

**North Dakota State University
Upper Great Plains Transportation Institute
Agency 627
Denver Tolliver, Director**

2021-2023 Biennial Budget Request

**Presented to:
The Senate Appropriations Committee**

January 20, 2021

Greetings, Chairman Holmberg, and members of the Senate Appropriations Committee. My name is Denver Tolliver. I am the director of North Dakota State University's Upper Great Plains Transportation Institute (UGPTI). Thank you for the opportunity to present UGPTI's 2021-2023 budget request to you today. I will start with a review of the agency's statutory responsibilities as spelled out in the Century Code.

1. MAJOR STATUTORY RESPONSIBILITIES

The Upper Great Plains Transportation Institute was established by the Legislature in 1967 (54-53-01) to conduct research in transportation and logistics to facilitate a wider understanding of the marketing factors associated with the geographical location of the state and the upper great plains region (54-53-03). The Institute must make public its findings and conclusions, along with any suggested solutions (54-53-03). In order to carry out its duties, the Institute may contract for and accept private contributions, gifts, and grants-in-aid from the federal government and other sources (54-53-04).

In addition, the Legislature created a transportation council (54-53-02) to serve in an advisory capacity. The council shall consult with the Institute in matters of policy and the development of transportation in the state of North Dakota (54-53-02). The 19-member council includes the following state agencies and stakeholders: Aeronautics Commission, Associated General Contractors of North Dakota, Association of Counties, Chamber of Commerce, Corn Council, Department of Agriculture, Department of Commerce, Department of Transportation, Farmers Union, Grain Dealers Association, Grain Growers Association, League of Cities, Lignite Energy Council, Motor Carriers Association, Public Service Commission, Wheat Commission, a member of Dakota Transit Association, a representative of the manufacturing sector, and a representative of the railway industry.

2. PROGRAMS AND CRITICAL AGENCY OBJECTIVES

UGPTI's research, training, and technical assistance activities that comprise its Core Program provide timely and essential information to state agencies, shippers, businesses, counties, townships, cities, and tribal governments. Some of the agency's leading objectives are to:¹

- Support urban planning by offering expertise in (a) traffic analysis software (e.g., traffic signal optimization and simulation), (b) metropolitan travel demand modeling, and (c) automation of traffic data collection
- Improve mobility by providing transit stakeholders, users, providers, suppliers, and agencies with the information and human resources needed to deliver cost-effective services in rural areas and small urban centers
- Enhance the competitiveness of North Dakota producers and businesses through freight transportation, supply chain, and logistics research
- Improve transportation infrastructure management through statewide models of economic production, truck traffic, road/bridge investment analysis, and asset management
- Support Vision Zero through an improved understanding of safety risks and mitigation strategies for rural areas and tribal communities, and through motor carrier safety research

¹ The objectives are not prioritized.

- Enable the transfer of technology and information to state, local, and tribal units of government through technical assistance, training, and workforce development
- Facilitate the deployment of Intelligent Transportation Systems that use sensors, automated controls, and integrated communication systems to inform travelers and improve highway safety and efficiency

Internally, the Upper Great Plains Transportation Institute is organized into areas of specialization that (for the most part) correspond to client groups (Table 1). Many of these programs are funded from federal grants or by the North Dakota Department of Transportation. Nevertheless, general funds are used to match federal grants and sustain the programs between funding opportunities.

Table 1. UGPTI Centers, Programs, and Focus Areas

▪ Advanced Traffic Analysis Center	▪ Transportation Learning Network
▪ DOT Support Center	▪ Commercial Vehicle Safety Center
▪ North Dakota Local Technical Assistance	▪ Mobility Applications/Real-time Simulation
▪ County Road & Bridge Planning/Needs	▪ Agricultural Freight
▪ Rural Transportation Safety & Security Center	▪ Rural Traffic Analysis
▪ Small Urban and Rural Center on Mobility	▪ Tribal Outreach

UGPTI is the lead institution of the Mountain-Plains Consortium (MPC), a competitively selected University Transportation Center sponsored by the U.S. Department of Transportation. The consortium includes Colorado State University, South Dakota State University, University of Colorado Denver, University of Denver, University of Utah, Utah State University, and University of Wyoming. MPC provides a means of federal funding and access to a wide range of expertise at the member institutions.

