Bismarck-Mandan
METROPOLITAN PLANNING ORGANIZATION

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TO: **Bismarck-Mandan Metropolitan Planning Organization Technical Advisory Committee**

FROM: **Rachel Lukaszewski, MPO Executive Director**

DATE: **April 8, 2024**

RE: **TAC Meeting**

There will be a meeting of the Bismarck-Mandan MPO Technical Advisory Committee on **Monday, April 15, 2024, at 10:00 AM.** The meeting will be held in the Tom Baker Meeting Room of the City/County Building at 221 N 5th St, Bismarck, ND. The agenda is outlined below.

The City of Bismarck and TAC members are encouraging citizens to provide their comments for public hearing items on the Bismarck-Mandan Metropolitan Planning Organization TAC agenda via email to mpo@bismarcknd.gov. Please include which item number your comment references. It will be sent to the members, as well as placed with the minutes. To ensure your comments are received prior to the meeting, please submit them by 5:00 pm 1 business day prior to the meeting. If you would like to participate via video or audio link for a 3-5 minute comment on a regular agenda public hearing item, please provide your name, agenda item and e-mail address to the above e-mail at least 3 days before the meeting.

Many of the 14 (fourteen) TAC members will attend this meeting in-person but have the option to request a ZOOM invite for remote participation. **Individuals wishing to participate via ZOOM should email contact information to mpo@bismarcknd.gov at least 3 days in advance of the meeting to receive a meeting invite tailored uniquely to them.**

As always, live meeting coverage is available on Government Access Channels 2 & 602HD or streaming live and archived online at FreeTv.org. Agenda items can be found online at MPO Technical Advisory Committee.

AGENDA

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Next scheduled TAC meeting is on 5/20/2024. Please call 701-355-1852 with questions. Any individual requiring special accommodations to allow access or participation at the meeting is asked to notify ADA Coordinator, Bismarck-Mandan MPO, PO Box 5503, Bismarck, ND 58506-5503 or complete and submit the Request for Reasonable Accommodations form at http://www.bismarcknd.gov/DocumentCenter/View/23201 at least five (5) days prior to the meeting.

PROJECTS UPDATE

Project	% Complete	Contracted Completion Date
Arrive 2050 Forecast/Arrive 2050 MTP (MPO wide)	53	03/31/2025
2023 Ortho-Contour Project (MPO wide)	100	02/29/2024
Safe Routes to Services Study (Bismarck/Mandan)	22	12/31/2024

Common MPO Acronyms

ATAC: Advanced Traffic Analysis Center	NDDOT: North Dakota Department of Transportation
CPG: Consolidated Planning Grant	TAZ: Traffic Analysis Zone
FHWA: Federal Highway Administration	TDMSE: Travel Demand Model & Socioeconomic Data
FTA: Federal Transit Administration	TIP: Transportation Improvement Plan
MTP: Metropolitan Transportation Plan	UPWP: Unified Planning Work Program

A full list of common MPO acronyms may be accessed online
https://www.bismarcknd.gov/DocumentCenter/View/37890/MPO-acronyms

BISMARCK-MANDAN METROPOLITAN PLANNING ORGANIZATION
TECHNICAL ADVISORY COMMITTEE
MARCH 18, 2024

The Bismarck-Mandan Metropolitan Planning Organization (MPO) Technical Advisory Committee (TAC) met March 18, 2024, at 10:00 a.m. in the Tom Baker Meeting Room, City/County Building, 221 N 5th Street, Bismarck, ND. Rachel Lukaszewski presided.

Members present or participating via Zoom were Ben Ehreth, Dan Schriock, Deidre Hughes, Chris Holzer for Gabe Schell, John Saiki, Andrew Stromme, Jarek Wigness, Greg Feser, Mitch Flanagan, Dean Schloss, Wayne Zacher, and Rachel Lukaszewski. Member absent was Natalie Pierce. The Freight Industry Representative membership is currently vacant.

Others present or participating via Zoom were Stephen Larson, Paulette Jacobsen, and Kim Riepl, Bismarck-Mandan MPO; Jason Carbee, HDR; Susan Dingle, Citizen; Miles Strain, Lon Juergens, Andrew Byron, and Andrew Moody, 95West Aerial Mapping; Blue Weber, Bolton & Menk; and John Forman, Ulteig.

MINUTES

Chair Lukaszewski called for consideration of the minutes from February 20, 2024.

MOTION: Mr. Stromme made a motion to approve the minutes as presented. Mr. Wigness seconded the motion and with Ben Ehreth, Dan Schriock, Deidre Hughes, Chris Holzer, John Saiki, Andrew Stromme, Jarek Wigness, Greg Feser, Mitch Flanagan, Dean Schloss, Wayne Zacher, and Chair Lukaszewski voting in favor, the minutes were approved.

TITLE VI PLAN UPDATE

Mr. Larson presented. The Bismarck-Mandan MPO, as a recipient of federal funding, is required to have a Title VI and Non-Discrimination/ADA Plan. The Title VI Program is in place to ensure the MPO takes all necessary steps to prevent unlawful discrimination in its programs, services, and activities. The MPO does a self-audit of its Title VI plan each year and makes appropriate updates to its Title VI Plan based on this. However, this year's update is also in response to a North Dakota Department of Transportation (NDDOT) audit of the MPO's Title VI Program. A new section was added to the Title VI Plan in response to the audit, and this addition required the MPO to release the plan revisions for a 30-day public comment period. The MPO did not receive any public comments on the update. Mr. Larson provided a brief overview of the update.

First, some routine minor changes were made to the document to make sure dates, complaint forms, the Title VI goals and accomplishments, and the demographics of the MPO's employees and boards are up to date.

Second, the MPO updated the demographics supporting its Limited English Proficiency Plan. Using the latest available Census data, an estimated 1.68% of the population in Bismarck, Mandan and Lincoln speak English less than very well.

Third, the MPO updated its Title VI maps to show the locations of its 2024 TIP projects, and to evaluate the distribution of those projects against relevant Title VI populations in the MPO area.

Finally, the MPO added a demographic profile and analysis section to the Title VI plan, in response to NDDOT's audit. This section is to comply with Federal Transit Administration (FTA) requirements. The demographic profile presents relevant minority populations in the MPO area and analyzes the MPO's efforts to meet the mobility needs of these populations. It also evaluates the distribution of state and federal funding in the MPO area.

Mr. Larson explained once the Title VI Update is approved, the Title VI Policy Statement and Assurances, along with the Title VI audit checklist, will be signed by the Policy Board Chair, allowing the MPO to continue to be eligible for federal funding.

Mr. Ehreth noted Leanne Schmidt is listed as the Title VI Coordinator for the MPO, and asked if she will be provided this update. Mr. Larson indicated yes. Mr. Ehreth further asked if the MPO's update aligns with the City of Bismarck's Title VI Plan. Mr. Larson indicated they are separate, but he will provide the MPO update to the City of Bismarck for their reference.

Mr. Ehreth asked how often the Title VI Plan and its elements are updated. Mr. Larson said annually. Mr. Ehreth also pointed out an item on page 16 of the plan under item 1, suggesting that the date referenced in connection to MPO's Public Participation Plan be removed. Mr. Larson noted the correction.

MOTION: Mr. Ehreth made a motion to recommend approval of the Title VI Plan Update as presented, with his correction included. Mr. Feser seconded the motion and with Ben Ehreth, Dan Schriock, Deidre Hughes, Chris Holzer, John Saiki, Andrew Stromme, Jarek Wigness, Greg Feser, Mitch Flanagan, Dean Schloss, Wayne Zacher, and Chair Lukaszewski voting in favor, the motion was approved.

2023 ORTHO-CONTOUR PROJECT

Mr. Strain led a presentation of 95West's final deliverables for this project. The MPO and its jurisdictions have received all deliverables, including both the Orthophotography and LiDAR for the MPO area, and the wall maps requested. 95West performed their flight for the project on May 3, 2023, and had to go through some extra steps to remove remaining snowfall from the final product. Mr. Juergens showed some examples of the overhead shots taken of the MPO area, stating 95West is very happy with the quality and detail of the imagery and the accuracy of the collection overall (the mapping accuracy is within half an inch). Mr. Byron showed some of the mapping elements and features provided to the MPO, including a digital elevation model, spot elevations, and a colorized point cloud. Ms. Lukaszewski noted the MPO is impressed with all the ways the data can be visualized. She thanked the 95West team for their efforts and troubleshooting on the project and noted that the deliverables will be sent to the North Dakota GIS Hub so they can be publicly accessible.

MOTION: Mr. Wigness made a motion to recommend approval of the 2023 Ortho-Contour Project as presented. Ms. Hughes seconded the motion and with Ben Ehreth, Dan Schriock, Deidre Hughes, Chris Holzer, John Saiki, Andrew Stromme, Jarek Wigness, Greg Feser, Mitch Flanagan, Dean Schloss, Wayne Zacher, and Chair Lukaszewski voting in favor, the motion was approved.

FY 2025 RECREATIONAL TRAILS PROGRAM (RTP) PROJECT

Ms. Riepl presented. Exhibit C is a request from SEH on behalf of Lincoln Park District (LPD) for MPO support of its proposed RTP project. The North Dakota Parks and Recreation District (NDPRD) will be soliciting for the RTP from April 1 through April 12. Applications within the MPO area require an MPO letter of support. The LPD is applying for the first phase of a two-phase project for the extension of a shared-used trail alongside 66th Avenue SE, from Lincoln Road to 28th Avenue SE. There is an existing trail on Lincoln Road from 52nd Street SE to 66th Street SE. This initial phase would be for earthwork, drainage needs, and the gravel base for the path, and a second phase would address paving and lighting. MPO staff reviewed the project and found it consistent with its Metropolitan Transportation Plan (MTP), specifically goals 1A and 5C. Project cost estimates are currently being assembled for the application.

Mr. Zacher asked if RTP projects require pedestrian facilities to be tied together, and Ms. Riepl indicated this is not required. Mr. Stromme asked if the trail will be open after the initial phase. Ms. Riepl said they would want both phases completed before opening the trail. Mr. Ehreth asked how LPD will seek funding for the second phase. Ms. Riepl indicated it may be assumed the next phase will be applied for through the RTP in a subsequent year. MPO staff is looking for a motion to provide a letter of support to LPD for this project application.

MOTION: Mr. Feser made a motion to recommend support of the Lincoln RTP project as presented. Mr. Wigness seconded the motion and with Ben Ehreth, Dan Schriock, Deidre Hughes, Chris Holzer, John Saiki, Andrew Stromme, Jarek Wigness, Greg Feser, Mitch Flanagan, Dean Schloss, Wayne Zacher, and Chair Lukaszewski voting in favor, the motion was approved.

ARRIVE 2050 FORECAST/ARRIVE 2050 MTP

Mr. Carbee provided a study update for HDR. They received good feedback from the Steering Committee on the Travel Demand Model (TDM) portion of the project and are working with the Advanced Traffic Analysis Center (ATAC) to incorporate that feedback into the model. The TDM is expected to be completed in April. On the MTP portion of the project, they are developing some alternatives, and some goals and objectives, to put before the Steering Committee for discussion. There will be two virtual stakeholder meetings held soon, and they plan to hold a public engagement meeting on April 29 at the Bismarck YMCA. They will also look for an event in Mandan to use for a public engagement opportunity.

SAFE ROUTES TO SERVICES/COMPLETE STREETS STUDY

Mr. Weber provided an update for Bolton & Menk. He noted comment boxes for the study have been placed in Bismarck and Mandan. There are boxes at the bus stop on Front Avenue by the Event Center, at the bus stop at Family Fare in Mandan, and one each at the Bismarck and Mandan Public Libraries. There is also a box at the Sacred Pipe Resource Center in Mandan. They have some listening sessions scheduled over the next week or so, including one with Ministry on the Margins, one with the Missouri Valley Coalition for Homeless People, one with Sacred Pipe Resource Center, and a couple sessions with Youthworks. They have a Steering Committee meeting scheduled for April 12, and their GIS team has also been doing a lot of work.

2024-2027 TIP ADMINISTRATIVE MODIFICATION

Mr. Larson presented. The MPO processed one administrative modification for the month of March, Exhibit F. This modification addresses a statewide ITS project for Weigh in Motion and Automatic Traffic Recorder maintenance. There is one location in the MPO area at Bismarck Expressway. This modification increases the cost estimates for the entire project, as noted on the modification form. Prorated costs for the MPO area are not available.

OTHER BUSINESS

Functional Class System Update

Ms. Lukaszewski noted the MPO's Urbanized Area Boundary (UZA) was recently approved, and so the MPO has shared an initial proposed update to the Functional Class System with jurisdictional engineers and planners. She shared the map with TAC and asked them to provide their comments on this in the coming days. She noted there are some roadways that will need to be moved from the Urban Functional Class System to the Rural System, and NDDOT will work with the jurisdictions on those changes. She pointed out a section of minor arterial on McKenzie Drive SE in Mandan that dead-ends. This will need to be removed from the Functional Class System in this update unless it can be looped back into the system. There are a few short additions proposed to the system on the west side of the UZA in Mandan, since the UZA has expanded on that side. Mr. Ehreth noted the Federal Highway Administration (FHWA) has some percentage guidelines on how the Functional Class System should be divided, and he asked if an analysis of the current update has been done based on these guidelines. Ms. Lukaszewski said she is working on this. There will be a meeting later this month on the Functional Class System Update where she will present that information.

ADJOURNMENT

There being no further business, the meeting was adjourned at 10:53 a.m., with the next scheduled meeting to take place on April 15, 2024, at 10:00 a.m. in the Tom Baker Meeting Room in the City/County Building, 221 N 5th St, Bismarck.

Respectfully Submitted,

Stephen Larson
Recording Secretary

APPROVED:

_____
Rachel Lukaszewski, Chair

EXHIBIT A

Bismarck-Mandan MPO

TIP 2024-2027 Amendment

Project Year(s) 2024

Entity	Project	Federal	State	Local	Total	Federal Funding Source
MANDAN	24.4.01	$126,000 (old) $198,000 (new)	$0	$14,000 (old) $22,000 (new)	$140,000 (old) $220,000 (new)	HEU

Project Description:

This amendment is for a project to install RRFB at 4 locations in Mandan, as recommended by the School Safety Crossing Study. The cost estimates for the project are increasing, as noted above. The PCN is 24054.

Consistency with the Bismarck-Mandan MPO Metropolitan Transportation Plan:

This project is in the TIP and is therefore consistent with the Arrive 2045 MTP.

Amendment Approved on _____ by the Bismarck-Mandan MPO Policy Board

_____

_____ Bismarck-Mandan MPO Policy Board Chair

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EXHIBIT B

Bismarck-Mandan MPO

TIP 2024-2027 Amendment

Project Year(s) 2024

Entity	Project	Federal	State	Local	Total	Federal Funding Source
NDDOT	24.6.24	872,440	$0	$0	$872,440	RSU

Project Description: This amendment adds a new project to the TIP for rail crossing signal improvements at the crossings on Eastdale Drive and on East Main Avenue. The PCNs are 24279 and 24296.

Consistency with the Bismarck-Mandan MPO Metropolitan Transportation Plan: This project is consistent with the Arrive 2045 MTP, specifically goal 2E.

