|---|---|
| | | |

_____ _____
County Auditor Date

**Application For Abatement Or Refund Of Taxes**

**Name of Applicant** Kessler, Stacey

**County Auditor's File No.** 16-205

**Date Application Was Filed With The County Auditor** 9-16-16

**Date County Auditor Mailed Application to Township Clerk or City Auditor** _____ (must be within five business days of filing date)

By KT

# AIRPORT

**DATE:** September 20, 2016

**FROM:** Gregory B. Haug, Airport Director

**ITEM:** Contract Change Order with Mariner Construction, Inc.

## REQUEST

Consider Change Order 1 - Final to Mariner Construction Inc.'s April 28, 2016 agreement for Short-Term, Long-Term, Economy and Employee Parking Lot Rehabilitation.

## BACKGROUND INFORMATION

The Short-Term, Long-Term, Economy and Employee Parking Lot Rehabilitation approved by the Board on April 26, 2016 has been completed. Change Order 1-Final adjusts project quantities to final amounts installed resulting in a cost reduction of $29,342.09.

## RECOMMENDED CITY COMMISSION ACTION

Approve Change Order 1-Final to the Mariner Construction Inc. April 28, 2016 agreement

## STAFF CONTACT INFORMATION

Greg Haug, Airport Director, 701-355-1808, ghaug@bismarcknd.gov

# CONTRACT CHANGE ORDER FORM

## DEPARTMENT

Contract between the City of Bismarck and MARINER

Contract Number: 2016-0000019 Change Order Number: 1-FINAL

Project/Subproject: APG, AIP57, NONAIP57 RELP Original Contract Amt: $434,082.18

Project Description: PARKING LOT REHABILITATION

Previous Contract Amount: $434,082.18

Change Order Amount: MINUS ($29,342.09) NEW TOTAL: $404,740.09

Original Contract Date: APRIL 28, 2016 Change in Contract Timeline: NA

Within Project Scope: (Y) / N* Within Project Funding: (Y) / N**

**If not within project scope, attach description of change in scope for Board approval.*

***If not within project funding, attach revised Project Budget for Board approval.*

Type of Change Order

_____ Non Design-related Change Order: These change orders include unforeseen conditions, code-related issues, and building inspector changes.

_____ Design-related Change Order: These change orders include unforeseen conditions that affect the appearance, layout, functionality, dimensions, and/or quality of the project.

_____ Emergency Field Condition Change Orders: These change orders include any condition that causes an emergency situation where safety or other immediate losses may occur.

X Other: (describe) ADJUST TO FINAL QUANTITIES AND CLOSE

Project Manager Signature: (<$15,000) _____ Date

Department Head Signature:(<$25,000) _____ Date

## ADMINISTRATION

X City Administrator Signature: (<$50,000) _____ 9-29-16 Date

Add to Commission Consent Agenda

## COMMISSION APPROVAL

Commission Approval Date:_____

Attach minutes for Commission Approval

## FISCAL

Comments: _____

Signature Date Completed

**TO ALL DEPARTMENTS:** Please attach a copy of the change order

**Change Order No. 1 - Final**
Date August 27, 2016

| | |
|---|---|
| Airport Name | Bismarck Airport |
| Location | Bismarck, ND |
| Contract Description | Short-Term, Long-Term, Economy and Employee Parking Lot Rehabilitation |
| Contract Date | April 28, 2016 |
| AIP Project # | Non-AIP |
| KLJ Project # | 1515709 |
| Owner's Project # | AIP.AIP57.Non-AIP57.RELP 600-620-603-6630-250 |

**Owner**
City of Bismarck
PO Box 991
Bismarck, ND 58502-0991

**Contractor**
Mariner Construction, Inc.
1771 West Cavalry Drive
Bismarck, ND 58504

**Engineer**
KLJ
4585 Coleman Street
Bismarck, ND 58503

General Reason for Change (quantify and explain details in sections 2 and 3)
CO 1-1 Adjust project quantities to the final amounts

| | AIP | Non-AIP | Total |
|---|---|---|---|
| Total Contract Amount Prior to this Change Order | $ - | $ 434,082.18 | $ 434,082.18 |
| Change Resulting from this Change Order | - | (29,342.09) | (29,342.09) |
| Total Contract Amount After this Change Order | $ - | $ 404,740.09 | $ 404,740.09 |

| Working Days | |
|---|---|
| Working days prior to this Change Order | 30 |
| Change resulting from this Change Order | 0 |
| Revised working days from this Change Order | 30 |

Change Order approved by:

9/7/16
Date

KLJ

9/15/16
Date

Mariner Construction, Inc.

Date

City of Bismarck

## Summary of Changes

Airport Name: Bismarck Airport
Location: Bismarck, ND
AIP Project #: Non-AIP
Contractor: Mariner Construction, Inc.

Change Order No. 1 - Final
Section 2
KLJ Project # 1515709
Owner's Project # AIP.AIP57.Non-AIP57.RELP 600-620-603-6630-

| Item # | Spec # | Item | Quantities | | | Unit | Unit Price | Revised Cost | Changed Cost |
|---|---|---|---|---|---|---|---|---|---|
| | | | Planned | Revised | Change | | | | |
| DIVISION 1 - BASE BID - ECONOMY PARKING LOT | | | | | | | | | |
| 1 | P-605 | Asphalt Pavement Crack Routing and Sealing | 100 | 158 | 58 | L.F. | $ 1.50 | $ 237.00 | $ 87.00 |
| 2 | P-605 | Asphalt Pavement Non-Routed Crack Sealing | 200 | - | (200) | L.F. | 1.10 | - | (220.00) |
| 3 | P-620 | Pavement Painting | 2,586 | 2,586 | - | S.F. | 1.80 | 4,654.80 | - |
| 4 | P-629 | Coal Tar Sealer/Rejuvenator | 9,160 | 9,160 | - | S.Y. | 1.04 | 9,526.40 | - |
| 5 | Local | Traffic Control | 1 | 1.00 | - | L.S. | 52,000.00 | 52,000.00 | - |
| 6 | Local | Mobilization | 1 | 1.00 | - | L.S. | 80,000.00 | 80,000.00 | - |
| | | | | | | | TOTAL COST - DIVISION 1, BASE BID | $ 146,418.20 | $ (133.00) |
| DIVISION 2 - BASE BID - SHORT-TERM PARKING LOT | | | | | | | | | |
| 1 | Local | Milling Pavement Surface | 10,639 | 10,639 | - | S.Y. | 2.55 | $ 27,129.45 | $ - |
| 2 | P-605 | Asphalt Pavement Crack Routing and Sealing | 100 | - | (100) | L.F. | 1.50 | - | (150.00) |
| 3 | P-605 | Asphalt Pavement Non-Routed Crack Sealing | 100 | - | (100) | L.F. | 1.10 | - | (110.00) |
| 4 | P-620 | Pavement Painting | 3,846 | 3,846 | - | S.F. | 1.80 | 6,922.80 | - |
| 5 | Local | Hot Bituminous Pavement, Class A | 1,300 | 1,174.26 | (125.74) | Ton | 110.00 | 129,168.60 | (13,831.40) |
| 6 | Local | PG 58-28 Asphalt Cement | 85 | 55.63 | (29.37) | Ton | 0.10 | 5.56 | (2.93) |
| 7 | Local | Bituminous Tack Coat | 532 | 554 | 22 | Gal. | 4.00 | 2,216.00 | 88.00 |
| 8 | P-629 | Coal Tar Sealer/Rejuvenator | 2,140 | 2,140 | - | S.Y. | 1.04 | 2,225.60 | - |
| 9 | Local | Curb and Gutter Removed | 88 | 96 | 8 | L.F. | 10.00 | 960.00 | 80.00 |
| 10 | Local | Standard Curb and Gutter | 88 | 96 | 8 | L.F. | 50.00 | 4,800.00 | 400.00 |
| 11 | Local | Preformed Loop Detector (If Needed) | 2 | - | (2) | Each | 980.00 | - | (1,960.00) |
| | | | | | | | TOTAL COST - DIVISION 2, BASE BID | $ 173,428.01 | $ (15,486.33) |
| DIVISION 3 - BASE BID - LONG-TERM PARKING LOT | | | | | | | | | |
| 1 | Local | Milling Pavement Surface | 1,160 | 413 | (747) | S.Y. | 3.68 | $ 1,519.84 | $ (2,748.96) |
| 2 | P-605 | Asphalt Pavement Crack Routing and Sealing | 3,000 | 2,054 | (946) | L.F. | 1.50 | 3,081.00 | (1,419.00) |
| 3 | P-605 | Asphalt Pavement Non-Routed Crack Sealing | 7,000 | 4,254 | (2,746) | L.F. | 1.10 | 4,679.40 | (3,020.60) |
| 4 | P-620 | Pavement Painting | 8,052 | 8,052 | - | S.F. | 1.80 | 14,493.60 | - |
| 5 | Local | Hot Bituminous Pavement, Class A | 142 | 64.82 | (77.18) | Ton | 120.00 | 7,778.40 | (9,261.60) |
| 6 | Local | PG 58-28 Asphalt Cement | 9 | 3.05 | (5.95) | Ton | 0.10 | 0.31 | (0.60) |
| 7 | Local | Bituminous Tack Coat | 75 | 45 | (30) | Gal. | 4.00 | 180.00 | (120.00) |
| 8 | P-629 | Coal Tar Sealer/Rejuvenator | 32,085 | 32,085 | - | S.Y. | 1.04 | 33,368.40 | - |
| 9 | Local | Curb and Gutter Removed | 152 | 195 | 43 | L.F. | 10.00 | 1,950.00 | 430.00 |
| 10 | Local | Standard Curb and Gutter | 152 | 195 | 43 | L.F. | 50.00 | 9,750.00 | 2,150.00 |
| | | | | | | | TOTAL COST - DIVISION 3, BASE BID | $ 76,800.95 | $ (13,990.76) |
| DIVISION 4 - ALTERNATE - EMPLOYEE PARKING LOT | | | | | | | | | |
| 1 | Local | Milling Pavement Surface | 3 | 3 | - | S.Y. | 10.00 | $ 30.00 | $ - |
| 2 | P-605 | Asphalt Pavement Crack Routing and Sealing | 400 | 1,252 | 852 | L.F. | 1.50 | 1,878.00 | 1,278.00 |
| 3 | P-605 | Asphalt Pavement Non-Routed Crack Sealing | 1,000 | - | (1,000) | L.F. | 1.10 | - | (1,100.00) |
| 4 | P-620 | Pavement Painting | 684 | 734 | 50 | S.F. | 1.80 | 1,321.20 | 90.00 |
| 5 | Local | Hot Bituminous Pavement, Class A | 1 | 1.00 | - | Ton | 800.00 | 800.00 | - |
| 6 | Local | PG 58-28 Asphalt Cement | 0.1 | 0.06 | (0.04) | Ton | 0.10 | 0.01 | - |
| 7 | Local | Bituminous Tack Coat | 1 | 1 | - | Gal. | 15.00 | 15.00 | - |
| 8 | P-629 | Coal Tar Sealer/Rejuvenator | 3,893 | 3,893 | - | S.Y. | 1.04 | 4,048.72 | - |
| | | | | | | | TOTAL COST - DIVISION 4, ALTERNATE | $ 8,092.93 | $ 268.00 |
| | | | | | | | | | |
| | | | | | | | TOTAL CHANGE | $ 404,740.09 | $ (29,342.09) |

## Explanation of Changes

| | | | |
|---|---|---|---|
| Airport Name | Bismarck Airport | | Change Order No. 1 - Final |
| Location | Bismarck, ND | | Section 3 |
| AIP Project # | Non-AIP | KLJ Project # | 1515709 |
| Contractor | Mariner Construction, Inc. | Owner's Project # | AIP.AIP57.Non-AIP57.RELP 600-620-603-6630-250 |

**Item No.** CO 1-1

Description

Adjust project quantities to the final amounts

Reason for Change

All project quantities were adjusted to the final amounts.

**Item No.** CO 1-2

Description

Reason for Change

**Item No.** CO 1-3

Description

Reason for Change

**Item No.** CO 1-4

Description

Reason for Change

# ENGINEERING DEPARTMENT

**DATE:** September 21, 2016

**FROM:** Gabe Schell, PE | City Engineer

**ITEM:** Encroachment Easement and Waiver – Heritage Development Inc

## REQUEST

Request approval of Heritage Development Inc for the right to install a sign and footings on a stormwater easement in Heritage Park Addition.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

Heritage Development Inc requests the right to install an identification sign for Heritage Park near the corner of Sonora Way and 57th Avenue. The location of this sign is within a dedicated stormwater easement within Lot 17, Block 1 Heritage Park Addition. The Heritage Park Association will maintain the sign located on the stormwater easement. See attached agreement and landscaping plan for more information.

## RECOMMENDED CITY COMMISSION ACTION

Consider approving request from Heritage Development Inc for the right to install a sign and footings on a stormwater easement in Heritage Park Addition.

## STAFF CONTACT INFORMATION

Gabe Schell
gschell@bismarcknd.gov
701-355-1505

# AGREEMENT AND WAIVER

The City of Bismarck (City) hereby grants Heritage Development, Inc. (Developer) the right to install a sign and footings on a stormwater easement located at Lot 17, Block 1, Heritage Park Addition to the City of Bismarck. The Heritage Park Association (Association) will maintain the sign located on the stormwater easement.

1. The Developer shall comply with all the rules regarding private installments on City utility easements as set by the City Engineer

2. The term of this grant shall be for twenty years and shall continue from year to year. The City may cancel this grant at any time after the initial twenty year term upon six months written notice to the Association.

3. Upon the end of the term or prior abandonment by the Association, the Association shall, at its own expense, remove the sign and restore the easement to its original condition if so required by the City.

4. In exchange for the City's permission to install and maintain a sign on the stormwater easement, the Developer and the Association agrees to release the City, its assigns, or other franchised utilities from and waive any and all claims relating to said sign including, but not limited to, damages arising from damage to the sign, loss of business or other personal injury or property damage resulting from damage to the sign by the City, is assigns, or other franchised utilities. The Developer and the Association understands that it is using the easement at its own risk and understands that the City, its assigns or other franchised utilities have no reliable method of indexing or locating the easement. The Developer or the Association shall not look to the City, its assigns or other franchised utilities, to pay for any expense or damage to the sign by the City, its assigns or other franchised utilities. The Developer and the Association agrees that it will hold the City harmless and indemnify the City, its assigns, or other franchised utilities from any and all claims in any way resulting from the placement of the sign on the easement. In the event the City is required to perform utility maintenance or construction at the location of the sign, the Association shall cooperate with the City in temporarily protecting the sign and accommodating the City's project at the Association's sole expense.

City of Bismarck

Dated this ___ day of _____, 2016

Attest:_____
Keith Hunke
City Administrator

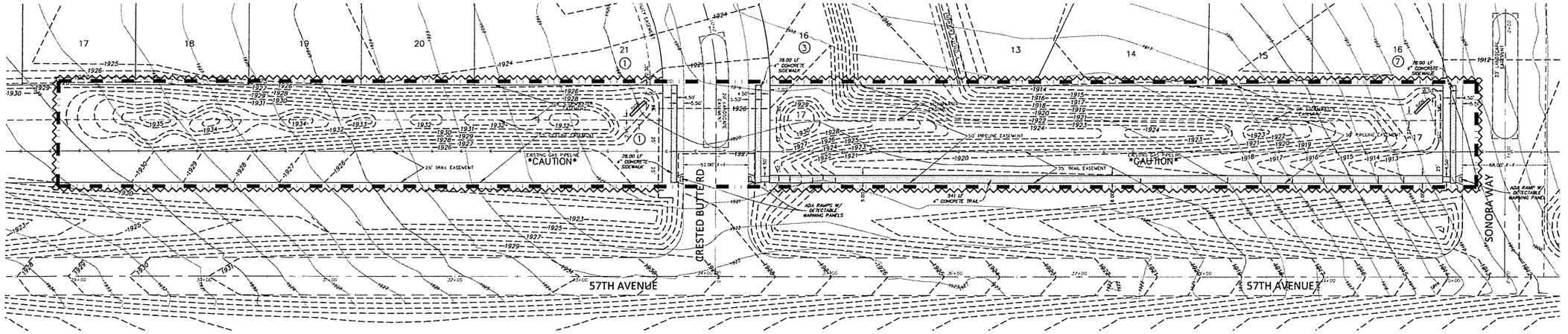
_____
Mike Seminary, President
Bismarck City Commission

---

Dated this 20th day of September, 2016

Attest: Chad Moldenhauer
Chad Moldenhauer, President
Heritage Development, Inc.

Chad Moldenhauer
Chad Moldenhauer, Board Member
Heritage Park Association




## LEGEND

EXISTING CONTOURS
EXISTING GAS
PROPOSED CONTOURS
CONSTRUCTION LIMITS
EROSION CONTROL
PROPOSED CONCRETE

REVISED 9-20-16
(SIGNS & CONCRETE TRAIL)

## APPROXIMATE QUANTITIES

CONTRACTOR IS TO CONSTRUCT LANDSCAPE BERMS WITH TOPSOIL FROM EXISTING TOPSOIL PILES LOCATED APPROXIMATELY 1500 LF TO THE NORTH OF THE BERMS. EMBANKMENT QUANTITY WILL BE MEASURED AND PAID FOR COMPACTED IN PLACE. CLEARING AND GRUBBING, SCARIFYING, AND WATER SHALL BE CONSIDERED INCIDENTAL TO EMBANKMENT.

| | |
|---|---|
| EROSION CONTROL | 1 LS |
| EMBANKMENT | 9,050 CY |
| SEEDING | 9,500 SY |
| MULCHING | 9,500 SY |
| 4" CONCRETE SIDEWALK | 4,465 SF |
| DETECTABLE WARNING PANEL | 24 SF |
| 3" GRAVEL BASE | 60 TON |
| 6" SUBGRADE PREPARATION - UNDER ALL PAVEMENT | 500 SY |

## GENERAL CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO APPLICABLE STATE AND FEDERAL CODES.
2. ALL SITE CONSTRUCTION SHALL CONFORM TO THE MOST RECENT EDITION OF THE CITY OF BISMARCK CONSTRUCTION SPECIFICATIONS FOR MUNICIPAL PUBLIC WORKS IMPROVEMENTS AS MODIFIED BY THE ATTACHED PLANS AND SPECIFICATIONS.
3. CONTRACTOR MUST BE BONDED BY THE CITY OF BISMARCK FOR ALL CONSTRUCTION IN CITY RIGHT OF WAY. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS.
4. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL NECESSARY SAFEGUARDS SUCH AS WARNING SIGNS, BARRICADES & NIGHT LIGHTS AT HIS OWN EXPENSE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR AND COORDINATE ALL TESTING REQUIRED. WHERE NOT SPECIFIED TESTING SHALL BE AS OUTLINED IN THE CITY OF BISMARCK CONSTRUCTION SPECIFICATIONS.
6. CONTRACTOR SHALL VERIFY GRADES, LINES, LEVELS, LOCATIONS AND DIMENSIONS AS SHOWN AND INSPECT ALL SURFACES THAT ARE TO RECEIVE WORK BEFORE PROCEEDING. THE OWNER WILL PROVIDE SURVEYING/STAKING. NOTIFY OWNER IN WRITING IN CASE OF UNSUITABLE CONDITIONS, DEFECTIVE SUBSTRATES OR DISCREPANCIES IN THE CONTRACT DOCUMENTS. STARTING OF WORK SHALL IMPLY ACCEPTANCE OF CONDITIONS.
7. PROTECT IMPROVEMENTS ON SITE AND ON ADJOINING PROPERTIES. PROVIDE BARRICADES, COVERINGS OR OTHER TYPES OF PROTECTION AS NECESSARY TO PREVENT DAMAGE AND TO SAFEGUARD AGAINST INJURIES. RESTORE TO ORIGINAL CONDITION ANY IMPROVEMENTS DAMAGED BY THE WORK OR IMPROVEMENTS WHICH REQUIRE TEMPORARY REMOVAL DURING CONSTRUCTION.

## GENERAL EROSION CONTROL NOTES

1. AN N.O.I. AND SWPPP WILL NEED TO BE PREPARED FOR THIS PROJECT BY THE GENERAL CONTRACTOR. THE CONTRACTOR SHALL SIGN THE DOCUMENTATION AND SUBMIT TO NORTH DAKOTA HEALTH DEPARTMENT. CONTRACTOR SHALL NOT START THE PROJECT UNTIL RECEIVING AN APPROVAL LETTER FROM THE NORTH DAKOTA HEALTH DEPARTMENT.
2. THE CONTRACTOR IS REQUIRED TO OBTAIN AN EROSION AND SEDIMENT CONTROL PERMIT FROM THE CITY OF BISMARCK PRIOR TO UNDERTAKING ANY LAND-DISTURBING ACTIVITIES RELATED TO THIS SITE PLAN.
3. CONTRACTOR SHALL IMPLEMENT APPROPRIATE EROSION CONTROL BEFORE BEGINNING ANY LAND DISTURBING ACTIVITIES AS DESIGNED. NOTE: EROSION CONTROL ITEMS SHOWN NEED TO BE IMPLEMENTED AT APPROPRIATE STAGES OF CONSTRUCTION ONLY.
4. CONTRACTOR SHALL CONTROL DUST BLOWING THROUGHOUT PROJECT.
5. CONTRACTOR SHALL HAVE A COPY OF THE SWPPP AND EROSION CONTROL PLAN ON-SITE AT ALL TIMES.
6. INSPECTIONS WILL BE PERFORMED AT LEAST ONCE EVERY 7 DAYS OR WITHIN 24 HOURS OF A STORM EVENT GREATER THAN 0.5 INCHES OF RAIN WITHIN A 24 HOUR PERIOD BY PERSONNEL FAMILIAR WITH ALL ASPECTS OF THE SWPPP AND THE IMPLEMENTED CONTROL PRACTICES. INSPECTIONS WILL INCLUDE THE REVIEW OF ALL DISTURBED AREAS, STRUCTURAL AND NON-STRUCTURAL CONTROL MEASURES, MATERIAL STORAGE AREAS AND VEHICULAR ACCESS POINTS.
7. EROSION CONTROL FOR PROJECT DESIGNATES A MINIMUM EFFORT TO CONTROL AND CONTAIN EROSION SEDIMENTS. CONTRACTOR SHALL USE DUE DILIGENCE TO CONTROL EROSION.
8. SEDIMENT TRACKING ONTO ADJACENT STREETS WILL BE PROHIBITED. STREETS SHALL BE CLEANED WITHIN 48 HOURS IF SEDIMENT TRACKING OCCURS.
9. ONCE ALL DISTURBED AREAS HAVE BEEN SEEDED AND MULCHED AND THE SITE DEMONSTRATES A MINIMUM OF 70% VEGETATIVE GROWTH, EROSION CONTROL MEASURES SHALL BE REMOVED BY CONTRACTOR.

## GRADING NOTES

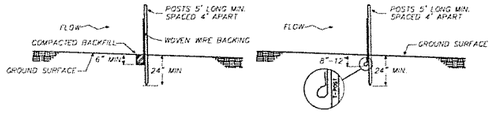
1. ALL WORK SHALL BE PERFORMED IN A WORKMAN LIKE MANNER AND SHALL CONFORM TO THE MOST RECENT EDITION OF THE CITY OF BISMARCK CONSTRUCTION SPECIFICATIONS FOR MUNICIPAL PUBLIC WORKS IMPROVEMENTS AS MODIFIED BY THESE PLANS.
2. SCARIFY ROOT ZONE/TOPSOIL IN ALL AREAS WHERE FILL IS GOING TO BE PLACED.
3. LOCATE AND PROTECT ALL EXISTING UTILITIES.
4. LANDSCAPE BERM IS TO BE CONSTRUCTED WITH TOPSOIL FROM EXISTING TOPSOIL PILE THAT IS LOCATED APPROXIMATELY 1500 FEET TO THE NORTH OF THE BERMS.
5. ALL FILL SHALL BE COMPACTED TO 80% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 WITH MOISTURE WITHIN PLUS OR MINUS 3% OF OPTIMUM MOISTURE CONTENT.
6. CLEAR AND GRUB THE SITE AS NEEDED TO CONSTRUCT THE IMPROVEMENTS. REMOVE ALL DEBRIS OFFSITE.
7. THE CONTRACTOR SHALL ADD WATER IF REQUIRED TO MEET MOISTURE REQUIREMENTS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROJECT SITE SAFETY.

## PAVEMENT NOTES

1. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF BISMARCK SPECIFICATIONS EXCEPT AS MODIFIED HEREIN.
2. CONTRACTOR SHALL EXECUTE 6" THICK SUBGRADE PREPARATION UNDER ALL AREAS TO BE PAVED. SUBGRADE SHALL BE COMPACTED TO A DENSITY OF 95% OF ASTM D 698.
3. GRAVEL BASE SHALL BE CLASS 5 GRAVEL COMPACTED TO A DENSITY OF 95% OF ASTM D 698.
4. EXTERIOR CONCRETE SHALL HAVE AIR CONTENT OF 5% TO 7% AND STRENGTH AT 28 DAYS SHALL BE 4000 PSI.
5. CONSTRUCTION JOINTS WILL BE PLACED TO COINCIDE WITH CONTRACTION JOINT SPACING. CONSTRUCTION JOINT FOR UNREINFORCED CONCRETE SHALL HAVE A MINIMUM 1½" DIAMETER HALF ROUND KEYWAY OR APPROVED EQUAL.
6. JOINT SPACING SHALL TYPICALLY BE SPACED AT 1-1/2 TIMES THE THICKNESS OF THE PAVEMENT (MEASURED IN INCHES) IN FEET (4" SDMK EQUALS 6 FOOT SPACING). IN NO CASE SHALL THE JOINT SPACING EXCEED TWO TIMES THE THICKNESS.
7. ASPHALT MATERIAL SHALL CONFORM TO CLASS B PAVING AS SPECIFIED BY CITY OF BISMARCK CONSTRUCTION SPECIFICATIONS.

## SEEDING NOTES

1. CLEAR AND GRUB SITE BEFORE SEEDING ENSURING THAT THE SITE IS IN A SMOOTH CONDITION WITH NO DEBRIS OR ROCKS LARGER THAN 2" IN DIAMETER.
2. ALL PORTIONS OF THE SITE NOT RECEIVING OTHER IMPROVEMENTS SHALL BE SEEDED. SEED SHALL CONFORM TO THE CITY OF BISMARCK SPECIFICATIONS FOR CLASS IV SEED. SEED SHALL BE INSTALLED AS FOLLOWS:
3. FERTILIZE SOIL DURING THE SEEDING PROCESS USING AN APPROPRIATE APPLICATION PROCESS. FERTILIZER SHALL BE 10-10-10 AND APPLIED AT A RATE OF 4 LBS. PER 1000 SQUARE FEET.
4. SEED SHALL BE DRILL SEEDED TO A DEPTH OF 1/4" TO 1/2" AND SHALL BE EVENLY SPREAD. AFTER SEED HAS BEEN SOWN, THE SOIL SHALL BE REPACKED IMMEDIATELY AFTER THE SEED IS APPLIED TO FIRM THE SOIL AROUND THE SEED. NO SEED SHALL BE PLACED ON DAYS WHERE THE WIND IS STRONG ENOUGH TO PREVENT IT FROM BEING PROPERLY IMBEDDED INTO THE SOIL.
5. THE SEEDING CONTRACTOR SHALL WATER THE NEWLY SEEDED AREAS ON THE SAME DAY THAT SEEDING OCCURS. IF AN IRRIGATION SYSTEM IS PRESENT AND FUNCTIONING, THE SEEDING CONTRACTOR SHALL ENERGIZE THIS SYSTEM AND ENSURE THAT A WATERING SCHEDULE HAS BEEN ESTABLISHED BEFORE LEAVING THE SITE.
6. SEED MUST SHOW A DENSITY OF 20 TO 30 SEEDLINGS PER SQUARE FOOT BEFORE ACCEPTANCE WILL OCCUR. THE CONTRACTOR SHALL FURNISH AND REPLACE WITHOUT ADDITIONAL COMPENSATION THEREFOR, ANY SEED FOR AREAS THAT HAVE NOT GERMINATED, HAVE DIED, OR ARE DAMAGED TO THE EXTENT THAT REPLACEMENT IS REQUIRED TO CONFORM TO THE REQUIREMENTS OUTLINED ABOVE. THE CONTRACT WARRANTY PERIOD SHALL ALSO APPLY TO THIS ITEM.
7. CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY EROSION SCARS OR WASHOUTS UNTIL THE DATE THAT FINAL SEED STAND IS ACCEPTED. SEE EROSION CONTROL PLAN FOR EROSION CONTROL METHODS.




DETAIL OF SILT FENCE INSTALLATION — DETAIL OF MACHINE SLICED SILT FENCE

### APPROVED TYPES OF SILT FENCE INSTALLATION

SILT FENCE — MATERIALS

FILTER FABRIC SHOULD HAVE A MINIMUM HEIGHT OF 36 INCHES.

WOOD POSTS SHOULD BE TREATED AND BE A MINIMUM OF 6 FT LONG WITH MINIMUM DIMENSIONS OF 2 INCH DIAMETER FOR ROUND POSTS OR 1 ½ INCHES BY 1½ INCHES (2 INCH × 2 INCH NOMINAL) FOR RECTANGULAR POSTS.

STEEL POSTS SHOULD BE A MINIMUM OF 5 FT LONG, WEIGH A MINIMUM OF 1.3 LBS/FT, HAVE WELDED PLATE NEAR THE BOTTOM, AND HAVE PROJECTIONS TO AID IN FASTENING THE WIRE TO THE FABRIC.

BACKING OF THE SILT FENCE IS REQUIRED, A STEEL WIRE FENCE FABRIC SHALL BE USED. THE WOVEN WIRE SHOULD BE AT LEAST 32 INCHES HIGH, HAVE A MAXIMUM OPENING SIZE OF 6 INCHES BY 6 INCHES, AND BE A MINIMUM OF 14-GAUGE, GRADE 60.

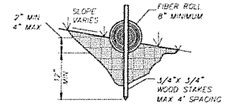
RE-FABRICATED SILT FENCES WILL NOT BE ALLOWED.

PLACEMENT

THE SILT FENCE SHOULD EXTEND FAR ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE FENCE IS HIGHER THAN THE TOP OF THE LOW POINT OF THE FENCE. THIS PREVENTS WATER FROM FLOWING AROUND THE CHECK.

FOR SLOPE PROTECTION, THE SILT FENCE SHOULD FOLLOW THE CONTOURS OF THE SITE AS CLOSELY AS POSSIBLE.

DO NOT PLACE A SILT FENCE DIRECTLY IN FRONT OF A CULVERT OUTLET. IT WILL NOT STAND UP TO THE CONCENTRATED FLOW.



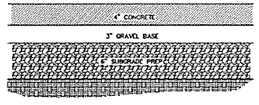

STRAW WATTLE DETAIL

DETAIL OF STRAW WATTLE INSTALLATION

STAKE WATTLES INTO A 2 TO 4 INCH DEEP TRENCH WITH A WIDTH EQUAL TO THE DIAMETER OF THE WATTLE.

DRIVE STAKES AT THE END OF EACH WATTLE AND SPACED 4 FEET MAXIMUM ON CENTER. USE WOOD STAKES WITH A NOMINAL CLASSIFICATION OF 0.75 BY 0.75 INCH AND MINIMUM LENGTH OF 24 INCHES.

IF MORE THAN ONE STRAW WATTLE IS PLACED IN A ROW, THE WATTLES SHOULD OVERLAP, NOT ABUTTED.




4" CONCRETE TRAIL SECTION

**SAFETY NOTICE TO CONTRACTOR**

In accordance with generally accepted construction practices the Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal business hours.

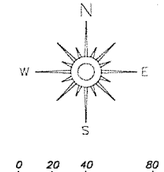
**UTILITY NOTICE TO CONTRACTOR**

The location of existing underground utilities are shown in an approximate way only and have not been independently verified by the Owner or its representatives. The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to exactly locate and preserve any and all underground utilities. Underground locates can be made by using the "One Call" number 1-800-795-0555.

**WARRANTY / DISCLAIMER**

The designs represented in these plans are in accordance with established practices of civil engineering. However, neither Swenson, Hagen & Co. nor its personnel can or do warranty these plans as constructed except in the specific cases where Swenson, Hagen & Co personnel inspect and control the physical construction on a full time basis.

CALL BEFORE YOU DIG
NORTH DAKOTA
UTILITIES UNDERGROUND LOCATION SERVICE
1-800-795-0555




0 20 40 80

SCALE: 1" = 40'
MARCH 11, 2016
VERTICAL DATUM: NGVD 88
REVISED 9-20-16

# 57TH AVENUE LANDSCAPE BERM & TRAIL PLAN
FOR
# HERITAGE RIDGE & PARK
BISMARCK, NORTH DAKOTA

SWENSON, HAGEN & COMPANY P.C.
800 Basin Avenue P.O. Box 1135
Bismarck, North Dakota 58504
Surveying
Hydrology
Land Planning
Civil Engineering
Landscape & Site Design
Construction Management
Phone (701) 223-8450
Fax (701) 223-2056
sheri@swensonhagen.com

DRAWN BY: CW
CHECK BY: JP
DATE:
FILE DESC:
COMPUTER FILE:
SURVEY FILE:

SHEET
1 OF 1

P:\Bismarck Heritage Ridge & Park\Heritage Ridge & Park GRADING (491).dwg, 8.5x11 Landscaping, 9/20/2016 10:11:42 AM, cwiw, 1:1

# ENGINEERING DEPARTMENT

**DATE:** September 19, 2016

**FROM:** Gabe Schell, PE | City Engineer

**ITEM:** Encroachment Easement and Waiver – 100 West Main Limited Partnership

## REQUEST

Request approval of 100 West Main Limited Partnership the right to install, maintain, repair and replace concrete footings projecting into the public right-of-way.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

100 West Main Limited Partnership requests the right to install, maintain, repair and replace concrete footings projecting into the public right-of-way at North First Street and Main Avenue.

## RECOMMENDED CITY COMMISSION ACTION

Consider approving request from 100 West Main Limited Partnership the right to install, maintain, repair and replace concrete footings projecting into the public right-of-way at North First Street and Main Avenue

## STAFF CONTACT INFORMATION

Gabe J. Schell
gschell@bismarcknd.gov
701-355-1505

GJS/ds

**Encroachment Easement and Waiver**

The City of Bismarck in the State of North Dakota hereby grants 100 West Main Limited Partnership (Grantee), and its successors and assigns, the right to install, maintain, repair and replace concrete footings projecting into the public right-of-way at 4' below grade as shown on the drawing attached hereto as Exhibit A and further described as follows: seven square pad footings with a maximum projection of 2'-3" and continuous strip footing with a projection of 6" for 56' along North First Street; one square pad footing with a projection of 2'-6" in each direction at the corner of North First Street and Main Avenue; and two square pad footings with a projection of 1'-4"and continuous strip footing with a projection of 6" for 31' along Main Avenue, together with the right of ingress and egress over and across the right-of-way at times and locations approved by the City to construct, install, maintain, repair and replace such encroachments (the "Encroachment Easement"), all affixed to the Grantee's building located on Block 56, Original Plat to the City of Bismarck (the "Property"), subject to the following conditions:

1. The Grantee shall comply with the applicable building codes and other reasonable requirements of the City regarding construction of the encroachments.

The term of this Encroachment Easement and the rights granted herein shall remain in full force and effect for the life of the proposed building and related improvements to be constructed on the Property (the "Building"); provided, however, that in the event that the Building located on the Property is destroyed by any means whatsoever then this Encroachment Easement and the rights granted hereunder shall remain in full force and effect if such reconstruction is commenced within two years of the date of such

destruction and diligently pursued to completion, and if such reconstruction is not commenced within two years of the date of such destruction, the City may terminate this Encroachment Easement.

2. Upon any cancellation by the City pursuant to paragraph 2, Grantee shall, at its own expense, remove the encroachments and restore the public right-of-way to its original condition. The parties may agree to enter into a new agreement for another fixed term if at the end of the initial term the City has no foreseeable need to clear the right-of-way for utility purposes.

3. The Grantee shall not look to the City to pay for any expense or damage to the encroachments by the City. The Grantee agrees to release the City from and waive any and all claims relating to said installation and maintenance including, but not limited to, damages to the encroachments by the City.

4. The Grantee agrees that it is using the public right-of-way at its own risk. The Grantee agrees that it will hold harmless and indemnify the City from any and all claims arising from the placement of the encroachments.

5. In the event the City is required to perform street maintenance or construction on the right-of-way at the location of the encroachments, the Grantee shall cooperate with the City in temporarily protecting the encroachments and accommodating the City's project, at the Grantee's expense.

6. This Encroachment Easement and the covenants, agreements and restrictions contained herein, shall run with the land benefitted and burdened hereunder.

9/16/16
Date

Gabe Schell, PE
City Engineer

100 West Main Limited Partnership, Grantee

(Signature)
Print Name: Randall J. Schold

Title: Co-President of MetroPlains Partners, LLC, Sole member of 100 W. Main GP, LLC, its GP

9/20/16
Date

Keith Hunke
City Administrator
Bismarck

Date

Mike Seminary
President
Bismarck City Commission

Date

STATE OF Minnesota )
) ss.
COUNTY OF Hennepin )

On this 16 day of Sept, 2016, before me personally appeared Randall J. Schaid, who is the Co-President of 100 West Main Limited Partnership, and that executed the within instrument, and acknowledged to me that such limited partnership executed the same.

LEAH M. SKOY
Notary Public-Minnesota
My Commission Expires Jan 31, 2020

Leah M. Skoy
Notary Public
My commission expires: 1/31/2020

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this 20th day of September 2016, before me personally appeared Gabe Schell known to me to be the City Engineer of the City of Bismarck described in and that executed the within instrument, and acknowledged to me that such entity executed the same.

Donna Seifert
Notary Public
My commission expires: Aug. 08, 2020

DONNA SEIFERT
Notary Public
State of North Dakota
My Commission Expires Aug. 08, 2020

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this ____ day of _____, 2016, before me personally appeared Keith Hunke known to me to be the City Administrator of the City of Bismarck described in and that executed the within instrument, and acknowledged to me that such entity executed the same.

_____
Notary Public
My commission expires:

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this ____ day of _____, 2016, before me personally appeared Mike Seminary known to me to be the Mayor of the City of Bismarck described in and that executed the within instrument, and acknowledged to me that such entity executed the same.

_____
Notary Public
My commission expires:

**LEGAL DESCRIPTION:**

Lots 7, 8, 9, 10 and 11, Block 56, Original Plat to the City of Bismarck, Burleigh County, North Dakota

Parcel ID: 0001-056-010

PREPARED BY:
Robin Wade Forward
Stinson Leonard Street LLP
811 E. Interstate Avenue
Bismarck, ND 58503
701-221-8600

# ENGINEERING DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Gabe Schell, PE | City Engineer

**ITEM:** Sidewalk Easement

## REQUEST

Approval of the Sidewalk Easement with Alvie R. Jarratt, Jr.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

This sidewalk easement is needed for installation of sidewalk at the corner of Midwest Drive and Tandem Drive on Lot 7 Block 2 of Midwest Business Park Addition. See the attached sidewalk easement for a detailed description of the tract of land.

## RECOMMENDED CITY COMMISSION ACTION

Approval of Sidewalk Easement for Mayor's Signature.

## STAFF CONTACT INFORMATION

Gabe Schell, PE
gschell@bismarcknd.gov
701-355-1505

| Document Prepared By:<br><br>GERMOLUS KNOLL LLP<br>1915 N. Kavaney Dr., Ste 3<br>PO Box 858<br>Bismarck, ND 58502-0858<br>Telephone: (701) 255-2010 | THIS SPACE FOR OFFICAL USE |
|---|---|

**SIDEWALK EASEMENT**

The undersigned, their successors and assigns, hereinafter called Grantor, in consideration of One and no/100 Dollars ($1.00) and other good and valuable consideration, receipt of which is hereby acknowledged, does hereby bargain, sell and transfer unto the City of Bismarck, North Dakota, a municipal corporation, its successors and assigns, hereinafter called Grantee, an exclusive and nighty-nine (99) year easement for public right-of-way to allow the realignment of a sidewalk upon the following described land situated in the County of Burleigh, State of North Dakota, to wit:

Part of Lot 7, Block 2, Midwest Business Park Addition to the City of Bismarck, Burleigh County, North Dakota, more particularly described as follows:

BEGINNING at the southwest corner of Lot 7, Block 2, Midwest Business Park Addition, as described in Document No. 811224, recorded at the Burleigh County Recorder's Office; thence along the west line of said Lot 7, Block 2, Midwest Business Park Addition, N 00°26'01" E a distance of 25.00 feet; thence on a curve to the left having a radius of 25.00 feet, an interior angle of 089°24'59" an arc length of 39.02 feet and the chord of said curve bears S 44°51'29" E a chord distance of 35.17 feet to the south line of said Lot 7, Block 2, Midwest Business Park Addition; thence along said south line of Lot 7, Block 2, Midwest Business Park Addition, S 89°51'00" W a distance of 25.00 feet to the said POINT OF BEGINNING.

Said tract contains 137 S.F., more or less, and is further described on the attached **Exhibit "A"**, which is incorporated herein by reference.

(Said easement is hereinafter referred to as the "Sidewalk Easement.") Grantor hereby covenants with Grantee that it is lawfully seized and possessed of the land underlying the Sidewalk Easement in fee simple absolute. Grantor makes no other warranties or representations, express or implied, whatsoever.

The Grantee hereby releases the Grantor, and its successors and assigns, from any and all liability for any wrongful deaths, injuries to persons, or damage or loss to property, and any other form of consequential, exemplary or other damages, and for any other expense, loss or liability incurred or suffered by the Grantee, its employees, contractors, subcontractors, agents, suppliers, arising out of or related to the excavation, grading, concrete work, and any other form of construction activities directly related to the construction of the sidewalk in, on, or under the Sidewalk Easement, and the Grantee assumes all responsibility therefor.

IN WITNESS WHEREOF, this instrument is executed by the undersigned on this 19th day of September, 2016.

Golden Holdings, LLC

Alvie R. Jarratt, Jr., Managing Member

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

DENISE UGLAND
Notary Public
State of North Dakota
My Commission Expires June 24, 2021

On this 19th day of September, 2016, before me personally appeared Alvie R. Jarratt, Jr., the managing member of Golden Holdings, LLC, who executed the within instrument, and acknowledged to me that he executed the same.

Notary Public

Acceptance and dedicated lands by the **City of Bismarck:**

Michael C Seminary, President
Board of City Commissioners

Attest:
Keith J. Hunke
City Administrator

STATE OF NORTH DAKOTA )
) SS
COUNTY OF BURLEIGH )

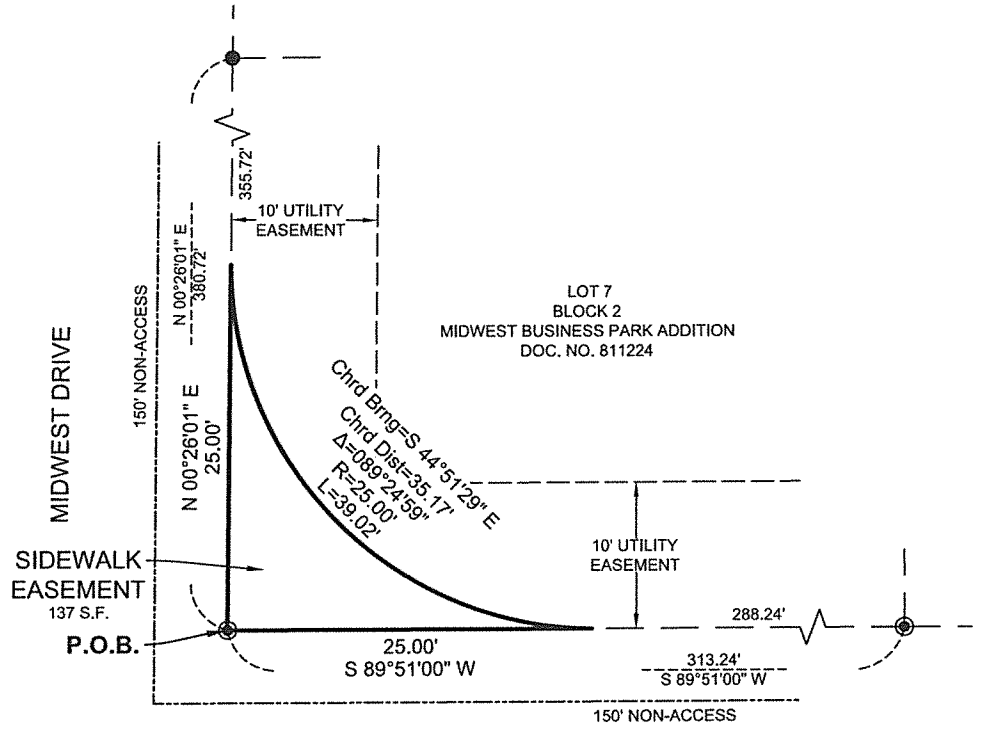
On this _____ day of _____, 2016, before me personally appeared Michael C. Seminary, President of Board of City Commissioners, and Keith J. Hunke, City Administrator, known to me to be the persons who are described in, and who executed the within and foregoing instrument and who severally acknowledged to me that they executed the same.

Notary Public

# EXHIBIT A

## SIDEWALK EASEMENT

PART OF LOT 7, BLOCK 2, MIDWEST BUSINESS PARK ADDITION
TO THE CITY OF BISMARCK, BURLEIGH COUNTY, NORTH DAKOTA




### LEGEND

- ◉ Rebar & LS 6373 Cap Found
- ● Rebar & LS 3463 Cap Set

### NOTE

Said tract of land is subject to any easement, restrictions or reservations, either existing or of record.

Bearings and distances may vary from previous plats due to different methods of measurements.

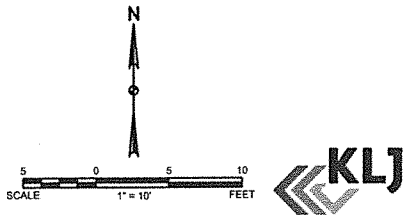
Survey was performed in Local Site
NAD 83 (2011), North Dakota South Zone.
Units are in International Feet.
Distances shown are ground distances.

### LEGAL DESCRIPTION

Part of Lot 7, Block 2, Midwest Business Park Addition to the City of Bismarck, Burleigh County, North Dakota, more particularly described as follows:

BEGINNING at the southwest corner of Lot 7, Block 2, Midwest Business Park Addition, as described in Document No. 811224, recorded at the Burleigh County Recorder's Office; thence along the west line of said Lot 7, Block 2, Midwest Business Park Addition, N 00°26'01" E a distance of 25.00 feet; thence on a curve to the left having a radius of 25.00 feet, an interior angle of 089°24'59" an arc length of 39.02 feet and the chord of said curve bears S 44°51'29" E a chord distance of 35.17 feet to the south line of said Lot 7, Block 2, Midwest Business Park Addition; thence along said south line of Lot 7, Block 2, Midwest Business Park Addition, S 89°51'00" W a distance of 25.00 feet to the said POINT OF BEGINNING.

Said tract contains 137 S.F., more or less.



# FINANCE DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Rebecca Collins

**ITEM:** Resolution Directing Special Assessments to be Levied

## REQUEST

Review and approval of the attached Special Assessments to be Levied.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

The assessments lists have been published in the Bismarck Tribune as required. Approval of this resolution allows the Special Assessment Commission to meet September 29 & 30, 2016 to hear objections to these assessments and confirm the assessments for the attached districts.

## RECOMMENDED CITY COMMISSION ACTION

Approve the Resolutions Directing Special Assessments to be Levied.

## STAFF CONTACT INFORMATION

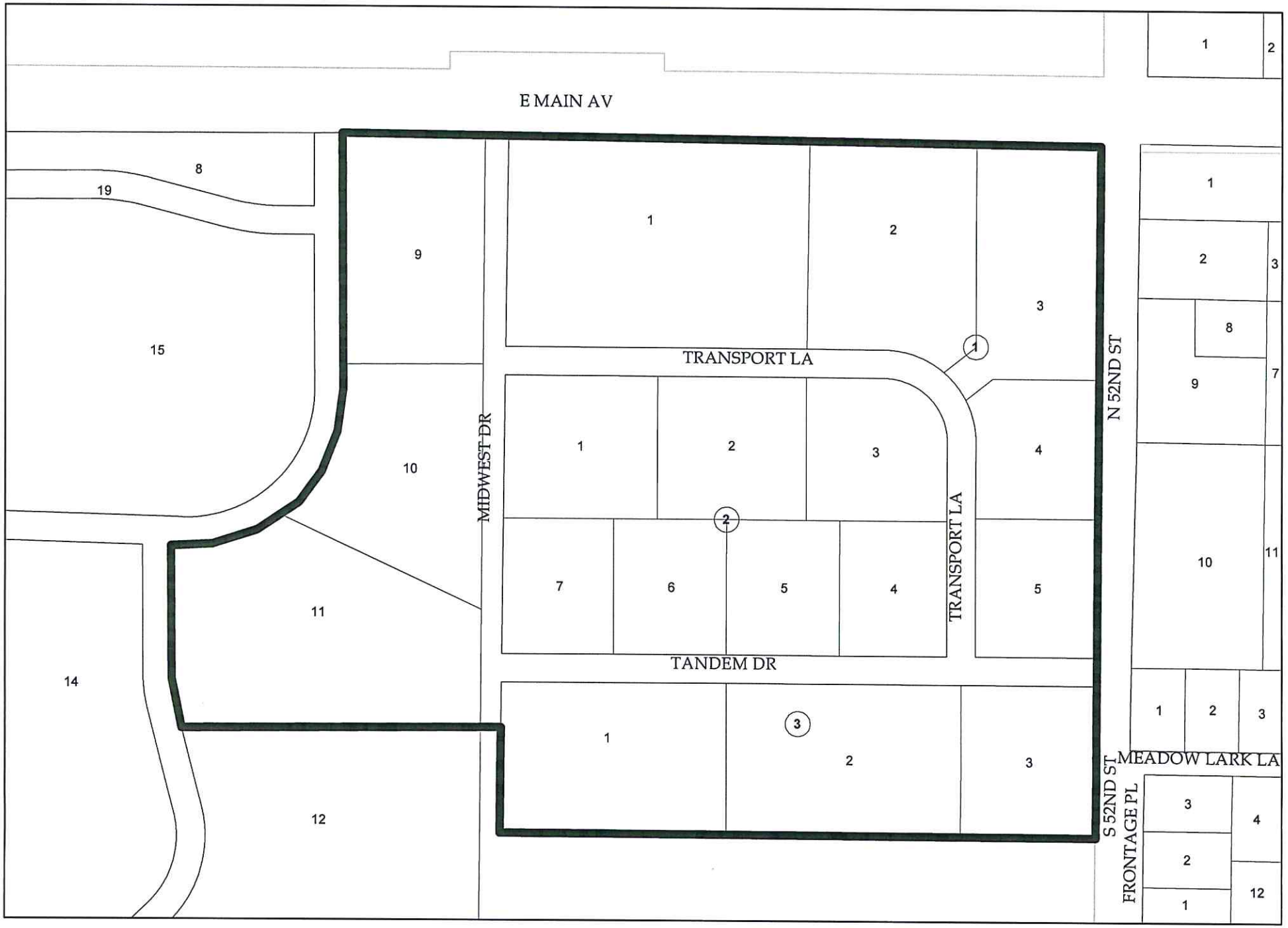
Rebecca Collins, bcollins@bismarcknd.gov, (701) 355-1603.

Attachment

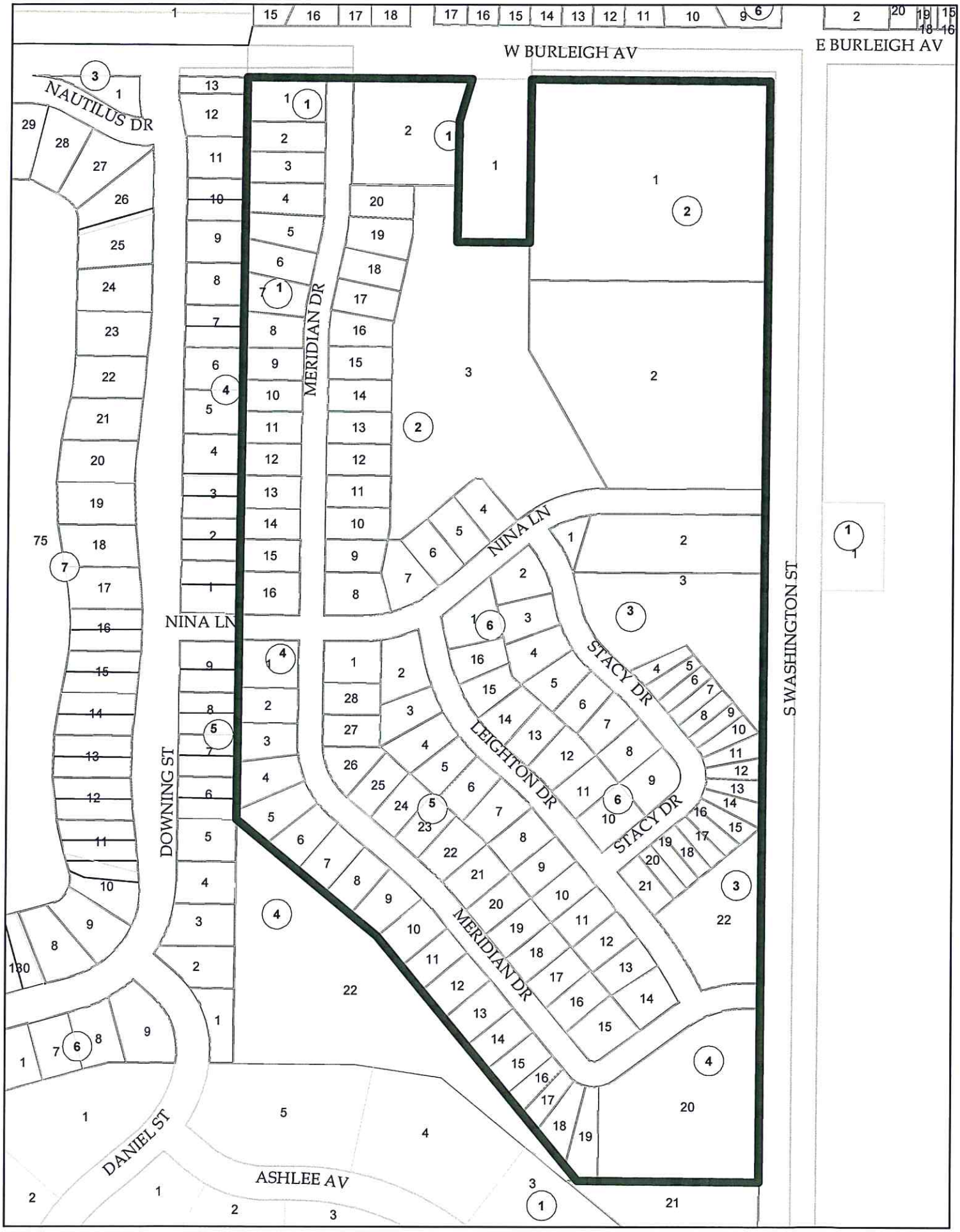
# Special Assessment Districts

| | Total Assessment |
|---|---|
| Sewer Improvement District No. 561 | $ 875,035.00 |
| Sewer Improvement District No. 562 | $ 1,374,182.94 |
| Sewer Improvement District No. 566 | $ 372,103.03 |
| Sewer Improvement District No. 567 | $ 80,054.02 |
| | |
| Street Improvement District No. 489 | $ 511,062.05 |
| Street Improvement District No. 490 | $ 2,091,892.75 |
| Street Improvement District No. 491 | $ 1,873,134.47 |
| Street Improvement District No. 492 | $ 1,082,158.57 |
| Street Improvement District No. 496 | $ 1,641,375.87 |
| Street Improvement District No. 498 | $ 1,784,100.39 |
| | |
| Water Improvement District No. 328 | $ 317,805.66 |

# SE561 - UNIT 1


E MAIN AV
TRANSPORT LA
MIDWEST DR
TRANSPORT LA
N 52ND ST
TANDEM DR
S 52ND ST
MEADOW LARK LA
FRONTAGE PL

# SE562 - UNIT 1


W BURLEIGH AV
E BURLEIGH AV
NAUTILUS DR
MERIDIAN DR
NINA LN
NINA LN
S WASHINGTON ST
STACY DR
LEIGHTON DR
STACY DR
DOWNING ST
MERIDIAN DR
DANIEL ST
ASHLEE AV

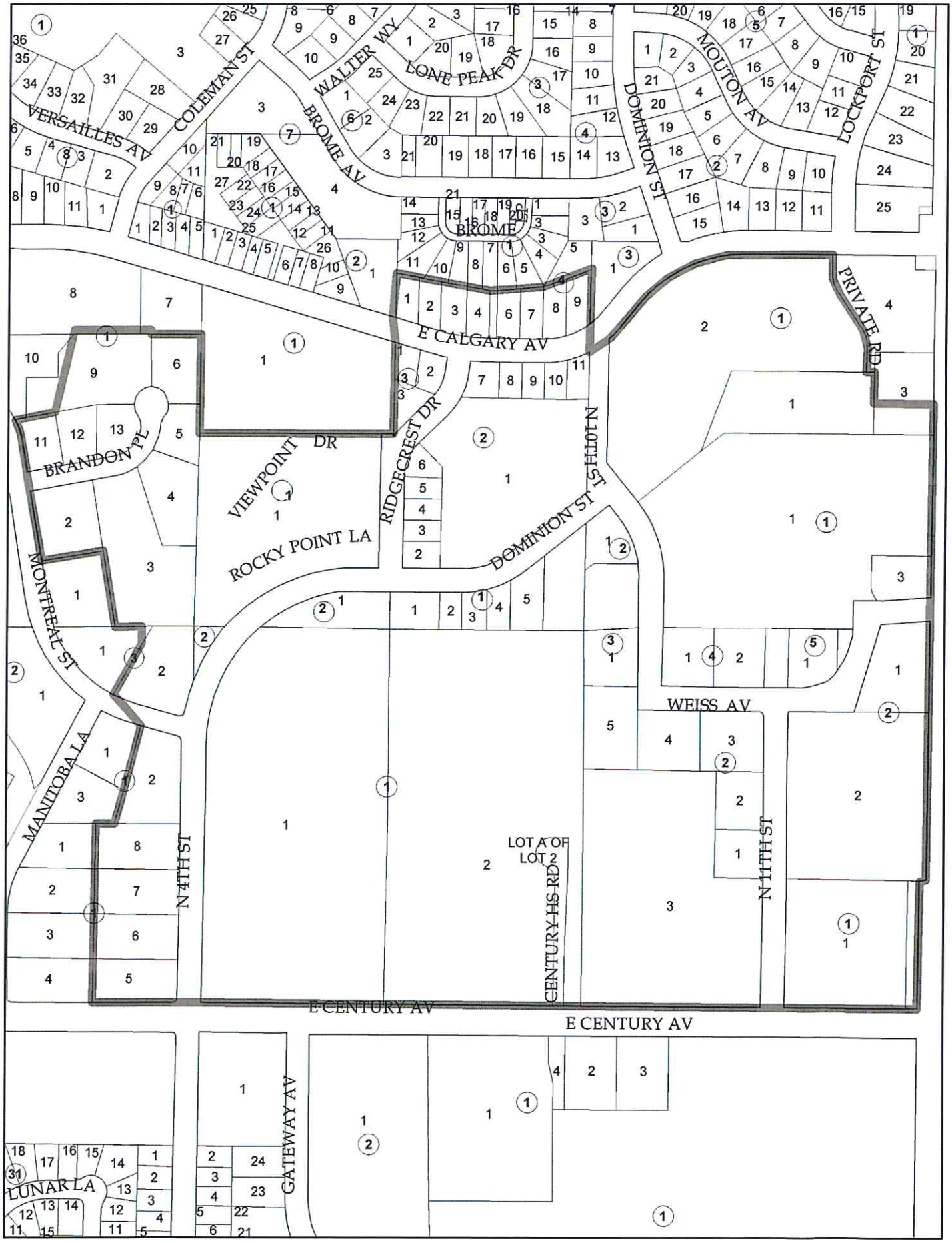
# SE566 - UNIT 1


E DIVIDE AV
PLATOON AV
BRIGADE ST
BATTALION ST
NE 52ND ST
17TH AV

# SE567 - UNIT 1


CENTENNIAL RD
E CALGARY AVE
LEICHTY PL
JERICHO RD
FRENCH ST
GREENSBORO DR

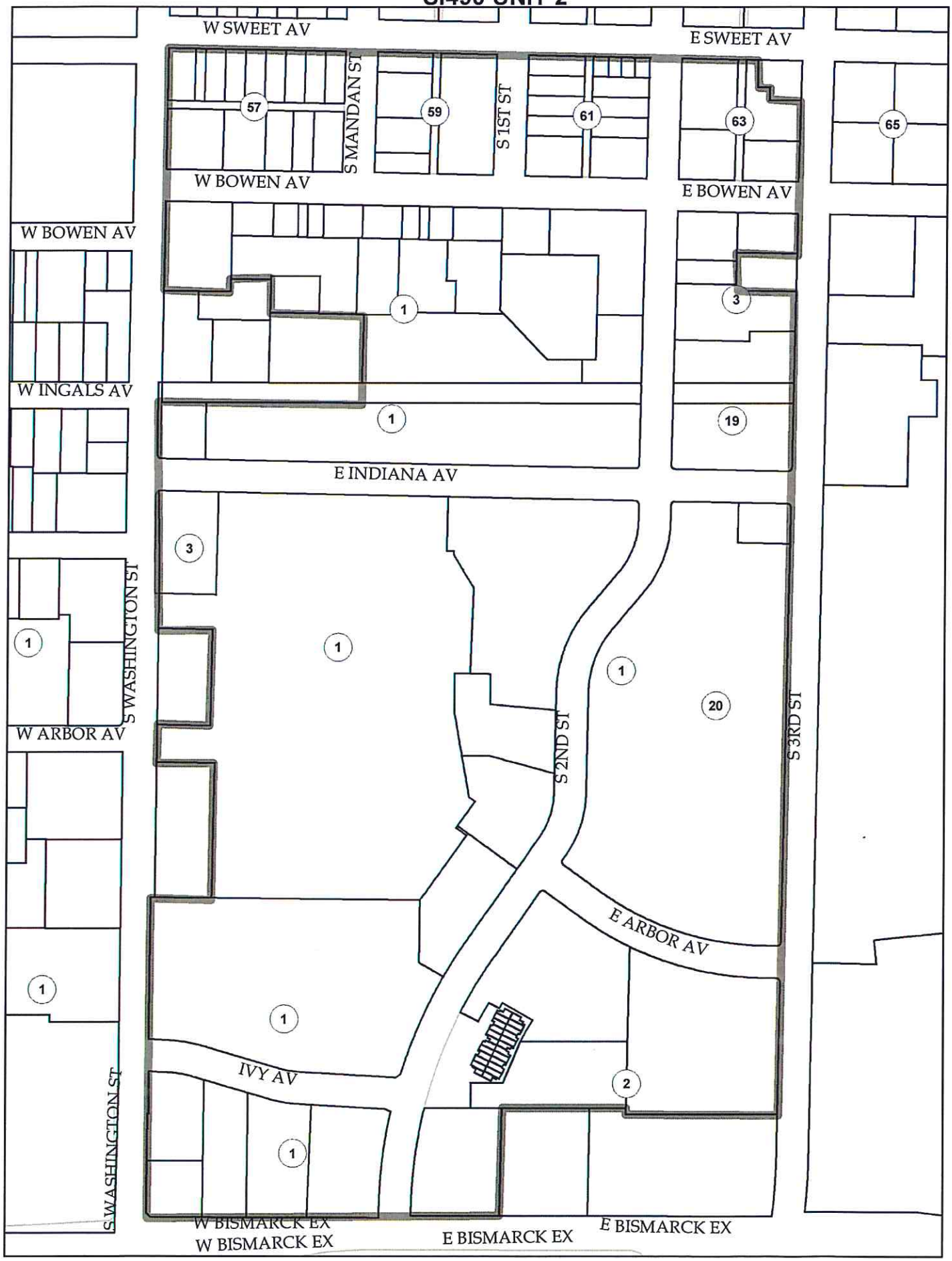
# SI 489 UNIT 2


VERSAILLES AV
COLEMAN ST
WALTER WY
LONE PEAK DR
BROME AV
BROME
DOMINION ST
MOUTON AV
LOCKPORT ST
E CALGARY AV
PRIVATE RD
BRANDON PL
VIEWPOINT DR
RIDGECREST DR
ROCKY POINT LA
DOMINION ST
N 10TH ST
MONTREAL ST
MANITOBA LA
N 4TH ST
WEISS AV
LOT A OF LOT 2
CENTURY HS RD
N 11TH ST
E CENTURY AV
E CENTURY AV
GATEWAY AV
LUNAR LA

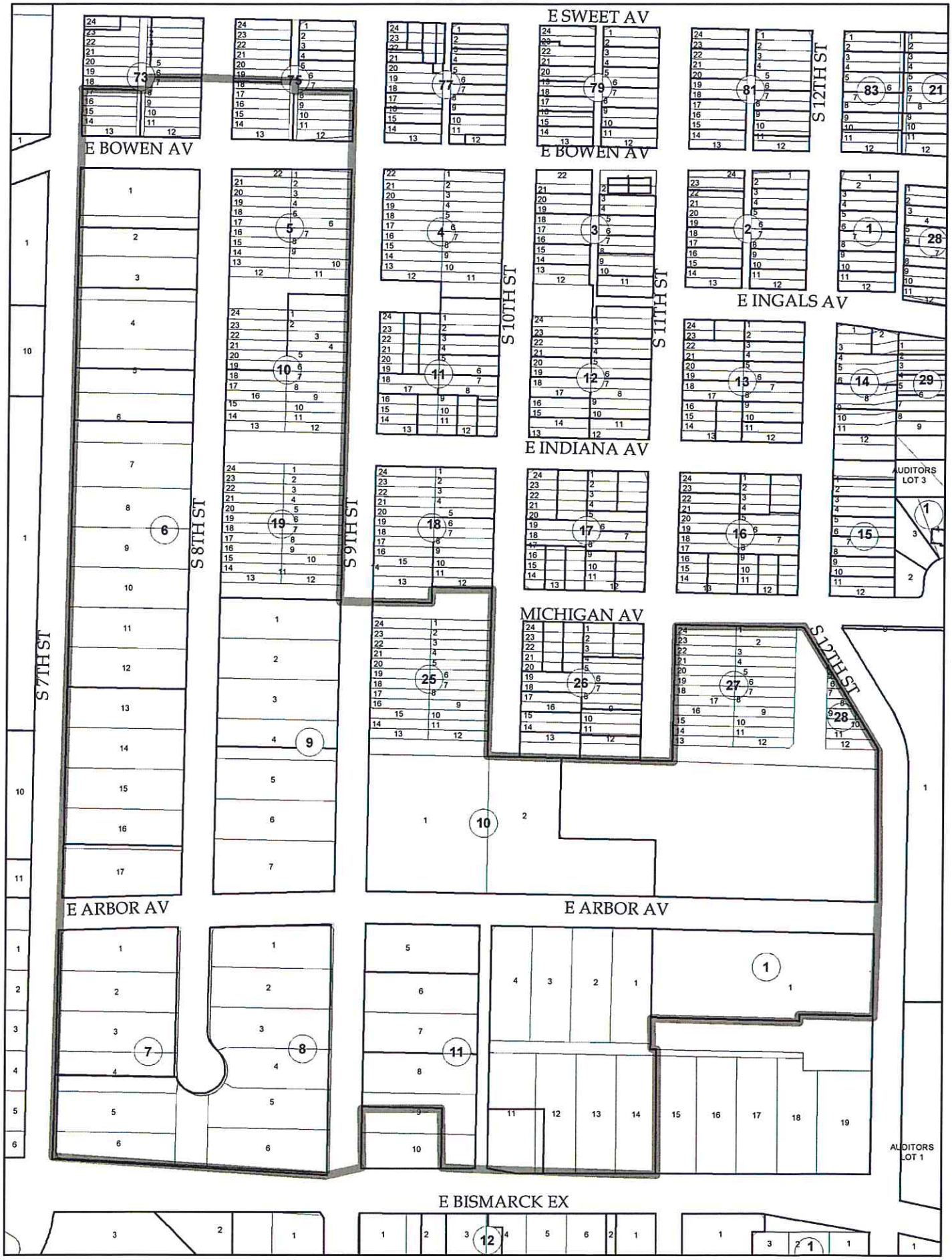
# SI490 UNIT1


E BOULEVARD AV
E F AV
E E AV
E D AV
E C AV
E B AV
E BROADWAY AV
E ROSSER AV
N 14TH ST
N 15TH ST
N 16TH ST
N 17TH ST
N 18TH ST
N 19TH ST
N 20TH ST
N 21ST ST
LORA ST
N CURTIS ST
COLICH ST

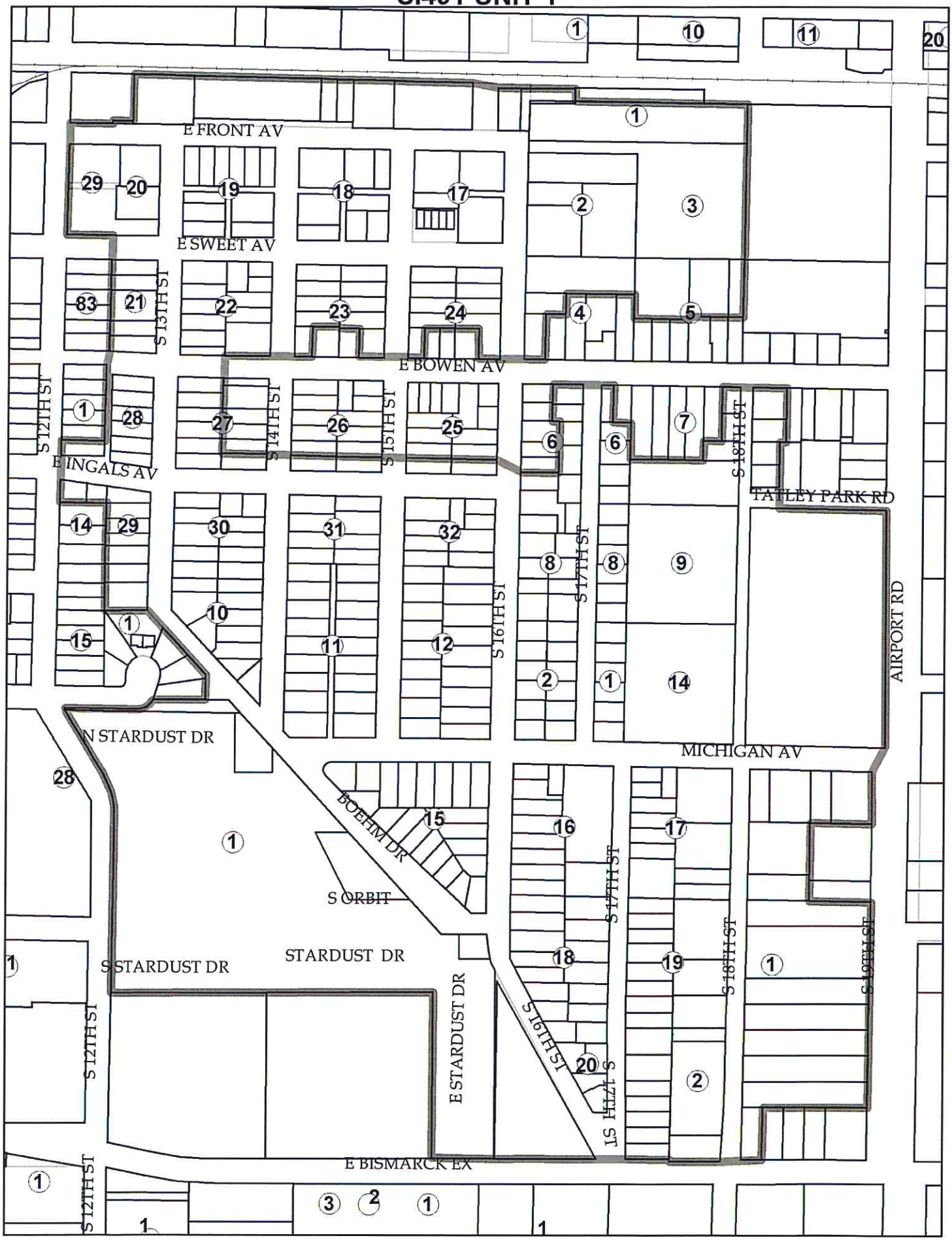
# SI490 UNIT 2


W SWEET AV
E SWEET AV
S MANDAN ST
S 1ST ST
57
59
61
63
65
W BOWEN AV
E BOWEN AV
W BOWEN AV
W INGALS AV
1
3
19
E INDIANA AV
S WASHINGTON ST
W ARBOR AV
20
S 2ND ST
S 3RD ST
E ARBOR AV
IVY AV
2
S WASHINGTON ST
W BISMARCK EX
W BISMARCK EX
E BISMARCK EX
E BISMARCK EX

# SI490 UNIT 3


E SWEET AV
E BOWEN AV
E BOWEN AV
E INGALS AV
E INDIANA AV
MICHIGAN AV
E ARBOR AV
E ARBOR AV
E BISMARCK EX
S 7TH ST
S 8TH ST
S 9TH ST
S 10TH ST
S 11TH ST
S 12TH ST
S 12TH ST
AUDITORS LOT 3
AUDITORS LOT 1