3. AUDITS

The Upper Great Plains Transportation Institute was audited by the Office of the State Auditor. A team from the State Auditor’s Office audited UGPTI’s financial transactions and expenditures for the biennium that ended June 30, 2019. The audit did not identify any areas of concern. This was the only audit of UGPTI during the 2019-2021 biennium.

4. ACCOMPLISHMENTS, CHALLENGES, AND GOALS

4.1 Challenges in 2019-2021 Biennium

The current biennium has been one of the most challenging in UGPTI’s history. Major adjustments were needed in research, technology transfer, training, and administration. In January of 2020, UGPTI developed contingency plans for operations during a possible pandemic and was able to quickly shift to a remote work/virtual program delivery environment. UGPTI’s research programs were largely unaffected and continued at a high level of productivity. The only delays were to projects that required field data collection. Nevertheless, UGPTI was able to accomplish all its research objectives during the biennium.

Because most of UGPTI’s training and outreach programs were already distance-based, the pandemic largely accelerated trends that were already occurring. For the most part, audiences want flexible learning opportunities, such as online courses, modules, webinars, and recorded seminars.

While several annual conferences and events with traditionally large gatherings had to be postponed, UGPTI successfully adapted many planned conferences and workshops to virtual events. To compensate for the training events that could not be delivered, new virtual events were added during the biennium, some of them directly related to functions in a pandemic environment. In short, UGPTI continued all its core programs and leveraged new opportunities presented by the changed environment.

4.2 Road and Bridge Needs Study

With its general fund appropriation, the Upper Great Plains Transportation Institute conducted its biennial analysis of county, township, and tribal road investment needs in the state. The study included 71,454 miles of road, including 5,682 miles of paved county road and 56,656 miles of gravel road. The data, assumptions, and results of the study were presented to the Interim Taxation Committee, the Annual Meeting of the Western Dakota Energy Association, the North Dakota Township Officers' Annual Meeting, two meetings of local government officials, and the North Dakota Department of Transportation. Feedback was encouraged throughout the process

Traffic Data Collection. UGPTI counted and classified vehicles at 437 locations on county, township, and tribal roads throughout the state, recording the total number of vehicles per day at each site, as well as the number of trucks, by size category. These statistics were collected in 2019 before the pandemic and should be reflective of long-term traffic patterns. When combined with NDDOT traffic counts on county roads, UGPTI's traffic data provide a comprehensive picture of traffic around the state (Figure 1).

Road Condition and Geometry Data. In addition to the traffic counts, UGPTI analyzed the surface conditions of more than 5,000 miles of paved county road. Ride quality data were collected by UGPTI students and staff in a cost-effective manner using smart phones with special apps to measure road roughness. In addition, video images were captured from the phones, allowing UGPTI staff to assess road conditions (e.g., cracking) and develop composite ride scores.

Surveys. In addition to these data collection efforts, a survey was administered to each county to determine blading and gaveling practices, the sources and costs of gravel, and other cost factors needed for the unpaved portion of the road analysis. All 53 counties responded to the survey. A separate survey was administered to townships. It had a 75% response rate. In addition, discussions were held with the MHA Nation regarding road maintenance practices and needs.

Grain Elevator Truck Use Survey. A separate survey was conducted of grain elevators in the state to determine the types of trucks used to haul grain from farms to elevators (e.g., tandem axle, tridem axle, and tractor-semitrailer), as well as the average distance of the inbound movements. This information is essential when forecasting road investment needs in the central and eastern parts of the state.

Bridge Condition Analysis. The current conditions of 2,261 bridges on county roads were assessed during the biennium. In addition to current condition ratings, condition forecasts were developed using UGPTI's bridge deterioration model.