Amendment Approved on _____ by the Bismarck-Mandan MPO Policy Board

_____

_____ Bismarck-Mandan MPO Policy Board Chair

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EXHIBIT C

ARRIVE 2050

FORECASTS

Arrive 2050 Forecasts: Travel Demand Model Socio-Economic Update

Final Report

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The preparation of this document was funded in part by the United States Department of Transportation with funding administered through the North Dakota Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration. Additional funding was provided through local contributions from the City of Bismarck, Burleigh County, City of Lincoln, City of Mandan, and Morton County. The United States Government and the State of North Dakota assume no liability for the contents or use thereof.

This document does not constitute a standard, specification, or regulation. The United States Government, the State of North Dakota, and the Bismarck-Mandan Metropolitan Planning Organization do not endorse products or manufacturers. Trade or manufacturers' names may appear herein only because they are considered essential to the objective of this document.

Acknowledgements

A sincere thank you to the following in guiding this Study and contributing to a critical step in the Metropolitan Transportation Planning process for the Bismarck-Mandan region.

Steering Committee

- Rachel Lukaszewski, Bis-Man MPO (Project Manager)
- Kristen Sperry, FHWA
- Wayne Zacher, NDDOT
- Gabe Schell, City of Bismarck
- Mark Berg, City of Bismarck
- Daniel Nairn, City of Bismarck
- Ben Ehreth, City of Bismarck
- Dan Schriock, Burleigh County
- Mitch Flanagan, Burleigh County
- Justin Froseth, City of Mandan
- Andrew Stromme, City of Mandan
- John Saiki, Morton County
- Natalie Pierce, Morton County
- Nick Nustad, City of Lincoln
- Deidre Hughes, Bis-Man Transit
- Jarek Wigness, City of Mandan

Model Development Staff

- Diomo Motuba, ATAC

Project Consultant Team

- Scott Harmstead, SRF Consulting
- Luke Champa, SRF Consulting
- Erik Kappelman, SRF Consulting
- Jason Carbee, HDR
- Craig Mizera, HDR
- Jeremy Williams, HDR
- Eric Wilke, HDR

Focus Groups

Economic Development

- Nathan Schneider, Bismarck Mandan Chamber EDC

Housing Agencies

- Dwight Barden, Burleigh County Housing Authority
- Rick Horn, Morton County Housing Authority

Social Service Agencies

- Dennis Meier, Three Rivers Human Service Zone
- Chelsea Flory, Burleigh County Human Service Zone

Education (K-12)

- Doreen Oucharek, Dakota Adventist Academy
- Darin Scherr, Bismarck Public Schools
- Daniel Neff, Light of Christ Catholic Schools
- Todd Benson, Shiloh Christian School
- Ryan Lagasse, Mandan Public Schools

Higher Education

- Brenda Nagel, University of Mary
- Brent Kleinjan, United Tribes Technical College
- Leander McDonald, United Tribes Technical College
- Karen Erickson, Bismarck State College

Real Estate Development

- Kelsi & James Hach
- Robert Martin, Ward Family Attorney
- Chad Wachter, Investcore & Wachter Development
- Jamie Schmidt, Investcore
- David Witham, Denizen Partners
- Jake Axtman, Denizen Partners
- Chad Moldenhauer, K&L Homes
- Cam Knutson, Knutson Realty
- Donna Fricke, Karen Silbernagel, and Nadeane Silbernagel, Silbernagel Family (Silver Ranch Development)
- Jesse Kalberer, Weisz & Sons
- Joe Hillerson, Trademark Realty, Boulder Homes, and LH Holdings
- Dr. Eric Belanger, Sanford Health & Major Land Owner
- Arthur Goldammer, Verity Homes
- Blake Seago, Verity Homes

Glossary

Age Cohorts: Groupings of people of the same age.

Average Daily Traffic (ADT): A traffic volume that represents an average, 24-hour period.

Bismarck-Mandan: Used to describe the entire MPO area, including Bismarck, Mandan, Lincoln and the metropolitan portions of Burleigh and Morton County.

Bismarck-Mandan Metropolitan Planning Organization (BMMPO): The Metropolitan Planning Organization (MPO) for the Bismarck-Mandan region.

Centroid: A point that represents the center of an area. In travel modeling, the centroid represents where all traffic generated by a transportation analysis zone (TAZ) is loaded onto the travel model's network via centroid connectors or pseudo links.

Centroid Connectors: An abstract link that connects the centroid to the TDM roadway network. Typically, centroid connectors are intended to represent one or more local street or driveways where development-generated traffic connects to the functionally-classified street network. Also known as Pseudo Links.

Feedback Loop: A process where the output from a step in a model sequence is used as a revised input for a prior step, and the model sequence is executed again. In the Bismarck-Mandan TDM, the congested travel time results of the traffic assignment step are "fed back" as inputs for the trip distribution step.

Freight Analysis Framework (FAF): FAF is typically produced every 5 years by the Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA). It is a data source that provides current year and forecasted future year freight movement among states and major metropolitan areas.

Friction Factors: Parameters used in the Gravity Model to represent the relative impact various travel costs have on trip length choice.

Functional Classification: A system used to classify streets and roadways according to the function they provide. Example classifications for the Bismarck-Mandan area include Interstate, arterial, collector, and local streets. All collectors, arterials, and Interstates in the Bismarck-Mandan region are included in the TDM.

Geographical Information System (GIS): A software package that integrates spatial mapping and databases, providing spatial analysis and mapping capabilities.

Gravity Model: A trip distribution approach that estimates trip levels exchanged between two zones based on the pair's trip productions, trip attractions, and cost of traveling between the zones.

Goodness of Fit: A statistical measure that describes how well a set of model-estimated data fit with observed (or real) data.

Gross Metropolitan Product (GMP): The measure of the market value of all final goods and services produced in a metropolitan area.

Infogroup: A company that provides a range of data products. The Infogroup data referred to in this report are estimates of existing employment levels by location and industry used by the MPO for model data development.

K-Factors: A parameter used in the Gravity Model to adjust trip distribution levels between zones. K-Factors are asserted values, sometimes referred to as a "socio-economic" adjustments, that are inserted to account for trip-making factors not otherwise explained by zonal productions, attractions, or travel costs.

Metropolitan Transportation Plan (MTP): A Federally-required planning document all MPOs complete every 5-years that should establish regional transportation goals and evaluate system performance, culminating in a fiscally-constrained list of projects and strategies over the next 20 plus years.

Mode Choice: In a traditional four-step model, mode choice is the third step following the trip distribution and prior to traffic assignment. Mode choice evaluates reasonable travel modes between TAZs, and assigns a mode of travel to each trip. Mode choice is not currently included in the Bismarck-Mandan TDM.

Pseudo Links: An abstract link that connects the centroid to the TDM roadway network. Typically, centroid connectors are intended to represent one or more local street or driveways where development-generated traffic connects to the functionally-classified street network. Also known as Centroid Connectors.

Quarterly Census of Employment Wages (QCEW): A Bureau of Labor Statistics program that publishes a quarterly count of employment and wages reported by employers

Root Mean Square Error: A statistical test that measures the difference between predicted and observed values; in the case of the TDM comparing model predicted traffic volumes at a location to observed traffic volumes at that location.

Sensitivity Test: A model run that evaluates model response to controlled changes to a model input variable.

Socio-Economic Data: A community's population characteristics like household status, vehicles available, employment type, and educational status. Socio-economic data is the independent variable which the Bismarck-Mandan TDM uses to generate trips.

Time-of-Day Factors: Parameters that convert the daily trip tables by trip purpose to peak period trip tables according to the estimated percentage of daily traffic that occurs during peak periods.

Traffic Assignment: The final step in the Bismarck-Mandan model, traffic assignment is the module that assigns or routes each trip to network links between its origin and destination.

Transportation Analysis Zone (TAZ): Also called traffic analysis zones, the TAZ is the basic unit of geography for the travel model. The MPO defines the TAZ boundaries for the model.

Travel Demand Model (TDM): A computerized application that combines an area's transportation system data, land use data, and tailored region-specific travel parameters to forecast regional or statewide travel. A TDM can evaluate how land development and the transportation system interact, and how transportation investments and land use development decisions can impact travelers and system performance.

Trip Attraction: Trips generated have both a production and an attraction. The number of trip attractions in a zone is defined by the amount of trip-attracting socio-economic data in that zone. Employment, measured in jobs, is the primary unit for trip attractions in the Bismarck-Mandan model.

Trip Distribution: The process of matching generated productions and attractions, thereby estimating the number of trips exchanged between all TAZs. The Bismarck-Mandan TDM uses the gravity model for trip distribution

Trip Generation: The first step in the model process that that estimates the number of trips occurring for all TAZs, based on the input socio-economic data. Trips generated have both a production and an attraction.

Trip Production: Trips generated have both a production and an attraction. The number of trip productions in a zone is defined by the amount of trip-producing socio-economic data in that zone. Households are the primary unit for trip productions in the Bismarck-Mandan model.

Validation: The process by which a model, after development, is tested to see how accurately it predicts observed travel patterns.

Woods and Poole: A firm that specializes in long-term economic and demographic projections.

Overview & Introduction

The Bismarck-Mandan Metropolitan Planning Organization (BMMPO) has prepared herein: the *Arrive 2050: Travel Demand Model Socio-Economic Update* (hereafter referred to as the 'TDMSE update') to develop demographic forecasts for the Bismarck-Mandan metropolitan area. The TDMSE update occurs every five years in advance of the long-range Metropolitan Transportation Plan (MTP) update process. The forecast projections of the TDMSE update are vital to local area jurisdictions and other entities and help to support different planning efforts throughout the region.

Population, households, and employment are the primary socio-economic factors used to explain travel trends and predict future travel patterns. Demographic forecasts developed by the BMMPO are used to revise and update the region's Travel Demand Model (TDM), the primary tool for assessing future conditions of the regional surface transportation system, particularly the roadway system, as well as freight and transit planning needs. The model estimates travel demand by evaluating the location and amount of housing and employment, the number of people in each household, and the types of jobs in different employment categories.

To better anticipate future transportation needs, the TDMSE update seeks to understand what strategies, techniques, variables, and methodologies have been used in prior demographic forecasts, and how past projections have compared with actual data from the U.S. Census Bureau. This includes a close examination of socio-economic factors from previous forecasts including the 2018 TDMSE update, the most recently completed study for the Bismarck-Mandan metropolitan area. This study then sets out a framework for three unique growth scenarios based primarily on trend variables (cohort age structures, industry labor distribution), dynamic variables (birth rates, death rates, migration), and constants (housing to demographic relationships, labor force participation rates, gender ratio). Socio-economic factors from these scenarios are forecast in five-year increments, from 2025 through 2050.

Travel Demand Model (TDM) Background

The BMMPO and its member organizations (City of Bismarck, City of Mandan, City of Lincoln, Burleigh County, and Morton County) have continually invested in the region's TDM. The regional TDM is a computerized application that forecasts travel across the transportation system. Regional travel forecasts are developed by combining data on the Bismarck-Mandan area's transportation system, regional land use and development patterns, and the travel characteristics of area residents. The TDM is used by the BMMPO and its partners to evaluate how land development and the transportation system interact, and how transportation investments and land use development decisions impact travelers and the performance of the regional transportation system. The BMMPO and its partners recognize the utility and importance of the TDM, as it provides data-driven, thoughtful, and reasonable results at a level of detail required for the analyses of regional scenarios.

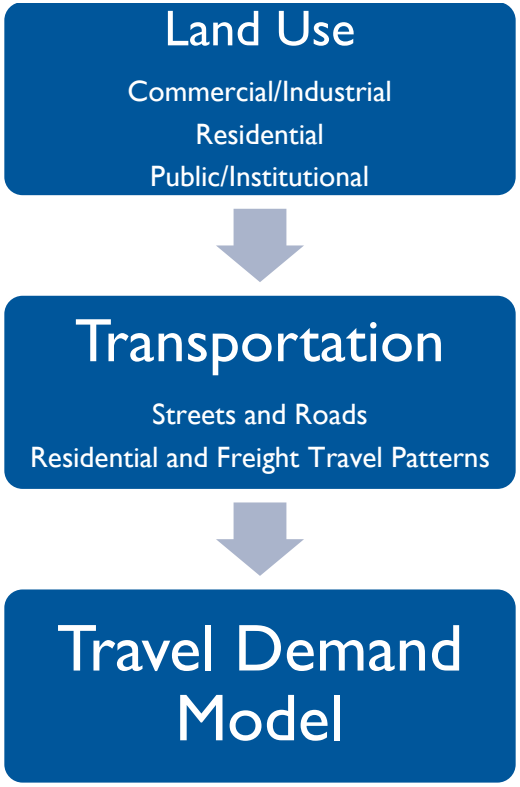
The Bismarck-Mandan TDM is developed and maintained by the Advanced Traffic Analysis Center (ATAC) at North Dakota State University. ATAC provided the model files and validation statistics for this study.

Study Purpose

There are two primary purposes of the TDMSE update. The first is to update the future socio-economic scenario to the year 2050, to be consistent with the planning horizon with the ongoing MTP update. The second is to provide an independent technical review of the TDM. This study comes at a critical juncture for the Bismarck-Mandan area, as the region moves passed the 2020 COVID-19 Pandemic and a previous decade of intense growth in development

and traffic associated with the oil boom in Western North Dakota. Previous TDMSE updates reflected the oil boom, which led to a significant increase in the Bismarck-Mandan region's rate of growth through peak oil/development and production in 2014. This study reflects a decrease in oil development, stabilized oil production market, and socio-economic impacts caused by the pandemic. This TDMSE update provides an opportunity to reevaluate a post-pandemic way of life, a more stable oil market in the region, and what future growth trajectories the region may experience as a result. The remainder of this document summarizes these elements of the study.