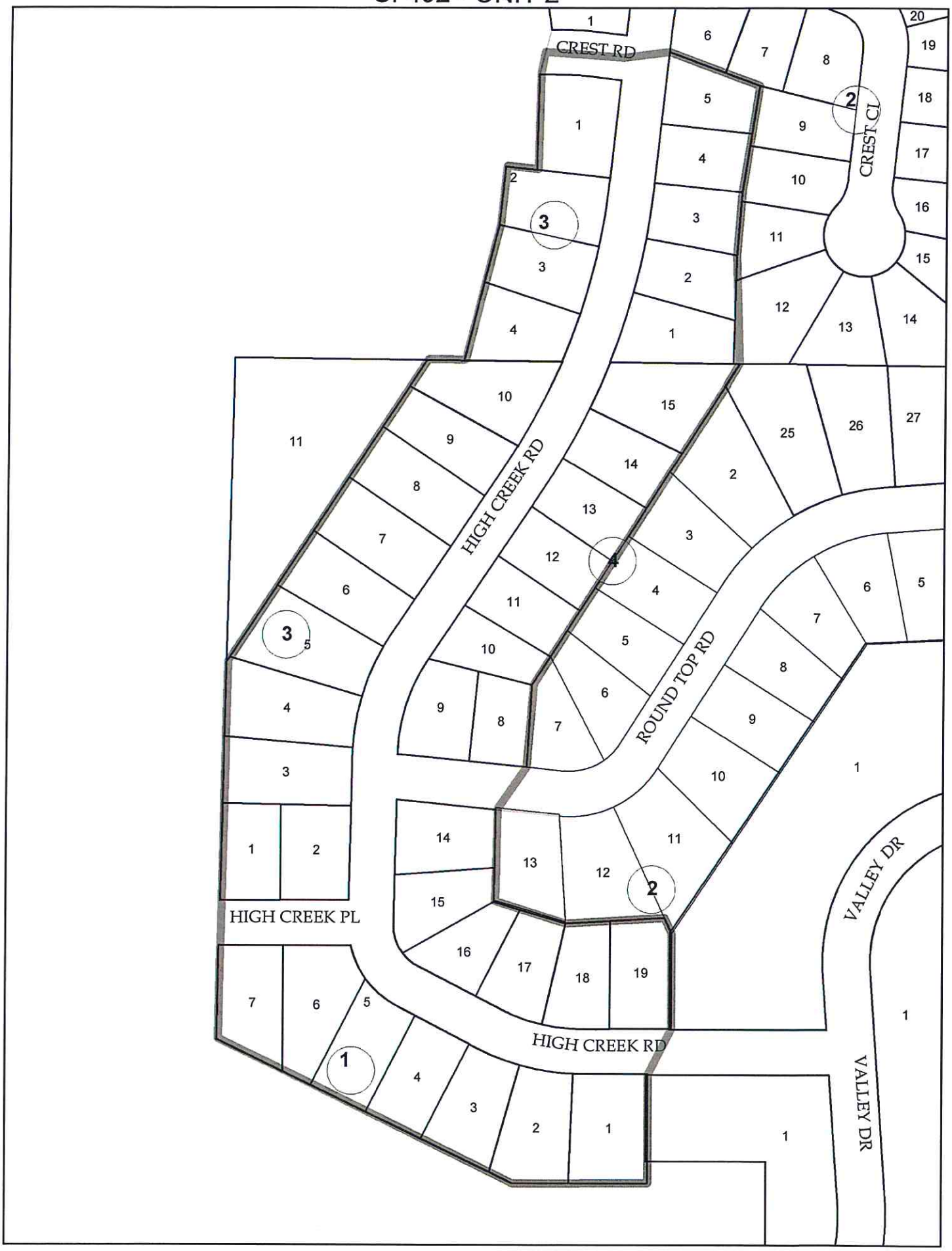
# SI491 UNIT 1


E FRONT AV
E SWEET AV
E BOWEN AV
E INGALS AV
TATLEY PARK RD
MICHIGAN AV
AIRPORT RD
N STARDUST DR
S STARDUST DR
STARDUST DR
S ORBIT
BOEHM DR
E STARDUST DR
E BISMARCK EX
S 12TH ST
S 13TH ST
S 14TH ST
S 15TH ST
S 16TH ST
S 17TH ST
S 18TH ST
S 19TH ST

# SI 492 - UNIT 1


POWDER RIDGE DR
BLUFF LA
CLAIRMONT RD
VALLEY DR
MONREO DR
DEL RIO DR
CHISHOLM TR

# SI 492 - UNIT 2


CREST RD
CREST CL
HIGH CREEK RD
ROUND TOP RD
HIGH CREEK PL
HIGH CREEK RD
VALLEY DR
VALLEY DR

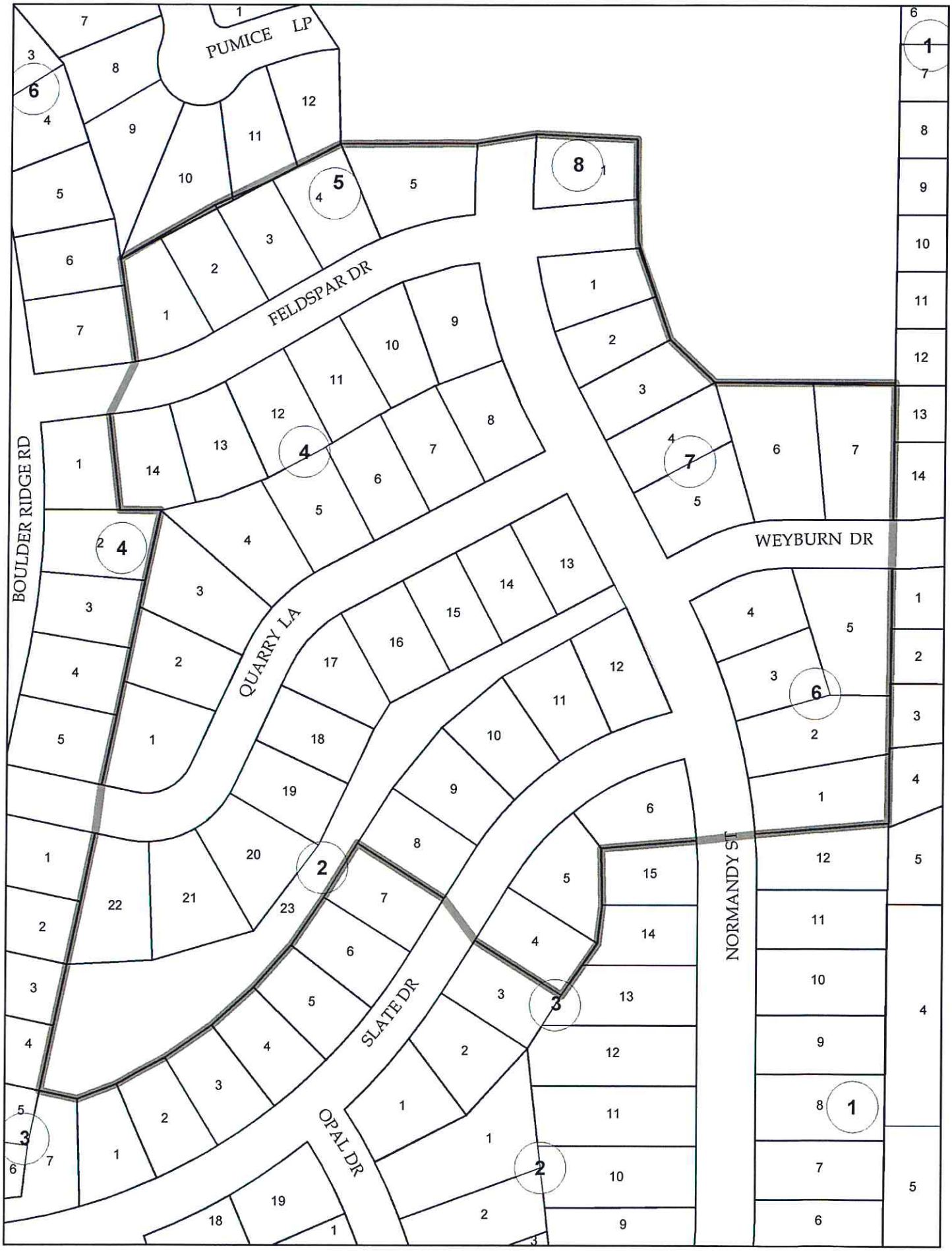
# SI 492 - UNIT 3


W LASALLE DR
LA PAZ AV
DURANGO DR
DRIFTWOOD LA
CHERRYBROOK DR
DURANGO DR
MEDORA AV
N WASHINGTON ST

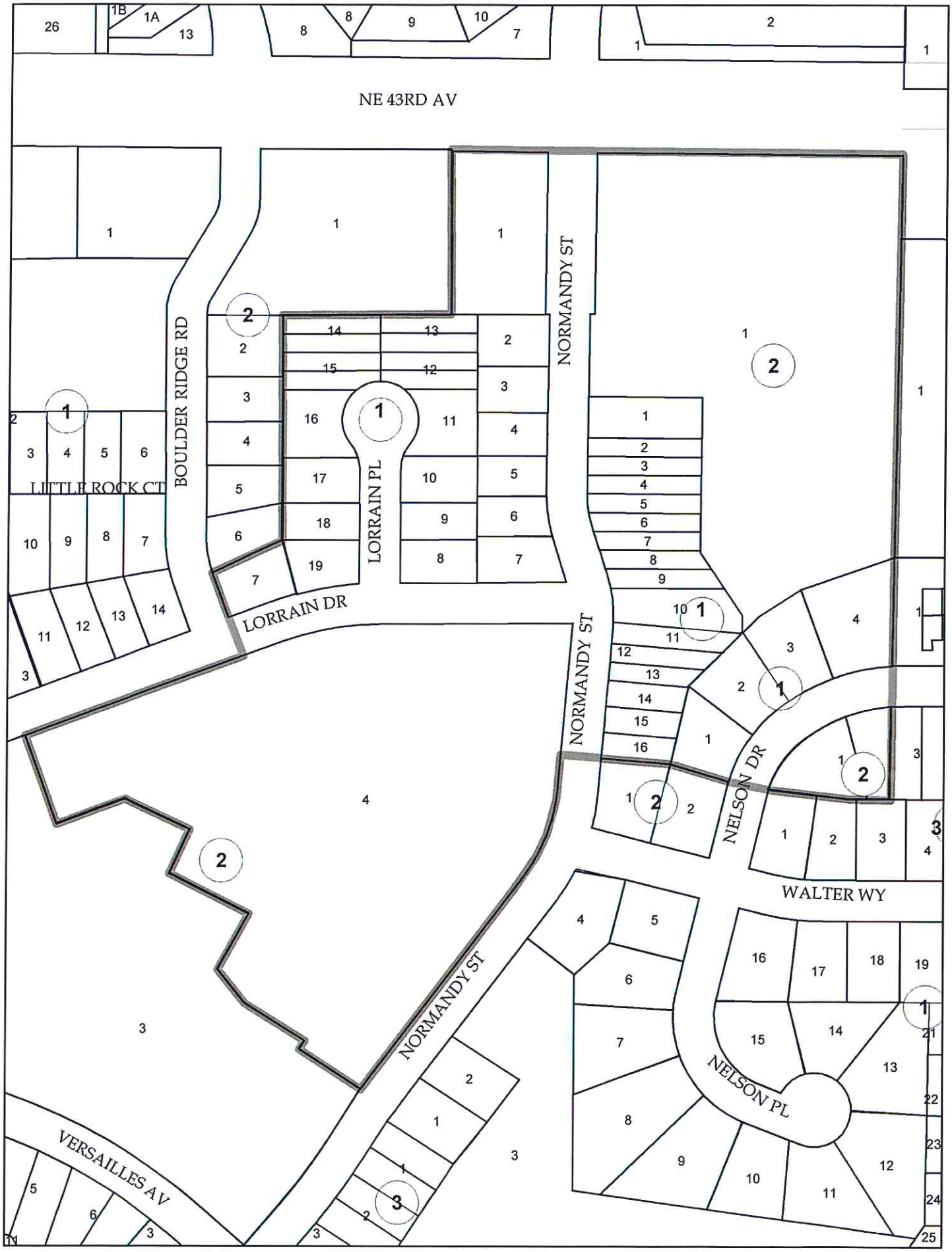
# SI 492 - UNIT 4


1
2
3
4
5
1
1
2
DURANGO DR
1
1
2
1
N WASHINGTON ST
4
5
10
6
7
8
9
13
DURANGO DR
SLATE DR
1
NORTHERN SKY DR
2
1
1
17
25
24
23
2
2
27

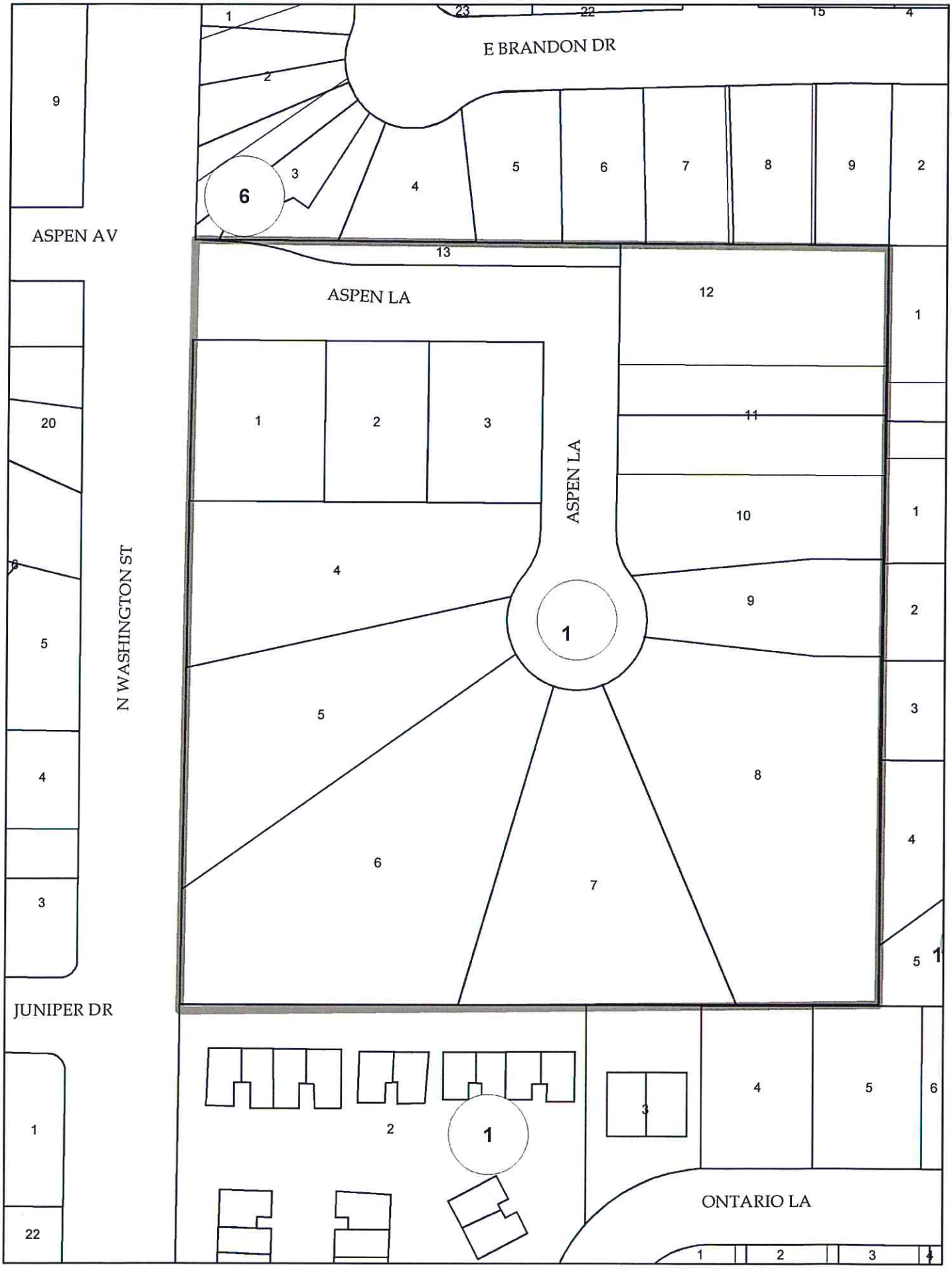
# SI 492 - UNIT 5


PUMICE LP
FELDSPAR DR
BOULDER RIDGE RD
QUARRY LA
WEYBURN DR
NORMANDY ST
SLATE DR
OPAL DR

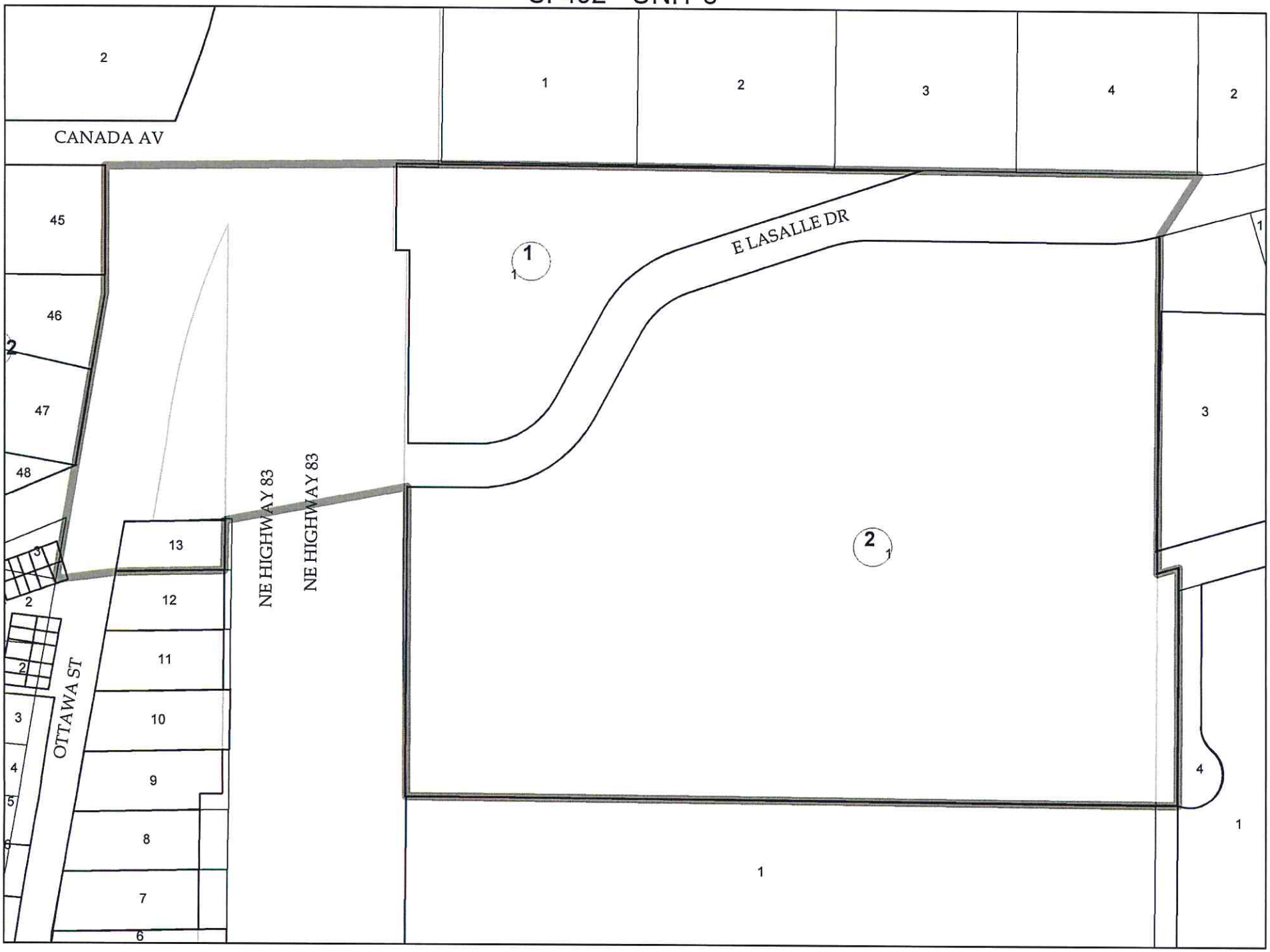
# SI 492 - UNIT 6


NE 43RD AV
BOULDER RIDGE RD
LITTLE ROCK CT
LORRAIN PL
LORRAIN DR
NORMANDY ST
NORMANDY ST
NELSON DR
WALTER WY
NELSON PL
VERSAILLES AV

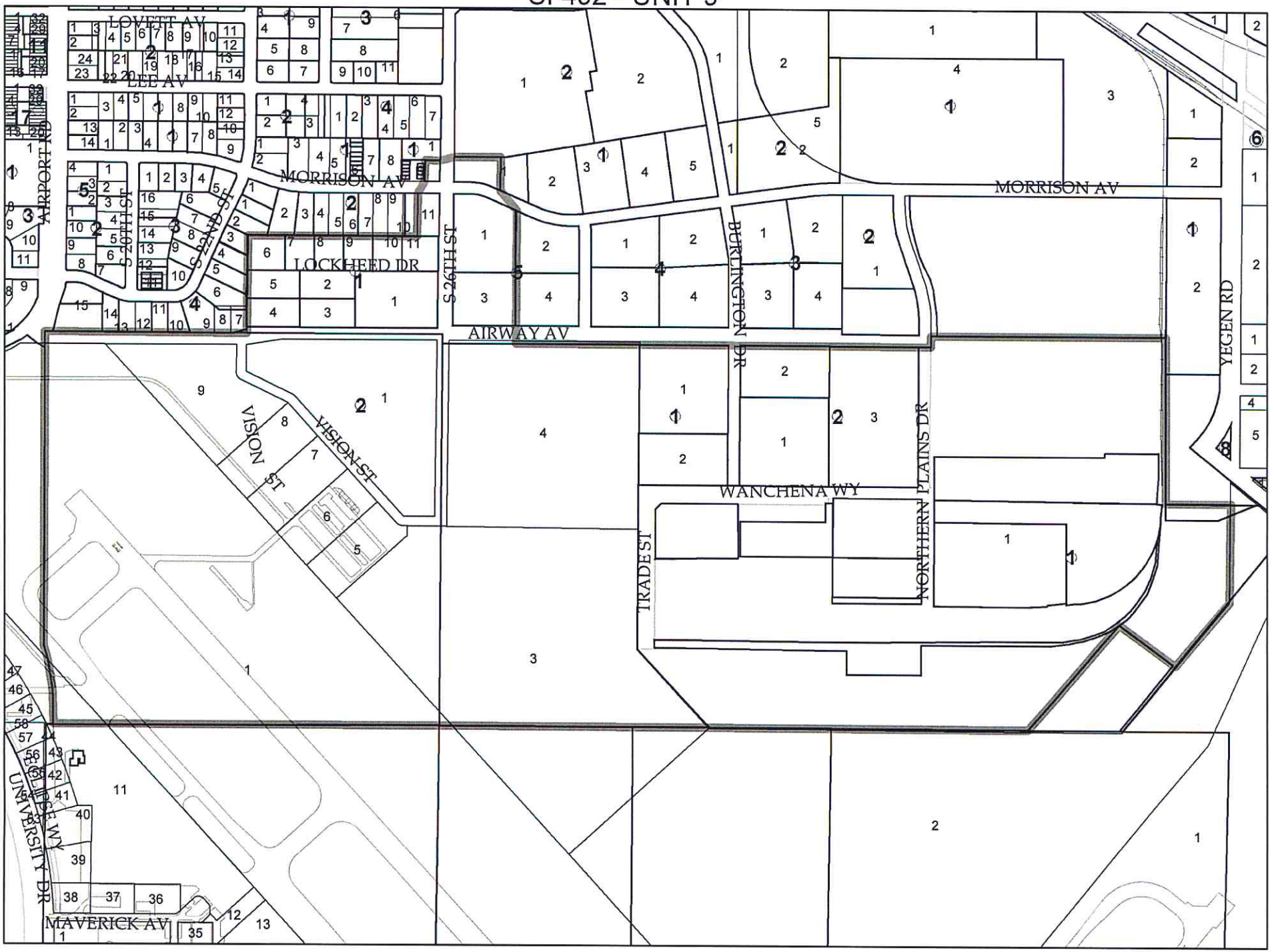
# SI 492 - UNIT 7


E BRANDON DR
ASPEN AV
ASPEN LA
ASPEN LA
N WASHINGTON ST
JUNIPER DR
ONTARIO LA

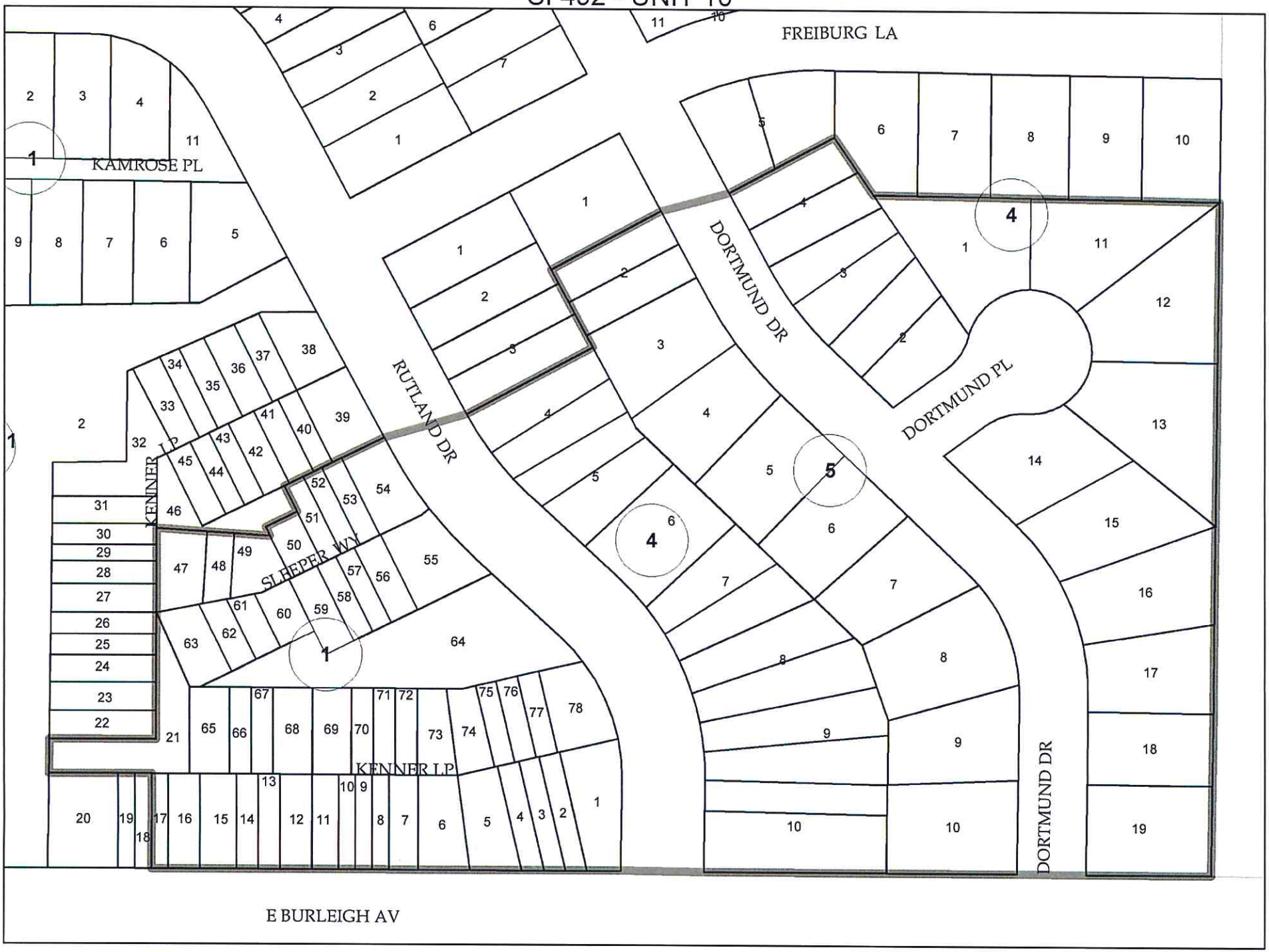
# SI 492 - UNIT 8


CANADA AV
E LASALLE DR
NE HIGHWAY 83
NE HIGHWAY 83
OTTAWA ST
1
2
3
4
45
46
47
48
13
12
11
10
9
8
7
6
5

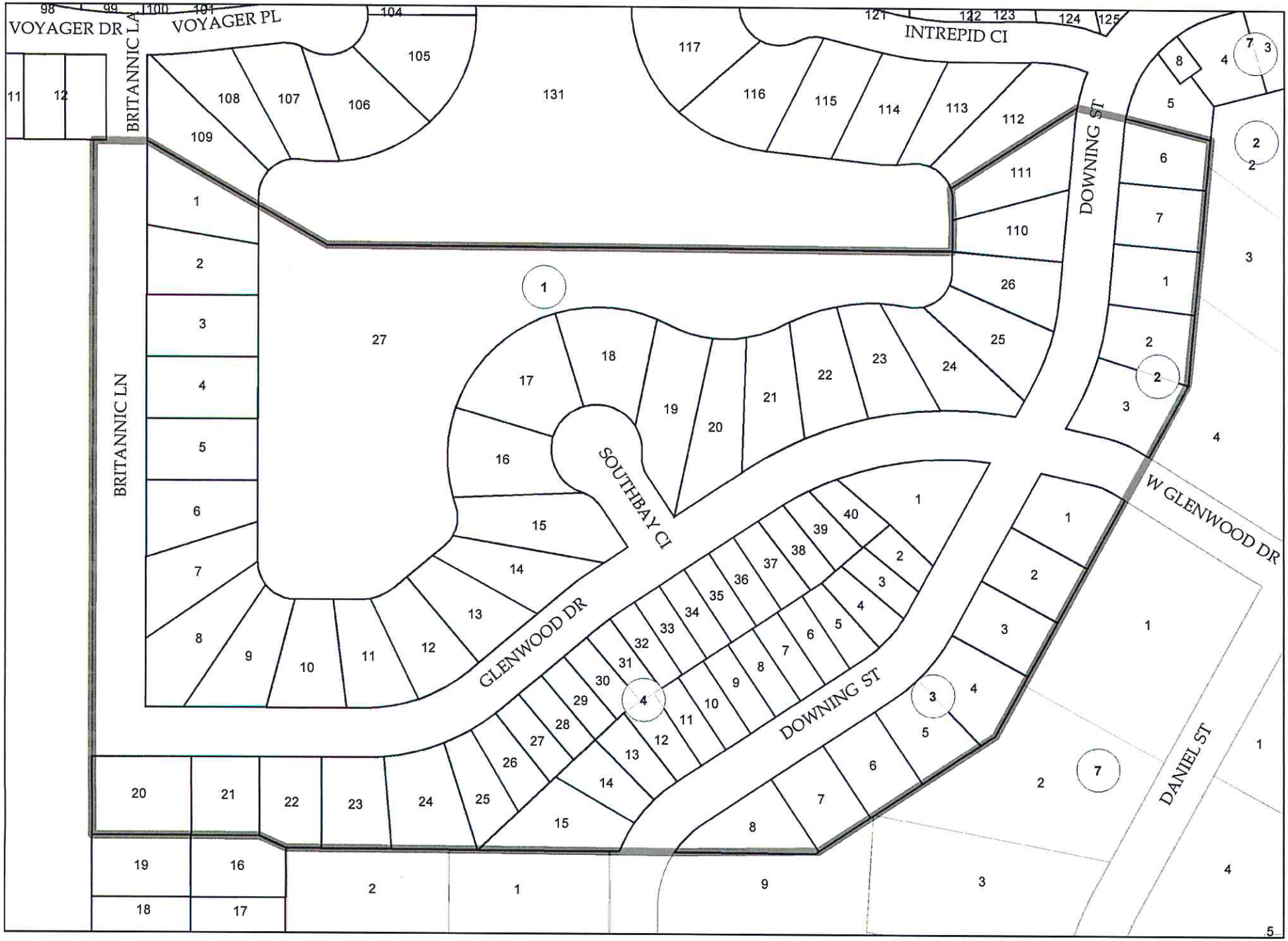
# SI 492 - UNIT 9


LOVETT AV
LEE AV
MORRISON AV
LOCKHEED DR
AIRWAY AV
MORRISON AV
AIRPORT RD
15TH ST S
15TH CT S
15TH PL S
15TH ST S
BURLINGTON DR
YEGEN RD
VISION ST
VISION ST
WANCHENA WY
TRADE ST
NORTHERN PLAINS DR
UNIVERSITY DR
COLLEGE WY
MAVERICK AV

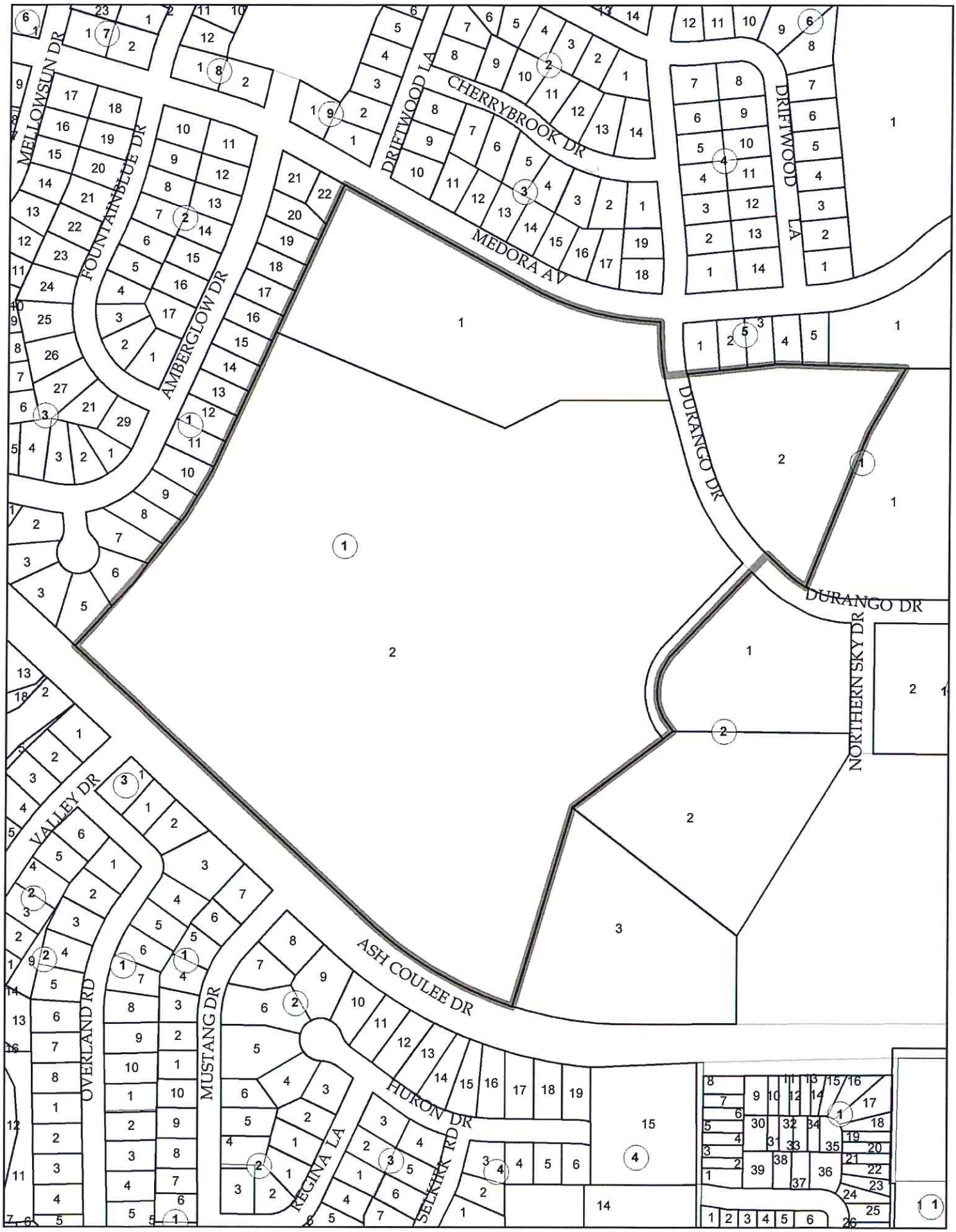
# SI 492 - UNIT 10



# SI496 - UNIT 1


VOYAGER DR
VOYAGER PL
BRITANNIC LA
INTREPID CI
DOWNING ST
BRITANNIC LN
SOUTHBAY CI
GLENWOOD DR
W GLENWOOD DR
DANIEL ST

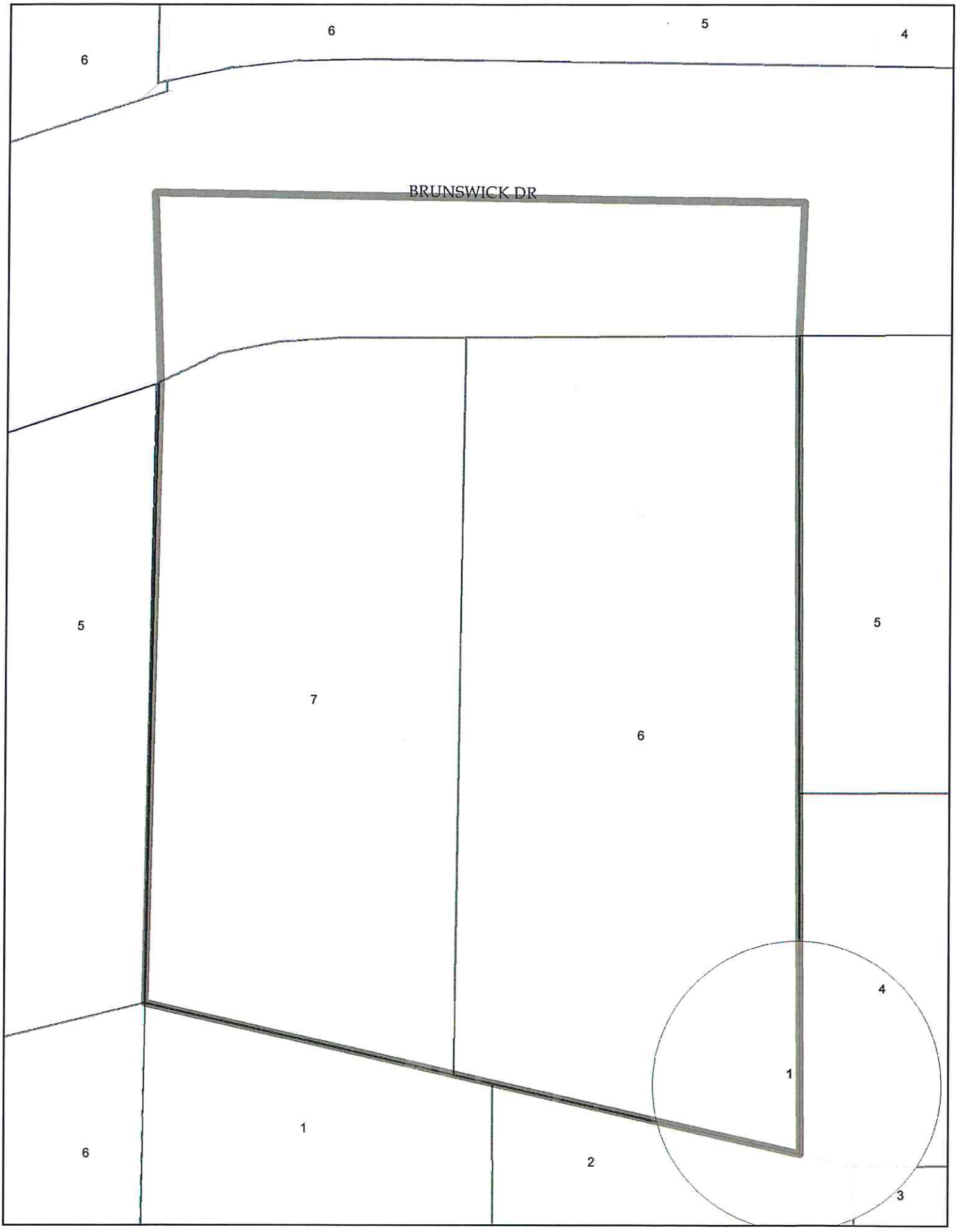
# SI496 - UNIT 2


MELLOWSUN DR
FOUNTAINBLUE DR
AMBERGLOW DR
CHERRYBROOK DR
DRIFTWOOD LA
MEDORA AV
DURANGO DR
NORTHERN SKY DR
VALLEY DR
OVERLAND RD
MUSTANG DR
ASH COULEE DR
HURON DR
REGINA LA
SELKIRK RD

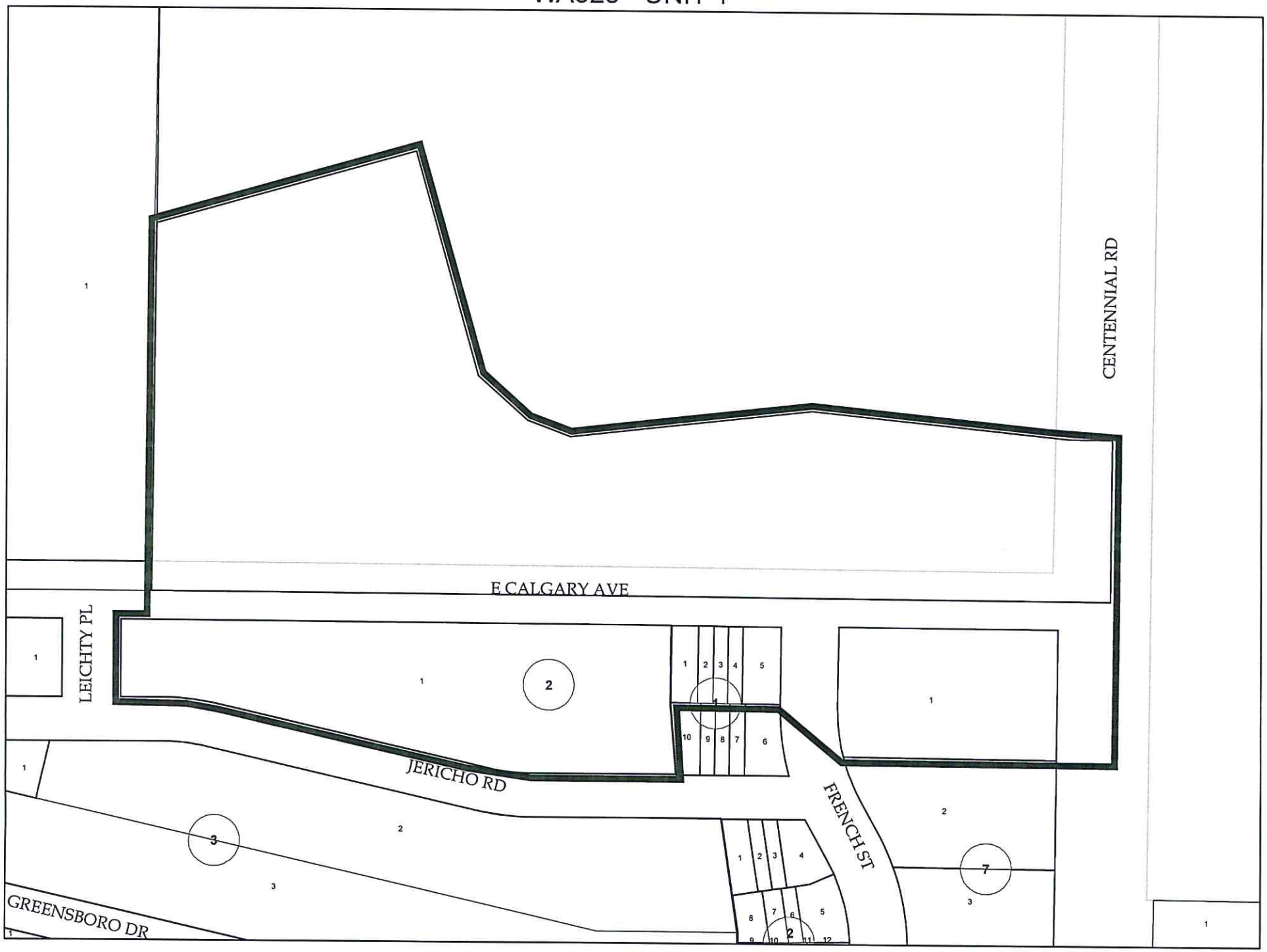
# SI498 - UNIT 1


W BURLEIGH AV
E BURLEIGH AV
NAUTILUS DR
MERIDIAN DR
NINA LN
STACY DR
LEIGHTON DR
S WASHINGTON ST
DOWNING ST
DANIEL ST
ASHLEE AV

# SI498 - UNIT 2



# WA328 - UNIT 1


CENTENNIAL RD
E CALGARY AVE
LEICHTY PL
JERICHO RD
FRENCH ST
GREENSBORO DR

# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** **September 20, 2016**

**FROM:** **Jeff Heintz, Director of Service Operations**

**ITEM:** **Request reallocation of funds to replace carpet in City/County building**

## REQUEST

Request commission approval to use a portion of the funds identified for the City/County building entry way repair to replace carpeting in the hallway on first floor.

## BACKGROUND INFORMATION

The front entryway on the west side of the City/County building is scheduled to have the slate tile either removed or coated to reduce the slippery surface during winter months. This was approved by the commission during the 2016 budget process as a One Time Expenditure of $5,000.

## RECOMMENDED CITY COMMISSION ACTION

Request reallocation of funds to cover the purchase and installation of carpet in the hallway on 1st Floor in the North hallway, and use the remaining funds to correct the slippery tile at the entrance on the west side of the building.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov

# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** **September 19, 2016**

**FROM:** **Jeff Heintz, Director of Service Operations**

**ITEM:** **Engineering Contract with Houston Engineering, Inc. for a Suitable Plant Growth Material Survey and Report for the Solid Waste Division**

## REQUEST

Please place on the September 27, 2016, Board of City Commission meeting consent agenda approval of contract with Houston Engineering, Inc. for a Suitable Plant Growth Material Survey and Report.

## BACKGROUND INFORMATION

The North Dakota Department of Health (NDDH) issued the City of Bismarck's Permit Number 0017 to construct and operate a solid waste facility. As part of the approved permit report, a pre-permit application was included for a new MSW landfill. For the design and permitting requirements the NDDH requires that the suitable plant growth material (SPGM) be quantified for the proposed landfill location by a qualified soil scientist.

The project consists of evaluating the proposed MSW landfill site for SPGM for final cover at the Bismarck Municipal Waste Facility. The project will adhere to North Dakota Department of Health (NDDH) Guideline #26 – Soil Surveys and Management of Suitable Plant Growth Material (SPGM) and Plant Rooting Soil for North Dakota Solid Waste Disposal Facilities (see NDDH web site for details). This will include, but not be limited to:

- Submission of an evaluation work plan to the ND State Department of Health prior to initiation of project (as outlined in Guideline #26);
- In-situ examination and sampling of site topsoil material;

- Laboratory analyses will include electrical conductivity of the saturated paste extract (ECsat), pH, sodium absorption ratio (SAR), and Organic Matter (OM);

- Evaluation of laboratory analyses;

- Preparation of a report that includes evaluation and summary of topsoil properties, recommendation for amendments to material, and recommendation of material as SPGM.

Registered Professional Soil Classifiers will conduct/supervise all field activities and testing. A state certified laboratory (Agvise, Northwood, ND) will be utilized for all analyses. Location of sample sites will be recorded via GPS equipment. Houston Engineering Inc. and sub-consultant, Prairie Soil Consulting, will provide an electronic copy of the report at the completion of the project, unless otherwise specified (i.e. hard copy, FAX).

## RECOMMENDED CITY COMMISSION ACTION

Approve the contract with Houston Engineering, Inc.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov

TASK ORDER AGREEMENT TO
**BISMARCK SOLID WASTE OPERATIONS ENGINEERING SERVICES AGREEMENT**

This is Task Order No. **07**, consisting of **5** pages.

**Task Order**

In accordance with Paragraph 1.01 of the Agreement between Owner and Engineer for Professional Services – Task Order Edition, dated **22 July 2014** ("Agreement"), Owner and Engineer agree as follows:

1. Specific Project Data

   A. Title: **SPGM Survey and Report**

   B. Description: **The North Dakota Department of Health (NDDH) issued the City of Bismarck's Permit Number 0017 to construct and operate a solid waste facility. As part of the approved permit report, a pre-permit application was included for a new MSW landfill. For the design and permitting requirements the NDDH requires that the suitable plant growth material (SPGM) be quantified for the proposed landfill location by a qualified soil scientist.**

   C. Number of Construction Contracts

   The Specific Project is anticipated to be constructed under **0** Construction Contracts.

2. Services of Engineer

   ☒ Study and Report Services

   **The project consists of evaluating the proposed MSW landfill site for SPGM for final cover at the Bismarck Municipal Waste Facility. The project will adhere to North Dakota Department of Health (NDDH) Guideline #26 – Soil Surveys and Management of Suitable Plant Growth Material (SPGM) and Plant Rooting Soil for North Dakota Solid Waste Disposal Facilities (see NDDH web site for details). This will include, but not be limited to:**

   - **Submission of an evaluation work plan to the ND State Department of Health prior to initiation of project (as outlined in Guideline #26);**
   - **In-situ examination and sampling of site topsoil material;**
   - **Laboratory analyses will include electrical conductivity of the saturated paste extract (ECsat), pH, sodium absorption ratio (SAR), and Organic Matter (OM);**
   - **Evaluation of laboratory analyses;**
   - **Preparation of a report that includes evaluation and summary of topsoil properties, recommendation for amendments to material, and recommendation of material as SPGM.**

   **Registered Professional Soil Classifiers will conduct/supervise all field activities and testing. A state certified laboratory (Agvise, Northwood, ND) will be utilized for all analyses. Location of sample sites will be recorded via GPS equipment. Houston**

**Engineering Inc. and sub-consultant, Prairie Soil Consulting, will provide an electronic copy of the report at the completion of the project, unless otherwise specified (i.e. hard copy, FAX).**

☒ Other Services

**As directed during coordination meetings with the City of Bismarck and NDDH.**

☒ Additional Services Requiring an Amendment to Task Order

Part 6 of Exhibit A is incorporated by reference unless otherwise noted.

3. Owner's Responsibilities

Owner shall have those responsibilities set forth in Article 2 and in Exhibit B.

4. Times for Rendering Services

| Phase | Completion Date |
|---|---|

**The SPGM Survey and report will be complete by 12/15/16.**

5. Payments to Engineer

A. Owner shall pay Engineer for services rendered as follows:

**By Standard Hourly rates set forth in Article 2 and described as Method B in Exhibit C of the Agreement.**

**The total estimated fee for services is $12,000.00. This cost estimate includes subcontractor costs for Prairie Soils Consulting to perform the sampling and analysis. The Engineer services will be based on the cumulative hours charged during the billing period plus Reimbursable Expenses and Engineer's Consultant's charges. The total estimated fee will not be exceeded without prior written authorization of the Owner.**

B. The terms of payment are set forth in Article 4 of the Agreement and in Exhibit C.

6. Consultants: **An approved subcontractor under the agreement is Prairie Soils Consulting, LLC, 613 Remington Ave, Bismarck, ND 58503.**

7. Other Modifications to Agreement:

**None**

8. Attachments:

9. Documents Incorporated By Reference:

**Bismarck Solid Waste Operations Engineering Services Agreement**

10. Terms and Conditions: Execution of this Task Order by Owner and Engineer shall make it subject to the terms and conditions of the Agreement (as modified above), which Agreement is incorporated by this reference. Engineer is authorized to begin performance upon its receipt of a copy of this Task Order signed by Owner.

The Effective Date of this Task Order is **13 September 2016**.

| OWNER: City of Bismarck | ENGINEER: Houston Engineering Inc. |
|---|---|
| By: | By: |
| Name: Mike Seminary | Name: Kevin Martin, PE |
| Title: Mayor | Title: Principal/Senior Project Manager |
| | Engineer License or Firm's Certificate No. 015C |
| | State of: North Dakota |
| Date Signed: | Date Signed: |
| Attest: | Attest: |
| Name: Keith Hunke | Name: Sherwin Wanner, PE |
| Title: City Administrator | Title: Bismarck Office Manager<br>Project Manager |
| Address for giving notices: | Address for giving notices: |
| Bismarck Department of Public Works<br>PO Box 5503<br>601 S. 26th Street<br>Bismarck, ND 58506-5503 | Houston Engineering Inc.<br>3712 Lockport St.<br>Bismarck, ND 58503 |

DESIGNATED REPRESENTATIVE
(Paragraph 8.03.A):

Jeff Heintz

Title: Director of Service Operations

Phone Number: 701-355-1705

Facsimile Number: 701-221-6840

E-Mail
Address: jheintz@nd.gov

DESIGNATED REPRESENTATIVE
(Paragraph 8.03.A):

Sherwin Wanner, PE

Title: Project Manager

Phone Number: 701-323-0200

Facsimile Number: 701-323-0300

E-Mail
Address: swanner@houstoneng.com

Bismarck

# EVENT CENTER

**DATE:** September 23, 2016

**FROM:** Charlie Jeske, Director

**ITEM:** Sealants at the Belle Mehus

## REQUEST

Please place on the September 27 Commission agenda the request to recaulk various areas around the Belle Mehus with sealants.

## BACKGROUND INFORMATION

Quotes were requested from three (3) companies. One decided not to give a quote and the other two are as follows:

Dakota Caulking total $11,985.

Midwest Caulking total $17,060.

The one time budgeted amount for 2016 is $22,000.

## RECOMMENDED CITY COMMISSION ACTION

Award the quote received from Dakota Caulking for $11,985.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting so please contact me at 355-1370 or cjeske@bismarcknd.gov if you have any questions or require additional information prior to the meeting.

**City of Bimarck**
Bismarck Event Center

315 South 5th Street
Bismarck, North Dakota 58504
(701) 355-1370 FAX (701) 222-6599

# QUOTE TABULATION SHEET

**Project:** Sealants at the Belle Mehus **Project Manager:** Anthony Rohrich

**Place:** Bismarck Event Center **Date:** 9/23/2016 **Time:**

| FIRM | | TOTAL |
|---|---|---|
| Dakota Caulking | | **$11,985.00** |
| Midwest Caulking | | **$17,060.00** |
| | | |
| | | |

Bismarck

# EVENT CENTER

**DATE:** September 23, 2016

**FROM:** Charlie Jeske, Director

**ITEM:** Sealants/repair work on sidewalks around the Event Center

## REQUEST

Please place on the September 27 Commission agenda the request for sidewalk sealant/repairs around the Event Center.

## BACKGROUND INFORMATION

Quotes were requested from companies to do sidewalk sealant/repairs around the Event Center and they are as follows:

Sidewalk repairs

| | |
|---|---|
| West Dakota Mudjacking | $2,641.50 |
| RoughRider Mudjacking | $3,500.00 |

Sealant Repairs

| | |
|---|---|
| Dakota Caulking | $ 11,900.00 |
| Midwest Caulking | $ 17,000.00 |
| Leier Caulking | did not bid |

The one time budgeted amount for 2016 is $20,000.

## RECOMMENDED CITY COMMISSION ACTION

Award the quote received from Dakota Caulking for $11,900.

Award the quote received from West Dakota Mudjacking for $2,641.50.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting so please contact me at 355-1370 or cjeske@bismarcknd.gov if you have any questions or require additional information prior to the meeting.

**City of Bimarck**
Bismarck Event Center

315 South 5th Street
Bismarck, North Dakota 58504
(701) 355-1370 FAX (701) 222-6599

# QUOTE TABULATION SHEET

**Project:** Mudjacking for sidewalks around the Event Center **Project Manager:** Anthony Rohrich

**Place:** Bismarck Event Center **Date:** 9/23/2016 **Time:**

| FIRM | | TOTAL |
|---|---|---|
| West Dakota Mudjacking | | **$2,641.50** |
| RoughRider Mudjacking | | **$3,500.00** |
| | | |
| | | |

**City of Bimarck**
Bismarck Event Center

315 South 5th Street
Bismarck, North Dakota 58504
(701) 355-1370 FAX (701) 222-6599

# QUOTE TABULATION SHEET

**Project:** Sealants for sidewalks around the Event Center **Project Manager:** Anthony Rohrich

**Place:** Bismarck Event Center **Date:** 9/23/2016 **Time:**

| FIRM | | TOTAL |
|---|---|---|
| Dakota Caulking | | **$11,900.00** |
| Midwest Caulking | | **$17,000.00** |
| Leier Caulking | | **no quote** |
| | | |

# PUBLIC WORKS UTILITY OPERATIONS

**DATE:** **September 27, 2016**

**FROM:** **Michelle Klose, Director of Utility Operations**

**ITEM:** **Change Order G-6 West End Reservoir Expansion Project**

## REQUEST

Approve Contract Change Order G-6 with PKG Contracting, Inc. on the Bismarck West End Reservoir Expansion Project.

## BACKGROUND INFORMATION

Prior contract date was June 15, 2016. This change order extends the contract timeline to September 30, 2016, in order to pay the final project payment. Final Inspection and Acceptance is also attached for signature.

## RECOMMENDED CITY COMMISSION ACTION

Approve change order G-6 with PKG Contracting, Inc.

## STAFF CONTACT INFORMATION

**Contact:** Terry Halstengard, 355-1700

# CONTRACT CHANGE ORDER FORM

## DEPARTMENT

Contract between the City of Bismarck and **PKG Contracting, Inc.**

Contract Number: **2013-33** Change Order Number: **G-6**

Project/Subproject: **WTRUTIL.WESTENDRES.DESIGNCONST**

Original Contract Amt: **$6,646,900**

Project Description: Bismarck West End Reservoir Expansion- General Construction

Previous Contract Amount: **$6,819,192** Change Order Amount: **$0**

Original Contract Date: **June 15, 2016** Change in Contract Timeline: **Sept. 30, 2016**

Within Project Scope: ___Y / N*___ Within Project Funding: ___Y / N**___

**If not within project scope, attach description of change in scope for Board approval.*

***If not within project funding, attach revised Project Budget for Board approval.*

Type of Change Order

_____ Non Design-related Change Order: These change orders include unforeseen conditions, code-related issues, and building inspector changes.

___x___ Design-related Change Order: These change orders include unforeseen conditions that affect the appearance, layout, functionality, dimensions, and/or quality of the project.

_____ Emergency Field Condition Change Orders: These change orders include any condition that causes an emergency situation where safety or other immediate losses may occur.

_____ Other: (describe) _____

Project Manager Signature: (<$15,000) Michelle Klose 9/22/16
Date

Department Head Signature:(<$25,000) _____
Date

## ADMINISTRATION

City Administrator Signature: (<$50,000) _____
Date

Add to Commission Consent Agenda

## COMMISSION APPROVAL

Commission Approval Date:_____

Attach minutes for Commission Approval

## FISCAL

Comments: _____
Signature Date Completed

**TO ALL DEPARTMENTS:** Please attach a copy of the change order

# Change Order
## No. G-6

Date of Issuance: September 8, 2016 | Effective Date: September 8, 2016

| | | |
|---|---|---|
| Project: *Bismarck West End Reservoir Expansion* | Owner: *City of Bismarck, N.D.* | Owner's Contract No.: |
| Contract: *General Construction* | | Date of Contract: May 14, 2013 |
| Contractor: *PKG Contracting, Inc.* | | Engineer's Project No.: *P00501-2007-004 060* |

**The Contract Documents are modified as follows upon execution of this Change Order:**

**Description of Change:** Provide labor, equipment, and materials for the following:

| Item | Description | Cost Adjustment |
|---|---|---|
| 1 | *Final completion time adjustment to verify landscape items and address punch list items. All items to be completed by September 15, 2016.* | *NA* |

Total Net Change ***$0.00***

Attachments: None.

**CHANGE IN CONTRACT PRICE:**

Original Contract Price:

$ *$6,646,900.00*

Increase from previously approved Change Orders No. G-1 to No. G-5:

$ *$172,292.00*

Contract with increase from previously approved Change Orders

$ *$6,819,192.00*

Increase of this Change Order:

$ *$0.00*

Contract Price incorporating this Change Order:

$ *$6,819,192.00*

**CHANGE IN CONTRACT TIMES:**

Original Contract Times: ☐ Working days ☐ Calendar days

Substantial completion (days or date): September 30, 2014

Ready for final payment (days or date): October 15, 2014

Increase from previously approved Change Orders No. G-1 to No. G-5:

Substantial completion (days): 31

Ready for final payment (days): 609

Contract Times prior to this Change Order:

Substantial completion (days or date): October 31, 2014

Ready for final payment (days or date): June 15, 2016

Increase Time of this Change Order:

Substantial completion (days or date): 0

Ready for final payment (days or date): 107

Contract Times with all approved Change Orders:

Substantial completion (days or date): October 31, 2014

Ready for final payment (days or date): September 30, 2016

| RECOMMENDED: | ACCEPTED: | ACCEPTED: |
|---|---|---|
| By: | By: | By: |
| Engineer (Authorized Signature) | Owner (Authorized Signature) | Contractor (Authorized Signature) |
| Date: 9/9/16 | Date: | Date: 9-14-16 |

Approved by Funding Agency (if applicable): Date:

1st page of Ordinance 6233 revised 9/13/16

Bismarck

# FINANCE DEPARTMENT

**DATE:** August 29, 2016

**FROM:** Sheila Hillman

**ITEM:** Introduction of 2017 Budget Ordinance

## REQUEST

Consider introduction of the 2017 budget ordinance and call for a public hearing.

Please place this item on the September 13, 2016 City Commission meeting.

## BACKGROUND INFORMATION

Attached is the 2017 budget ordinance for the general fund, special funds, debt service funds and mill levies that reflects the Commission's actions on the budget agenda items of the August 15 special meeting. You will receive the 2017 Proposed Budget book under separate cover. An executive summary of the budget actions and the details of the budget revenue and expenditures for all funds are included in the budget book. Also included are the fees, charges and utility rates and the Capital Improvement Program for 2017.

The Commission may approve changes to the budget ordinance at this meeting and those changes would be reflected in the ordinance presented at the public hearing. The Commission may also approve changes for the fees, charges and utility rates or the Capital Improvement Program although these changes do not impact the budget ordinance.

I will be available at the Commission meeting to answer questions or provide additional information.

## RECOMMENDED CITY COMMISSION ACTION

Commission action is to consider introduction of the 2017 budget ordinance and call for a public hearing on September 27, 2016.

## STAFF CONTACT INFORMATION

Sheila Hillman: shillman@bismarcknd.gov or 355-1600

Attachment

Page 1 revised 9/13/16

# ORDINANCE NO. 6233

*First Reading* _____
*Second Reading* _____
*Final Passage and Adoption* _____
*Publication Date* _____

AN ORDINANCE MAKING THE ANNUAL APPROPRIATIONS FOR EXPENDITURES OF THE CITY OF BISMARCK, NORTH DAKOTA FOR THE FISCAL YEAR COMMENCING JANUARY 1, 2017 AND ENDING DECEMBER 31, 2017 AND MAKING THE ANNUAL TAX LEVY FOR THE YEAR 2016.

BE IT ORDAINED BY THE BOARD OF CITY COMMISSIONERS OF THE CITY OF BISMARCK, NORTH DAKOTA:

Section 1. There are hereby appropriated the following sums of money for so much thereof that may be necessary for the purpose of paying expenses of the City of Bismarck, North Dakota for the fiscal year commencing January 1, 2017 and ending December 31, 2017.

| | Personal Services | Maintenance & Operations | Capital Outlays | Transfers | Total |
|---|---|---|---|---|---|
| **Budgeted Funds:** | | | | | |
| General Fund | | | | | |
| Administration | 594,814 | 231,167 | - | - | 825,981 |
| Salary & Benefits Adjustment | 732,289 | 38,134 | - | - | 770,423 |
| Building Maintenance | 280,682 | 450,291 | - | - | 730,973 |
| Building Construction | - | - | - | 467,000 | 467,000 |
| Dakota Media Access | - | 380,934 | - | - | 380,934 |
| Contingencies | - | - | - | 825,000 | 825,000 |
| Attorney | 507,285 | 19,655 | - | - | 526,940 |
| Combined Communications | 1,951,728 | 742,382 | - | - | 2,694,110 |
| City Emergency Management | 89,531 | 13,778 | - | - | 103,309 |
| Engineering | 2,320,472 | 123,220 | - | - | 2,443,692 |
| Finance | 2,917,144 | 629,663 | - | - | 3,546,807 |
| | | ~~485,473~~ | | | ~~7,766,581~~ |
| Fire Department | 7,281,108 | 526,473 | - | - | 7,807,581 |
| Human Resources | 463,427 | 19,333 | - | - | 482,760 |
| Employee Training | 18,140 | 39,620 | - | - | 57,760 |
| Municipal Court | 414,303 | 102,568 | - | - | 516,871 |
| Community Development | 1,487,974 | 148,971 | - | - | 1,636,945 |
| Metropolitan Planning Org | 223,907 | 597,672 | - | - | 821,579 |
| Police | 11,316,477 | 1,209,738 | 32,209 | - | 12,558,424 |
| Public Health | 1,991,899 | 300,738 | - | - | 2,292,637 |

| | Personal Services | Maintenance & Operations | Capital Outlays | Transfers | Total |
|---|---|---|---|---|---|
| One-time Operations | 395,653 | 1,332,864 | 1,117,176 | 147,000 | 2,992,693 |
| Equipment Reserve | | 104,900 | 23,000 | 9,855 | 137,755 |
| Nondepartmental | 1,058,228 | 257,276 | - | 1,710,114 | 3,025,618 |
| **General Fund Total** | 34,045,061 | 7,269,377 | 1,172,385 | 3,158,969 | 45,645,792 |
| | | | | | |
| Special Revenue Funds | | | | | |
| E&H Transit System | - | 3,346,433 | - | - | 3,346,433 |
| Bismarck Public Library | 1,820,536 | 893,445 | 34,100 | 62,581 | 2,810,662 |
| Police Drug Enforcement | 9,375 | 61,767 | 24,999 | - | 96,141 |
| Roads & Streets | 3,453,739 | 2,984,641 | 74,500 | 139,339 | 6,652,219 |
| Street Lights & Traffic Signal | 704,406 | 1,402,195 | 210,000 | 388,160 | 2,704,761 |
| Hotel & Motel Tax | - | 850,100 | - | 149,900 | 1,000,000 |
| Lodging Liquor & Food Tax | - | 24,100 | - | 2,208,378 | 2,232,478 |
| Sales Tax | - | 400 | - | 19,403,363 | 19,403,763 |
| Vision Fund | 114,914 | 2,412,843 | - | - | 2,527,757 |
| Special Deficiency & Assumption | - | 259,000 | 150,000 | 1,006,794 | 1,415,794 |
| Gov't Grants & Activities | 1,024,254 | 4,080,402 | 307,900 | 35,600 | 5,448,156 |
| **Special Revenue Funds Total** | 7,127,224 | 16,315,326 | 801,499 | 23,394,115 | 47,638,164 |
| | | | | | |
| Debt Service Funds | | | | | |
| Sewermain Bonds | - | 7,025,060 | - | 500,000 | 7,525,060 |
| Watermain Bonds | - | 739,748 | - | 250,000 | 989,748 |
| Sidewalk Bonds | - | 1,637,450 | - | 50,000 | 1,687,450 |
| Street Improvement Bonds | - | 21,968,827 | - | 1,000,000 | 22,968,827 |
| **Debt Service Funds Total** | **-** | 31,371,085 | - | 1,800,000 | 33,171,085 |
| | | | | | |
| **Total Budgeted Funds** | **41,172,285** | **54,955,788** | **1,973,884** | **28,353,084** | **126,455,041** |

Section 2. There are hereby levied the following sums of money on all taxable property in the City of Bismarck for the year 2016 for the purpose of paying expenses of the City of Bismarck.

| EXPENSE | AMOUNT |
|---|---|
| General Fund | 14,747,732 |
| Building Construction | 1,518,718 |
| Special Deficiency | 703,110 |
| E/H Transit System | 1,054,665 |
| Library | 1,986,286 |
| **TOTAL** | **20,010,511** |

Section 3. Repeal. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed.

Section 4. Taking Effect. This ordinance shall be in full force and effect from and after its final passage and adoption.

CITY OF BISMARCK
APPLICATION FOR RETAIL
ALCOHOLIC BEVERAGE LICENSE
(PARTNERSHIP OR CORPORATION)

LIQ2016-00119
8-2-16

License AA-00262
Class D

___ New License Application
___ Renewal
X Transfer
___ Relocation

NOTE: This application must be made under oath and be accompanied by required fees.

CHECK ONE: X Liquor and Beer
___ Beer
___ Wine (Restaurants)

CHECK ONE: ___ On-Sale Only
___ Off-Sale Only
X On and Off Sale

The undersigned states that the following information is true and correct.

**NAME OF PARTNERSHIP OR CORPORATION** Tonka Group Inc.
DATE OF INCORPORATION August 2016 PHONE [redacted]
ADDRESS [redacted] CITY, STATE, ZIP Bismarck, ND 58503
IF OUT OF STATE CORPORATION, IS CORPORATION REGISTERED IN NORTH DAKOTA? —
**NAME AND ADDRESS OF REGISTERED AGENT** Patrick Koski
[redacted] Bismarck, ND 58503
CERTIFICATE NUMBER _____ PHONE [redacted]
**NAME OF BUSINESS FOR WHICH LICENSE IS REQUESTED** The Elbow Room
BUSINESS ADDRESS 115 S. 5th ST. CITY, STATE, ZIP Bismarck, ND 58501
MAILING ADDRESS [redacted] CITY, STATE ZIP Bismarck, ND 58503
PRIMARY CONTACT Patrick Koski PHONE [redacted]
EMAIL [redacted]

LIST ALL OFFICERS OR DIRECTOR OF CORPORATION OR PARTNERS, AND % OF OWNERSHIP (Attach separate sheet, if necessary)

**NAME** Patrick Koski ADDRESS/CITY/STATE [redacted]
DATE OF BIRTH [redacted] M/F M RACE W DRIVER'S LICENSE # AND STATE ISSUED [redacted] (ND)
OCCUPATION Realtor TITLE Owner %OWNERSHIP 50%

**NAME** Jason Frank ADDRESS/CITY/STATE [redacted]
DATE OF BIRTH [redacted] M/F M RACE W DRIVER'S LICENSE # AND STATE ISSUED [redacted]
OCCUPATION Builder/Contractor TITLE Owner %OWNERSHIP 50%

**NAME** _____ ADDRESS/CITY/STATE _____
DATE OF BIRTH _____ M/F ___ RACE ___ DRIVER'S LICENSE # AND STATE ISSUED _____
OCCUPATION _____ TITLE _____ %OWNERSHIP _____

MANAGER'S NAME Gwendolyn Jones ADDRESS/CITY/STATE [redacted] Bis, ND 58504

DATE OF BIRTH [redacted] M/F F RACE W DRIVER'S LICENSE # AND STATE ISSUED [redacted]

OCCUPATION Bar Manager TITLE Manager

LIST NAMES/ADDRESS/PERCENTAGE OF OWNERSHIP OF ANY PERSON OWNING AN INTEREST IN THE BUSINESS Patrick Kosiki [redacted] Bismarck, ND 58503
Jason Frank [redacted] Bismarck, ND 58554

OWNER OF BUILDING OR PREMISES Loran Galphin

**NOTE:** If owner is other than applicant, attach a copy of lease or rental agreement. Also, all applicants must attach a copy of a blueprint or diagram on a separate sheet 11" x 8 ½" in size, showing premises to be licensed. Show all exits, bars, dining areas, (if any) beverage coolers and beverage storage areas. Indicate which are solid walls, half walls, dividers, and movable partitions. Outline in different color ink, the area to be used for the sale and/or service of alcoholic beverages if entire building is not so used. Include the direction "North" on the diagram.

1. Are manager and all partners legal residents of the United States and the State of North Dakota, and are all officers or directors legal residents of the United States? Yes If not, explain _____

2. Have any of the persons listed above been convicted of any crime within the past five years? If yes, list all convictions, dates, location and disposition or sentence of each _____

3. Does the building meet all state and local sanitation and safety requirements? Yes

4. a. If a transfer or change in ownership or management, list former owner and manager James Walker - Owner, Danelle Walker - Owner, Terry Waelhof - Manager
   b. If a transfer or change in ownership, former owner must sign below:
   I hereby consent to the requested transfer of this license: Effective December 1st, 2016
   [signature] Danelle Walker Date 7-22-2016

5. Has applicant, or any of the persons listed above, within the past five years had any license to engage in the sale of alcoholic beverages revoked or suspended? No If yes, give details _____

6. If a new application, has applicant or any of the persons listed above, engaged in the sale or transportation of alcoholic beverages previously? No If yes, give details _____

7. Has applicant, or any of the persons listed above, within the past five years, had an application for any federal, state or local license of any type rejected or denied? If yes, give details No

8. Is there any agreement or understanding, or proposed agreement or understanding to obtain the license for another, or to operate the business for another, or as an agent for another? No If yes, give details _____

9. Has the business been sold or leased, or is there any intention to sell or lease, the business to another? Yes
   If yes, give details Business is being Sold To New Owners

10. Has the applicant, or any of the persons listed above, any interest in whatsoever, directly or indirectly, any other licensed liquor establishment within or without the State of North Dakota? No If yes, give details _____

11. Will the applicant, or any of the persons listed above, be engaged in any other business other than the sale of liquor under the license applied for? No If yes, give details _____

12. Have all property taxes and special assessments currently due been paid? Yes If not, explain _____

I hereby agree and consent that authorized officers or representatives of the city may enter the premises licensed at any time to inspect the same and records of the business, and hereby waive any and all rights under the Constitution of the United States or State of North Dakota relative to searches and seizures without issuance of or use of a search warrant, and agree that I will not claim such immunities, and that such search, inspection and seizure may be made at any time without a warrant.

I agree that I will not transfer to sell this license, if granted, without the prior approval of the governing body and in accordance with applicable ordinances.

I also agree that should any of the information contained in this application change within the period of the license, if granted, that I will inform city officials immediately and furnish such details as may be requested by such officials concerning any such changes. I also agree that should there be a change in ownership or management during the period of the license, prior approval of the Board of City Commissioners is required.

I further agree that misrepresentation, false statement, or omission in this application shall be grounds for rejection of said application or for revocation or suspension of any license granted.