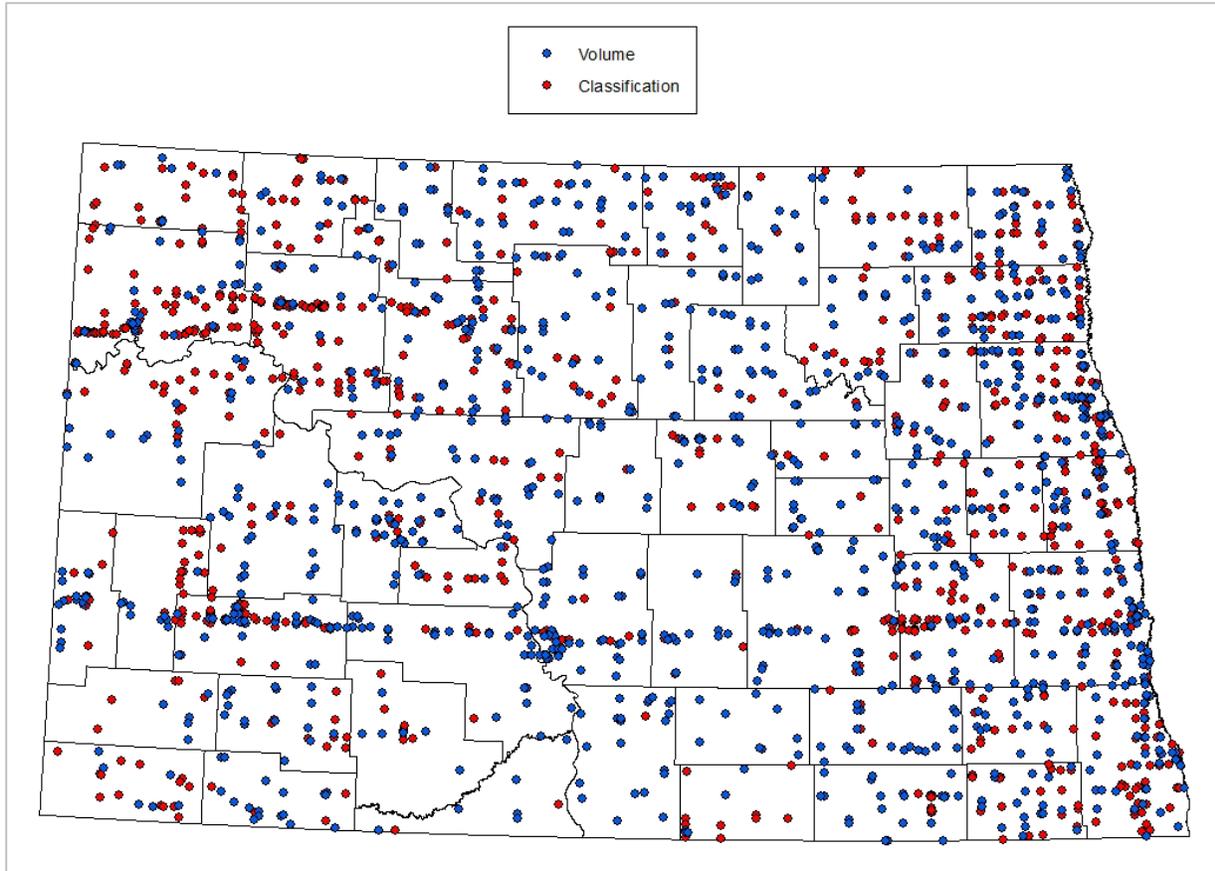


Figure 1 Traffic Counts and Vehicle Classification Studies: UGPTI and NDDOT

Scenarios Analyzed. Given the market uncertainties and impacts of COVID-19, several economic activity/traffic scenarios were analyzed in the study:

1. The original pre-COVID forecast of 1,440 new wells per year (or an equivalent of 60 rigs operating in the state)
2. A revised scenario in which only 564 new wells were added in 2020, and the number of new wells is projected to increase annually, returning to 1,440 wells per year in 2025
3. A lower bound scenario, in which drilling does not return to its original baseline level of 1,440 new wells per year until 2027

4.3 Road and Bridge Asset Management System

With its general fund appropriation, UGPTI significantly improved the Geographic Roadway Inventory Tool (GRIT) in 2019 and 2020. GRIT is an easy-to-use asset management program tailored for county road managers. A steering committee of 10 county transportation managers, the North Dakota Department of Transportation, and the North Dakota Association of Counties provide periodic feedback, guidance, and suggestions for improvements. All data collected by UGPTI (such as paved road condition and traffic information) are uploaded to GRIT and combined with data entered by the counties to provide a consistent inventory of roads throughout the state. GRIT stores and displays information on road surface type and current condition, shoulder width, subgrade strength, and other design features, as well as traffic, construction history, and improvement plans.