Figure 1. Travel Demand Model Process/Inputs



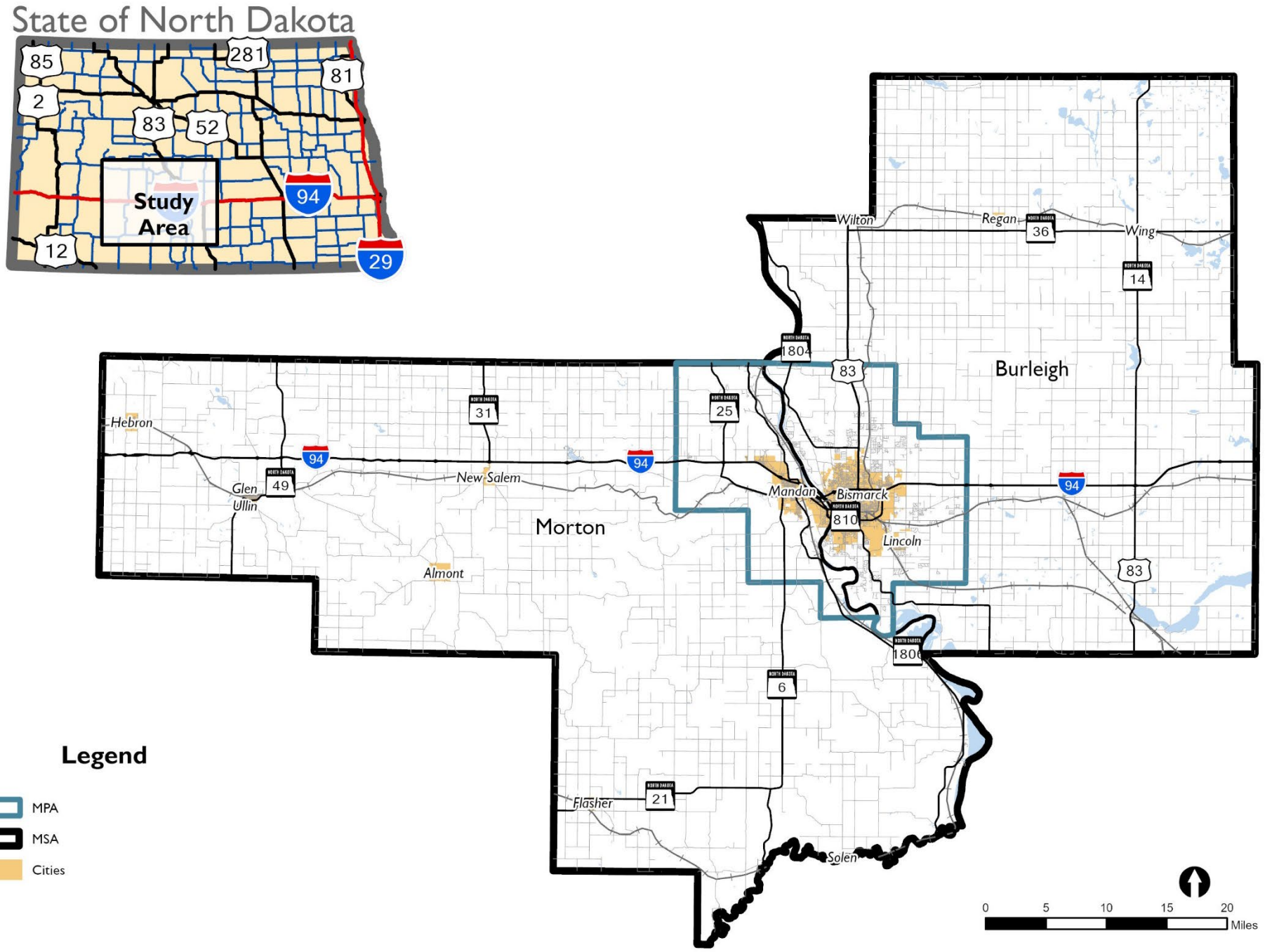
Study Area

The BMMPO has been designated by the governor of North Dakota to function as the Metropolitan Planning Organization (MPO) for the Bismarck-Mandan metropolitan area. Urban areas in the United States with a population of 50,000 or more have a designated Metropolitan Planning Organization (MPO) to assist in making fair and impartial transportation decisions and to help administer federal transportation funds the Metropolitan Transportation Planning process.

Throughout the TDMSE update, references are made to both the Bismarck-Mandan Metropolitan Statistical Area (MSA) and the Bismarck-Mandan Metropolitan Planning Area (MPA), and each denotes different geographic areas. An MSA is defined as a region consisting of one or more counties that contain at least one combined urban area with a population of at least 50,000. These are used by the U.S. Census Bureau and other federal government agencies for statistical purposes. The Bismarck-Mandan MSA includes Burleigh and Morton Counties.

The MPA is the boundary by which an MPO's transportation planning process is carried out. It accounts for both urbanized areas as well as contiguous exurban areas with vital county, state, and federal roadways that can be expected to urbanize over a 25-year period. The BMMPO's MPA covers three cities, eight townships in Burleigh County, one township in Morton County, and 15 unorganized townships in Burleigh or Morton Counties.

Figure 2. TDMSE Update Study Area



Community Snapshot

As part of the data-driven update process, the BMMPO's TDMSE update utilizes robust quantitative socio-economic data sets. This study supplements the quantitative analysis by gathering robust qualitative data, obtained through public engagement and conversations with key local stakeholders about the future of the Bismarck-Mandan region. This qualitative information is used to cross-reference the quantitative socio-economic data being used to forecast population, households, and employment to the planning horizon year of 2050.

Ultimately, the feedback provided through the focus group and Steering Committee engagement process has guided the update of the BMMPO's TDM and will continue through the MTP update. The qualitative feedback received ensures both updates estimate the most practical and realistic assumptions. Sections of this report include the focus group engagement process, steering committee engagement process, and major themes that guide the TDMSE update.

Steering Committee

The Steering Committee (SC) provided overall guidance for the TDMSE update. Meetings with the SC occurred at critical milestones as described below:

Steering Committee Meeting #1

Meeting held in November 2022 to kick-off the TDMSE Update with the steering committee. Key takeaways:

- Provide a defensible rate of growth.
- Compare to historical projections or forecasts.
- Focus on the region's unique opportunities and challenges to growth.

Steering Committee Meeting #2

Meeting held in February 2023 to review socio-economic forecasts from previous planning efforts, review draft forecast methodology, and review draft forecast scenarios which included:

- Low growth scenario.
- Medium growth scenario.
- High growth scenario.

Allocation Workshops

East River Allocation Workshop

Workshop held in April 2023 with City of Bismarck, City of Lincoln, and Burleigh County steering committee members. Workshop centered around allocating socio-economic data in the BMMPO's metropolitan area east of the Missouri River. Roll plots were used to draw specific growth areas with real-time tracking of targets in ArcGIS.

West River Allocation Workshop

Workshop held in April 2023 with City of Mandan and Morton County steering committee members. Workshop centered around allocating socio-economic data in the BMMPO's metropolitan area west of the Missouri River. Roll plots were used to draw specific growth areas with real-time tracking of targets in ArcGIS.

Steering Committee Meeting #3

Meeting held October 2023 to review refinements and socio-economic shifts resulting from allocation workshops.

Focus Group Engagement Process

The engagement process used focus group meetings to gather qualitative data about the future of the Bismarck-Mandan region. Focus groups were organized around perspectives related directly to the future growth of the region and driving forces of community growth. The focus groups included engaging technical professionals in the following fields or areas:

- Economic Development
- Housing Agencies
- Social Service Agencies
- School Districts and Private K-12 Institutions
- Higher Education
- Real Estate Development

Informal conversations/interviews were held with individuals and small groups to assess the perception of growth or decline in BMMPO's metropolitan area.

Key Questions

The conversations revolved around key high-level questions. The questions were intended to examine socio-economic growth and decline in the Bismarck-Mandan region and helped interviewees think critically about the future of their communities. Questions were tailored to the group being interviewed but generally were similar overall to ensure consistent feedback. The specific questions may be found in Appendix B.

Focus Group Discussion Timeline

Focus group meetings were held between mid-November, 2022 to early-January, 2023.

Major Themes

Overall, the major themes from the focus group meetings include:

Expectations for the Region

There was consensus that the Bismarck-Mandan region will likely grow into the future. People were optimistic about the direction and expect stable, steady growth through 2050. Focus groups mentioned the need to grow smart and responsibly moving forward. Focus groups also speculated more regional competitiveness for Bismarck-Mandan which will help attract people from small towns in North Dakota, other communities across the upper Midwest (big and small), and beyond.

Drivers of Growth

The region's economy feels stable to people. Healthcare, State Government, and Education were mentioned most often as the biggest reasons for stability. The energy and financial sectors were also mentioned as being critical to the regional economy.

Parks and recreation, natural resources, the Missouri River, and the attractive landscape were mentioned as a growth driver in nearly every focus group meeting. The region is very connected to the natural beauty of the area, and people expressed pride in the regional landscape.

Interviewees mentioned the family-friendliness, cleanliness, sense of community, diversity, and safety of Bismarck-Mandan as important social factors that will help continue to drive growth for the region in the future.

People are noticing the rural exodus happening across the state/upper Midwest, with people moving to regional hubs like Bismarck-Mandan for better access to education, healthcare, business opportunities, social services, and other amenities not found in rural areas.

Other trends were brought up, which have been seen nationally in the post-covid era included:

- workforce shortage,
- immigration,
- e-commerce,
- telecommuting,
- cost of living (inflation),
- and the mental health crisis.

These factors could have a positive or negative impact to growth moving forward and although it may be too early to speculate how they'll specifically impact regional growth in the future, considerations of these factors shed light on the TDMSE update.

Challenges to Growth

There was a lot of speculation that housing availability (options) and affordability will continue to be a challenge and change is likely needed. Incentives, infill development, and increased density are a few of the examples mentioned to address housing challenges in the region.

The workforce crisis is a national trend, but was mentioned as the biggest barrier to growth moving forward across the board, with nearly every focus group interviewee mentioning it as an challenge for their representative business, organization, or institution.

Infrastructure and the timing of development was also a concern for most real estate developers. The expense and financing of infrastructure in and of itself was seen as barrier, but also the time spent getting infrastructure in the ground, ready for homes and businesses has delayed projects and added to the overall cost of real estate in the region. It was mentioned that the City of Bismarck is in the process of pursuing funding for a city-wide sewer system upgrade.

Another concern is migration (out of the region), specifically the migration of young people looking to establish themselves in the community. People thought the region could do a better job of marketing to and retaining young people who may be looking to settle down and start building their lives after receiving an education or starting a career.

Opportunity Areas

Focus group interviewees mentioned the following specific opportunity areas for the region to address growth:

- Poor mobility north and south across the region.
- Lack of public transit and taxi services to meet the needs of social services and other people who utilize transit or taxi service.
- Implement 66th Street interchange with I-94, on the eastern edge of Bismarck as a short-term priority.
- Public Private Partnerships - Silver Ranch property owner interested in helping with local match for Transportation Alternatives (TA) grant to construct a grade separated path or trail for cyclists and pedestrians to cross 43rd Avenue.
- Need for the planned interchange on the western edge of Mandan.
- Intersection safety concerns with ND 1804 (United Tribes Technical College).
- Safety and operational issues at the intersection of N 19th Street and Shiloh Drive (Shiloh Christian School).
- Explore bike and pedestrian trail feasibility along BNSF railroad through downtown.

Please see Appendix B for further detail.

Socio-Economic Update

Socio-Economic Forecast Methodology

The primary purpose of the socio-economic data update is to provide updated land use growth information to support the BMMPO's future transportation planning efforts. The BMMPO staff used several sources of data such as Data Axle employment data, the 2020 Decennial Census, local jurisdiction building permits, and aerial photography to compile a 2021 base year socio-economic dataset. The socio-economic data were updated to the year 2050, consistent with the minimum 20- year planning horizon of the ongoing MTP update. For the purposes of use by the TDM, socio-economic data were developed in the following categories:

Population

To forecast the Bismarck-Mandan regional population as accurately as possible, a cohort survival model was used to forecast future population, in 5-year intervals: 2021, 2025, 2030, 2035, 2040, 2045, and 2050. The cohort model estimated critical rates to 'naturally' project the population into the future:

- Births
- Deaths
- Migration

These rate estimates are applied to the current population, and the future (new) population is formed. A new set of birth, death, and migration rates are then estimated for the new model which is used to create another iterative future population. This is applied iteratively over several periods of time into the future. The existing cohorts are also 'aged' through the process, meaning the 2020 population of 55-year-olds are the same model units as the 2025 population of 60-year-olds, after deaths and migration are calculated. Age cohorts continuously move forward through the cohort survival model. This process is repeated at 5-year intervals through the analysis period of 2050.

The qualitative analysis described in the community snapshot section above, has the most impact on model results. For example, regional opportunities and challenges can vary birth, death, and migration rates; the natural drivers of growth into the future.

Households

Housing forecasts include aggregate measures of housing as well as more detailed socio-economic breakdowns of current and future housing in the Bismarck-Mandan region. Baseline housing characteristics were derived from the 2020 Decennial Census, 2021 ACS data, and inventory of aerial imagery (in newer developments/fringe areas). This data established household size and makeup.

Current demographic information was used to perform a regression analysis between the number of households and each age cohort's population. The estimated coefficients from the regression analysis can be applied to the forecast age cohort populations to estimate the complete housing stock in any given forecast year. Other demographic elements like number of college students or percentage renter occupied housing will also be regressed on past cohort data in order to use the forecast cohort information to estimate future values.

Table 1. Select Household (HH) Statistics

AREA	HHs	PERSONS PER HH
City of Mandan	9,832	2.24
City of Bismark	32,393	2.20
Morton County	13,502	2.26
Burleigh County	39,805	2.32

Source: American Community Survey (2016-2020)

Table 1 shows recent data on households in the region. The table shows the number of households and the persons per household. A simple way to estimate future households is to estimate future population and then divide by the baseline persons per household. That approach can be used in this project as one validation check against the linear model that will predict future housing and households.

Employment

Since the 2018 TDMSE update, employment evolved in the Bismarck-Mandan region, and across the United States. Where people work, how, and how often changed with the advent of widespread remote work in response to the COVID-19 pandemic. While the level of remote work has decreased since March 2020 in North Dakota, remote work continues to be a large part of the economy moving forward. Automation and other recent technological advancements, particularly in the field of robotics, will undoubtedly continue to reshape the economy. Employment forecasts took elements like this into account as they were created. As part of the scenario estimations, adjustments were made to inputs to reflect the different factors impacting work and the workplaces of the region into the future.

The employment forecast is based on the gross domestic product (GDP) of Burleigh and Morton Counties. The aggregate GDP is broken down into broad sectors based on the North American Industry Classification System, 2 Digit (NAICS2) Codes.

Table 2 displays the sector codes used to classify jobs. The regression analysis considered the NAICS2 codes directly to provide greater detail but then aggregated those codes according to Table 2.

Table 2. NAICS2 Industry Classification

INDUSTRY	NAICS2 CODE
Agriculture	11
Educational Services	61
Manufacturing	31-33
Construction and Mining	21,23
Retail Trade	44-45
Services	51-53,55-56,62,71,81,92,99
Utilities, Wholesale Trade, and Transportation	22,42,48,49

Tables 3 and 4 reflect data from Woods & Poole and the Bureau of Economic Analysis (BEA).

See Appendix C for further detail on socio-economic forecast modeling.