______________________________
Signature of Applicant

ARLA LAWLER
Notary Public
State of North Dakota
My Commission Expires February 1, 2020

Subscribed and sworn to before me this 2 day of August, 2016

Arla Lawler
Notary Public

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

Recommend application be: APPROVED __________ DENIED ___________

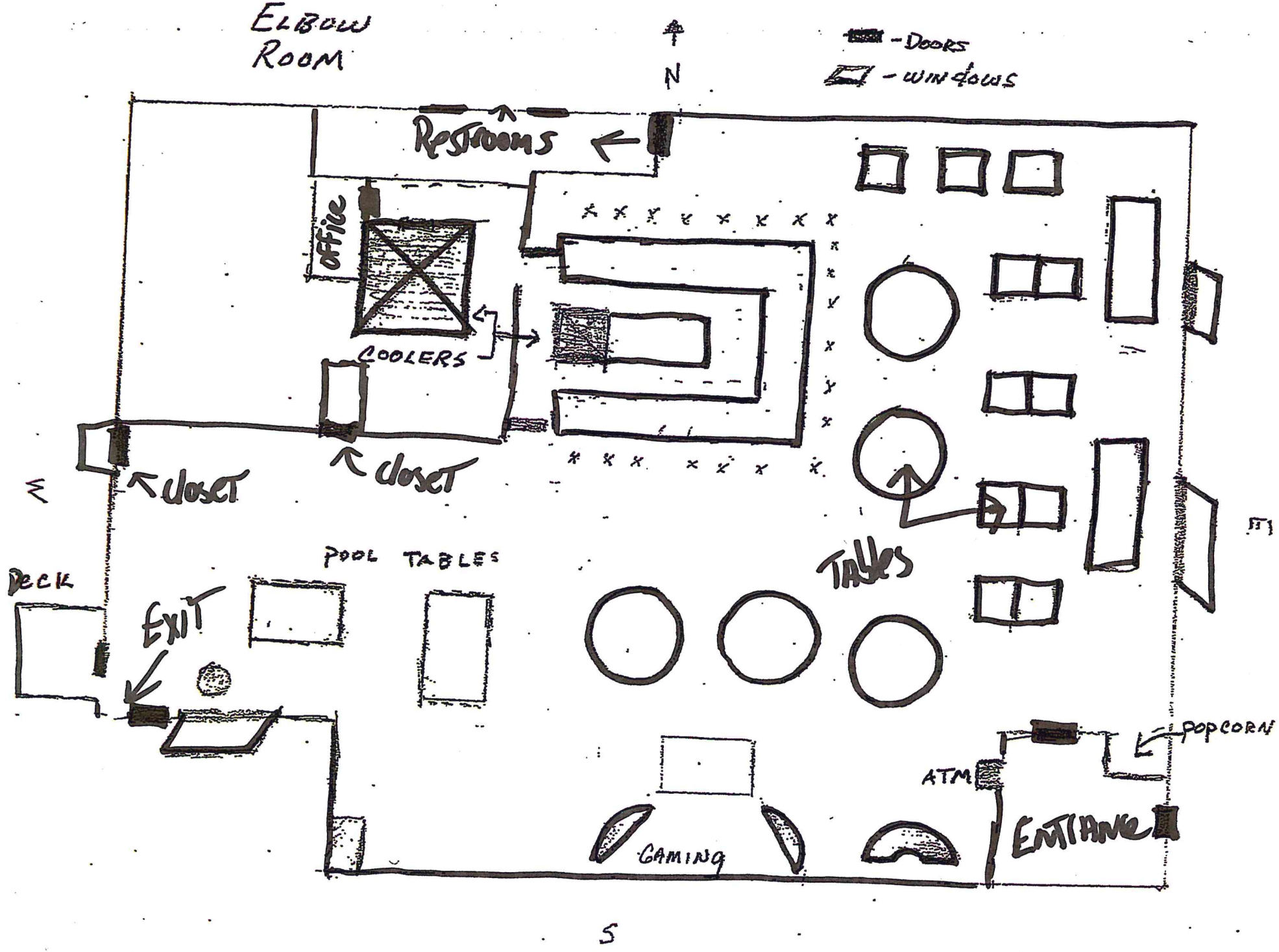
Reasons for negative recommendation ______________________________

______________________________

Date: ____________________ ______________________________
Chief of Police

Date: ____________________ ______________________________
City Administration

Revised: 2/1/12


ELBOW ROOM
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# License Reviews
## City of Bismarck

**License Number: LIQ2016-00119**

Licensee Name: **THE ELBOW ROOM**

Applied: **8/3/2016**

Issued:

Site Address: **115 S 5TH ST**

Expired:

City, State Zip Code: **BISMARCK, ND 58501**

Status: **PENDING**

Applicant: **KOSKI, PATRICK M & SHANNON T**

Parent License:

Owner: **5 MAIN DAKOTA BUILDING PARTNE**

Contractor: **<NONE>**

Details:

**TRANSFER OF CLASS D LIQUOR LICENSE TO NEW OWNERS. COMPANY NAME AND LOCATION REMAIN THE SAME.**

**LIST OF REVIEWS**

| SENT DATE | RETURNED DATE | DUE DATE | TYPE | CONTACT | STATUS | REMARKS |
|---|---|---|---|---|---|---|
| Review Group: ADMIN-POLICE | | | | | | |
| 8/3/2016 | 8/4/2016 | 8/4/2016 | COMPLETENESS CHECK POLICE | Tara Axtman | COMPLETE | background complete |
| Notes: | | | | | | |
| 8/4/2016 | 8/4/2016 | 8/5/2016 | LT REVIEW | Gary Malo | COMPLETE | |
| Notes: Diagram Attached. Owner/Manager Background Clear. Forward to DC. Completed by Sgt. Gaddis for Lt. Malo. | | | | | | |
| Review Group: AUTO | | | | | | |
| 8/3/2016 | 8/3/2016 | 8/4/2016 | COMPLETENESS CHECK ADMIN | Marla Schroeder | COMPLETE | |
| Notes: | | | | | | |
| 8/4/2016 | 8/4/2016 | 8/5/2016 | CITY ADMIN | Jason Tomanek | APPROVED | |
| Notes: Based on PD's review and approval, Administration approves as well. Please note, on the application submitted, the entity listed is TONK Group, Inc.- the actual name of the entity is TONKA GROUP, Inc., the applicant did not write out the entire company name. | | | | | | |
| 8/4/2016 | 8/4/2016 | 8/5/2016 | DC REVIEW | Randy Ziegler | COMPLETE | |
| Notes: Ok, forward to Chief. | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8/4/2016 | 8/8/2016 | 8/5/2016 | COMPLETENESS CHECK FINAL | Marla Schroeder | COMPLETE | |
| Notes: | | | | | | |
| 8/4/2016 | 8/4/2016 | 8/5/2016 | CHIEF REVIEW | Dan Donlin | APPROVED | |
| Notes: | | | | | | |

# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** **September 20, 2016**

**FROM:** **Jeff Heintz, Director of Service Operations**

**ITEM:** **Presentation of Solid Waste Management Collection System Evaluation study by HDR**

## REQUEST

HDR will provide an overview of the findings from their Solid Waste Management Collection System evaluation.

## BACKGROUND INFORMATION

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to provide: 1) an assessment and review of the current garbage collection system; 2) an evaluation of utility modification; and 3) recommendations for modifications to the collections utility. Collectively these tasks are known as the "Collection System Evaluation and Report" (Project). The goal of this Project is to provide the City with the tools, feasibility costs, and implementation recommendations to successfully meet the needs of the citizens of Bismarck while planning for the future.

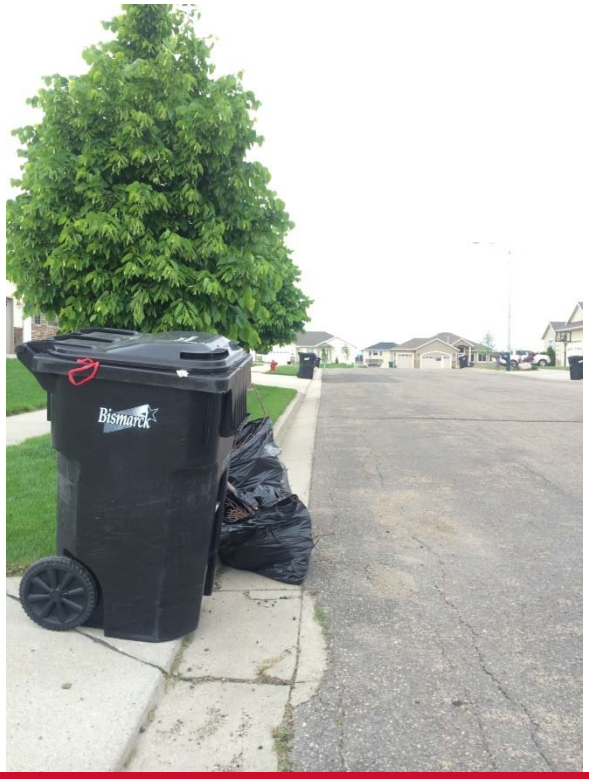
In general, the Project provided an evaluation the City's existing municipal solid waste (garbage) collection system, benchmarked the City against other similar communities, performed a sensitivity analysis of potential changes to collection services and ultimately decided on recommendations for modifications to the collection utility in order to increase collection efficiency. This final report is intended to provide a planning tool for the future expansion of the residential collection system. This Project was completed with input from the City and review of previously completed technical memoranda (TM).

## RECOMMENDED CITY COMMISSION ACTION

Receive the study from HDR and discuss the recommendations regarding the city's solid waste collection system.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov




# Final Report

## Collection System Evaluation

## City of Bismarck Solid Waste Utility

*Bismarck, North Dakota*
July 13, 2016

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# Contents

# Tables

## Figures



## Exhibits



## Appendices

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# 1 Executive Summary

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to provide: 1) an assessment and review of the current garbage collection system; 2) an evaluation of utility modification; and 3) recommendations for modifications to the collections utility. Collectively these tasks are known as the "Collection System Evaluation and Report" (Project). The goal of this Project is to provide the City with the tools, feasibility costs, and implementation recommendations to successfully meet the needs of the citizens of Bismarck while planning for the future.

The following is a summary of the key recommendations for the Project:

| Key Recommendations | Justifications |
|---|---|
| Adopt a Volumetric Residential rate structure for residential collection.<br>• Residential curbside should utilize automated collection and multiple cart sizes with additional waste in pre-sold bags.<br>• Residential alley could be completed with semi-automated collection and multiple cart sizes with additional waste in pre-sold bags. | Automated vehicles and a policy of all waste placed in the cart or pre-sold bags will result in lower total operational costs.<br>A Volumetric Rate structure will incentivize recycling and more equitably distribute the cost of garbage collection and disposal, based on use of the system.<br>Volume of waste may be reduced when garbage is required to be placed in cart with occasional excess in specially marked pre-sold bags. |
| Provide seasonal residential curbside and residential alley yard debris pick-up, and cease operating a majority of the seasonal grass clipping drop sites.<br>• Residential curbside Collection should utilize fully automated collection with a City-provided wheeled cart.<br>• Residential alley Collection should utilize semi-automated collection and multiple cart sizes (City-provided). | The operational analysis concluded that the estimated cost of providing seasonal residential yard debris collection could be offset by closing a majority of the seasonal grass collection sites. |

| Key Recommendations | Justifications |
|---|---|
| Continue the twice yearly cleanup weeks and expand the policy to allow additional residential waste during portions of the year. | Providing cleanup weeks, at least twice a year, is a practice followed by the majority of communities in the region.<br>Additional services or utility features include:<br>• Scheduled bulk waste collection for a reasonable fee;<br>• Residential holiday collection allowing excess garbage to be set out without use of pre-sold bags during Thanksgiving until New Years and;<br>• Landfill Disposal Vouchers allowing passenger vehicle sized loads to be disposed at the landfill without the typical tipping fee. |
| Rebalance collection routes by customer service type and adopt residential garbage collection zones that result in residential collection occurring in a four-day per week schedule, rather than five days per week. | The current routes are based on vehicle type resulting in some routes finishing earlier in the day, and nearly all are returning to the landfill under capacity.<br>A four-day per week schedule will meet the needs of the City and allow collection for the entire service area during weeks with holidays.<br>The proposed collection routes allow for growth in the system, while still maintaining an overall balanced system. This results in trucks being able to complete their route independently, and in approximately the same time. |
| Perform a detailed evaluation and optimization of dumpster service. | The Project GIS documents the location, size, frequency of collection and type of collection for the dumpsters deployed as of July 2015. However, the route observations indicated a discrepancy in the number of pickups between the accounting records and observations.<br>The current routes indicate the collection of residential alley garbage and dumpsters along an individual route. Analysis of the routes and collection tonnages based on the route observations performed as part of this study indicate that the dumpster collection may have room for optimization including size, frequency of collection and monthly fee. |

| Key Recommendations | Justifications |
|---|---|
| When converting to new collection technology, adopt a spare ratio policy for collection vehicles of 35%. | An industry accepted standard is a 35% spare ratio for automated collection vehicles and 25% for manual collection vehicles. Currently the City fleet is exceeding a 50% spare ratio for portions of the fleet.<br>The City's current high spare ratio is a function of the residential holiday collection requiring double the fleet. |
| Track customers by service type: Residential Curbside, Residential Alley, Apartment Dumpsters, and Yard Debris. | As the utility grows, individual customer classes will utilize different collection technology and routing.<br>Tracking data by customer class allows for future cost of service analysis and rate adjustments to spread the costs equitably among the customer classes. |
| Prior to purchasing new dedicated alley collection vehicles, perform a feasibility analysis for converting to automated side loaders. | This final report concludes that it is highly probably that 90% of alley users can be converted to automated side loaders. |
| Maintain and update the GIS database provided with this final report, at a minimum, on an annual basis. Adopt the rebalanced curbside garbage collection routes. | Asset management of dumpsters and customer account types were difficult to determine based on current customer data.<br>The Project GIS database provided contains customer pick-up locations based on a combination of the City's GIS, collection truck wheel paths and accounting and billings data. |

Execution of the Project consisted of gathering background data and information and the completion of a series of technical memoranda documenting the findings of specific portions of the utility. This final report summarizes the findings of the previous technical memoranda and presents new and revised information as a result of additional study completed after the delivery of the technical memoranda.

Section 3 includes evaluation of the existing utility operations with the intent of producing a baseline to allow comparison of the City's current program to other similar municipal operations, as well as identifying potential modifications to the City's current program. Included in this evaluation was a review of data and information provided by the City, observations of the existing collection routes, development of a baseline operational model and a benchmarking comparison to regional communities.

Section 4 documents an evaluation of potential utility modifications. Based on discussions with City staff, the City and HDR identified the following potential modifications to be evaluated 1) Variable Rate Cart structure for both curbside and alley customers; 2) Variable Rate Cart and Bag structure for both curbside and alley customers; and 3) Residential curbside and alley grass clipping collection. Also included in Section 4 is operational modeling evaluating the feasibility of providing residential

collection service based on a four day work week compared to the current five day work week.

Section 5 presents an analysis and recommendations for optimization of the residential collection routes and boundaries.

Section 6 is a comprehensive summary of the Project's findings and recommendations.

# 2 Introduction and Purpose

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to provide: 1) an assessment and review of the current garbage collection system; 2) an evaluation of utility modification; and 3) recommendations for modifications to the collections utility. Collectively these tasks are known as the "Collection System Evaluation and Report" (Project). The goal of this Project is to provide the City with the tools, feasibility costs, and implementation recommendations to successfully meet the needs of the citizens of Bismarck while planning for the future.

In general, the Project provided an evaluation the City's existing municipal solid waste (garbage) collection system, benchmarked the City against other similar communities, performed a sensitivity analysis of potential changes to collection services and ultimately decided on recommendations for modifications to the collection utility in order to increase collection efficiency. This final report is intended to provide a planning tool for the future expansion of the residential collection system. This Project was completed with input from the City and review of previously completed technical memoranda (TM). The following TMs have been previously completed, and are included as appendices to this final report:

- TM 300 – Evaluation of Current Collection Operations & Identification of Potential System Modifications (Appendix B);
- TM 401 – Evaluation of Potential System Modifications (Appendix C);
- TM 402 – Recommended Residential Collection Boundaries (Appendix D); and
- TM 403 – Recommended Residential Collection Routes (Appendix E).

The following sections summarize the previously completed TMs and supplement the findings with comments and additional information and study identified during review with the City staff.

# 3 Evaluation of Existing Utility Operations

The Project included an evaluation of the existing utility operations with the intent of producing a baseline to allow comparison of the City's current program to other similar municipal operations, as well as identify potential modifications to the City's current program. The main components of this evaluation included:

- Reviewing data and information provided by the City;
- Establishing a baseline of the current collection system, including route observations;
- Conducting a benchmarking analysis;
- Identifying potential modifications for further evaluation; and
- Preparing a summary memorandum and reviewing with City Staff.

During the Project, TM 300 was prepared and reviewed with City staff. The TM presented the preliminary findings and recommendations for further evaluation of potential modifications to the current residential garbage collection system. The following

sections summarize the major components of TM 300. For reference, TM 300 is included as Appendix B to this report.

## 3.1 Current System Overview

The Service Operations Division of the Public Works Department for the City is responsible for providing garbage collection to all residential customers in the incorporated area. This includes a combination of curbside collection, alley collection, and collection from apartment complexes using dumpsters.

**Residential Curbside Collection** - The City provides once a week curbside collection service utilizing 96-gallon carts to approximately 17,270 single-family households. Collection crews are made up of one driver and one collector operating a multi-pack collection vehicle with both an automated side-loading arm and rear-load capabilities (referred to as semi-automated in this report).

**Residential Alley Collection** - Once a week alley collection is provided to approximately 1,912 households in the City. Alley customers can set out an unlimited number of containers of up to 35-gallons in size. Alley collection is accomplished using rear-load collection vehicles and crews of one driver and two collectors per vehicle.

**Apartment Collection** - Collection of waste from apartments is accomplished using a combination of front-load and rear-load collection vehicles to collect from approximately 783 dumpsters. Collection of apartment dumpsters occur street side, in parking lot areas, or in alleys, depending on the specific needs and configuration of individual properties.

TM 300 & TM 401 previously estimated residential collection consisted of 15,423 curbside and 3,270 alley households. The estimates used in TM 300 were the best available data from the City accounting and operational sources at the time that the work operational modeling was conducted. The number of households stated in TM 300 & TM 400 represented the number of accounts, and not the number of household units. In many cases, multi-family homes each receive individual carts but share one account with the City.

The updated household numbers used in this final report reflect the number of individual garbage collection pick-ups. The number of curbside and alley households used in the final report was refined by use of the GPS tracking of the vehicle wheel paths, accounting data containing units per account, and GIS analysis of the available data. Exhibit 1 Residential Collection Locations attached to this final report provides a graphical location of the residential households serviced by the City collection utility.

The City of Bismarck does not provide commercial collection or roll-off containers for construction and demolition debris. Commercial users, mobile home parks, and temporary roll-off container users are serviced by private haulers.

In order to evaluate the efficiency and effectiveness of the current residential collection system and identify opportunities for improvement, HDR first needed to baseline the current system. Our approach involved reviewing data provided by the City. The City provided data including costs and other details relating to labor and equipment used for the residential collection services, which were used in the development of the baseline information.

The baseline development also utilized route observation data collected by City staff. HDR developed a collection route observation form, provided it to the City, and described the process that should be followed by City staff when conducting observations. Route observations were completed in June of 2015. Observations were completed over a two-week period, and included following 38 routes.

The City currently organizes its residential garbage collection routes based on truck type used to collect the materials rather than basing them on customer type served. The City's typical weekly deployment of collection vehicles is illustrated in Table 1.

**Table 1 - Typical Truck Deployments, Garbage Collection**

| | Number of Trucks Deployed | | | | |
|---|---|---|---|---|---|
| **Truck Type** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| Multi-Pack | 3 | 5 | 5 | 5 | 5 |
| Rear-Load Residential Alley | 0 | 2 | 2 | 2 (1) | 0 |
| Rear-Load Dumpsters | 4 | 0 | 0 | 0 | 1 |
| Front-Load | 1 (2) | 1 | 0 | 1 | 1 |
| Total | 8 | 8 | 7 | 8 | 7 |

Notes:
On Thursday the two rear-loads deployed were observed to collect residential alley routes for their first load and apartment dumpsters for their second load.
On Monday, a rear-load truck finished early and switched to a front-load truck to help on one of the other routes.

With regard to total trucks, the route observations conducted were related only to garbage collection. However, the City also operates 18 yard debris collection sites around the City that consist of dumpsters that are collected seven days a week during the growing season. As noted in Table 2, the City deploys three rear-load vehicles for yard debris collection from these sites each day from May through October.

**Table 2 - Typical Truck Deployments, Yard Debris (1)**

| | Number of Trucks Deployed | | | | | | |
|---|---|---|---|---|---|---|---|
| **Truck Type** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** | **Saturday** | **Sunday** |
| Multi-Pack | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rear-Load | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Front-Load | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

Notes:
(1) May through October only.

Table 3 provides an overview of the City's collection fleet including the total number of collection vehicles by type, the maximum number of each type that is deployed for collection efforts on a given day, the number of spare vehicles, and spare ratios of each type the City has on hand.

**Table 3 - Collection Fleet Summary**

| Truck Type | Total Fleet | Max Deployed | Spare | Spare Ratio |
|---|---|---|---|---|
| Multi-Pack | 9 | 5 | 4 | 80% |
| Rear-Load | 10 | 7 | 3 | 43% |
| Front-Load | 2 | 1 | 1 | 100% |

## 3.2 Summary of Route Observation Data

TM 300 includes an in depth discussion on the formulation of the key system metrics from the June 2015 route observations. The following tables summarize the key metrics as derived from the June 2015 route observations.

### Table 4 - Key Metrics Yielded from June 2015 Route Observations (1)

| | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Avg. Trips to Facility per Day |
|---|---|---|---|---|---|---|---|---|
| Residential Curbside | 91% | 60.2 | 7.7 | 8.7 | 1:53 | 0:48 | 0:19 | 2 |
| Residential Alley | 92% | 72.1 | 6.8 | 7.5 | 2:20 | 0:45 | 0:22 | 2 |
| Apartment Dumpsters | 94% (2) | 239.6 | 12.4 | 9.3 | 2:08 | 0:47 | 0:16 | 2 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

(2) The average set-out rate for apartments is not shown as 100% because observations indicated instances where trucks on apartment routes passed by some dumpsters.

### Table 5 - Week One Curbside Collection Metrics by Route (1) – June 2015

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3335 | 89% | 59.9 | 10.4 | 7.9 | 2:12 | 0:48 | 0:23 | 1 |
| 3409 | 90% | 59.0 | 8.2 | 9.7 | 1:45 | 0:45 | 0:14 | 4 |
| 3482 | 89% | 65.1 | 8.0 | 7.8 | 2:05 | 0:38 | 0:26 | 1 |
| 3551 | 92% | 59.6 | 6.6 | 9.0 | 1:39 | 0:57 | 0:20 | 5 |
| 3552 | 84% | 66.0 | 5.7 | 7.5 | 1:44 | 0:37 | 0:27 | 1 |
| 3558 | 92% | 61.4 | 7.3 | 9.3 | 2:04 | 0:53 | 0:17 | 3 |
| 3562 | 95% | 48.6 | 5.5 | 6.9 | 1:38 | 0:41 | 0:20 | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

## Table 6 - Residential Alley Metrics by Route (1) – June 2015

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3472 | 94% | 66.0 | 5.0 | 11.1 | 2:20 | 0:46 | 0:08 | 1 |
| 3572 | 94% | 62.7 | 5.3 | 7.4 | 2:01 | 0:44 | 0:15 | 2 |
| 3573 | 89% | 79.9 | 7.8 | 8.1 | 2:14 | 0:31 | 0:26 | 1 |
| 3572-A (2) | 98% | 66.7 | 10.0 | 6.0 | 3:01 | 1:03 | 0:23 | 2 |
| 3573-A (2) | 88% | 72.1 | 6.8 | 4.3 | 2:53 | 1:18 | 0:18 | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

(2) On Thursday, trucks 3572 and 3573 drive a primary residential alley route for the first load and an apartment dumpster route for the second load.

## Table 7 - Apartment Dumpster Collection Metrics by Route (1) – June 2015

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3472-AA (2) | 100% | 183.2 | Not Available | Not Available | 2:39 | 1:02 | 0:17 | 1 |
| 3472-BB (2) | 95% | 207.1 | 8.0 | 11.5 | 1:39 | 1:16 | 0:25 | 1 |
| 3478 (rear) | 100% | 193.2 | 8.0 | 9.3 | 3:01 | 0:42 | 0:48 | 1 |
| 3557 (front) | 99% | 309.3 | 14.1 | 9.8 | 1:56 | 0:37 | 0:10 | 2 |
| 3572 (rear) | 91% | 231.8 | 16.5 | 8.9 | 2:57 | 0:54 | 0:12 | 1 |
| 3572-B (3) | 100% | 156.2 | 5.9 | 11.0 | 1:21 | 0:45 | 0:17 | 2 |
| 3573-B (3) | 100% | 196.5 | 3.8 | 6.7 | 1:08 | 0:18 | Not Available | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

(2) Route 3472-AA was observed on the first week with route 3472-BB observed the second week.

(3) On Thursday, trucks 3572 and 3573 drive a primary residential alley route for the first load and an apartment dumpster route for the second load.

## 3.3 Baseline of Current Operations

HDR endeavored to model the City's residential garbage collection operations on a customer type basis (i.e. curbside collection, alley collection, and apartment collection). However, the fact that many of the City's collection vehicles commonly pick up material from a variety of customer types on the same route made this difficult to accomplish for apartment collection. The following sections document assumptions and provide metrics used to model the curbside and residential alley collection. However, it was not possible to model the apartment collection in an informative manner. Table 8 summarizes the weekly number of pick-ups per customer class.

**Table 8 - Weekly Pick-ups by Customer Class**

| Customer Class | Weekly Pick-ups |
|---|---|
| Residential Curbside | 17,270 |
| Residential Alley | 1,912 |
| **Total** | **19,182** |
| | |
| Dumpsters – Front Load | 482 |
| Dumpsters – Rear Load | 647 |
| **Total** | **1,129** |

The total number of residential pick-ups, 19,182, reflects the number of individual households currently serviced by the collection utility.

The operational modeling has been updated to reflect that, for a number of accounts, there are multiple units that are collected individually. After the completion and review of TM 300 and TM 401, the number of alley customers and pick-up locations was further refined based on the additional data developed from City billing databases, GIS layers and analysis of the collection vehicle wheel paths as monitored by the GPS equipment in the trucks. The wheel track data, provided in GIS format, was used to refine the number of alley customers. The same data was also used to determine dumpster style (front or rear load) based on collection truck type.

### 3.3.1 Residential Curbside Collection

The City's current curbside garbage collection service is provided once a week to each household, and is comprised of three routes on Monday and five routes Tuesday through Friday, for a total of 23 routes per week. Two-person crews (one driver and one collector) use multi-pack collection vehicles to collect 96-gallon carts from each household

TM 300 summarized the key metrics for residential curbside route service, labor, operations and capital costs. These metrics were used to model the estimated annual cost for completing residential curbside garbage collection costs

Table 9 presents a summary of the estimated total annual costs for labor, operations and capital, associated with the City's residential curbside collection operations. Total annual expenses for curbside collection are estimated at approximately $1.34 million.

**Table 9 – Residential Curbside Estimated Total Annual Cost**

| Description | Est. Cost |
|---|---|
| Total Annual Labor Cost | $699,000 |
| Total Annual Vehicle Operating Cost | $160,000 |
| **Total Annual Operating Cost** | **$ 859,000** |
| | |
| Total Annual Vehicle Capital Cost | $392,000 |
| Total Annual Cart Cost | $86,000 |
| **Total Annual Capital Cost** | **$478,000** |
| | |
| **Estimated Total Annual Cost** | **$1,337,000** |

### 3.3.2 Residential Alley Collection

There are approximately 1,912 units included in alley collection. The current collection system for residential alley service includes rear-load vehicles that also collect a limited number of dumpsters (a hook is used to unload dumpsters into the rear of the vehicle).

The City's current residential alley collection service is provided once a week to each household and is comprised of two routes on Tuesday, Wednesday and Thursday for a total of six routes each week. On Wednesday, the two routes were observed to be completed by noon. Similarly, on Thursday, the two routes completed a primarily residential alley trip before collecting apartments in the afternoon. For the purposes of the existing conditions operational model, it was assumed that there is an average of two routes per day two days a week to accomplish alley collection. Three person crews (one-driver and two collectors) use rear-load collection vehicles to collect waste from user provided cans.

TM 300 summarized the key metrics for residential alley route service, labor, operations and capital costs. These metrics were used to model the estimated annual cost for completing residential curbside garbage collection costs.

Table 10 presents a summary of the estimated total annual costs for labor, operations, and capital associated with the City's residential alley collection operations. Total annual expenses for residential alley collection are estimated at approximately $566,000.

**Table 10 – Residential Alley Estimated Total Annual Cost**

| Description | Est. Cost |
|---|---|
| Total Annual Labor Cost | $453,000 |
| Total Annual Vehicle Operating Cost | $49,000 |
| **Total Annual Operating Cost** | **$502,000** |
| | |
| Total Annual Vehicle Capital Cost | $64,000 |
| Total Annual Cart Cost | $0 |
| **Total Annual Capital Cost** | **$64,000** |
| | |
| **Estimated Total Annual Cost** | **$566,000** |

### 3.3.3 Apartment Dumpster Collection

As of August 2015, the City has about 671 accounts and 783 dumpsters deployed for the collection of waste from apartments and municipal buildings. Waste is collected in City supplied dumpsters of 1, 1.5, 2, 3, 4, 6 and 8 cubic yard capacity with the option for collection one, two or three times per week. The current collection system involves using rear-load vehicles for alleys and other tight locations and a front-load vehicle that collects from locations with sufficient space for dumpster deployment and service.

Rear-load vehicles are considered a manual collection service because the dumpster must be rolled to the back of the vehicle and manually hooked to a cable wench to be dumped. Each rear-load vehicle is typically manned by one driver and two collectors. Front-load vehicles are considered an automated technology because the dumpster is collected by an automated front swing arm. Front-load vehicles are typically manned by one driver and no collectors. Table 11 indicates the number of trucks deployed primarily for dumpster collection on a weekly basis.

Exhibit 2 included in this final report shows the location of the dumpsters currently deployed and collected by the City. This exhibit was created from the GIS database developed for this Project.

### Table 11 – Typical Truck Deployments, Dumpsters

| Truck Type | Monday | Tuesday (1) | Wednesday (1) | Thursday (2) | Friday | Total |
|---|---|---|---|---|---|---|
| Rear | 4 | 0 | 0 | 1 | 1 | 6 |
| Front | 1 | 1 | 0 | 1 | 1 | 4 |
| Total | 5 | 1 | 0 | 2 | 2 | 10 |

Notes:

(1) On Tuesday and Wednesday, a rear load truck was observed collecting primarily residential alley customers and occasional dumpster for all trips.

(2) On Thursday, two rear load trucks each completed one primarily alley trip and one primarily dumpster trip.

Table 12 summarizes the total number of dumpsters collected by each truck type. Over half of the dumpsters are collected more than once per week.

### Table 12 - Dumpsters by Vehicle Type

| | Rear Load | Front Load | Total |
|---|---|---|---|
| No. of Dumpsters | 479 | 304 | 783 |

Additional data was collected and analyzed subsequent of the TM 401 findings. This City provided updated data including an updated database (including the number of accounts, size and number of dumpsters per account, and number of days each account was collected), a GIS layer with the approximate location of each dumpster identified in the database, and the GIS wheel paths from the actual collection trucks. Utilizing this new data, a GIS analysis was conducted to determine the vehicle type and collection day for each dumpster identified. Table 13 compares the number of dumpsters observed to be collected using the GIS layer, the June 2015 observations, and the accounting records. Table 14 summarizes the dumpster collection metrics determined from this GIS analysis.

### Table 13 – Dumpster Collection Frequency

| | Monday | | Tuesday | | Wednesday | | Thursday | | Friday | | Grand Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Front | Rear | Front | Rear | Front | Rear | Front | Rear | Front | Rear | Front | Rear | |
| GIS Estimate | 179 | 460 | 117 | 17 | 0 | 26 | 91 | 108 | 95 | 36 | 482 | 647 | 1,129 |
| Observations | 148 | 467 | 135 | 4 | 0 | 17 | 84 | 130 | 93 | 38 | 460 | 656 | 1,116 |
| Accounting (1) | - | - | - | - | - | - | - | - | - | - | - | - | 1,083 |

Notes:

(1) City accounting files do not contain the collection day for each dumpster.

Table 13 indicates a narrow margin of error between the GIS analysis and the route observations. Additionally, both methods indicate more frequent pickups than the accounting records.

**Table 14 – Dumpster Service Metrics**

| | Front Load | | | | Rear Load | | | |
|---|---|---|---|---|---|---|---|---|
| | # of Dumpsters Picked Up (GIS) (1) | Total Dumpster Capacity (CY) (2) | Total Lbs. Collected (3) | Lbs/CY (4) | # of Dumpsters Picked Up (GIS) (1) | # of Dumpsters Picked Up (GIS) (2) | Total Lbs. Collected (3) | Lbs/CY (4) |
| Monday | 179 | 895.5 | 46,920 | 52.4 | 460 | 1,000.5 | 89,240 | 89.2 |
| Tuesday | 117 | 431.5 | 40,620 | 94.1 | 17 | 53.5 | 841 | 15.7 |
| Wednesday | - | - | - | - | 26 | 104.0 | 3,576 | 34.4 |
| Thursday | 91 | 450.0 | 23,680 | 52.6 | 108 | 289.5 | 19,328 | 66.8 |
| Friday | 95 | 502.5 | 28,840 | 57.4 | 36 | 142 | 7,740 | 54.5 |
| ∑ | 482 | 2,279.5 | 140,060 | 61.4 | 647 | 1,589.5 | 120,725 | 52.1 |

Notes:

(1) The Number of Dumpsters Picked Up was determined using the City's GIS layer combined with the wheel paths of the trucks. This metric has a narrow margin of error compared to the June Observations.

(2) The Total Dumpster Capacity was determined by summing the dumpster sizes, as reported in the City's GIS layer, for all dumpsters collected that day.

(3) Total Lbs. Collected is the reported pounds collected during the June Observations.

(4) Lbs./CY is calculated by dividing the Total Lbs. Collected by the Total Dumpster Capacity (CY)

The average size of a front-load dumpster is 4.7 cubic yards and the average size of a rear-load dumpster is 2.5 cubic yards.

Using the reported tons collected during the observations, the average pounds per cubic yard of waste collected by a front-loader is 61.4 and for rear-loaders is 52.1. Both of these values are well below the expected 150 lbs/cy of waste in a dumpster. This indicates the potential to collect dumpsters less frequently or scale dumpsters to a smaller size. Additionally, the data indicates capacity to add dumpsters to the routes. It is recommended that going forward, front-load dumpsters are deployed over rear-load, where possible.

## 3.4 Benchmarking

HDR performed a preliminary search for regional cities with comparable systems in order to benchmark specific operations and financial metrics. The preliminary search included considering population, housing density, service provider, collection style and frequency of service. A preliminary list of communities, as well as a list of questions/metrics, was developed and discussed with the City prior to contacting the benchmarking communities.

Based on the goals for this Project, the benchmarking was focused on determining the major collection metrics of similar sized communities using semi-automated and fully automated methods for residential collection, and the total cost of collection service in these communities. With regard to the major collection metrics, the survey focused on the number of residential customers, total weekly collection routes and availability of curbside recycling, yard debris collection and bulk waste disposal. Financial metrics were focused on a break-down of the monthly collection fee charged to residential customers to determine the level of service included and the estimated costs.

The preliminary list included approximately 15 communities in an effort to receive responses from a minimum of six. Any communities that utilize private or contract collection services for residential garbage collection were not included in the benchmarking metrics. Communities with privatized collection that are similarly sized to Bismarck included: Sioux Falls, SD; Vermillion, SD; Rochester, MN; Maple Grove, MN; and Duluth, MN. Benchmarking information was obtained from eight regional communities with varying degrees of completeness and detail. The complete benchmarking matrix is available as an attachment to TM 300.

Of the communities contacted, Bismarck is unique in using multi-pack vehicles for residential, automated cart collection service. For the purposes of this benchmarking analysis, Bismarck's collection that utilizes multi-pack trucks is considered semi-automated.

As shown in Table 15 below, the preferred frequency for residential garbage collection is one time per week. This is largely due to the regional adoption of collection technology utilizing fully automated or semi-automated collection with carts. Similarly the majority of the communities with automated collection services have a volumetric based fee structure, meaning that there are multiple cart sizes available for a range of monthly fees.

Fully automated operations are able to maximize productivity as compared to semi-automated systems. However, fully automated options may not meet the needs of all communities. It is common for municipalities to incorporate a blend of fully automated and semi-automated operations to address specific service requirements unique to their community. For example, it is not uncommon for residential curbside collection to be fully automated and residential alley collection to consist of semi-automated or manual service. It should be noted that the success of any collection system rests on the establishment of a comprehensive "Code of Ordinances" that can be fairly and uniformly enforced to maximize efficiencies and adherence to the designed service.

### Table 15 – Benchmarking Overview

| Community | Number of Households (1) | Style of Collection | Frequency of Collection | # of Routes per Week | Fee Type |
|---|---|---|---|---|---|
| Bismarck, ND | 19,182 (2) | Manual & Semi-Automated (5) | 1 x week | 23 Multi-Pack<br>8 - Manual | Fixed |
| Fargo, ND | 26,000 (3) | Automated | 1 x week | 30 | Volumetric |
| Grand Forks, ND | 22,000 (3) | Automated & Semi-Automated (6) | 1 x week | 20 | Volumetric |
| Minot, ND | 11,.500 | Manual | 2 x week | 25 | Fixed |
| Mankato, MN | 10,000 | Automated | 1 x week | 15 | Volumetric |
| Moorhead, MN | 11,000 | Automated | 1 x week | | Volumetric |
| Fergus Fall, MN | 4,400 | Automated | 1 x week | 10 | Volumetric |
| Aberdeen, SD | 8,000 | Manual | 1 x week | 16 | Fixed |
| Billings, MT | 34,000 (4) | Automated | 1 x week | 28 | Fixed |

Notes:
Residential accounts

(1) 17,270 curbside customers and 1,912 alley customers
(2) Includes alley accounts collected via automated service
(3) 17,000 90-gal containers and 8,500 300-gallon containers collected using the same vehicles
(4) Semi-automated is side-load with rear compactors (multi-pack trucks)
(5) Semi-automated is front-load with automated tippers

### 3.4.1 Residential Manual Collection Comparison

Table 16 summarizes the benchmarking communities that perform manual residential collection. The City of Bismarck is included in the table for comparison.

The number of routes required is impacted by a number of variables including set-out rates (the percent of homes that set-out garbage for collection in a given week), average pounds per set out (how much garbage is set out at each home), set-out restrictions (limits on the amount, size, or manner in which garbage can be placed out for collection), the level of enforcement of set-out restrictions, route timing, and staff configuration.

Bismarck's residential collection service is a mixture of manual collection from alley customers and semi-automated collection from curbside customers. The increased efficiency of the semi-automated curbside collection is reflected in Bismarck's collection service showing a higher average number households served per route compared to the communities with manual collection.

Based on conversations with the Minot and Aberdeen collections staff, it was determined that neither community had detailed formal metrics for set-out rates or timing of routes. Both communities compared well to Bismarck as each provides residential collection in both newer areas via curbside collection and via alleys in older portions of the community. It should be noted that Minot collects each account twice per week and based on anecdotal observations by the Minot staff, the set-out rate is not consistent for each collection day. It is common for curbside set-outs to drop below 50% on the second collection day in communities that offer twice per week collection.

**Table 16 - Residential Manual Collection Service Metrics**

| Metric | Bismarck | Minot | Aberdeen |
|---|---|---|---|
| Housing Density (Units/mi2) | 544 | 659 | 512 |
| Avg. Households/Route | 671 (semi-auto) | 575 | 400 |
| Set-Out Limits | Limited (1) | 32 gal containers | In container (2) |
| Work Week | 5 days | 4 days | 4 days |
| Hours per Day | 8 | 8 | 8 |
| Bulk Waste Curbside | Yes | Yes | No |
| Recycling Curbside | Yes - Contract | No | Yes – Contract |
| Yard Debris Curbside | No | No | No |
| Enforcement | Drivers | Drivers | Drivers |
| Monthly Fee | $12.31 (96 Gal)<br>$3.81 (Recycle)<br>$16.12 Total | $10.18 | $13.50 |

Notes:

1) Set-out quantity is limited to truck lifting capability and capacity.

(1) Must be contained within the selected size container.

### 3.4.2 Residential Automated Collection Comparison

Table 17 below summarizes the benchmarking communities that perform automated or semi-automated residential collection. The City of Bismarck is included in the table for comparison purposes even though the collection system is not considered fully automated for the purposes of this analysis.

The number of routes required is impacted by a number of variables including set-out rates (the percent of homes that set out garbage for collection in a given week), average pounds per set out (how much garbage is set out, on average, at each home), set out restrictions (limit on the amount, size, or manner in which garbage can be placed out for collection), the level of enforcement of set out restrictions, route timing and staff configuration.

The majority of the surveyed automated collection service communities have a higher average number of homes serviced per route when compared to Bismarck. For example, based on the survey, Billings, Fargo and Grand Forks have developed collection routes for curbside residential, alleys and multifamily that is nearly fully automated. This is reflected in the number of accounts that an average route can service each day. Each of these communities has a volumetric collection fee structure that forces the users to limit refuse collection to dedicated containers or specially marked, pre-purchased bags.

The communities surveyed did not have formal set-out rates or time metrics for their collection systems. All reported that observed set-out rates were over 90%. Based on the published data and conversations with the collection staff of each community, Billings, Fargo and Grand Forks have similar solid waste systems to the City of Bismarck as each community provides collection services and owns the landfill where the waste is disposed. The Minnesota communities only operated a collection system and disposal occurs at a private landfill or transfer station.

It was anticipated, based on these benchmarking results, that the City of Bismarck could realize similar average households per route as Fargo, Grand Forks and Billings by implementing fully automated residential curbside collection and refined semi-automated alley collection.

### Table 17 – Residential Automated Service Metrics

| Metric | Bismarck | Fargo | Grand Forks | Mankato | Fergus Falls | Moorhead | Billings |
|---|---|---|---|---|---|---|---|
| Housing Density (Units/mi2) | 544 | 532 | 1,095 | 547 | 286 | 555 | 585 |
| Avg. Households/Route | 671 | 866 | 1,100 | 666 | 440 | No Response | 910 |
| Set-Out Limits - Garbage | Limited (1) | Must be in container (2) | Must be in container (2) | Must be in container or pre-purchased bag (2) | Must be in container (2) | Must be in container or pre-purchased bag (2) | Must be in container (2) |
| Work Week | 5 days | 5 days | 5 days | 5 days | 5 days | 5 days | 4 days |
| Hours per Day | 8 | 8 | 8 | 8 | 8 | 8 | 10 |
| Bulk Waste Curbside | Yes | Fee | Fee | Fee | Fee | Fee | Yes |
| Recycling Curbside | Yes - Contract | Yes | Yes - Contract | Yes - Contract | Yes - Contract | Yes | No |
| Yard Debris Curbside | No | No | Yes | Yes | No | Yes | Yes |
| Enforcement | Drivers | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin |
| Monthly Fee | $12.31 (96 Gal)<br>$3.81 (Recycle)<br>$16.12 Total | $6 (48 Gal)<br>$9 (64 Gal)<br>$14 (96 Gal) | $15.82 per 60 Gal Container | $11 (35 Gal)<br>$16 (65-Gal)<br>$25 (95 Gal) | $16 (65-Gal)<br>$25 (95 Gal) | $11 (35 Gal)<br>$16 (65-Gal)<br>$25 (95 Gal) | $8.98 |

Notes:

1) Set-out quantity is limited to truck lifting capability and capacity.
2) Must be contained within the provided, selected size (if available) container.

### 3.4.3 Residential Automated Collection Comparison

Table 18 summarizes the monthly residential collection fee for each community surveyed. The table summarizes the total fee charged to the residential user class, indicates which services are provided, and summarizes if the cost of service for collection and disposal is being covered by the fee collected. Many of the communities surveyed that performed both collections and operated a landfill indicated that the residential collection cost of service was subsidized by the commercial tipping fee from the landfill or the general fund.

**Table 18 – Monthly Fee Summary**

| Community | Monthly Fee (1) | Fee Type | Services Included (2) | Costs Included (3) | Notes |
|---|---|---|---|---|---|
| Bismarck, ND (7) | $16.12 | Fixed | G, R, B | G, R, B, D | (5) |
| Fargo, ND (7) | $14 | Volumetric | G, R | G, R | (5) |
| Grand Forks, ND (7) | $15.82 | Volumetric | G, R, Y | G, R, Y | (5) |
| Minot, ND (7) | $10.18 | Fixed | G | G, D | (6) |
| Mankato, MN (8) | $25 | Volumetric | G, R, Y | G, R, Y, D | (4) |
| Moorhead, MN (8) | $25 | Volumetric | G, R, Y | G, R, Y, D | (4) |
| Fergus Fall, MN (8) | $25 | Volumetric | G, R | G, R, Y, D | (4) |
| Aberdeen, SD (8) | $13.50 | Fixed | G, R, B | 1 x week | (4) |
| Billings, MT (7) | $8.98 | Volumetric | G, R, B | G, R, B, D | (6) |

Notes

(1) For volumetric fee structures, this is the largest container fee.
(2) Curbside services: G=Garbage, R=Recycling, Y=Yard Debris, B=Bulk Waste.
(3) Costs of service: G=Garbage, R=Recycling, Y=Yard Debris, B=Bulk Waste, D=Disposal.
(4) Fee covers cost of service for collections and disposal.
(5) Fee covers cost of service for collections; Disposal costs are covered by other income.
(6) Fee does not cover full cost of service for collection and disposal.
(7) Municipality owns and operates a municipal solid waste landfill.
(8) Municipality hauls waste for disposal at a third part municipal solid waste landfill.

# 4 Evaluation of Utility Modifications

After determination of the “short-listed” scenarios for further evaluation, HDR prepared TM 401 for the purpose of documenting the identified scenarios in comparison of the existing conditions baseline model. Based on discussions with City staff, the City and HDR identified the following potential modifications to be evaluated:

- Variable Rate Cart structure for both curbside and alley customers;
- Variable Rate Cart and Bag structure for both curbside and alley customers; and
- Residential curbside and alley grass clipping collection.

For each of the alternative scenarios identified, HDR evaluated the scenarios based on the following set of criteria, compared to the current case:

- Estimated route metric impacts;
- Estimated labor cost impacts;
- Estimated operating and maintenance cost impacts; and
- Estimated capital cost impacts.

Detailed discussions and analysis are included in TM 401 in Appendix C. The following sections summarize the findings of the evaluation of the three scenarios for the residential curbside and residential alley customer classes.

## 4.1 Residential Curbside Garbage Collection

The City's current curbside garbage collection service is provided once a week to each household and is comprised of three routes on Monday and five routes Tuesday through Friday, for a total of 23 routes per week. Two-person crews (one driver and one collector) use multi-pack collection vehicles to collect 96-gallon carts from each household. While curbside customers are provided with a 96-gallon cart, set-outs are not currently limited to what is placed in the cart. Materials are required to be properly containerized, but may be placed in the cart, in bags, or in other customer provided containers of up to 35-gallons in size with lids.

Based on discussions with other communities that have implemented variable rate cart programs that include additional, specially marked and purchased, bags for out-of-cart set-outs, it has been observed that initially, there are higher numbers of additional bags set out by residents. However, over time, the number of additional bags set out for collection decreases dramatically. For example, a number of communities reported that during the initial 18-24 months of operation, a majority of customers set-out additional bags for collection. However, after this initial period, customer set-outs of additional bags reduced sharply and eventually approached zero additional bags during an average week.

For these reasons, a "Variable Rate Cart + Bag - Mature" scenario as well as a "Variable Rate Cart + Bag – Initial" scenario have been included in this analysis in order to show differences in certain metrics (though some metrics are identical) between a mature system and a recently implemented (Initial) system. Therefore, the model was designed to evaluate estimated, planning level cost and operational impacts under the following scenarios:

1. No change in services offered ("Current Case");
2. Changing to a Variable Rate Cart program collected by a fully-automated side-loader ("Variable Rate Cart"), with no allowance for out-of-cart set-outs;
3. Changing to a Variable Rate Cart program with specially marked bags for purchase by customers for out-of-cart set-outs, collected by a fully-automated side-loader, in a mature system ("Variable Rate + Bag – Mature"); and
4. Changing to a Variable Rate Cart program with specially marked bags for purchase by customers for out-of-cart set-outs, collected by a fully-automated side-loader, initially ("Variable Rate + Bag - Initial).

TM 401 included an analysis of the anticipated costs of providing changes to the residential service collection as described above continuing the process of collecting five days per week. During staff review of the findings and recommendations of TM 300, it was requested that the feasibility of providing residential curbside collection four days per week be analyzed. The following sections summarize the TM 401 analysis and an updated analysis for completing the collection four days per week.

### 4.1.1 Five Days per Week Collection Estimated Costs

The anticipated impact on number of vehicles and routes for the potential system modifications compared to the Current Case for curbside garbage collection service is shown in Table 19 . With each of the potential modifications, the number of vehicles/routes could be reduced to 4, from the Current Case that uses 5 vehicles.

**Table 19 – Residential Curbside Alternative Scenarios – 5 Days per Week**

| Scenario | Vehicle Type | Number of Vehicles | Routes per Week |
|---|---|---|---|
| Current Case | Multi-Pack | 5 | 23 |
| Variable Rate Cart | Fully-Automated Side-Loader | 4 | 20 |
| Variable Rate Cart + Bag - Mature | Fully-Automated Side-Loader | 4 | 20 |
| Variable Rate Cart + Bag - Initial | Fully-Automated Side-Loader | 4 | 20 |

Each of the proposed scenarios results in increases in the number of customers that can be served on each route. This is demonstrated in the ability to reduce the number of trucks deployed and routes per week.

**Collection Technology**

By switching to fully-automated side-loaders, sanitary collectors are not required.

It is expected that for the Variable Rate Cart + Bag – Mature scenario, the use of additional bags will be rare, which will allow the vehicle driver to collect the bags with minimal effect on efficiency, and no need for a collector. For the Variable Rate Cart + Bag – Initial scenario, it is assumed that one collector will be used in order to assist with collecting the extra bags, expected to be more frequent in the initial system.

Each of the three proposed scenarios will result in a decrease in the number of sanitary collectors required for the utility. Reducing the number of required sanitary collectors does not indicate the recommendation, or requirement, to downsize City staff. Any changes to the collections operations will require multiple years to fully implement and it is expected that excess staff will be relocated to other positions or handled through attrition.

Also included in the evaluation was the effect of modification on annual costs associated with vehicle operation and maintenance, and capital costs. All of the proposed scenarios include changing to fully automated vehicles from the current use of multi-pack trucks. Although the fully-automated side-loader has a higher annual maintenance and repair cost, the smaller fleet size results in an overall annual savings.

Capital costs include the purchase and distribution of new variable sized wheeled carts, purchase of new and replacement collection vehicles and other necessary large items to operate the utility. The proposed scenarios result in an estimated savings of nearly

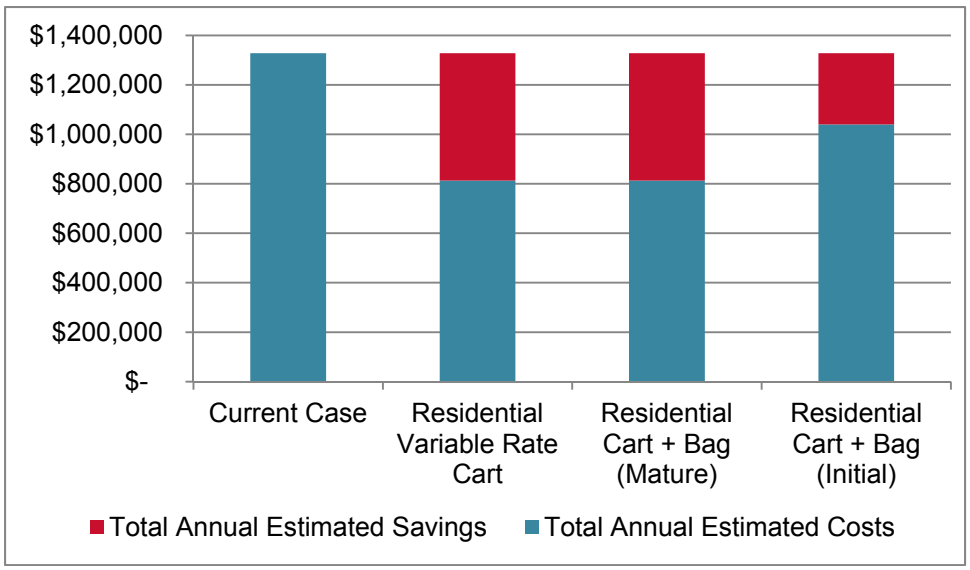
$515,000 in capital costs each year.  The fully-automated side-load vehicles are believed to be available at a lower cost than the current multi-pack vehicles. Additionally, the alternative scenarios require fewer vehicles.

Table 20 summarizes the total annual estimated costs associated with the current system and the alternative scenarios. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

### Table 20 - Residential Curbside Garbage - Estimated Total Annual Cost. 5-Days Per Week

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Estimated Total Annual Labor Cost | $699,000 | $352,000 | $352,000 | $579,000 |
| Estimated Total Annual Vehicle Operating Cost | $160,000 | $148,000 | $148,000 | $148,000 |
| **Estimated Total Annual Operating Cost** | **$859,000** | **$500,000** | **$500,000** | **$727,000** |
| | | | | |
| Estimated Total Annual Vehicle Capital Cost | $392,000 | $236,000 | $236,000 | $236,000 |
| Estimated Total Annual Cart Cost | $86,000 | $86,000 | $86,000 | $86,000 |
| **Estimated Total Annual Capital Cost** | **$478,000** | **$322,000** | **$322,000** | **$322,000** |
| | | | | |
| **Estimated Total Annual Cost** | **$1,337,000** | **$822,000** | **$822,000** | **$1,049,000** |
| **Estimated Total Annual Savings** | **$-** | **$515,000** | **$515,000** | **$288,000** |

### Figure 1 - Residential Curbside Garbage - Estimated Total Annual Costs, 5 Days per Week




As shown in Figure 1, each of the alternative scenarios results in an overall estimated savings compared to the current case. The above costs are presented as feasibility numbers for the purpose of comparing multiple scenarios. This analysis is not a true cost of service calculation. Potential annual savings will be realized over a number of years as changes are implemented and the operations mature.

### 4.1.2 Four Days per Week Collection Estimated Costs

Currently, the City observes 10 holidays throughout the year. The garbage collection schedule is modified during weeks with a holiday resulting in delayed service to customers. Generally, this adjustment results in two routes being collected on one day.

In order to accommodate holidays, a four-day per week collection system was modeled. Operating four days per week would allow all customers to receive collection service weekly, regardless of holidays.

The four-day collection model was based on the following assumptions:

1. Collection would occur Monday through Thursday;
2. Collection schedule would shift during weeks with holidays;
3. Four, fully-automated side loaders would be utilized;
4. The collection staff would work a 10-hour shift;
5. A maximum achievable production rate is within 190 to 200 stops/hour.

The results of the impacts to key route metrics are shown in Table 21. For comparison purposes, the Current Case is included, along with the Variable Rate Cart alternative, presented in TM 401.

**Table 21 - Residential Curbside Route Model Results. 4 Days per Week**

| Metric | Current | Variable Rate Cart – 5 Days | Variable Rate Cart – 4 Days |
|---|---|---|---|
| Number of Units (1) | 17,270 | 17,270 | 17,270 |
| Trips to Facility (2) | 2 | 2 | 3 |
| Hours per Day | 6.43 | 7.17 | 9.42 |
| Number Stops per Day | 3,416 | 3,281 | 4,102 |
| Miles per Trip (3) | 16.44 | 18.91 | 23.63 |

Notes:

1) TM 300 and 401 previously modeled the number of accounts. This number has been updated to reflect the number of household units.
2) Due to truck weight capacity limits, the 4 –Day system would require trucks make 3 trips to the facility throughout the day.
3) With eight less trips to the facility overall, each route will increase in length.

Table 21 indicates that the residential curbside collection could be achieved within a four day week, while keeping collectors working within a 10-hour day. As a result of fewer overall routes, the 4-day collection system has longer routes with more homes per route, and therefore has a larger fuel expense.

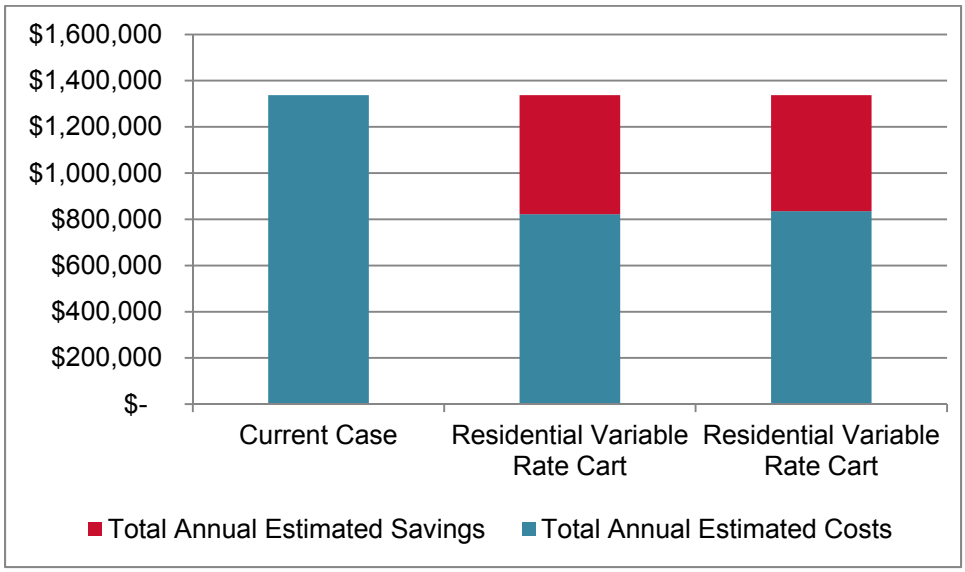
Table 22 summarizes the total annual estimated costs associated with the current system and a 4-day collection system. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

**Table 22 - Residential Curbside Garbage - Estimated Total Annual Cost. 4 Days Per Week**

| Metric | Current | Variable Rate Cart – 5 Days | Variable Rate Cart – 4 Days |
|---|---|---|---|
| Estimated Total Annual Labor Cost | $699,000 | $352,000 | $352,000 |
| Estimated Total Annual Vehicle Operating Cost | $160,000 | $148,000 | $161,000 |
| **Estimated Total Annual Operating Cost** | **$859,000** | **$500,000** | **$513,000** |
| | | | |
| Estimated Total Annual Vehicle Capital Cost | $392,000 | $236,000 | $236,000 |
| Estimated Total Annual Cart Cost | $86,000 | $86,000 | $86,000 |
| **Estimated Total Annual Capital Cost** | **$478,000** | **$322,000** | **$322,000** |
| | | | |
| **Estimated Total Annual Cost** | **$1,337,000** | **$822,000** | **$835,000** |
| **Estimated Total Annual Savings** | **$-** | **$515,000** | **$502,000** |

As shown in Table 22, the 4-day system results in an overall estimated savings compared to the current case and addresses the challenge of holiday collection, though its costs are estimated slightly higher than the five day per week scenario, due to the difference in fuel expense.

**Figure 2 - Residential Curbside Garbage - Estimated Total Annual Costs, 4 Days per Week**



### 4.1.3 Residential Curbside Collection System Capacity

After the completion of TM 300 and TM 401, City staff requested that analysis of the collection technology change include an estimate of the total number of pick-ups that could be collected. This estimate could be used to determine when additional routes (trucks) would need to be added to the system in the future.

Table 23 demonstrates the estimated total number of residential curbside units that could be serviced by the four routes per day operating 10-hours per day. As shown, this automated system would have the ability to potentially service an additional approximate 2,000 to 3,000 curbside units, though some rebalancing of routes may be required.

The "Bismarck and Mandan North Dakota Housing Demand Analysis – 2030" prepared by Hanna:Keelan Associated in October of 2015 predicted that, on average, Bismarck will add 350 new single family homes per year between 2015 and 2030. This results in an estimate that a new curbside residential route be added in approximately 5 to 8 years.

**Table 23 - Residential Curbside System Capacity**

| Stops per Hour | Hours per Day | No. of Units | Increased Capacity (Units) (1) |
|---|---|---|---|
| 190 | 9.75 | 19,307 | 2,037 |
| 200 | 9.75 | 20,323 | 3,053 |

Notes:

1) The increased capacity is the number of units exceeding the existing 17,270 units currently serviced.

## 4.2 Residential Alley Garbage Collection

The City's current alley garbage collection service is provided once a week to each household using rear-load collection vehicles, and is comprised of two routes on Tuesday and two routes Wednesday and Thursday that complete one trip designated as alley before collecting apartments, for a total of 4 complete routes per week. Two-person crews (one driver and one collector) use rear-load collection vehicles to collect garbage from each household. The residential alley customers provide their own garbage cans and are not limited to the amount of garbage that can be set out.

### 4.2.1 Residential Alley Semi-Automated Collection

**Collection Technology**

Switching alley collection to fully automated collection technology was not considered feasible by City staff due to the limited clearance in the alley serviced

The selection of potential system modifications, similar to the curbside system, resulted in three alternative scenarios for alley garbage collection service, as shown in Table 24. In each alternative scenario, a 20 cubic yard rear-load vehicle with a tipper is recommended, rather than the 25 cubic yard rear-load vehicles that are used in the Current Case. The recommendation of a smaller vehicle size is due to the fact that the Current Case vehicles are estimated to be only half full when arriving at the

facility each trip. The alternative scenarios also include a recommendation to complete two full days of residential alley routes, instead of the existing system which consists of one full day and two partial days, each with two vehicles. The model was designed to evaluate estimated, planning level cost and operational impacts under the following scenarios:

1. No change in services offered (Current Case);
2. Changing to a Variable Rate Cart program collected by rear-load vehicles with tippers (Variable Rate Cart);
3. Changing to a Variable Rate Cart program with specially marked bags for purchase collected by rear-load vehicles with tippers (Variable Rate Cart + Bag – Mature);
4. Changing to a Variable Rate Cart program with specially marked bags for purchase collected by rear-load vehicles with tippers (Variable Rate Cart + Bag – Initial)

**Table 24 – Residential Alley Semi-Automated Alternative Scenarios**

| Scenario | Vehicle Type | Number of Vehicles | Routes per Week | Vehicle Capacity |
|---|---|---|---|---|
| Current Case | Rear-Load | 2 | 4 | 25 CY |
| Variable Rate Cart | Rear-Load with Tipper | 1 | 3 | 20 CY |
| Variable Rate Cart + Bag - Mature | Rear-Load with Tipper | 1 | 3 | 20 CY |
| Variable Rate Cart + Bag - Initial | Rear-Load with Tipper | 1 | 3 | 25 CY |

The scenarios presented in TM 401 have been modified to adjust to the updated number of units. After the completion and review of TM 300 the number of alley customers and pick-up locations was further refined based on the additional data developed from City billing databases, GIS layers and analysis of the collection vehicle wheel paths as monitored by the GPS equipment in the trucks. The wheel track data, provided in GIS format, was used to refine the number of alley customers. As a result, the number of alley customers has decreased from the value reported in TM 300 and TM 401.

Each of the proposed scenarios includes the use of cart tippers installed on the rear-load vehicles. While this is a change in technology the result is not an automated solution and the total number of customers per day that can be served by each route does not greatly increase.

Labor costs will not be reduced for the proposed scenarios as all will include the same number of drivers and collectors. Again, without changing to a fully automated collection technology, there will not be a significant change in estimated labor costs.

Also included in the evaluation was the effect of modification on annual costs associated with vehicle operations and maintenance, and capital costs. The anticipated savings for switching to a smaller vehicle size is approximately $218,000 annually. The Variable Rate Cart and Mature Variable Rate Cart + Bag alternative scenarios indicates the same amount of savings because they each assume the use of smaller (20 cubic yard) vehicles and a reduced estimate of maintenance cost per vehicle. Potential savings from a smaller truck size is offset by the need to purchase and distribute wheeled carts to the

alley customers. The Variable Rate Cart + Bag – Initial alternative does not reduce the waste per household significantly enough to use a smaller vehicle. As result, there is fewer savings for the vehicle capital cost.

Table 25 summarizes the total annual estimated costs associated with the current system and the alternative scenarios. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

Exhibit 3 shows the residential alley service collection locations included in the semi-automated modeling.

**Table 25 – Residential Alley Semi-Automated Collection- Estimated Total Annual Cost**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Estimated Total Annual Labor Cost | $453,000 | $453,000 | $453,000 | $453,000 |
| Estimated Total Annual Vehicle Operating Cost | $49,000 | $25,000 | $25,000 | $25,000 |
| **Estimated Total Annual Operating Cost** | **$502,000** | **$301,000** | **$301,000** | **$301,000** |
| | | | | |
| Estimated Total Annual Vehicle Capital Cost | $64,000 | $44,000 | $44,000 | $51,000 |
| Estimated Total Annual Cart Cost | $- | $3,000 | $3,000 | $3,000 |
| **Estimated Total Annual Capital Cost** | **$64,000** | **$47,000** | **$47,000** | **$54,000** |
| | | | | |
| **Estimated Total Annual Cost** | **$566,000** | **$348,000** | **$348,000** | **$355,000** |
| **Estimated Total Annual Savings** | **$-** | **$218,000** | **$218,000** | **$211,000** |

**Figure 3 - Residential Alley Semi-Automated Estimated Total Annual Costs**


Completing residential alley collection on a four-day per week collection schedule does not require additional feasibility analysis because the total number of routes does not exceed four per week. It is anticipated that residential alley collection will be modified for two-day per week collection if the decision is made to convert to volumetric fee structure and semi-automated collection methods.

### 4.2.2 Residential Alley Automated Collection

After the completion and review of TM 300 & TM 401 the number of alley customers and pick-up locations was further refined based on the additional data developed from City billing databases, GIS layers and analysis of the collection vehicle wheel paths as monitored by the GPS equipment in the trucks.

After review with City collection staff, a GIS layer indicating the pick-up location for residential alley customers was developed. The number of alley pick-up locations was determined to be 1,912. Additionally, the alley locations were reviewed in the field with the City staff and determined that approximately 90% could likely be converted to automated pick-up in the alley locations. The remaining pick-ups would likely need to be completed using rear-load trucks because it would not be feasible to collect with an automated side loader truck. These pickups have the potential to be collected by the rear-load vehicle dumpster fleet. Exhibit 4 shows the residential alley locations that can likely be converted to automated collection.

A model was designed to evaluate estimated, planning level cost and operational impacts for switching to fully-automated collection for a majority of the alley customers. The model was created under the following assumptions:

1. Collection would occur Monday through Thursday;
2. Fully-automated side loaders would be utilized;
3. The collection staff would work a 10-hour shift;

4. Customers would place the garbage carts in the alley location and would not be required to place the carts in the street.
5. Automated collection will require either a collection vehicle with an arm on each side or for the vehicle to drive each alley twice.
6. Customers located in alleys with limited space would be collected by the dumpster rear-load fleet.

The results of the impacts to key route metrics are shown in Table 26. For comparison, the Current Case and Variable Rate Cart alternative, presented in TM 401, are also shown.

**Table 26 - Automated Residential Alley Metrics**

| Metric | Current | Variable Rate Cart - Manual | Variable Rate Cart – Automated |
|---|---|---|---|
| Number of Units (1) | 1,912 | 1,912 | 1,912 |
| Number of Collection Days per Week | 2 | 3 | 2 |
| Number of Trucks | 2 | 1 | 1 |
| Trips to Facility (2) | 2 | 2 | 3 |
| Stops per Day | 880 | 605 | 1,816 |
| Total Number of Sanitation Collectors (3) | 4 | 2 | 0 |
| Total Number of Truck Drivers | 2 | 1 | 2 |
| Vehicle Cost | $149,500 | $155,000 | $275,000 |

Notes:

1) The Current Case number of units has been reduced from TM 300 and TM 401 as a result of updated GIS data. The Automated Alley Collection assumes 90% of alley customers are capable of being accessed by a full-automated vehicle.
2) The Automated Alley Collection assumes a 10-hour work day and an increase in trips to the facility.
3) Switching to an automated collection allows the driver to collect the carts without exiting the vehicle.

As shown in Table 26, collecting the alleys with a fully-automated vehicle could be achieved in two, ten-hour days, with one vehicle. With the fully-automated vehicle, a higher rate of stops per hour is achievable. The fully-automated vehicle also does not require use of sanitary collectors, allowing those positions to fill another role in the utility. However, the fully-automated vehicle has a higher purchase price and higher expected annual maintenance costs.

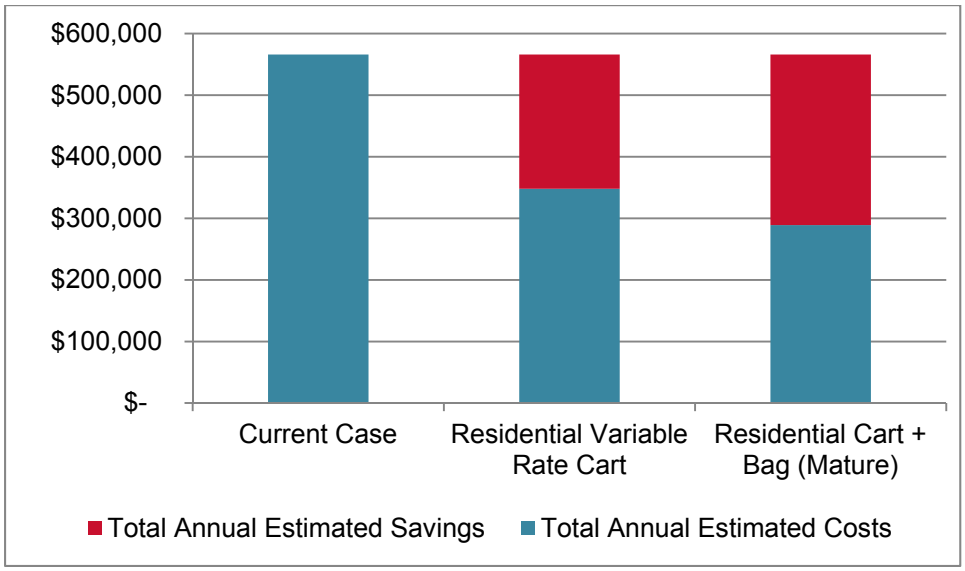
Table 27 summarizes the total annual estimated costs associated with the current system and the alternative scenarios. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

**Table 27 - Automated Residential Alley - Estimated Total Annual Cost**

| Metric | Current | Variable Rate Cart - Manual | Variable Rate Cart - Automated |
|---|---|---|---|
| Estimated Total Annual Labor Cost | $453,000 | $276,000 | $162,000 |
| Estimated Total Annual Vehicle Operating Cost | $49,000 | $25,000 | $45,000 |
| **Estimated Total Annual Operating Cost** | **$502,000** | **$301,000** | **$207,000** |
| | | | |
| Estimated Total Annual Vehicle Capital Cost | $64,000 | $44,000 | $79,000 |
| Estimated Total Annual Cart Cost | $- | $3,000 | $3,000 |
| **Estimated Total Annual Capital Cost** | **$64,000** | **$47,000** | **$82,000** |
| | | | |
| **Estimated Total Annual Cost** | **$566,000** | **$348,000** | **$289,000** |
| **Estimated Total Annual Savings** | **$-** | **$218,000** | **$277,000** |

Table 27 indicates the Variable Rate Cart – Automated alternative presents a cost savings of approximately $277,000. The fully-automated vehicle, due to its higher achievable efficiency rate, has the ability to collect more households in fewer collection days. This results in greater labor related savings.

**Figure 4 - Residential Alley Garbage - Estimated Total Annual Costs Automated Collection**




## 4.3 Residential Yard Waste Collection

The City currently operates 18 yard debris collection sites that consist of dumpsters that are collected seven days a week during the growing season. The City deploys three rear-load vehicles for yard debris collection from these sites each day from May through October. TM 401 includes a detailed discussion for the development of the estimated annual costs of the yard debris collection program. The following sections of this report

summarize the findings of TM 401, which is included as Appendix C. For 2016, the City estimates that the labor, fuel and vehicle maintenance (total operating cost) cost of providing these collection sites is $224,000. Based on conversations with the City and their cost of service consultant, capital costs are not included (e.g. amortization of collection vehicles and dumpsters used in this service).

An operational model was developed to estimate the operational and financial impacts of implementing a curbside and alley yard waste collection service for residential customers under the following assumptions:

- Curbside yard waste collection would utilize 25 cubic yard fully-automated side-loaders;
- Alley yard waste collection would utilize 20 cubic rear loaders with tippers;
- Each resident would receive an additional 96-gallon cart to use for yard waste.
- The yard waste collection would occur May through October.

It is important to note that the TM 401 modeling exercise estimates annual metrics for route, labor, operations and maintenance, and capital. However, as the City would only offer the service for five months out of the year, for the summary metrics, a 41.66% ratio has been applied to labor and operating expenses. Capital costs were not reduced for seasonal variations. Additionally, the yard waste was modeled as an independent service. It is likely that the yard waste collection service would utilize the same staff and vehicle resources as garbage collection. The estimated costs below reflect salaries and capital costs for separate labor and vehicles, though if the City decided to implement this service, labor and vehicle costs could potentially be shared with other services. Table 28 shows the estimated annual cost of providing seasonal curbside yard waste collection.

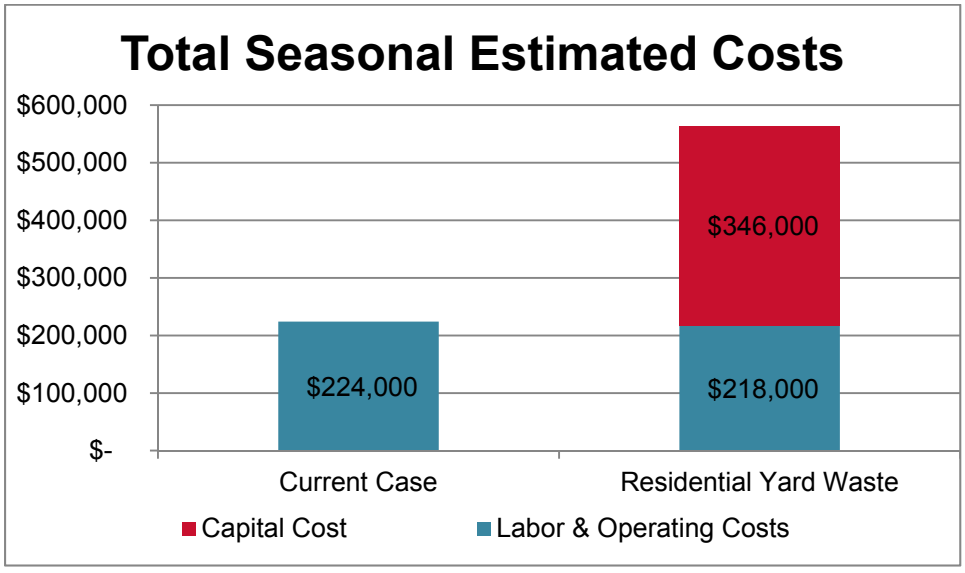
### Table 28 - Residential Yard Waste Estimated Total Seasonal Costs

| Estimated Cost | Curbside Yard Waste Collection | Alley Yard Waste Collection | Total Residential Yard Waste Collection |
|---|---|---|---|
| Total Labor Cost (1) | $105,000.00 | $50,000 | $155,000 |
| Total Vehicle Operating Cost (1) | $53,000.00 | $10,000 | $63,000 |
| **Total Operating Cost (1)** | **$158,000** | **$60,000** | **$218,000** |
| | | | |
| Total Vehicle Capital Cost (2) | $196,000 | $44,000 | $240,000 |
| Total Cart Cost (2) | $95,000 | $11,000 | $106,000 |
| **Total Capital Cost (2)** | **$291,000** | **$55,000** | **$346,000** |
| | | | |
| **Total Cost** | **$449,000** | **$115,000** | **$564,000** |

Notes:
(1) Seasonal cost, it is assumed that labor will be shared with other parts of the utility.
(2) Annual cost, it is assumed that the capital costs will be allocated to this service.

Although the estimated costs for providing residential grass clipping collection exceed the current estimated Total Operating Cost of $224,000, it is important to note that the current cost does not contain the amortization cost of vehicles and dumpsters. Additionally, it is likely that garbage collection staff could perform this service. As an example, the proposed alley collection service consists of one vehicle operating twice per week. The same crew would be able to perform the yard waste collection during the remainder of the week, with the same vehicle. As a result, the estimated labor cost, vehicle capital cost, and vehicle operating cost would be reduced as they are already represented in the garbage collection cost.

### Figure 5 - Residential Yard Waste - Estimated Total Annual Costs



# 5 Collection Boundaries for Optimization & Growth

Currently, Bismarck operates a 5-day per week collection schedule, with the City divided into five zones for residential collection. During weeks with holidays, the schedule is modified, resulting in either the collection of two zones on one day, or a zone being skipped during that week. The boundaries were revised with the following objectives and assumptions:

1. Collection would be performed on a 4-day per week basis;
2. Curbside collection would be converted to automated system with the requirement that all waste is contained in a cart or prepaid bag,
3. The number of units would be balanced per zone;
4. The number of units would remain balanced with the addition of platted, but currently undeveloped, parcels;
5. Alley customers would not be represented as they make up a minority of the customer base and are collected by a rear load truck.