In the 2019-2021 biennium, information on routine maintenance activities (such as seal coats), striping, and gravel road treatments were added. In addition, a pavement condition forecasting procedure was included that allows counties to see the expected conditions of roads up to 35 years out. Expanded reporting and mapping capabilities now allow counties to view the percentages of road miles in various condition categories. Other enhancements made during the biennium include:

- The inclusion of emergency related projects such as flooding, so that the public can see where roads are closed
- A load restriction webmap linked to the NDDOT's Traveler Information map that allows truckers to view state and local road restrictions on one webmap
- The ability for counties to set and show active load restrictions (currently being added)
- An inventory and map of bridges and minor structures less than 20 feet in length (data for 25 counties have been added to GRIT thus far)
- The ability to track and display bridge load postings

4.4 Examples of Productivity Levels in 2019-2021

Thus far this biennium, UGPTI and MPC have published 52 peer-reviewed transportation research reports, which are freely available from our website. In addition, UGPTI has offered 460 training, e-learning, and outreach events, in which there were 13,170 participants. These numbers do not include all of UGPTI's e-learning accomplishments or expected events and participants during the remaining six months of the biennium. These are only the results as of December 31, 2020.

4.5 Goals and Plans for 2021-2023 Biennium

Win Critical Grant Competitions for Federal Funding. After the expected reauthorization of the surface transportation (FAST) act, a national competition will be held for the University Transportation Centers (UTC) grant, which is very important to UGPTI. The goal is to win the competition for the regional center and participate in at least one other winning proposal. Winning these competitions will allow UGPTI to maintain its current level of UTC funding. In addition, UGPTI hopes to win an upcoming competition on improving the coordination of rural transit services, so that transit-dependent people can make complete trips using multiple transit programs and service providers.

Road and Bridge Program. This summer, UGPTI staff and students will start the **data collection** effort for the 2021-2023 road and bridge study and update the economic forecasts and models used. In addition, UGPTI will add features and capabilities to the **county road and bridge asset management system**, including new planning and simulation tools for unpaved roads. In collaboration with the NDDOT, UGPTI will expand its **tribal outreach efforts**, making asset management tools more available to tribal nations. This effort has already begun through a collaboration with the MHA Nation in which UGPTI staff are importing the reservation road network into GRIT. UGPTI hopes to partner with other tribal nations in the next biennium to have a comprehensive road inventory across all jurisdictions. In a related effort, UGPTI will continue to refine its **road jurisdiction database**, which not only tells who owns the road segment, but who is responsible for maintaining it.

Road Safety and Technology. UGPTI will continue its work in road safety by working with tribes to enhance their cash reporting systems. Working with the NDDOT, UGPTI will continue to explore opportunities for technology deployment and automation.

Remote Sensing of Surface Transportation Infrastructure. Partnering with the NDDOT and Northern Plains UAS Test Site, UGPTI hopes to launch a new effort that utilizes data from unmanned aircraft for surface transportation planning and asset management. This is the focus of UGPTI’s supplemental budget request presented later.

5. BUDGET REQUESTS

5.1 UGPTI’s 2019-2021 Base Budget

As shown in Column 2 of Table 2, UGPTI’s current general fund appropriation is \$4,396,329. The federal and special fund appropriations are \$12,663,210 and \$6,232,684, respectively. These appropriations provide UGPTI with the authority to collect federal and state grants up to these limits if UGPTI is successful in winning the grant competitions and procuring research contracts.

Table 2. Upper Great Plains Transportation Institute Base Budget and 2021-23 Request

Item	2019-2021 Base	2021-2023 Request	Change to Base	Percent Change
General Fund	\$4,396,329	\$4,621,329	\$225,000	5.1%
Federal Funds	\$12,663,210	\$12,663,210	\$0	0.0%
Special Funds	\$6,232,684	\$6,232,684	\$0	0.0%
Total: All Funds	\$23,292,223	\$23,517,223	\$225,000	1.0%
FTE	43.88	43.88	0	0.0%

5.2 UGPTI’s 2021-2023 Budget Request

UGPTI’s budget request is recommended by its Advisory Council and approved by the State Board of Higher Education. Because of the impacts the 5% cut would have on its existing programs, UGPTI is requesting that its base budget not be cut as called for in the Executive Recommendation. In addition, a supplemental request for \$225,000 is included to establish a much needed program in remote sensing of surface transportation infrastructure. This request represents a 5.1% increase in UGPTI’s current general fund appropriation.