Figure 4. Burleigh County Employment/GDP

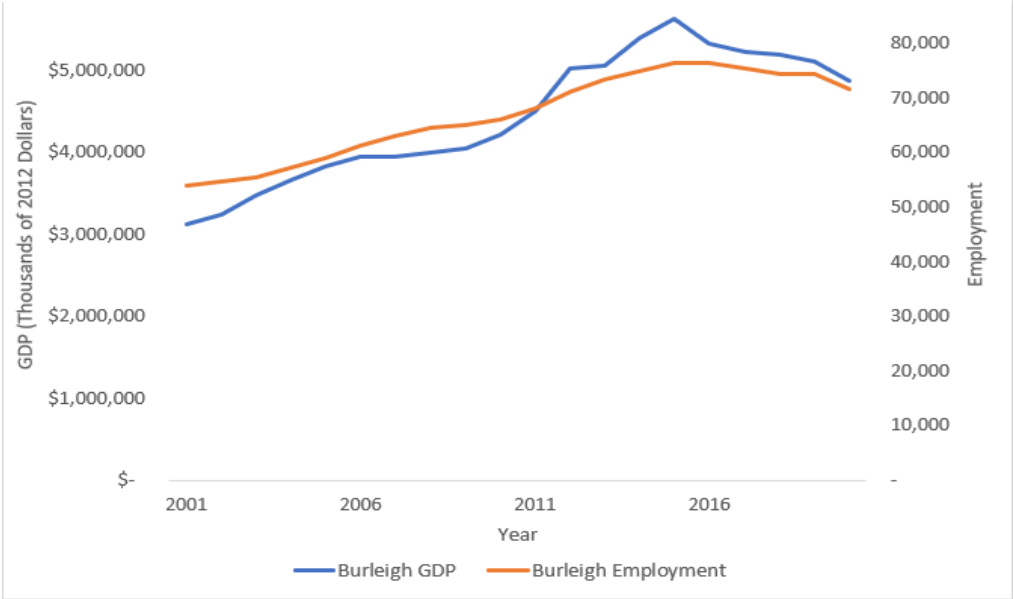
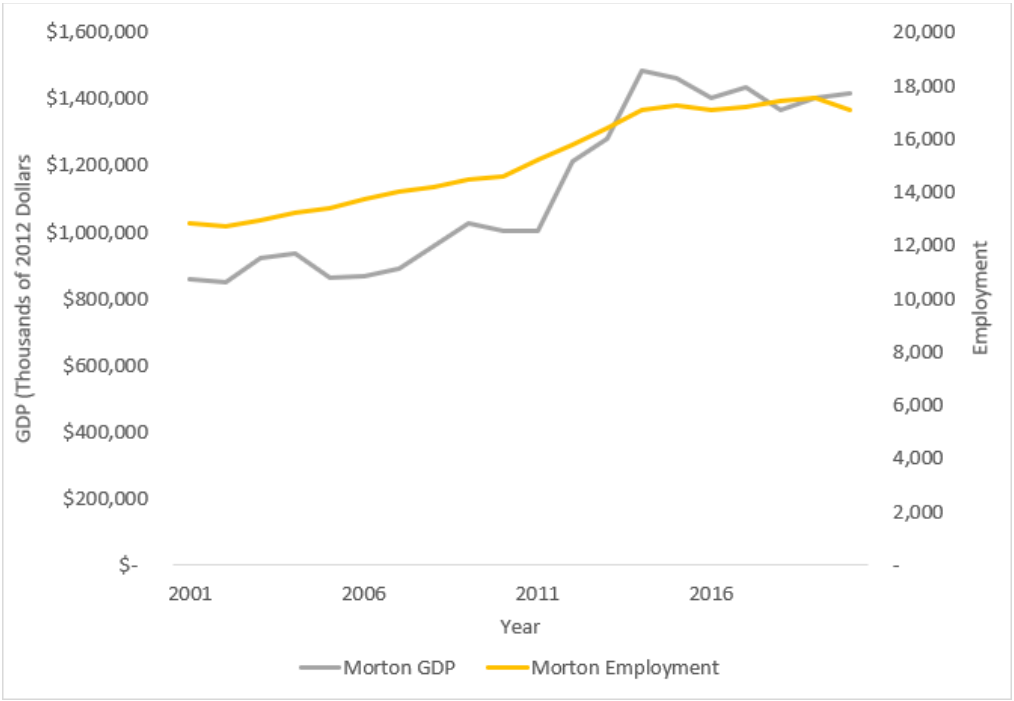


Figure 3. Morton County Employment/GDP



Growth Scenario Development

Several steps went into the update of the socio-economic data and subsequent growth scenario development:

- Reviewing long-term and recent regional growth trends
- Reviewing other economic data for growth projections
- Identifying three potential development scenarios
- Selecting a preferred future development scenario
- Allocating future regional growth to traffic analysis zone (TAZ) geographies

The general process followed for the development of regional growth scenarios included:

1. Reviewed the current growth context for Bismarck-Mandan, including an assessment of recent population growth and trends.
2. Established feasible growth rates based on historical trends and previous planning efforts.
3. Refined the cohort survival model and subsequent socio-economic data update to evaluate and develop regional control-total projections of future population, households, and employment through year 2050.
4. Estimated the BMMPO's MPA portion of the MSA population, households, and jobs. As shown in Figure 1, the BMMPO's study area or MPA, is in portions of northeast Morton County and southwest Burleigh County.

Grounding Scenarios in Context

Several perspectives were considered when evaluating current trends and potential growth trajectories through 2050 for the Bismarck-Mandan metropolitan area. These perspectives included the review of the following key inputs.

Population

Key quantitative inputs were used to develop grounded forecasts:

- Decennial Census: current and historical demographics
- American Community Survey (ACS): Current
- Center for Disease Control and Prevention (CDC): birth and death rates

Employment

The quantitative inputs used for employment forecasts was updated since the 2018 TDMSE update, and include the following:

- Quarterly Census of Employment Wages (QCEW): current industry level calculation
- Gross Domestic Product (GDP) Data: current and historical GDP trends
- Woods & Poole Economics, Inc.: labor productivity and gross domestic product (GDP) forecast

The reviews identified likely trends for Bismarck-Mandan's growth moving forward, and grounded scenarios in realistic context.

Calibrating Scenarios

Additional information was used to help calibrate growth scenarios to both national and local conditions.

- National Historical Growth Trends
- Regional Historical Growth Trends
- Local Considerations
- Woods and Poole Data

National Demographic and Growth Trends

When reviewing historical population trends in Bismarck-Mandan, it is important to consider the context of national demographic trends. Figure 4 shows that while the number of US live births is at levels consistent with the 1950s, the birth rate has declined significantly over the past several decades.

As shown in Figure 3, population growth rates in the United States have trended down since the 1950s, due in large part to declining birth rates.

Due in part to a nationally declining birth rate, the median age in the MSA has increased steadily from 24.9 years in 1970 to 37.9 (estimated) in 2021. Projections from Woods and Poole, shown in Figure 5, estimate median age in the MSA will increase to 47.2 years of age by 2050.

Figure 5. U.S. Historic Population Growth Rate 1950-2024

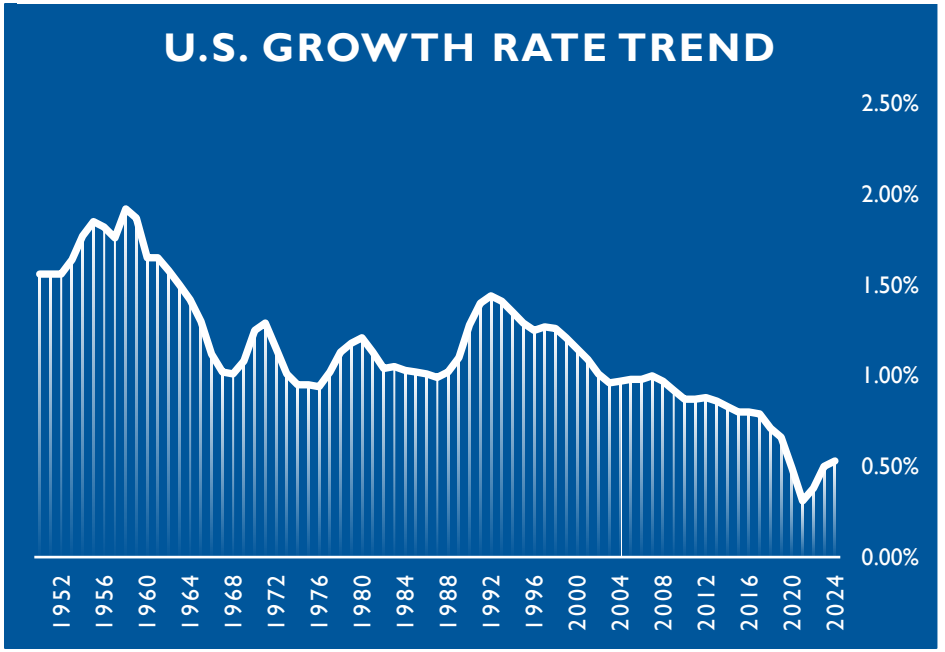
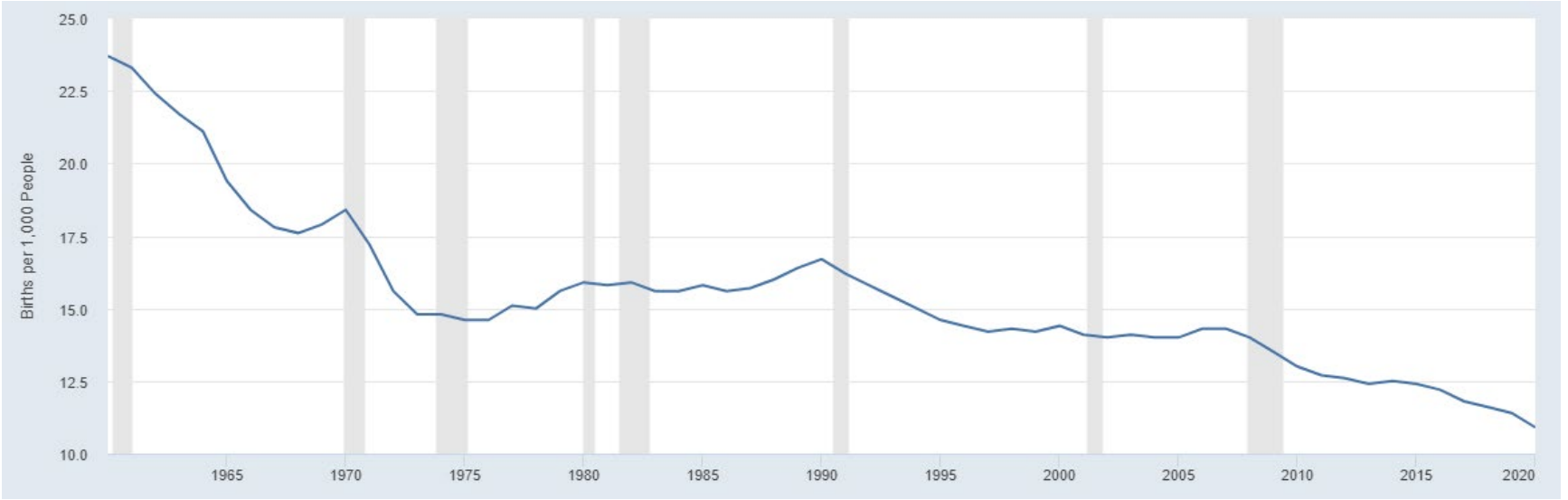


Figure 6. US Birth Rate Trends (FRED, Federal Reserve Bank of St. Louis



The key takeaway from Figures 5, 6, and 7 is that trends indicate that declining birth rates and an aging population will have some downward impact on future growth rates for the nation and Bismarck-Mandan.

Woods & Poole Demographic Projections and Trends

Woods & Poole Economics, Inc. (Woods & Poole) is an economics firm specializing in national and regional models for long-term county economic and demographic data projections. The Woods & Poole data calibrates the BMMPO's growth forecasts to national trends because Woods & Poole forecasts socio-economic data for every county in the nation simultaneously. The national simultaneous forecasting done by Woods & Poole provides a reasonable forecast based on the flow of socio-economic activity at the national level. The data provided critical insight into employment trends within industry sectors and population changes within age cohorts.

- Household sizes are projected to stabilize in the future, after declining over the last several decades. As shown in Figure 8, those trends recently stabilized between 2015-2017 however, Woods and Poole project minor decreases in household size between 2021 and 2050.

- Woods & Poole projects employment growth at 1.45% per year for the two-county area between 2021 and 2050. Employment by industry sector for both counties is shown in Figure 9[1]. The three fastest growing sectors are projected to be:
    - Real Estate (+2.8% / year)
    - Education (+2.7% / year)
    - Mining (+2.6% / year)

[1] Note that the Woods and Poole data were used as a basis for forecasting relative growth rates by job sector, not for developing an absolute number of forecasted jobs.