## 5.1 Existing Residential Collection Zones

The City currently serves the 17,270 customers on a 5-day per week basis. The collection schedule is comprised of three routes on Monday and five routes Tuesday through Friday. Table 29 indicates the number of pick-ups per weekday.

**Table 29 - Existing Residential Pick-ups**

| | Existing Units | Platted Future Units | Increase |
|---|---|---|---|
| **Monday** | 2,900 | 3,532 | 632 |
| **Tuesday** | 3,638 | 3,852 | 214 |
| **Wednesday** | 3,348 | 3,808 | 460 |
| **Thursday** | 3,900 | 3,973 | 73 |
| **Friday** | 3,484 | 3,947 | 463 |
| **Total** | 17,270 | 19,112 | 1,842 |

The platted future units per zone were estimated by assigning a pick-up to currently undeveloped, platted lots. Although Mondays contain fewer pick-ups than the other zones, Table 29 indicates that with the addition of platted future units, the five zones will become more balanced over time.

Exhibit 1 Residential Collection Locations, included as an attachment to this final report, documents the existing and platted future pick-up locations that were used to develop the revised route zone boundaries. The GIS layer used to create this exhibit is included in the project GIS data transferred to the City with this final report.

## 5.2 Recommended Revised Residential Collection Zones

The existing route boundaries were revised under the assumption that the City would perform the collection throughout the course of four days during the week and assuming changes in technology for curbside collection would enable the City to collect more efficiently. Under these assumptions, the maximum number of pick-ups per zone is approximately 4,800. The zones were revised in order to accommodate growth to the northwest and northeast without requiring major boundary changes. Table 30 contains the number of pick-ups within each of the revised zones.

**Table 30 – Revised Residential Pick-ups Zones**

| | Existing Units | Platted Units | Increase |
|---|---|---|---|
| **Zone 1** | 4,442 | 4,779 | 337 |
| **Zone 2** | 3,818 | 4,480 | 662 |
| **Zone 3** | 4,779 | 5,210 | 431 |
| **Zone 4** | 4,231 | 4,643 | 412 |
| **Total** | **17,270** | **19,112** | **1,842** |

The recommended collection zones maintain an overall balanced schedule. Additionally, the boundaries would accommodate growth to the north with minimal changes to the boundaries. As the customer base extends north, it is recommended that the northern boundary of Zone 2 also moves north to the next major street. This allows the north-south boundary lines to remain the same and only requires the shifting of one border.

Collecting over four days provides flexibility to the collection service. This allows all customers to receive service, regardless of the presence of holidays or other delays in service. Using the Growth Management Plan developed by the City, the revised boundaries were also evaluated to determine the long-range planned customers. It was assumed that for Low Density Residential, there would be an average of 6 units per acre. Table 31 contains the number of low density units within each zone boundary.

**Table 31 - Growth Management Pick-ups**

| | Low Density Residential (acres) | Growth Management Units | Total Units[1] |
|---|---|---|---|
| Zone 1 | 3,370 | 20,220 | 24,999 |
| Zone 2 | 303 | 1,818 | 6,298 |
| Zone 3 | 1,627 | 9,762 | 14,972 |
| Zone 4 | 265 | 1,590 | 6,233 |
| Total | 5,565 | 33,390 | 52,502 |

Notes:

(1) Total Units includes Existing Units, Platted Future Units and Growth Management Units.

As previously mentioned, it is recommended that as the City continues to develop to the north, the northern boundary of Zone 2 be moved further north to maintain balanced routes on a daily basis. Refer to the attached Exhibit 5 for a graphic representation of the proposed collection zones.

## 5.3 Proposed Collection Routes

Each zone has been further divided to show the approximate collection route that each truck will need to cover inside the zone. The routes within the collection zones were revised with the following objectives and assumptions:

1. Four, fully-automated vehicles would perform the collection;
2. The work day for the collection staff would begin at 7:00 am and end at 5:30 pm, allowing for a half-hour lunch and three fifteen-minute breaks;
3. The number of units, including existing units and platted, currently undeveloped units, would be balanced per route;
4. Growth Management Units were not represented as they will occur over a significant time period, likely greater than 10-years; and
5. Residential alley customers would not be represented as they make up a minority of the customer based and are collected by a rear load truck.

The boundaries were created in order to accommodate growth to the northwest and northeast without requiring major boundary changes. By balancing the existing units and platted, currently undeveloped units, the route boundaries will require minimum rebalancing within the next two to three years. Table 32 through Table 35 contain the number of pickups within each route boundary per collection zone. In these tables, the "Existing Units" are the estimated collection points as of the July 2015 billing listing and GIS analysis of the truck routes. "Platted Units" are lots that have been created by existing plats, are zoned residential, and will be a garbage collection location after a structure is built. "Total Units" is the sum of the "Existing Units" and "Platted Units".

### Table 32 – Zone 1 Route Boundaries

| Route | Existing Units | Platted Units | Total Units(1) | Trips to Landfill |
|---|---|---|---|---|
| **Route 1-1** | 817 | 156 | 973 | 3 |
| **Route 1-2** | 1,485 | 34 | 1,519 | 3 |
| **Route 1-3** | 1,335 | 37 | 1,372 | 3 |
| **Route 1-4** | 805 | 110 | 915 | 3 |
| **Total** | **4,442** | **337** | **4,779** | **-** |

Notes:
(1) Total Units refers to the combination of Existing Units and Platted Units presented in TM 402. Total Units is the number of existing collection points plus the undeveloped platted single family parcels that will eventually be curbside collection points.

The recommended route boundaries for Zone 1 provide additional capacity to Route 1-1 and Route 1-4. These route boundaries were established to accommodate the anticipated growth to the northeast with minimal changes to the route boundaries.

### Table 33 – Zone 2 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 2-1** | 1,069 | 9 | 1,078 | 3 |
| **Route 2-2** | 1,095 | 2 | 1,097 | 3 |
| **Route 2-3** | 675 | 529 | 1,204 | 3 |
| **Route 2-4** | 979 | 122 | 1,101 | 3 |
| **Total** | **3,818** | **662** | **4,480** | **-** |

As described in TM 402, Zone 2 is expected to have minimal growth compared to the other collection zones as indicated in the Growth Management Plan. As a result, the recommended route boundaries for Zone 2 are overall balanced.

### Table 34 – Zone 3 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 3-1** | 1,332 | 3 | 1,335 | 4 |
| **Route 3-2** | 1,470 | 6 | 1,476 | 4 |
| **Route 3-3** | 1,126 | 179 | 1,305 | 4 |
| **Route 3-4** | 851 | 243 | 1,094 | 3 |

### Table 34 – Zone 3 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Total** | **4,779** | **431** | **5,210** | **-** |

The recommended route boundaries for Zone 3 provide additional capacity to Route 3-4 in order to accommodate the anticipated growth to the northwest with minimal changes to the route boundaries. The four routes operate in a high-density population area. As a result, the trucks are expected to reach weight capacity in less time, resulting in an additional trip to the landfill, without exceeding the overall collection time frame.

### Table 35 – Zone 4 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 4-1** | 708 | 264 | 972 | 3 |
| **Route 4-2** | 947 | 137 | 1,084 | 3 |
| **Route 4-3** | 1,234 | 4 | 1,238 | 4 |
| **Route 4-4** | 1,342 | 7 | 1,349 | 4 |
| **Total** | **4,231** | **412** | **4,643** | **-** |

The recommended route boundaries for Zone 4 also provide additional capacity to Route 4-1 and Route 4-2 in order to accommodate the anticipated growth to the north with minimal changes to the route boundaries.

Refer to Exhibit 6 through Exhibit 9 for a graphical representation of the routes by zone.

# 6 Conclusions

The following sections include a summary of key findings and conclusions from the evaluation of the City's current collection system and potential system modifications.

## 6.1 Key Findings for the Existing System

### 6.1.1 General System

Based on the review of the system data and route observations, the following general system key findings were identified:

1. Residential curbside collection consists of a semi-automated service with limited collection restrictions placed on the customers.
2. Residential alley collection consists of manual service with limited collection restrictions placed on the customers.
3. Apartment collection service consists of dumpster collections. Collection restrictions are inherent in the dumpster size and frequency of collection.
4. Currently, the collection service is managed by collection truck type and not customer service type. For example, residential alley collection occurs on the same routes as apartment collection.
5. Collection routes are not documented in a graphic format (maps).
6. Customer account numbers and types were difficult to determine based on the current process used to manage the data.
7. Asset management of containers and dumpsters is limited. It was difficult to determine the location of City owned dumpsters and the locations where City containers have been deployed.
8. The City currently has an 80% spare ratio for multi-pack vehicles, which is higher than a typical 35% spare ratio that is generally recommended for automated/semi-automated vehicles. This spare ration is higher than average due to the need to deploy additional routes on collection days following a City recognized holiday.
9. Collection crews return to the landfill for lunch breaks, which means vehicles are not necessarily at or near capacity when returning to the landfill. Changing this practice has the potential to make routes more efficient by only having collection vehicles return to the landfill when they are at or near capacity, or at the end of a collection day.

### 6.1.2 Residential Curbside Service

1. Residential curbside garbage collection service occurs five days a week with a total of 23-routes per week. There are approximately 17,200 curbside customers.
2. Individual routes are not documented in maps or GIS format.
3. Collection is completed with a semi-automated system, where residents have carts but are also allowed to place items outside of the carts. The City uses multi-pack

vehicles that have side-arm loading capabilities in addition to rear-loading capabilities.

4. The City's current residential curbside garbage collection system covers an average of 671 homes per route as shown by the route observations, which is well within the range of 500 to 800 homes per route that is typically observed in manual and semi-automated collection systems.
5. Use of the multi-pack vehicles for the current system that allows unlimited garbage to be placed at the curb is an efficient means of collection.
6. In fully automated systems, garbage routes typically cover between 1,000 and 1,300 homes per route.
7. Benchmarking of regional automated collection systems support the ability to service additional homes per route.
8. To achieve the benefits of fully automated collection, set out limits are required to be enacted and enforced.
9. It was observed that three of the seven curbside routes required more than one vehicle to complete the route. It was also observed that the time spent on the routes varied widely.

### 6.1.3 Residential Alley Service

1. The City's current residential alley garbage collection service occurs three days a week with a total of six routes per week. There are approximately 1,912 current residential alley customers.
2. Collection is completed using rear-load trucks where sanitation collectors manual load the garbage into the back of the truck. There are no setout limits on the amount of garbage placed at collection areas.
3. Residential alley customers provide their own refuse containers in the form of 32-gallon garbage cans and/or bags of refuse.
4. Routes occur three days per week and typically only collect alley service half of the day. On the second half of the day the same trucks collect apartment dumpsters.
5. Individual routes are not documented in maps or GIS format.
6. A limited number of apartment dumpsters are collected on the residential alley routes.
7. Determination of the location of current residential alley customers is difficult because the City does not have a record of the addresses, or accounts, that are collected on alley routes.
8. Alley collection locations were interpreted from account addresses, proximity to alley's identified in the GIS layers and review with the City staff.
9. City staff has indicated that switching to an automated collection technology is not practical due to the limited access and overhead obstacles in many of the collection locations.

10. Based on review of the interpreted alley collection locations, it appears that there is a portion of the alley service being competed in private driveways or private alleys.
11. Conversion of a significant portion of the alley collection to an automated technology may be possible for customers located adjacent to public alleys.

### 6.1.4 Apartment Dumpster Service

1. The City's current apartment collection system uses rear-load vehicles with a hook system to collect dumpsters from apartments and front-load automated vehicles to collect dumpsters from apartments.
2. Of the 783 dumpsters, 304 are believed to be collected by a front-load truck while the remaining 479 are collected by a rear-load truck.
3. Data gathered from both dumpster styles indicated they are under the 150 pounds per loose cubic yard expected with apartment residential waste.
4. A limited number of apartment dumpsters are collected by the residential alley routes.
5. Individual routes are not documented in maps or GIS format.
6. The City does not have an established asset management program for the dumpsters deployed.
7. Similar to curbside service, it was observed that two of the five alley/apartment collection routes required more than one vehicle to complete the route. It was also observed that time spent on each route varied widely.

### 6.1.5 Goals of Potential Modifications

With input from the City staff the following goals for modifying the collection system to allow for cost savings and efficacy included:

1. Change collection technology for the purpose of increasing the number of accounts that can be collected by individual routes.
2. Adopt and enforce residential set-out limits (amount of waste) and restrictions (how waste is containerized) for the purpose of increasing the number of accounts that can be collected by individual routes.
3. Rebalance and document collection routes.
4. Revise vehicle replacement policies to more efficiently manage spare ratios.
5. Revise collection routes by customer service type.
6. Implement a refined asset management mechanism utilizing the City's GIS databases to track deployed containers, track customer pickup locations, summarize customer service type by property, and document individual collection routes.

## 6.2 Key Findings for Potential Modifications

### 6.2.1 Residential Curbside Automated Collection

1. All scenarios included switching to fully automated collection trucks and providing set-out limits either in the form of wheeled carts of varying sizes and/or pre-sold bags.
2. These changes would be considered a “volumetric” fee base, as customers would be charged based on the size cart selected, and therefore amount of waste disposed.
3. The Variable Rate scenario and the Variable Rate + Bag – Mature scenario, for five day per week collection, are estimated to provide the City with the greatest savings, at roughly $515,000 in annual savings compared to the Current Case.
    a. Estimated savings are largely due to a switch to fully-automated side-load collection vehicles that would require only one driver and no collectors, and
    b. Would allow the City to complete collections with four routes per day instead of the current five routes per day.
4. The Variable Rate + Bag – Initial scenario is estimated to provide the City with some savings (nearly $288,000 annually), compared to the Current Case
    a. Estimated savings are largely due to the use of fully-automated side-load collection vehicles, which would allow the City to complete collections with 4 routes per day instead of the current 5 routes per day.
    c. However, the initial system would likely require one driver and one collector until the use of the extra bags by residents is diminished.
5. It is possible to complete the residential curbside collection utilizing a four day per week, 10-hour per day, schedule. The Variable Rate + Bag – Mature, for four day per week collection scenario is estimated to provide the City with roughly $502,000 in annual savings compared to the Current case.
6. It is estimated that the proposed four automated routes would be able to serve an additional 2,000 to 3,000 curbside units. Based on recent housing projections an additional route (truck) would need to be added between 2020 and 2023.

### 6.2.2 Residential Alley Collection

1. All scenarios included providing set-out limits either in the form of wheeled carts of varying sizes and/or pre-sold bags.
2. These changes would be considered a “volumetric” fee base, as customers would be charged based on the size cart selected, and therefore amount of waste disposed.
3. Without changing to an automated collection technology, it does not appear to be possible to achieve a significant increase in collection efficiency or cost savings.
    a. The Variable Rate scenario and the Variable Rate + Bag – Mature scenario are estimated to provide the City with the greatest savings, at roughly $218,000 in annual savings compared to the Current Case.

i. Estimated savings are largely due to labor related savings as a result of consolidating the current two routes into one route.

b. The Variable Rate + Bag – Initial scenario is estimated to provide the City with some savings (nearly $211,000).

c. Estimated savings are largely due to lower vehicle costs associated with the 20 cubic yard rear-loaders with tippers.

d. The initial system would likely require one driver and two collectors until the use of the extra bags by residents is diminished.

e. Changing to 20-cubic yard collection vehicles may not be an efficient modification for the potential annual costs savings as this would introduce a second size rear-load truck to the City fleet.

4. Review of the alley pick-up locations using GIS analysis and field visits determined that converting 1,712 of the 1,912 alley customers to an automated collection system appears possible.

   a. The Variable Rate – Automated scenario is estimated to provide the City with $277,000 in annual savings compared to the Current Case.

      i. Estimated savings are largely due to a switch to fully-automated side-load collection vehicles that would require only one driver and no collectors.

      ii. However, the fully-automated vehicle requires more annual maintenance and has a higher vehicle price.

   b. It is possible to complete the alley customers with one fully-automated vehicle in two days utilizing a 10-hour per day schedule.

### 6.2.3 Residential Yard Waste Collection

1. The City's current yard waste collection system consists of 18 yard debris collection sites with dumpsters located around the City that are collected seven days a week during the growing season.
2. The City deploys three rear-load vehicles for yard waste collection from these sites each day from May through October. The City estimates the current yard waste collection system total operations costs are estimated to be $225,000 for 2016. Capital costs are not included in this estimate (e.g. the amortization of collection vehicles or dumpsters).
3. If the City were to offer 96-gallon cart collection of yard waste to residential curbside and alley customers, the total estimated capital costs would be nearly $346,000 per year including the amortization of collection vehicles and carts.
4. The estimated total operations costs for providing 96-gallon cart collection of yard waste to residential curbside and alley customers is $218,000 per year.
5. The costs of the curbside yard waste collection can potentially be further offset by utilizing the same staff and vehicles as garbage collection.

### 6.2.4 Apartment Dumpster Service

1. The City's current dumpster collection system consists of 304 front-load dumpsters and 479 rear-load dumpsters collected between one and three times per week.
2. The current collected pounds of dumpster weight per loose cubic yard is well below the expected 150 pounds per cubic yard. This indicates the potential to scale dumpsters to a smaller size or collect on a less frequent basis.
3. Vehicles collecting dumpsters were observed to return to the landfill at half capacity, indicating capacity in the system to grow, and the potential to rebalance the route and fleet. This could also indicate the potential to convert to 20 cubic yard trucks.

# 7 Recommendations

1. Establish customer classes and track key metrics by these classes.
    a. Customer Classes should include, at a minimum,:
        i. Residential Alley Garbage
        ii. Residential Curbside Garbage
        iii. Apartment Dumpsters Garbage
        iv. Residential Alley Yard Debris
        v. Residential Curbside Yard Debris
    b. Base collection routes on Customer Class.
    c. Track and document collected garbage, and yard debris, by Customer Class on a monthly and annual basis.
2. Update the utility finical model to determine the cost of service by Customer Class and adjust the rates as approved by the City Council for a fair and equitable allocation of the true costs of the utility. How the rates are adjusted would be a policy decision to be made by the City Council.
3. Maintain and update the GIS database, provided with this final report, that can be used by the operators of the utility to:
    a. Track the location of deployed dumpsters and residential carts;
    b. Document the collection zones and collection routes;
    c. Document the location of customers by class.
4. Adopt a Volumetric Residential rate structure to incentivize recycling and equitably distribute the cost of garbage collection and disposal based on use of the system.
    a. Volumetric Rate structures are commonly used in water and sewer utilities. Customers understand that higher use of the utility results in a higher price.
    b. Garbage collection utilities can utilize the same principal. A volumetric rate structure charges a variable fee based on the size cart chosen by the customer.

5. Prior to implementing a volumetric collection system it is recommended that the City implement an education program that
    a. Informs the users of the size containers available,
    b. The typical number of bags of garbage each container holds on average, and
    c. Requests that the user selects a container size for the program.
    d. Based on previous experience, the majority of the users may not respond and will be assigned the default container size. Some systems allow a “swap out” period at no charge to change the size container, but begin charging a “swap out” fee outside of the initial grace period. Prior to the implementation, the City will need to determine the default container size for the utility.
6. To continue to provide high quality service to the customers after the adoption of a volumetric rate structure, implement the following additional services or utility features:
    a. Scheduled bulk waste collection. This service should consist of customers scheduling bulk waste item pick-up for a reasonable fee. Communities have reported that utilizing a bulk waste collection program has reduced the amount of large items set-out during spring/fall clean-up weeks and illegal dumping.
    b. Residential Holiday Collection. This program would allow excess garbage to be set-out without using pre-sold bags for the time from the first collection after Thanksgiving until the first collection of the New Year. This type of program benefits users that have typically limited garbage quantities but may have an increase from hosting holiday visitors.
    c. Landfill Disposal Vouchers. Provide users with disposal vouchers that allow passenger vehicle sized loads to dispose at the landfill without paying the typical tipping fee. Vouchers can be distributed on an annual basis, or as a coupon included with each utility bill. It is recommended that the program be based on vouchers, or coupons, that must be turned in at the landfill scale instead of based on address or showing a utility bill. Use of a voucher will mitigate the potential of abuse from commercial or non-City resident users.
    d. Spring/Fall Cleanup Weeks. It is recommended that the City continue the practice of cleanup weeks for large items and excessive waste. Other communities have reported that when these weeks are eliminated, illegal dumping increases.
7. Require that all residential garbage is placed in a City provided wheeled cart. Excess waste can be placed in specially marked, pre-sold bags adjacent to the cart. No oversized waste or garbage contained in user provided bags will be collected.
8. Modify the residential curbside to a fully automated system based on the “Variable Rate Cart + Bag - Mature” option described in this final report and TM 401.
9. Modify the residential alley collection to be a semi-automated system based on the “Variable Rate Cart + Bag - Mature” option described in this final report and TM 401.
    a. It is recommended that the residential alley collection be completed with the existing Heil multi-packs or rear-load vehicles.

b. Prior to purchasing new dedicated alley collection vehicles, the operational feasibility of converting to automated side loaders should be further explored. This final report concludes that it is highly probable that 1,712 users (90%) can be converted to automated side loader service.

10. Modify the residential collection to be performed on a four-day per week basis.
11. Perform a detailed evaluation and optimization of the Apartment Dumpster service to:
    a. Balance the collection days,
    b. Convert rear-load service to front load as operational consideration allows; and
    c. Review the size, number and routes of collection vehicles to optimize the returning weights of the collection fleet.
12. Cease to operate the 18-seasonal grass clipping drop sites. Replace with residential curbside and alley yard debris collection as described in this final report and TM 401.
13. Adopt the Collection Zones as shown in Exhibit 5.
    a. These zones result in a four-day per week, 10-hour per day, schedule.
    b. Collection should occur Monday – Thursday.
    c. Holiday collection should shift the balance of the week one day per zone with Thursday service being completed on Friday.
14. Adopt the Collection Routes as shown in Exhibit 6 to Exhibit 9.

# Appendix A. Exhibits

**Exhibit 1 Residential Collection Locations**

**Exhibit 2 Dumpster Collection Locations**

**Exhibit 3 Residential Alley Collection Locations – Semi Automated Service**

**Exhibit 4 Residential Alley Collection Locations – Automated Service**

**Exhibit 5 Proposed Residential Curbside Collection Zones**

**Exhibit 6 Proposed Residential Curbside Collection Routes – Zone 1**

**Exhibit 7 Proposed Residential Curbside Collection Routes – Zone 2**

**Exhibit 8 Proposed Residential Curbside Collection Routes – Zone 3**

**Exhibit 9 Proposed Residential Curbside Collection Routes – Zone 4**

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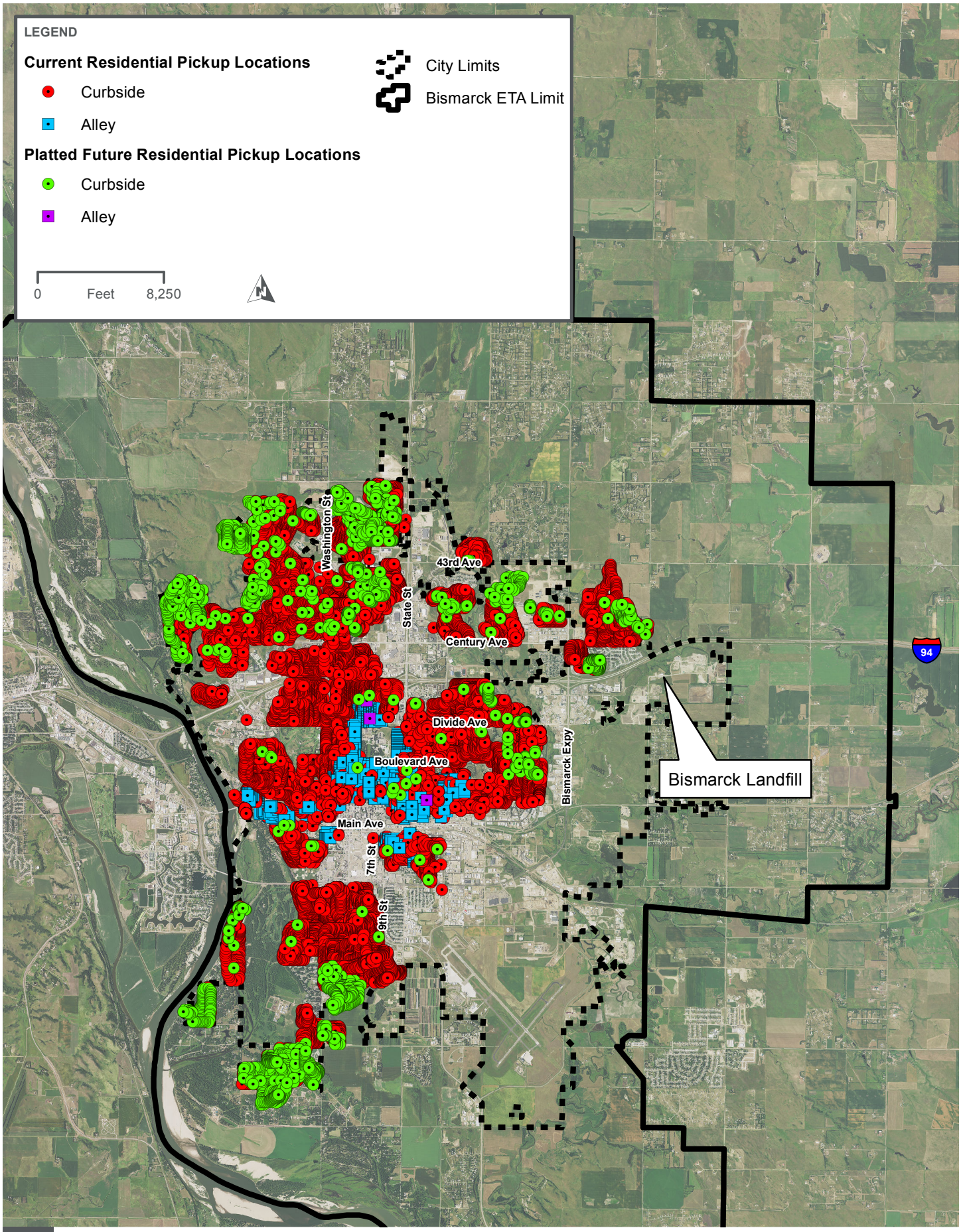
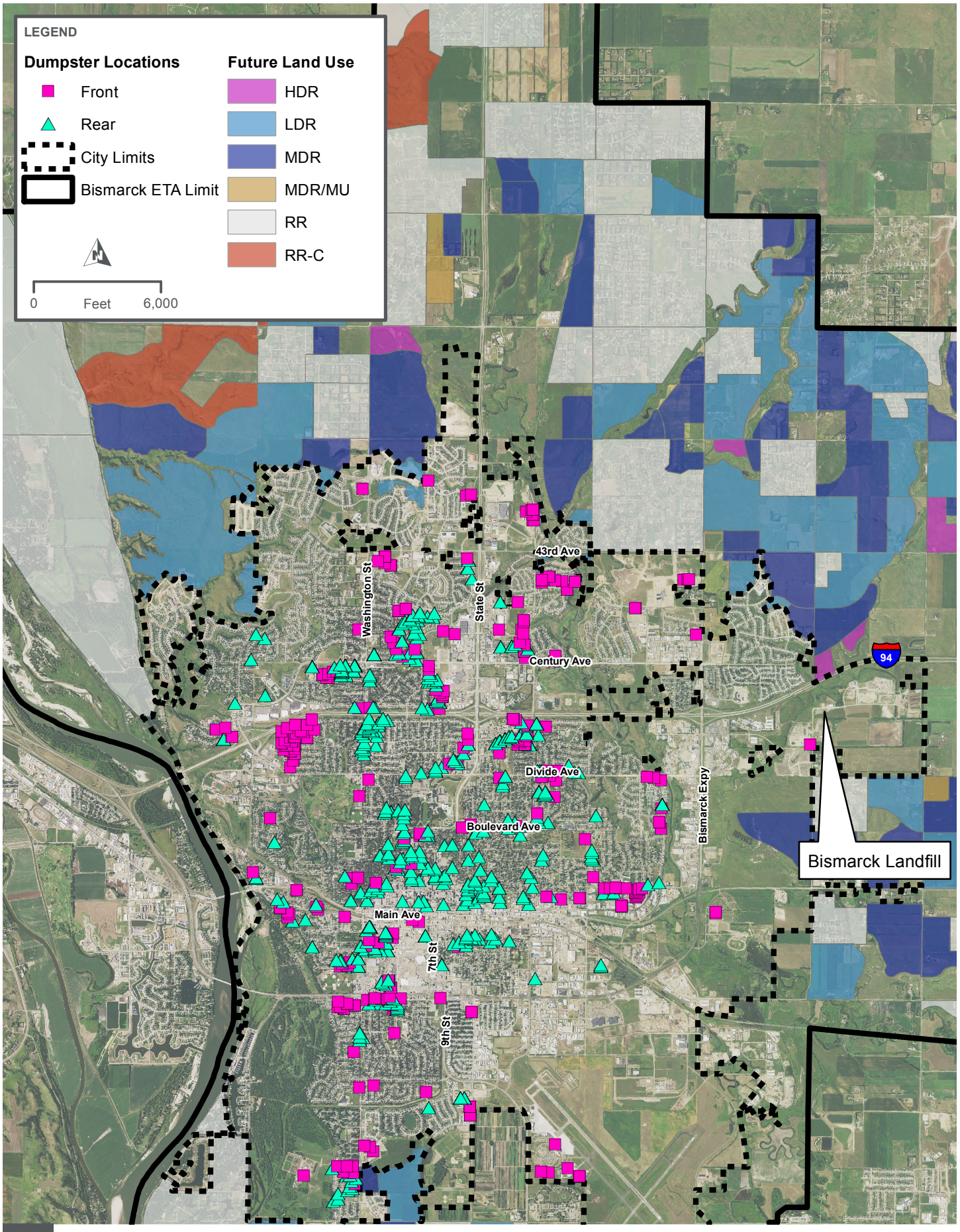



# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

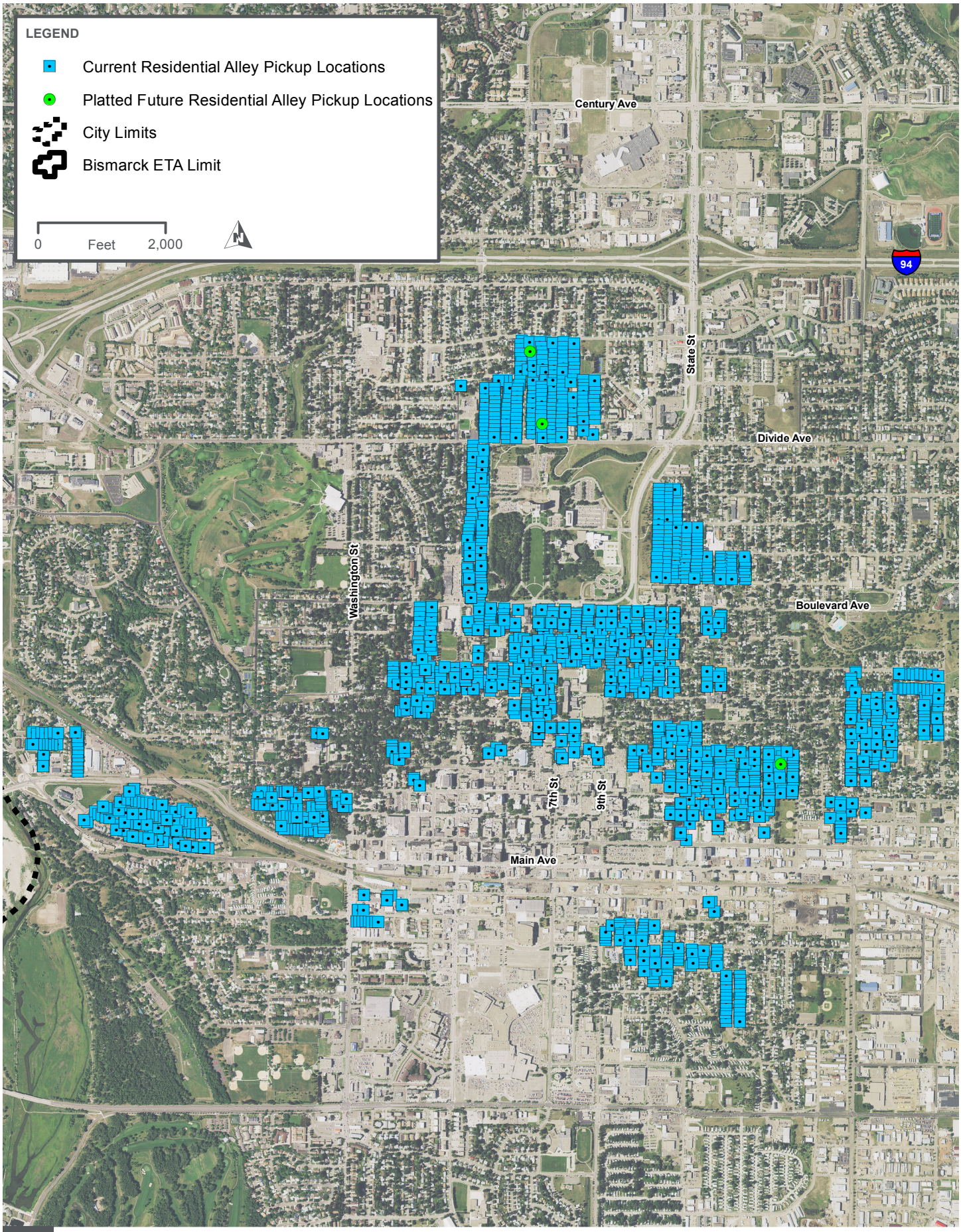
### RESIDENTIAL COLLECTION LOCATIONS (EXHIBIT 1)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### DUMPSTER COLLECTION LOCATIONS (EXHIBIT 2)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### RESIDENTIAL ALLEY COLLECTION LOCATIONS - SEMI-AUTOMATED SERVICE (EXHIBIT 3)

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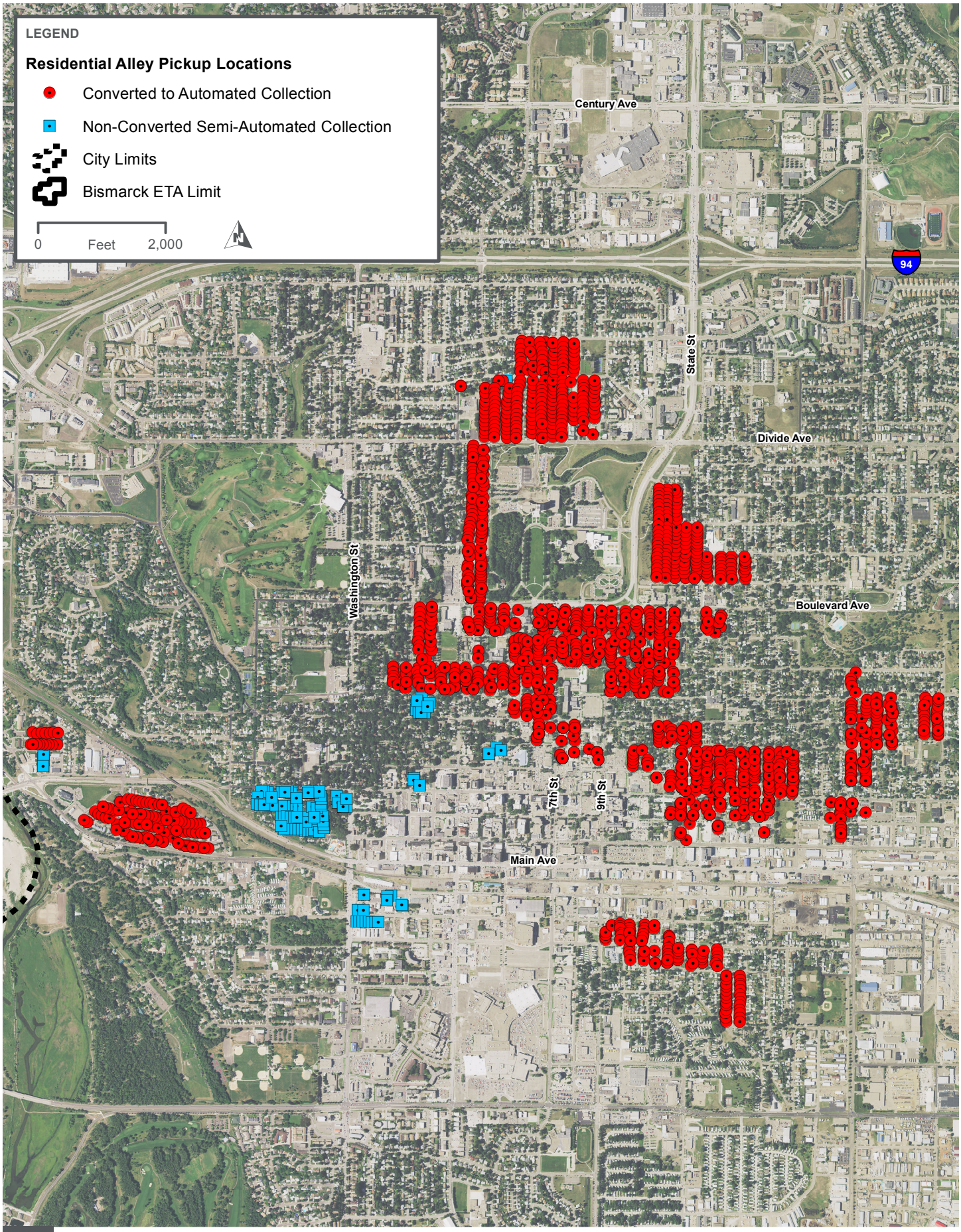
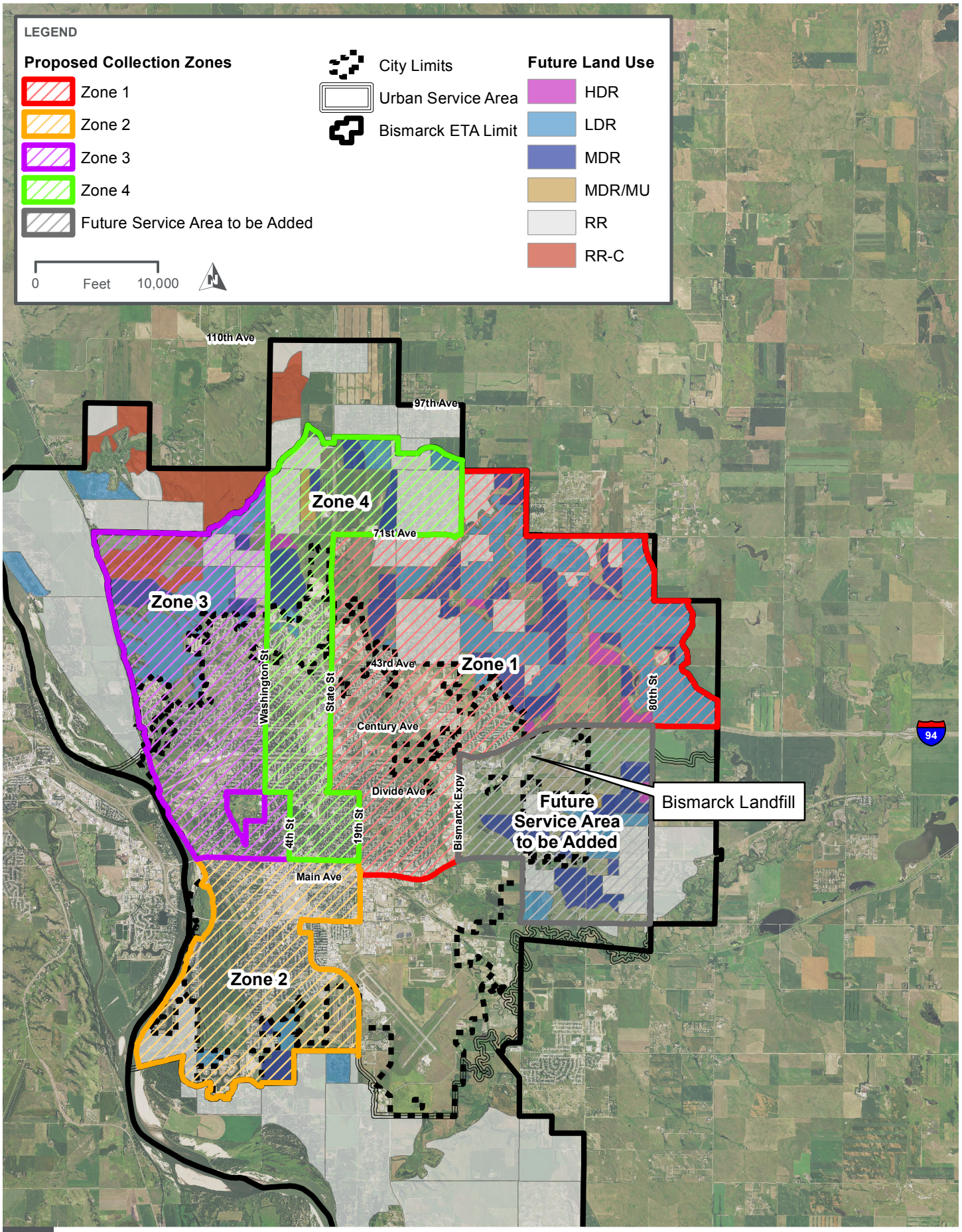



# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

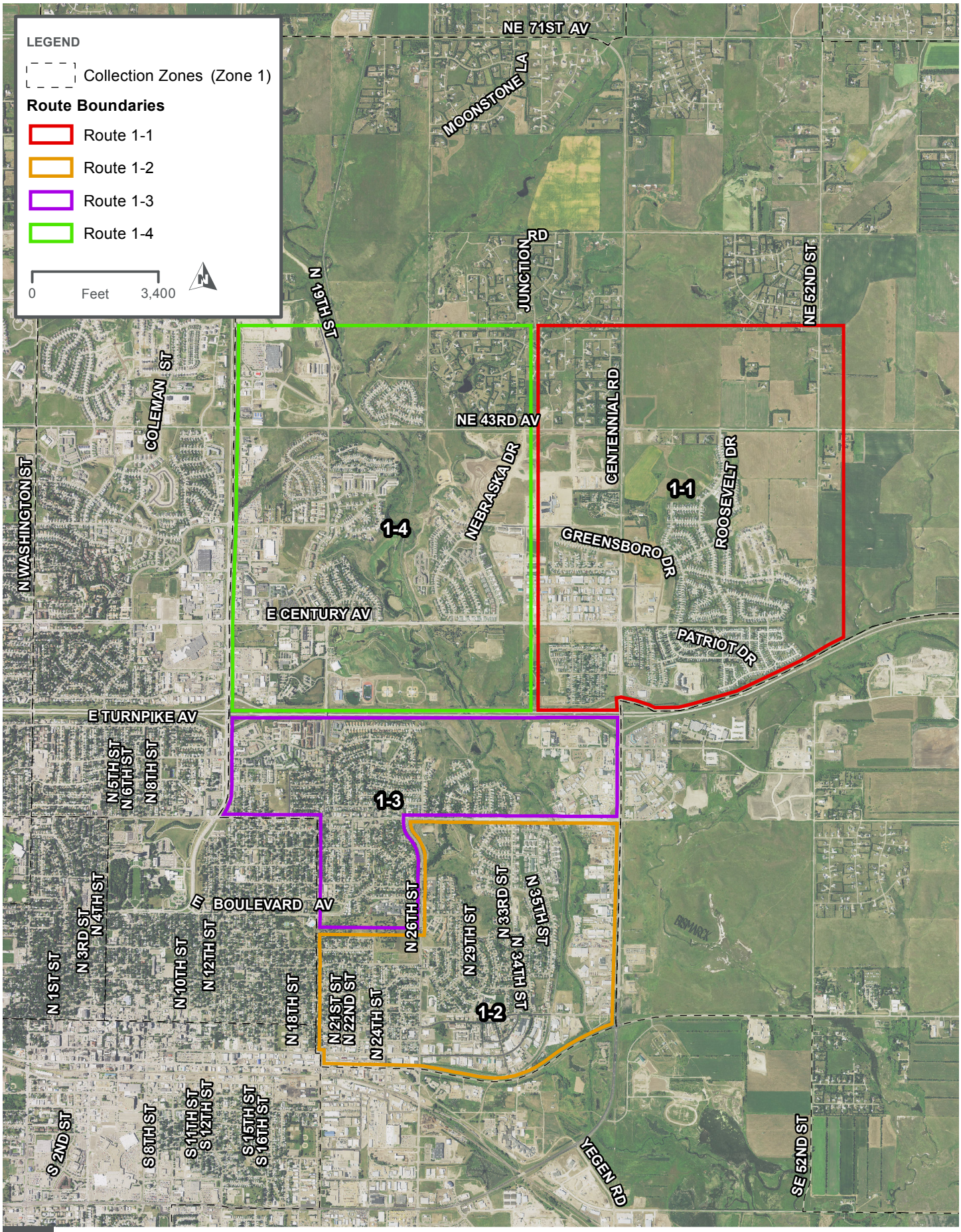
### RESIDENTIAL ALLEY COLLECTION LOCATIONS - AUTOMATED SERVICE (EXHIBIT 4)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

PROPOSED RESIDENTIAL CURBSIDE COLLECTION ZONES (EXHIBIT 5)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### PROPOSED RESIDENTIAL CURBSIDE COLLECTION ROUTES - ZONE 1 (EXHIBIT 6)

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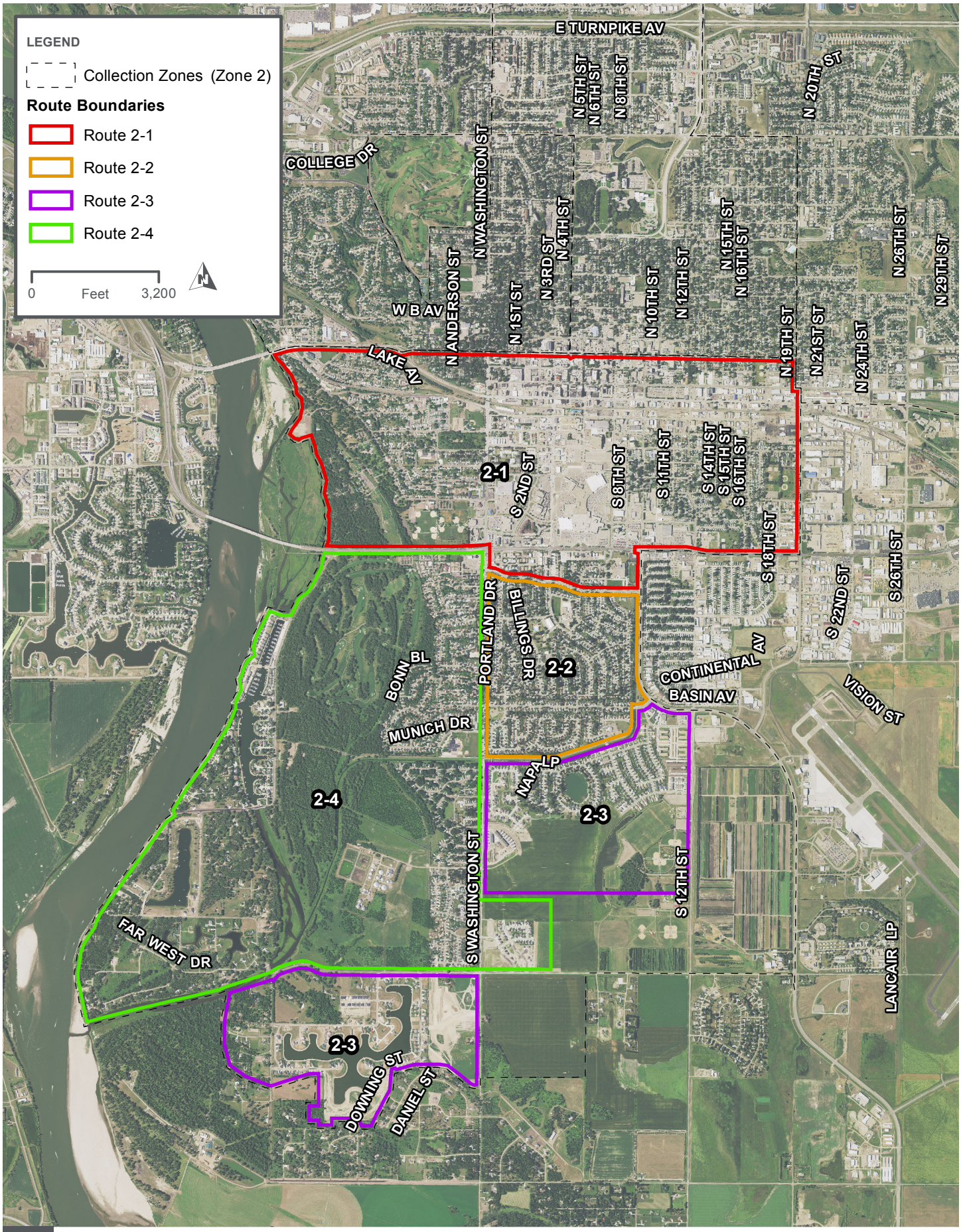
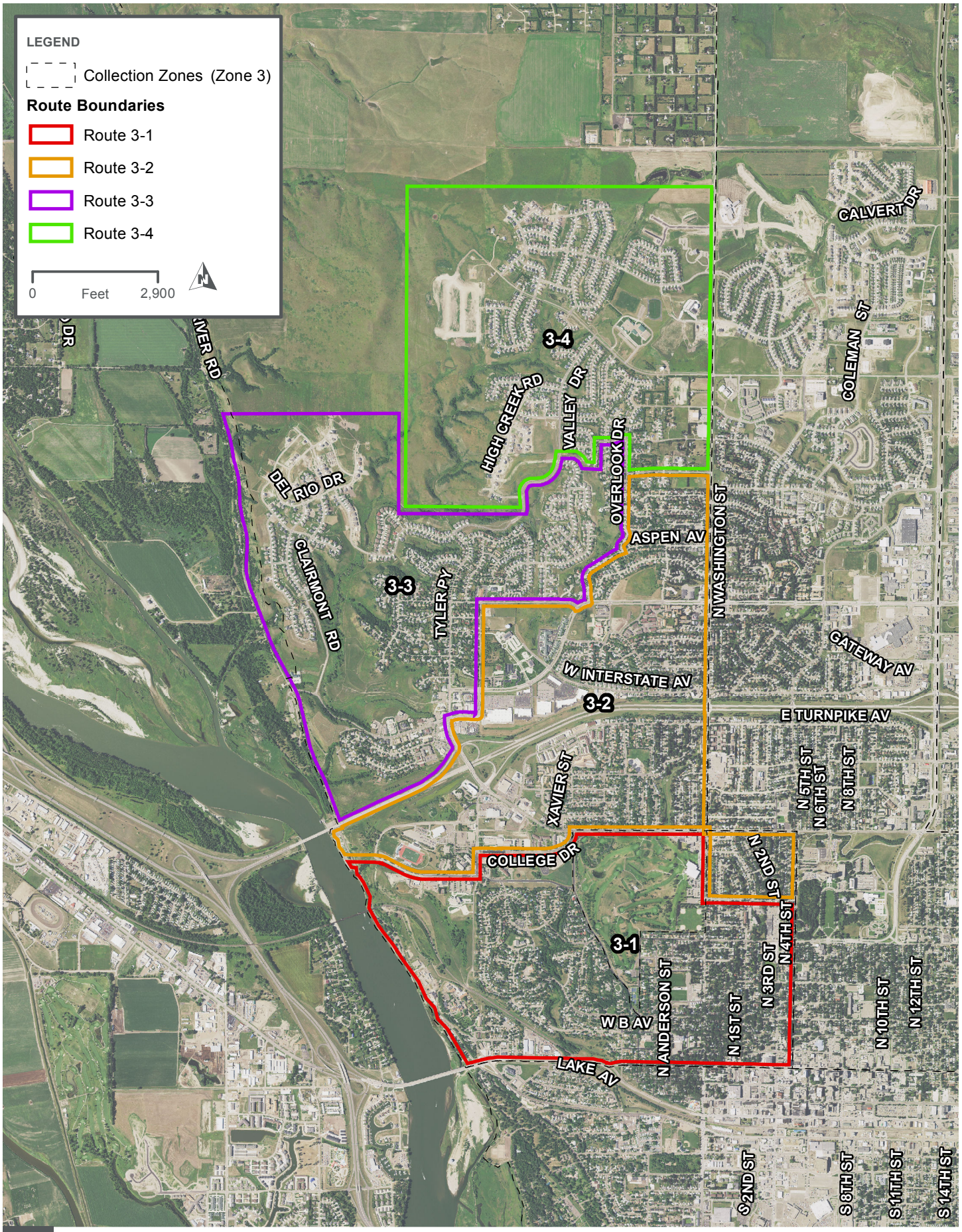



# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

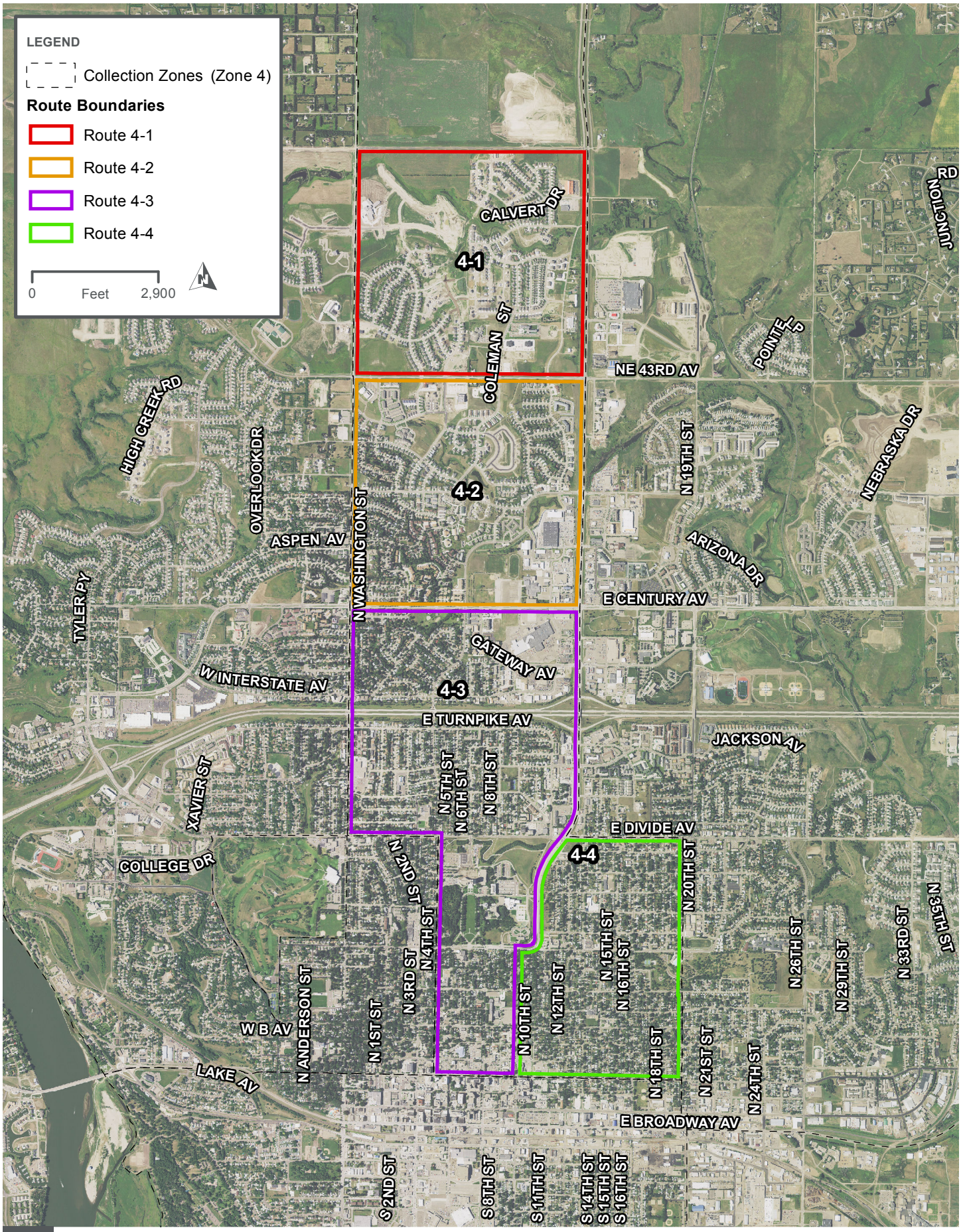
PROPOSED RESIDENTIAL CURBSIDE COLLECTION ROUTES - ZONE 2 (EXHIBIT 7)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### PROPOSED RESIDENTIAL CURBSIDE COLLECTION ROUTES - ZONE 3 (EXHIBIT 8)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

PROPOSED RESIDENTIAL CURBSIDE COLLECTION ROUTES - ZONE 4 (EXHIBIT 9)

# Appendix B. TM 300 – Evaluation of Current Collection Operations & Identification of Potential System Modifications;

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# Technical Memo

| | |
|---|---|
| Date: | Monday, September 21, 2015 |
| Project: | Solid Waste Management Collection Evaluation |
| To: | Jeff Heintz, Director of Public Works - Service Operations, City of Bismarck, ND |
| From: | Bent Erickson, Project Manager, HDR Engineering, Inc. |
| Subject: | Task 300 – Evaluation of Current Collection Operations & Identification of Potential System Modifications |

## Introduction

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to evaluate the City's existing municipal solid waste (garbage) collection system, benchmark the City against other similar communities, and ultimately perform a sensitivity analysis of potential changes to collection services.

The City would like to consider various options for maximizing efficiency and improving services for the municipal collection of residential garbage. The purpose of Task 300 of this Solid Waste Management Collection Evaluation (Study) was to review and evaluate data provided by the City regarding current collection practices with the intent of producing a baseline to allow comparison of the City's current program to other similar municipal operations, as well as identify potential modifications to the City's current program.

The main components of Task 300 included:

- Establishing a baseline of the current collection system;
- Conducting a benchmarking analysis;
- Identifying potential modifications for further evaluation; and
- Preparing a summary memorandum.

This summary memo presents an overview of the results of Task 300 as well as preliminary findings and recommendations for further evaluation of potential modifications to the current residential garbage collection system.

## Current System Overview

The Service Operations Division of the Public Works Department for the City is responsible for providing garbage collection to all residential customers in the incorporated area. This includes a combination of curbside collection, alley collection, and collection from apartment complexes.

**Residential Curbside Collection** - The City provides once a week curbside collection service utilizing 96-gallon carts to approximately 15,423 single-family households. Collection crews are made up of one driver and one collector operating a multi-pack collection vehicle with both an automated side-loading arm and rear-load capabilities (referred to as semi-automated in this memo).

**Residential Alley Collection** - Once a week alley collection is provided to approximately 3,720 households in the City. Alley customers can set out an unlimited number of containers of up to 35-gallons in size. Alley collection is accomplished using rear-load collection vehicles and crews of one driver and two collectors per vehicle.

**Apartment Collection** - Collection of waste from apartments is accomplished using a combination of front-load and rear-load collection vehicles to collect from approximately 635 dumpster accounts. Collection of apartment dumpsters occur street side, in parking lot areas, or in alleys, depending on the specific needs and configuration of individual properties.

The City of Bismarck does not provide commercial collection or roll-off containers for construction and demolition debris. Commercial users, mobile home parks, and temporary roll-off container users are serviced by private haulers.

In order to evaluate the efficiency and effectiveness of the current residential collection system and identify opportunities for improvement, HDR first needed to baseline the current system. Our approach involved reviewing data provided by the City. The City provided data including costs and other details relating to labor and equipment used for the residential collection services, which were used in the development of the baseline information.

The baseline development also utilized route observation data collected by City staff. HDR developed a collection route observation form, provided it to the City, and described the process that should be followed by City staff when conducting observations. To date, the summer routes have been observed. (Future tasks will include a winter observation.) City personnel performed the route observations and delivered the completed forms back to HDR for analysis. Over a period of two weeks in June, every route was observed. In total, 38 route observations were performed.

## Summary of Route Observation Data

The June route observations yielded the key system metrics shown in Table 1. The first week generally observed curbside services collected with multi-pack trucks that have a side-loading arm as well as rear-loading access. During the second week, observations generally consisted of residential alley and apartment services. It is important to note that the averages related to time and mileage in Table 1 are presented on a per trip basis, and that the collection vehicles made an average of two trips to the disposal facility per collection day.

As shown in Table 1, the average curbside set-out rate is over 90%, which would be expected in a system with once per week collection. The average pounds per set-out for curbside service were approximately 60 pounds, which is consistent with what is seen in other communities. The route observations indicated an average pounds-per-set-out for alley collections of approximately 72 pounds. However, the observations indicated only 1,287 alley units that either had set-outs or were passed by, whereas customer data provided by the City indicated approximately 3,720 residential alley customers. It is believed that the route observations, indicating 1,287 units, were reflecting clusters of alley containers set out and counted as one unit instead of multiple units. As a result, the pounds-per-set-out was estimated under the assumption that the total tons collected on residential alley routes represented 92% of the residential alley customers reflected in the customer data (3,720 units). This resulted in a set-out per household of 25 pounds.

“Average on route time” indicates the amount of time actually spent on the route collecting, and does not include time spent in pre-trip inspections, fueling, traveling to and from the route, breaks/lunch, or time spent at the landfill unloading the vehicles. “Average off route time” indicates the amount of time spent during pre-trip inspections, fueling, traveling to and from the route, and breaks/lunch, but does not include time spent at the landfill unloading the vehicles. “Turnaround time at the landfill” indicates the time it takes to bring loads into the facility, cross the scales, unload the vehicle, and exit the facility. For those employees that had a lunch break while at the landfill, in between loads, the time spent during the lunch/break was not included in the “Turnaround time at the facility” calculation; it was included in “Average off route time”.

Table 2 summarizes the curbside collection data gathered during week one of the observations on a per route basis. Table 2 includes the same metrics as Table 1, though on a per “route” basis defined by primary vehicle numbers, and indicates how many vehicles were required to complete the route. While the average on route time per trip for curbside service shown in Table 1 is 1 hour and 53 minutes, and average on route time per trip shown in Table 2 ranges from 1 hour and 38 minutes to 2 hours and 12 minutes, the individual on route time for each trip for curbside service ranged from 1 hour and 25 minutes to 2 hours and 41 minutes. Of the seven routes shown, three of the routes required more than one vehicle to complete the route.

Table 3 and Table 4 summarize the residential alley and apartment dumpster collection data generally gathered during week two of the observations on a per route basis. The route observations determined that the rear-load vehicles are used for both residential alley collection and apartment dumpster routes. Table 3 and Table 4 were created based on the primary customer type serviced by the route. For example, on Monday all of the rear-load trucks were collecting dumpsters. Tuesday through Thursday, the rear-load trucks deployed were primarily collecting residential alley accounts. However, there

were instances of residential alley routes picking up dumpsters from apartment customers.

Table 3 and Table 4 include the same metrics as Table 1 and Table 2, also on a per route basis defined by primary vehicle numbers, and indicate how many vehicles were required to complete the route. While the average on route time per trip for alley service shown in Table 1 is 2 hours and 20 minutes, and average on route time per trip shown in Table 3 ranges from 2 hours and 1 minute to 3 hours and 1 minute, the individual on route time for each trip for residential alley service ranged from 1 hour and 45 minutes to 3 hours and 12 minutes. Of the five routes shown, two of the routes required more than one vehicle to complete the route.

For apartment service, as shown in Table 1, the average on route time per trip is 2 hours and 8 minutes. Table 4 indicates route time per individual trip ranges from 1 hour and 8 minutes to 3 hours and 1 minute.

For curbside and alley/apartment collection, the variance in on route time coupled with the need for multiple trucks to complete certain routes are an indication that there are potential efficiencies to be gained in rebalancing the routes in a manner that would allow one vehicle to complete one route, with more balanced on route times. There may also be potential efficiencies gained in separating alley and apartment collection, where apartments that use dumpsters but are serviced with the same rear-loaders as are used for alley collection, by moving a majority of dumpster service to the front-load route.

## Table 1 - Key Metrics Yielded from Route Observations (1)

| | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Avg. Trips to Facility per Day |
|---|---|---|---|---|---|---|---|---|
| Week 1: **Curbside** | 91% | 60.2 | 7.7 | 8.7 | 1:53 | 0:48 | 0:19 | 2 |
| Week 2: **Residential Alley** | 92% | 72.1 | 6.8 | 7.5 | 2:20 | 0:45 | 0:22 | 2 |
| Week 2: **Apartment Dumpsters** | 94% (2) | 239.6 | 12.4 | 9.3 | 2:08 | 0:47 | 0:16 | 2 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

(2) The average set-out rate for apartments is not shown as 100% because observations indicated instances where trucks on apartment routes passed by some dumpsters.

## Table 2 - Week One Curbside Collection Metrics by Route (1)

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3335 | 89% | 59.9 | 10.4 | 7.9 | 2:12 | 0:48 | 0:23 | 1 |
| 3409 | 90% | 59.0 | 8.2 | 9.7 | 1:45 | 0:45 | 0:14 | 4 |
| 3482 | 89% | 65.1 | 8.0 | 7.8 | 2:05 | 0:38 | 0:26 | 1 |
| 3551 | 92% | 59.6 | 6.6 | 9.0 | 1:39 | 0:57 | 0:20 | 5 |
| 3552 | 84% | 66.0 | 5.7 | 7.5 | 1:44 | 0:37 | 0:27 | 1 |
| 3558 | 92% | 61.4 | 7.3 | 9.3 | 2:04 | 0:53 | 0:17 | 3 |
| 3562 | 95% | 48.6 | 5.5 | 6.9 | 1:38 | 0:41 | 0:20 | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.

## Table 3 - Residential Alley Metrics by Route (1)

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3472 | 94% | 66.0 | 5.0 | 11.1 | 2:20 | 0:46 | 0:08 | 1 |
| 3572 | 94% | 62.7 | 5.3 | 7.4 | 2:01 | 0:44 | 0:15 | 2 |
| 3573 | 89% | 79.9 | 7.8 | 8.1 | 2:14 | 0:31 | 0:26 | 1 |
| 3572-A (2) | 98% | 66.7 | 10.0 | 6.0 | 3:01 | 1:03 | 0:23 | 2 |
| 3573-A (2) | 88% | 72.1 | 6.8 | 4.3 | 2:53 | 1:18 | 0:18 | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.
(2) On Thursday, trucks 3572 and 3573 drive a primary residential alley route for the first load and an apartment dumpster route for the second load.

## Table 4 - Apartment Dumpster Collection Metrics by Route (1)

| Route # Based on Primary Truck # | Avg. Set-Out Rate | Avg. Lbs./Set-Out | Avg. On Route Miles | Avg. Off Route Miles | Avg. On Route Time hh:mm | Avg. Off Route Time hh:mm | Avg. Turn Around Time at Facility hh:mm | Trucks Running Route |
|---|---|---|---|---|---|---|---|---|
| 3472-AA (2) | 100% | 183.2 | Not Available | Not Available | 2:39 | 1:02 | 0:17 | 1 |
| 3472-BB (2) | 95% | 207.1 | 8.0 | 11.5 | 1:39 | 1:16 | 0:25 | 1 |
| 3478 (rear) | 100% | 193.2 | 8.0 | 9.3 | 3:01 | 0:42 | 0:48 | 1 |
| 3557 (front) | 99% | 309.3 | 14.1 | 9.8 | 1:56 | 0:37 | 0:10 | 2 |
| 3572 (rear) | 91% | 231.8 | 16.5 | 8.9 | 2:57 | 0:54 | 0:12 | 1 |
| 3572-B (3) | 100% | 156.2 | 5.9 | 11.0 | 1:21 | 0:45 | 0:17 | 2 |
| 3573-B (3) | 100% | 196.5 | 3.8 | 6.7 | 1:08 | 0:18 | Not Available | 1 |

Notes:

(1) Miles and times are shown on a per trip basis rather than a per day basis.
(2) Route 3472-AA was observed on the first week with route 3472-BB observed the second week.
(3) On Thursday, trucks 3572 and 3573 drive a primary residential alley route for the first load and an apartment dumpster route for the second load.

## Baseline of Current Operations

The City currently organizes its residential garbage collection routes based on truck type used to collect the materials rather than basing them on customer type served. The City's typical weekly deployment of collection vehicles is illustrated in Table 5.

**Table 5 - Typical Truck Deployments, Garbage Collection**

| | Number of Trucks Deployed | | | | |
|---|---|---|---|---|---|
| **Truck Type** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| Multi-Pack | 3 | 5 | 5 | 5 | 5 |
| Rear-Load Residential Alley | 0 | 2 | 2 | 2 (1) | 0 |
| Rear-Load Dumpsters | 4 | 0 | 0 | 0 | 1 |
| Front-Load | 1 (2) | 1 | 0 | 1 | 1 |
| **Total** | **8** | **8** | **7** | **8** | **7** |

Notes:

(1) On Thursday the two rear-loads deployed were observed to collect residential alley routes for their first load and apartment dumpsters for their second load.
(2) On Monday, a rear-load truck finished early and switched to a front-load truck to help on one of the other routes.

With regard to total trucks, the route observations conducted were related only to garbage collection. However, the City also operates 18 yard debris collection sites around the City that consist of dumpsters that are collected seven days a week during the growing season. As noted in Table 6, the City deploys three rear-load vehicles for yard debris collection from these sites each day from May through October.

**Table 6 - Typical Truck Deployments, Yard Debris (1)**

| | Number of Trucks Deployed | | | | | | |
|---|---|---|---|---|---|---|---|
| **Truck Type** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** | **Saturday** | **Sunday** |
| Multi-Pack | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rear-Load | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Front-Load | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **3** | **3** | **3** | **3** | **3** | **3** | **3** |

Notes:

(1) May through October only.

Table 7 provides an overview of the City's collection fleet including the total number of collection vehicles by type, the maximum number of each type that is deployed for collection efforts on a given day, the number of spare vehicles, and spare ratios of each type the City has on hand.

**Table 7 - Collection Fleet Summary**

| Truck Type | Total Fleet | Max Deployed | Spare | Spare Ratio |
|---|---|---|---|---|
| Multi-Pack | 9 | 5 | 4 | 80% |
| Rear-Load | 10 | 7 | 3 | 43% |
| Front-Load | 2 | 1 | 1 | 100% |

HDR endeavored to model the City's residential garbage collection operations on a customer type basis (i.e. curbside collection, alley collection, and apartment collection). However, the fact that many of the City's collection vehicles commonly pick up material from a variety of customer types on the same route made this difficult to accomplish for apartment collection. The following sections document assumptions and provide metrics used to model the curbside and residential alley collection. However, it was not possible to model the apartment collection in an informative manner.

**Residential Curbside Collection**

The City's current curbside garbage collection service is provided once a week to each household and is comprised of three routes on Monday and five routes Tuesday through Friday, for a total of 23 routes per week. Two-person crews (one driver and one collector) use multi-pack collection vehicles to collect 96-gallon carts from each household. Table 8 shows the number of set-outs (homes that set out material for collection), pass-by's (homes that did not set out material for collection), and total homes per route defined by primary vehicle number for curbside service, as observed the week of June 8, 2015. As shown, there was an average of 671 homes per curbside garbage collection route.

**Table 8 – Household Counts by Semi-Automated Route**

| Date | Route Based on Primary Truck # | Set-Out | Pass-By | Total | # Trucks |
|---|---|---|---|---|---|
| June 8 | 3335 | 574 | 51 | 625 | 1 |
| | 3409 | 1020 | 79 | 1099 | 3 |
| | 3558 | 637 | 35 | 672 | 2 |
| June 9 | 3335 | 683 | 51 | 734 | 1 |
| | 3482 | 576 | 78 | 654 | 1 |
| | 3551 | 416 | 32 | 448 | 1 |
| | 3558 | 737 | 63 | 800 | 3 |
| | 3562 | 558 | 22 | 580 | 1 |
| June 10 | 3335 | 313 | 64 | 377 | 1 |
| | 3409 | 893 | 134 | 1027 | 3 |
| | 3482 | 482 | 35 | 517 | 1 |
| | 3551 | 534 | 44 | 578 | 2 |
| | 3558 | 463 | 36 | 499 | 1 |
| June 11 | 3335 | 553 | 87 | 640 | 1 |
| | 3409 | 817 | 135 | 952 | 3 |
| | 3482 | 499 | 70 | 569 | 1 |
| | 3551 | 620 | 65 | 685 | 2 |
| | 3558 | 540 | 85 | 625 | 2 |
| June 12 | 3335 | 706 | 72 | 778 | 1 |
| | 3409 | 269 | 60 | 329 | 1 |
| | 3482 | 517 | 74 | 591 | 1 |
| | 3551 | 1120 | 95 | 1215 | 4 |
| | 3552 | 366 | 63 | 429 | 1 |
| **Total** | | **13,893** | **1,530** | **15,423** | **38** |
| **Average** | | **604.04** | **66.52** | **670.57** | **1.65** |

Based on the information provided by the City and data gathered during the summer route observations, curbside garbage collection staff appears to be working an average of 6 hours and 36 minutes per collection day. This time is inclusive of all on-route time, off-route time, turnaround time at the disposal facility, lunches/breaks, and inspection time. (It should be noted that the average hours worked per day is anticipated to be higher in the winter due to additional challenges in collecting in snow and icy conditions.)

In developing the baseline operational model for curbside collection, which will be used in future tasks to evaluate potential operational and cost impacts of proposed changes to the system, HDR used a variety of data provided by the City along with the route observation data to calculate a series of metrics for the existing system. The raw data and calculated metrics presented in Table 9 through Table 13 will be reviewed with City staff prior to modeling potential modifications to the system, which will ultimately show

comparisons of these key elements of the baseline system with the potential modifications.

Table 9 presents raw data and calculated metrics related to residential curbside route service.

**Table 9 – Residential Curbside Route Service Metrics**

| Raw Data | |
|---|---|
| Number of Accounts | 15,423 |
| Number of Collection Days per Week (1) | 4.6 |
| Number of Collections per Household per Week | 1 |
| Number of Multi-Pack Trucks in Service per Collection Day | 5 |
| Avg. Set-out Rate | 91% |
| Avg. Lbs. per Household per Week | 60.2 |
| Multi-Pack Truck Load Limit (lbs.) (2) | 20,000 |
| Avg. On Route Time per Trip (hrs.) | 1.88 |
| Avg. Turn Around Time at Disposal Facility per Trip (hrs.) | 0.32 |
| Avg. Off Route Time Per Trip (hrs.) (3) | 0.28 |
| Avg. Additional Off Route Time per Day (4) | 0.57 |
| Avg. Trips to Disposal Facility per Truck per Day | 2 |

| Calculated Metrics | |
|---|---|
| Number of Stops per Week | 14,035 |
| Multi-Pack Stops per Hour | 324 |
| Multi-Pack Avg. Stops Per Route | 610 |
| Multi-Pack Total Homes per Route | 671 |
| Total Pounds per Route | 36,735 |
| Avg. Weight per Load (lbs.) | 18,367 |
| Avg. Time per Trip (hrs.) (5) | 2.48 |
| Avg. Collection Time per Day (6) | 5.53 |
| Stops per Day | 3,051 |

Notes:

(1) While the City runs a total of 23 curbside collection routes five days per week (Monday–Friday), it runs five collection routes Tuesday through Friday and just three routes on Monday. For modeling purposes we have assumed 5 routes per collection day, which results in an average of 4.6 collection days.
(2) Assumes a 25 cubic yard vehicle capacity multiplied by an estimated 800 lbs. per cubic yard of waste.
(3) Off Route Time per Trip does not include lunch time as lunch is taken once per shift not once per trip.
(4) Additional off-route time includes daily lunch break and inspection time.
(5) The average time per trip was calculated by adding together the average on-route time per trip (1.88 hrs.), the average turnaround time at disposal facility per trip (0.32 hr.), and the average off-route time per trip (0.28 hr.).
(6) The average collection time per day was calculated by multiplying the average time per trip (2.48 hrs.) by the average number of trips to the disposal facility per truck per day (2) and then adding to that the average additional off-route time per day (0.57 hr.).