5.3 Special Funds Appropriation

UGPTI does not operate facilities or assess fees that generate revenue on a continuous basis. Rather, UGPTI’s special funds appropriations represent the authority to collect grants and contracts from state and local agencies and private industries. Grants are competitive in nature and subject to the budget constraints of the sponsoring agencies. Therefore, UGPTI’s special funds reflect a range of underlying uncertainties.

Most of UGPTI’s special funds originate from the North Dakota Department of Transportation (NDDOT) under a strategic agency partnership that has benefited North Dakota for the last four decades. In addition to NDDOT funding, an annual grant from the Wheat Commission has allowed

UGPTI to continuously track and report on grain shipments exported from the state over time. Several of North Dakota's Metropolitan Planning Organizations (MPOs) provide regular (although not necessarily annual) funding to UGPTI for travel demand modeling and technical assistance in urban transportation planning. The remainder of UGPTI's special funds consist of one-time funding from in-state commodity groups (such as the Corn Utilization and Soybean Councils), the South Dakota Department of Public Health (for safety studies), the Montana Department of Transportation, the Minnesota Department of Transportation, and several counties in Minnesota.

5.4 Federal Funds

The requested appropriation of \$12,663,210 shown in Table 2 represents a ceiling for UGPTI's federal grant collections. It is the agency's best projection of the authority needed to procure all grants that may become available during the biennium. This figure reflects historical grant levels, applications in progress, and anticipated RFPs.

More than half of UGPTI's funding comes from federal grants and contracts. The vast majority originates from the U.S. Department of Transportation (U.S. DOT), including grants from the Office of the Secretary, Federal Highway Administration, Federal Transit Administration, Federal Motor Carrier Safety Administration, and the National Highway Traffic and Safety Administration. Some grants (such as the University Transportation Center grant) are provided directly to UGPTI by federal agencies. In other cases, the funds are "federal source funds" provided by third parties through the federal procurement process. From a federal funding perspective, UGPTI is almost entirely dependent upon the U.S. Department of Transportation.

Although federal funds are important to UGPTI's budget, they have pre-determined uses. Federal funds must be used to analyze national priorities. They cannot be redirected toward state and local issues. Ultimately, UGPTI has limited discretion in determining which critical issues are researched with federal funds, as these objectives are prescribed in law. Federal research funds are not a substitute for state research dollars.

5.5 General Fund Request

5.5.1 Critical Role of UGPTI's General Fund Appropriation

Although state general funds comprise a minor portion of UGPTI's overall budget, they are essential to the agency's success and sustainability. State general funds are needed to match federal grants and provide continuity in times of delay or disruption in federal funding. Many of UGPTI's direct grants (such as the University Transportation Centers grant) require a 100% match of non-federal source funds. UGPTI's general funds are the only dependable source of match for these funds. Moreover, general funds are the only hard dollars in UGPTI's budget. Federal and special funds are provided at the discretion of intermediate agencies and third parties and are subject to the budget limits placed on these agencies.

5.5.2 Supplemental Request for 2021-2013

Remote sensing of roads, bridges, railroads, pipelines, freight yards, rights-of-way, and essential assets (such as signs and signals) offers great benefits to transportation operators and agencies. Remote sensing, thus far, has been based primarily on satellite images and video or photography from manned aircraft. However, unmanned aerial vehicles (UAVs) offer enhanced potential. In

the near future (with beyond visual line of sight operations) the coverage, timeliness, and usefulness of remotely-generated information can be dramatically improved, along with effectiveness of transportation planning, traffic operations, and incident response.

With UAVs, more information can be generated faster at less cost. Much of the field data collected by humans can be gathered remotely and processed at rapid speeds. Options and response scenarios can be swiftly generated through artificial intelligence, allowing the scarce time and expertise of professional engineers and planners to be used more effectively. Data can be gathered without risking worker safety. Overall job performance and workforce satisfaction can be enhanced.

This optional funding request of \$225,000 will allow the Upper Great Plains Transportation Institute to partner with the NDDOT and Northern Plains UAS Test Site to develop a world-class program in remote sensing of transportation systems, which will benefit the state for decades to come. UGPTI's expertise in sensors, data mining and analytics, machine learning, and transportation infrastructure and operations can be combined with the NPUASTS's expertise in flight planning and operations, communications, navigation, surveillance, and aircraft command and control systems to make North Dakota a global leader in data-driven transportation planning solutions.