Figure 7. MSA Median Age Trend 1970-2060

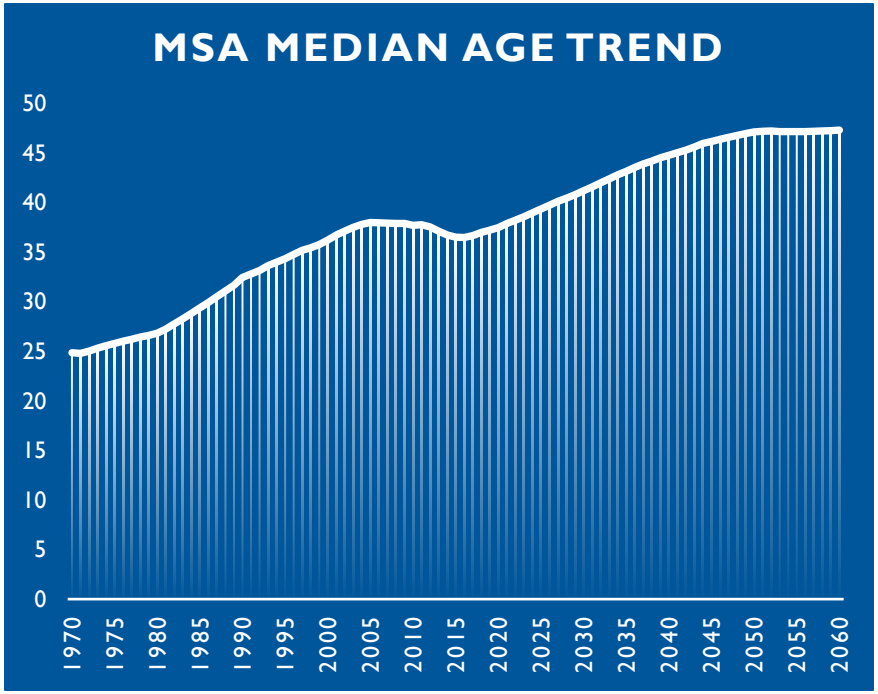


Figure 8. Woods & Poole Population Projections 2021-2060

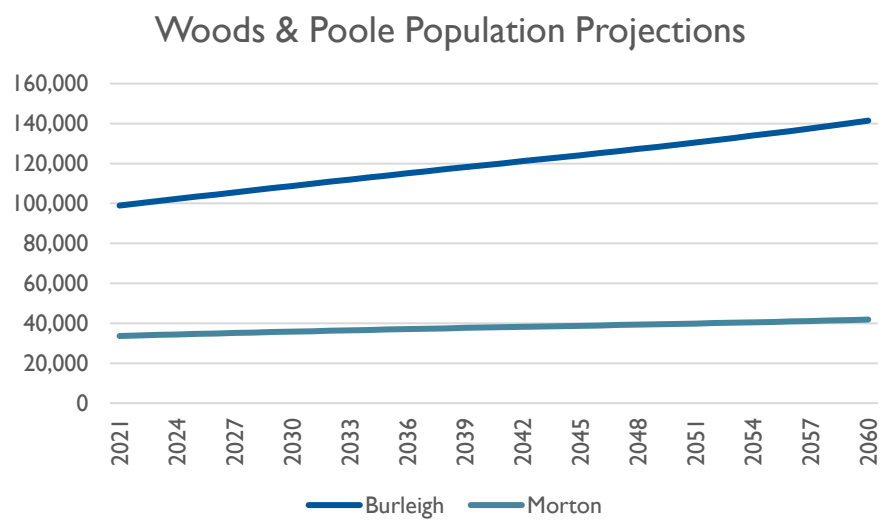


Figure 9. Woods & Poole Household Size Projections 1970-2060

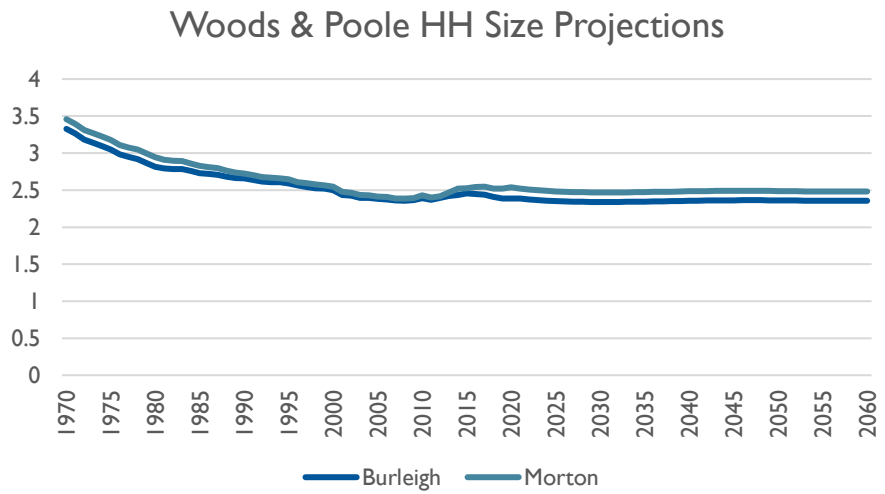
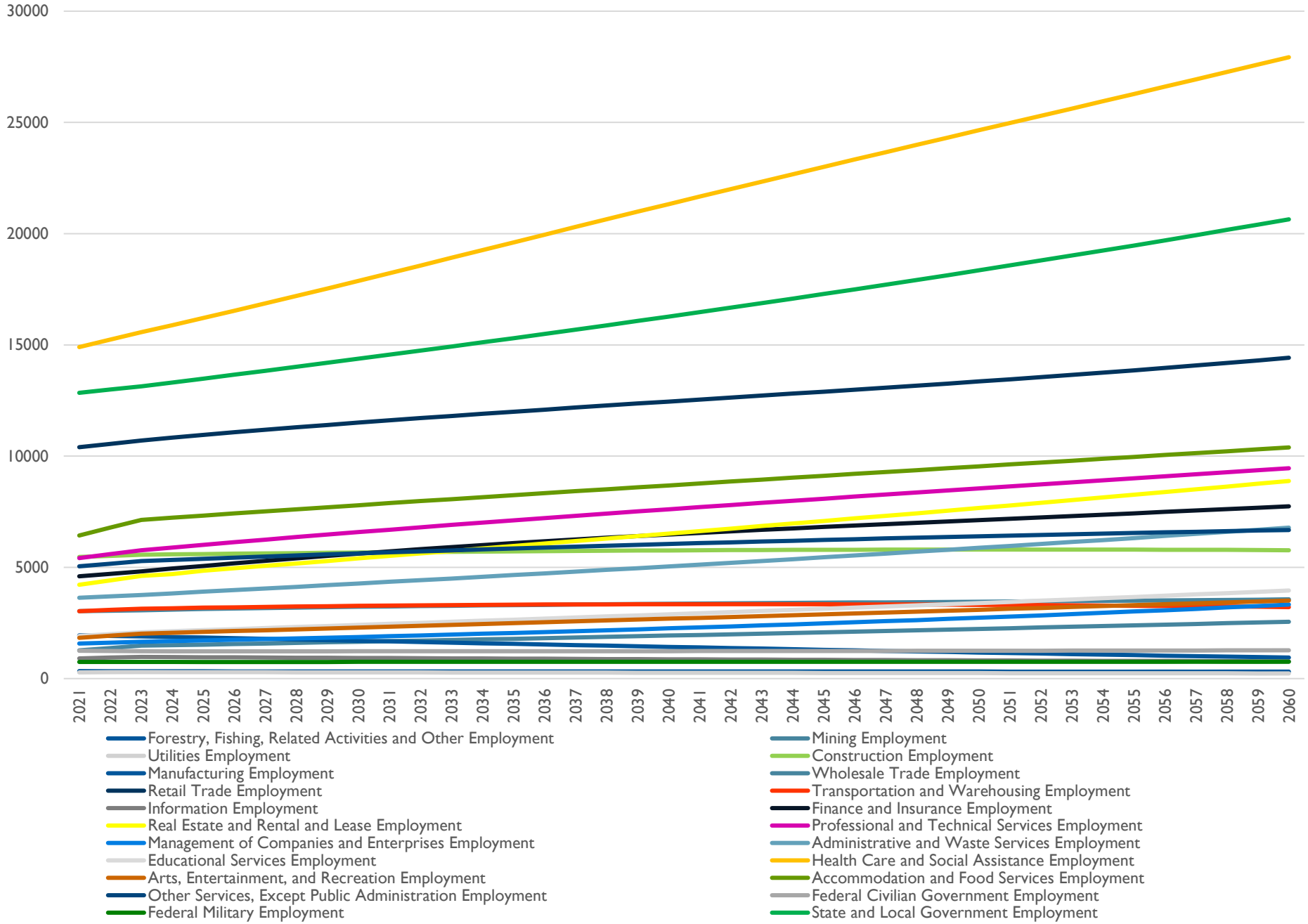


Figure 8. Woods & Poole Employment Projections 2021-2060



- The ratio of regional employment to population is projected to increase in the future. This ratio increased rapidly over the last several decades however, in 2021 during the pandemic, jobs per 100 people actually decreased. The ratio is projected to increase moving forward however, the rate of increase is projected to decline in the future. By year, the employment-to-population ratios are:
    - 1970 – 46 jobs / 100 people
    - 1980 – 55 jobs / 100 people
    - 1990 – 62 jobs / 100 people
    - 2000 – 70 jobs / 100 people
    - 2010 – 74 jobs / 100 people
    - 2021 – 67 jobs / 100 people (estimated)
    - 2035 – 75 jobs / 100 people (projected
    - 2050 – 78 jobs / 100 people (projected)

One item to note when considering employment trends shown in the bullet points above is that Woods and Poole includes secondary jobs other data sources do not. These include part time, private household employees, miscellaneous workers, and proprietors. Thus, absolute levels of base year employment were taken from the Infogroup data used by the Bismarck-Mandan MPO to estimate current year employment levels in the TDM. The critical insights offered by the Woods and Poole data are the growth trends by industry sector that can be applied to the current year data.

Quarterly Census of Employment Wages (QCEW) Data

Employment trends are one of the stickiest data points in the TDMSE Update meaning, the data and subsequent forecasts can vary wildly depending upon the data sources used. In previous TDMSE updates, Woods and Poole data were relied upon to estimate jobs. However, Woods and Poole include secondary jobs which other data sources do not. These include part time, private household employees, miscellaneous workers, and proprietors.

Table 3. Comparison of Employment Estimates

Data Source	BEA	Woods & Poole	QCEW	Data Axle
2021 Burleigh County Employment Estimate	75,145	75,098	56,290	56,493

Given the significant changes seen in the workforce and labor market during and after the COVID-19 pandemic, the BMMPO pursued a simpler, more realistic[2] data-source to base employment projections from QCEW data.

Base year employment data was taken from the Data Axle data used by the BMMPO to estimate current year, or 2021 employment levels

[2] Based upon City of Bismarck staff's monitoring of employment projections and accuracy as compared to local conditions, QCEW was referenced in Steering Committee Meeting #2 as being the most accurate.

in the TDM. The Data Axle data matched closely to the QCEW data, as shown in Table 3 using Burleigh County as an example. The critical insights gleaned from the Woods and Poole data are the growth trends by industry sector and GDP which were then applied to the current year data.

Comparing QCEW based data with that of previous TDMSE updates, there is a stark difference however, QCEW was used for the baseline of the 2022 TDMSE Update for several reasons:

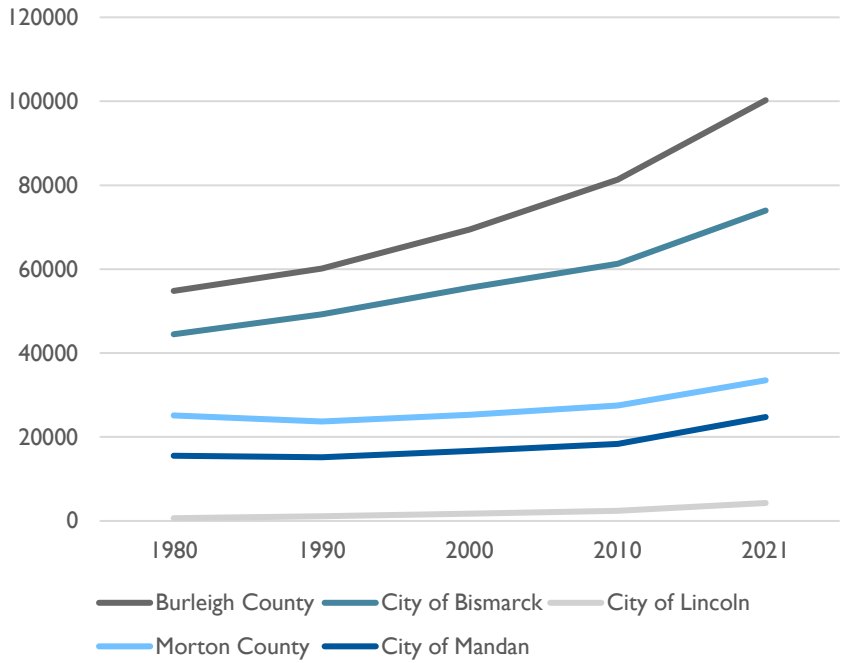
- Excludes most home-based employment and those receiving unemployment benefits (trips associated with each are factored into how ATAC models household trips).
- Known in the TDM industry as being the top federal resource for estimating at-work employment[3].
- Matches Data Axle baseline data purchased by the BMPPO in 2021.
- Incorporates Woods & Poole data to set growth trends and reasonableness of growth.

Previous TDMSE updates leaned on BEA and/or Woods and Poole data which is locally known to overestimate jobs for the region.

Regional Growth Trends

The Bismarck-Mandan area has experienced consistent growth over the past several decades, with some periods of rapid growth. In the period 1980-2021, the region has grown approximately 1.6% per year, on average, with the decade between 1980-1990 being the slowest (0.5% per year) and 2010-2021 being the fastest (2.3% per year). Figure 9 shows the population growth in Burleigh and Morton counties since 1980.

Figure 10. MSA Historic Population Growth Trends



[3] TRB. National Cooperative Highway Research Program (NCHRP). (2016). Report 716. Chapter 3. Pg. 16. Virginia Department of Transportation, Transportation and Mobility Division. (2020) Travel Demand Modeling and Procedures.

Previous Studies

Development scenarios considered past completed planning efforts with socio-economic forecasts from the region. The following plans were reviewed and are listed below:

- *Together 2045: Bismarck's Comprehensive Plan (2022)*
  - Population growth through 2045: 1.2%
  - Household growth through 2045: 1.1%-1.6%
  - Employment growth through 2045: N/A
- *Arrive 2045 Metropolitan Transportation Plan (2020)*
  - Population growth through 2045: 1.2%
  - Household growth through 2045: 1.2%
  - Employment growth through 2045: 1.7%
- *Envision 2040: 2015-2040 Bismarck-Mandan MPO Long Range Transportation Plan (2015)*
  - Household growth through 2040:1.9%
  - Employment growth through 2040: 2.2%
- *Bismarck-Mandan MPO 2010-2035 Long Range Transportation Plan*
  - Household growth through 2035: 1.3%
  - Employment growth through 2035: 1.2%

The previous studies averaged the following growth rates:

- Population: 1.2%
- Households: 1.4%
- Employment: 1.7%

Higher rates of growth forecasts were assumed during western North Dakota's oil boom, which peaked in 2014 and is reflected in the BMMPO's 2015 LRTP/MTP. Please see Appendix D for further detail.

Potential Growth Scenarios Considered

Based on the data, trends reviewed, and previous studies, the TDMSE Update steering committee convened and identified three preliminary scenarios for further consideration. These three scenarios were developed from a population growth perspective only, with an understanding that employment and household details would be developed based on the selected population scenario. These three potential scenarios were based upon a stable and steady development pace anticipated by the region moving forward:

High Growth Scenario: "High Growth without an Oil Boom"

Steady pace of growth in between historic averages and previous forecasts. Guided by identified heightened opportunities, challenges, and national trends.

- This scenario yields an average 1.4% annual growth rate.
- Total scenario 2050 MPA Population of 202,780.

Medium Growth: "Realistic Growth"

Steady pace of realistic growth with expectations guided by identified opportunities, challenges, and national trends.

- This scenario yields an average 1.1% annual growth rate.
- Total scenario 2050 MPA Population of 186,610.

Low Scenario: "Conservative Growth"

Steady pace of conservative growth with expectations guided by identified opportunities, heightened challenges, and national trends.

- This scenario yields a 0.9% annual growth rate.
- Total scenario 2050 MPA Population of 173,180.

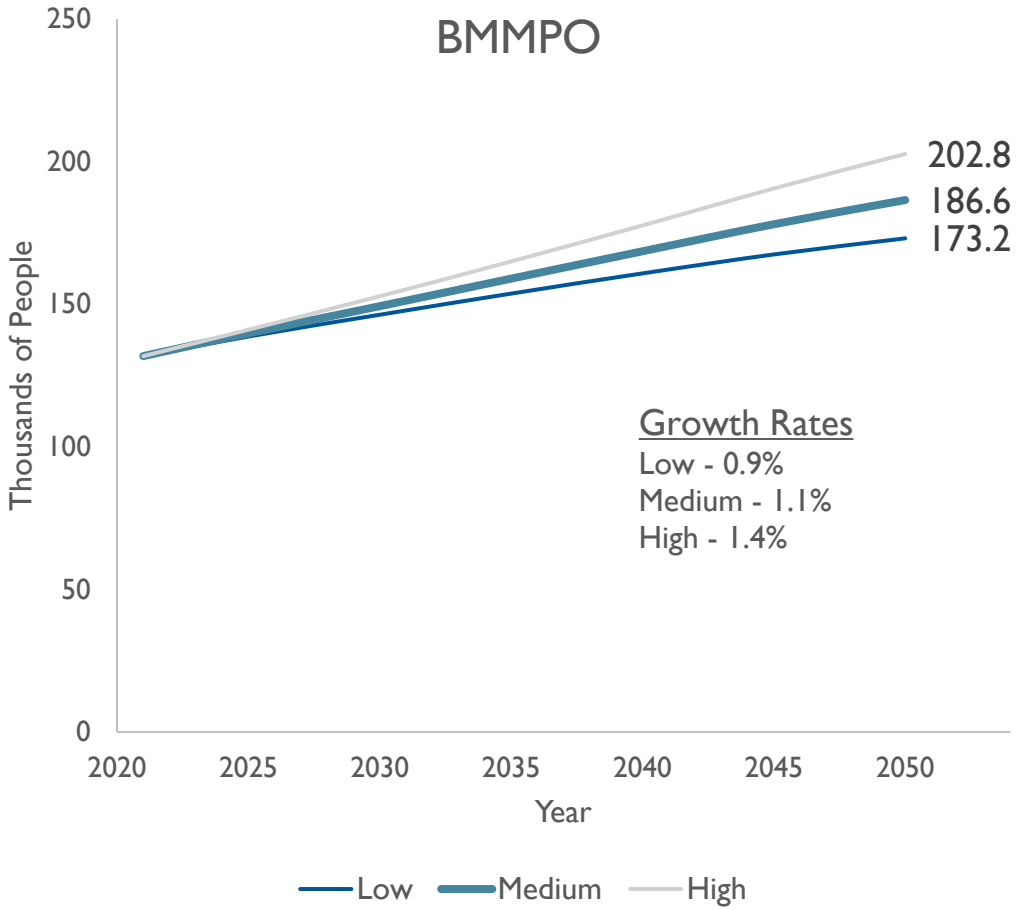
The three scenarios were presented to the MPO's TAC and Policy Board in March 2023. Based on the recommendation of the Steering Committee, the TAC and Policy Board decided to advance these three development scenarios for further consideration, and inclusion of all three in the scenario planning efforts of the Metropolitan Transportation Plan (MTP) update:

- High: "High Growth without an Oil Boom"
- Medium: "Realistic Growth"
- Low: "Conservative Growth"

The MPA population growth associated with these three scenarios is illustrated in Figure 10. The TAC and Policy board also identified a preferred growth scenario, as highlighted below.