Table 10 presents raw data and calculated metrics related to residential curbside labor.

**Table 10 – Residential Curbside Labor Metrics**

| Raw Data | |
|---|---|
| Number of Routes per Day | 5 |
| Sanitation Collectors per Crew | 1 |
| Truck Drivers per Crew | 1 |
| Total Number of Sanitation Collectors | 5 |
| Total Number of Truck Drivers | 5 |
| Supervisors | 1 |
| Supervisors per Employee | 0.10 |
| Total Number of Supervisors | 1 |
| Avg. Annual Salary and Benefits - Sanitation Collectors | $56,473 |
| Avg. Annual Salary and Benefits - Truck Drivers | $62,792 |
| Avg. Annual Salary and Benefits - Supervisors | $98,807 |
| Annual Incidentals Cost per Employee (1) | $350 |

| Calculated Metrics | |
|---|---|
| Annual Salaries and Wages – Sanitation Collectors (2) | $282,365 |
| Annual Salaries and Wages – Truck Drivers (2) | $313,960 |
| Annual Salaries and Wages – Supervisors (2) | $98,807 |
| Total Annual Salaries and Wages (3) | $695,132 |
| Total Annual Incidentals Expense (4) | $3,850 |
| Estimated Annual Labor Related Expense (5) | $698,982 |

Notes:

(1) HDR assumed an incidentals cost of $350 per employee per year to cover the cost of uniforms, personal protective equipment (PPE), etc.
(2) Annual salaries and wages for each of the three position types were calculated by multiplying the average annual salary and benefits for the position by the total number of employees in the position.
(3) Total annual salaries and wages were calculated by summing the total annual salaries and wages for sanitation collectors ($282,365), truck drivers ($313,960), and supervisors ($98,807).
(4) Total annual incidentals expense was calculated by multiplying the annual incidentals cost per employee ($350) by the total number of employees (11).
(5) Estimated annual labor expense was calculated by summing total annual salaries and wages and total annual incidentals expense.

Table 11 presents raw data and calculated metrics related to residential curbside operations.

**Table 11 – Residential Curbside Operations Metrics**

| Raw Data | |
|---|---|
| Average Miles per Trip | 16.4 |
| Average Fuel Economy (mpg) | 4.0 |
| Number of Routes per Day | 5 |
| Number Multi-Pack Collection Vehicles Excluding Spares | 5 |
| Spare Ratio (%) | 80% |
| Number of Spare Multi-Pack Collection Vehicles | 4 |
| Total Number of Multi-Pack Collection Vehicles | 9 |
| Maintenance and Repair ($/vehicle/year) | $14,600 |
| Fuel ($/gallon) | $2.69 |
| Insurance ($/vehicle/year) | $276 |

| Calculated Metrics | |
|---|---|
| Annual Miles per Curbside Collection Vehicle (1) | 7,865 |
| Annual Gallons per Curbside Collection Vehicle (2) | 1,966 |
| Total Annual Maintenance & Repair Expense (3) | $131,400 |
| Total Annual Fuel Expense (4) | $26,446 |
| Total Annual Insurance Expense (5) | $2,486 |
| Estimated Annual Operating Expense (6) | $160,331 |

Notes:

(1) Annual miles per curbside collection vehicle = [[average miles per trip (16.4) x average number of trips per truck per collection day (2) x number of routes per week (23)] / number of routes per day (5)]] x 52 weeks per year.
(2) Gallons per curbside collection vehicle were calculated by dividing the annual miles per curbside collection vehicle by the average fuel economy.
(3) Total annual repair and maintenance expense was calculated by multiplying the annual maintenance and repair expense per vehicle ($14,600) by the total number of multi-pack collection vehicles (9).
(4) Total annual fuel expense = fuel price per gallon ($2.69) x annual gallons per curbside collection vehicle (1,966) x number of multi-pack collection vehicles excluding spares (5).
(5) Total annual insurance expense was calculated by multiplying the annual insurance expense per vehicle ($276) by the total number of multi-pack collection vehicles (9).
(6) Estimated annual operating expense was calculated by summing the annual maintenance and repair expense ($131,400), the annual fuel expense ($26,446), and the annual insurance expense ($2,486).

Table 12 presents raw data and calculated metrics related to residential curbside annual capital outlays.

**Table 12 – Residential Curbside Capital Metrics**

| Raw Data | |
|---|---|
| Cost of Multi-Pack Collection Truck (New) | $305,000 |
| Cost of Automated Cart (New) | $50 |
| Total Number of Multi-Pack Trucks in Fleet | 9 |
| Total Number of Automated Carts | 15,423 |

| Calculated Metrics | |
|---|---|
| Annual Vehicle Capital Cost (1) | $392,143 |
| Annual Cart Cost (2) | $77,115 |
| Estimated Annual Capital Outlay (3) | $469,258 |

Notes:

(1) Annual vehicle capital cost is based on a seven year vehicle life and seven year straight amortization of all vehicle expenses.
(2) Annual cart cost is based on ten year straight amortization of all cart expenses.
(3) Estimated annual capital outlay is calculated by summing the annual vehicle capital cost and annual cart cost.

Table 13 presents a summary of the estimated total annual costs associated with the City's residential curbside collection operations. Total annual expenses for curbside collection are estimated at approximately $1.34 million.

**Table 13 – Residential Curbside Estimated Total Annual Cost**

| | |
|---|---|
| Total Annual Labor Cost | $698,982 |
| Total Annual Vehicle Operating Cost | $160,331 |
| **Total Annual Operating Cost** | **$ 859,313** |
| | |
| Total Annual Vehicle Capital Cost | $392,143 |
| Total Annual Cart Cost | $77,115 |
| **Total Annual Capital Cost** | **$469,258** |
| | |
| **Estimated Total Annual Cost** | **$1,328,571** |

## Residential Alley

As previously described, there are approximately 3,720 homes included in alley collection. The current collection system for residential alley service includes rear-load vehicles that also collect a limited number of dumpsters (a hook is used to unload dumpsters into the rear of the vehicle).

The City's current residential alley collection service is provided once a week to each household and is comprised of two routes on Tuesday, Wednesday and Thursday for a total of six routes each week. On Wednesday, the two routes were observed to be completed by noon. Similarly, on Thursday, the two routes completed a primarily

residential alley trip before collecting apartments in the afternoon. For the purposes of the existing conditions operational model, it was assumed that there is an average of two routes per day two days a week. Three person crews (one-driver and two collectors) use rear-load collection vehicles to collect waste from user provided cans.

Table 14 shows the number of set-outs, pass-by's and total residential alley collections observed. Also shown is the number of dumpsters picked up on the route, as reported by the observers. It should be noted that the total number of residential alley collections (1,287) is significantly lower than the number of estimated accounts (3,720). The difference is assumed to be attributed to the fact that residential alley customers supply their own collection cans and these tend to be grouped together in the alley. Making a determination of the number of households represented in a grouping, or collected at a specific stop, was likely difficult to achieve during the manual observations.

**Table 14 – Household Counts by Residential Alley Route**

| Day | Route Based on Primary Truck # | Residential Alley Set-Out | Residential Alley Pass-By | Residential Alley Total | Dumpsters | # Trucks |
|---|---|---|---|---|---|---|
| Tues. | 3572 | 358 | 22 | 380 | 4 | 2 |
| | 3573 | 305 | 17 | 322 | 0 | 1 |
| Wed. | 3472 | 151 | 9 | 160 | 0 | 1 |
| | 3573 | 110 | 22 | 132 | 17 | 1 |
| Thur. | 3572-A | 114 | 0 | 114 | 86 | 2 |
| | 3573-A | 169 | 10 | 179 | 30 | 1 |
| **Total** | | **1207** | **80** | **1287** | **137** | **8** |
| **Average** | | **201.17** | **13.33** | **214.50** | **22.83** | **1.33** |

In developing the baseline operational model for alley collection, which will be used in future tasks to evaluate potential operational and cost impacts of proposed changes to the system, HDR used a variety of data provided by the City along with the route observation data to calculate a series of metrics for the existing system. The raw data and calculated metrics presented in Table 15 through Table 19 will be reviewed with City staff prior to modeling potential modifications to the system, which will ultimately show comparisons of these key elements of the baseline system with the potential modifications.

Table 15 presents raw data and calculated metrics related to residential alley route service.

**Table 15 – Residential Alley Route Service Metrics**

| Raw Data | |
|---|---|
| Number of Accounts | 3,720 |
| Number of Collection Days per Week (1) | 2 |
| Number of Collections per Household per Week | 1 |
| Number of Multi-Pack Trucks in Service per Collection Day | 2 |
| Avg. Set-out Rate | 92% |
| Avg. Lbs. per Household per Week (2) | 24.6 |
| Multi-Pack Truck Load Limit (lbs.) (3) | 20,000 |
| Avg. On Route Time per Trip (hrs.) | 2.33 |
| Avg. Turn Around Time at Disposal Facility per Trip (hrs.) | 0.37 |
| Avg. Off Route Time Per Trip (hrs.) (4) | 0.27 |
| Avg. Additional Off Route Time per Day (5) | 0.57 |
| Avg. Trips to Disposal Facility per Truck per Day | 2 |

| Calculated Metrics | |
|---|---|
| Number of Stops per Week | 3,422 |
| Multi-Pack Stops per Hour | 367 |
| Multi-Pack Avg. Stops Per Route | 855.6 |
| Multi-Pack Total Homes per Route | 930 |
| Total Pounds per Route | 21,048 |
| Avg. Weight per Load (lbs.) | 10,524 |
| Avg. Time per Trip (hrs.) (6) | 2.97 |
| Avg. Collection Time per Day (7) | 6.51 |
| Stops per Day | 1,711 |

Notes:

(1) While the City runs a total of 6 curbside collection routes three days per week (Tuesday–Thursday), the routes Wednesday and Thursday complete only one trip dedicated to alleys before either collecting dumpsters or finishing for the day. For modeling purposes we have assumed 2 routes per collection day, which results in an average of 2 collection days.

(2) Assumes the total tons collected by the trucks during observations represented 92% (set-out rate) of the total number of accounts (3,270).

(3) Assumes a 25 cubic yard vehicle capacity multiplied by an estimated 800 lbs. per cubic yard of waste.

(4) Off Route Time per Trip does not include lunch time as lunch is taken once per shift not once per trip.

(5) Additional off-route time includes daily lunch break and inspection time.

(6) The average time per trip was calculated by adding together the average on-route time per trip (2.33 hrs.), the average turnaround time at disposal facility per trip (0.37 hr.), and the average off-route time per trip (0.27 hr.).

(7) The average collection time per day was calculated by multiplying the average time per trip (2.97 hrs.) by the average number of trips to the disposal facility per truck per day (2) and then adding to that the average additional off-route time per day (0.57 hr.).

Table 16 presents raw data and calculated metrics related to residential alley labor.

**Table 16 – Residential Alley Labor Metrics**

| Raw Data | |
|---|---|
| Number of Routes per Day | 2 |
| Sanitation Collectors per Crew | 2 |
| Truck Drivers per Crew | 1 |
| Total Number of Sanitation Collectors | 4 |
| Total Number of Truck Drivers | 2 |
| Supervisors | 1 |
| Supervisors per Employee | 0.17 |
| Total Number of Supervisors | 1 |
| Avg. Annual Salary and Benefits - Sanitation Collectors | $56,473 |
| Avg. Annual Salary and Benefits - Truck Drivers | $62,792 |
| Avg. Annual Salary and Benefits - Supervisors | $98,807 |
| Annual Incidentals Cost per Employee (1) | $350 |

| Calculated Metrics | |
|---|---|
| Annual Salaries and Wages – Sanitation Collectors (2) | $225,892 |
| Annual Salaries and Wages – Truck Drivers (2) | $125,584 |
| Annual Salaries and Wages – Supervisors (2) | $98,807 |
| Total Annual Salaries and Wages (3) | $450,283 |
| Total Annual Incidentals Expense (4) | $2,450 |
| Estimated Annual Labor Related Expense (5) | $452,733 |

Notes:

(1) HDR assumed an incidentals cost of $350 per employee per year to cover the cost of uniforms, personal protective equipment (PPE), etc.
(2) Annual salaries and wages for each of the three position types were calculated by multiplying the average annual salary and benefits for the position by the total number of employees in the position.
(3) Total annual salaries and wages were calculated by summing the total annual salaries and wages for sanitation collectors ($225,892), truck drivers ($125,584), and supervisors ($98,807).
(4) Total annual incidentals expense was calculated by multiplying the annual incidentals cost per employee ($350) by the total number of employees (7).
(5) Estimated annual labor expense was calculated by summing total annual salaries and wages and total annual incidentals expense.

Table 17 presents raw data and calculated metrics related to residential alley operations.

**Table 17 – Residential Alley Operations Metrics**

| Raw Data | |
|---|---|
| Average Miles per Trip | 14.3 |
| Average Fuel Economy (mpg) | 4.0 |
| Number of Routes per Day | 2 |
| Number Multi-Pack Collection Vehicles Excluding Spares | 2 |
| Spare Ratio (%) | 50% |
| Number of Spare Multi-Pack Collection Vehicles | 1 |
| Total Number of Multi-Pack Collection Vehicles | 3 |
| Maintenance and Repair ($/vehicle/year) | $14,600 |
| Fuel ($/gallon) | $2.69 |
| Insurance ($/vehicle/year) | $276 |

| Calculated Metrics | |
|---|---|
| Annual Miles per Curbside Collection Vehicle (1) | 4,462 |
| Annual Gallons per Curbside Collection Vehicle (2) | 1,115 |
| Total Annual Maintenance & Repair Expense (3) | $43,800 |
| Total Annual Fuel Expense (4) | $6,001 |
| Total Annual Insurance Expense (5) | $828 |
| Estimated Annual Operating Expense (6) | $50,629 |

Notes:

(1) Annual miles per curbside collection vehicle = [[average miles per trip (14.3) x average number of trips per truck per collection day (2) x number of routes per week (6)] / number of routes per day (2)]] x 52 weeks per year.
(2) Gallons per curbside collection vehicle were calculated by dividing the annual miles per curbside collection vehicle by the average fuel economy.
(3) Total annual repair and maintenance expense was calculated by multiplying the annual maintenance and repair expense per vehicle ($14,600) by the total number of rear-load collection vehicles (3).
(4) Total annual fuel expense = fuel price per gallon ($2.69) x annual gallons per curbside collection vehicle (1,115 x number of rear-load collection vehicles excluding spares (2).
(5) Total annual insurance expense was calculated by multiplying the annual insurance expense per vehicle ($276) by the total number of rear-load alley collection vehicles (3).
(6) Estimated annual operating expense was calculated by summing the annual maintenance and repair expense ($43,800), the annual fuel expense ($6,001), and the annual insurance expense ($828).

Table 18 presents raw data and calculated metrics related to residential alley annual capital outlays.

**Table 18 – Residential Alley Capital Metrics**

| Raw Data | |
|---|---|
| Cost of Rear-Load Collection Truck (New) | $149,500 |
| Total Number of Rear-Load Trucks in Fleet | 3 |

| Calculated Metrics | |
|---|---|
| Annual Vehicle Capital Cost (1) | $64,071 |
| Estimated Annual Capital Outlay (2) | $64,071 |

Notes:

(1) Annual vehicle capital cost is based on a seven year vehicle life and seven year straight amortization of all vehicle expenses.

(2) Estimated annual capital outlay is calculated by summing the annual vehicle capital cost and annual cart cost. The current system does not utilize carts, and as a result, the annual capital outlay is equivalent to the annual vehicle capital cost; however alternatives modeled in future tasks may include carts.

Table 19 presents a summary of the estimated total annual costs associated with the City's residential alley collection operations. Total annual expenses for residential alley collection are estimated at approximately $567,000.

**Table 19 – Residential Alley Estimated Total Annual Cost**

| | |
|---|---|
| Total Annual Labor Cost | $452,733 |
| Total Annual Vehicle Operating Cost | $50,629 |
| **Total Annual Operating Cost** | **$503,361** |
| | |
| Total Annual Vehicle Capital Cost | $64,071 |
| Total Annual Cart Cost | $0 |
| **Total Annual Capital Cost** | **$64,071** |
| | |
| **Estimated Total Annual Cost** | **$567,433** |

### Apartment Dumpster Collection

There are approximately 635 dumpster accounts for apartments. The current collection system for alley and apartment service includes rear-load vehicles collecting from alleys as well as apartments, including some apartments with dumpsters (a hook is used to unload dumpsters into the rear of the vehicle). There is also one front-load vehicle that collects from apartments with dumpsters. As shown in Table 5, there are typically four rear-load vehicles running on Monday, two rear-load vehicles running Tuesday through Thursday, and one rear-load vehicle running on Friday. As previously described, there is typically one driver and two collectors on each rear-load route. As shown in Table 5,

there is one front-load vehicle that typically runs Monday, Tuesday, Thursday and Friday, which is operated by one driver (with no collectors).

While the route observations gathered the same route data points for apartment collection as was collected for curbside and alley service, there were challenges in calculating similar metrics for apartment customers serviced with dumpsters included in the model due to differences such as unit counts of individual homes versus dumpsters serving multiple units, which impacted our ability to calculate data related to operations, labor and capital for apartments. (The route observation form may be modified prior to winter observations.)

# Benchmarking

HDR performed a preliminary search for regional cities with comparable systems in order to benchmark specific operations and financial metrics. The preliminary search included considering population, housing density, service provider, collection style and frequency of service. A preliminary list of communities, as well as a list of questions/metrics, was developed and discussed with the City prior to contacting the benchmarking communities.

Based on the goals for this Study, the benchmarking was focused on determining the major collection metrics of similar sized communities using semi-automated and fully automated methods for residential collection and the total cost of collection service in these communities. With regard to the major collection metrics, the survey focused on the number of residential customers, total weekly collection routes and availability of curbside recycling, yard debris collection and bulk waste disposal. Financial metrics were focused on a break-down of the monthly collection fee charged to residential customers to determine the level of service included and the estimated costs.

The preliminary list included approximately 15 communities in an effort to receive responses from a minimum of six. Any communities that utilize private or contract collection services for residential garbage collection were not included in the benchmarking metrics. Communities with privatized collection that are similarly sized to Bismarck included: Sioux Falls, SD; Vermillion, SD; Rochester, MN; Maple Grove, MN; and Duluth, MN. Benchmarking information was obtained from eight regional communities with varying degrees of completeness and detail. The complete benchmarking matrix is available as an attachment to this memorandum.

Of the communities contacted, Bismarck is unique in using multi-pack vehicles for residential, automated cart collection service. For the purposes of this benchmarking analysis Bismarck’s collection that utilizes multi-pack trucks is considered semi-automated.

**Table 20 - Benchmarking Overview – Garbage Collection**

| Community | Number of Households (1) | Style of Collection | Frequency of Collection | # of Routes per Week | Fee Type |
|---|---|---|---|---|---|
| Bismarck, ND | 19,180 (2) | Manual & Semi-Automated (5) | 1 x week | 23 Multi-Pack 8 - Manual | Fixed |
| Fargo, ND | 26,000 (3) | Automated | 1 x week | 30 | Volumetric |
| Grand Forks, ND | 22,000 (3) | Automated & Semi-Automated (6) | 1 x week | 20 | Volumetric |
| Minot, ND | 11,.500 | Manual | 2 x week | 25 | Fixed |
| Mankato, MN | 10,000 | Automated | 1 x week | 15 | Volumetric |
| Moorhead, MN | 11,000 | Automated | 1 x week | | Volumetric |
| Fergus Fall, MN | 4,400 | Automated | 1 x week | 10 | Volumetric |
| Aberdeen, SD | 8,000 | Manual | 1 x week | 16 | Fixed |
| Billings, MT | 34,000 (4) | Automated | 1 x week | 28 | Fixed |

Notes:

(1) Residential accounts
(2) 15,423 curbside customers and 3,720 alley customers
(3) Includes alley accounts collected via automated service
(4) 17,000 90-gal containers and 8,500 300-gallon containers collected using the same vehicles
(5) Semi-automated is side-load with rear compactors (multi-pack trucks)
(6) Semi-automated is front-load with automated tippers

As shown in Table 20 above, the preferred frequency for residential garbage collection is one time per week. This is largely due to the regional adoption of collection technology utilizing fully automated or semi-automated collection with carts. Similarly the majority of the regional, automated collection services have a volumetric based fee structure, meaning that there are multiple cart sizes available for a range of monthly fees.

Fully automated operations are able to maximize productivity as compared to semi-automated systems. However, fully automated options may not meet the needs of all communities. It is common for municipalities to incorporate a blend of fully automated and semi-automated operations to address specific service requirements unique to their community. For example, it is not uncommon for residential curbside collection to be fully automated and residential alley collection to consist of semi-automated or manual

service. The success of any collection system rests on the establishment of a comprehensive “Code of Ordinances” that can be fairly and uniformly enforced to maximize efficiencies and adherence to the designed service.

### Manual Collection Comparison

Table 21 summarizes the benchmarking communities that perform manual residential collection. The City of Bismarck is included in the table for comparison.

**Table 21 - Manual Service Metrics**

| Metric | Bismarck | Minot | Aberdeen |
|---|---|---|---|
| Housing Density (Units/mi$^2$) | 544 | 659 | 512 |
| Avg. Households/Route | 671 (semi-auto) | 575 | 400 |
| Set-Out Limits | Limited (1) | 32 gal containers | In container (2) |
| Work Week | 5 days | 4 days | 4 days |
| Hours per Day | 8 | 8 | 8 |
| Bulk Waste Curbside | Yes | Yes | No |
| Recycling Curbside | Yes - Contract | No | Yes – Contract |
| Yard Debris Curbside | No | No | No |
| Enforcement | Drivers | Drivers | Drivers |
| Monthly Fee | $16.12 | $10.18 | $13.50 |

1) Set-out quantity is limited to truck lifting capability and capacity.
2) Must be contained within the selected size container.

The number of routes required is impacted by a number of variables including set-out rates (the percent of homes that set-out garbage for collection in a given week), average pounds per set out (how much garbage is set out at each home), set-out restrictions (limits on the amount, size, or manner in which garbage can be placed out for collection), the level of enforcement of set-out restrictions, route timing, and staff configuration.

Bismarck’s residential collection service is a mixture of manual collection from alley customers and semi-automated collection from curbside customers. The increased efficiency of the semi-automated curbside collection is reflected in Bismarck’s collection service showing a higher average number households served per route compared to the communities with manual collection.

Based on conversations with the Minot and Aberdeen collections staff, it was determined that neither community had detailed formal metrics for set-out rates or timing of routes. Both communities compared well to Bismarck as each provides residential collection in both newer areas via curbside collection and via alleys in older portions of the community. It should be noted that Minot collects each account twice per week and based on anecdotal observations by the Minot staff, the set-out rate is not consistent for each collection day. It is common for curbside set-outs to drop below 50% on the second collection day in communities that offer twice per week collection.

**Automated Collection Comparison**

Table 22 below summarizes the benchmarking communities that perform automated or semi-automated residential collection. The City of Bismarck is included in the table for comparison purposes even though the collection system is not considered fully automated for the purposes of this analysis.

The number of routes required is impacted by a number of variables including set-out rates (the percent of homes that set out garbage for collection in a given week), average pounds per set out (how much garbage is set out, on average, at each home), set out restrictions (limit on the amount, size, or manner in which garbage can be placed out for collection), the level of enforcement of set out restrictions, route timing and staff configuration.

As shown in Table 22, the majority of the surveyed automated collection service communities have a higher average number of homes serviced per route when compared to Bismarck. For example, based on the survey, Billings, Fargo and Grand Forks have developed collection routes for curbside residential, alleys and multifamily that is nearly fully automated. This is reflected in the number of accounts that an average route can service each day. Each of these communities has a volumetric collection fee structure that forces the users to limit refuse collection to dedicated containers or pre-purchased bags.

The communities surveyed did not have formal set-out rates or time metrics for their collection systems. All reported that observed set-out rates were over 90%. Based on the published data and conversations with the collection staff of each community, Billings, Fargo and Grand Forks have similar solid waste systems to the City of Bismarck as each community provides collection services and owns the landfill where the waste is disposed. The Minnesota communities only operated a collection system and disposal occurs at a private landfill or transfer station.

It is anticipated that the City of Bismarck could realize similar average households per route as Fargo, Grand Forks and Billings by implementing fully automated residential curbside collection and refined semi-automated alley collection.

## Table 22 - Automated Service Metrics

| Metric | Bismarck | Fargo | Grand Forks | Mankato | Fergus Falls | Moorhead | Billings |
|---|---|---|---|---|---|---|---|
| Housing Density (Units/mi$^2$) | 544 | 532 | 1,095 | 547 | 286 | 555 | 585 |
| Avg. Households/Route | 671 | 866 | 1,100 | 666 | 440 | No Response | 910 |
| Set-Out Limits - Garbage | Limited (1) | Must be in container (2) | Must be in container (2) | Must be in container or pre-purchased bag (2) | Must be in container (2) | Must be in container or pre-purchased bag (2) | Must be in container (2) |
| Work Week | 5 days | 5 days | 5 days | 5 days | 5 days | 5 days | 4 days |
| Hours per Day | 8 | 8 | 8 | 8 | 8 | 8 | 10 |
| Bulk Waste Curbside | Yes | Fee | Fee | Fee | Fee | Fee | Yes |
| Recycling Curbside | Yes - Contract | Yes | Yes - Contract | Yes - Contract | Yes - Contract | Yes | No |
| Yard Debris Curbside | No | No | Yes | Yes | No | Yes | Yes |
| Enforcement | Drivers | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin | Drivers/Admin |
| Monthly Fee | $12.31 (96 Gal)<br>$3.81 (Recycle)<br>$16.12 Total | $6 (48 Gal)<br>$9 (64 Gal)<br>$14 (96 Gal) | $15.82 per 60 Gal Container | $11 (35 Gal)<br>$16 (65-Gal)<br>$25 (95 Gal) | $16 (65-Gal)<br>$25 (95 Gal) | $11 (35 Gal)<br>$16 (65-Gal)<br>$25 (95 Gal) | $8.98 |

1) Set-out quantity is limited to truck lifting capability and capacity.
2) Must be contained within the provided, selected size (if available) container.

## Monthly Fee Summary

Table 23 below summarizes the monthly residential collection fee for each community surveyed. The table summarizes the total fee charged to the residential user class, indicates which services are provided and summarizes if the cost of service for collection and disposal is being covered by the fee collected. Many of the communities surveyed that performed both collections and operated a landfill indicated that the residential collection cost of service was subsidized by the commercial tipping fee from the landfill or the general fund.

**Table 23 - Monthly Fee Summary**

| Community | Monthly Fee (1) | Fee Type | Services Included (2) | Costs Included (3) | Notes |
|---|---|---|---|---|---|
| Bismarck, ND (7) | $16.12 | Fixed | G, R, B | G, R, B, D | (5) |
| Fargo, ND (7) | $14 | Volumetric | G, R | G, R | (5) |
| Grand Forks, ND (7) | $15.82 | Volumetric | G, R, Y | G, R, Y | (5) |
| Minot, ND (7) | $10.18 | Fixed | G | G, D | (6) |
| Mankato, MN (8) | $25 | Volumetric | G, R, Y | G, R, Y, D | (4) |
| Moorhead, MN (8) | $25 | Volumetric | G, R, Y | G, R, Y, D | (4) |
| Fergus Fall, MN (8) | $25 | Volumetric | G, R | G, R, Y, D | (4) |
| Aberdeen, SD (8) | $13.50 | Fixed | G, R, B | 1 x week | (4) |
| Billings, MT (7) | $8.98 | Volumetric | G, R, B | G, R, B, D | (6) |

Notes:

(1) For volumetric fee structures, this is the largest container fee.
(2) Curbside services: G=Garbage, R=Recycling, Y=Yard Debris, B=Bulk Waste.
(3) Costs of service: G=Garbage, R=Recycling, Y=Yard Debris, B=Bulk Waste, D=Disposal.
(4) Fee covers cost of service for collections and disposal.
(5) Fee covers cost of service for collections; Disposal costs are covered by other income.
(6) Fee does not cover full cost of service for collection and disposal.
(7) Municipality owns and operates a municipal solid waste landfill.
(8) Municipality hauls waste for disposal at a third part municipal solid waste landfill.

# Key Findings & Potential System Modifications

This section provides general discussion on key findings from the route observations and benchmarking tasks, and provides some general industry standard metrics to compare to the City's metrics. This section also identifies potential system modifications to be considered for residential garbage collection, based on the results of the baseline efforts, route observations, and benchmarking tasks, as well as discussions with City staff. As previously noted, at the time of this writing, only the summer route observations have been completed; results of winter route observations may impact certain aspects of the potential modifications described in this section.

## General System Key Findings

Based on the review of the system data and route observations, the following general system key findings were identified:

- Residential curbside collection consists of a semi-automated service with limited collection restrictions placed on the customers.
- Residential alley collection consists of manual service with limited collection restrictions placed on the customers.
- Apartment collection service consists of dumpster collections. Collection restrictions are provided by the fee charged for dumpster size and frequency of collection.
- Currently, the collection service is managed by collection truck type and not customer service type. For example residential alley collection occurs on the same routes as apartment collection.
- Collection routes are not documented in a graphic format (maps).
- Customer account numbers and types were difficult to determine based on the current process used to manage the data.
- Asset management of containers and dumpsters is limited. It was difficult to determine the location of City owned dumpsters and the locations where City containers have been deployed.
- The City currently has an 80% spare ratio for multi-pack vehicles, which is higher than a typical 30% spare ratio that is generally recommended for automated/semi-automated vehicles.
- Collection crews return to the landfill for lunch breaks, which means vehicles are not necessarily at or near capacity when returning to the landfill. Changing this practice has the potential to make routes more efficient by only having collection vehicles return to the landfill when they are at or near capacity or at the end of a collection day.

Potential over-arching utility modifications that could benefit the system include:

- Implement a refined asset management mechanism utilizing the City's GIS databases to track deployed containers, track customer pickup locations, summarize customer service type by property, and document individual collection routes.
- Rebalance and document collection routes.
- Revise vehicle replacement policies to more efficiently manage spare ratios.
- Revise collection routes by customer service type.
- Adopt and enforce residential set-out limits (amount of waste) and restrictions (how waste is containerized) for the purpose of increasing the number of accounts that can be collected by individual routes.
- Change collection technology for the purpose of increasing the number of accounts that can be collected by individual routes.

### General Recommendations

HDR recommends that the City implement an asset management program for the solid waste utility that includes:

- Tracking customer service type (i.e. curbside, alley or apartment) and type/size of deployed containers (carts or dumpster), by property.
- Delineating individual residential collection routes, by customer type (e.g. curbside, alley, dumpster).

The City could expand the existing GIS data sets to include these items. Having a solid foundation of assets, customer locations and collection routes will allow for the refinement and optimization of the utility, regardless of future changes.

The following sections describe the detailed findings and potential system modifications, by customer class.

## Curbside Service Key Findings & Potential Modifications

- The City's current curbside garbage collection system covers an average of 671 homes per route as shown by the route observations, which is well within the range of 500 to 800 homes per route that is typically observed in manual and semi-automated collection systems. (In fully automated systems, garbage routes typically cover between 1,000 and 1,300 homes per route.)
- With the City's current semi-automated system, where residents have carts but are also allowed to place items outside of the carts, the City uses multi-pack vehicles that have side-arm loading capabilities in addition to rear-loading capabilities.
- It was observed that three of the seven curbside routes required more than one vehicle to complete the route. It was also observed that the time spent on the routes varied widely.

These metrics indicate the following potential modifications should be considered for curbside service:

- **Rebalance** curbside garbage routes (with existing vehicles) to allow for more efficient and equitable routes, balancing homes covered by each route and time spent on each route, with one vehicle completing each route without the need for additional vehicles to assist in completing routes.
- **Fully automate** curbside garbage routes, which would require enforcing a set-out limit of collecting only materials that are placed inside the cart.
    - A fully automated system would allow the City to convert from the current multi-pack vehicles to fully automated side-loading vehicles. A change in vehicle technology would potentially allow for savings on vehicle cost in two ways:
        1. Fully automated side-loaders are potentially less expensive than the current multi-pack vehicles, on a per truck basis;
        2. With a higher number of homes covered on each route with a fully automated system, the City may need fewer vehicles to complete curbside collection each week.
    - Labor cost savings could also be achieved in two ways:
        1. Fewer trucks may be necessary to complete the routes; and
        2. Fully automated vehicles only require one driver with no collectors.

## Alley & Apartment Service Key Findings & Potential Modifications

- The City's current alley and apartment collection system uses rear-load vehicles to collect bags or cans from alley customers, and a hook system on the rear-load vehicle to collect dumpsters from apartments.
- There is also one front-load vehicle route that collects dumpsters from apartments.
- It is believed that a majority of the 635 dumpster accounts are covered on the single front-load route that runs four days per week, and approximately 180 dumpster accounts are covered on the rear-load routes that also service alley customers.
- It is recommended that City staff and HDR discuss potential modifications to the route observation form prior to the winter observations in order to more accurately capture key data for alley and apartment collection.
- Similar to curbside service, it was observed that two of the five alley/apartment collection routes required more than one vehicle to complete the route. It was also observed that time spent on each route varied widely.

These metrics indicate the following potential modifications should be considered for alley and apartment services:

- **Rebalance** alley and apartment collection (with existing vehicles) to allow for more equitable and efficient routes.
    - Rebalancing should include evaluating whether it is possible to move all dumpster accounts to the current one front-load vehicle route, which may mean the front-load route would need to run five days per week, rather than the current four days per week.
    - If all dumpster accounts can be serviced with one front-load route, without the need for adding more front-load vehicles, alley collection could be made more efficient without adding inefficiencies, or extra vehicles, to the front-load apartment collection.
- **Semi-automate** alley collection by retrofitting existing vehicles or transitioning to a different collection technology.
    - This could allow the City to require alley customers to use carts and require enforcement for all materials to be placed in a cart by the customers, but would lower labor costs and associated workers compensation insurance.
    - This approach would require one driver and at least one collector, but could potentially speed up the collection process, allowing for more homes to be collected on each route.

## Volume-Based Collection Service

For the purposes of increasing efficiency, balancing cost of service, and creating an incentive to recycle more, the City could consider a volume-based garbage collection system for curbside customers and residential alley customers. In a volume-based system, residents are charged for the collection of garbage based on the amount they throw away. This creates a direct economic incentive to recycle more and to generate less waste. A volume-based rate structure treats garbage services like electricity, gas, and other utilities, where households pay a variable rate depending on the amount of service they use. Volumetric programs can be implemented in several ways; however, three main approaches include:

- **Variable rate cart program**: This approach uses fully automated vehicles, and residents select from among varying sizes of carts. Residents selecting larger carts are charged higher rates, while residents selecting smaller carts are charged lower rates for collection and disposal. This approach would allow the City to fully automate collection, but would no longer allow residents to place additional materials outside of the cart.
    - It has been reported in communities using the variable rate cart system that waste was reduced by 15%.
    - This system utilizes automated collection technology with an anticipated 1,000+ curbside accounts serviced per route.

- Residential alley accounts can be serviced with semi-automated tipping technology on front- or rear-load trucks.

- **Bag program** (or stickers/tags): Residents dispose of their waste in specialized bags (or with special stickers/tags affixed to regular garbage bags) approved by the municipality and clearly marked with the municipal seal or other unique instructions or information. In a bag program, a flat fee can be charged to residents on a utility bill to cover fixed costs, but a majority of the costs are built into the cost of the bags (or stickers/tags).
  - It has been reported in communities using a bag program that waste was reduced by 25% or more.
  - If the City pursued a bag program, the existing carts could potentially be repurposed for a new curbside yard waste collection service.
  - A bag program could work for curbside and alley collection; though it would be more challenging to enforce with multifamily homes served by dumpsters.
  - Residential curbside and alley could be collected utilizing manual rear-load trucks, which could allow for efficiencies to be gained in collecting from both customer types on the same route.
- **Combination of carts and bags:** This approach uses carts for collection in combination with pre-paid bags (or stickers/tags) for additional garbage. This method would be very similar to the curbside collection program that the City is currently utilizing, with the exception that any additional bags set outside the cart would need to be specially purchased bags (or sticker/tags) prior to being set out at the curb.
  - This system would require the least changes to the City's current operations, though it would require some administrative efforts to get the specially marked bags (stickers/tags) developed and distributed to convenient locations (i.e. grocery stores), and to re-stock the stores as needed.
  - While the additional charge for materials set outside of the cart will deter some residents from setting additional materials outside of the cart, some residents would continue to set materials outside of the cart, using the pre-paid bags, for the convenience.
  - Residential alley accounts could be serviced with the same system as curbside, and therefore could be serviced with the same vehicles.
  - While this approach could reduce the amount of waste set-out by customers, it is not anticipated to have a meaningful impact on waste reduction.

Based on our experience in other communities, the majority of recent volumetric based fee systems have been formed using the variable rate cart system. From the regional

benchmarking, there are instances of a combination of automated container and excess bag systems. In the region, a manual collection pre-paid bag system was not found to benchmark.

## Next Steps

The next step in this study is to coordinate with City staff to “short-list” three of the system modifications from the options presented above, to be further evaluated in Task 400. It is anticipated that a meeting/conference call will be conducting in the near future to allow City and HDR staff to review this memo, discuss drivers and goals that should be considered when short-listing system modifications and work together to determine which modifications make the most sense for further evaluation.

City staff, after review of the draft TM 300 memo and discussion, directed HDR to prepare operational models for the following two scenarios for comparison to the existing condition operational model:

1. **Variable Rate Cart** - Residential variable rate structure using City provided carts for both curbside and alley customers.
2. **Variable Rate Cart + Bag** - Residential variable rate structure using City provided carts with the option for additional waste placed in pre-paid bags. This option would be for both curbside and alley customers.

Additionally, City staff requested the operational model costs for:

1. Feasibility of completing residential curbside and alley grass clipping collection.

The results of these three modeling runs will be presented in technical memorandum 401.

# Appendix C. TM 401 – Evaluation of Potential System Modifications

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# Technical Memo

| | |
|---|---|
| Date: | Thursday, November 05, 2015 |
| Project: | Solid Waste Management Collection Evaluation |
| To: | Jeff Heintz, Director of Public Works - Service Operations, City of Bismarck, ND |
| From: | Brent Erickson, Project Manager, HDR Engineering, Inc. |
| Subject: | Subtask 401 – Evaluation of Potential System Modifications, Update Operational Model |

# Introduction

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to evaluate the City's existing municipal solid waste (garbage) collection system, benchmark the City against other similar communities, and ultimately perform a sensitivity analysis of potential changes to collection services.

The City would like to consider various options for maximizing efficiency and improving services for the municipal collection of residential garbage. The purpose of Task 400 of this Solid Waste Management Collection Evaluation (Study) was to review and evaluate potential modifications to the City's current program. Subtask 401 includes updating the operational model used in Task 300 in order to compare certain operational metrics of potential modifications shortlisted in Task 300 to the current case. Subtask 402 includes route rebalancing, which is not anticipated to occur until the City has made final decisions on which system configuration to rebalance. Subtask 403 includes route optimization, which, like Subtask 402, is not anticipated to occur until the City has made a final decision on which system configuration to optimize. The remainder of this memo summarizes the results of Subtask 401.

The main components of Subtask 401 included:

- Updating the operational model used in Task 300 to show the potential modifications side-by-side with the current case, for comparison; and
- Evaluating each potential modification as compared to the current case, using certain planning level estimates of financial and operational impacts.

# Identification of Potential System Modifications

Based on discussions with City staff, the City and HDR identified the following potential modifications to be evaluated in Subtask 401:

- Variable Rate Cart structure for both curbside and alley customers;
- Variable Rate Cart and Bag structure for both curbside and alley customers; and
- Residential curbside and alley grass clipping collection.

For each of the alternative scenarios identified, HDR evaluated the scenarios based on the following set of criteria, compared to the current case:

- Estimated route metric impacts;
- Estimated labor cost impacts;
- Estimated operating and maintenance cost impacts; and
- Estimated capital cost impacts.

## Residential Curbside Garbage Collection

The City's current curbside garbage collection service is provided once a week to each household and is comprised of three routes on Monday and five routes Tuesday through Friday, for a total of 23 routes per week. Two-person crews (one driver and one collector) use multi-pack collection vehicles to collect 96-gallon carts from each household. While curbside customers are provided with a 96-gallon cart, set-outs are not currently limited to what is placed in the cart. Materials are required to be properly containerized, but may be placed in the cart, in bags, or in other customer provided containers of up to 35-gallons in size with lids.

Based on discussions with other communities that have implemented variable rate cart programs that include additional, specially marked and purchased, bags for out-of-cart set-outs, it has been observed that initially, there are higher numbers of additional bags set out by residents. However, over time, the number of additional bags set out for collection decreases dramatically. For example, a number of communities reported that during the initial 18-24 months of operation, a majority of customers set-out additional bags for collection. However, after this initial period, customer set-outs of additional bags reduced sharply and eventually approached zero additional bags during an average week.

For these reasons, a “Variable Rate Cart + Bag - Mature” scenario as well as a “Variable Rate Cart + Bag – Initial” scenario have been included in this analysis in order to show differences in certain metrics (though some metrics are identical) between a mature system and a recently implemented (Initial) system. Therefore, the model was designed to evaluate estimated, planning level cost and operational impacts under the following scenarios:

1. No change in services offered (“Current Case”);
2. Changing to a Variable Rate Cart program collected by a fully-automated side-loader (“Variable Rate Cart”), with no allowance for out-of-cart set-outs;
3. Changing to a Variable Rate Cart program with specially marked bags for purchase by customers for out-of-cart set-outs, collected by a fully-automated side-loader, in a mature system (“Variable Rate + Bag – Mature”); and
4. Changing to a Variable Rate Cart program with specially marked bags for purchase by customers for out-of-cart set-outs, collected by a fully-automated side-loader, initially (“Variable Rate + Bag - Initial).

The anticipated impact on number of vehicles and routes for the potential system modifications compared to the Current Case for curbside garbage collection service is shown in Table 1. With each of the potential modifications, the number of vehicles/routes could be reduced to 4, from the Current Case that uses 5 vehicles.

**Table 1 – Residential Curbside Alternative Scenarios**

| Scenario | Vehicle Type | Number of Vehicles | Routes per Week |
|---|---|---|---|
| Current Case | Multi-Pack | 5 | 23 |
| Variable Rate Cart | Fully-Automated Side-Loader | 4 | 20 |
| Variable Rate Cart + Bag - Mature | Fully-Automated Side-Loader | 4 | 20 |
| Variable Rate Cart + Bag - Initial | Fully-Automated Side-Loader | 4 | 20 |

## Residential Curbside Garbage - Route Metrics

The results of the impacts to key route metrics are shown in Table 2. With a change to variable rate carts, a higher set-out rate (95%) is assumed due to the likelihood of residents setting out more frequently with set-out limits in place. The pounds per set-out are estimated to be reduced by 15% based on observed reductions in waste disposed in other communities with similar systems. For the Variable Rate Cart + Bag – Initial scenario, the set-out rate is estimated to remain at 91% and the pounds per set-out are only slightly reduced compared to the Current Case. The average on route time per trip is increased in each of the alternative scenarios in order to move closer to an 8 hour day, while leaving a little extra time to accommodate winter months, as well as growth in number of homes served per route.

## Table 2 - Residential Curbside Route Model Results

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Set-Out Rate (1) | 91% | 95% | 95% | 91% |
| Lbs./Set-Out | 60.2 | 51.2 | 51.2 | 57.0 |
| Avg. On Route Time per Trip (hrs.) (2) | 1.88 | 2.25 | 2.25 | 2.25 |
| Avg. Weight per Load | 18,367 | 18,743 | 18,743 | 20,000 |
| Hours per Day | 6.43 | 7.17 | 7.17 | 7.17 |
| Stops per Hour (3) | 162 | 163 | 163 | 156 |
| Stops per Route | 610 | 733 | 733 | 702 |
| Total Homes Per Route (4) | 671 | 771 | 771 | 771 |
| Number Stops per Day | 3,051 | 2,930 | 2,930 | 2,807 |

Notes:

(1) Set-out rate for alternatives is anticipated to increase due to restrictions on items being placed outside the cart.
(2) On Route Time is expected to increase with increased set-outs and increased efficiency.
(3) Stops per Hour is calculated by dividing the number of set-outs per day by the total on-route time per day. This metric is used to ensure the number of stops per hour is reasonable. It is estimated that in a fully automated system, the City of Bismarck could achieve 180 to 200 stops per hour.
(4) A mature fully automated system is estimated to realize maximum Total Homes per Route of between 850 and 950 in the City of Bismarck, which allows for growth compared to the base case and alternatives currently modeled.

### Residential Curbside Garbage - Labor Costs

By switching to fully-automated side-loaders, sanitary collectors are not required. It is expected that for the Variable Rate Cart + Bag – Mature scenario, the use of additional bags will be rare, which will allow the vehicle driver to collect the bags with minimal effect on efficiency, and no need for a collector. For the Variable Rate Cart + Bag – Initial scenario, it is assumed that one collector will be used in order to assist with collecting the extra bags, expected to be more frequent in the initial system.

Each of the three proposed scenarios will result in a decrease in the number of sanitary collectors required for the utility. Reducing the number of required sanitary collectors does not indicate the recommendation, or requirement, to downsize City staff. Any changes to the collections operations will require multiple years to fully implement and it is expected that excess staff will be relocated to other positions or handled through attrition.

Table 3 summarizes the raw data used to calculate labor impacts for each scenario. The estimated annual incidentals per employee as well as the salary and benefits per employee are assumed to remain the same across each of the scenarios.

**Table 3 - Residential Curbside Garbage Labor Metrics – Raw Data**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag – Initial |
|---|---|---|---|---|
| Number of Routes per Day | 5 | 4 | 4 | 4 |
| Sanitation Collector per Crew | 1 | - | - | 1 |
| Vehicle Drivers per Crew | 1 | 1 | 1 | 1 |
| Total Number of Sanitation Collectors | 5 | - | - | 4 |
| Total Number of Vehicle Drivers | 5 | 4 | 4 | 4 |
| Number of Supervisors | 1 | 1 | 1 | 1 |
| Estimated Annual Incidentals Cost per Employee | $350 | $350 | $350 | $350 |
| Average Annual Salaries and Benefits – Per Collector | $56,473 | $56,473 | $56,473 | $56,473 |
| Average Annual Salaries and Benefits – Per Driver | $62,792 | $62,792 | $62,792 | $62,792 |
| Average Annual Salaries and Benefits – Per Supervisor | $98,807 | $98,807 | $98,807 | $98,807 |

Table 4 summarizes the calculated key metrics including total estimated labor costs and estimated annual labor related savings for each scenario.

**Table 4 - Residential Curbside Garbage Labor Metrics – Calculated Data**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag – Initial |
|---|---|---|---|---|
| Total Estimated Annual Salaries and Wages – Sanitation Collectors | $282,365 | - | - | $225,892 |
| Total Estimated Annual Salaries and Wages – Vehicle Drivers | $313,960 | $251,168 | $251,168 | $251,168 |
| Total Estimated Annual Salaries and Wages – Supervisors | $98,807 | $98,807 | $98,807 | $98,807 |
| Total Estimated Annual Salaries and Wages (1) | $695,132 | $349,975 | $349,975 | $575,867 |
| Total Estimated Annual Incidentals Expense | $3,850 | $1,750 | $1,750 | $3,150 |
| Estimated Annual Labor Related Expense | $698,982 | $351,725 | $351,725 | $579,017 |
| **Estimated Annual Labor Related Savings** | **-** | **$347,257** | **$347,257** | **$119,965** |

Notes:

(1) Total Annual Salaries and Wages were calculated by summing the product of the per-employee salary and number of workers for each labor type.

As shown in Figure 1, all three alternative scenarios result in labor related savings, though the Variable Rate Cart + Bag – Initial scenario shows slightly less savings than the other alternative scenarios, compared to the Current Case.


**Figure 1 - Residential Curbside Garbage - Labor Costs**

## Residential Curbside Garbage - Vehicle Operations and Maintenance Costs

Table 5 summarizes the raw data used in the model as well as the calculated metrics for the current case and the alternative scenarios. Although the fully-automated side-loader has a higher annual maintenance and repair cost, the smaller fleet size results in an overall annual savings of approximately $12,000.

## Table 5 - Residential Curbside Garbage - Operations Model Results

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Average Miles per Trip (1) | 16.44 | 18.91 | 18.91 | 18.91 |
| Average Fuel Economy (mpg) | 4.0 | 4.0 | 4.0 | 4.0 |
| Number of Routes per Day | 5 | 4 | 4 | 4 |
| Number Collection Vehicles Excluding Spares | 5 | 4 | 4 | 4 |
| Spare Ratio (%) (2) | 80% | 35% | 35% | 35% |
| Maintenance and Repair ($/vehicle/year) (3) | $14,600 | $20,000 | $20,000 | $20,000 |
| Estimated Annual Operating Expense | $160,331 | $148,103 | $148,103 | $148,103 |
| **Estimated Annual Operating Savings** | **-** | **$12,229** | **$12,229** | **$12,229** |

Notes:

(1) Miles per trip increases for the alternative scenarios due to the increase in average homes per route and fewer total routes.

(2) HDR recommends a 35% spare ratio for fully-automated side-loader vehicles. However, the City may decide to hold a higher number of spares in order to address holiday collection.

(3) Annual vehicle maintenance and repair is estimated to increase for the fully-automated side-load vehicles.

As shown in Figure 2, the alternative scenarios result in minor savings in operations and maintenance costs compared to the current case.

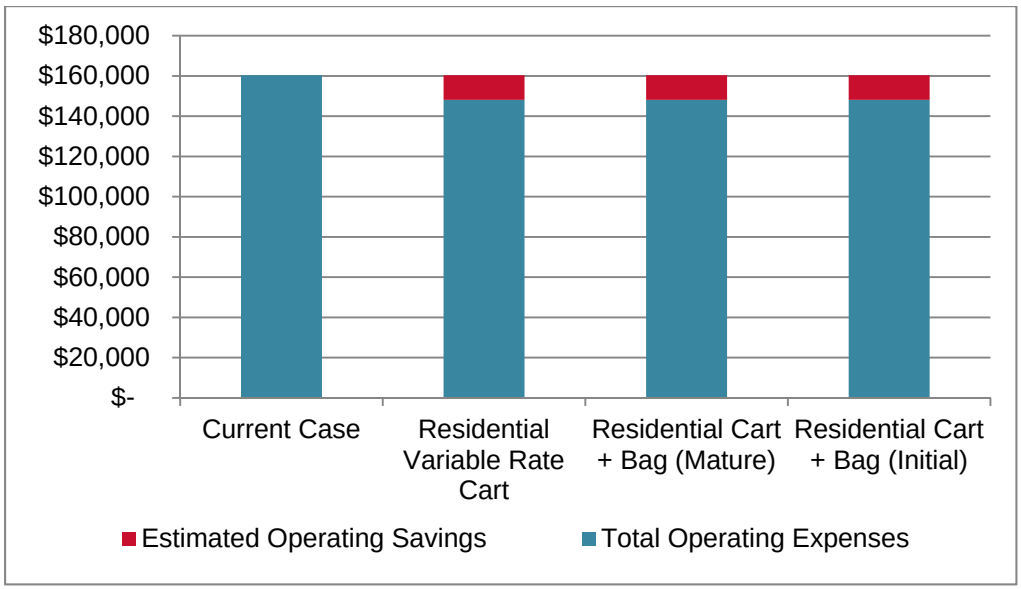


**Figure 2 – Residential Curbside Garbage - Operating Costs**

## Residential Curbside Garbage - Capital Costs

Table 6 presents the raw data and estimates used to model the capital costs associated with the alternative scenarios as well as calculated metrics, as compared to the current case. It is important to note that the cost to produce and distribute specially marked bags is not included in the capital calculations. In similar cart + bag systems, the cost to produce and distribute the bags is covered entirely by the purchase price paid by the customer. As a result, while the City would have a cost associated with production and distribution of the bags, that cost would be offset by revenues generated when customers purchase the bags.

**Table 6 - Residential Curbside Garbage - Capital Model Results**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Cost of Multi-Pack Collection Vehicle (New) | $305,000 | - | - | |
| Cost of Fully-Automated Side-Loader Collection Vehicle (New) | - | $275,000 | $275,000 | $275,000 |
| Cost of Automated Cart: 96-gal. (New) | $50 | $55 | $55 | $55 |
| Cost of Automated Cart: 65-gal. (New) | - | $50 | $50 | $50 |
| Cost of Automated Cart: 35-gal. (New) | - | $45 | $45 | $45 |
| Total Number of Vehicles in Fleet | 9 | 6 | 6 | 6 |
| Total Number of Carts: 96-gal. (1) | 15,423 | 3,856 | 3,856 | 3,856 |
| Total Number of Carts: 65-gal. (1) | - | 7,712 | 7,712 | 7,712 |
| Total Number of Carts: 35 gal. (1) | - | 3,856 | 3,856 | 3,856 |
| Annual Vehicle Capital Cost (2) | $392,143 | $235,714 | $235,714 | $235,714 |
| Annual Cart Cost (3) | $77,115 | $77,115 | $77,115 | $77,115 |
| Estimated Annual Capital Outlay | $469,258 | $312,829 | $312,829 | $312,829 |
| **Estimated Annual Capital Savings** | **$-** | **$156,429** | **$156,429** | **$156,429** |

Notes:

(1) The cart distribution for the variable rate scenarios is based on discussion with regional communities. Experience of these communities was that the default container size dictates the most common cart size selected by residents. For this study it was assumed that 25% of customers selected 96-gallon carts, 50% selected 65-gallon carts, and 25% selected 35-gallon carts.

(2) Vehicles amortized over 7 year period.

(3) Carts amortized over 10 year period.

As shown in Figure 3, the alternative scenarios result in an estimated savings of nearly $160,000 in capital costs. The fully-automated side-load vehicles are believed to be available at a lower cost than the current multi-pack vehicles. Additionally, the alternative scenarios require fewer vehicles.

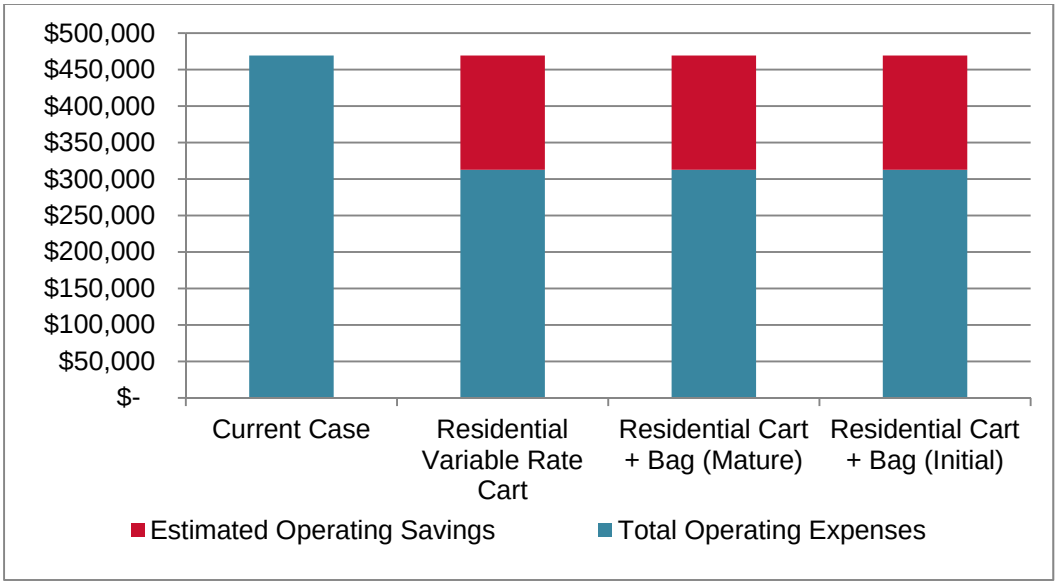


**Figure 3 – Residential Curbside Garbage - Capital Costs**

### Summary of Residential Curbside Garbage Alternatives

Table 7 summarizes the total annual estimated costs associated with the current system and the alternative scenarios. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

## Table 7 - Residential Curbside Garbage - Estimated Total Annual Cost

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Estimated Total Annual Labor Cost | $699,000 | $352,000 | $352,000 | $579,000 |
| Estimated Total Annual Vehicle Operating Cost | $160,000 | $148,000 | $148,000 | $148,000 |
| **Estimated Total Annual Operating Cost** | **$859,000** | **$500,000** | **$500,000** | **$727,000** |
| | | | | |
| Estimated Total Annual Vehicle Capital Cost | $392,000 | $236,000 | $236,000 | $236,000 |
| Estimated Total Annual Cart Cost | $77,000 | $77,000 | $77,000 | $77,000 |
| **Estimated Total Annual Capital Cost** | **$469,000** | **$313,000** | **$313,000** | **$313,000** |
| | | | | |
| **Estimated Total Annual Cost** | **$1,328,000** | **$813,000** | **$813,000** | **$1,040,000** |
| **Estimated Total Annual Savings** | **$-** | **$515,000** | **$515,000** | **$288,000** |

As shown in Figure 4, each of the alternative scenarios results in an overall estimated savings compared to the current case.

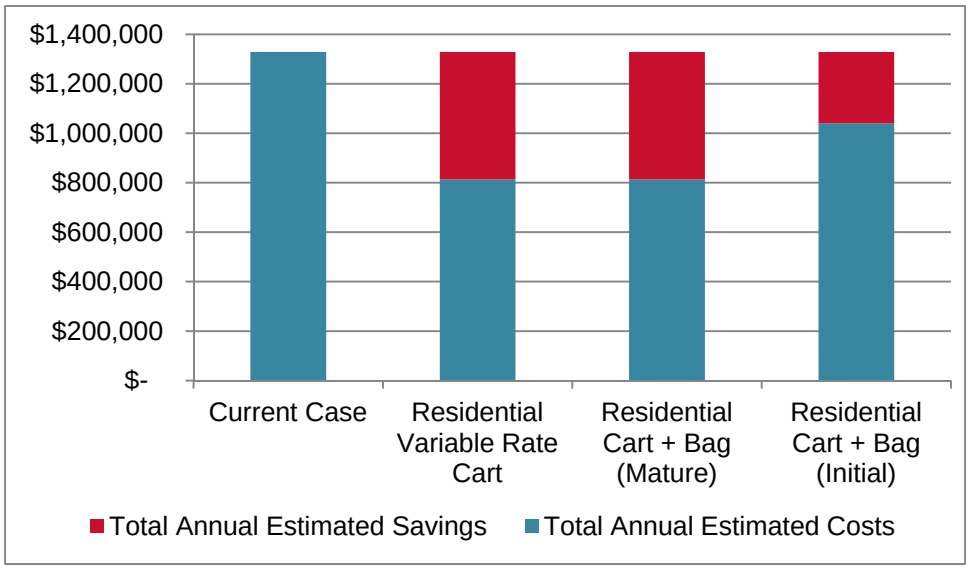


**Figure 4 – Residential Curbside Garbage - Estimated Total Annual Costs**

## Residential Alley Garbage Collection

The City's current alley garbage collection service is provided once a week to each household using rear-load collection vehicles, and is comprised of two routes on Tuesday and two routes Wednesday and Thursday that complete one trip designated as alley before collecting apartments, for a total of 4 complete routes per week. Two-person crews (one driver and one collector) use rear-load collection vehicles to collect garbage from each household. The residential alley customers provide their own garbage cans and are not limited to the amount of garbage that can be set out.

The selection of potential system modifications, similar to the curbside system, resulted in three alternative scenarios for alley garbage collection service, as shown in Table 8. In each alternative scenario, a 20 cubic yard rear-load vehicle with a tipper is recommended, rather than the 25 cubic yard rear-load vehicles that are used in the Current Case. The recommendation of a smaller vehicle size is due to the fact that the Current Case vehicles are estimated to be only half full when arriving at the facility each trip. The alternative scenarios also include a recommendation to complete two full days of residential alley routes, instead of the existing system which consists of one full day and two partial days, each with two vehicles. The model was designed to evaluate estimated, planning level cost and operational impacts under the following scenarios:

1. No change in services offered (Current Case);
2. Changing to a Variable Rate Cart program collected by rear-load vehicles with tippers (Variable Rate Cart);
3. Changing to a Variable Rate Cart program with specially marked bags for purchase collected by rear-load vehicles with tippers (Variable Rate Cart + Bag – Mature);
4. Changing to a Variable Rate Cart program with specially marked bags for purchase collected by rear-load vehicles with tippers (Variable Rate Cart + Bag – Initial)

**Table 8 - Residential Alley Garbage Alternative Scenarios**

| Scenario | Vehicle Type | Number of Vehicles | Routes per Week | Vehicle Capacity |
|---|---|---|---|---|
| Base Case | Rear-Load | 2 | 4 | 25 CY |
| Variable Rate Cart | Rear-Load with Tipper | 2 | 4 | 20 CY |
| Variable Rate Cart + Bag - Mature | Rear-Load with Tipper | 2 | 4 | 20 CY |
| Variable Rate Cart + Bag - Initial | Rear-Load with Tipper | 2 | 4 | 20 CY |

## Residential Alley Garbage - Route Metrics

The results of the impact to key route metrics are shown in Table 9. With a change to variable rate carts, a higher set-out rate (95%) is assumed due to the likelihood of residents setting out more frequently with set-out limits in place. The pounds per set-out are estimated to be reduced by 15% based on observed reductions in waste disposed in other communities with similar systems. For the Variable Rate Cart + Bag – Initial scenario, the set-out rate is estimated to remain at 92% and the pounds per set-out are assumed to be only slightly less than the Current Case. The average on route time per trip remains the same as the current case in each of the alternative scenarios in order to accommodate winter months, as well as growth in number of customers.

**Table 9 - Residential Alley Garbage - Route Model Results**

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Set-Out Rate (1) | 92% | 95% | 95% | 92% |
| Lbs/Set-Out | 24.6 | 20.9 | 20.9 | 24.6 |
| Avg. On Route Time per Trip (hrs.) (2) | 2.33 | 2.33 | 2.33 | 2.33 |
| Avg. Weight per Load (3) | 10,524 | 9,237 | 9,237 | 10,524 |
| Hours per Day | 7.23 | 7.23 | 7.23 | 7.23 |
| Stops per Hour (4) | 183 | 190 | 190 | 184 |
| Stops per Route | 856 | 884 | 884 | 856 |
| Total Homes Per Route | 930 | 930 | 930 | 930 |
| Number Routes per Day | 2 | 2 | 2 | 2 |

Notes:

(1) Set-out rate for alternatives is anticipated to increase due to restrictions on items being placed outside the cart.
(2) On Route Time is expected to increase with increased efficiency.
(3) Alternatives utilized a 20-CY capacity vehicle which results in a reduced weight per load. However, the vehicles are returning to the landfill closer to capacity than the current case.
(4) Stops per Hour is calculated by dividing the number of set-outs per day by the total on-route time per day. This metric is used to ensure the number of stops per hour is reasonable. It is estimated that the City of Bismarck could achieve up to 200 stops per hour for alley collection.

## Residential Alley Garbage - Labor Costs

Table 10 shows the raw data and estimates used in calculating the labor impacts of each of the scenarios. The alternative scenarios assume the same number of routes, drivers, and collectors as the current case.

**Table 10 - Residential Alley Garbage Labor Metrics – Raw Data**

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Number of Routes per Day | 2 | 2 | 2 | 2 |
| Sanitation Collector per Crew | 2 | 2 | 2 | 2 |
| Vehicle Drivers per Crew | 1 | 1 | 1 | 1 |
| Total Number of Sanitation Collectors | 4 | 4 | 4 | 4 |
| Total Number of Vehicle Drivers | 2 | 2 | 2 | 2 |
| Number of Supervisors | 1 | 1 | 1 | 1 |
| Annual Incidentals Cost per Employee | $350 | $350 | $350 | $350 |
| Annual Salaries and Wages – Sanitation Collectors (1) | $56,473 | $56,473 | $56,473 | $56,473 |
| Annual Salaries and Wages – Vehicle Drivers | $62,792 | $62,792 | $62,792 | $62,792 |
| Annual Salaries and Wages – Supervisors | $98,807 | $98,807 | $98,807 | $98,807 |

Notes:

(1) Does not include potential reduction in workers compensation insurance.

Table 11 shows the calculated labor metrics for each of the scenarios. As shown, without a reduction in crew size, there are no anticipated annual labor related savings.

**Table 11 – Residential Alley Garbage Labor Metrics – Calculated Data**

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Total Annual Salaries and Wages (1) | $450,283 | $450,283 | $450,283 | $450,283 |
| Total Annual Incidentals Expense | $2,450 | $2,450 | $2,450 | $2,450 |
| Estimated Annual Labor Related Expense | $452,733 | $452,733 | $452,733 | $452,733 |
| Estimated Annual Labor Savings | $- | $- | $- | $- |

Notes:

(1) Total Annual Salaries and Wages were calculated by summing the product of the salary and number of workers for each labor type.

As shown in Figure 5, the total estimated labor costs remain the same for all scenarios.

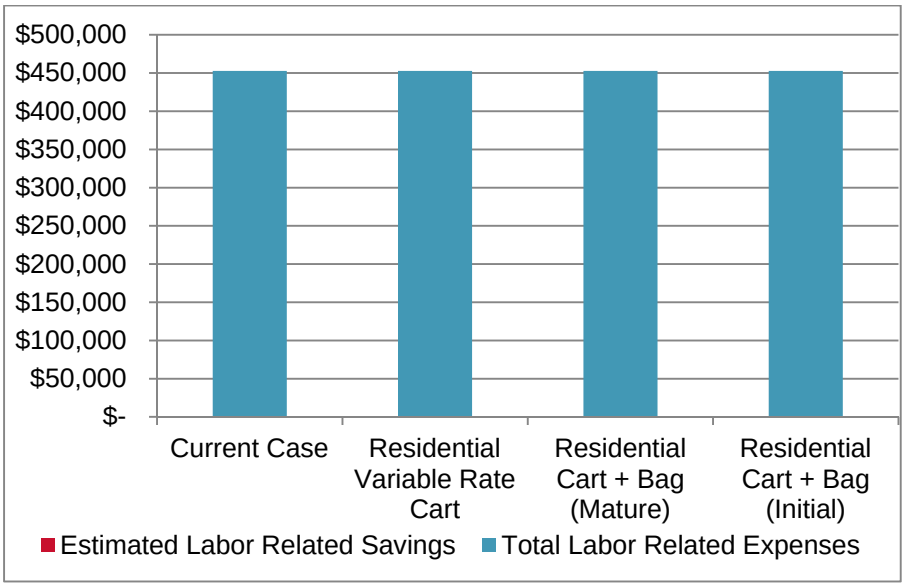


**Figure 5 – Residential Alley Garbage - Labor Costs**

## Residential Alley Garbage - Vehicle Operations and Maintenance Costs

Table 12 summarizes the operations and maintenance metrics estimated in the model for each of the alternatives. The anticipated savings for switching to a smaller vehicle size is approximately $13,800 annually. Each of the alternative scenarios indicates the same amount of savings because they each assume the use of smaller (20 cubic yard) vehicles and a reduced estimate of maintenance cost per vehicle.

**Table 12 - Residential Alley Garbage - Operations Model Results**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Average Miles per Trip | 14.3 | 14.3 | 14.3 | 14.3 |
| Average Fuel Economy (mpg) | 4.0 | 4.0 | 4.0 | 4.0 |
| Number of Routes per Day | 2 | 2 | 2 | 2 |
| Number Rear-Load Collection Vehicles Excluding Spares | 2 | 2 | 2 | 2 |
| Spare Ratio (%) | 50% | 25% | 25% | 25% |
| Maintenance and Repair ($/vehicle/year) | $14,600 | $10,000 | $10,000 | $10,000 |
| Estimated Annual Operating Expense | $48,629 | $34,829 | $34,829 | $34,829 |
| **Estimated Annual Operating Savings** | **$-** | **$13,800** | **$13,800** | **$13,800** |

Figure 6 shows the total estimated operations and maintenance costs are lower for the alternative scenarios.

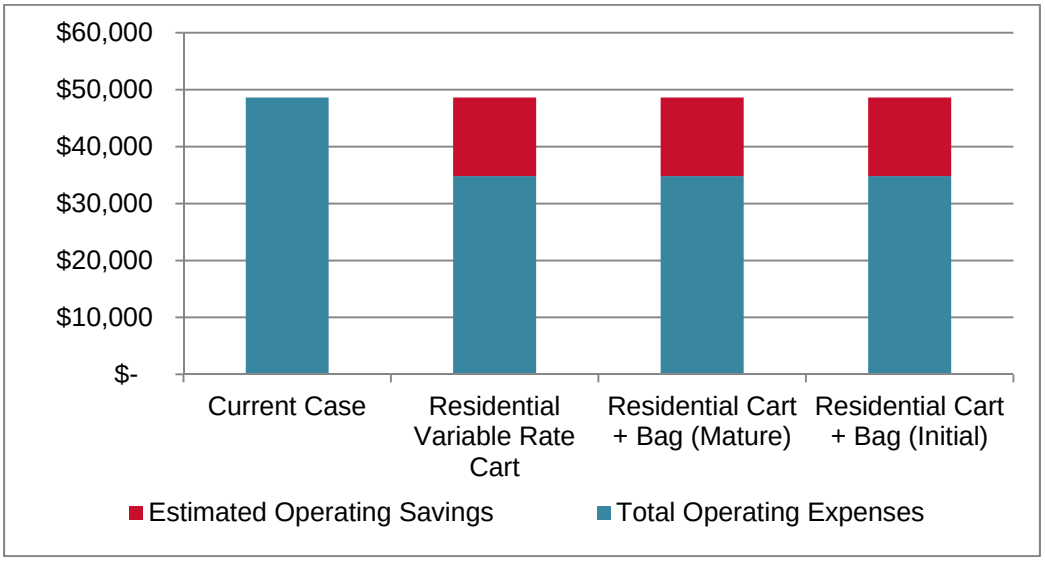


**Figure 6 - Residential Alley Garbage - Operating Costs**

## Residential Alley Garbage - Capital Costs

Table 13 indicates the metrics used to model the estimated residential alley capital outlay. As discussed for curbside collection, The Variable Rate Cart + Bag systems do not show the costs associated with purchasing and distributing the bags due to the belief that the cost for production and distribution of the specially marked bags would be recovered through the sale of the bags to customers.

## Table 13 - Residential Alley Garbage - Capital Model Results

| Metric | Base | Variable Rate Cart | Variable Rate Cart + Bag - Mature | Variable Rate Cart + Bag - Initial |
|---|---|---|---|---|
| Cost of Rear-Load Collection Vehicle (New) | $149,500 | NA | NA | NA |
| Cost of Rear-Load Collection Vehicle with Tipper (New) | - | $155,000 | $155,000 | $155,000 |
| Cost of Automated Cart: 96-gal. (New) | - | $55 | $55 | $55 |
| Cost of Automated Cart: 65-gal. (New) | - | $50 | $50 | $50 |
| Cost of Automated Cart: 35-gal. (New) | - | $45 | $45 | $45 |
| Total Number of Vehicles in Fleet | 3 | 3 | 3 | 3 |
| Total Number of Carts: 96-gal. (1) | NA | 930 | 930 | 930 |
| Total Number of Carts: 65-gal. (1) | NA | 1,860 | 1,860 | 1,860 |
| Total Number of Carts: 35-gal. (1) | NA | 930 | 930 | 930 |
| Annual Vehicle Capital Cost (2) | $64,071 | $66,429 | $66,429 | $66,429 |
| Annual Cart Cost (3) | - | $5,115 | $5,115 | $5,115 |
| Estimated Annual Capital Outlay | $64,071 | $71,544 | $71,544 | $71,544 |
| **Estimated Annual Capital Savings** | **$-** | **$(7,472)** | **$(7,472)** | **$(7,472)** |

Notes:

(1) The cart distribution for the variable rate scenarios is based on City of Fargo distribution where 25% of customers selected 96-gallon carts, 50% selected 65-gallon carts, and 25% selected 35-gallon carts

(2) Vehicles amortized over 7 year period.

(3) Carts amortized over 10 year period.

As shown in Figure 7, the alternative scenarios have a slightly larger capital outlay than the current case due to the purchase of carts as well as the slightly more expensive vehicles that include tippers.

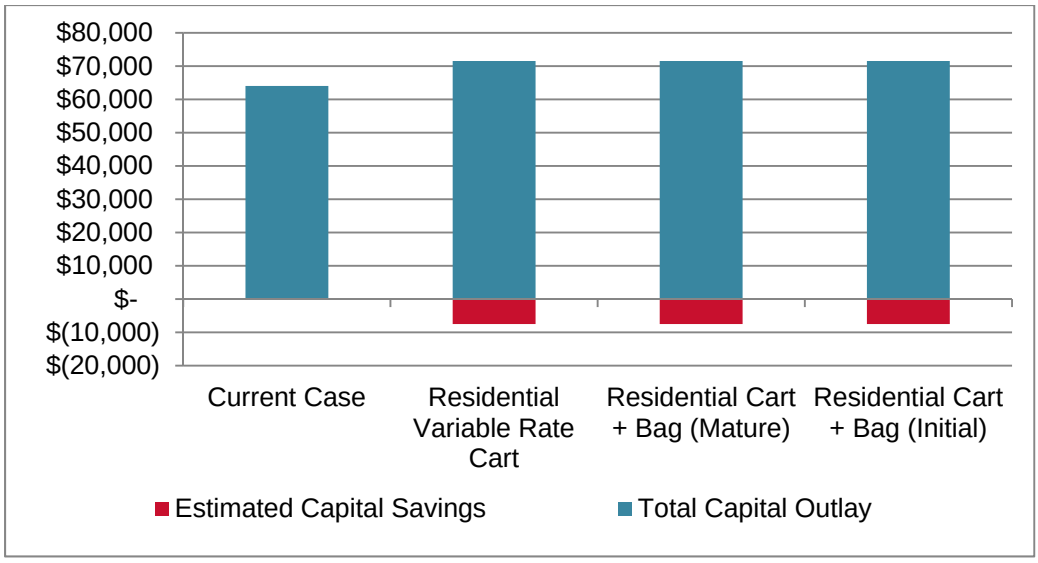


**Figure 7 - Residential Alley Garbage - Captial Costs**

## Summary of Residential Alley Garbage Collection Alternatives

As shown in Table 14, although the alternative scenarios have initially higher estimated capital costs due to the added cost of tippers and carts for the alley residents, the alternative scenarios result in a slight overall estimated savings compared to the Current Case, based on slightly lower estimated maintenance costs. Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total annual costs have been rounded to the nearest hundred.