5.5.3 Salaries Included at Base Level

UGPTI's budget request shown in Table 2 does not include funding for a salary increase package that may subsequently be enacted by the Legislature. If a salary package is enacted for state employees, UGPTI requests that those funds be added by the Appropriations Committee at a later time.

5.5.4 Capital and One-Time Funding

UGPTI's 2019-2021 budget does not include funds for capital facilities or one-time funds. Similarly, UGPTI's 2021-2023 budget request does not include requests for capital facilities or one-time funds.

6. GOVERNOR'S BUDGET GUIDELINES

The Executive Recommendation calls for a 5% reduction in general funds (Table 3), which amounts to \$219,816. If implemented, this cut will reduce UGPTI's base level appropriation to \$4,176,513. The State Board of Higher Education (SBHE) and UGPTI's Advisory Council has recommended the restoration of this cut.

If implemented, the 5% cut would erode UGPTI's ability to meet the demands of state and local agencies. UGPTI receives many requests for research and technical assistance from agencies that do not have funds in their budgets to provide contracts. In fact, much of UGPTI's rail and freight analysis is supported by general funds. The restoration of these funds to UGPTI's base budget would allow UGPTI to work with the Public Service Commission and Federal Railroad Administration on railroad safety, a critical issue in the state. With the restored funds, UGPTI could develop an annual railroad traffic report featuring major commodities imported to and exported from the state—which would be useful to state agencies, as well as to business and industry groups. In addition, critical software upgrades can be purchased, and federal grants can be matched. The requested changes to the Executive Recommendation are itemized in Table 4.

Table 3. Executive Recommendation for UGPTI's 2021-2031 Budget

	General Fund	Federal Funds	Special Funds	Total All Funds
2021-23 Legislative Base Budget	\$4,396,329	\$12,663,210	\$6,232,684	\$23,292,223
5% General Fund Reduction	-\$219,816			-\$219,816
Base Budget	\$4,176,513	\$12,663,210	\$6,232,684	\$23,072,407
2021-23 Budget Request Limit	\$4,176,513	No Limit	\$6,232,684	No Limit
2021-23 Reprioritization 5% Spec. Funds			\$311,364	
2021-23 Base Budget FTE				43.88

Table 4. Itemized List of Requested Changes to Executive Recommendation

Restoration of 5% cut in general funds	+ \$219,816
Program in remote sensing of transportation infrastructure	+ \$225,000

7. CARES ACT FUNDING

In light of the COVID-19 pandemic, UGPTI's Small Urban and Rural Center on Mobility (SURCOM) needed to adapt its in-person training and outreach programs to deliver them safely. SURCOM has used CARES funding to start the development of an online library of materials, by transitioning physical training materials to an electronic format. Specifically, the CARES Act funds were used to develop virtual and online eLearning sessions to replace in-person, instructor-led trainings. Initially, \$102,495 was requested for the project (Table 5). However, during the course of the project, an agreement was reached with the federal government to utilize the Learning Management System (LMS) of the National Rural Transit Assistance Program (NRTAP). This was a better and most cost-effective option than developing a new LMS from scratch.

Table 5. UGPTI CARES Act Funding

Item	Personnel	Operating	Total
Original Amount Requested	\$86,496	\$15,999	\$102,495
Amount Returned	\$43,000	\$14,400	\$57,400
Revised Amount	\$43,496	\$1,599	\$45,095

As shown in Table 5, the partnership with the federal government reduced the original cost estimate of converting in-person training and outreach programs to virtual delivery formats from \$86,496 to \$43,496. The remaining \$43,000 was returned to the state so it could be used for other purposes. As of December 31, 2020, approximately \$3,481 remains to be expended.

8. UGPTI 2021-20123 GENERAL FUND BUDGET REQUEST

In conclusion, the requested changes to UGPTI's 2019-2021 base budget are summarized in Table 6. Thank you for your consideration of these requests.

Table 6. Requested Changes to UGPTI's 2019-2021 General Fund Appropriation

Item	Amount
2019-2021 Base	\$4,396,329
2021-2023 Request	\$4,621,329
Change to Base	+\$225,000
Percent Change to Base	5.1%