Future levels of households and employment totals were projected based on the trends from Woods and Poole for the three development scenarios established by the TAC and Policy Board. Household growth forecasts were derived by applying the household size factors derived from Census and Woods and Poole data, and are identified in Table 4. The resulting MPA household totals for the preferred growth scenario are also shown in Table 4.

Figure 11. MPA Population Forecasts



A summary of the growth scenarios is provided in Appendix E.

Employment growth forecasts were developed by industry sectors, based on projected trends from QCEW, GDP, and Woods and Poole data as described in the sections above. The resulting MPA employment totals for the preferred scenario are illustrated in Table 5.

Table 4. Preferred (Medium) Growth Household Projections

Households Characteristics							
Year	2021	2025	2030	2035	2040	2045	2050
Households	56,130	63,100	68,830	72,870	76,490	78,560	82,720
PPHH	2.3	2.2	2.1	2.2	2.2	2.2	2.2
HH with Children	17,644	18,325	19,581	20,006	20,818	21,952	22,793
3+ Veh	21,072	22,625	23,682	24,433	25,008	25,368	26,076
2 Veh	24,019	27,619	30,706	32,879	34,883	36,011	38,286
1 Veh	10,209	11,916	13,410	14,462	15,444	15,992	17,102
0 Veh	830	940	1,032	1,097	1,156	1,189	1,256
Renter Households	17,955	20,590	22,796	24,343	25,746	26,540	28,137
Household Structure Type							
Year	2021	2025	2030	2035	2040	2045	2050
HH in 1-unit strucuture	33,990	36,268	37,740	38,787	39,548	40,039	40,999
HH in 2 or more unit structure	16,896	20,925	24,634	27,240	29,751	31,131	33,933
HH in Mobile or Other	5,243	5,907	6,456	6,843	7,191	7,389	7,788

Household Income Distrbution							
Year	2021	2025	2030	2035	2040	2045	2050
Less than $10,000	5.7%	6.1%	6.5%	6.7%	6.9%	7.0%	7.2%
$10,000 to $14,999	4.3%	4.4%	4.5%	4.6%	4.6%	4.6%	4.7%
$15,000 to $24,999	9.2%	9.5%	9.8%	9.9%	10.1%	10.2%	10.3%
$25,000 to $34,999	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%
$35,000 to $49,999	12.6%	12.2%	11.9%	11.7%	11.6%	11.5%	11.3%
$50,000 to $74,999	18.0%	17.0%	16.2%	15.7%	15.2%	14.9%	14.5%
$75,000 to $99,999	14.4%	14.1%	13.9%	13.8%	13.6%	13.6%	13.4%
$100,000 to $149,999	16.6%	17.0%	17.3%	17.5%	17.7%	17.8%	18.0%
$150,000 to $199,999	5.2%	5.2%	5.1%	5.1%	5.1%	5.1%	5.1%
$200,000 or more	4.9%	5.3%	5.7%	5.9%	6.1%	6.2%	6.4%

Household Size Distrbution							
Year	2021	2025	2030	2035	2040	2045	2050
1 Person	32.4%	34.1%	35.7%	36.6%	37.5%	38.0%	38.8%
2 Person	37.8%	38.4%	39.0%	39.4%	39.7%	39.9%	40.2%
3 Person	13.8%	13.2%	12.6%	12.3%	12.0%	11.8%	11.5%
4 Person	10.1%	9.1%	8.2%	7.6%	7.1%	6.8%	6.3%
5 Person	4.5%	3.9%	3.4%	3.1%	2.8%	2.6%	2.3%
6 Person	1.1%	0.9%	0.8%	0.7%	0.7%	0.6%	0.6%
7+ person	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%

Table 5. Preferred (Medium) Growth Employment Projections

BMMPO Medium Employment Scenario									
NAICS 2-Digit Code & Employment Sector		% Linear Growth	**2021**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
11	Agriculture, forestry, fishing and hunting	1.4%	250	250	250	350	250	400	350
21	Mining, quarrying, and oil and gas extraction	0.7%	250	250	300	250	300	300	300
22	Utilities	1.5%	350	350	350	400	400	450	500
23	Construction	1.2%	3,750	4,800	3,850	4,800	4,450	4,700	5,050
31-33	Manufacturing	0.7%	2,700	3,050	3,050	3,050	3,150	3,200	3,250
42	Wholesale Trade	1.5%	3,400	3,900	3,700	3,900	4,200	4,500	4,900
44-45	Retail Trade	1.0%	7,350	7,450	7,500	8,000	8,650	8,750	9,550
48-49	Transportation and Warehousing	1.7%	2,350	2,450	2,650	2,850	3,100	3,200	3,500
51	Information	-1.1%	750	700	600	600	600	500	500
52	Finance and Insurance	0.3%	2,550	2,900	2,550	2,850	2,750	2,900	2,800
53	Real estate and rental and leasing	4.0%	600	800	800	950	1,000	1,200	1,300
54	Professional, scientific, and technical services	2.8%	3,450	3,800	3,950	4,550	5,150	5,600	6,250
55	Management of companies and enterprises	2.8%	1,400	1,550	1,600	1,900	2,100	2,300	2,550
56	Administrative and support and waste management and remediation services	1.1%	2,550	2,700	2,600	2,900	3,100	3,200	3,400
61	Education services	2.3%	1,800	1,900	1,950	2,150	2,450	2,650	3,000
62	Health care and social assistance	1.7%	11,150	12,150	12,500	13,350	14,550	15,200	16,500
71	Arts, entertainment, and recreation	3.0%	1,150	1,300	1,550	1,650	1,850	2,000	2,150
72	Accommodation and food service	0.1%	5,850	6,000	6,050	5,950	6,100	6,050	6,050
81	Other services (except government and government enterprises)	0.3%	2,300	2,450	2,300	2,450	2,400	2,550	2,500
92	Government and government enterprises	1.3%	6,050	6,300	6,650	7,050	7,450	7,900	8,300
TOTAL		**1.3%**	**60,000**	**65,100**	**64,800**	**70,000**	**74,000**	**77,600**	**82,700**

Preferred Growth Scenario

For the BMMPO's planning purposes, it was necessary to select an official future development scenario. This official development scenario would be the baseline planning scenario for 2035 and 2050 planning horizons, including the basis for developing the "fiscally-constrained" elements of the MPO's MTP.

The process for adopting the official development scenario included discussions and decisions from three different groups.

Steering Committee

A presentation and discussion of the three final development scenarios was held with the steering committee on February 13, 2023. The purpose of this meeting was the selection of a recommended official MPA development scenario for the TDMSE Update and subsequent MTP update. The steering committee discussed the past and future economic and demographic trends, within the MPA, the wider state, and the nation. The steering committee decided that the Medium / "Realistic Growth" scenario was the most reasonable scenario to use. The reasons communicated by steering committee members for this recommendation were:

- The medium or "Realistic Growth" scenario reflects 30 years of booms and busts in Bismarck-Mandan, including the late 1980s (bust), early 2010s (boom), and post COVID-19 era (uncertainty). With oil development stable, less-exaggerated highs and lows the region might experience in the future are reflected by this development scenario.
- Housing and employment trends across the nation, including the Bis-Man market, have created uncertainty in how people will live and work in the future.
- It is understood that the oil extraction industry and technology has matured, and even if a significant prolonged increase in oil prices occurs during the planning horizon it would likely require less of a worker influx than the recent oil boom, as most of the infrastructure to increase production is in place.

Technical Advisory Committee

The MPO's TAC met on March 20, 2023, with an action item to provide a recommendation for selecting a development scenario. After a brief presentation and some discussion of all scenarios, the TAC forwarded the recommendation for approval of the Medium / "Realistic Growth" scenario as the official BMMPO development scenario.

Policy Board

The MPO's Policy Board met on March 21, 2023, with an action item to approve a final BMMPO development scenario. After a brief presentation and some discussion, the Policy Board voted to adopt the Medium / "Realistic Growth" scenario as the official MPO development scenario.

Growth Allocation

The purpose of development allocation was to identify the location and timing of the new jobs and housing associated with the three future development scenarios. For the purposes of use in the TDM, growth needed to be allocated to the transportation analysis zone (TAZ) geographies of the model for both the 2035 interim planning horizon and the 2050 planning horizon.

The allocation of future land development was guided primarily by:

- An understanding of current development densities (jobs per acre, housing units per acre).
- Local planning and development expertise on the land development market.
- Geographic Information System (GIS) mapping of recent building permits, future land use plans, and land suitability elements such as flood zones, elevations, and wetlands.

The development allocation was structured in sequential development tiers. The development tiers were a combination of year (either 2035 or 2050) and development scenario (low, medium, or high). Six tiers were identified so that each growth area was assigned to a tier according to its assumed sequence of timing:

- Tier 1: Low / Conservative Growth Scenario for 2035
- Tier 2: Medium / Realistic Growth Scenario for 2035
- Tier 3: High / High Growth without an Oil Boom Scenario for 2035
- Tier 4: Low / Conservative Growth Scenario for 2050
- Tier 5: Medium / Realistic Growth Scenario for 2050
- Tier 6: High / High Growth without an Oil Boom Scenario for 2050

The tiers were compounding so that Tier 3 High / High Growth without an Oil Boom level of job and household growth for 2035 included all of the development associated with Tiers 1 and Tier 2.

Current Development Densities

Typical development densities were identified through a review of current development patterns based on a combination of geographic information system (GIS) aerial photos, parcel data, and Data Axle employment data from the BMMPO. The review indicated the following typical development densities:

- **Multi-Family Residential:** 16 units / acre
- **Urban Single-Family Residential:** 2.6 units / acre
- **Rural Single-Family Residential:** 0.6 units / acre
- **Commercial:** 18 jobs / acre
- **Industrial:** 6 jobs / acre

Commercial developments looked at office developments and shopping developments separately, looking at the breakdown of service industry, retail industry, and "other" industry jobs for each. It was noted that more recent suburban commercial developments in Bis-Man had seen higher job densities. For instance, the area northeast of State Street and Century Avenue in Bismarck, which is a mix of retail, service, and office uses, has over 23 jobs per acre. Through discussions with the steering committee and understanding of the tight labor market, 18 jobs per acre for commercial is utilized for future development density assumptions.

Like commercial, industrial developments looked at the breakdown of industrial industry, manufacturing industry, and "other" industry jobs for each. Many industrial developments in the region are relatively low-density. The city staff on the steering committee suggested more typical developments would trend towards a density of 6 jobs per acre for future developments.

Development Allocation Workshop and Revisions

Once the expected future development densities were established, the allocation effort transitioned into working with the steering committee, particularly members involved in planning and development within their jurisdiction, to identify the likely location and sequential timing of developments. This process involved first holding a workshops on April 14, 2023, which established the major growth areas and projected development timing by tier for the study area. The workshop was an opportunity to identify the locations of future growth by type and timing. The major elements of the workshop involved:

- **Verifying 2022-2023 Development Areas:** The model is a 2021 baseline, so the future year data needed to incorporate any development that had occurred since January 2022. Much of this work was completed prior to the workshop, including reviewing updated building permit data in GIS, reviewing recent aerial photography to verify, and discussing reasonable jobs and housing assumptions for each recent development.
- **Reviewing On-going and Near-Term Developments:** The workshop participants identified ongoing and recently-platted commercial and residential developments. These developments were associated with Tier 1 and Tier 2, as they were the most likely to occur next.
- **Reviewing GIS data and recently completed future land use plans to identify Mid-Term and Long-Term Developments:** The workshop participants discussed next parcels and groups of parcels for development, with an understanding of the likely development environment and constraints. These locations were primarily associated with Tiers 3 through 4.
- **Discussing Infill Opportunities:** Planning staff identified opportunities for infill development in the downtown areas and fringe areas located in proximity or with accessibility to city centers. In Bismarck, staff identified areas for potential commercial and residential development, based on an assessment of underutilized serviceable parcels. In Mandan, staff recommendation guided by the Mandan Downtown Subarea Study was used to identify locations and development assumptions. Infill development was assumed in all growth tiers and across each scenario.
- **Discussing Development Details:** As the workshop went through individual parcels and groups of parcels for developments, comments were recorded on development timing, unique features on development density or type. These discussions informed how many jobs and how many housing units could fit within the identified development areas, and which Tier each area should fall into.

Following the allocation workshop a first draft of the resulting development types and development timing was developed in GIS, with additional time spent refining development areas and jobs and housing calculations by area. This first draft was distributed to the steering committee for review and comment in May 2023.

Several iterations of follow-up small-group and individual conversations about refinement of the draft development allocations occurred from May 2023 to October 2023. The revised development allocations were incorporated into the TAZ geographies and submitted to the steering committee for final review on October 19, 2023. Based on final comments received, the development allocation was finalized. The final development allocation was presented to the TAC and Policy Boards at the April 2024 meetings. Figure 13 shows the resulting allocation of households by TAZ. Figure 14 shows the allocation of jobs by TAZ.