**Table 14 - Residential Alley Garbage - Estimated Total Annual Cost**

| Metric | Current | Variable Rate Cart | Variable Rate Cart + Bag – Mature | Variable Rate Cart + Bag – Initial |
|---|---|---|---|---|
| Total Annual Labor Cost | $453,000 | $453,000 | $453,000 | $453,000 |
| Total Annual Vehicle Operating Cost | $49,000 | $35,000 | $35,000 | $35,000 |
| **Total Annual Operating Cost** | **$502,000** | **$488,000** | **$488,000** | **$488,000** |
| | | | | |
| Total Annual Vehicle Capital Cost | $64,000 | $66,000 | $66,000 | $66,000 |
| Total Annual Cart Cost | $- | $5,000 | $5,000 | $5,000 |
| **Total Annual Capital Cost** | **$64,000** | **$71,000** | **$71,000** | **$71,000** |
| | | | | |
| **Estimated Total Annual Cost** | **$566,000** | **$559,000** | **$559,000** | **$559,000** |
| **Estimated Total Annual Savings** | **$-** | **$7,000** | **$7,000** | **$7,000** |

As illustrated in Figure 8, the Variable Rate Cart scenario, the Variable Rate Cart + Bag – Mature scenario and the Variable Rate Cart + Bag – Initial scenario offer an estimated $7,000 in annual savings compared to the Current Case.

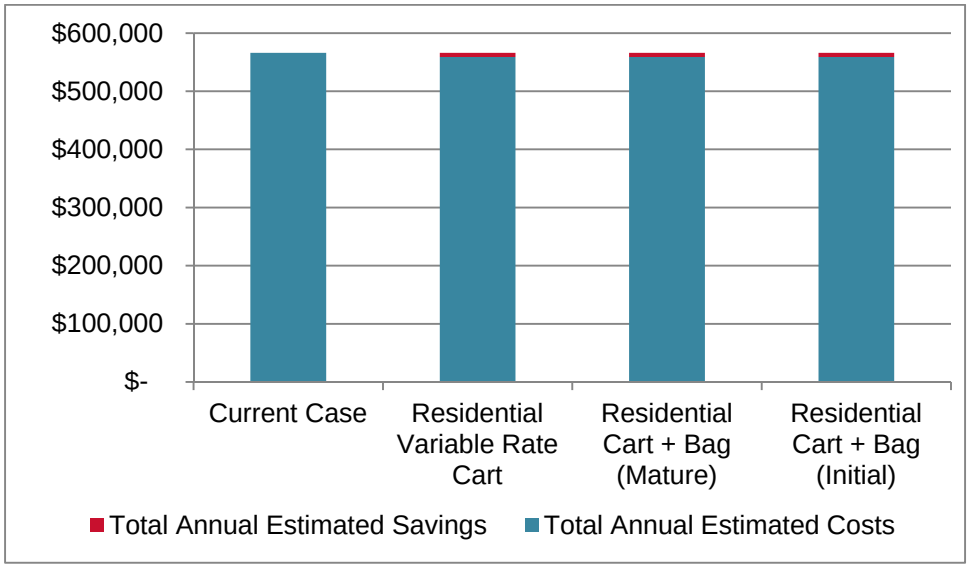


**Figure 8 - Residential Alley Garbage - Estimated Total Annual Costs**

## Residential Curbside Yard Waste Collection

The City currently operates 18 yard debris collection sites around the City that consist of dumpsters that are collected seven days a week during the growing season. The City deploys three rear-load vehicles for yard debris collection from these sites each day from May through October. An operational model was developed to estimate the operational and financial impacts of implementing a curbside yard waste collection service for residential curbside customers under the following assumptions:

- The yard waste collection would utilize the same vehicle type as garbage collection (25 cubic yard fully-automated side-loaders);
- Each resident would receive an additional 96-gallon cart to use for yard waste.
- The yard waste collection would occur May through October.

It is important to note that the modeling exercise estimates annual metrics for route, labor, operations and maintenance, and capital. However, as the City would only offer the service for five months out of the year, for the summary metrics, a 41.66% ratio has been applied to show the seasonal estimated cost of offering curbside yard waste collection.

Table 15 presents the key metrics assumed for the potential residential curbside yard waste collection service. As shown in the raw data, the model assumes a 75% set-out rate and 60 pounds per set-out. Because yard waste is anticipated to compact more readily than garbage, a ratio of 1,000 pounds-per-cubic-yard is assumed for the vehicle capacity, resulting in a 25,000 pounds-per-load limit for each vehicle. It is estimated that the City would need to run three vehicles per day, five days per week.

## Table 15 - Residential Curbside Yard Waste - Route Model Results

| Raw Data | |
|---|---|
| Number of Accounts | 15,423 |
| Number of Collection Days per Week | 5 |
| Number of Collections per Household per Week | 1 |
| Number of Fully-Automated Side-Load Vehicles in Service per Collection Day | 3 |
| Avg. Set-out Rate | 75% |
| Avg. Lbs. per Household per Week (1) | 60.0 |
| Fully-Automated Side-Load Vehicle Load Limit (lbs.) (2) | 25,000 |
| Avg. On Route Time per Trip (hrs.) | 2.25 |
| Avg. Turn Around Time at Disposal Facility per Trip (hrs.) | 0.32 |
| Avg. Off Route Time Per Trip (hrs.) | 0.73 |
| Avg. Additional Off Route Time per Day (3) | 0.57 |
| Avg. Trips to Disposal Facility per Vehicle per Day | 2 |

| Calculated Metrics | |
|---|---|
| Number of Stops per Week | 11,567 |
| Fully-Automated Side-Load Stops per Hour | 171 |
| Fully-Automated Side-Load Avg. Stops Per Route | 771 |
| Fully-Automated Side-Load Total Homes per Route | 1,028 |
| Total Pounds per Route | 46,269 |
| Avg. Weight per Load (lbs.) | 23,135 |
| Avg. Time per Trip (hrs.) (4) | 3.30 |
| Avg. Collection Time per Day (5) | 7.16 |
| Stops per Day | 2,313 |

Notes:

(1) Based on a 96-gallon container being nearly full.
(2) Assumes a 25 CY capacity vehicle multiplied by an estimated 1000 lbs/CY of compacted grass.
(3) Additional Off Route Time includes daily lunch break and inspection time.
(4) The average time per trip was calculated by adding together the on-route time, turn around time, and off-route time.
(5) The average collection time per day was calculated by multiplying the average time per trip by the average number of trips to the disposal facility per vehicle per day and then adding the average additional off-route time per day.

### Residential Curbside Yard Waste - Labor Costs

Table 16 presents the estimated labor metrics associated with residential curbside yard waste collection. Using fully-automated side-load vehicles eliminates the need for collectors, as the vehicle driver is able to collect the carts without exiting the vehicle. Using the same salary and benefit estimates as were used for curbside garbage collection, the labor costs are associated with three drivers only. It is assumed that the supervisor used for curbside garbage collection could also serve as the supervisor for seasonal yard waste collection.

## Table 16 – Residential Curbside Yard Waste - Labor Metrics

| Raw Data | |
|---|---|
| Number of Routes per Day | 3 |
| Sanitation Collectors per Crew (1) | - |
| Vehicle Drivers per Crew | 1 |
| Total Number of Sanitation Collectors | - |
| Total Number of Vehicle Drivers | 3 |
| Supervisors (2) | - |
| Avg. Annual Salary and Benefits - Vehicle Drivers | $62,792 |
| Annual Incidentals Cost per Employee | $350 |

| Calculated Metrics | |
|---|---|
| Annual Salaries and Wages – Vehicle Drivers (3) | $188,376 |
| Total Annual Salaries and Wages (4) | $188,376 |
| Total Annual Incidentals Expense (5) | $1,050 |
| Estimated Annual Labor Related Expense (6) | $189,426 |

Notes:

(1) Use of a fully-automated side-loader will not require sanitary collectors.
(2) Assumes supervisor for garbage collection will also be responsible for yard waste collection.
(3) Annual salaries and wages for each of the position types were calculated by multiplying the average annual salary and benefits for the position by the total number of employees in the position.
(4) Total annual salaries and wages were calculated by summing the total annual salaries and wages for sanitation collectors and vehicle drivers. In this case, sanitary collectors are not required for the fully-automated side-load vehicles.
(5) Total annual incidentals expense was calculated by multiplying the annual incidentals cost per employee ($350) by the total number of employees (3).
(6) Estimated annual labor expense was calculated by summing total annual salaries and wages and total annual incidentals expense.

### Residential Curbside Yard Waste - Vehicle Operations and Maintenance Costs

Table 17 presents the estimated vehicle operations and maintenance metrics related to residential curbside yard waste collection operations. The average miles per trip was estimated based on the miles per home ratio of the Current Case for garbage collection, applied to the estimated number of homes per route for yard waste collection. The maintenance for fully-automated side-loaders is estimated to be slightly higher than the current multi-pack vehicles.

## Table 17 – Residential Curbside Yard Waste - Operations Metrics

| Raw Data | |
|---|---|
| Average Miles per Trip | 25.21 |
| Average Fuel Economy (mpg) | 4.0 |
| Number of Routes per Day | 3 |
| Number Fully-Automated Side-Load Collection Vehicles Excluding Spares | 3 |
| Spare Ratio (%) | 35% |
| Number of Spare Fully-Automated Side-Load Collection Vehicles | 1 |
| Total Number of Fully-Automated Side-Load Collection Vehicles | 4 |
| Maintenance and Repair ($/vehicle/year) | $20,000 |
| Fuel ($/gallon) | $2.69 |
| Insurance ($/vehicle/year) | $276 |

| Calculated Metrics | |
|---|---|
| Annual Miles per Curbside Collection Vehicle (1) | 13,108 |
| Annual Gallons per Curbside Collection Vehicle (2) | 3,277 |
| Total Annual Maintenance & Repair Expense (3) | $80,000 |
| Total Annual Fuel Expense (4) | $26,446 |
| Total Annual Insurance Expense (5) | $1,105 |
| Estimated Annual Operating Expense (6) | $107,550 |

Notes:

(1) Annual miles per curbside collection vehicle = average miles per trip (25.21) x average number of trips per vehicle per collection day (2) x number of collection days per week (5) x 52 weeks per year.
(2) Gallons per curbside collection vehicle were calculated by dividing the annual miles per curbside collection vehicle by the average fuel economy.
(3) Total annual repair and maintenance expense was calculated by multiplying the annual maintenance and repair expense per vehicle ($20,000) by the total number of collection vehicles (4).
(4) Total annual fuel expense = fuel price per gallon ($2.69) x annual gallons per curbside collection vehicle (3,277 x number of collection vehicles excluding spares (3)).
(5) Total annual insurance expense was calculated by multiplying the annual insurance expense per vehicle ($276) by the total number of collection vehicles (4).
(6) Estimated annual operating expense was calculated by summing the annual maintenance and repair expense ($80,000), the annual fuel expense ($26,446), and the annual insurance expense ($1,105).

### Residential Curbside Yard Waste - Capital Costs

Table 18 presents the estimated capital metrics for residential curbside yard waste collection. The potential new collection service assumes the purchase of fully-automated side-load vehicles, as well as the purchase of 96-gallon carts specifically designated for yard waste for curbside customers.

## Table 18 – Residential Curbside Yard Waste - Capital Metrics

| Raw Data | |
|---|---|
| Cost of Fully-Automated Side-Load Vehicle | $275,000 |
| Cost of Automated Cart, 96-gal | $55 |
| Total Number of Fully-Automated Side-Load Vehicles in Fleet | 4 |
| Total Number of Automated Carts (1) | 15,423 |

| Calculated Metrics | |
|---|---|
| Annual Vehicle Capital Cost (2) | $157,143 |
| Annual Cost Cart (3) | $84,827 |
| Estimated Annual Capital Outlay (4) | $241,969 |

Notes:

(1) Assumes each residential curbside customer will be given a 96-gallon yard waste cart.
(2) Annual vehicle capital cost is based on a seven year vehicle life and seven year straight amortization of all vehicle expenses.
(3) Annual cart cost is based on a ten year straight amortization of all cart expenses.
(4) Estimated annual capital outlay is calculated by summing the annual vehicle capital cost and annual cart cost.

### Summary of Residential Curbside Yard Waste Model Results

Table 19 presents a summary of the estimated total seasonal costs (41.66% of annual estimated costs) associated with implementing a residential curbside yard waste collection operation. (Note the cart costs are not seasonal.)

Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total seasonal costs have been rounded to the nearest hundred.

**Table 19 - Residential Yard Waste Curbside - Estimated Total Seasonal Cost**

| Metric | Curbside Yard Waste Collection (Seasonal) |
|---|---|
| Total Seasonal Labor Cost | $79,000 |
| Total Seasonal Vehicle Operating Cost | $45,000 |
| **Total Seasonal Operating Cost** | **$124,000** |
| | |
| Total Seasonal Vehicle Capital Cost | $65,000 |
| Total Annual Cart Cost | $85,000 |
| **Total Capital Cost** | **$150,000** |
| | |
| **Estimated Total Annual Cost** | **$274,000** |

## Residential Alley Yard Waste Collection

As previously stated, the City currently operates 18 yard debris collection sites around the City that consist of dumpsters that are collected seven days a week during the growing season. The City deploys three rear-load vehicles for yard debris collection from these sites each day from May through October. An operational model was developed to estimate the operational and financial impacts of implementing an alley yard waste collection service for residential alley customers under the following assumptions:

- The yard waste collection would utilize the same vehicle type as garbage collection (20 cubic yard rear-loaders with tippers);
- Each resident would receive an additional 96-gallon cart to use for yard waste.
- The yard waste collection would occur May through October.

It is important to note that the modeling exercise estimates annual metrics for route, labor, operations and maintenance, and capital. However, as the City would only offer the service for five months out of the year, for the summary metrics, a 41.66% ratio has been applied to show the seasonal estimated cost of offering curbside yard waste collection.

Table 20 presents the key metrics assumed for the potential residential alley yard waste collection service. As shown in the raw data, the model assumes a 75% set-out rate and 50 pounds per set-out (slightly less than curbside customers). Because yard waste is anticipated to compact more readily than garbage, a ratio of 1,000 pounds-per-cubic-

yard is assumed for the vehicle capacity, resulting in a 20,000 pounds-per-load limit for each vehicle. It is estimated that the City would need to run one vehicle per day, four days per week.

**Table 20 - Residential Alley Yard Waste - Route Model Results**

| Raw Data | |
|---|---|
| Number of Accounts | 3,720 |
| Number of Collection Days per Week | 4 |
| Number of Collections per Household per Week | 1 |
| Number of Rear-Load Vehicles in Service per Collection Day | 1 |
| Avg. Set-out Rate | 75% |
| Avg. Lbs. per Household per Week | 50.0 |
| Rear-Load Vehicle Load Limit (lbs.) (1) | 20,000 |
| Avg. On Route Time per Trip (hrs.) | 2.33 |
| Avg. Turn Around Time at Disposal Facility per Trip (hrs.) | 0.37 |
| Avg. Off Route Time Per Trip (hrs.) | 0.63 |
| Avg. Additional Off Route Time per Day (2) | 0.57 |
| Avg. Trips to Disposal Facility per Vehicle per Day | 2 |

| Calculated Metrics | |
|---|---|
| Number of Stops per Week | 2,790 |
| Rear-Load Stops per Hour | 150 |
| Rear-Load Avg. Stops Per Route | 697.5 |
| Rear-Load Total Homes per Route | 930 |
| Total Pounds per Route | 34,875 |
| Avg. Weight per Load (lbs.) | 17,438 |
| Avg. Time per Trip (hrs.) (3) | 3.33 |
| Avg. Collection Time per Day (4) | 7.22 |
| Stops per Day | 698 |

Notes:

(1) Assumes a 20 CY capacity vehicle multiplied by an estimated 1000 lbs/CY of compacted grass.
(2) Additional Off Route Time includes daily lunch break and inspection time.
(3) The average time per trip was calculated by adding together the on-route time, turn around time, and off-route time.
(4) The average collection time per day was calculated by multiplying the average time per trip by the average number of trips to the disposal facility per vehicle per day and then adding on route time and the average additional off-route time per day.

### Residential Alley Yard Waste - Labor Costs

Table 21 presents the labor related calculated metrics for residential alley yard waste collection. The crew is assumed to be made up of one driver and two collectors, similar to the current alley garbage collection. Using the same salary and benefit estimates as were used for alley garbage collection, the labor costs are associated with one driver and one collector. It is assumed that the supervisor for alley garbage collection could also serve as the supervisor for seasonal yard waste collection.

## Table 21 – Residential Alley Yard Waste - Labor Metrics

| Raw Data | |
|---|---|
| Number of Routes per Day | 1 |
| Sanitation Collectors per Crew | 1 |
| Vehicle Drivers per Crew | 1 |
| Total Number of Sanitation Collectors | 1 |
| Total Number of Vehicle Drivers | 1 |
| Supervisors (1) | - |
| Avg. Annual Salary and Benefits - Sanitation Collectors (2) | $56,473 |
| Avg. Annual Salary and Benefits - Vehicle Drivers | $62,792 |
| Annual Incidentals Cost per Employee | $350 |

| Calculated Metrics | |
|---|---|
| Annual Salaries and Wages – Sanitation Collectors (3) | $56,473 |
| Annual Salaries and Wages – Vehicle Drivers (3) | $62,792 |
| Total Annual Salaries and Wages (4) | $119,265 |
| Total Annual Incidentals Expense (5) | $700 |
| Estimated Annual Labor Related Expense (6) | 119,965 |

Notes:

(1) Assumes supervisor for the garbage collection will also be responsible for yard waste collection.
(2) Does not account for potential savings due to reduced workers compensation insurance.
(3) Annual salaries and wages for each of the position types were calculated by multiplying the average annual salary and benefits for the position by the total number of employees in the position.
(4) Total annual salaries and wages were calculated by summing the total annual salaries and wages for sanitation collectors and vehicle drivers.
(5) Total annual incidentals expense was calculated by multiplying the annual incidentals cost per employee by the total number of employees (2).
(6) Estimated annual labor expense was calculated by summing total annual salaries and wages and total annual incidentals expense.

### Residential Alley Yard Waste - Vehicle Operations and Maintenance Costs

Table 22 presents the estimated operations and maintenance metrics related to residential alley yard waste collection. The average miles per trip was estimated based on the miles per home ratio of the Current Case for alley garbage collection, applied to the estimated number of homes per route for yard waste collection. It is estimated that switching to a smaller body rear-load vehicle will result in a reduction in annual maintenance and repair costs.

## Table 22 – Residential Alley Yard Waste - Operations Metrics

| Raw Data | |
|---|---|
| Average Miles per Trip | 14.3 |
| Average Fuel Economy (mpg) | 4.0 |
| Number of Routes per Day | 1 |
| Number Rear-Load Collection Vehicles Excluding Spares | 1 |
| Spare Ratio (%) | 25% |
| Number of Spare Rear-Load Collection Vehicles (1) | 1 |
| Total Number of Rear-Load Collection Vehicles | 2 |
| Maintenance and Repair ($/vehicle/year) | $10,000 |
| Fuel ($/gallon) | $2.69 |
| Insurance ($/vehicle/year) | $276 |

| Calculated Metrics | |
|---|---|
| Annual Miles per Collection Vehicle (2) | 5,949 |
| Annual Gallons per Collection Vehicle (3) | 1,487 |
| Total Annual Maintenance & Repair Expense (4) | $20,000 |
| Total Annual Fuel Expense (5) | $4,001 |
| Total Annual Insurance Expense (6) | $552 |
| Estimated Annual Operating Expense (7) | $24,553 |

Notes:

(1) Assumes that spare vehicles will be taken from garbage collection fleet.
(2) Annual miles per curbside collection vehicle = average miles per trip (14.3) x average number of trips per vehicle per collection day (2) x number of collection days per week (4) x 52 weeks per year.
(3) Gallons per curbside collection vehicle were calculated by dividing the annual miles per curbside collection vehicle by the average fuel economy.
(4) Total annual repair and maintenance expense was calculated by multiplying the annual maintenance and repair expense per vehicle ($10,000) by the total number of rear-load collection vehicles (2).
(5) Total annual fuel expense = fuel price per gallon ($2.69) x annual gallons per curbside collection vehicle (1,487) x number of collection vehicles excluding spares (1)).
(6) Total annual insurance expense was calculated by multiplying the annual insurance expense per vehicle ($276) by the total number of rear-load alley collection vehicles (2).
(7) Estimated annual operating expense was calculated by summing the total annual maintenance and repair expense ($20,000), the annual fuel expense ($4,001), and the annual insurance expense ($552).

### Residential Alley Yard Waste - Capital Costs

Table 23 presents the estimated capital metrics for residential alley yard waste collection. The potential new collection service assumes the purchase of 20 cubic yard rear-loaders with tippers, as well as the purchase of 96-gallon carts specifically designated for yard waste for alley customers.

## Table 23 – Residential Alley Yard Waste - Capital Metrics

| Raw Data | |
|---|---|
| Cost of Rear-Load Collection Vehicle with Tipper (1) | $155,000 |
| Cost of Automated Cart, 96-gal (New) | $55 |
| Total Number of Rear-Load Vehicles in Fleet | 2 |
| Total Number of Automated Carts (2) | 3,720 |

| Calculated Metrics | |
|---|---|
| Annual Vehicle Capital Cost (3) | $44,286 |
| Annual Cost Cart (4) | $20,460 |
| Estimated Annual Capital Outlay (5) | $64,746 |

Notes:

(1) 20 cubic yard capacity with tipper.
(2) Assumes each residential alley customer will be given a 96-gallon yard waste cart.
(3) Annual vehicle capital cost is based on a seven year vehicle life and seven year straight amortization of vehicle capital expenses.
(4) Annual cart cost is based on a ten year straight amortization of cart purchase expenses.
(5) Estimated annual capital outlay is calculated by summing the annual vehicle capital cost and annual cart cost.

### Summary of Residential Alley Yard Waste Model

Table 24 presents a summary of the estimated total seasonal costs (41.66% of annual estimated costs) associated with implementing a residential alley yard waste collection operation. (Note the cart costs are not seasonal.)

Due to the planning level nature of this evaluation, which is intended to be used to demonstrate the relative magnitude of potential changes to the system, the estimated total seasonal costs have been rounded to the nearest hundred.

## Table 24 - Residential Alley Yard Waste - Estimated Total Seasonal Cost

| Metric | Alley Yard Waste Collection (Seasonal) |
|---|---|
| Total Seasonal Labor Cost | $50,000 |
| Total Seasonal Vehicle Operating Cost | $10,000 |
| **Total Seasonal Operating Cost** | **$60,000** |
| | |
| Total Seasonal Vehicle Capital Cost | $18,000 |
| Total Annual Cart Cost | $20,000 |
| **Total Capital Cost** | **$38,000** |
| | |
| **Estimated Total Cost** | **$98,000** |

## Conclusions

The following main conclusions can be drawn from the modeling exercise for each of the alternative scenarios identified.

### Curbside Garbage Collection

- Both the Variable Rate scenario and the Variable Rate + Bag – Mature scenario are estimated to provide the City with the greatest savings, at roughly $515,000 in annual savings, compared to the Current Case. Estimated savings are largely due to a switch to fully-automated side-load collection vehicles that would require only one driver and no collectors, and would allow the City to complete collections with 4 routes per day instead of the current 5 routes per day.
- The Variable Rate + Bag – Initial scenario is estimated to provide the City with some savings (nearly $290,000 annually), compared to the Current Case. Estimated savings are largely due to the use of fully-automated side-load collection vehicles, which would allow the City to complete collections with 4 routes per day instead of the current 5 routes per day. However, the initial system would likely require one driver and one collector until the use of the extra bags by residents is diminished.

### Alley Garbage Collection

- Significant operational cost savings cannot be achieved for the alley collection without a change to automated collection technology. The Variable Rate scenario, the Variable Rate + Bag – Mature scenario and the Variable Rate + Bag – Initial scenario are estimated to provide the City with minimal savings (roughly $7,000 annually) compared to the Current Case. Estimated savings are largely due to lower vehicle costs associated with the 20 cubic yard rear-loaders with tippers. The initial system would likely require one driver and two collectors until the use of the extra bags by residents is diminished.

### Yard Waste Collection

- The City's current yard waste collection system consists of 18 yard debris collection sites with dumpsters located around the City that are collected seven days a week during the growing season.
- The City deploys three rear-load vehicles for yard waste collection from these sites each day from May through October. The City estimates the current yard waste collection system costs are between $190,000 and $250,000 per year.
- If the City were to offer fully-automated 96-gallon cart collection of yard waste to curbside customers, the seasonal cost is estimated to be nearly $275,000 per year.
- If the City were to offer semi-automated 96-gallon cart collection of yard waste to alley customers, the seasonal cost is estimated to be nearly $100,000 per year.

- Total curbside and alley yard waste collection service is estimated to cost roughly $375,000 per year.

## Recommendations

Based on the evaluations conducted in Subtask 401, HDR provides the following recommendations, by service type.

### Curbside Garbage Collection

With the potential for significant savings on curbside garbage collection by implementing a fully-automated system, the City should consider making the change in collection technology. Given the current practice of out-of-cart set-outs, the City could use the Variable Rate Cart + Bag approach, which would allow residents some time to adjust to using only the cart to set out garbage. Using specially marked bags purchased by the residents in order to place material out of the cart will increase awareness for the residents. It is believed that over time, fewer and fewer residents will continue to use the out-of-cart specially marked bags, and the City's curbside garbage collection system will eventually realize the full benefit of efficiencies associated with fully-automated collection.

It should be noted that there may be certain streets within the City where the fully-automated side-loaders may not be able to effectively operate, though the number of streets where it may be an issue is expected to be very low. (Based on route observations, we anticipate low hanging limbs and wires to affect less than 1% of the homes.) It may be possible to include these areas on alley collection routes in order to use rear-loaders with tippers for collection. It may also be possible to leave these streets on the fully-automated route, but require the driver to move the carts to an area where the side-loader can be used.

If the City decides to implement fully-automated collection using side-loaders, a phased approach to purchase the vehicles over time could be considered in order to accommodate the City's vehicle replacement schedule. Variable sized carts would need to be purchased to have on-hand for the residents electing to move to a smaller cart. A pricing structure for the variable rate carts would need to be developed and applied to the City's billing system. Education and outreach efforts would also need to be initiated in order to explain the new system to the affected residents.

### Alley Garbage Collection

Converting residential customers to a variable rate will require that the alley customers also have the choice of size container.

If the City decides to implement cart-based collection for alley garbage customers, it is recommended that the City use 20 cubic yard rear-loaders, fitted with tippers. The smaller sized vehicle will allow for greater efficiency than the current use of 25 cubic yard vehicles that are not reaching capacity on each trip. As with the curbside recommendation, a phased approach to purchase the vehicles over time could be considered in order to accommodate the City's vehicle replacement schedule. Variable sized carts would need to be purchased to have on-hand for residents electing to move to a smaller cart. A pricing structure for the variable rate carts would need to be developed and applied to the City's billing system. Education and outreach efforts would also need to be initiated in order to explain the new system to the affected residents.

It is also recommend that the number of residential alley customers be reviewed. As demonstrated by the operational analysis, moving additional customers to automated curbside collection has the benefit of reducing operational costs and increasing the collection efficiency. A detailed analysis and review of the alley routes could likely identify customers currently served by manual collection that could potentially be converted to automated curbside collection.

### Ancillary Recommendations

As previously mentioned, implementing the above recommended volumetric residential collection system will require the users to become accustom to limiting the amount of garbage placed at the curb. Education of the users to understand the reasons for modifying the City's policy on garbage collection will be integral to the acceptance of the volumetric program. Based on communications with regional communities that have switched to volumetric based collection the following utility operational measures are recommended to be considered by the City:

- **Volumetric Collection Public Education**: Prior to implementing a volumetric collection system it is recommended that the City implement an education program that 1) informs the users of the size containers available, 2) the typical number of bags of garbage each container holds on average and 3) requests that the user selects a container size for the program. Based on previous experience the majority of the users will not respond and will be assigned the default container size. Prior to the request, the City will need to determine the default container size for the utility.

- **Bulk Waste Collection**: Regional communities have reported success in implementing a fee based bulk collection program. Under this program users would schedule a bulk item pick-up, for a reasonable fee, from the City. Communities have reported that utilizing a bulk waste collection program has

reduced the amount of large items set-out during spring/fall clean-up weeks and illegal dumping at public drop sites.

- **Residential Holiday Collection**: With once per week collection, there is the need to have holiday collection days on the next collection day when a City-recognized holiday falls on a scheduled collection day. Currently, the City deploys additional crews to complete two days of collection in a single day in order to make up for the collections missed on the holiday the previous day. Under any of the alternative scenarios reviewed, the practice of deploying extra crews on the next collection day will likely need to continue. Therefore, the City may consider holding additional spare vehicles in order to accommodate holidays.

- **Residential Holiday Excess Waste Collection**: Communities have implemented a residential holiday collection time frame where extra waste at the curb is collected without additional charge. Typically the time period is the first collection after Thanksgiving until the first collection of the New Year. This type of program benefits users that have typically limited garbage quantities to have an increase from hosting holiday visitors.

- **Landfill Disposal Vouchers**: Provide users with disposal vouchers that allow passenger vehicle sized loads to dispose at the landfill without paying the typical tipping fee. Vouchers can be distributed on an annual basis, or as a coupon included with each utility bill. It is recommended that the program be based on vouchers, or coupons, that must be turned in at the landfill scale instead of based on address or showing a utility bill. Use of a voucher will mitigate the potential of abuse from commercial or non-City resident users.

- **Spring/Fall Cleanup Collection**: It is recommended that the City continue the practice of cleanup weeks for large items and excessive waste. Other communities have reported that when these weeks are eliminated that illegal dumping increases.

### Yard Waste Collection

Based on the planning level cost and operational estimates made for curbside and alley yard waste collection, it appears that offering this separate service would be more expensive than the City's current system of collecting from 18 different drop-off locations around the City. However it appears that implementing a volumetric residential collection service would realize enough savings to the utility to offset the increased costs of providing residential yard debris collection. Offering residential yard debris collection would allow for the closure of the drop-off sites resulting in additional total savings to the utility.

# Appendix D. TM 402 – Recommended Curbside Residential Collection Boundaries

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# Technical Memo

| | |
|---|---|
| Date: | Tuesday, March 15, 2016 |
| Project: | Solid Waste Management Collection Evaluation |
| To: | Jeff Heintz, Director of Public Works - Service Operations, City of Bismarck, ND |
| From: | Brent Erickson, Project Manager, HDR Engineering, Inc. |
| Subject: | Subtask 402 – Recommended Residential Collection Boundaries |

# Introduction

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to evaluate the City's existing municipal solid waste (garbage) collection system, benchmark the City against other similar communities, and ultimately perform a sensitivity analysis of potential changes to collection services.

The City would like to consider various options for maximizing efficiency and improving services for the municipal collection of residential garbage. The purpose of Task 400 of this Solid Waste Management Collection Evaluation (Study) was to review and evaluate potential modifications to the City's current program. Subtask 401 included updating the operational model used in Task 300 (evaluation of current system) in order to compare certain operational metrics of potential modifications shortlisted in Task 300 to the current system. Subtask 402 includes route rebalancing and Subtask 403 includes route optimization. The remainder of this memo summarizes the results of Subtask 402. It is anticipated that Subtask 403 will be completed after City concurrence with the proposed residential route boundaries presented in this memorandum.

The main components of Subtask 402 included:

- Identifying the residential curbside and alley pick-up locations; and
- Prepare residential collection boundaries that balance the current and future pick-up locations

# Background

Currently, Bismarck operates a five-day per week collection schedule, with the City divided into five zones for residential collection. The current zones are setup to include both alley and curbside collection on Tuesday, Wednesday and Thursday and only curbside collection on Monday and Friday. During weeks with holidays, the schedule is modified, resulting in either the collection of two zones on one day, or the Friday zone being collected the following Monday.

Curbside service is completed with the Heil multi-pack vehicles and consists of 96-gallon carts collected with the automated arm of the vehicle, and additional bags manually loaded into the rear compactor. Alley collection is competed via rear-load manual service. Details of the residential collection service are included in Technical Memorandum (TM) 300 and TM 401.

# Existing Residential Customers & Collection Zones

Table 1 summarizes the weekly number of pick-ups per customer class used in this analysis. As of July 2015 the total number of residential pick-up locations, 19,182, reflects the number of individual households currently serviced by the collection utility.

TM 300 and 401 utilized a lower number of pick-up locations, based on information that was available at that time. The number of customers has been updated to reflect instances where several units, collected individually, are listed under a single account. After the completion and review of TM 300 & TM 401, the number of alley customers and pick-up locations was further refined based on the additional data developed from City billing databases, GIS layers, and analysis of the collection vehicle wheel paths as monitored by the GPS equipment in the trucks. The wheel track data, provided in GIS format, was used to refine the number of alley customers.

**Table 1 – Revised Weekly Pick-ups by Customer Class**

| Customer Class | Weekly Pick-ups |
|---|---|
| Residential Curbside | 17,270 |
| Residential Alley | 1,912 |
| **Total** | **19,182** |

The City currently serves the 17,270 curbside customers on a five-day per week basis. The collection schedule is comprised of three routes on Monday and five routes Tuesday through Friday. Table 2 indicates the number of pick-ups per weekday.

Table 2 - Existing Residential Curbside Pick-ups

| | Existing Units | Platted Future Units | Total Future Units |
|---|---|---|---|
| **Monday** | 2,900 | 632 | 3,532 |
| **Tuesday** | 3,638 | 214 | 3,852 |
| **Wednesday** | 3,348 | 460 | 3,808 |
| **Thursday** | 3,900 | 73 | 3,973 |
| **Friday** | 3,484 | 463 | 3,947 |
| **Total** | 17,270 | 1,842 | 19,112 |

The platted future units per zone were estimated by assigning a pick-up to currently undeveloped, platted lots. Although Mondays contain fewer existing pick-ups than the other zones, Table 2 indicates that, with the addition of platted future units, the five existing zones will become more balanced over time.

# Exhibits

Exhibit 1 Residential Collection Locations, included as an attachment to this TM, documents the existing and platted future pick-up locations that were used to develop the revised collection zone boundaries. The GIS layer used to create Exhibit 1 is included in the project GIS data that will be transferred to the City with the final report.

Exhibit 2 Existing Residential Collection Zones, included as an attachment to this TM shows the existing residential collection zones summarized in Table 2. Exhibit 2 was created from the City GIS database provided during the data request portion of this task.

# Recommended Revised Residential

The existing collection zones were revised under the assumption that the City would perform the collection throughout the course of four days during the week instead of five days, and assuming changes in technology for curbside collection would enable the City to collect more efficiently. Under these assumptions, the maximum number of pick-ups per zone is approximately 4,800. The residential boundaries were revised with the following objectives and assumptions:

1. Collection would be performed on a 4-day per week basis;
2. Curbside collection would be converted to fully automated technology with the requirement that all waste is contained in a cart or prepaid bag,
3. The number of units would be balanced per zone;

4. The number of units would remain balanced with the addition of platted, but currently undeveloped, parcels;
5. Minimizing the need for rebalancing in the future in order to minimize changes in customer collection days over time;
6. Alley customers would not be represented as they make up a minority of the customer base and are collected by a rear load truck.

The zones were revised in order to accommodate growth to the northwest and northeast without requiring major boundary changes. Table 3 contains the number of pick-ups within each of the revised zones.

**Table 3 – Revised Residential Curbside Pick-ups Zones**

| | Existing Units | Platted Future Units | Total Future Units |
|---|---|---|---|
| **Zone 1** | 4,442 | 337 | 4,779 |
| **Zone 2** | 3,818 | 662 | 4,480 |
| **Zone 3** | 4,779 | 431 | 5,210 |
| **Zone 4** | 4,231 | 412 | 4,643 |
| **Total** | **17,270** | **1,842** | **19,112** |

The recommended collection zones maintain an overall balanced number of daily pick-ups for the existing and future conditions. Additionally, the boundaries were established to accommodate the anticipated growth to the north with minimal changes to the boundaries. As the customer base extends north, it is recommended that the northern boundary of Zone 2 also moves north to the next major street. This allows the east and west boundary lines to remain the same, minimizing the impact to customer collection day changes for future boundary modifications.

Providing collection service in a four day week provides flexibility to the operations by allowing all customers to receive weekly service, regardless of the presence of holidays or other delays in service. During a week with a holiday, the City employees can recognize the holiday and then the remainder of the collection days will be pushed one day back in the week. For example, when a holiday falls on a Tuesday, Monday will be collected as usual. Tuesday will be the holiday with no collection. Normal Tuesday service will occur on Wednesday. Normal Wednesday service will occur on Thursday. Normal Thursday service will occur on Friday.

Exhibit 3 Proposed Residential Collection Zones, included as an attachment to this TM, shows the recommended revised collection boundaries. The GIS layer used to create this exhibit is included in the project GIS data that will be transferred to the City with the final report.

# Growth Management for Future Collection Zones

Using the Growth Management Plan developed by the City, the revised boundaries were also evaluated to determine the long-range planned customers. It was assumed that for Low Density Residential, there would be an average of 6 units per acre. Table 4 contains the number of low density units within each zone.

**Table 4 - Growth Management Curbside Pick-ups by Proposed Zone**

| | Low Density Residential Acres | Growth Management Units | Total Estimated Future Units |
|---|---|---|---|
| **Zone 1** | 3,370 | 20,220 | 24,999 |
| **Zone 2** | 303 | 1,818 | 6,298 |
| **Zone 3** | 1,627 | 9,762 | 14,972 |
| **Zone 4** | 265 | 1,590 | 6,233 |
| **Total** | 5,565 | 33,390 | 52,502 |

As previously mentioned, it is recommended that as the City continues to develop to the north, the northern boundary of Zone 2 be moved further north to maintain balanced routes on a daily basis.

Table 5 summarizes the total estimated future units including current platted units and the Growth Management Plan estimated units. The total estimated future units will occur over a significant time period, likely greater than 30-years, and is intended to be a planning projection for continued revision of the collection zones.

**Table 5 – Total Estimated Curbside Pick-ups by Proposed Zone**

| | Existing Units | Platted Future Units | Growth Management Units | Total Estimated Future Units |
|---|---|---|---|---|
| **Zone 1** | 4,442 | 337 | 20,220 | 24,999 |
| **Zone 2** | 3,818 | 662 | 1,818 | 6,298 |
| **Zone 3** | 4,779 | 431 | 9,762 | 14,972 |
| **Zone 4** | 4,231 | 412 | 1,590 | 6,233 |
| **Total** | **17,270** | **1,842** | **33,384** | **52,496** |

# Residential Curbside Collection System Capacity

After the completion of TM 300 and TM 401, City staff requested that analysis of the collection technology change include an estimate of the total number of pick-ups that could be collected. This estimate could be used to determine when additional routes (trucks) would need to be added to the system.

Table 6 demonstrates the estimated total number of residential curbside units that could be serviced by the four routes per day, four days per week, operating 10-hours per day. As shown, the automated system would have the ability to potentially service an additional 2,000 to 3,000 curbside units. It is important to note that the collection zones would need to be marginally rebalanced to continue to provide service.

The “Bismarck and Mandan North Dakota Housing Demand Analysis – 2030”, prepared by Hanna:Keelan Associates in October of 2015, predicted that on average Bismarck will add 350 new single family homes per year between 2015 and 2030. For planning purposes, it is estimated that an additional curbside residential route will need to be added in approximately 5 to 8 years. It is estimated that the City should plan to add a route to each zone (resulting in a total of five routes) between 2021 and 2024.

**Table 6 - Residential Curbside System Capacity**

| Stops per Hour (1) | Hours per Day | No. of Units | Increased Capacity (Units) (2) |
|---|---|---|---|
| 190 | 9.75 | 19,307 | 2,037 |
| 200 | 9.75 | 20,323 | 3,053 |

Notes:

1) Estimated stops per hour were base on a range of 190 to 200 based on experience with similar communities using automated collection. Actual stops per hour metrics should be measured and documented as the utility transitions to automated collection.
2) The increased capacity is the number of units exceeding the existing 17,270 units currently serviced.

# Conclusion

The attached exhibits document the proposed residential collection boundaries. After review and comment by the City, individual route boundaries (collection areas for individual trucks inside of the collection zones) will be developed and included in the project GIS data to be transferred to the City with the final report.

# Exhibits

**Exhibit 1 Residential Collection Locations**

**Exhibit 2 Existing Residential Collection Zones**

**Exhibit 3 Proposed Residential Collection Zones**

# Appendix E. TM 403 – Recommended Curbside Residential Collection Routes

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# Technical Memo

| | |
|---|---|
| Date: | Wednesday, June 01, 2016 |
| Project: | Solid Waste Management Collection Evaluation |
| To: | Jeff Heintz, Director of Public Works - Service Operations, City of Bismarck, ND |
| From: | Brent Erickson, Project Manager, HDR Engineering, Inc |
| Subject: | Subtask 403 – Recommended Residential Route Boundaries |

# Introduction

The City of Bismarck (City) contracted with HDR Engineering, Inc. (HDR) to evaluate the City's existing municipal solid waste (garbage) collection system, benchmark the City against other similar communities, and ultimately perform a sensitivity analysis of potential changes to collection services.

The City would like to consider various options for maximizing efficiency and improving services for the municipal collection of residential garbage. The purpose of Task 400 of this Solid Waste Management Collection Evaluation (Study) was to review and evaluate potential modifications to the City's current program. Subtask 401 included updating the operational model used in Task 300 (evaluation of current system) in order to compare certain operational metrics of potential modifications shortlisted in Task 300 to the current system. Subtask 402 included route rebalancing in order to identify optimum zones for collection. Subtask 403 includes route optimization, which identifies routes within the collection zones. The remainder of this memo summarizes the results of Subtask 403.

The purpose of Subtask 403 is to determine curbside residential collection route boundaries within the previously identified collection zones that balance the current and platted pick-up locations within each previously determined collection zone. For the purpose of this TM, 'collection zone' is defined as the area serviced by a fleet of vehicles. As a result, there are four collection zones previously identified in TM 402. 'Route boundary' is defined as the area serviced by a single truck within a single collection zone. Within each collection zone are four route boundaries, resulting in a total of 16 route boundaries.

# Background

Currently, Bismarck operates a five-day per week collection schedule, with the City divided into five zones for residential collection. The current zones are setup to include

both alley and curbside collection on Tuesday, Wednesday and Thursday and only curbside collection on Monday and Friday. During weeks with holidays, the schedule is modified, resulting in either the collection of two zones on one day, or the Friday zone being collected the following Monday.

Curbside service is completed with the Heil multi-pack vehicles and consists of 96-gallon carts collected with the automated arm of the vehicle, and additional bags manually loaded into the rear compactor. Alley collection is competed via rear-load manual service. Details of the residential collection service are included in Technical Memorandum (TM) 300 and TM 401.

TM 402 recommended performing collection throughout the course of four days during the week instead of the current five day schedule. The collection zones were revised with the following assumptions:

1. Collection would be performed on a 4-day per week basis;
2. Curbside collection would be converted to fully automated technology with the requirement that all waste is contained in a cart or prepaid bag,
3. The number of units would be balanced per zone;
4. The number of units would remain balanced with the addition of platted, but currently undeveloped, parcels;
5. Minimizing the need for rebalancing in the future in order to minimize changes in customer collection days over time;
6. Alley customers would not be represented as they make up a minority of the customer base and are collected by a rear load truck.

The proposed collections zones, agreed upon through discussions of TM 402, are included in TM 403 Exhibit 1. The “Future Service Area to be Added” (as shown in TM 403 Exhibit 1) does not contain any existing pickups or platted units. This area is not expected to need service within the next 5-10 years, and will eventually be an added route to a collection zone.

# Existing Residential Collection Routes

For the purposes of this TM, it was assumed that the City services approximately 17,270 residential curbside customers on a weekly basis. The pick-ups are distributed amongst 23 routes, with three trucks being deployed Monday and five trucks deployed Tuesday through Friday. As summarized in TM 300, the route observations indicated each route has an average of 671 homes.

Based on the information provided by the City and data gathered during the route observations, the curbside garbage collection staff appears to be actively engaged in

collecting waste an average of 6 hours and 26 minutes per collection day. This time is inclusive of all on-route time, off-route time, turnaround time at the disposal facility, lunches/breaks, and inspection time.

# Recommended Residential Collection Routes

The existing collection routes were revised under the assumption the City would perform the collection throughout the course of four days during the week. The routes within the collection zones were revised with the following objectives and assumptions:

1. Four, fully-automated vehicles would perform the collection;
2. The work day for the collection staff would begin at 7:00 am and end at 5:30 pm, allowing for a half-hour lunch and three fifteen-minute breaks;
3. The number of units, including existing units and platted, currently undeveloped units, would be balanced per route;
4. Growth Management Units were not represented as they will occur over a significant time period, likely greater than 10-years; and
5. Residential Alley customers would not be represented as they make up a minority of the customer based and are collected by a rear load truck.

The boundaries were created in order to accommodate growth to the northwest and northeast without requiring major boundary changes. By balancing the existing units and platted, currently undeveloped units, the route boundaries will require minimum rebalancing within the next two to three years. Table 1 through Table 4 contain the number of pickups within each route boundary per collection zone. In these tables, the “Existing Units” are the estimated collection points as of the July 2015 billing listing and GIS analysis of the truck routes. “Platted Units” are lots that have been created by existing plats, are zoned residential, and will be a garbage collection location after a structure is built. “Total Units” is the sum of the “Existing Units” and “Platted Units”.

### Table 1 - Zone 1 Route Boundaries

| Route | Existing Units | Platted Units | Total Units[(1)] | Trips to Landfill |
|---|---|---|---|---|
| **Route 1-1** | 817 | 156 | 973 | 3 |
| **Route 1-2** | 1,485 | 34 | 1,519 | 3 |
| **Route 1-3** | 1,335 | 37 | 1,372 | 3 |
| **Route 1-4** | 805 | 110 | 915 | 3 |
| **Total** | **4,442** | **337** | **4,779** | - |

Notes:
(1) Total Units refers to the combination of Existing Units and Platted Units presented in TM 402. Total Units is the number of existing collection points plus the undeveloped platted single family parcels that will eventually be curbside collection points.

The recommended route boundaries for Zone 1 provide additional capacity to Route 1-1 and Route 1-4. These route boundaries were established to accommodate the anticipated growth to the northeast with minimal changes to the route boundaries.

### Table 2 - Zone 2 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 2-1** | 1,069 | 9 | 1,078 | 3 |
| **Route 2-2** | 1,095 | 2 | 1,097 | 3 |
| **Route 2-3** | 675 | 529 | 1,204 | 3 |
| **Route 2-4** | 979 | 122 | 1,101 | 3 |
| **Total** | **3,818** | **662** | **4,480** | - |

As described in TM 402, Zone 2 is expected to have minimal growth compared to the other collection zones as indicated in the Growth Management Plan. As a result, the recommended route boundaries for Zone 2 are overall balanced.

### Table 3 - Zone 3 Route Boundaries

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 3-1** | 1,332 | 3 | 1,335 | 4 |
| **Route 3-2** | 1,470 | 6 | 1,476 | 4 |
| **Route 3-3** | 1,126 | 179 | 1,305 | 4 |
| **Route 3-4** | 851 | 243 | 1,094 | 3 |
| **Total** | **4,779** | **431** | **5,210** | - |

The recommended route boundaries for Zone 3 provide additional capacity to Route 3-4 in order to accommodate the anticipated growth to the northwest with minimal changes to the route boundaries. The four routes operate in a high-density population area. As a result, the trucks are expected to reach weight capacity in less time, resulting in an additional trip to the landfill, without exceeding the overall collection time frame.

**Table 4 - Zone 4 Route Boundaries**

| Route | Existing Units | Platted Units | Total Units | Trips to Landfill |
|---|---|---|---|---|
| **Route 4-1** | 708 | 264 | 972 | 3 |
| **Route 4-2** | 947 | 137 | 1,084 | 3 |
| **Route 4-3** | 1,234 | 4 | 1,238 | 4 |
| **Route 4-4** | 1,342 | 7 | 1,349 | 4 |
| **Total** | **4,231** | **412** | **4,643** | - |

The recommended route boundaries for Zone 4 also provide additional capacity to Route 4-1 and Route 4-2 in order to accommodate the anticipated growth to the north with minimal changes to the route boundaries.

TM 403 Exhibit 2 through TM 403 Exhibit 5, included as attachments, show the recommended route boundaries. The GIS layer used to create these exhibits is included in the project GIS data that will be transferred to the City with the final report.

# Conclusion

The attached exhibits document the proposed residential collection route boundaries. Utilization of these route boundaries is dependent on the City adopting setout limits and converting residential curbside service to fully automated collection.

After review and comment by the City on the route boundaries, the recommended turn-by-turn routes will be developed and included in the project GIS data to be transferred to the City with the final report.

# Exhibits

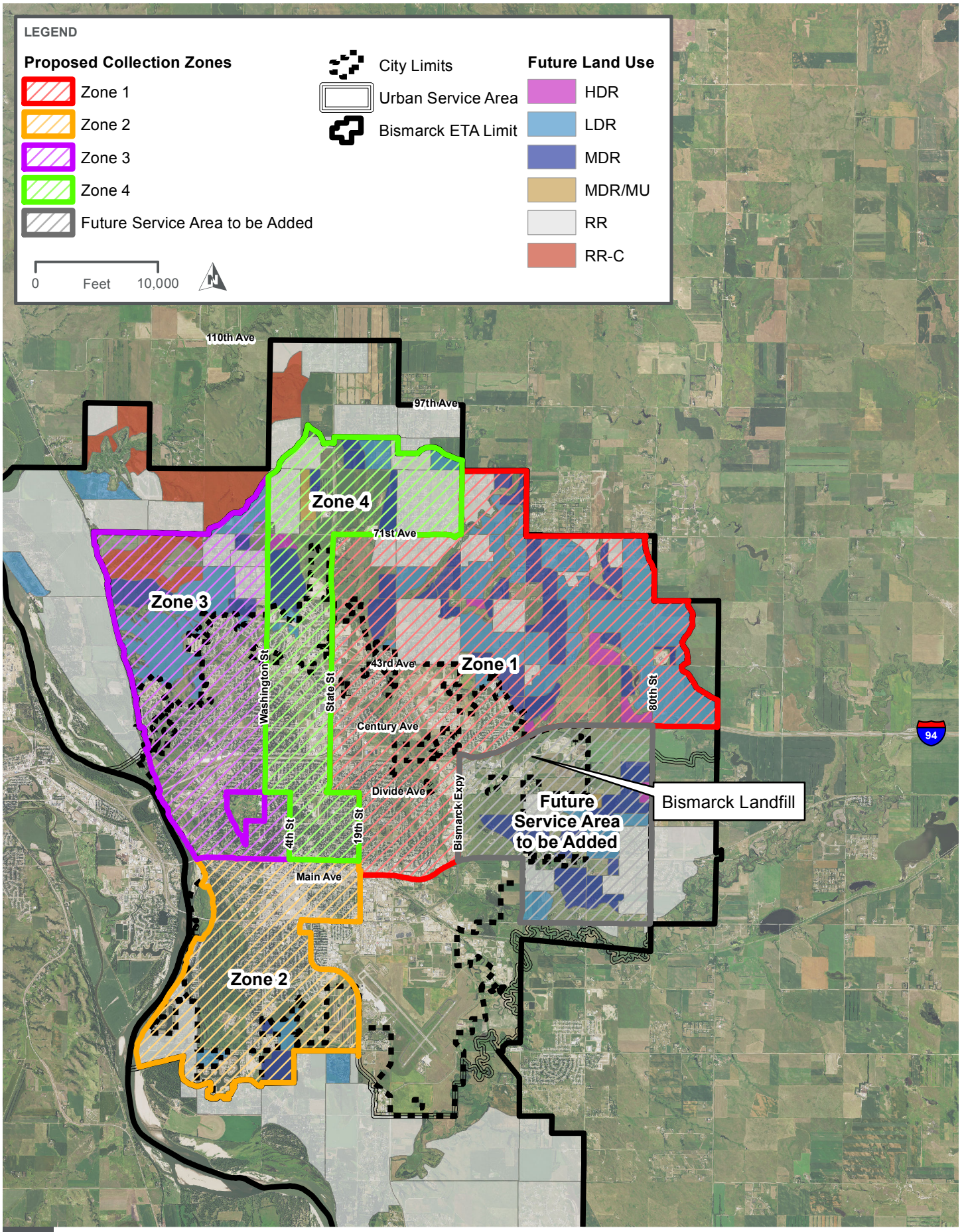
**TM 403 Exhibit 1 Proposed Residential Collection Zones**

**TM 403 Exhibit 2 Proposed Residential Collection Routes – Zone 1**

**TM 403 Exhibit 3 Proposed Residential Collection Routes – Zone 2**

**TM 403 Exhibit 4 Proposed Residential Collection Routes – Zone 3**

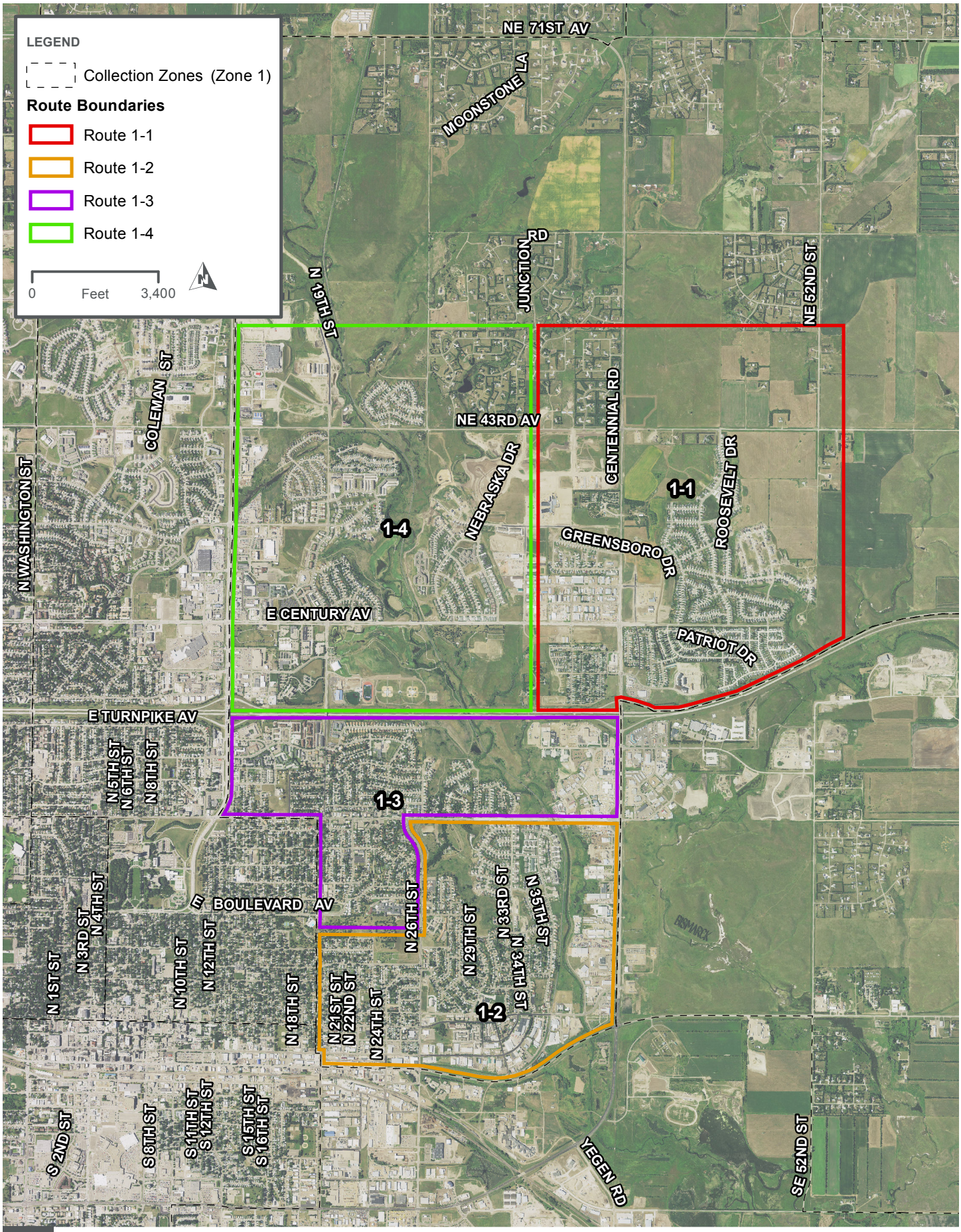
**TM 403 Exhibit 5 Proposed Residential Collection Routes – Zone 4**




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

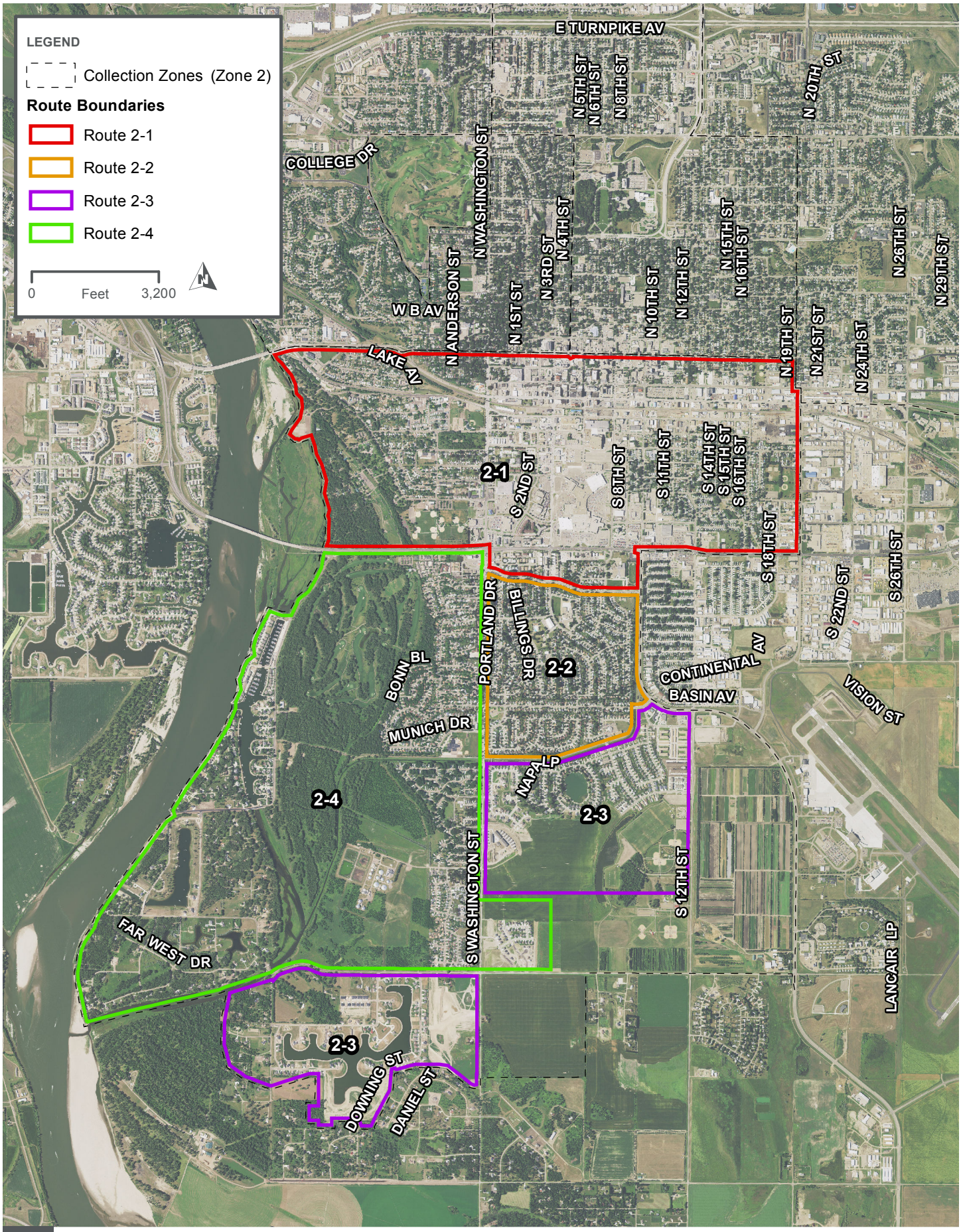
### PROPOSED RESIDENTIAL COLLECTION ZONES (TM 403 EXHIBIT 1)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

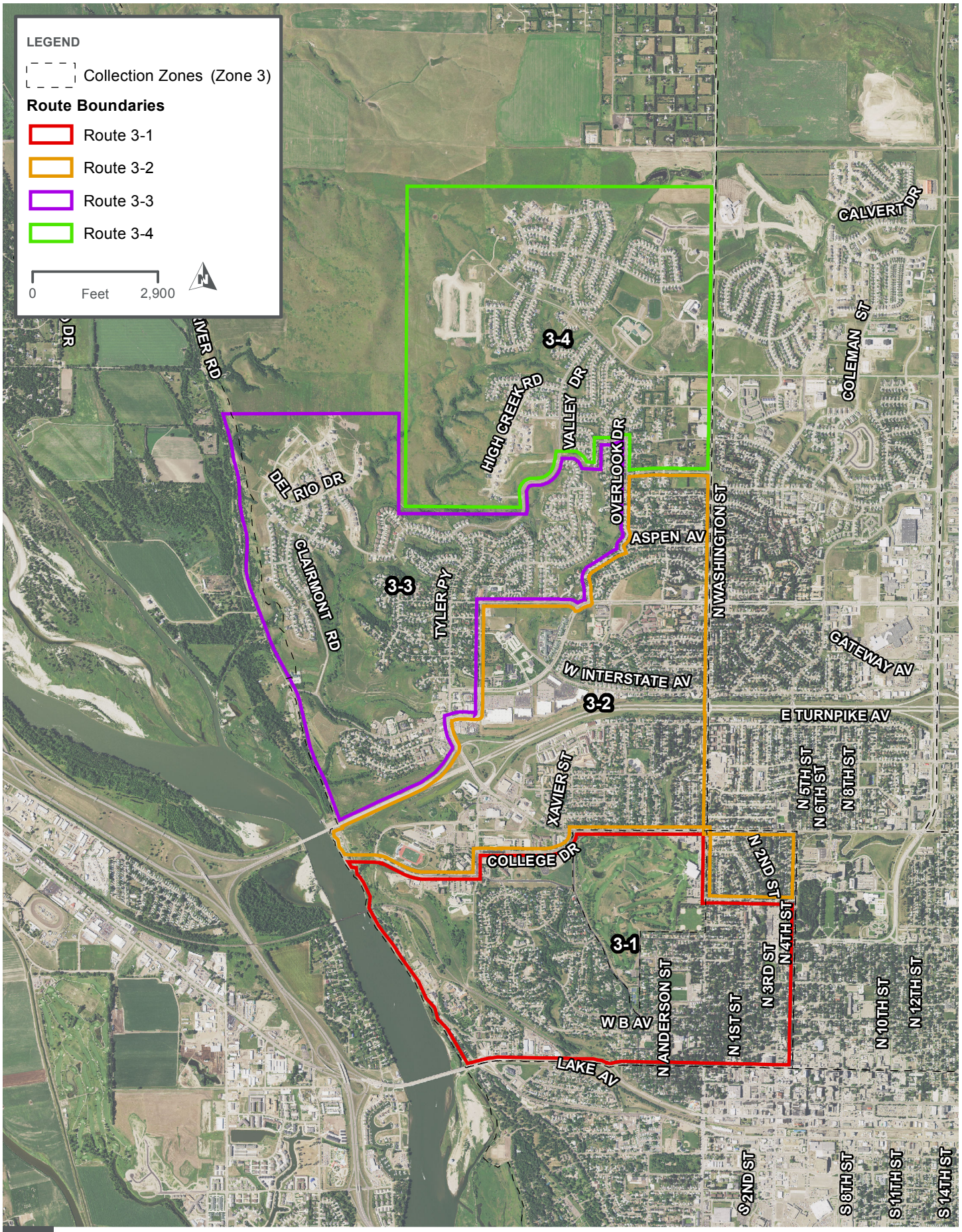
### PROPOSED RESIDENTIAL COLLECTION ROUTES - ZONE 1 (EXHIBIT 2)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

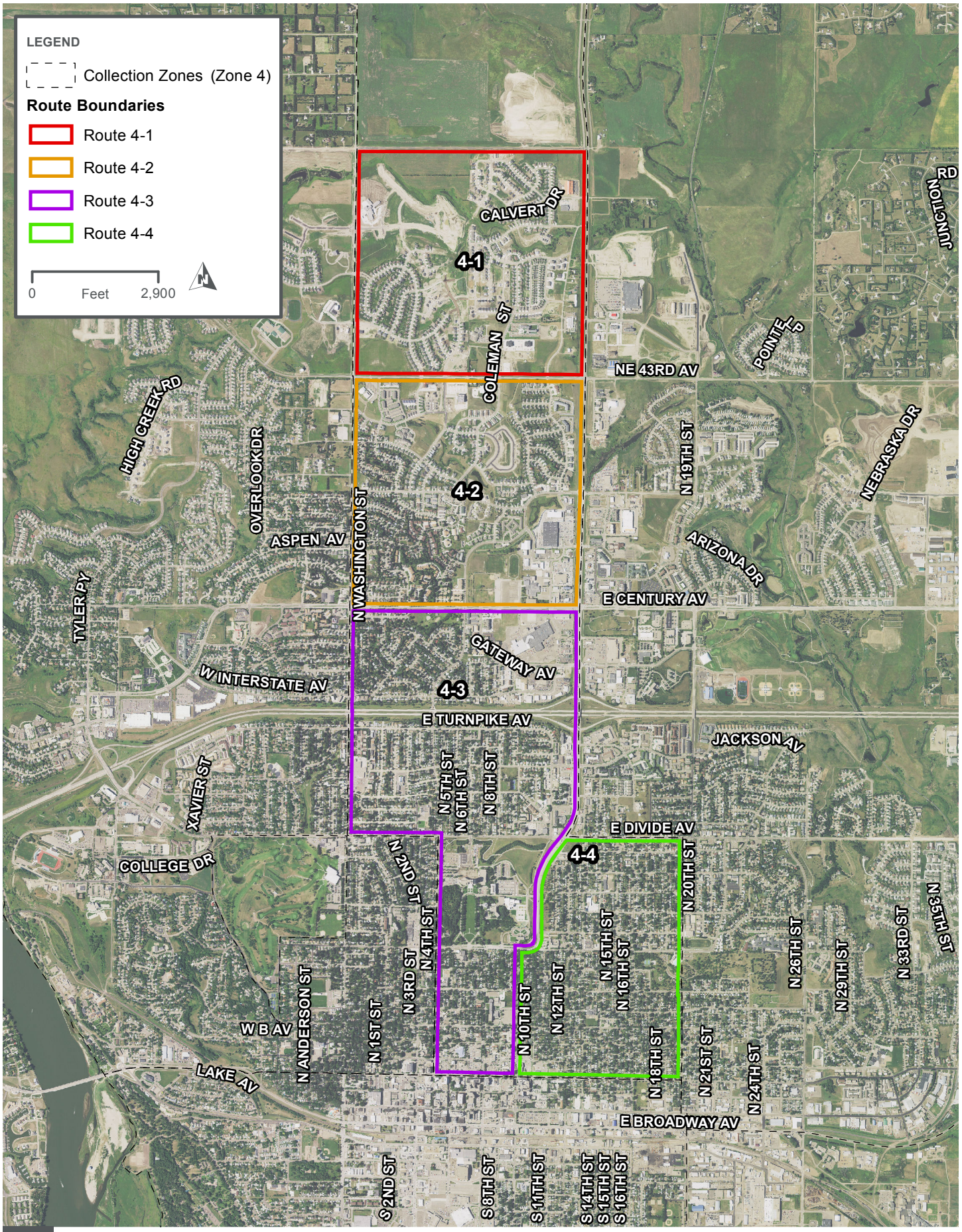
### PROPOSED RESIDENTIAL COLLECTION ROUTES - ZONE 2 (EXHIBIT 3)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### PROPOSED RESIDENTIAL COLLECTION ROUTES - ZONE 3 (EXHIBIT 4)




# CITY OF BISMARCK

## RESIDENTIAL WASTE COLLECTION

### PROPOSED RESIDENTIAL COLLECTION ROUTES - ZONE 4 (EXHIBIT 5)

Bismarck

# COMMUNITY DEVELOPMENT DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Carl D. Hokenstad, AICP, Director of Community Development

**ITEM:** Lot 4, Block 3, High Top Acres Second Subdivision - Appeal

## REQUEST

Jeff Anderson is appealing the decision of the Board of Adjustment to deny a variance from Section 14-04-01(10) of the city Code of Ordinances (RR – Residential / Accessory Buildings) to increase the maximum side wall height of an accessory building currently under construction to sixteen (16) feet.

The property is located northeast of Bismarck, east of US Highway 83 and north of 71st Avenue NE, along the east side of Moonstone Lane.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

The Board of Adjustment held a public hearing on the variance request on September 1, 2016.

Several members of the public spoke at the public hearing. Concerns raised at the hearing included the size of the building being out of place within a rural residential subdivision.

Written comments in opposition were also received and are attached with the September 1, 2016 draft meeting minutes. At the conclusion of the public hearing and based on the findings contained in the staff report, the Board of Adjustment unanimously voted to deny the variance.

## RECOMMENDED CITY COMMISSION ACTION

Consider the request for an appeal of the September 1, 2016 decision of the Board of Adjustment to deny a variance from Section 14-04-01(10) of the City Code of Ordinances (RR – Residential / Accessory Buildings) to increase the maximum side wall height of an accessory building to sixteen (16) feet.

## STAFF CONTACT INFORMATION

Please contact Jenny Wollmuth, CFM, the planner in our office assigned to this request at 355.1845 or jwollmuth@bismarcknd.gov.

Jenny Wollmuth will present this item at the meeting.

Bismarck City Administration

September 12, 2016

JEFF ANDERSON
7309 MOONSTONE LN
BISMARCK ND 58503-6843

Dear Mr. Anderson:

This letter is to inform you that we have received your letter notifying the Bismarck City Commission that you have requested an appeal of the Board of Adjustment's September 1, 2016 decision to deny a variance you requested. The variance is from Section 14-04-01(10) of the City Code of Ordinances (RR-Residential/Accessory Buildings) to increase the maximum side wall height of an accessory building to sixteen (16) feet located on Lot 4, Block 3, High Top Acres Second Subdivision.

We have put your appeal on the regular agenda of the September 27, 2016 City Commission meeting. The meeting will be held in the Tom Baker Meeting Room of the City/County Office Building at 221 North Fifth Street and begin at 5:15 p.m.

This will give you an opportunity to appear before the Board of City Commissioners. If you wish to waive the right to appear, please notify the City Administration Department in writing by Tuesday, September 20, 2016.

Sincerely,

Jason Tomanek
Assistant City Administrator
JT/keh

cc: Jenny Wollmuth, Planner
Carl Hokenstad, Community Development Director

Appeal notice

I Jeff Anderson would like to appeal the decision, for the shop that was built on Lot 7201 Moonestone Lane.

I was given a permit for 16 foot High walls, with a 25 foot to the peak max height. I built the shop 16 foot walls max height is 23 foot 2 inches. This is to the decision by the board of adjustments on sept 15th.

Jeff Anderson

# STAFF REPORT

City of Bismarck
Community Development Department
Planning Division

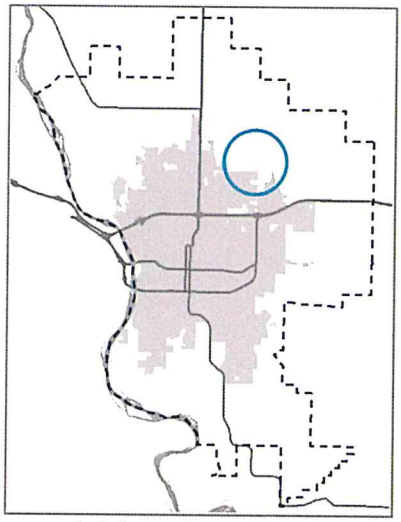
September 1, 2016

**Application for: Variance**

*TRAKiT Project ID:* VAR2016-017

**Project Summary**

| | |
|---|---|
| *Title:* | Lot 4, Block 3, High Top Acres Second Subdivision (7201 Moonstone Lane) |
| *Status:* | Board of Adjustment |
| *Owner(s):* | Jeff Anderson |
| *Project Contact:* | Jeff Anderson |
| *Location:* | Northeast of Bismarck, east of US Highway 83 and north of 71st Avenue NE, along the east side of Moonstone Lane. |
| *Request:* | Variance from Section 14-04-01(10) of the City Code of Ordinances (RR – Residential)(Accessory Building). |



**Staff Analysis**

The applicant is requesting a variance to increase the side wall height of an accessory building currently under construction from fourteen (14) feet to sixteen (16) feet.

A building permit was issued for a 2,368 square foot accessory building on October 15, 2015. Upon inspection it was discovered that the side walls were constructed at sixteen (16) feet. According to the applicant the proposed accessory building was to be constructed with sixteen (16) foot side walls. However, the building permit does not state the size of the side walls. A copy of the building permit is attached. The zoning ordinances limits the maximum height of side walls for accessory buildings located in the RR – Residential zoning district to fourteen (14) feet.

If approved as proposed the side wall height for the accessory building, currently under construction, would be increased to sixteen (16) feet.

**Applicable Provision(s) of Zoning Ordinance**

Section 14-02-03 of the City Code of Ordinances (Definitions) defines a variance as, "A device which grants a property owner relief from certain provisions of the zoning ordinance when, because of the particular physical surroundings, shape or topographical condition of the property, compliance would result in a particular hardship upon the owner, as distinguished from a mere inconvenience or desire to increase the financial return."

Section 14-04-01(10) of the City Code of Ordinances (RR – Residential)(Accessory Buildings) states, "All allowable accessory buildings for a single-family residence shall be limited to a maximum of fourteen hundred (1,400) square feet for lots of 40,000 square feet or less; to a maximum of eighteen hundred (1,800) square feet for lots between 40,000 square feet and 64,999 square feet; and to a maximum of twenty-four hundred (2,400) square feet for lots over 65,000 square feet, except provided herein. The maximum wall height shall be limited to fourteen (14) feet and the maximum building height shall be limited to twenty-five (25) feet." According to the applicant the side wall height of the accessory building currently under construction is sixteen (16) feet.

*(continued)*

**Required Findings of Fact**

1. The need for a variance is not based on special circumstances or conditions unique to the specific parcel of land involved that are not generally applicable to other properties in this area and within RR - Residential zoning classifications.
2. The hardship is not caused by the provisions of the Zoning Ordinance.
3. Strict application of the provisions of the Zoning Ordinance would not deprive the property owner of the reasonable use of the property.
4. The requested variance is not the minimum variance that would accomplish the relief sought by the applicant.
5. The granting of the variance is not in harmony with the general purposes and intent of the Zoning Ordinance.

**Staff Recommendation**

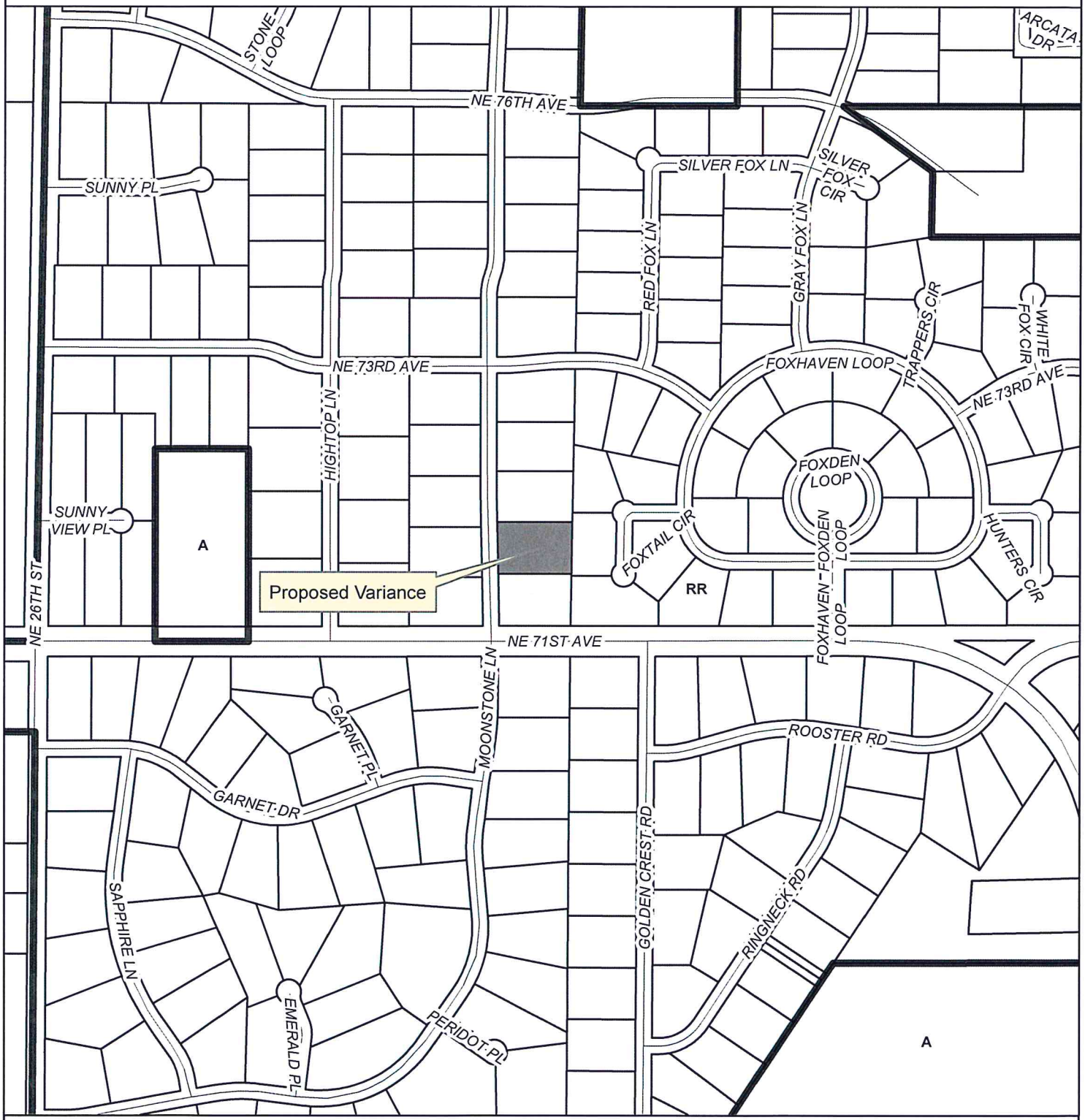
Staff recommends reviewing the above findings and modifying them as necessary to support the decision of the Board.

**Attachments**

1. Location Map
2. Site plan
3. Written Statement of Hardship
4. Building permit *(BRAC2015-0183)*
5. Excerpt of September 1, 2016 meeting minutes *(draft)*

*Staff report prepared by:* Jenny Wollmuth, Planner
701-355-1845 | jwollmuth@bismarcknd.gov

# Proposed Variance
# Lot 4, Block 3, High Top Acres Second Subdivision




***August 17, 2016 (hlb)***

*This map is for representational use only and does not represent a survey. No liability is assumed as to the accuracy of the data delineated hereon.*

0 270 540 1,080 Feet

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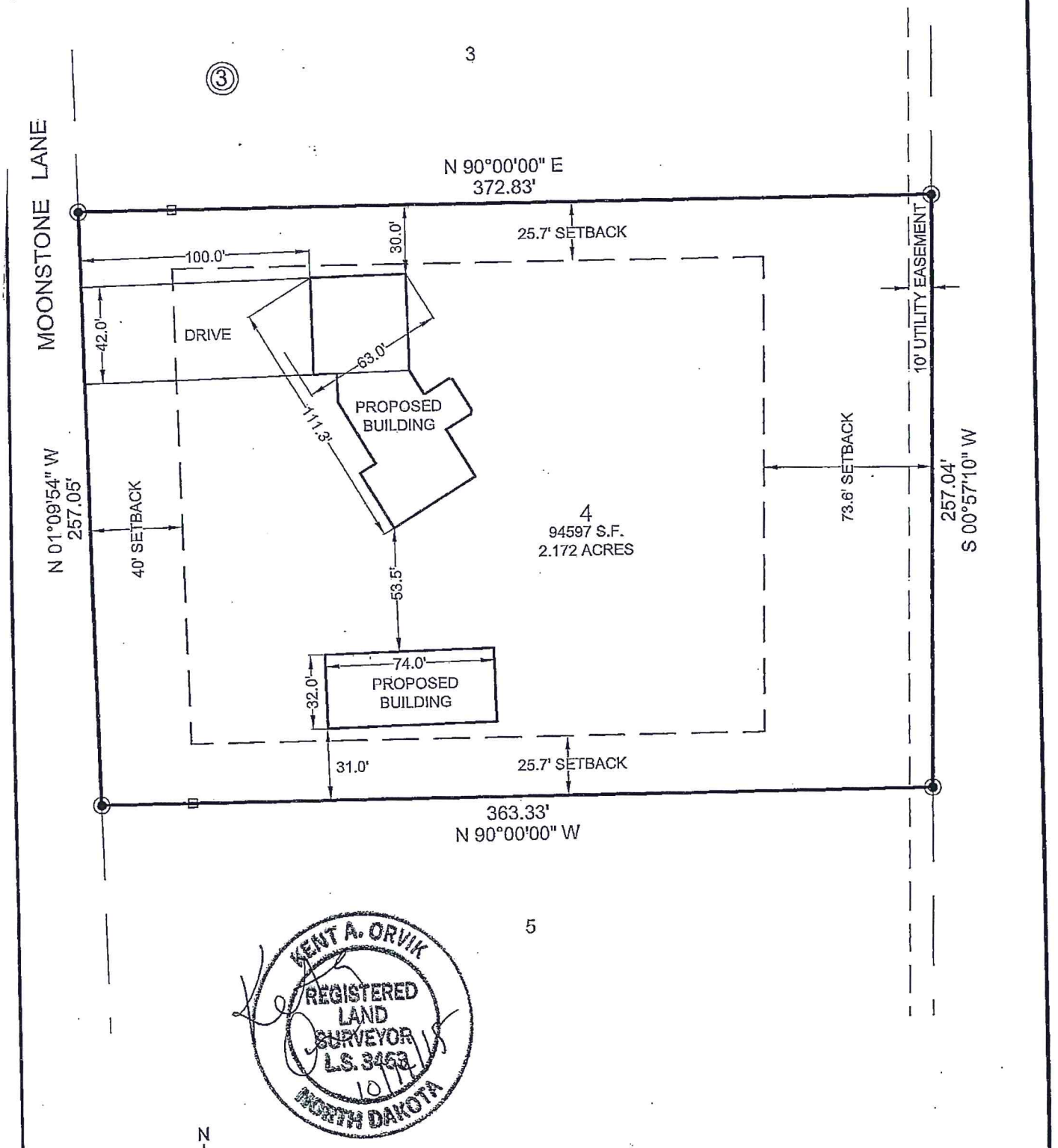



KENT A. ORVIK
REGISTERED LAND SURVEYOR
L.S. 3463
10/14
NORTH DAKOTA

N

30 0 30 60
SCALE 1" = 60' FEET

LEGEND

- MONUMENT FOUND
- MONUMENT SET
- BUILDING SETBACK

Revd. -

LOT SURVEY EXHIBIT
*JEFF ANDERSON*
BISMARCK, ND

KLJ

7201 MOONSTONE LANE
LOT 4, BLOCK 3,
HIGHTOP ACRES 2ND SUB.
BURLEIGH COUNTY, ND

| DRAWN BY | CHKD BY | PROJECT NO. | DATE |
|---|---|---|---|
| ZT | JRJ | 1615455 | 10/14/2015 |



Oct 14, 2015 - 10:24am - P:\Private\ND\LotSurvey\JeffAnderson\1615455\CADD\1615455L4B4HightopAcresSecondSubdivision.dwg

# Bismarck

BUILDING RESIDENTIAL
ACCESSORY
GARAGE

Permit:BRAC2015-0183
Approved By: CAND
Issued Date: 10/15/2015
Expiration Date: 4/12/2016
Permit Fee: $455.45

***Bismarck Community Development Department *Building Inspections***
*221 North 5th Street* PO Box 5503 *Bismarck, ND 58506-5503 * www.bismarcknd.gov * Phone: 701-355-1465 *Fax: 701-258-2073*

Owner:ANDERSON, JEFFREY B & LAURIE B

Address: 7201 MOONSTONE LN

Location: BISMARCK ETA

Property Number: 31-139-80-0I-03-040

Legal Description:

Zoning: RR

Lot Size: 94597

Occupancy: R-3

Number of Units: 0

Easements: 10' utility easement rear property line (E)

Contractor: OAK MASTER CABINETS AND CONSTRUCTION

Contractor Address: 7309 MOONSTONE LA

Phone Number: (701) 224-9379

Type Construction: VB

Type of Work: NEW

Building Height: 1

Building Width: 74

Front Yard Set Back: 40

Rear Yard Set Back: 50

Side Yard Set Back: 15-36.41

Description of Work: CONSTRUCT A 32'X74' DETACHED ACCESSORY BUILDING
Additional Notes:

**BISMARCK BOARD OF ADJUSTMENT**
**MEETING MINUTES**
**September 1, 2016**

The Bismarck Board of Adjustment met on September 1, 2016 at 5:00 p.m. in the Tom Baker Meeting Room in the City-County Office Building, 221 North 5th Street. Chairman Marback presided.

Members present were Jennifer Clark, Chris Seifert, Ken Heier, Rick Wohl and Michael Marback.

Member absent was Ken Hoff.

*****

**VARIANCE FROM SECTION14-04-01(10) OF THE CITY CODE OF ORDINANCES (RR-RESIDENTIAL)(ACCESSORY BUILDING) – LOT 4, BLOCK 3, HIGH TOP ACRES SECOND SUBDIVISION (7201 MOONSTONE LANE)**

Chairman Marback stated the applicant, Jeff Anderson, is requesting a variance to increase the side wall height of an accessory building currently under construction from fourteen (14) feet to sixteen (16) feet.

Ms. Wollmuth gave an overview of the request, including the following findings:

1. The need for a variance is not based on special circumstances or conditions unique to the specific parcel of land involved that are not generally applicable to other properties in this area and within the RR-Residential zoning classifications.

2. The hardship is not caused by the provisions of the Zoning Ordinance.

3. Strict application of the provisions of the Zoning Ordinance would not deprive the property owner of the reasonable use of the property.

4. The requested variance is not the minimum variance that would accomplish the relief sought by the applicant.

5. The granting of the variance is not in harmony with the general purposes and intent of the Zoning Ordinance.

Ms. Wollmuth said staff recommends reviewing the findings in the staff report and modifying them as necessary to support the decision of the Board. She then said multiple comments have been received from neighboring property owners and copies of each of them have been provided to the board members.

Chairman Marback asked if the permit that was issued stated any specific building information on it. Ms. Wollmuth said the permit did not specify the side wall height.

Mr. Heier suggested adding more information to these permits, such as the structure being limited to one story and the building specifications. Ms. Wollmuth said the process has changed somewhat recently and these types of permits actually go through a formal review process by the residential plans examiner rather than being issued over the counter.

Mr. Anderson said he asked how high the side wall could be when he applied for the permit and he was told 16 feet so that is what he went with. He said he was told the side wall height was fine but then it failed at the framing inspection.

Mr. Seifert said some comments from the neighboring owners have included the side wall height restriction was known and that with Mr. Anderson himself being a builder should have known what he was limited to. He then asked how many buildings like this he has built and how many have had a 16 foot side wall.

Mr. Anderson said he has constructed buildings similar to this in the past but this is the only one with a 16 foot side wall.

Mr. Heier said some residents reference the restrictions and conditions portion of their covenants and asked if he is familiar with that information. Mr. Anderson said he is not familiar with those and went by what he was told was ok in the beginning of the process.

Mr. Heier said the building is under the maximum height restriction of 25 feet so it is just the side wall that is causing the violation.

Chairman Marback opened the public hearing.

Brenda Muscha, 7224 Moonstone Lane, said her main concern is that this building looks like a large farm shop and the owner has had since July to correct this issue. She said she submitted comments to the Planning Division and she would like this request to be denied. She said it is not fair for somebody to create a violation and then then ask for forgiveness when it is too late and it makes the property look very sloppy. She said she is happy to see development, but the building is just too big.

Faron Kastner, 7117 Moonstone Lane, said he lives directly south of this property and was out of town when it was constructed. He said he is opposed to the location because when they walk out of their house, the building is all they see. He said he is confident that the owner was aware of the side wall restriction and that he even knows the building requirements, without being a builder. He said they were mistakenly omitted from receiving an adjacent property owner notification and the Planning Division worked to correct that. He then said this owner has built enough homes to know the ins and outs of the requirements and he has also not seen the permit clearly posted on at the location as it is required to be. He said he also does not feel the other lots owned by Mr. Anderson are adequately maintained.

Additional written comments in opposition to this request are attached as Exhibits A-E.

There being no further comments, Chairman Marback closed the public hearing.

Ms. Clark said in her experience on this board, she does recall a couple of ways to fix this problem included filling in with dirt or landscaping and asked if those would be options here. She said a lot of the comments received in opposition to this request are of non-compliance by the owner and asked what the general timeline is of how this issue came together.

Mr. Blaskowski said the building was permitted and the issue was discovered on August 11th during a framing inspection, at which point the owner had to stop any further work on the structure.

Chairman Marback said one statement made was regarding the height of a camper that the owner wants to put in the building, but he has seen buildings with a 14 foot side wall hold a large camper if the trusses are done right, so that cannot be used as an excuse here.

Mr. Heier asked if there is an issue with how the building is located on the property. Mr. Blaskowski said it is not, that the setback requirements are all being met with where it is located.

Ms. Clark said if they permitting process has changed, is it still possible that this mistake could be made again.

Mr. Blaskowski said it is possible that the indicated conversation with a staff member and the owner took place and the owner could have been told that a 16 foot side wall was an option. He added that staff is experienced and trained to answer those questions appropriately as much as possible. He said processes have been put in place to avoid oversights like this going forward.

Mr. Heier said it would be impossible to list all of the things somebody cannot do, but there is a history of why these requirements are in place such as wanting to avoid overhead living units and things of that nature. He then asked if the wind load requirements are being met with how the building is constructed right now.

Mr. Blaskowski said he would need to check into that further but the inspector did not make mention of an issue regarding the wind load requirements.

Ms. Clark asked what will happen if this request is denied since it is already framed and mostly constructed. Chairman Marback said it can be appealed to the City Commission or the owner can remove the roof and shorten the walls somehow. He said either way it could still be the same height at the peak, but the side wall would then be in compliance.

Ms. Clark said she understands the neighbors' frustrations and she takes them seriously. She said because the problem can be fixed, although it will be costly, there is not a uniqueness to the property to need a variance. She said there is not any proof that the owner knew it would be an issue, but it is still a violation.

Mr. Seifert said there are other very large buildings near this location and their side wall height cannot be judged just by looking at them, but they are likely in compliance.

Mr. Wohl said he noticed the same thing and also noticed many have doors that are higher than the side wall, so it can be done correctly.

Chairman Marback asked how the building is being constructed before the house. Mr. Blaskowski said the permits were issued at the same time and the footings for the house have been poured.

**MOTION:** A motion was made by Ms. Clark to deny the variance to increase the side wall height of an accessory building currently under construction from fourteen (14) feet to sixteen (16) feet on Lot 4, Block 3, High Top Acres Second Subdivision (7201 Moonstone Lane). The motion was seconded by Mr. Wohl and with Board Members Clark, Heier, Seifert, Wohl and Marback voting in favor of the motion, the motion was approved and the variance was denied.

## Hilary Balzum

**From:** Terri Fleming <[redacted]
**Sent:** Thursday, August 25, 2016 7:17 PM
**To:** Planning - General Mailbox
**Subject:** VAR2016-017

Thank you for the letter regarding this variance. I drove by the location and was surprised to see that the building was already constructed. Isn't it too late? If the sentiment at the hearing is sufficiently negative, would you really make him tear it down anyway? If not, then the hearing is really just a pretense.

I wonder if the owner built the building first in order to leverage the city to approve the variance? If so, then to prevent that, the city should consider denying the variance to send a needed message.

I have no specific opposition to the variance, if the premature construction was an honest oversight.

James Fleming

PS - the etrakit link in the letter was not working.

EXHIBIT C.

## Hilary Balzum

**From:** Planning - General Mailbox
**Sent:** Monday, August 29, 2016 12:31 PM
**To:** Carl Hokenstad; Daniel Nairn; Hilary Balzum; Jenny Wollmuth; Kim Lee; William Hutchings
**Subject:** FW: Variance Request
**Attachments:** image1.JPG; image3.JPG; image4.JPG; ATT00001.txt

-----Original Message-----
From: Jan Kville [mailto:[redacted]
Sent: Monday, August 29, 2016 10:43 AM
To: Planning - General Mailbox
Subject: Variance Request

Concerning Jeff Anderson request for a variance for accessory building:
1. A building that large should be on a industry site not residential.
2. I feel this will decrease the value of my property.
3. A building of this height is an eye sore, in a residential area.
4. I am 100 percent against a building of 16 ft high in our subdivision that why the City Code of Ordinance were developed to prevent a situation such as this.

Jeff Anderson is the developer of these lots...plus a home builder, he should know what the City Code of Ordinances are. He should read the 'Restrictions and Conditions ' number 3 of his own ordinance. He has 3 lots and 2 of them have fallen into disrepair, I've lived here 13 years and nothing has changed it just gets worse.

Exhibit C.

## Hilary Balzum

**From:** Planning - General Mailbox
**Sent:** Thursday, September 01, 2016 8:58 AM
**To:** Carl Hokenstad; Daniel Nairn; Hilary Balzum; Jenny Wollmuth; Kim Lee; William Hutchings
**Subject:** FW: Project number VAR2016-017
**Attachments:** Document1.docx

**Importance:** High

**From:** Cathy Vetter [mailto:[redacted]
**Sent:** Wednesday, August 31, 2016 7:51 PM
**To:** Planning - General Mailbox
**Subject:** Project number VAR2016-017
**Importance:** High

Please see the attached letter in regards to our objection to allow Jeff Anderson to increase the maximum sidewall height. We are unable to attend the meeting as we both work past 5:00pm.
Thanks,
Shannon and Cathy Vetter

Project number VAR2016-017

This is in regards to the letter that we received to allow Jeff Anderson to increase the maximum sidewall height of an accessory building to 16 feet. **I don't believe that he should be allowed to increase his sidewalls.** He was the developer of the land and helped to make some of the restrictions for the property area. Therefore he was well aware of the restrictions in this area and should have asked permission prior to constructing the accessory building or just followed the restrictions.

When we built our shed, we fully knew the restrictions of the property, as did Jeff, and followed the proper channels to be able to build what we asked for. We went around to the neighbors prior to constructing our property to make sure that everyone was okay with what we were doing and obtain the correct signatures. We never went over size however since we did not have our home built, we had to have approval at the time to build the shed.

Jeff knowingly constructed the property outside the restrictions in the hopes that no one would inforce the restrictions since it was already built. If he did not feel this way, he would have followed the proper channels or just built within the restrictions.

Also per the county ordinance, you are only allowed one approach into your property. If you come and look at this property, there are two approaches going into the property, one where I assume the house will be built and the second where the constructed shop is.

There are restrictions and county inspections for a reason and if we continue to allow people to go outside of them then there is no reason to enforce them**. This will set precedence for the future for others to just build and not take into consideration the restrictions. If one can do it then why can't others.**

Sincerely,

Shannon and Cathy Vetter

EXHIBIT D.

## Hilary Balzum

**From:** Planning - General Mailbox
**Sent:** Thursday, September 01, 2016 11:56 AM
**To:** Carl Hokenstad; Daniel Nairn; Hilary Balzum; Jenny Wollmuth; Kim Lee; William Hutchings
**Subject:** FW: var2016-017

**From:** Jody Bencker [mailto:[redacted]
**Sent:** Thursday, September 01, 2016 11:51 AM
**To:** Planning - General Mailbox
**Subject:** var2016-017

We just received the notice in the mail today. Jeff Anderson has already constructed this building, I don't think you should break the law then ask for the law to be changed.
Thank you.

Exhibit E.

## Hilary Balzum

**From:** Planning - General Mailbox
**Sent:** Thursday, September 01, 2016 4:13 PM
**To:** Hilary Balzum
**Subject:** FW: Jeff Anderson 7201 Moonstone Lane

**From:** Brenda Muscha [mailto:[redacted]
**Sent:** Thursday, September 01, 2016 3:22 PM
**To:** Planning - General Mailbox
**Subject:** Re: Jeff Anderson 7201 Moonstone Lane

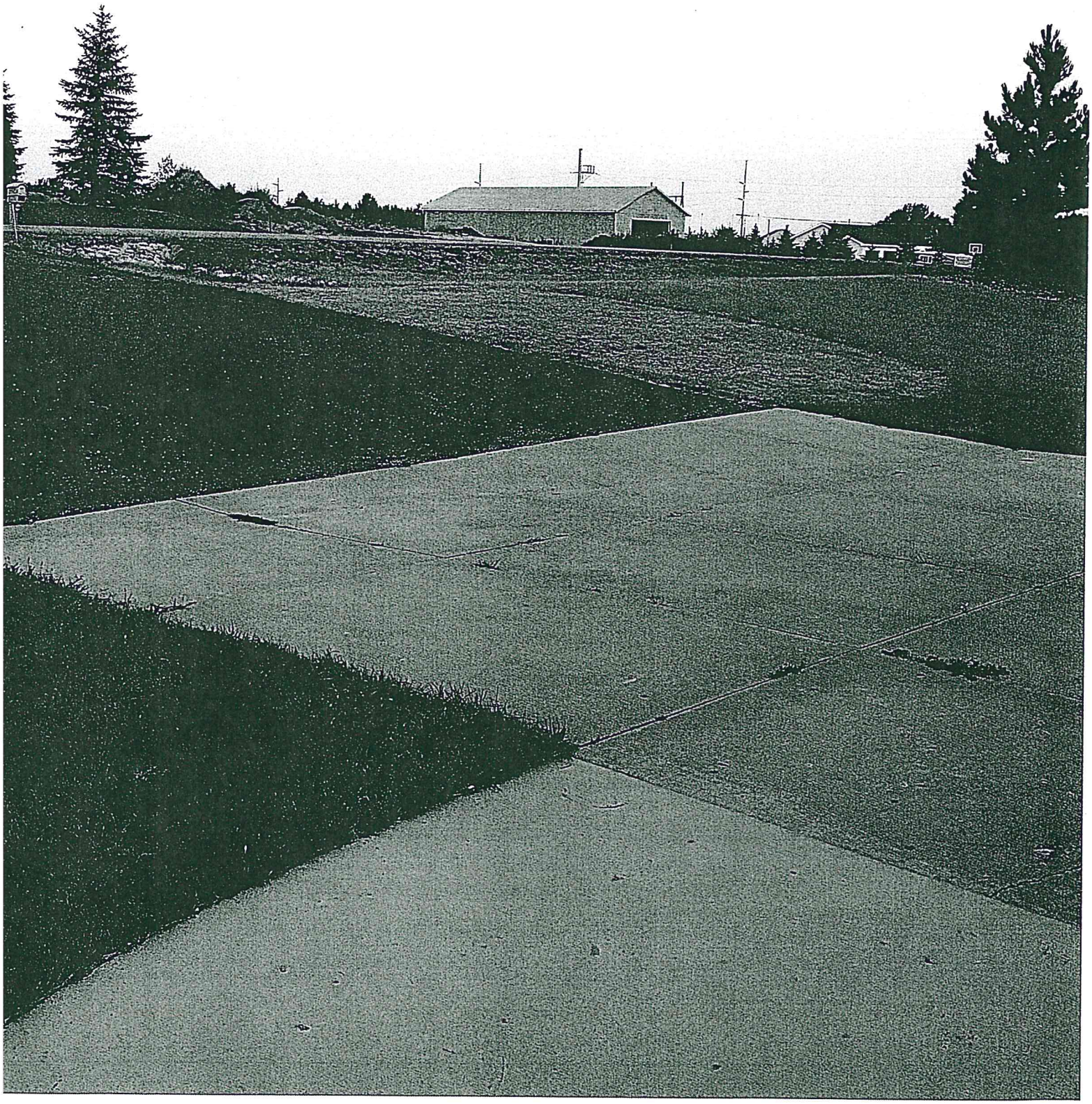
To the Bismarck Board of Adjustment,

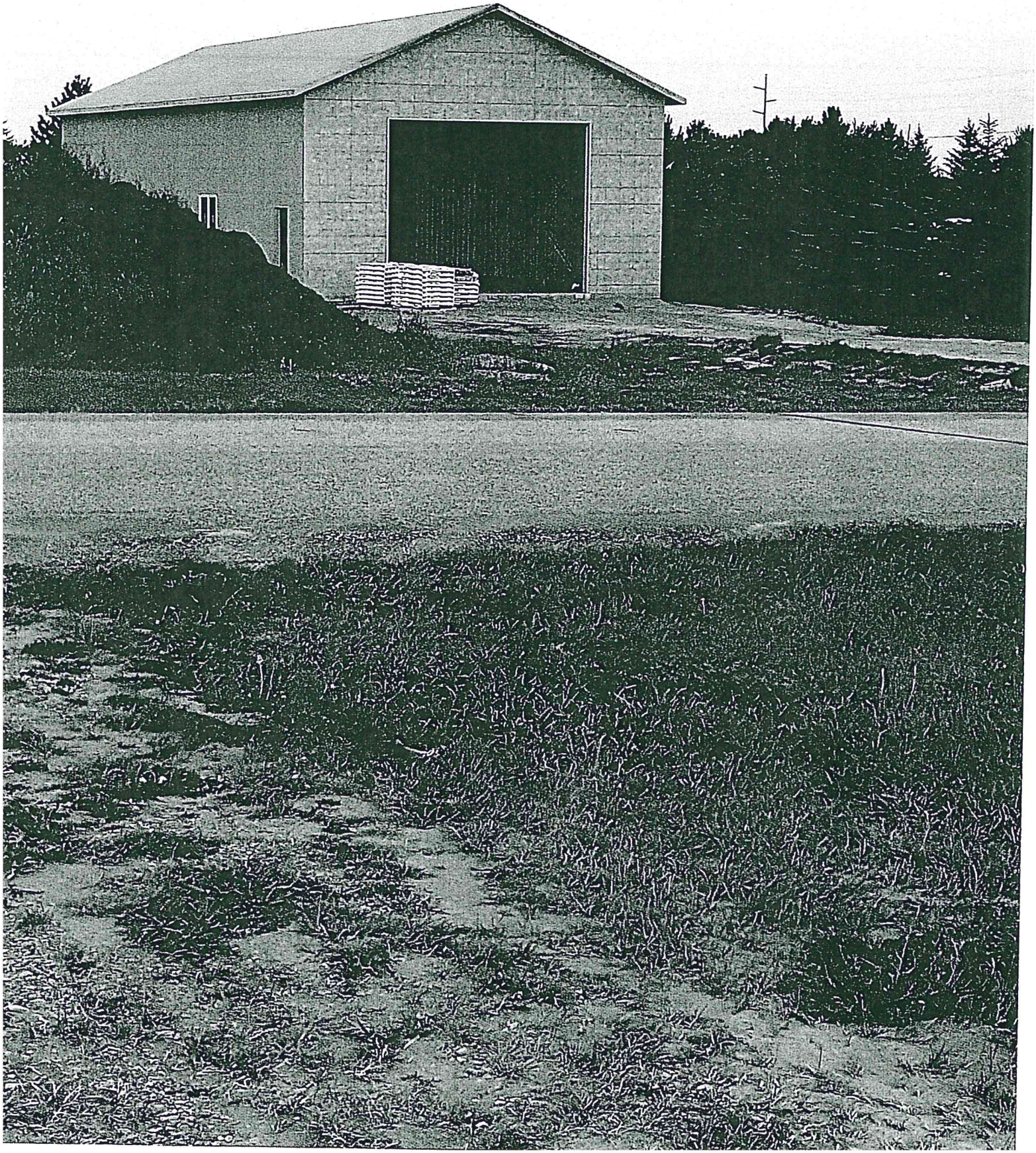
Please deny the variance request for the very large shop being built at 7201 Moonstone Lane. Your paperwork shows that the surveyor was out in October of 2015. If Jeff Anderson wanted a variance to the City Code, he had months & months to ask for it BEFORE he started construction. What is the point in having rules if people can build whatever they want? Jeff currently resides on Moonstone Lane. His current home contains a shop with the appropriate wall height. Obviously he knew the Code and simply ignored it.

I live at 7224 Moonstone Lane. Jeff Anderson owns the 2 undeveloped lots to the south of my property. One on each side of the road which includes 7201 Moonstone Ln. I've had to deal with him not maintaining these lots for the past 15 years. Now when he finally gets around to developing at least one of the lots, he puts up a shop so big that that it violates the City Code. If he is allowed to get away with this violation, what will stop him from breaking another rule? He certainly hasn't bothered to follow the "Restrictions & Conditions" for High Top Acres that he signed with his wife in August of 1995. Rules are rules. He should have to follow them just like everyone else.

I ask that you please stand firm and deny his request to change the sidewall height to 16 feet.

Thanks,
Brenda Muscha





# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** September 20, 2016

**FROM:** Jeff Heintz, Director of Service Operations

**ITEM:** Approval and Award of Bids for Server Room AC

## REQUEST

Approve bids for Server Room AC and award contract to the lowest bidder. Please place this item on the September 27, 2016 City Commission Meeting Agenda.

## BACKGROUND INFORMATION

Existing unit is not designed for IT Server Rooms, so does not provide the quality of environmental control needed to fully protect a server. The new unit will do that. The existing unit will be retained as a back-up to allow protection during servicing of the new unit.

## RECOMMENDED CITY COMMISSION ACTION

Approve bids and award a contract to the low bidder.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov

# BID TABULATION - Bismarck Server Room AC Project

CITY OF BISMARCK PUBLIC WORKS DEPARTMENT

BIDS OPENED SEPTEMBER 20, 2016

| Bidders | Bonds | License | Addendum #1 | Addendum #2 | Base Bid | Comments |
|---|---|---|---|---|---|---|
| City Air | X | X | X | X | **$57,340** | |
| Gibb & Son | X | X | X | X | **$69,250** | |
| HA Thompson | X | X | X | X | **$58,800** | |
| Lindtech | X | X | X | X | **$51,665** | **Low Bid** |
| Northern Plains | X | X | X | X | **$103,315** | |

| Notes |
|---|
| |
| |
| |
| |

# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** September 19, 2016

**FROM:** Jeff Heintz, Director of Service Operations

**ITEM:** Award bid for snow removal at the City/County Building sidewalks and parking lot, Public Health sidewalks and parking lot, Public Library sidewalks and parking lot, and Bismarck Event Center sidewalks and parking lots for 2016 - 2017

## REQUEST

Please place on the September 27th meeting agenda of the Board of City Commissioners a request to award the bid for snow removal at the City/County Building sidewalks and parking lot, Public Health sidewalks and parking lot, Public Library sidewalks and parking lot, and Bismarck Event Center sidewalks and parking lots for 2016 – 2017.

## BACKGROUND INFORMATION

The sites bid are the City/County building sidewalks and parking lot, Public Health sidewalks and parking lot, Public Library sidewalks and parking lot, and Event Center sidewalks and parking lots for the 2016 – 2017 snow season.

## RECOMMENDED CITY COMMISSION ACTION

The best and lowest bidder for all areas is All Seasons Landscape (see attached bid tab).

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov

# 2016 - 2017 SNOW REMOVAL
# BID TABULATION

| | Site | Group 1 - Downtown Sites | All Seasons Landscape | | | Northland Concrete | | | Guthmiller & Son | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16-17 | 17-18 | 18-19 | 16-17 | 17-18 | 18-19 | 16-17 | 17-18 | 18-19 |
| City/County | A-1 | A Services Base | $140.00 | $140.00 | $145.00 | $135.00 | $140.00 | $145.00 | No bid for Removal or other services. "Bidder is required to bid on all sites within proposal group to be qualified." | | |
| | A-1 | A Services Additional per inch | $15.00 | $15.00 | $20.00 | $15.00 | $17.00 | $20.00 | | | |
| | A-1 | D Services Sand/Ice Melt | $85.00 | $85.00 | $85.00 | $75.00 | $80.00 | $80.00 | | | |
| Public Health | A-2 | A Services Base | $440.00 | $450.00 | $465.00 | $450.00 | $460.00 | $470.00 | | | |
| | A-2 | A Services Additional per inch | $45.00 | $50.00 | $50.00 | $50.00 | $55.00 | $55.00 | | | |
| | A-2 | D Services Sand/Ice Melt | $180.00 | $190.00 | $200.00 | $150.00 | $160.00 | $170.00 | | | |
| Library | A-3 | A Services Base | $260.00 | $270.00 | $270.00 | $285.00 | $290.00 | $295.00 | | | |
| | A-3 | A Services Additional per inch | $27.00 | $30.00 | $35.00 | $30.00 | $32.00 | $34.00 | | | |
| | A-3 | D Services Sand/Ice Melt | $95.00 | $105.00 | $110.00 | $125.00 | $135.00 | $150.00 | | | |
| C/C | C-1 | C Services Exits/Sidewalks | $80.00 | $85.00 | $90.00 | $90.00 | $95.00 | $100.00 | | | |
| | C-1 | D Services Egress Sand/Ice Melt | $45.00 | $45.00 | $50.00 | $65.00 | $65.00 | $70.00 | | | |
| PHC | C-2 | C Services Exits/Sidewalks | $110.00 | $115.00 | $115.00 | $140.00 | $145.00 | $155.00 | | | |
| | C-2 | D Services Egress Sand/Ice Melt | $60.00 | $60.00 | $65.00 | $75.00 | $85.00 | $100.00 | | | |
| Library | C-3 | C Services Exits/Sidewalks | $125.00 | $125.00 | $130.00 | $140.00 | $160.00 | $175.00 | | | |
| | C-3 | D Services Egress Sand/Ice Melt | $75.00 | $80.00 | $80.00 | $90.00 | $100.00 | $110.00 | | | |
| | | TOTAL | $1,782.00 | $1,845.00 | **$1,910.00** | $1,915.00 | $2,019.00 | $2,129.00 | $0.00 | $0.00 | $0.00 |
| Load/Haul | Truck Capacity/Price: 12-14 | | | | | | | | | | |
| | Truck Capacity/Price: 15 | | $170.00 | $170.00 | $170.00 | $180.00 | $180.00 | $180.00 | $180.00 | $180.00 | $180.00 |
| | Truck Capacity/Price: | | | | | | | | $220.00 | $220.00 | $220.00 |

# 2016 - 2017 SNOW REMOVAL
# BID TABULATION

| | Site | Group 2 - Event Center | All Seasons Landscape | | | Northland Concrete | | | Guthmiller & Son | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16-17 | 17-18 | 18-19 | 16-17 | 17-18 | 18-19 | 16-17 | 17-18 | 18-19 |
| Lot B | B-1 | A Services Base | $270.00 | $280.00 | $290.00 | $290.00 | $300.00 | $300.00 | No bid for Removal or other services. "Bidder is required to bid on all sites within proposal group to be qualified." | | |
| | B-1 | A Services Additional per inch | $30.00 | $30.00 | $35.00 | $30.00 | $30.00 | $35.00 | | | |
| | B-1 | D Services Sand/Ice Melt | $75.00 | $75.00 | $80.00 | $80.00 | $85.00 | $90.00 | | | |
| | C-4 | C Services Exits/Sidewalks | $90.00 | $90.00 | $100.00 | $120.00 | $120.00 | $125.00 | | | |
| | C-4 | D Services Sidewalks Sand/Ice Melt | $70.00 | $75.00 | $75.00 | $75.00 | $80.00 | $80.00 | | | |
| Lot C | B-2 | A Services Base | $450.00 | $460.00 | $460.00 | $450.00 | $455.00 | $465.00 | | | |
| | B-2 | A Services Additional per inch | $45.00 | $45.00 | $50.00 | $45.00 | $50.00 | $50.00 | | | |
| | B-2 | D Services Sand/Ice Melt | $140.00 | $160.00 | $200.00 | $125.00 | $135.00 | $140.00 | | | |
| Lot D | B-3 | A Services Base | $620.00 | $640.00 | $650.00 | $650.00 | $655.00 | $665.00 | | | |
| | B-3 | A Services Additional per inch | $65.00 | $65.00 | $65.00 | $70.00 | $70.00 | $75.00 | | | |
| | B-3 | D Services Sand/Ice Melt | $180.00 | $195.00 | $210.00 | $175.00 | $175.00 | $185.00 | | | |
| Lot E | B-4 | A Services Base | $260.00 | $260.00 | $260.00 | $260.00 | $270.00 | $280.00 | | | |
| | B-4 | A Services Additional per inch | $30.00 | $30.00 | $30.00 | $30.00 | $30.00 | $30.00 | | | |
| | B-4 | D Services Sand/Ice Melt | $90.00 | $90.00 | $90.00 | $75.00 | $85.00 | $85.00 | | | |
| | | TOTAL | $2,415.00 | $2,495.00 | $2,595.00 | $2,475.00 | $2,540.00 | $2,605.00 | $0.00 | $0.00 | $0.00 |
| Loading & Hauling | Truck Capacity/Price: 12-14 | | | | | | | | | | |
| | Truck Capacity/Price: 15 | | $175.00 | $175.00 | $175.00 | $180.00 | $180.00 | $180.00 | $180.00 | $180.00 | $180.00 |
| | Truck Capacity/Price: 20 to 28 | | | | | | | | $220.00 | $220.00 | $220.00 |
| | Truck Capacity/Price: | | | | | | | | | | |

# PUBLIC WORKS SERVICE OPERATIONS

**DATE:** September 20, 2016

**FROM:** Jeff Heintz, Director of Service Operations

**ITEM:** Request reallocation of funds to be used to address sewer plumbing and air handling in City/County building

## REQUEST

Reallocate leftover funds from the City/County electrical panel replacement to be used to address the sewer gas odor problem in the City/County building.

## BACKGROUND INFORMATION

Complaints of sewer gas odor in the City/County building have been received by our staff since July. Analysis by heating and cooling engineers and plumbers has identified the source to be an old cast iron sewer pipe that is leaking in a tunnel in the basement, and a sewage ejector pump co-located in a room with an air handling unit that serves first and second floor.

To correct this problem, we need to exhaust the tunnel to the outside, relocate the air handler to second floor, remove the leaking cast iron sewer pipe and replace with PVC, re-route the upper floor bathroom waste drains to the tunnel waste main instead of the sewage ejector pump, and replace the corroded water meter valving into a new location that is accessible to maintenance staff.

The total cost of this project is estimated to be $113,000. We are moving forward with the first phase by exhausting the tunnel air to alleviate the odor for approximately $6,000. The remaining projects to correct the sewer gas issues are estimated to cost $107,000. Funds for this repair are not available in the Building Maintenance budget.

Excess funds from the repair and replacement of the electrical panel in the City/County building are adequate to cover this expense. We received and awarded bids to repair the electrical panel and will have approximately $105,000 remaining in the fund that could be used to address the sewer gas issue.

## RECOMMENDED CITY COMMISSION ACTION

Request to approve the reallocation of funds that will be left over from the City/County electrical panel repair and replacement to be used for the sewer gas odor corrective actions at the City/County building.

## STAFF CONTACT INFORMATION

I will be present at the City Commission meeting to respond to questions the Board maybe have regarding this matter. **Contact:** Jeff Heintz, 355-1700, jheintz@bismarcknd.gov

Bismarck

# AIRPORT

**DATE:** September 15, 2016

**FROM:** Gregory B. Haug, Airport Director

**ITEM:** Agenda item for September 27, 2016, Security Checkpoint Reconfiguration

## REQUEST

Receive and consider bids and project budget for Security Checkpoint Reconfiguration Phase 1.

## BACKGROUND INFORMATION

On April 1, 2016 the Board approved an agreement with Ubl Design Group to develop design options for Security Checkpoint reconfiguration at the passenger terminal. On July 12, 2016 airport staff and Ubl briefed the Board and received permission to design and bid the reconfiguration. To meet a November 1, 2016 deadline to accommodate Transportation Security Administration (TSA) screening equipment delivery and installation, the first phase (move of glass walls and electrical connections) of the reconfiguration has been designed and bid. The phase 2 second floor queue area expansion will come to the Board in the near future.

Bids will be opened at 4 PM September 26, 2016. Staff will bring a bid tab, budget and recommendations to the meeting.

## RECOMMENDED CITY COMMISSION ACTION

Airport Staff will provide a recommendation at the meeting.

## STAFF CONTACT INFORMATION

Greg Haug, Airport Director, 701-355-1808, ghaug@bismarcknd.gov

Bismarck

# COMMUNITY DEVELOPMENT DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Carl D. Hokenstad, AICP, Director of Community Development

**ITEM:** CORE Technical Assistance Grant for Improvements to 212 East Main Ave.

## REQUEST

The applicant requests a 75% match for architectural services up to $2,475 from the CORE Technical Assistance Bank to obtain architectural services for the rehabilitation of the building at 212 East Main Avenue.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

The Renaissance Zone Authority held a public hearing on the request for CORE Technical Assistance Bank Program on September 20, 2016.

No members of public spoke at the public hearing.

At the conclusion of the public hearing, and based on the findings contained in the staff report, the Renaissance Zone Authority unanimously recommended approval of the request for CORE Technical Assistance Bank program funds up to $2,475.

## RECOMMENDED CITY COMMISSION ACTION

Approve the request to use the CORE Technical Assistance Bank Program for the improvements as specified in the staff report and all attached documents.

## STAFF CONTACT INFORMATION

Please contact Daniel Nairn, AICP, the planner in our office assigned to this request, at 355-1854 or dnairn@ bismarcknd.gov.

# STAFF REPORT

City of Bismarck
Community Development Department
Planning Division

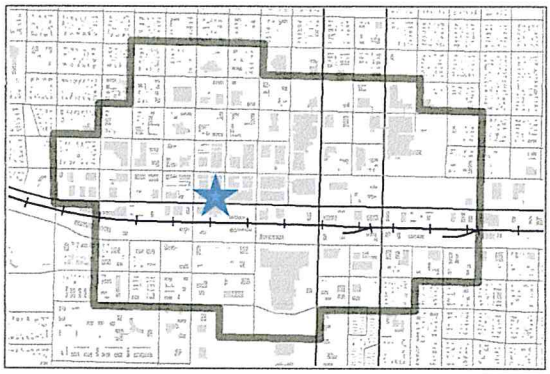
**September 20, 2016**

**Application for: CORE Incentive Grant Program**

*TRAKiT Project ID:* CORE2016-002

## Project Summary

| | |
|---|---|
| *Title:* | Rehabilitation of 212 East Main Avenue |
| *CORE Project Type:* | Technical Assistance Bank |
| *Status:* | Renaissance Zone Authority |
| *Applicant(s):* | River Road Partners, LLC |
| *Owner(s):* | River Road Partners, LLC |
| *Street Address:* | 202 East Main Avenue |
| *Legal Description:* | Lot 12, Block 52, Original Plat. |



*Project Description:* Obtain technical assistance for improvements to the façade and code review for interior renovations for a previously-approved Renaissance Zone project.

## Project Information

| | | | | | |
|---|---|---|---|---|---|
| *Parcel Size (square feet):* | 3,250 | *Building Floor Area (square feet):* | 4,776 | Incentive Requested: | A 75% match for architectural services up to $2,475. |
| *Total Project Cost (square feet):* | N/A | *Contractor:* | Cole Johnson, EAPC | | |

## Staff Analysis

The Renaissance Zone Authority previously approved a Renaissance Zone designation for the purchase with improvements of 212 East Main Avenue during the December 15, 2015 regular meeting. The applicant then purchased the building and submitted exterior design documents for review during the August 19, 2016 Renaissance Zone Authority meeting. The Authority conditionally approved the designs, delegating the task of refining the final design to the Technical Advisors.

Technical Advisors Bruce Whittey and Steph Smith met with the applicants and City Staff on August 24, 2016 to discuss the design. It was the consensus that this meeting that applicants may benefit from professional architectural services to design the façade improvements and complete the required code review necessary to obtain a building permit. Staff informed the applicants of the Technical Assistance Bank Grant Program.

River Road Partners are seeking funds from the Technical Assistance Bank. If approved, the grant would provide a 75% match for architectural services up to a maximum of $2,475 or 30 hours or work. The work must be performed after approval to be eligible for reimbursement.

The applicants have submitted a project description, which is attached to this report.

*(continued)*

**Required Findings of Fact**

1. The property is located within the Tax Increment Financing District for downtown Bismarck.
2. The project supports the recommendations of the 1995 Central Business District Plan, and all subsequent updates and revisions, as well as the approved 2015 Downtown Design Guidelines.
3. The work performed is intended to be preliminary in scope, and funding will not be used for construction activity.
4. The property is not exempt from general taxation.
5. The professional services obtained through funding from this grant will be for façade design work or other eligible technical services.

**Staff Recommendation**

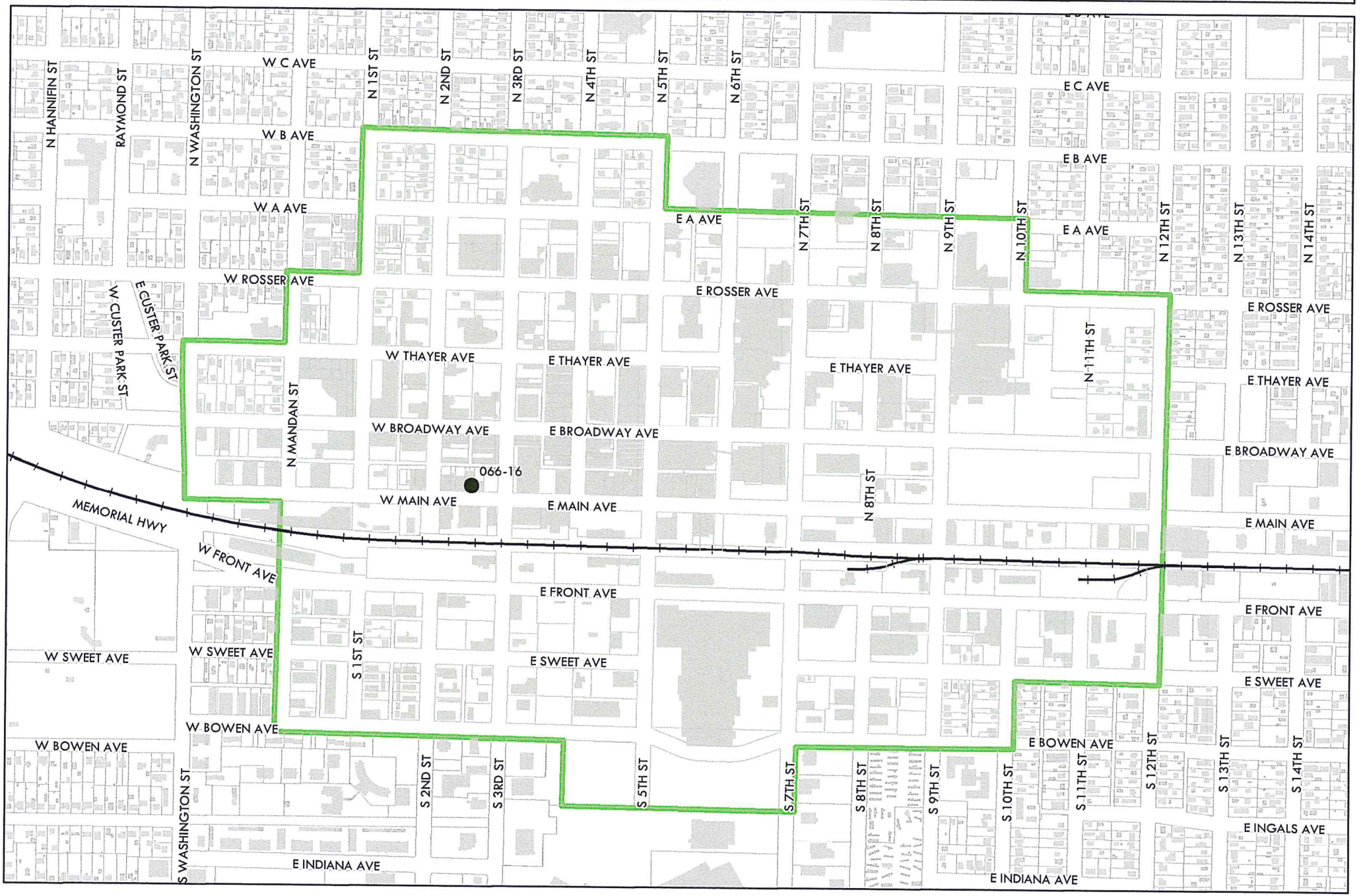
Based on the above findings, staff recommends approval of the request for a grant from the Technical Assistance Bank Grant Program for improvements to 212 East Main Avenue.

**Attachments**

1. Project Description Submitted by Applicant

*Staff report prepared by:* Daniel Nairn, Planner
701-355-1854 | dnairn@bismarcknd.gov

# 212 West Main Avenue - CORE Technical Assistance Bank




**City of Bismarck**
**Community Development Department- Planning Division**

This map is for representational use only and does not represent a survey. No liabiltiy is assumed as to the accuracy of the data delineated hereon.

0 215 430 860 Feet

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**September 9, 2016**

Our property at 212 E Main Avenue is currently a Bismarck Renaissance Zone project. It is our hope we could utilize the Core Incentive Grant programs, including the technical assistance bank to ensure the vision for this property is executed to the best of our ability. We want this building to be an asset to our community.

River Road Partners LLC is comprised of 5 equal partners. Within those 5 partners are 3 businesses, D&N Cinematics, Up & Running Design and River Road Gardens. D&N Cinematics and Up and Running Design are currently located downtown. Our vision for this historic property is multifaceted. Exterior changes include major fascia improvements including removing dated metal awning and restoration of transom windows and other features that have been hidden over the years. New windows would be added where current windows have been deemed in poor condition or energy inefficient. Other improvements to the exterior would include repainting the cinder block sides of the building, including the potential installation of an large art piece on the east side of the building.

There are 3 residential units in the building. Minor improvements would be made to the units and common areas to bring these areas up to date.

Much of the work will happen on the main floor. The area will be stripped of its suspended ceiling to expose the tin ceiling and crown molding underneath. In addition, a new entrance to the basement would be created on the main floor (see attached rendering). This would create 2 paths in and out of the basement for proper egress. This coincides with the basement remodel which would include a complete electrical overhaul, installation of bathroom facilities, repainting walls and refinishing floors. It is our hope we could continue to foster growth of small business in the core of Bismarck by making this newly usable space in the basement a place for the current tenant, Rhythm Records, to thrive.

Our offices of D&N Cinematics and Up and Running Design would be relocated to the main floor. Within the building mixed usage including residential, professional and retail spaces would coexist to make the building and area a dynamic and vibrant location.

# COMMUNITY DEVELOPMENT DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Carl D. Hokenstad, AICP, Director of Community Development

**ITEM:** CORE Façade Incentive Grant for Improvements to 214-216 East Main Ave.

## REQUEST

The applicant requests a 50% match of project costs up to $26,425 from the CORE Façade Improvement Grant Program for improvements to the exterior façade of the building at 214-216 East Main Avenue.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

The Renaissance Zone Authority held a public hearing on the request for CORE Façade Incentive Grant Program on September 20, 2016.

No members of public spoke at the public hearing.

At the conclusion of the public hearing, and based on the findings contained in the staff report, the Renaissance Zone Authority unanimously recommended approval of the request for CORE Façade Incentive Grant program funds up to $25,892 (also deducting the amount of a previously awarded signage grant from the allowable total), excluding any work done on the east façade of the building.

## RECOMMENDED CITY COMMISSION ACTION

Approve the request to use the CORE Façade Improvement Grant Program for a 50% match up to $25,892 for the improvements as specified in the staff report and all attached documents.

## STAFF CONTACT INFORMATION

Please contact Daniel Nairn, AICP, the planner in our office assigned to this request, at 355-1854 or dnairn@ bismarcknd.gov. Daniel will present this item at the meeting.

# STAFF REPORT

City of Bismarck
Community Development Department
Planning Division

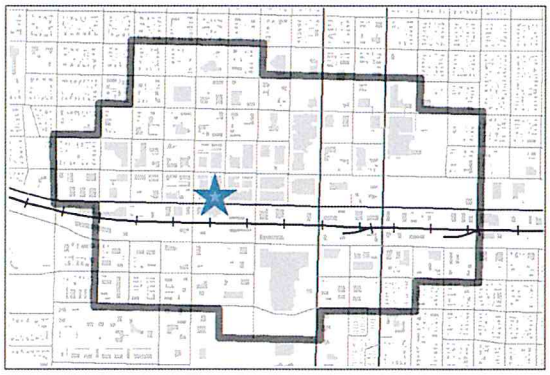
September 20, 2016

**Application for: CORE Incentive Grant Program**
**Downtown Design Review**

*TRAKiT Project ID:* CORE2016-001

## Project Summary

| | |
|---|---|
| *Title:* | Modifications to 214-216 East Main Avenue |
| *CORE Project Type:* | Facade Incentive |
| *Status:* | Renaissance Zone Authority |
| *Applicant(s):* | Vold Tire Company, LLC |
| *Owner(s):* | Vold Tire Company, LLC |
| *Street Address:* | 214-216 East Main Avenue |
| *Legal Description:* | Lots 10-11, Block 52, Original Plat |



| | |
|---|---|
| *Project Description:* | Remove various elements from the building and install new elements with the intent to highlight the original building. Clerestory windows, energy efficient doors, and restoration of brick are key elements. The project is anticipated to start once approved by the City. The timeline has not been solidified, but is hoped to be completed this year. |

## Project Information

| | | | | | |
|---|---|---|---|---|---|
| *Parcel Size (square feet):* | 6,500 | *Building Floor Area (square feet):* | 2,992 | Incentive Requested: | 50% match of improvements up to $25,892 |
| *Total Project Cost:* | Approximately $72,000 | *Contractor:* | Two bids received | | |

## Staff Analysis

Vold Tire Company LLC (Rolf Eggers) was awarded a technical assistance grant to help design façade improvements to 214-216 East Main Avenue on January 26, 2016. The final design for this work has been completed, and the applicant now requests a façade Incentive Grant to cover 50% of the costs of the improvements.

The Renaissance Zone Authority awarded $3,575 for a partial façade renovation to this property in 2009. Another CORE grant of $532.50 was awarded for signage at the same time. The CORE program guidelines allow a maximum of $30,000 in reimbursement for façade improvement. Deducting the amount already disbursed, a total of $25,292 is available for the match. The previous grant was used to replace windows, and this grant request does not involve the newer windows.

Two bids have been received for construction of the proposed design. The façade program guidelines require three bids. The applicant claims to have contacted many contractors with only two interested in providing an estimate. Both estimates are close to each other.

This applicant is also requesting approval of Downtown Design Review for the project.

*(continued)*

**Required Findings of Fact**

1. The property is located within the Tax Increment Financing District for downtown Bismarck.
2. The project supports the recommendations of the 1995 Central Business District Plan, and all subsequent updates and revisions, as well as the approved 2015 Downtown Design Guidelines.
3. The project would meet all applicable building code and zoning requirement.
4. The applicant has not received three bids for construction. Two bids have been submitted.
5. The rehabilitation project addresses every story of the façade, all signs of blight, and any portion of the façade that demonstrates poor visual appearance.
6. The property is not exempt from general property tax.

**Staff Recommendation**

Based on the above findings, staff recommends approval of the request for a grant from the Façade Incentive Grant Program for improvements to 214-216 East Main Avenue, waiving the requirement to obtain three bids.

**Attachments**

1. Project Location Map
2. Bismarck Storefront Redesign Project
3. Building Exterior Condition Assessment
4. Project Construction Bids

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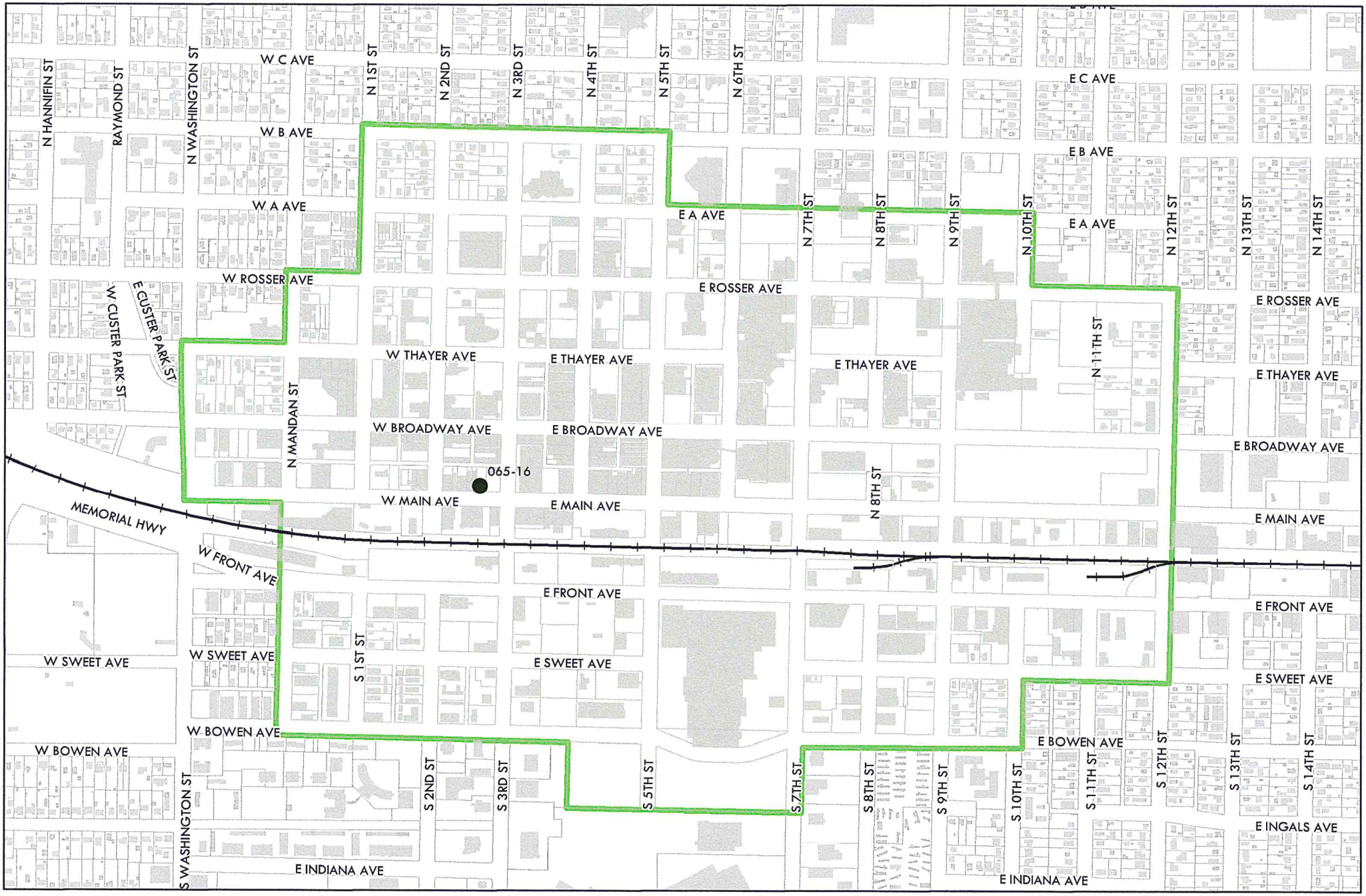
*Staff report prepared by:* Daniel Nairn, AICP, Planner
701-355-1854 | dnairn@bismarcknd.gov

# 214 West Main Avenue - CORE Facade Improvement Program




**City of Bismarck**
**Community Development Department- Planning Division**

This map is for representational use only and does not represent a survey. No liabiltiy is assumed as to the accuracy of the data delineated hereon.

0 215 430 860 Feet

N

**September 9, 2016**

# Building Exterior Condition Assessment

**Condition of brick and other materials:**

Condition of brick is good. The brick has been painted with is peeing. The paint will be removed.

**Condition of the roof:**

Roof condition is good. Roof will not be modified.

**Condition of the windows:**

Windows are in good condition and are newer. Doors do not have insulated glass and will be replaced.

**Type of windows (single-pane, reflective, etc.)**

Clear, insulated glass, aluminum storefront.

**List the remaining elements from the original/historic design (if the building is historically significant)**

Brick

**List the modified elements from the original/historic design (if the building is historically significant)**

Clerestory glazing has been removed. Brick has been painted/covered. Below window has been clad in buffalo board. Clerestory glazing will be reinstalled, brick will be uncovered, below windows will incorporated fibercement board.

**Have any of the original windows been removed or covered up?**

Yes, see comment above.

**Is there EIFS/Dry-Vit as an existing exterior building material?**

No, there. The east wall does have stucco which is in need of repair. This wall will be refinished with stucco.

**Has any of the brick been painted?**

Yes. This well be removed.

**List any visible signs of blight.**

See stucco comment above.


# BISMARCK STOREFRONT REDESIGN

214 MAIN AVE
BISMARCK ND 58501

Cole Johnson
Architect
701-224-7313
Cole.Johnson@EAPC.net

EAPC

Architecture | Engineering | Industrial
Wind Energy | Interior Design | Construction

TELE **701.258.3116** FAX **701.223.7983**
116 W Main Ave, Suite A, Bismarck ND 58501

Grand Forks ND
Williston ND
Bemidji MN

Fargo ND
Minot ND
Buenos Aires ARG

Bismarck ND
Norwich VT

www.eapc.net

# PROJECT DESCRIPTION

The project consists of removing various elements from the building and installing upgraded elements.

The exterior brick is currently painted which is chipping off. The intent is to use a chemical stripping agent to remove the paint without damaging the brick.

Below the windows, metal panels which have been painted have been installed. These will be removed and replace with fiber cement panels with PVC trim work.

Between the individual storefronts, similar metal panel has been installed. These will be removed down to the brick and restored.

Currently there is an aluminum canopy with tie-back supports. This canopy will be removed, including tie-backs and any associated hardware.

Previously, the clerestory glazing was removed and infilled with framing, sheathing and metal panel cladding. This is to be removed and a clerestory glazing is to be installed.

The current entrance doors are non insulated glass. These doors will be replaced with insulated glass doors.

The walling coping/cap of the existing brick walls is a brick row lock course. A new prefinished metal wall coping is to be installed over this.

Existing signage is to be removed. New lit signage brackets are to be installed as shown. Above the windows, new sign lighting is to be installed. The wiring for these lights are to be concealed in a wire moulding, painted to match brick.

The east wall is currently a stucco finish over mix of clay tile and brick back up. The stucco is chipping and falling off in areas. The intent is to repair this stucco wall and repaint.

# PROJECT SPEC

**Brick Paint Stripper:**
Use a chemical paint stripper compatible with brick. Test on a spot prior to applying to entire building.
Suggested Products, or Similar:

1. Sure Klean Heavy Duty Paint Stripper (ProSoCo, Inc.)
2. Sure Klean 859 Stripper (ProSoCo, Inc.)
3. Blok-Guard & Graffiti Control II (ProSoCo, Inc.)
4. Envirestrip Paint Remover (Diedrich Technologies)
5. 505 Special Coatings Stripper (Diedrich Technologies)
6. 606, 606X Caustic Multi-layer Paint Remove (Diedrich Technologies)
7. Heavy Duty Paint Remover (Hydroclean)
8. Peel Away 1,2 (Dumond Chemicals, Inc.)

**Fiber-Cement Panels:**
James Hardie, HardiePanel Vertical Siding, Smooth, Color to be selected by Architect

**Trim Boards:**
PVC Trim Moulding Boards. Painted to Match HardieBoard, Profile to be selected by Architect.

**Clerestory Glazing:**
Aluminum, Fully Broken System with Muntin Grid Applied to Exterior of Glass. Clear Anodized
Suggested Products, or Similar:

1. Kawneer 451T Storefront (Tubelite, EFCO, others are acceptable)

**Entrance Doors:**
By same manufacturere of Clerestory Glazing. With 1" Insulated Glass

**Wall Cap/Coping:**
Prefinished Metal Coping, In Profiles Shown on Drawings, Color to be Selected By Architect.

**Sign Brackets:**
Basis of Design, or Similar:
'Sign Bracket Store' 36" Palisades Lighted Sign Bracket

**Sign Lighting:**
Goose Neck Light Fixtures, Finish to be Selected by Architect. Open to manufacturer suggestions.

**Thin Brick System:**
Hebron Brick, 'Brick Lite' Thin Brick, Color to be selected from Hebron's Thin Brick Line
System Assembly (Thick Set):

1. Water Resistive Barrier With Drainage Mat Layer (Can Be Separate Components)
2. Metal Lath
3. Scratch Coat
4. Bond Coat
5. Thin Brick

Corners to be factory formed corner pieces.

**Misc. Items**
For demo work, remove all associated hardware and materials related to the demo items.
For new clerestory storefront, the construction of the infill is unknown. Assume some blocking and patching of gyp.

# PROJECT OVERVIEW/ SPECIFICATION

EAPC

Architecture | Engineering | Industrial
Wind Energy | Interior Design | Construction

TELE 701.258.3116 FAX 701.223.7983
116 W Main Ave, Suite A, Bismarck ND 58501

Grand Forks ND
Williston ND
Bemidji MN

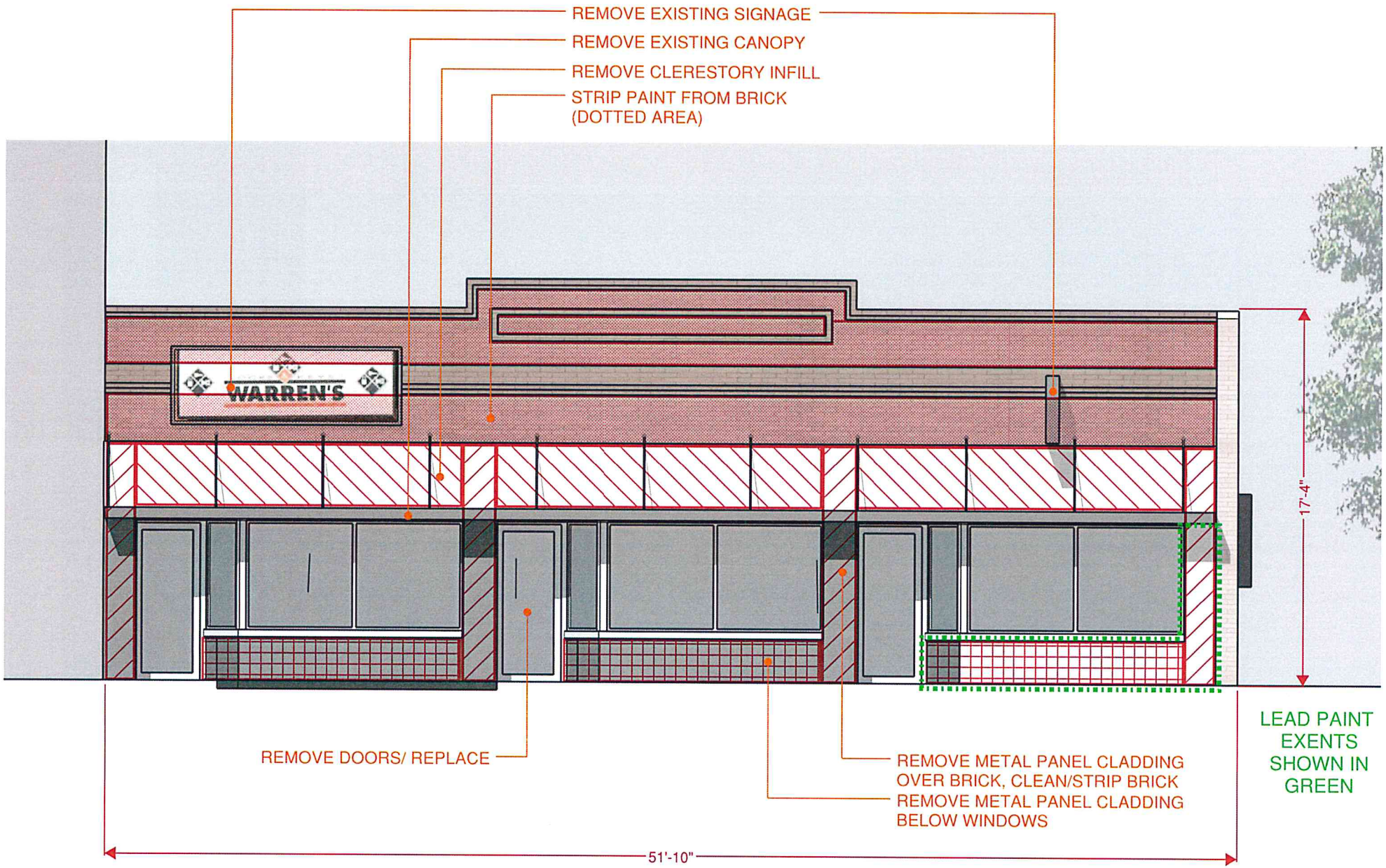
Fargo ND
Minot ND
Buenos Aires ARG

Bismarck ND
Norwich VT

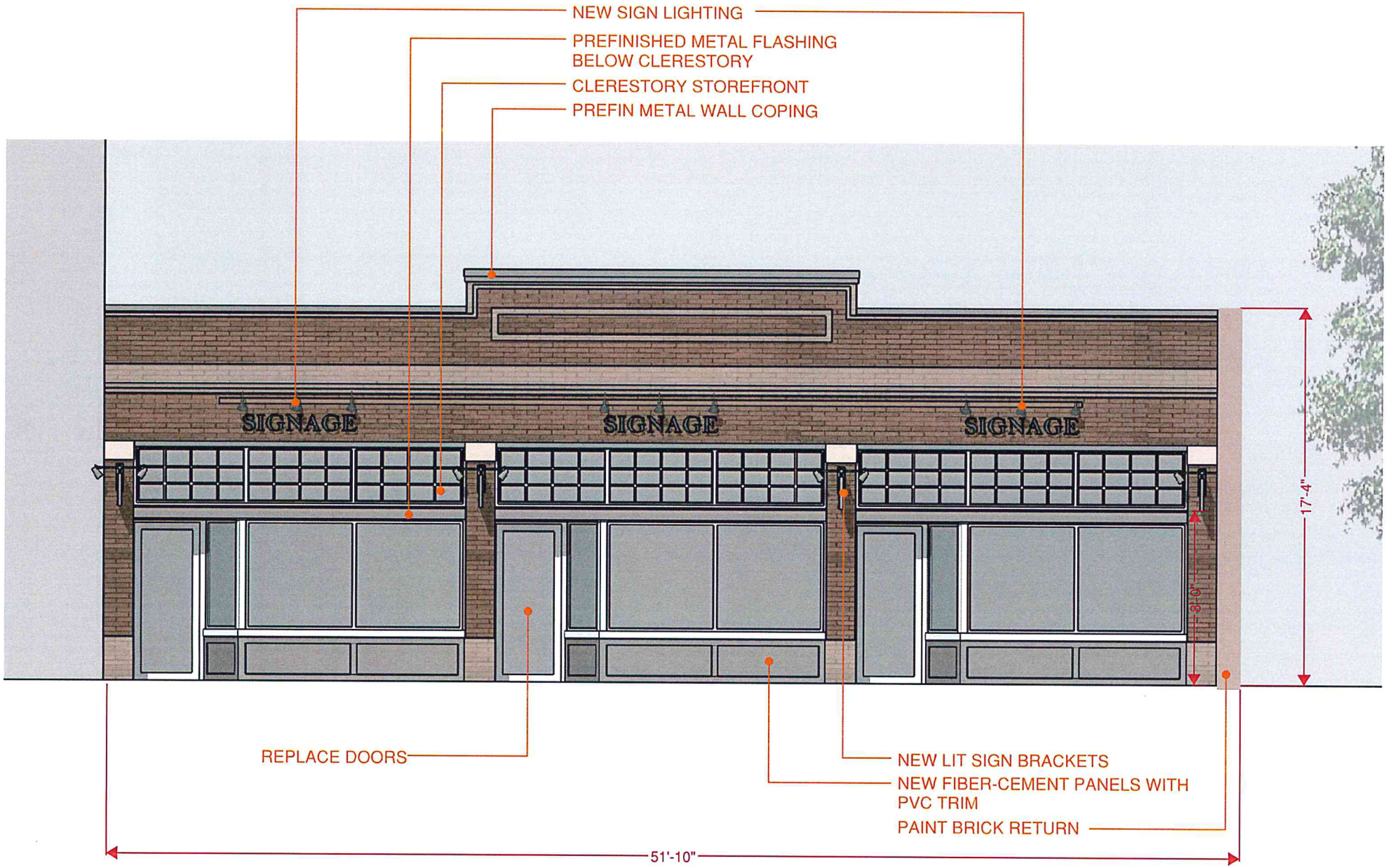
www.eapc.net


# XISTING BUILDING NOTES

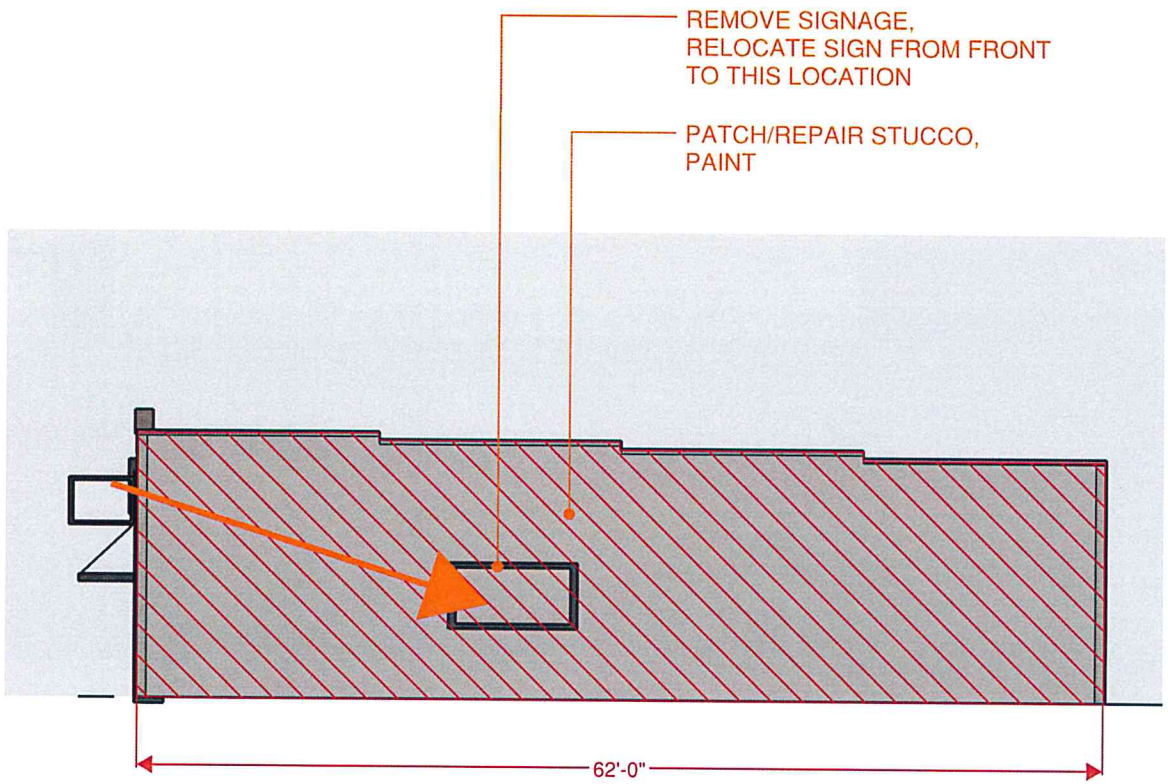

# EW CONSTRUCTION NOTES



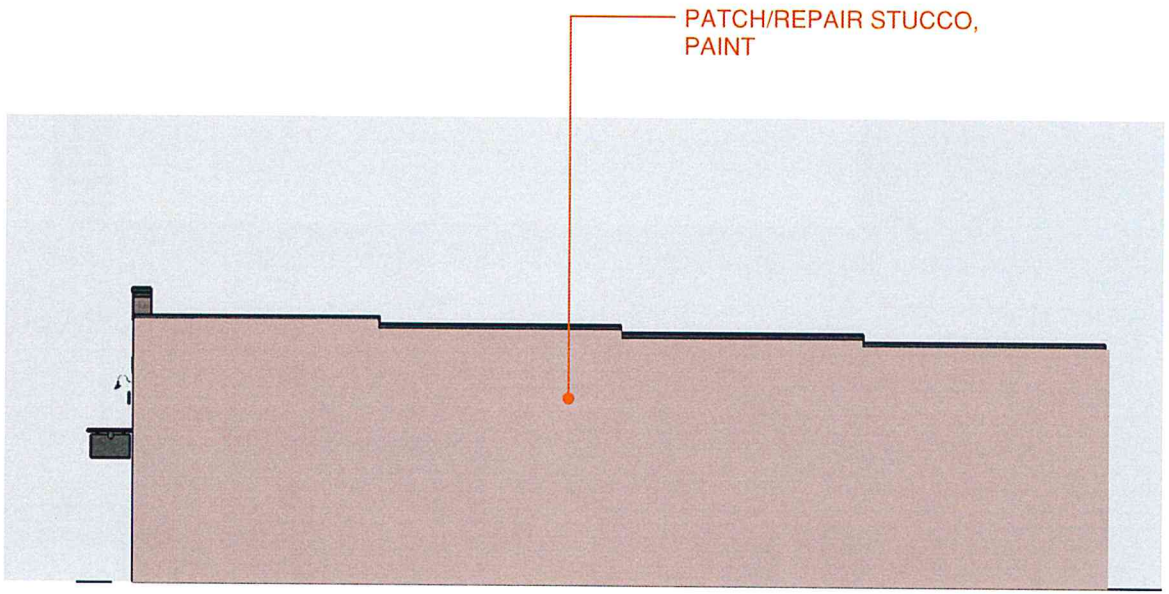

RONT ELEVATION DEMO 1/4"=1'-0"




RONT ELEVATION NEW 1/4"=1'-0"




IDE ELEVATION EXISTING 1/8"=1'-0"




IDE ELEVATION NEW 1/8"=1'-0"


WARREN'S
RHYTHM RECORDS
MUSIC CAFE
CDs / Records
Coffee / Tea
Clothes
Turntables
Coming
Soon


RHYTHM RECORDS
MUSIC CAFE
Coffee / Tea
Turntables
212
WARREN'S
MONEY BAGS
PAYDAY LOANS
Coming Soon


B.P.O.E.
WARREN'S
MONEY BAGS
PAYDAY LOANS
Coming Soon
PATCH/REPAIR STUCCO
REMOVE PANELS


ROCKS IN YOUR HEAD MUSIC STORE
COMING SOON
STELLAS
DECOR GIFTS
PRIVATE PARKING

**DAKOTA WEST CONTRACTING, INC.**
**GENERAL CONSTRUCTION**
PHONE (701) 255-0004 FAX (701) 255-7626
P.O. BOX 2377
BISMARCK, ND 58502



# PROPOSAL

TO

*EAPC*
Attn Cole

| PHONE | DATE |
|---|---|
| | 6/14/2016 |
| **JOB NAME/LOCATION** | |
| 214 Main Ave.<br>Bismarck ND | |
| **JOB NUMBER** | **JOB PHONE** |
| | |

We hereby submit specifications and estimates for:

| | |
|---|---|
| General Conditions | **$2,400.00** |
| Demolition | **$2,429.00** |
| General Carpentry for clearstory openings, int. finishes and painting | **$5,060.00** |
| Cement board and trim | **$4,079.00** |
| Masonry - sand blast and restore | **$14,781.00** |
| Stucco and coating of east wall | **$9,200.00** |
| Aluminum entrances and clearstory windows | **$18,172.00** |
| Roof edge metal | **$3,950.00** |
| Electrical with sign brackets | **$11,400.00** |
| Caulking allowance | **$550.00** |
| Contingency | **$3,500.00** |
| Lead Paint abatement. | **$450.00** |

Exclusions: Asbestoes or lead paint removal or testing. Temp utilities, any hidden structural deficencies, signage, Heat and shelter, handicap operators

**We Propose** hereby to furnish material and labor – complete in accordance with the above specifications, for the sum of: 75,971.00 dollars ($ ).