Figure 12. Preferred (Medium) Employment Growth Scenario

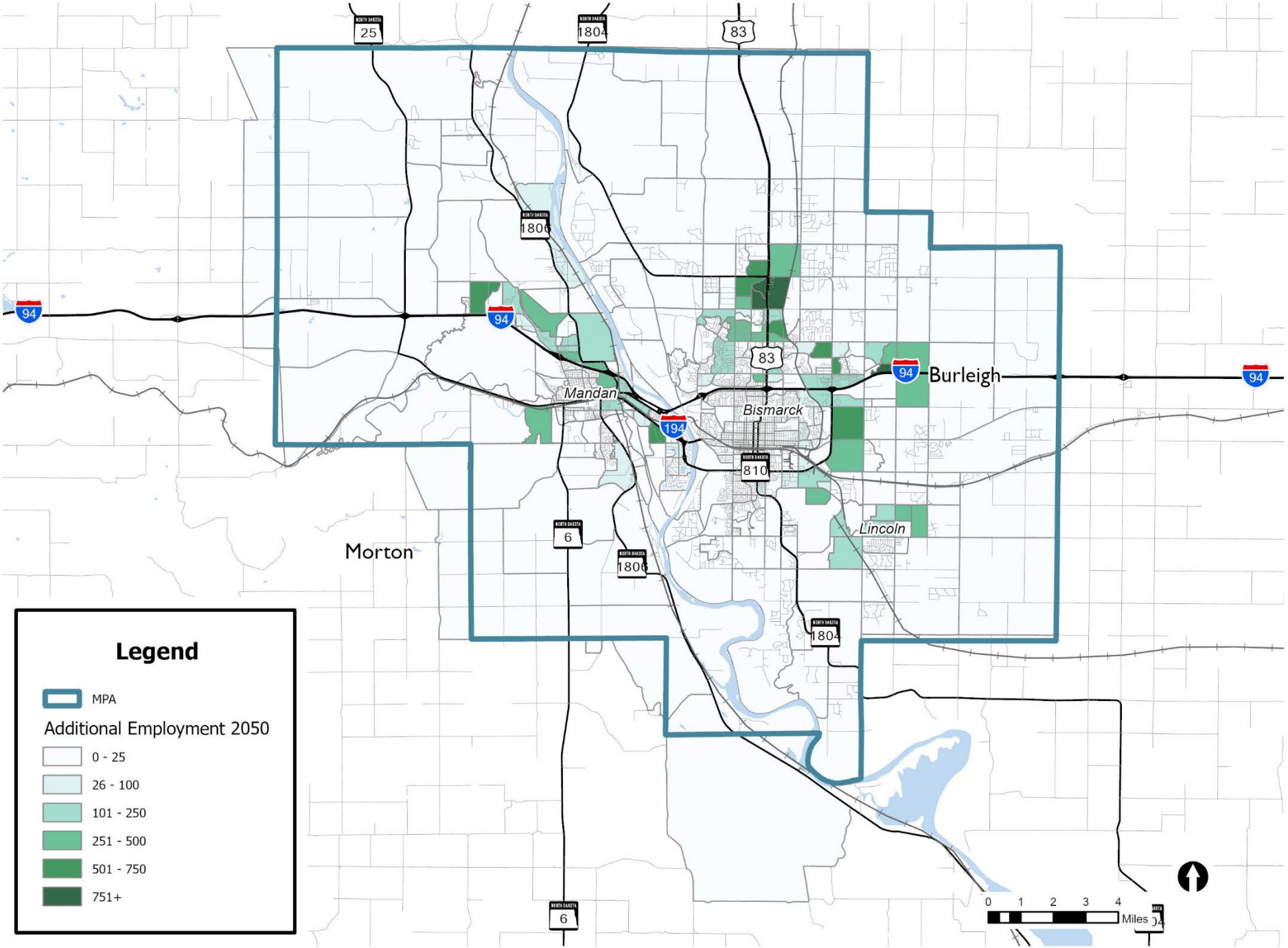
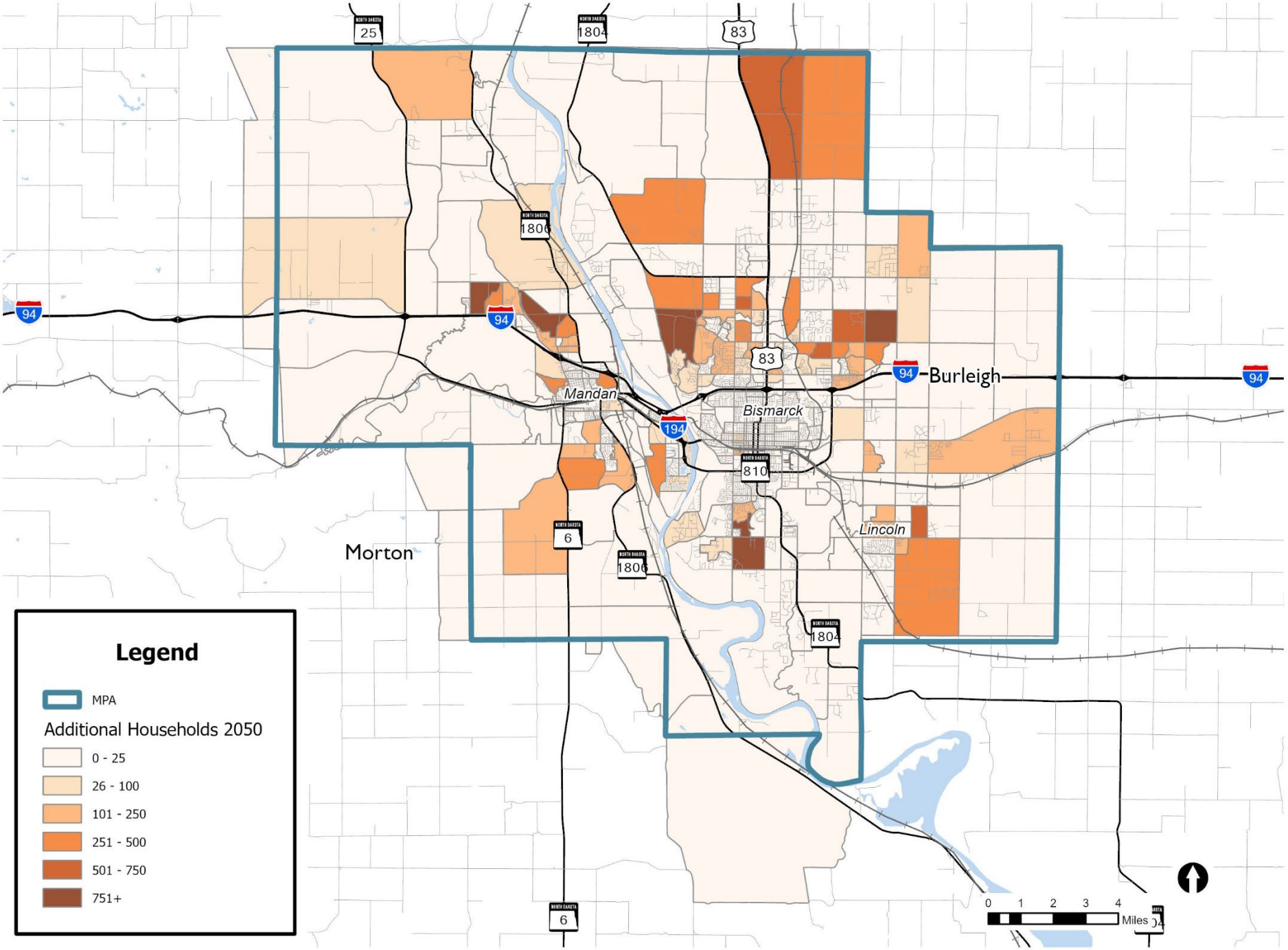


Figure 13. Preferred (Medium) Household Growth Scenario



Travel Model Review

The overall goals of the travel model review were to review the travel model for reasonable assumptions and to get steering committee input on model construction.

Model Technical Review

As with the 2045 version of the TDM, the review of the model focused on developing a useful tool for transportation planning applications. The goals of the model review were to work with ATAC to provide a model that provided:

1. A good representation of existing travel patterns, and
2. Flexibility to respond to transportation network and socio-economic inputs.

This second point is an important consideration because some models have several parameter constraints that provide a model that accurately replicates observed travel patterns but can constrain the model too much so that it cannot be a useful scenario tool that responds to desired tests of network and socioeconomic changes.

The model review team structured the model technical review to focus on the elements summarized in this section.

Model Network Review

The model team and the TDMSE steering committee reviewed several elements of the model network, including:

- **Transportation Analysis Zone (TAZ) construction**: the original TAZ structure was developed by MPO staff based on Census geography. During review of the TAZs, it was determined that one TAZ should be subdivided. The area east of State Street, north of 43rd Avenue, south of 57th Avenue, and west of Hay Creek contains several significant large retail, service, and residential trip generating uses and was originally all a single TAZ. It was decided that this TAZ should be split into three (3) TAZs with Skyline Boulevard and La Salle Drive acting as the dividing line for this subdivision.
- **Centroid Connectors**: In several locations, centroid connector locations were adjusted to best reflect how development in the TAZs could actually access the arterial and collector network. There were extensive edits made to the original version of the network based on this centroid connector review.
- **Local Street Network**: In several locations, it was recommended that that local streets get added to the network to do a better job of reflecting how TAZ traffic would actually load onto the network. These local streets were added into the network.
- **TAZ data miscoding**: During the model review, it was noted that some TAZs had data but did not assign any trips to the network. This was due to a difference in TAZ name and centroid identification numbers, and this was fixed during review.

Base Year 2021 Model Socio-Economic Data

The model review team noted some TAZs that had significant development in reality had unreasonably low socio-economic data. These discrepancies were addressed by the model development team at ATAC.

Script Review

During review of the model script, several items were identified which were addressed.

Distributed Trips

Initially, trips were lost during the model trip distribution procedure. Table 6 shows the old (before trip distribution) and distributed trips (after trip distribution). Initially, 6.4% of trips were lost during the processing steps. ATAC updated the script which resulted in about the same number of distributed trips as balanced trips (with some rounding error). Table 7 shows the new balanced trips.

Table 6. Original (Pre-Review) Model Trip Distribution Loss

	Original Balanced Trips (From Trip Generation)	Original Distributed Trips (Into Trip Distribution)	Percent Difference
Total	541,207.9	506,406.97	-6.4%

Table 7. Revised (Post-Review) Model Trip Distribution Loss

	Updated Balanced Trips (From Trip Generation)	Updated Distributed Trips (Into Trip Distribution)	Percent Difference
Total	540,941.3	541,525.10	0.1%

IE & EI Freight Trip Program Input File Location

One program in the script initially searched for a file location that differed from the other programs for the same file. As a result, anyone running a scenario would receive an error message unless the user copied an additional file into a new scenario file location. Instead, it was recommended to have the IE & EI Freight Trip Program file use the same input file location for the *Socioeconomic_2020.dbf* file as the other programs in the script so that running scenarios does not require additional file management outside of the script.

Speed Adjustments

ATAC used travel probe data to make adjustments to posted speeds by facility type for multiple subareas across the model area. Several of the adjustments were rather severe adjustments to posted speeds, with adjustments 10 to 15 miles per hour lower or higher to posted speeds. The concern was that these adjustments to base year speeds would carry unreasonably restrictive link coding into the future year. The model review team pointed out these speed adjustments to the ATAC staff and suggested these speed adjustments be within five (5) miles per hour of the posted speeds. These reduced speed adjustments were made to the final version of the model.

Post-processing

Post-processing is a forecasting refinement that adjusts the traffic volume output of a scenario model run according to the level of deviation seen for that link in the base year model. The future year model outputs originally did not include the correct base year absolute and relative difference values that were calculated in the base year, leading to missing calculations. The model review team moved those values to the E+C road network, so that adjusted volumes could be calculated.

Trip Generation

Separate production and attraction modules are used for trip generation. The model includes some standard trip purposes that the model review team reviewed against other sources to look at consistency. Those standard trip purposes were:

- Home-Based Work (HBW)
- Home-Based Shopping (HBSH)
- Home-Based Other (HBO)
- Non-Home Based (NHB)

The trip attraction rates used by the travel demand model for these standard purposes are shown in Table 8 below. The trip attraction rates are relatively consistent with the national trip rates documented in National Cooperative Highway Research Program (NCHRP) Report 716.

Table 8. Trip Attraction Rates

Purpose	Household	Other Jobs	Retail Jobs	Service Jobs
HBW	0	1.284	1.284	1.284f
HBSH	0	1.08	5	0.91
HBO	1.2	0.2	1.1	1.5
NHB	0.6	0.5	2.1	1.4

The trip production rates approach uses household size for trip rates for each trip purpose and shown in Table 9 below.

Table 9. Trip Production Rates

Trip Purpose	1-Person Households (HH)	2-Person HHs	3-Person HHs	4-Person HHs
HBW	1.049	1.665	2.624	2.457
HBSH	1.127	2.092	3.424	3.242
HBO	1.322	2.465	2.390	4.665
NHB	2.006	2.421	2.961	3.329

The other trip purposes in the model include:

- Grade School
- Middle School
- High School
- Freight

University trips are generated in terms of HBW, HBO, NHB, and HBSH for Bismarck State College, University of Mary, and United Tribes Technical College.

Additionally, special generators are used for hospitals, shopping malls and supercenters, and the Airport. The special generator number of productions and attractions are determined using the initially calculated productions and attractions based on employment data and trip rates, and then scaled up or down.

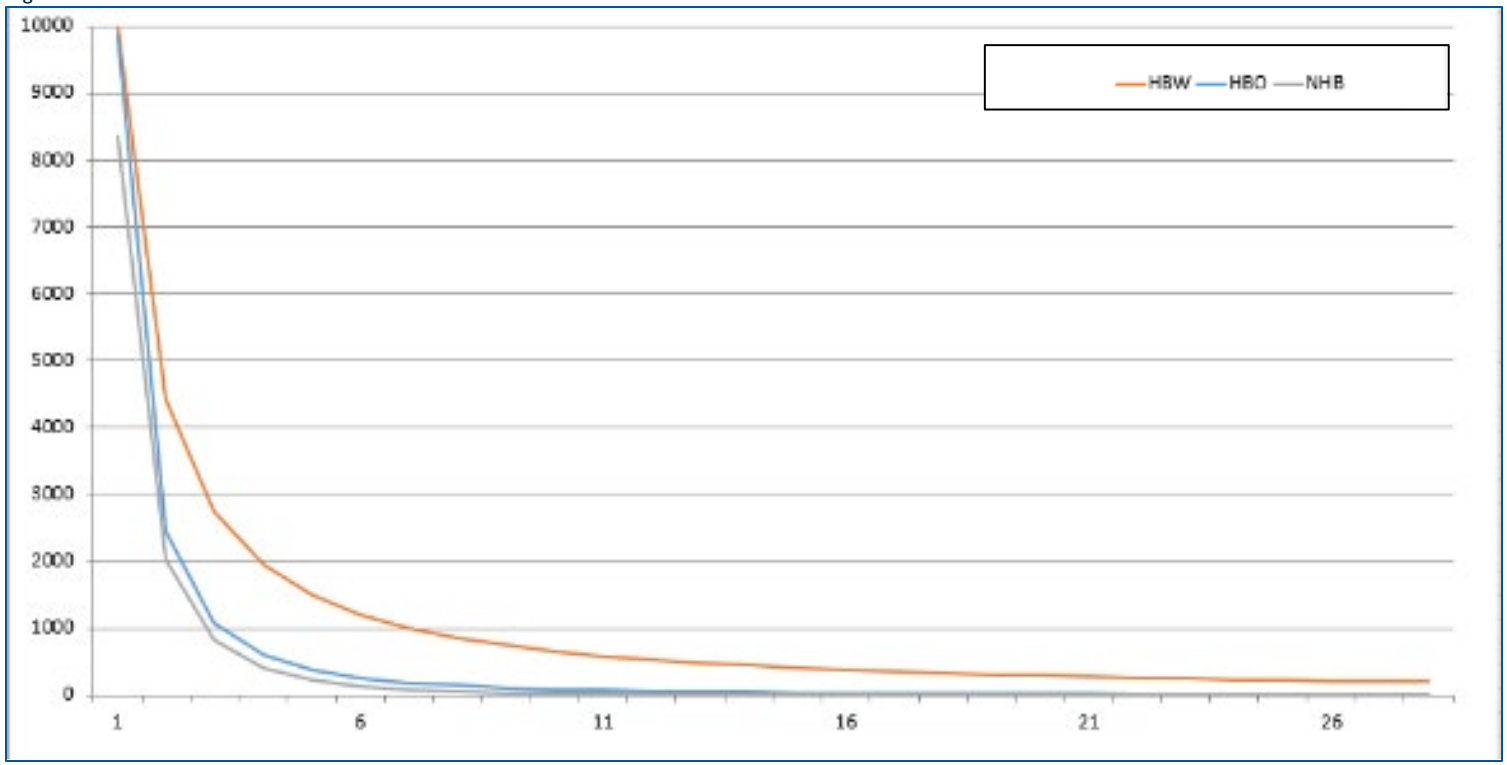
Trip productions and productions do not go through a balancing step, instead the input trip rates result in balanced trips.