**Payment will be made as follows:**
Work Progress Payments Due 30 Days After Billing.

**All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Property owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Worker's Compensation Insurance.**

Authorized Signature Mark Kuhn

Note: This proposal may be withdrawn by us if not accepted within 60 days.

**Acceptance of Proposal** - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature _____

Date of Acceptance: _____

Signature _____

Professional Contractors Inc.

1131 Airport Road
Bismarck, ND 58504
Phone (701) 223-7072
Fax (701) 223-7083

June 7, 2016

Cole Johnson
EAPC
116 W Main Ave
Bismarck ND 58501

**Re: Bismarck Store Front Redesign (Revised)**
**214 Main Avenue**
**Bismarck, ND 58501**

Dear Tom:

This proposal is to remodel the store front as per drawings and e-mail sent April 13, 2016.
The following is the breakdown and total cost as requested:

| | | |
|---|---|---|
| 1) | General requirements | $ 3,800 |
| 2) | Demolition | $ 8,450 |
| 3) | Carpentry/cement board siding | $ 3,200 |
| 4) | Masonry | $ 11,900 |
| 5) | Aluminum doors/windows | $ 19,300 |
| 6) | Roof cap flashing/blocking | $ 5,800 |
| 7) | Electrical | $ 9,850 |
| 8) | Stucco east wall | $ 9,300 |
| | Total Cost | $ 71,600 |

Excludes:
1) Interior finishes
2) Building signature

We can start the project any time and construction would take approximately 6 weeks after final shop drawings/material colors selected.

Alt. #1 – upgrade goose neck lites to LED ADD $ 3,300

Feel free to contact me for any questions.

Sincerely,

Dave Reis

# ENGINEERING DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Gabe Schell, PE | City Engineer

**ITEM:** Street Improvement District No. SI 15-491 – Unit #1

## REQUEST

Request approval of Contract Change Order No. 14.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

Street Improvement District SI 15-491 is a hard surface pavement replacement and water main replacement project. Change Order 14 includes costs for work by others not included in the original project budget. This additional work includes the chip seal and was completed by city public works staff. The total cost of the work by others is $122,885.50.

This change order along with previous change orders represents an increase in 4.49% of the original contract amount and was covered in the project budget under the 10% contingency.

## RECOMMENDED CITY COMMISSION ACTION

Consider request approving Contract Change Order No. 14.

## STAFF CONTACT INFORMATION

Gabe Schell, PE
gschell@bismarcknd.gov
701-355-1505

# CONTRACT CHANGE ORDER FORM

## DEPARTMENT

Contract between the City of Bismarck and Mariner Construction, Inc

Contract Number: 15-27 Change Order Number: 14

Project/Subproject: SI-491 Original Contract Amt: $5,571,232.06

Project Description: Street Improvement District No. 15-491

Previous Contract Amount: $5,698,406.44

Change Order Amount: $122,885.50

Original Contract Date: 8/01/16 Change in Contract Timeline: N

Within Project Scope: Y Within Project Funding: Y**

**If not within project scope, attach description of change in scope for Board approval.*

***If not within project funding, attach revised Project Budget for Board approval.*

Type of Change Order

_____ Non Design-related Change Order: These change orders include unforeseen conditions, code-related issues, and building inspector changes.

_____ Design-related Change Order: These change orders include unforeseen conditions that affect the appearance, layout, functionality, dimensions, and/or quality of the project.

_____ Emergency Field Condition Change Orders: These change orders include any condition that causes an emergency situation where safety or other immediate losses may occur.

__X___ Other: Work by others, including Public Works and City Survey Department

Project Manager Signature: (<$15,000) _____
Date

Department Head Signature:(<$25,000) _____
Date

## ADMINISTRATION

City Administrator Signature: (<$50,000) _____
Date

Add to Commission Consent Agenda

## COMMISSION APPROVAL

Commission Approval Date: _____

Attach minutes for Commission Approval

## FISCAL

Comments: _____
Signature Date Completed

**TO ALL DEPARTMENTS:** Please attach a copy of the change order

Bismarck

# ENGINEERING DEPARTMENT

**DATE:** September 20, 2016

**FROM:** Gabe Schell, PE | City Engineer

**ITEM:** Consultant Agreement

## REQUEST

Approval of consultant services with Short Elliot Hendrickson, Inc. relating to the geotechnical evaluation of the East Century Avenue bridge approaches.

Please place this item on the September 27, 2016 City Commission meeting.

## BACKGROUND INFORMATION

This project will involve a field investigation of the settlement of the East Century Avenue bridge mechanically stabilized earth (MSE) wall system. These services will include site survey, soil borings and laboratory testing, instrumentation and monitoring and a field investigation report. The full contract is attached. Contract is hourly not to exceed $267,088. Additional testing and evaluation may be deemed necessary upon initial results. Design and construction phases may be added by amendment to this contract at a future date with Board approval.

**Project Schedule**

| | |
|---|---|
| Contract Approval: | September 27, 2016 |
| Field Work and Monitoring | Fall 2016 - Fall 2017 |
| Investigation Report and Presentation to City Commission | Fall 2017 |

## RECOMMENDED CITY COMMISSION ACTION

Approval of the attached Consultant Agreement.

## STAFF CONTACT INFORMATION

Gabe Schell
gschell@bismarcknd.gov
701-355-1505

cc: Jeff Heintz, Director of Service Operations
Sheila Hillman, Director of Finance

# CONTRACT REVIEW

## ENGINEERING DEPARTMENT

Contract between the City of Bismarck and Short Elliott Hendrickson Inc

Purpose of Contract: Geotechnical Evaluation of E Century Ave Bridge Approach Embankments

Contract Amount: $ 267,088

Contract Period: 9/27/16 thru Spring 2018

Funding Source: HC Funding, Citymoney only

Federal Project Number (if applicable): N/A

City Project Number: HC15-104

Comments: SEH listed Keith Hunke as Client's Authorized Representative. Gabe Schell can be listed if that is preferable.

*After Mayor's signature, route to:* Tom Kary

Department Signature: [signature] 9/20/16
Date

SEH incorporated requested changes as "revision to general conditions" on supplemental letter agreement

## CITY ATTORNEY

Comments: OK

City Attorney Signature: [signature] 9-26-16
Date

## FISCAL

Comments: 2015 CIP $500K ST ok

Director of Finance Signature: [signature] 9-26-16
Date

## APPROVAL

City Administrator Signature: [signature] 9-26-16
Date

# Master Agreement for Professional Services

This Master Agreement for Professional Services is effective as of September 27, 2016 between City of Bismarck, ND ("Client") and Short Elliott Hendrickson Inc. ("Consultant").

By entering into this Agreement, Client agrees to utilize the professional services of Consultant and Consultant agrees to provide the professional services described in this Agreement, exhibits or attachments. The attached General Conditions of the Agreement for Professional Services (General Conditions Rev. 07.14.16) shall apply to all work performed by Consultant on behalf of Client. Individual projects requested by Client on an as needed basis and accepted by Consultant will be described in Supplemental Letter Agreements ("SLA") with other optional exhibits and attachments cited. Nothing herein shall be deemed to require Client to retain Consultant or require Consultant to provide services beyond those specified in Supplemental Letter Agreements.

This Master Agreement for Professional Services, General Conditions, Exhibits, and Attachments to Exhibits (collectively referred to as the "Agreement") represent the entire understanding between Client and Consultant and supersedes all prior contemporaneous oral or written agreements with respect to the services to be provided by Consultant hereunder. In the event of a conflict between the documents, this document and the attached General Conditions shall take precedence over all Exhibits unless alternate terms have been specifically agreed to on the SLA under "Other Terms and Conditions". The SLA shall take precedence over Exhibits. This Agreement may not be amended except by written agreement signed by the authorized representatives of each party.

| **Short Elliott Hendrickson Inc.** | **City of Bismarck, ND** |
|---|---|
| By: Robert L. Ellis | By: _____ |
| Title: Principal | Title: _____ |

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## Supplemental Letter Agreement

In accordance with the Master Agreement for Professional Services between City of Bismarck, North Dakota ("Client"), and Short Elliott Hendrickson Inc. ("Consultant"), effective September 27, 2016, this Supplemental Letter Agreement dated September 27, 2016 authorizes and describes the scope, schedule, and payment conditions for Consultant's work on the Project described as: Geotechnical Evaluation of E. Century Ave. Bridge Approach Embankments.

**Client's Authorized Representative:** Keith Hunke, City Administrator
**Address:** 221 N. Fifth Street
Bismarck, ND 58506
**Telephone:** 701.355.1300 **email:** khunke@bismarcknd.gov

**Project Manager:** Ronald B. Farmer, P.E.
**Address:** 3535 Vadnais Center Drive
Saint Paul, MN 55110
**Telephone:** 651.490.2139 **email:** rfarmer@sehinc.com

**Scope:** The Basic Services to be provided by Consultant:

The Scope of Services is Exhibit A-2 to this Supplemental Letter Agreement.

**Schedule:** Work to begin approximately two weeks after receipt of notice-to-proceed and will extend for approximately 12 months thereafter.

**Payment:**

The fee is hourly and estimated to be $267,088 including expenses and equipment as shown in Exhibit A-4.

Invoices will be submitted in accordance with Exhibit A-1. A schedule of SEH expenses is included in Exhibit A-3.

**Other Terms and Conditions:**
Revise "General Conditions" as follows:

1) Replace Section IV, Paragraph C.1. with the following:

*C. Limitations on Consultant's Liability.*

*1. To the fullest extent permitted by law, and notwithstanding any other provision of this Agreement, the total liability, in the aggregate, of Consultant and Consultant's officers, directors, partners, employees, agents, and Consultant's consultants, and any of them, to Client and anyone claiming by, through, or under Client for any and all claims, losses, costs, or damages whatsoever arising out of, resulting from or in any way related to the Agreement or any Work Order hereunder from any cause or causes, including but not limited to the negligence, professional errors or omissions, strict liability or breach of contract, or warranty express or implied of Consultant or Consultant's officers, directors, partners, employees, agents, or Consultant's consultants, or any of them, shall not exceed Consultant's liability insurance coverage under Section C.4. available at the time of settlement or judgment.*

2) Add Paragraph C.4. to Section IV as follows:

*C.4. Insurance. Consultant will purchase and maintain such insurance as is appropriate for the Services being performed and furnished. The insurance required by this Paragraph C. shall include the specific coverage and be written for not less than the limits of liability and coverage as hereinafter provided, or required by law, whichever is greater.*

| | |
|---|---|
| *Workers Compensation:* | *Statutory Limits* |
| *Comm. Gen. Liability:* | *$1,000,000 per occurrence, $2,000,000 general aggregate* |
| *Prof. Errors and Omissions* | *$1,000,000 per claim, $2,000,000 general aggregate* |

3) Replace the entirety of Section VI – "Intellectual Property" with the following:

Section VI – Intellectual Property

A) ***CLIENT USE OF DOCUMENTS.*** *Consultant and Client shall retain an ownership and property interest in all documents created pursuant to this Agreement and any Work Order hereunder (including the right of reuse by Consultant at the discretion of Consultant) whether or not the Project is completed. Client may make and retain copies of Service related documents for information and reference in connection with use on the subject project by Client and others. Such Documents are not intended or represented to be suitable for reuse by Client or others on extensions of the subject project or on any other project. Any such reuse or modification without written verification or adaptation by Consultant, as appropriate for the specific purpose intended, will be at Client's sole risk and without liability or legal exposure to Consultant, Consultant officers, directors, partners, employees, agents, or Consultant consultants. Client shall indemnify and hold harmless Consultant, Consultant officers, directors, partners, employees, agents, and Consultant consultants from all claims, damages, losses, and expenses, including attorneys' fees arising out of or resulting there from. Any verification or adaptation of the Documents for extensions of the subject project or for any other project will entitle Consultant to further compensation at rates to be agreed upon by Client*

| **Short Elliott Hendrickson Inc.** | **City of Bismarck, North Dakota** |
|---|---|
| By: Robert L. Ellis | By: _____ |
| Title: Principal | Title: _____ |

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# General Conditions of the Agreement for Professional Services

## SECTION I – SERVICES OF CONSULTANT

### A. General

1. Consultant agrees to perform professional services as set forth in the Agreement for Professional Services or Supplemental Letter Agreement ("Basic Services"). Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of a third party against either the Client or the Consultant. The Consultant's services under this Agreement are being performed solely for the Client's benefit, and no other party or entity shall have any claim against the Consultant because of this Agreement or the performance or nonperformance of services hereunder.

### B. Schedule

1. Unless specific periods of time or dates for providing services are specified, Consultant's obligation to render services hereunder will be for a period which may reasonably be required for the completion of said services.
2. If Client has requested changes in the scope, extent, or character of the Project or the services to be provided by Consultant, the time of performance and compensation for Consultant's services shall be adjusted equitably. The Client agrees that Consultant is not responsible for damages arising directly or indirectly from delays beyond Consultant's control. If the delays resulting from such causes increase the cost or the time required by Consultant to perform its services in accordance with professional skill and care, then Consultant shall be entitled to a equitable adjustment in schedule and compensation.

### C. Additional Services

1. If Consultant determines that any services it has been directed or requested to perform are beyond the scope as set forth in the Agreement or that, due to changed conditions or changes in the method or manner of administration of the Project, Consultant's effort required to perform its services under this Agreement exceeds the stated fee for Basic Services, then Consultant shall promptly notify the Client regarding the need for additional services. Upon notification and in the absence of a written objection, Consultant shall be entitled to additional compensation for the additional services, and to an extension of time for completion of additional services absent written objection by Client.
2. Additional services shall be billed in accord with agreed upon rates, or if not addressed, then at Consultant's standard rates.

### D. Suspension and Termination

1. If Consultant's services are delayed or suspended in whole or in part by Client, or if Consultant's services are delayed by actions or inactions of others for more than 60 days through no fault of Consultant, then Consultant shall be entitled to either terminate its agreement upon 7 days written notice or, at its option, accept an equitable adjustment of rates and amounts of compensation provided for elsewhere in this Agreement to reflect reasonable costs incurred by Consultant.
2. This Agreement may be terminated by either party upon seven days written notice should the other party fail substantially to perform in accordance with its terms through no fault of the party initiating the termination.
3. This Agreement may be terminated by either party upon thirty days' written notice without cause. All provisions of this Agreement allocating responsibility or liability between the Client and Consultant shall survive the completion of the services hereunder and/or the termination of this Agreement.
4. In the event of termination, Consultant shall be compensated for services performed prior to termination date, including charges for expenses and equipment costs then due and all termination expenses.

## SECTION II – CLIENT RESPONSIBILITIES

### A. General

1. The Client shall, in proper time and sequence and where appropriate to the Project, at no expense to Consultant, provide full information as to Client's requirements for the services provided by Consultant and access to all public and private lands required for Consultant to perform its services.
2. The Consultant is not a municipal advisor and therefore Client shall provide its own legal, accounting, financial and insurance counseling and other special services as may be required for the Project. Client shall provide to Consultant all data (and professional interpretations thereof) prepared by or services performed by others pertinent to Consultant's services, including but not limited to, previous reports; sub-surface explorations; laboratory tests and inspection of samples; environmental assessment and impact statements, surveys, property descriptions; zoning, deed and other land use restrictions; as-built drawings, electronic data base and maps. The costs associated with correcting, creating or recreating any data that is provided by the Client that contains inaccurate or unusable information shall be the responsibility of the Client.
3. Client shall provide prompt written notice to Consultant whenever the Client observes or otherwise becomes aware of any changes in the Project or any defect in Consultant's services. Client shall promptly examine all studies, reports, sketches, opinions of construction costs, specifications, drawings, proposals, change orders, supplemental agreements and other documents presented by Consultant and render the necessary decisions and instructions so that Consultant may provide services in a timely manner.
4. Client shall require all utilities with facilities within the Client's Project site to locate and mark said utilities upon request, relocate and/or protect said utilities as determined necessary to accommodate work of the Project, submit a schedule of the necessary relocation/protection activities to the Client for review and comply with agreed upon schedule. Consultant shall not be liable for damages which arise out of Consultant's reasonable reliance on the information or services furnished by utilities to Client or others hired by Client.
5. Consultant shall be entitled to rely on the accuracy and completeness of information or services furnished by the Client or others employed by the Client and shall not be liable for damages arising from reasonable reliance on such materials. Consultant shall promptly notify the Client if Consultant discovers that any information or services furnished by the Client is in error or is inadequate for its purpose.

## SECTION III – PAYMENTS

### A. Invoices

1. Undisputed portions of invoices are due and payable within 30 days. Client must notify Consultant in writing of any disputed items within 15 days from receipt of invoice. Amounts due Consultant will be increased at the rate of 1.0% per month (or the maximum rate of interest permitted by law, if less) for invoices 30 days past due. Consultant reserves the right to retain Instruments of Service until all invoices are paid in full. Consultant will not be liable for any claims of loss, delay, or damage by Client for reason of withholding services or Instruments of Service until all invoices are paid in full. Consultant shall be entitled to recover all reasonable costs and disbursements, including reasonable attorney's fees, incurred in connection with collecting amounts owed by Client.
2. Should taxes, fees or costs be imposed, they shall be in addition to Consultant's agreed upon compensation.
3. Notwithstanding anything to the contrary herein, Consultant may pursue collection of past due invoices without the necessity of any mediation proceedings.

## SECTION IV – GENERAL CONSIDERATIONS

### A. Standards of Performance

1. The standard of care for all professional engineering and related services performed or furnished by Consultant under this Agreement will be the care and skill ordinarily exercised by members of Consultant's profession practicing under similar circumstances at the same time and in the same locality. Consultant makes no warranties, express or implied, under this Agreement or otherwise, in connection with its services.
2. Consultant neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform the work in accordance with its construction contract or the construction documents prepared by Consultant. Client acknowledges Consultant will not direct, supervise or control the work of construction contractors or their subcontractors at the site or otherwise. Consultant shall have no authority over or responsibility for the contractor's acts or omissions, nor for its means, methods or procedures of construction. Consultant's services do not include review or evaluation of the Client's, contractor's or subcontractor's safety measures, or job site safety or furnishing or performing any of the Contractor's work.
3. If requested in the scope of a Supplemental Letter Agreement, then Consultant may provide an Opinion of Probable Construction Cost. Consultant's Opinions of Probable Construction Cost provided for herein are to be made on the basis of Consultant's experience and qualifications and represent Consultant's best judgment as a professional generally familiar with the industry. However, since Consultant has no control over the cost of labor, materials, equipment or service furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, Consultant cannot and does not guarantee that proposals, bids or actual construction cost will not vary from Opinions of Construction Cost prepared by Consultant. If Client wishes greater assurance as to probable Construction Cost, Client shall employ an independent cost estimator or negotiate additional services and fees with Consultant.

### B. Indemnity for Environmental Issues

1. Consultant is not a user, generator, handler, operator, arranger, storer, transporter or disposer of hazardous or toxic substances, therefore the Client agrees to hold harmless, indemnify and defend Consultant and Consultant's officers, directors, subconsultant(s), employees and agents from and against any and all claims, losses, damages, liability and costs, including but not limited to costs of defense, arising out of or in any way connected with, the presence, discharge, release, or escape of hazardous or toxic substances, pollutants or contaminants of any kind at the site.

### C. Limitations on Consultant's Liability

1. The Client hereby agrees that to the fullest extent permitted by law, Consultant's total liability to the Client for any and all injuries, claims, losses, expenses, or damages whatsoever arising out of or in any way related to the Project or this Agreement from any cause or causes including, but not limited to, Consultant's negligence, errors, omissions, strict liability, breach of contract or breach of warranty shall not exceed five hundred thousand dollars ($500,000). In the event Client desires limits of liability in excess of those provided in this paragraph, Client shall advise Consultant in writing and agree that Consultant's fee shall increase by 1% for each additional five hundred thousand dollars of liability limits, up to a maximum limit of liability of five million dollars ($5,000,000).
2. Neither Party shall be liable to the other for consequential damages, including, without limitation, lost rentals, increased rental expenses, loss of use, loss of income, lost profit, financing, business and reputation and for loss of management or employee productivity, incurred by one another or their subsidiaries or successors, regardless of whether such damages are foreseeable and are caused by breach of contract, willful misconduct, negligent act or omission, or other wrongful act of either of them.
3. It is intended by the parties to this Agreement that Consultant's services shall not subject Consultant's employees, officers or directors to any personal legal exposure for the risks associated with this Agreement. The Client agrees that as the Client's sole and exclusive remedy, any claim, demand or suit shall be directed and/or asserted only against Consultant, and not against any of Consultant's individual employees, officers or directors, and Client knowingly waives all such claims against Consultant individual employees, officers or directors.

### D. Assignment

1. Neither party to this Agreement shall transfer, sublet or assign any rights under, or interests in, this Agreement or claims based on this Agreement without the prior written consent of the other party. Any assignment in violation of this subsection shall be null and void.

## SECTION V – DISPUTE RESOLUTION

### A. Mediation

1. Any dispute between Client and Consultant arising out of or relating to this Agreement or services provided under this Agreement, (except for unpaid invoices which are governed by Section III), shall be submitted to nonbinding mediation as a precondition to litigation unless the parties mutually agree otherwise. Mediation shall occur within 60 days of a written demand for mediation unless Consultant and Client mutually agree otherwise.

### B. Litigation – Choice of Venue and Jurisdiction

1. Any dispute not settled through mediation shall be settled through litigation in the state where the Project at issue is located.

## SECTION VI – INTELLECTUAL PROPERTY

### A. Proprietary Information

1. All documents, including reports, drawings, calculations, specifications, CADD materials, computers software or hardware or other work product prepared by Consultant pursuant to this Agreement are Consultant's Instruments of Service ("Instruments of Service") and Consultant retains all ownership interests in Instruments of Service, including all available copyrights.
2. Consultant shall retain all of its rights in its proprietary information including, without limitation, its methodologies and methods of analysis, ideas, concepts, expressions, inventions, know how, methods, techniques, skills, knowledge and experience possessed by Consultant prior to, or acquired by Consultant during, the performance of this Agreement and the same shall not be deemed to be Work Product or Work for Hire and Consultant shall not be restricted in any way with respect thereto.

### B. Client Use of Instruments of Service

1. Provided that Consultant has been paid in full for its services, Client shall have the right in the form of a license to use Instruments of Service resulting from Consultant's efforts on the Project. Consultant shall retain full rights to electronic data and the drawings, specifications, including those in electronic form, prepared by Consultant and its subconsultants and the right to reuse component information contained in them in the normal course of Consultant's professional activities. Consultant shall be deemed to be the author of such Instruments of Service, electronic data or documents, and shall be given appropriate credit in any public display of such Instruments of Service.
2. Records requests or requests for additional copies of Instruments of Services outside of the scope of services are available to Client subject to Consultant's current rate schedule.

### C. Reuse of Documents

1. All Instruments of Service prepared by Consultant pursuant to this Agreement are not intended or represented to be suitable for reuse by the Client or others on extensions of the Project or on any other Project. Any reuse of the Instruments of Service without written consent or adaptation by Consultant for the specific purpose intended will be at the Client's sole risk and without liability or legal exposure to Consultant; and the Client shall release Consultant from all claims arising from such use. Client shall also defend, indemnify and hold harmless Consultant from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from reuse of Consultant documents without written consent.

**Exhibit A-1**
**to Supplemental Letter Agreement**
**Between City of Bismarck, ND (Client)**
**and**
**Short Elliott Hendrickson Inc. (Consultant)**
**Dated September 27, 2016**

## Payments to Consultant for Services and Expenses Using the Hourly Basis Option

The Agreement for Professional Services is amended and supplemented to include the following agreement of the parties:

### A. Hourly Basis Option

The Client and Consultant select the hourly basis for payment for services provided by Consultant. Consultant billing will be at employee hourly salary times a multiplier of 3.1. Consultant shall be compensated monthly. Monthly charges for services shall be based on Consultant's current billing rates for applicable employees plus charges for expenses and equipment.

Consultant will provide an estimate of the costs for services in this Agreement. It is agreed that after 90% of the estimated compensation has been earned and if it appears that completion of the services cannot be accomplished within the remaining 10% of the estimated compensation, Consultant will notify the Client and confer with representatives of the Client to determine the basis for completing the work.

Compensation to Consultant based on the rates is conditioned on completion of the work within the effective period of the rates. Should the time required to complete the work be extended beyond this period, the rates shall be appropriately adjusted.

### B. Expenses

The following items involve expenditures made by Consultant employees or professional consultants on behalf of the Client. Their costs are not included in the hourly charges made for services and shall be paid for as described in this Agreement but instead are reimbursable expenses required in addition to hourly charges for services:

1. Transportation and travel expenses.
2. Lodging and meal expense connected with the Project.
3. Fees paid, in the name of the Client, for securing approval of authorities having jurisdiction over the Project.
4. Plots, Reports, plan and specification reproduction expenses.
5. Postage, handling and delivery.
6. Expense of overtime work requiring higher than regular rates, if authorized in advance by the Client.
7. Renderings, models, mock-ups, professional photography, and presentation materials requested by the Client.
8. All taxes levied on professional services and on reimbursable expenses.
9. Other special expenses required in connection with the Project.
10. The cost of special consultants or technical services as required. The cost of subconsultant services shall include actual expenditure plus 0% markup for the cost of administration and insurance.

The Client shall pay Consultant monthly for expenses.

### C. Equipment Utilization

The utilization of specialized equipment, including automation equipment, is recognized as benefiting the Client. The Client, therefore, agrees to pay the cost for the use of such specialized equipment on the project at the rate of $3 per invoiced SEH employee hour.

Survey equipment rates are listed in Exhibit A-3.

The Client shall pay Consultant monthly for equipment utilization.

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**Exhibit A-2**

**East Century Bridge Approaches Geotechnical Evaluation**

Scope of Services Attachment to Supplemental Letter Agreement (Rev. 1)

SEH, AET or a combination of the two firms will perform the services listed below.

Phase 1 – Discovery and Work Plan Formulation

Based on initial site visits, review of the MSE wall shop drawings, the MSE wall design documents, the Preliminary Braun Geotechnical Report, and the 2015 SRF Field Investigation Report for Bridge BISM03, a general work plan has been developed by SEH and AET. The general work plan was presented to City Staff at a meeting conducted in Bismarck on August 29, 2016 and has been revised after the original cost submittal of September 1, 2016. Additional Discovery and Work Plan Formulation tasks are as follows:

1) Review the Final Braun Geotechnical Report dated May 22, 2006,
2) Review plan sheets, record drawings and construction specifications for the approaches,
3) Review surcharge/preload settlement data collected during construction,
4) Initial site visit has been deleted due to previous visits by geotechnical and survey staff members. Structural engineer will not visit the site and will not evaluate the MSE wall system.
5) Finalize soil boring and lab testing work plan,
6) Finalize field instrumentation work plan,
7) Finalize field surveying work plan, and
8) Perform Project Management tasks for this Phase and Project set up.

Phase 2 – Field Investigation

This phase has been subdivided into four sub-phases.

Phase 2a – Site Survey

1) Establish Control,
2) Install 13 targets (reflectors) on approach MSE wall panels and/or moment slab walls, (targets will generally be placed on wall panels and/or moment slab walls associated with locations of electronic monitoring devices).
3) Complete a topographic survey of the approach embankments and MSE walls, including 100 feet on both sides (north and south).
    a. Prepare plan view with topo
    b. Prepare cross sections @ 25-foot intervals
4) Perform Project Management tasks for this sub-phase.

Phase 2b – Soil Borings and Laboratory Testing

1) Plan Soil Boring and Laboratory Testing Program. These programs have been planned and include:
    a. Four, approximately 20-foot deep, standard penetration test (SPT) soil borings (one in each approach embankment quadrant; NE, SE, NW, SW) near the toe of the MSE walls. Four off-set borings (approximately 5 feet away from the SPT borings) to obtain undisturbed samples of cohesive soils for potential future consolidation and shear strength laboratory testing. Consolidation and shear strength testing is not included in the budget.

b. Two, approximately 60-foot deep, SPT borings on Century Avenue (one on each approach embankment, near the centerline) have been eliminated from the scope of work.
c. Cone Penetration Tests
    i. Two 60-foot CPT's through the roadway, within approximately 5 feet of the 60-foot deep borings have been eliminated from the scope of work.
    ii. A minimum of four CPT's near the SPT soil borings at the MSE wall toe(s) have been eliminated from the scope of work along with other CPT's along the MSE wall toe(s).
    iii. AET will prepare a factual report summarizing drilling and testing activities; and presenting boring logs, and laboratory classification test results.
d. Laboratory Testing
    i. AET
        1. Classification of SPT soil samples delivered to the lab.
        2. Preparation of soil boring logs.
        3. Water content tests on cohesive soil samples.
        4. Four grain-size tests on selected soil samples have been eliminated from the scope of work.
        5. Extrude and classify undisturbed samples.
        6. Four consolidated-undrained triaxial compression test series with pore-water pressure measurements have been eliminated from the scope of work. (Three individual tests per series)
        7. Twenty single point unconsolidated-undrained triaxial compression tests have been eliminated from the scope of work.
        8. Four consolidation tests have been eliminated from the scope of work.
        9. Ten Atterberg Limits tests have been eliminated from the scope of work.
        10. Four Organic content tests.
        11. Four specific gravity tests have been eliminated from the scope of work.

2) Survey soil boring locations (by SEH survey crew).
3) SEH Geotechnical staff will answer driller's questions during soil borings and CPT testing.
4) SEH Geotechnical staff will review SPT soil samples in AET's laboratory.
5) SEH Geotechnical staff will review undisturbed samples in AET's laboratory.
6) SEH Geotechnical staff will not assign laboratory tests on selected samples. (AET will automatically perform water content tests on cohesive SPT samples and assign four organic content tests on selected samples.)
7) SEH and AET Geotechnical staff will review laboratory test results for completeness and reasonability.
8) SEH Geotechnical staff will not determine soil parameters for MSE wall analysis. MSE wall analysis has been eliminated from the scope of work.
9) Perform Project Management tasks for this sub-phase of the work.
10) Note: Borings and laboratory tests are for geo-structural purposes. No environmental borings or testing will be conducted.

**Exhibit A-2**

**East Century Bridge Approaches Geotechnical Evaluation**

Scope of Services Attachment to Supplemental Letter Agreement (Rev. 1)

Phase 2c – Instrumentation

1) The instrumentation program has been finalized as summarized below.
2) Order and Purchase Instrumentation and peripherals.
3) Install survey reflectors (See sub-Phase 2a).
4) Manual crack gages (have been eliminated from the scope or work).
5) Install Shape Accel Arrays.
    a. Install one shape accel array line beneath the both the east and west approach embankments (in cross section) to measure embankment settlement along the lines. Each line will consist of two arrays, overlapped at the center, for ease of handling and installation.
        i. One side will consist of two SEH-owned arrays that will be removed upon completion of the project. A one-time fee of $2000 will be invoiced for use of the arrays.
        ii. The other side will consist of two arrays purchased for this project and invoiced to the City.
6) Install eight electronic crack gages to measure crack width changes has been eliminated from the scope of work.
7) Install four electronic Tilt Meters to measure wall panel tilt changes has been eliminated from the scope of work.
8) Install two slope inclinometer casings in front of the MSE walls to measure below-grade lateral soil movement. (The slope inclinometers are not electronic sensors.) Locations to be determined based on conditions encountered in the soil borings.
9) Set up an electronic earth station to monitor shape array data and transmit the data to AET's office in St. Paul, MN. Read-only access to data plots will be provided to City staff after the data has been reviewed and plotted.
10) SmartConnect™ will not be used on this project because there is are no manual gages being used and/or monitored and, therefore, there is no necessity to view any such data/information. Survey shots on reflectors will be summarized in tables and forwarded to City staff.
11) The 13 reflectors will be shot 4 times (each) over the course of monitoring, as a check, when electronic instruments indicate significant movement has occurred.
12) The two slope inclinometers will be read by SEH staff once a month for the first three months and quarterly thereafter for the course of a year total. Data will be transmitted electronically to AET. AET will prepare summary plots of the data within one week after each set of readings.
13) Two digital level reading events, similar to the SRF reading published in the 2015 Inspection Report, will not be conducted and have been eliminated from the scope of work.
14) Electronic instrumentation data will include monthly assessments by AET and SEH Geotechnical Staff. Any disturbing trends will be noted immediately and communicated to City Staff.
15) Quarterly instrumentation summary reports, with an assessment of implications, will be prepared by AET and SEH Geotechnical Staff. Reports will be transmitted electronically to City Staff. (Hard copies are not included.)
16) Perform Project Management tasks for this sub-phase of the work.

**Exhibit A-2**

**East Century Bridge Approaches Geotechnical Evaluation**

Scope of Services Attachment to Supplemental Letter Agreement (Rev. 1)

Phase 2d – Field Investigation Report

1) MSE wall internal stability performed on two wall cross sections has been eliminated from the scope of work.
2) MSE wall settlement analysis performed on two wall cross sections has been eliminated from the scope of work.
3) MSE wall global stability analysis performed on two wall cross sections has been eliminated from the scope of work.
4) Electronic instrumentation data will be summarized and synthesized within the report text.
5) Manual data (reflector survey) will be summarized and synthesized within the report text.
6) A potential site remediation and repair alternative has been eliminated from the scope of work.
7) A Draft FIR will be prepared that includes:
    a. A copy of the surveyed plan view (11"x17") and cross section sheets.
    b. A factual report (as an appendix) summarizing the results of the soil boring and laboratory testing program along with logs of soil borings, along with implications from the information.
    c. Electronic instrumentation data with implications from that data.
    d. Summaries of the MSE wall Analyses with implications from those analyses have been eliminated from the scope of work.
    e. A recommended MSE wall settlement/movement remediation approach with an engineer's opinion of probably cost has been eliminated from the scope of work.
    f. One electronic and 8 hard copies will be provided.
8) Respond to City comments on the Draft FIR.
9) Prepare a Final FIR.
    a. One electronic and 15 hard copies will be provided.
10) Present the Final FIR to the City Commission at a Commission meeting.
    a. SEH/AET attendees will include:
        i. SEH geotechnical engineer
        ii. AET geotechnical engineer
        iii. SEH structural engineer has been eliminated from the meeting.
        iv. SEH Bismarck Office Manager
11) Perform Project Management tasks for this sub-phase of the work.

# SEH Schedule of Expenses – 2016 Exhibit A-3

### Vehicle Mileage Rates

$0.54/mile

### Vehicle Allowance Costs

Resident Project Representative ..... $13.00/day
Survey and Field Vehicle ..... $4.50/hour + $0.54/mile

### Survey Equipment

Robotic Total Station ..... $25.00/hour
Global Positioning System (GPS) ..... $25.00/hour

### Computer Equipment

Computer Charges per Direct Hour of Labor ..... $3.00/hour

### Other Equipment Expenses

SEH uses many different types of equipment, such as traffic counters; flow meters; air, water, and soil sampling kits; inspection cameras; density meters; and many others. Our equipment is frequently upgraded to utilize current technology. You will be charged for equipment usage per your agreement with SEH.

Rates are subject to change.

## Identifiable Reproduction and Reprographic Costs – 2016

| Item | | 8½x11 | 11x17 | Large Format | Per Item |
|---|---|---|---|---|---|
| Black/White Copy (3) | | 0.07 | 0.24 | 0.95 + 0.50/sq. ft. | |
| Color Copy (3) | | 0.46 | 1.02 | 0.95 + 2.55/sq. ft. | |
| Mylar | | | | 5.00 | |
| CD Copy | | | | | 3.00 |
| Lamination | | 2.00 | 3.50 | 3.50/sq. ft. | |
| Laminated Foamcore<br>– up to 30"x 42"<br>– larger than 40"x 60" | | | | <br>40.00<br>75.00 | |
| 3-Ring Binder | *size* | 1" | 2" | 3" | 4" |
| | *cost* | 3.20 | 4.80 | 5.60 | 7.24 |
| Machine Folding | | | | | 0.02 |
| Binding<br>– wire<br>– comb | | | | | <br>3.60<br>3.20 |
| Covers<br>– custom<br>– blank | | | | | <br>0.15<br>0.03 |
| Tabs (white) | | | | | 0.20 |
| Mailing/Processing | | | | | UPS or USPS rates |

(1) prices include operator time
(2) prices denote single-sided printing
(3) standard stock, white paper used for pricing

Prices are subject to change and may not be accompanied by immediate notification.

SEH

**Basic Component:** **SUMMARY** Exhibit A-4

**Deliverables:**

| | Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Phase 1 - Discovery & Work Plan Formulation | 4 | 27 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 15 |
| 2 | Phase 2a - Site Survey | 11 | 4 | 0 | 0 | 0 | 20 | 0 | 3 | 0 | 35 | 36 | 0 |
| 3 | Phase 2b - Soil Borings & Lab Testing | 2 | 8 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 4 | 0 |
| 4 | Phase 2c - Instrumentation | 20 | 55 | 0 | 0 | 0 | 44 | 0 | 2 | 0 | 39 | 68 | 12 |
| 5 | Phase 2d - Field Investigation Report (FIR) | 14 | 51 | 10 | 0 | 0 | 18 | 0 | 9 | 0 | 9 | 0 | 12 |
| | Total hours | 51 | 145 | 10 | 0 | 0 | 84 | 0 | 16 | 0 | 85 | 108 | 39 |

| | |
|---|---|
| ***Total Project labor cost*** | **$96,200** |
| ***Reimbursable Expenses*** | |
| **Mileage** | **$144** |
| **Survey Vehicle** | **$441** |
| **Total Station/GPS** | **$1,750** |
| **AET Costs** | **$162,188** |
| **Reproduction** | **$500** |
| **Auto Rental** | **$0** |
| **Auto Gasoline** | **$0** |
| **Air Fare** | **$3,650** |
| **Motels** | **$0** |
| **Meals** | **$40** |
| **Instrumentation Costs** | **$2,175** For SEH Shape Arrays. AET's instrumentation costs are included in Phase 2c and detailed in AET's spreadsheets. |
| ***Total project cost*** | **$267,088** |

**Unique components or assumptions:**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project cost this phase | | 96,199.90 | 9,077.75 | 25,809.28 | 1,140.42 | 0.00 | 0.00 | 10,759.14 | 0.00 | 3,937.63 | 0.00 | 11,717.25 | 29,893.54 | 3,864.90 |
| Multiplier = | 3.1 | | | | | | | | | | | | | |
| Hourly Base Rate times 3.1 plus $3/hour for Computers | | | 178.00 | 178.00 | 114.04 | 221.89 | 127.93 | 128.09 | 158.81 | 246.10 | 123.47 | 137.85 | 276.79 | 99.10 |
| Staff (Last Name) | | | Farmer | Farmer | Flores | Johnson | Klop | Mike G | Carlson | Nysether | Haider | Illg | Staff | McJames |
| FY 2017 Rate | | | 56.45 | 56.45 | 35.82 | 70.61 | 40.30 | 40.35 | 50.26 | 78.42 | 38.86 | 43.50 | 88.32 | 31.00 |

| | TOTAL | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Mileage** | $144 | $0 | $21 | $19 | $86 | $17 |
| **Survey Vehicle** | $441 | $0 | $153 | $18 | $270 | $0 |
| **Total Station** | $1,750 | $0 | $850 | $100 | $800 | $0 |
| **AET Costs** | $162,188 | $15,625 | $0 | $21,787 | $115,406 | $9,370 |
| **Reproduction** | $500 | $0 | $0 | $0 | $0 | $500 |
| **Auto Rental** | $0 | $0 | $0 | $0 | $0 | $0 |
| **Auto Gasoline** | $0 | $0 | $0 | $0 | $0 | $0 |
| **Air Fare** | $3,650 | $0 | $0 | $0 | $0 | $3,650 |
| **Motel** | $0 | $0 | $0 | $0 | $0 | $0 |
| **Meals** | $40 | $0 | $0 | $0 | $0 | $40 |
| **Instrumentation Costs** | $2,175 | $0 | $175 | $0 | $2,000 | $0 |

***Basic Component:*** **Phase 1 - Discovery & Work Plan Formulation**

**Deliverables:**

| Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Review Geotechnical Reports | | 8 | | | | | | | | | | | 8 | $1,423.96 |
| 2. Review Plan Sheets, Shop Drawings and Specifications | | 8 | | | | | | | | | | | 8 | $1,423.96 |
| 3. Review Construction Surchage Data | | 8 | | | | | | | | | | | 8 | $1,423.96 |
| 4. Initial Site Trip | | | | | | | | | | | | | 0 | $0.00 |
| 5 Work Plan Formulation - Soil Borings & Lab Testing | | 1 | | | | | | | | | | | 1 | $178.00 |
| 6. Work Plan Formulation - Field Instrumentation | | 1 | | | | | | | | | | | 1 | $178.00 |
| 7. Work Plan Formulation - Surveying | | 1 | | | | | | 1 | | 1 | | | 3 | $561.95 |
| 8. Project Management | 4 | | | | | | | | | | | 15 | 19 | $2,198.48 |
| | | | | | | | | | | | | | | $0.00 |
| Total hours | 4 | 27 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 15 | 48 | $7,388.30 |

| | |
|---|---|
| ***Project labor cost this phase*** | **$7,388** |
| ***Reimbursable Expenses*** | |
| **Mileage** | **$0** |
| **Survey Vehicle** | **$0** |
| **Total Station/GPS** | **$0** |
| **AET Costs** | **$15,625** |
| **Reproduction** | **$0** |
| **Auto Rental** | **$0** |
| **Auto Gasoline** | **$0** |
| **Air Fare** | **$0** |
| **Motels** | **$0** |
| **Meals** | **$0** |
| **Instrumentation Costs** | **$0** |
| ***Total project cost this phase*** | **$23,013** |

**Unique components or assumptions:**

8. Start-up and monthly invoicing for admin.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project cost this phase | 7,388.30 | 711.98 | 4,805.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 246.10 | 0.00 | 137.85 | 0.00 | 1,486.50 |
| Hourly Billable Rate Including $3/hour for Computers | | 178.00 Farmer | 178.00 Farmer | 114.04 Flores | 221.89 Johnson | 127.93 Klop | 128.09 Mike G | 158.81 Carlson | 246.10 Nysether | 123.47 Haider | 137.85 Illg | 276.79 Staff | 99.10 McJames |

***Basic Component:*** **Phase 2a - Site Survey**

**Deliverables:**

| Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Site Survey (Establish Control) | | | | | | 6 | | 1 | | 10 | 14 | |
| 2. Site Survey (Install Targets) | | 4 | | | | 4 | | 1 | | 19 | 14 | |
| 3. Site Survey - Topographic | | | | | | 10 | | 1 | | 6 | 8 | |
| 4. Project Management | 10 | | | | | | | | | | | |
| Total hours | 11 | 4 | 0 | 0 | 0 | 20 | 0 | 3 | 0 | 35 | 36 | 0 |

| | | |
|---|---|---|
| ***Project labor cost this phase*** | **$20,759** | |
| ***Reimbursable Expenses*** | | |
| **Mileage** | **$21** | 1=25 miles, 2=5 miles, 3=8miles |
| **Survey Vehicle** | **$153** | 1=12 hrs, 2=14hrs, 3=8hrs |
| **Total Station/GPS** | **$850** | 1=12 hrs, 2=14hrs, 3=8hrs |
| **AET Costs** | **$0** | |
| **Reproduction** | **$0** | |
| **Auto Rental** | **$0** | |
| **Auto Gasoline** | **$0** | |
| **Air Fare** | **$0** | |
| **Motels** | **$0** | |
| **Meals** | **$0** | |
| **Instrumentation Costs** | **$175** | Reflectors |
| ***Total project cost this phase*** | **$21,958** | |

**Unique components or assumptions:**

***Basic Component:*** **Phase 2b - Soil Borings & Lab Testing**

**Deliverables:**

| Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Plan Soil Boring, CPT & Testing Program | | | | | | | | | | | | | 0 | $0 |
| 2. Survey Soil Boring and CPT Locations | | 1 | | | | 2 | | 1 | | 1 | 4 | | 9 | $1,925 |
| 3. Coordination During Drilling | | 3 | | | | | | | | | | | 3 | $534 |
| 4. Review Soil Samples in AET Lab | | 3 | | | | | | | | | | | 3 | $534 |
| 5. Review Soil Samples in SET Lab | | | | | | | | | | | | | 0 | $0 |
| 6. Assign Laboratory Tests | | | | | | | | | | | | | 0 | $0 |
| 7. Test Results Review | | 1 | | | | | | | | | | | 1 | $178 |
| 8. Determine Soil Paramters for Analyses | | | | | | | | | | | | | 0 | $0 |
| 9. Project Management | 2 | | | | | | | | | | | | 2 | $356 |
| Total hours | 2 | 8 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 4 | 0 | 18 | $3,527 |

***Project labor cost this phase*** **$3,527**

***Reimbursable Expenses***

| | | |
|---|---|---|
| **Mileage** | **$19** | 2=10 miles, 4=26miles |
| **Survey Vehicle** | **$18** | 2=4 hrs |
| **Total Station/GPS** | **$100** | 2=4 hrs |
| **AET Costs** | **$21,787** | Includes $2,000 contingency for soil borings that will only be invoiced if used. |
| **Reproduction** | **$0** | |
| **Auto Rental** | **$0** | |
| **Auto Gasoline** | **$0** | |
| **Air Fare** | **$0** | |
| **Motels** | **$0** | |
| **Meals** | **$0** | |
| **Instrumentation Costs** | **$0** | |

***Total project cost this phase*** **$25,452**

**Unique components or assumptions:**

2. City to assist w/traffic control for 2 soil borings and 2 CPT's in E. Century Ave.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project cost this phase | 3,527.24 | 355.99 | 1,423.96 | 0.00 | 0.00 | 0.00 | 256.17 | 0.00 | 246.10 | 0.00 | 137.85 | 1,107.17 | 0.00 |
| Hourly Billable Rate Including $3/hour for Computers | | 178.00 Farmer | 178.00 Farmer | 114.04 Flores | 221.89 Johnson | 127.93 Klop | 128.09 Mike G | 158.81 Carlson | 246.10 Nysether | 123.47 Haider | 137.85 Illg | 276.79 Staff | 99.10 McJames |

***Basic Component:*** **Phase 2c - Instrumentation**

**Deliverables:**

| Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Finalize Instrumentation Program | | 1 | | | | | | | | | | | 1 | $178.00 |
| 2. Order and Purchase Instrumentation and Periferals | | | | | | | | | | | | | 0 | $0.00 |
| 3. Install Survey Reflectors (See Phase 2a) | | | | | | | | | | | | | 0 | $0.00 |
| 4. Install Manual Crack Gages (None included) | | | | | | | | | | | | | 0 | $0.00 |
| 5. Install Shape Arrays | | | | | | | | | | | | | 0 | $0.00 |
| 6. Install Electronic Crack Gages | | | | | | | | | | | | | 0 | $0.00 |
| 7. Install Electronic Tilt Meters | | | | | | | | | | | | | 0 | $0.00 |
| 8. Install Slope Inclinometers | | | | | | | | | | | | | 0 | $0.00 |
| 9. Set up Earth Station and Web Site | | | | | | | | | | | | | 0 | $0.00 |
| 10. Set up SmartConnect for Site (not included due to no manual gages) | | | | | | | | | | | | | 0 | $0.00 |
| 11. Four Surveys of Reflectors & Data Reduction | | 8 | | | | 8 | | 1 | | 24 | 40 | | 81 | $17,074.82 |
| 12. Slope Inclinometer Readings and Data Transmission (Inital monthly + Quarterly) | | 4 | | | | 20 | | 1 | | 7 | 28 | | 60 | $12,234.91 |
| 13. Two Digital Level Reading Events and Data Reduction (eliminated) | | | | | | | | | | | | | 0 | $0.00 |
| 14. Electronic Instrumentation Monthly Observations | | 12 | | | | | | | | | | | 12 | $2,135.94 |
| 15. Quarterly Instrumentation Summary Reports | | 30 | | | | 16 | | | | 8 | | 12.0 | 66 | $9,681.21 |
| 16. Project Management | 20 | | | | | | | | | | | | 20 | $3,559.90 |
| Total hours | 20 | 55 | 0 | 0 | 0 | 44 | 0 | 2 | 0 | 39 | 68 | 12 | 240 | $44,864.78 |

| | | |
|---|---|---|
| ***Project labor cost this phase*** | **$44,865** | |
| ***Reimbursable Expenses*** | | |
| **Mileage** | **$86** | 11=40 mi, 12=70 mi |
| **Survey Vehicle** | **$270** | 11=32 hr, 12=28 hr |
| **Total Station/GPS** | **$800** | 11=32 hr |
| **AET Costs** | **$115,406** | Includes $10,000 contingency that will only be invoiced if used. |
| **Reproduction** | **$0** | Quarterly reports will be electronic. |
| **Auto Rental** | **$0** | |
| **Auto Gasoline** | **$0** | |
| **Air Fare** | **$0** | |
| **Motels** | **$0** | |
| **Meals** | **$0** | |
| **Instrumentation Costs** | **$2,000** | Lump sum charge for SEH Shape Arrays (arrays to be removed upon project completion) |
| ***Total project cost this phase*** | **$163,427** | |

**Unique components or assumptions:**

1. Includes one-day trip on SEH Plane to select Instrumentation Locations.
4. No manual crack gages will be installed.
13. One-time reading of panels with electronic tilt gages. One reading of all panels listed on SRF Report of 2015.
15. Three Quarterly Reports. Fourth Report is final report in Phase 2d.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project cost this phase | 44,864.78 | 3,559.90 | 9,789.73 | 0.00 | 0.00 | 0.00 | 5,635.74 | 0.00 | 492.20 | 0.00 | 5,376.15 | 18,821.86 | 1,189.20 |
| Hourly Billable Rate Including $3/hour for Computers | | 178.00 Farmer | 178.00 Farmer | 114.04 Flores | 221.89 Johnson | 127.93 Klop | 128.09 Mike G | 158.81 Carlson | 246.10 Nysether | 123.47 Haider | 137.85 Illg | 276.79 Staff | 99.10 McJames |

***Basic Component:*** **Phase 2d - Field Investigation Report (FIR)**

**Deliverables:**

| Task | Project Manager | Senior Geotech Engineer | Geotech Engineer | Senior Structural Engineer | Structural Engineer | Technician | GIS Support | Bismarck Coordination | Civil Engineer | Land Surveyor | Survey Crew (2 person) | Administrative Staff | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. MSE Wall Internal Stability Analysis | | | | | | | | | | | | | 0 | $0.00 |
| 2. MSE Wall Settlement Analysis | | | | | | | | | | | | | 0 | $0.00 |
| 3. MSE Wall Global Stability Analysis | | | | | | | | | | | | | 0 | $0.00 |
| 4. Electronic Instrumentation Data Compilation & Graphs | | 1 | | | | | | | | | | | 1 | $178.00 |
| 5. Survey Data Compilation & Graphs | | 4 | | | | 1 | | | | 1 | | | 6 | $977.92 |
| 6. Site Remediation Alternatives Evaluations | | | | | | | | | | | | | 0 | $0.00 |
| 7. Prepare Draft FIR | | 24 | 8 | | | 12 | | 2 | | 4 | | 8 | 58 | $8,557.64 |
| 8. Respond to City Comments | | 6 | 0 | | | 1 | | 1 | | 2 | | | 10 | $1,717.86 |
| 9. Prepare Final FIR | | 8 | 2 | | | 4 | | 1 | | 2 | | 4 | 21 | $3,082.59 |
| 10. Present FIR to City Commission | | 8 | 0 | 0 | 0 | | | 5 | | | | | 13 | $2,654.47 |
| 11. Project Management | 14 | | | | | | | | | | | | 14 | $2,491.93 |
| Total hours | 14 | 51 | 10 | 0 | 0 | 18 | 0 | 9 | 0 | 9 | 0 | 12 | 123 | $19,660 |

| | | |
|---|---|---|
| ***Project labor cost this phase*** | **$19,660** | |
| ***Reimbursable Expenses*** | | |
| **Mileage** | **$17** | 10=32 mi |
| **Survey Vehicle** | **$0** | |
| **Total Station/GPS** | **$0** | |
| **AET Costs** | **$9,370** | |
| **Reproduction** | **$500** | |
| **Auto Rental** | **$0** | |
| **Auto Gasoline** | **$0** | |
| **Air Fare** | **$3,650** | SEH Plane flight to Bismarck |
| **Motels** | **$0** | |
| **Meals** | **$40** | |
| **Instrumentation Costs** | **$0** | |
| ***Total project cost this phase*** | **$33,238** | |

**Unique components or assumptions:**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project cost this phase | 19,660.39 | 2,491.93 | 9,077.75 | 1,140.42 | 0.00 | 0.00 | 2,305.53 | 0.00 | 2,214.92 | 0.00 | 1,240.65 | 0.00 | 1,189.20 |
| Hourly Billable Rate Including $3/hour for Computers | | 178.00 Farmer | 178.00 Farmer | 114.04 Flores | 221.89 Johnson | 127.93 Klop | 128.09 Mike G | 158.81 Carlson | 246.10 Nysether | 123.47 Haider | 137.85 Illg | 276.79 Staff | 99.10 McJames |

American Engineering Testing, Inc. See attached tabs for itemized cost break-down 9/1/2016
Project Budget

Project: E. Century Avenue, Bismarck, ND AET No. _____

| | 9/6/16 Estimate[1] | |
|---|---|---|
| Drilling | $19,251 | (includes $2,000 contingency) |
| Lab | $2,536 | |
| Engineering | | |
| a. Discovery and Work Plan Formulation | $15,625 | |
| b. Field Investigation Report (FIR) | $9,370 | |
| Instrumentation | $115,406 | (includes $10,000 contingency) |
| **TOTAL ESTIMATE** | **$162,188** | |

1: Assumes the purchase of 2 - 88.5 foot long SAA, the original estimate assumed 1 - 172 foot long SAA
One earth station and one fence enclosure
Removed CPT work and 2x60' borings in roadway.
Includes 2 inclinometer installation and data reduction.
Removed SET lab testing.
Assumes 12 months of SAA reading and inclinometer data reduction

**Additional Costs for reading beyond 12 months (maximum of 6 additional months)**

| | |
|---|---|
| Each additional month of SAA reading | $1100 per month |
| Each additional inclinometer data reduction | $641 per set |

Project: E. Century Avenue, Bismarck, ND AET No. 0

Exploratory Drilling

**Coordination**

| | | | | | | |
|---|---|---|---|---|---|---|
| Services of Principal Engineer | 8 | hours at | $183.00 | per hour | $1,464.00 | |
| Services of Engineer I | | hours at | $120.00 | per hour | $0.00 | |
| Services of Drilling Manager | 10 | hours at | $120.00 | per hour | $1,200.00 | |
| | | | | | Coordination Subtotal | $2,664.00 |

**Drilling**

Assumptions: 2 man crew, 1 mob from St. Paul
4x20'and 4x20' offsets for tubes = 160'
Assumes 2 days mob/demob, 2 days for drilling

| | | | | | | |
|---|---|---|---|---|---|---|
| Mob: 2 man crew | 13 | hours at | $190.00 | per hour | $2,470.00 | |
| Mob: Pick up mileage | 880 | miles at | $1.00 | per mile | $880.00 | |
| Mob: Low boy mileage | 880 | miles at | $1.80 | per mile | $1,584.00 | |
| ATV Rig | | hours at | $112.00 | per hour | $0.00 | |
| 2 man crew (Regular Time) | 16 | hours at | $190.00 | per hour | $3,040.00 | |
| 2 man crew (Over Time) | 0 | hours at | $285.00 | per hour | $0.00 | |
| Rig Mileage | | miles at | $1.35 | per mile | $0.00 | |
| Pickup Truck | 16 | hours at | $17.50 | per hour | $280.00 | |
| Pickup Mileage | | miles at | $1.20 | per mile | $0.00 | |
| Borehole grout | 160 | feet at | $3.25 | per foot | $520.00 | |
| Per Diem for drill crew (2 men) | 4 | days at | $312.00 | per day | $1,248.00 | |
| Field Engineer (Regular Time) | 32 | hours at | $120.00 | per hour | $3,840.00 | |
| Field Engineer (Over Time) | 0 | hours at | $120.00 | per hour | $0.00 | |
| Per Diem for Eng (1 man) | 4 | days at | $156.00 | per day | $624.00 | |
| Utility Clearance | 1 | hours at | $101.00 | per hour | $101.00 | |
| Warning Signs | 0 | each | $200.00 | per each | $0.00 | |
| | | | | | Drilling Subtotal | $14,587.00 |

**CPT**

Assumptions: 2 man crew, 1 mob from St. Paul
2x60' + one extra day's worth (say 300')
Assumes 2 days mob/demob, 2 days for field testing

| | | | | | | |
|---|---|---|---|---|---|---|
| Mob: 2 man crew | 0 | hours at | $190.00 | per hour | $0.00 | |
| Mob: Pick up mileage | 0 | miles at | $1.00 | per mile | $0.00 | |
| Mob: CPT Low boy mileage | 0 | miles at | $1.80 | per mile | $0.00 | |
| Per Diem (2 men) | 0 | days at | $280.00 | per day | $0.00 | |
| Piezocone footage | 0 | feet at | $16.00 | per foot | $0.00 | |
| Dissipation Tests | 0 | tests at | $550.00 | per test | $0.00 | |
| Sounding Logs | 0 | logs | $40.00 | per log | $0.00 | |
| Data Report | 0 | each | $750.00 | per | $0.00 | |
| | | | | | CPT Subtotal | $0.00 |

**Total Drilling Estimate** **$17,251.00**

Project: E. Century Avenue, Bismarck, ND AET No. 0

**Laboratory Testing**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Atterberg Limits | 10 | tests at | $110.00 | per test | | $1,100.00 | AET | |
| Sieve Analysis | 4 | tests at | $102.00 | per test | | $408.00 | AET | |
| Hydrometer Analysis | | tests at | $197.00 | per test | | $0.00 | AET | |
| Specific Gravity | 0 | tests at | $95.00 | per test | x 1.15 | $0.00 | SET | |
| Organic Content | 4 | tests at | $55.00 | per test | | $220.00 | AET | |
| Unconfined Compression | | tests at | $95.00 | per test | | $0.00 | AET | |
| Consolidation Test w/time | 0 | tests at | $550.00 | per test | x 1.15 | $0.00 | SET | |
| UU Triaxial | 0 | tests at | $170.00 | per test | x 1.15 | $0.00 | SET | |
| CU Triaxial | 0 | tests at | $1,500.00 | per test | x 1.15 | $0.00 | SET | |
| Services of Senior Technician | 8 | hours at | $101.00 | per hour | | $808.00 | AET | |
| | | | | | | | Lab Testing Subtotal | $2,536.00 |

**Total Lab Estimate** **$2,536.00**

Project: E. Century Avenue, Bismarck, ND AET No. 0

**Manual Instrumentation + Subcontract Costs**

**Inclinometers**

Assumptions: 2 man crew + field engineer
2x30'
Assumes 2 days for drilling/installation, to be performed during same trip as other borings

**Drilling**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ATV Rig and 2 man crew | 10 | hours at | $302.00 | per hour | | $3,020.00 | |
| Rig Mileage | | miles at | $1.35 | per mile | | $0.00 | |
| Pickup Truck | 10 | hours at | $17.50 | per hour | | $175.00 | |
| Pickup Mileage | | miles at | $1.20 | per mile | | $0.00 | |
| Per Diem for drill crew (2 men) | 1 | days at | $312.00 | per day | | $312.00 | |
| Field Engineer | 10 | hours at | $120.00 | per hour | | $1,200.00 | |
| Per Diem for Eng (1 man) | 1 | days at | $156.00 | per day | | $156.00 | $4,863.00 |

**Materials**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10' sections | 8 | each | $12.00 | per | | $96.00 | |
| Caps | 4 | each | $15.00 | per | | $60.00 | |
| Grout | 60 | feet | $3.25 | per foot | | $195.00 | |
| Protective Covers | 2 | each | $250.00 | per | | $500.00 | $851.00 |

**Inclinometer probe/data reduction**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inclinometer Probe | 1 | each | $335.00 | per set | | $335.00 | |
| Servs of Sr Eng (data reduction) | 2 | hours at | $153.00 | per hour | | $306.00 | |
| | | | | | Subtotal | $641.00 | per set |
| Number of Readings | 6 | each | $641.00 | per set | | $3,846.00 | |
| Shipping Charges | 4 | each | $100.00 | per | | $400.00 | |
| | | | | | Total | | $4,246.00 |

read initial plus once a month for first 3 months, ther
Assumes that SEH will take readings and ser

**Manual Crack Monitors**

| | | | | | | |
|---|---|---|---|---|---|---|
| Avongard Monitors | 0 | each | $35.00 | per | $0.00 | $0.00 |

**Electronic Instrumentation**

| | | | | | | |
|---|---|---|---|---|---|---|
| HDD (Subcontract) | 3 | days | $3,000.00 | per day | x1.15 | $10,350.00 |
| 4" HDPE Conduit | | | $2,900.00 | | x1.15 | $3,335.00 |
| Security Fence | 1 | each | $2,500.00 | per | x1.15 | $2,875.00 |
| | | | | | | $16,560.00 |

Per Dakota Line Contractors: $3000 per day
Per Dakota Supply Group
Per Dakota Fence

Each fence enclosure = $2,875

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Travel for GRR | | | | | | | |
| Round trip travel | 0 | hours at | $183.00 | per hour | | $0.00 | |
| Round trip mileage | 0 | miles at | $1.00 | per mile | | $0.00 | |
| Per Diem | 0 | days at | $156.00 | per day | | $0.00 | |
| | | | | | Subtotal | $0.00 | per trip (GRR) |
| Number of Trips (GRR) | 0 | trips | $0.00 | per trip | | | $0.00 |
| On-Site Time for GRR | 0 | hours at | $183.00 | per hour | | $0.00 | |
| Per Diem | 0 | days at | $156.00 | per day | | $0.00 | |
| | | | | | | | $0.00 |

Sum $26,520

Century Avenue MSE Wall instrumentation; Bismarck, N

Prepared by JGB - Aug 26, 2016
Updated Sept. 6, 2016

| Description | Equipment | | | | Install Time | | | Assumptions |
|---|---|---|---|---|---|---|---|---|
| | Quantity | Unit Price | Subtotal | AET 15% | Quantity | Unit Price | Subtotal | |
| Mobilization/de-mob | | | | | 1 | $ 4,207.00 | $ 4,207.00 | Eng I & Sr. Eng. Tech., plus vehicle (1 week on-site) |
| Daily hotel/per diem | | | | | 6 | $ 272.00 | $ 1,632.00 | One 6-day work week |
| Sr. Engineer Site Visit (2 partial days on-site) | | | | | 1 | $ 4,801.00 | $ 4,801.00 | Eng III, personal vehicle mileage |
| Lift Rental, weeks | 0 | $ 1,200.00 | $ - | $ - | | | | Assume $1500/week (vs. $1000 locally) |
| Biaxial Tiltmeter w/ ave. 200-ft cable | 0 | $ 1,908.00 | $ - | $ - | 0 | $ 954.00 | $ - | Eng I & Sr. Eng. Tech., plus vehicle & lift |
| VW Crackmeter w/ ave. 200-ft cable | 0 | $ 683.00 | $ - | $ - | 0 | $ 715.50 | $ - | Eng I & Sr. Eng. Tech., plus vehicle & lift |
| 88.5-ft SAAF500 w/ 50-ft cable (two half-length SAAs) | 2 | $ 13,500.00 | $ 27,000.00 | $ 4,050.00 | 2 | $ 1,431.00 | $ 2,862.00 | Eng I & Sr. Eng. Tech., plus vehicle |
| SAA232 | 0 | $ 550.00 | $ - | $ - | | | | |
| SAA232-5 | 1 | $ 1,650.00 | $ 1,650.00 | $ 247.50 | | | | |
| extra SAA cable, ft | 605 | $ 1.52 | $ 919.60 | $ 137.94 | | | | |
| extra VW cable, ft | 0 | $ 0.79 | $ - | $ - | | | | |
| extra conduit, ft | 355 | $ 0.50 | $ 177.50 | $ 26.63 | | | | |
| conduit elbows, joints, U-clamps | 1 | $ 200.00 | $ 200.00 | $ 30.00 | | | | |
| VDV setup cost - FIRST Earth Station | 1 | $ 800.00 | $ 800.00 | $ 120.00 | 12 | $ 120.00 | $ 1,440.00 | Eng I, 12 hours |
| VDV hosting, month - FIRST Earth Station | 12 | $ 560.00 | $ 6,720.00 | $ 1,008.00 | 24 | $ 153.00 | $ 3,672.00 | Eng III, 2 hrs/month (data review) |
| VDV setup cost - SECOND Earth Station | 0 | $ 100.00 | $ - | $ - | 0 | $ 120.00 | $ - | Eng I, 4 hours |
| VDV hosting, month - SECOND Earth Station | 0 | $ 40.00 | $ - | $ - | | | | |
| datalogger programming, hours, FIRST | | | | | 12 | $ 120.00 | $ 1,440.00 | Eng I, 12 hours |
| datalogger programming, hours, SECOND | | | | | 0 | $ 120.00 | $ - | Eng I, 8 hours |
| CR6 Earth Station, each | 1 | $ 7,086.00 | $ 7,086.00 | $ 1,062.90 | 1 | $ 1,431.00 | $ 1,431.00 | Eng I & Sr. Eng. Tech., plus vehicle, 6 hrs each |
| Web-camera at each Earth Station | 0 | $ 3,105.00 | $ - | $ - | 0 | $ 477.00 | $ - | Eng I & Sr. Eng. Tech., plus vehicle, 2 hrs each |
| VDV hosting of webcams, month | 0 | $ 40.00 | $ - | $ - | | | | |
| Misc. supplies | 1 | $ 900.00 | $ 900.00 | $ 135.00 | | | | |
| sensor cable pulling, hours | | | | | 16 | $ 238.50 | $ 3,816.00 | Eng I & Sr. Eng. Tech., plus vehicle |
| Drill crew installation of posts for 1st Earth Station | | | | | 1 | $ 1,314.00 | $ 1,314.00 | rig, pickups, crew, Sr. Eng. Tech, 3 hrs each |
| Drill crew installation of posts for 2nd Earth Station | | | | | 0 | $ 1,314.00 | $ - | rig, pickups, crew, Sr. Eng. Tech, 3 hrs each |

| | |
|---|---|
| **Sensor/supplies Subtotal (incl. markup)** | **$ 52,271.07** |
| **Install Subtotal** | **$ 26,615.00** |
| **OVERALL TOTAL** | **$ 78,886.07** |
| Base | $ 125,570.95 |
| Change | $ (46,684.89) |

Notes: Does not include drilling costs for SPT borings
Does not include HDD costs
Does not include installation of conventional inclinometers or vertical SAAFs
Does not include material or install costs for conventional crack monitors

Project: E. Century Avenue, Bismarck, ND AET No. 0

**Engineering**

Discovery and Work Plan Formulation

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Services of Principal Engineer | 50 | hours at | $183.00 | per hour | | $9,150.00 | | |
| Services of Senior Engineer | 20 | hours at | $153.00 | per hour | | $3,060.00 | | |
| Services of Engineer II | | hours at | $137.00 | per hour | | $0.00 | | |
| Services of Engineer I | | hours at | $120.00 | per hour | | $0.00 | | |
| Services of Word Processor | | hours at | $66.00 | per hour | | $0.00 | | |
| | | | | | | | $12,210.00 | |
| Travel for GRR | | | | | | | | |
| Round trip travel | 13 | hours at | $183.00 | per hour | | $2,379.00 | | |
| Round trip mileage | 880 | miles at | $1.00 | per mile | | $880.00 | | |
| Per Diem | 1 | days at | $156.00 | per day | | $156.00 | | |
| | | | | | Subtotal | $3,415.00 | per trip (GRR) | |
| Number of Trips (GRR) | 1 | trips | $3,415.00 | per trip | | | $3,415.00 | |
| | | | | | | Discovery and Work Plan Formulation = | | $15,625.00 |

Field Investigation Report (FIR)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Services of Principal Engineer | 20 | hours at | $183.00 | per hour | | $3,660.00 | | |
| Services of Senior Engineer | 5 | hours at | $153.00 | per hour | | $765.00 | | |
| Services of Engineer II | | hours at | $137.00 | per hour | | $0.00 | | |
| Services of Engineer I | 10 | hours at | $120.00 | per hour | | $1,200.00 | | |
| Services of Word Processor | 5 | hours at | $66.00 | per hour | | $330.00 | | |
| | | | | | | | $5,955.00 | |
| Travel for GRR | | | | | | | | |
| Round trip travel | 13 | hours at | $183.00 | per hour | | $2,379.00 | | |
| Round trip mileage | 880 | miles at | $1.00 | per mile | | $880.00 | | |
| Per Diem | 1 | days at | $156.00 | per day | | $156.00 | | |
| | | | | | Subtotal | $3,415.00 | per trip (GRR) | |
| Number of Trips (GRR) | 1 | trips | $3,415.00 | per trip | | | $3,415.00 | |
| | | | | | | Field Investigation Report = | | $9,370.00 |

**Total Eng. Estimate** **$24,995**