Trip Distribution

Trip distribution is completed through use of a gravity model, a standard approach to trip distribution that predicts the trip interaction between two TAZs based on two factors: the amount of activity in a zone (measured in jobs and households) and the cost of traveling between the zones (measured in time). Additional factors are used to specify the gravity model to fit observed conditions in the Bismarck-Mandan area.

Friction Factors specify how much time is a disincentive to travel in the gravity model. The friction factor curves are shown in Figure 16. These curves are relatively standard applications and deemed appropriate by the model review team.

Figure 146. Bismarck-Mandan Friction Factor Curves



K-Factors are special "socio-economic" factors that adjust trip-making behavior to account for forces not explained by other elements of the gravity model. They are recommended to be used sparingly and only for special circumstances. Two different k-factors are used in the Bismarck-Mandan model:

- Trips crossing the river have a 0.8 k-factor placed on them. All else being equal, this factor places a slight penalty on a trip crossing the Missouri River from the east side to the west side.
- Trips with both trip ends east of the river have a k-factor of 1.2 placed on them. All else being equal, this factor slightly increases the propensity of trips to stay east of the river.

In both cases, there is likely a case that residents on each of the river are slightly more likely to choose a trip destination on their own side of the river. Thus, these k-factors are somewhat minor and for the most part are considered reasonable.

Time of Day Element

The Bismarck-Mandan model includes three time periods for the AM peak, the PM peak period, and all other periods (off-peak). This approach provides some enhanced benefits to the model for period-only capacity assessments, and no exceptional items were noted during review of this element.

External Traffic

While traffic with internal trip ends are generated and distributed according to socio-economic data, external traffic is estimated through asserting trip levels and patterns, rather than model generated elements. The original version of the model had major discrepancies ADTs at external stations (shown in Table 10). Given the complexity of modeling external process, this was pointed out to ATAC staff and some revisions were made to get this deviation lower particularly for the higher volume stations. The revised external station deviations are shown in Table 11.

Table 10. Original Model External Station Volume Deviation

Zone	Name	Counted ADT	Modeled ADT	Deviation
447	Highway 25 N	1,400	1,478	5.6%
448	I-94 W	10,880	9,982	-8.3%
449	Hwy 139	1,345	1,245	-7.4%
450	Hwy 6 S	2,385	2,224	-6.8%
451	US 83 N	7,245	6,838	-5.6%
452	Hwy 1806 S	1,440	1,769	22.8%
453	Hwy 1804 S	595	481	-19.2%
454	Apple Creek	835	781	-6.5%
455	Co Rd 10	4,895	4,591	-6.2%
456	Hwy 1806 N	485	495	2.1%
457	I-94E	9,520	8,692	-8.7%
458	71st Ave	5,620	5,518	-1.8%
459	Hwy 1804 N	480	472	-1.7%

Table 11. Revised Model External Station Volume Deviation

Zone	Name	Counted ADT	Modeled ADT	Deviation
447	Highway 25 N	1,400	1,567	11.9%
448	I-94 W	10,880	10,682	-1.8%
449	Hwy 139	1,345	1,332	-1.0%
450	Hwy 6 S	2,385	2,380	-0.2%
451	US 83 N	7,245	7,315	1.0%
452	Hwy 1806 S	1,440	1,893	31.5%
453	Hwy 1804 S	595	622	4.5%
454	Apple Creek	835	835	0%
455	Co Rd 10	4,895	4,912	0.3%
456	Hwy 1806 N	485	532	9.7%
457	I-94E	9,520	9,303	-2.3%
458	71st Ave	5,620	5,903	5.0%
459	Hwy 1804 N	480	504	5.0%

Traffic Assignment

The traffic assignment step occurs after all trip origins and destinations have been identified and the travel route is selected. The Bismarck-Mandan travel model uses a rather standard approach to traffic assignment with a User Equilibrium methodology supported by a Bureau of Public Roads (BPR) formulation look up. The model uses daily capacities that are a factor of 10 times higher than hourly capacity (a standard assumption for the industry, reflecting a typical peak hour percentage of daily traffic.)

Traffic Assignment Validation Results

Model validation is a process by which the base year model is compared to existing travel data to determine model performance. The validation statistics from the model indicate that the model does a relatively good job of reflecting observed conditions in the MPO area.

A standard measure of model validation is root mean square error (RMSE). RMSE is a measure that summarizes the standard deviation of the residuals, in this case the amount of error between predicted values and observed values in locations where there was a traffic count. Percentage RMSE (%RMSE) is the standardized way we have evaluated the goodness of fit for the traffic assignment. Table 12 shows the draft validation results by facility type. Table 13 shows the draft validation results by volume range. Generally, this level of %RMSE indicates a good fit between modeled and observed conditions.

Table 12. Validation Results by Facility Type

Facility Type	Number of Counts	% RMSE	Validation Target
Freeways	13	25.65%	30%
Principal Arterials / Expressways	208	26.03%	30%
Minor Arterials	242	43.00%	40%
Collectors	160	59.15%	50%
Total	623	35.40%	N/A

Table 13. Validation Results by Volume Range

ADT Volume Range	Number of Observations	% RMSE
1 -5,000	272	80.48%
5,001 -10,000	179	31.88%
10,001 - 15,000	111	30.11%
15,001 - 20,000	37	20.12%
20,001 - 30,000	18	14.39%
30,001 or higher	5	8.02%

A summary of the model construction and performance from ATAC is provided in Appendix A.

Appendices Available Online or Upon Request

Progress Report

Date:	Friday, April 05, 2024
Project:	Bismarck-Mandan Arrive 2050 Update
To:	Rachel Lukaszewski
From:	Jason Carbee
Subject:	Progress Report for February 25 to March 30, 2024

Please note that this progress report summarizes the work completed during the period above.

TDMSE Task 8 – Model Performance Review

- HDR made final network updates to reflect the comments from the steering committee.
- HDR and SRF continued development of the draft document, submitting a draft copy to MPO staff for review March 29.
- Awaiting ATAC delivery of the E+C model (received April 3).

MTP Task 1 – Project Management

- The consultants continued monthly accounting and progress reports.
- Consulting team continued internal coordination calls.
- Continued MPO-HDR-SRF team coordination calls.
- Provided updates to TAC and Policy Board meetings.

MTP Task 2 – MTP Engagement

- Study team continued development of outreach materials and planning for April public and stakeholder engagement.
- Study team held the steering committee and individual city of Bismarck meeting on February 26-27.
- Study team prepared for and held steering committee meeting on March 26.
- Prepared for April 2 Stakeholder meetings.

MTP Task 4 – Goals Objectives and Performance Measures

- SRF drafted initial goals and objectives for steering committee review.
- HDR drafted an initial performance measure / project prioritization approach for steering committee consideration.

MTP TASK 5 – Baseline System Conditions

- Made final updates to the existing conditions document.
- Updated draft E+C conditions traffic forecasts and V/C.

MTP TASK 6 – Develop and Screen Alternatives

- Continued development of future project list, including bicycle and pedestrian recommendations from the previous bike/ped plan.
- Continued independent development of other bike / ped alternatives.

MTP TASK 7 – Financial Analysis

- Began development of baseline funding.

Project Progress Summary

Task	Start Date	End Date	Percent Complete		Explanation / Discussion
			Period Start	Period End	
TDMSE Task 1 - Project Management	Sep-22	Aug-23	99%	99%	
TDMSE Task 2 - Outreach and Stakeholder Consultation	Sep-22	Jun-23	100%	100%	
TDMSE Task 3- TDMSE Data Needs	Sep-22	Nov-23	100%	100%	
TDMSE Task 4 - TDMSE Methodology	Oct-22	Nov-23	100%	100%	
TDMSE Task 5 - Development Scenario and Forecasts	Nov-22	Feb-23	100%	100%	
TDMSE Task 6 - Baseline Study Expectations (Forecasts)	Nov-22	Mar-23	100%	100%	
TDMSE Task 7- Allocate Socioeconomic Data	Dec-22	Aug-23	100%	100%	
TDMSE Task 8 - Model Performance Review and Validation	Feb-23	Mar- 24	80%	90%	Anticipating final model presentation in April.
TDMSE Task 9 - Report	Sep-22	Apr-24	50%	80%	
MTP TASK 1 - Project Management	Jun-23	Dec-24	35%	38%	Continued progress meetings, accounting, and invoicing.
MTP TASK 2 – Public Engagement	Jun-23	Dec-24	28%	35%	Working towards late April engagement
MTP TASK 3 – Data Collection	Jun-23	Sep-23	97%	99%	
MTP TASK 4 – Goals, Objectives & Performance Measures	Aug-23	Mar-23	10%	40%	
MTP TASK 5 – Baseline System Conditions	Aug-23	Mar-24	75%	85%	Neared finalization of baseline conditions documentation and initial reviews of future traffic volumes
MTP TASK 6 - Develop & Screen Alternatives	Jan-24	Jun-24	2%	10%	
MTP TASK 7 – Financial Plan and Implementation Schedule	Oct-23	Aug-24	0%	0%	
MTP TASK 8 – MTP Document Development and Review	Jun-24	Dec-24	0%	0%	
Project Totals	Sep-22	Dec-24	47%	53%	

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EXHIBIT E

NDDOT Contract No. 38231482A

North Dakota Department of Transportation

AMENDMENT TO CONTRACT NO. 38231482

Project No. CPG-2024(001)

THIS AMENDMENT to the above-referenced contract is entered into by and between the State of North Dakota, acting through its Director of Transportation, hereinafter known as NDDOT, whose address is 608 East Boulevard Avenue, Bismarck, North Dakota 58505-0700, and Bismarck Mandan Metropolitan Planning Organization, hereinafter known as the Contractor, whose address is 221 North 5th St, PO Box 5503, Bismarck, ND 58506-5503.

WHEREAS, the parties entered into a contract on December 26, 2023; and

WHEREAS, UPWP Amendment #2 added Complete Street set aside funds to two studies and increases the overall contract compensation; and

NOW THEREFORE, the Contractor and NDDOT agree that the "Total Amount of Federal Funds Obligated to the subrecipient" is now $888,857.00; the "Total Federal Award" becomes $ 1,111,071.00 total; $888,857.00 federal; $222,214.00 local match; Section 3 "Compensation" will now be $888,857.00.

All other terms and conditions of the above-referenced contract are incorporated herein by reference and remain in full force and effect.

EXECUTED the date last below signed.

WITNESS:

NAME (TYPE OR PRINT)

SIGNATURE

To be signed by **Owner**; **Partner**; **Corp. Pres**., **Vice Pres**., or **other authorized Corp. Officer**. (If signed by other authorized Corp. Officer, please attach copy of Power of Attorney or other documentation showing authority to sign.)

CONTRACTOR:

COMPANY NAME

OFFICER'S NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

WITNESS:

NAME (TYPE OR PRINT)

SIGNATURE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

DIRECTOR (TYPE OR PRINT)

SS

SIGNATURE

DATE

APPROVED as to substance by:

Paul Benning SH

DIVISION DIRECTOR (TYPE OR PRINT)

Paul Benning

SIGNATURE

03/26/24

DATE

CLA 52494 (Div. 06)
L.D. Approved 5-19-00; 5-03

BOLTON & MENK

Real People. Real Solutions.

Safe Routes to Services Monthly Progress Report #5

Submission Date:
April 5, 2024

Performance Period:
March 2, 2024 – March 29, 2024

Project:
Safe Routes to Services

BMI Job No.: 0T4.131300

Recipient: Bismark-Mandan MPO

Prime Consultant:
Bolton & Menk

Dear Ms. Riepl:

Enclosed is Bolton & Menk's invoice for the Bismarck-Mandan Safe Routes to Services project, for the period ending March 29, 2024. The total fee for work completed during this time period is $14,949.57. A brief overview of the project progress is provided below.

Tasks complete to date:

Task	% Billed	% Complete
Task 1: Project Management	20.8%	25.5%
Task 2: Public Participation	38.0%	33.1%
Task 3: Steering Committee Meetings	18.5%	19.0%
Task 4: Investigate Issues	94.1%	93.1%
Task 5: Identify Alternatives	0.0%	0.0%
Task 6: Implementation Strategies	4.4%	3.6%
Task 7: Engagement Vendors & Direct Expenses	0.0%	0.0%
Total:	**22.6%**	**22.1%**

Summary of Activities Within Invoice Period:

Task 1: Project Management

- Coordination with the project team and BMMPO
- Task and budget management
- MPO TAC meeting
- MPO Policy Board meeting

Task 2: Public Participation

- 5 comment boxes placed in Bismarck and Mandan
- Hosted a total of 5 listening sessions throughout Bismarck
- Project newsletter shared with the Stakeholder List
- INPUTiD™ active

Task 3: Steering Committee Meetings

- No activity during this invoice period

Task 4: Investigate Issues

- StreetLight Data analysis
- Infrastructure analysis
- Barrier assessment

Safe Routes to Services – Monthly Progress Report (cont.)

Task 5: Identify Alternatives

- No activity during this invoice period

Task 6: Implementation Strategies

- Drafting of report

Task 7: Engagement Vendors & Direct Expenses

- No activity during this invoice period

Required Action by BMMPO:

- None in this reporting period

Problems Encountered:

- None in this reporting period

Summary of Project Decisions:

- None in this reporting period

Out of Scope Services:

- None in this reporting period

If you have any questions, please do not hesitate to call me at (701) 306-1670.

Sincerely,

Bolton & Menk, Inc.

Mike Bittner

Mike Bittner, PE, PTOE, PTP, RSP, PMP, IMSA II
Senior Transportation Project Manager

EXHIBIT G

BISMARCK-MANDAN METROPOLITAN PLANNING ORGANIZATION POLICY BOARD ADMINSTRATIVE MODIFICATION TO THE 2023-2024 ANNUAL UNIFIED PLANNING WORK PROGRAM (UPWP)

DATE: March 19, 2024

REGARDING: Funds Transfer from Task 204 and Taks 102

According the MPO's Public Participation Plan, 'The MPO is allowed to move funding between tasks to an amount up to 10% of the total cumulative yearly amount, without North Dakota Department of Transportation (NDDOT) and Federal Highway Administration/Federal Transit Administration (FHWA/FTA) approval.'

According to the currently adopted 2023-2024 UWPW, the 10% threshold for 2024 is $104,751.10. The current funds transfer of $10,000 is within this limit, and the details are descried below. The funds transfer removes funding allocated to Streelight Data under Data Acquisition.

Task	Year	Funds In	Funds Out	Federal Share	Local Share	Beginning Budget	Ending Budget	Local Partner
Task 102: Training Travel and Education	2024	10,000	-	8,000	2,000	6,700	16,700	Bismarck
Task 204: Planning Studies / Data Acquisition	2024	-	10,000			699,475	689,475	

As of March 19, 2024, the date creating this notice, the 2023-2024 UWPW is administratively modified via a funds transfer between tasks. Notice is being given to the MPO TAC and Policy Boards at a future regularly scheduled meeting. Notice will also be given to NDDOT and FHWA. No approvals are needed.

Submitted:

Rachel Lukaszewski — 3/19/2024

Bismarck-Mandan MPO Staff — Date