P3

Performance Programming Process

December 2019

MONTANA
MDT
DEPARTMENT OF TRANSPORTATION

This document updates MDT's November 2015 *Performance Programming Process (P3): A Tool for Making Transportation Investment Decisions* manual. The update was produced by High Street Consulting Group in conjunction with Robert Peccia & Associates conducted under the direction of the Montana Department of Transportation's (MDT) Rail, Transit, and Planning Division (Planning Division). The document, completed in November 2019, updates information on processes and requirements associated with how MDT allocates resources for bridge and pavement investment, and rebrands what was P3 as Px3.

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HIGH STREET CONSULTING GROUP

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Acronyms and Abbreviations

CMAQ – Congestion Mitigation and Air Quality

FAHP – Federal-Aid Highway Program

FAST Act – Fixing America's Surface Transportation Act

FHWA – Federal Highway Administration

HSIP – Highway Safety Improvement Program

MDT – Montana Department of Transportation

NHS – National Highway System

PvMS – Pavement Management System

Px3 – Performance Programming Process

SOGR – State of Good Repair

STIP – Statewide Transportation Improvement Program

STPP – Surface Transportation Program Primary

STPS – Surface Transportation Program Secondary

STPU – Surface Transportation Program Urban

TAMP – Transportation Asset Management Plan

TCP – Tentative Construction Plan

TMP – Transportation Management Plan

TranPlanMT – Montana's Long-Range Transportation Plan


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Introduction

The Montana Department of Transportation (MDT) uses a performance-based funding allocation process known as Px3 to determine how it should allocate Montana's limited transportation resources. The Px3 process helps MDT optimize its spending to maintain and improve the pavement and bridges on the state's Interstates, National Highway System (NHS), and Primary Highway System (Primary System).

This document provides a brief description of the Px3 process and explains how it fits into MDT's broader budgeting and project selection activities. It identifies the various inputs and considerations that influence the process and describes the analysis methods and tools MDT uses to develop allocation recommendations for bridge and pavement spending. It also explains how the outputs from Px3 are used by MDT staff and decision-makers.

MDT's Mission

Our guiding mission is to serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and sensitivity to the environment.

State Resource Allocation

Montana, like all states, receives funding every year from the Federal Highway Administration (FHWA) authorized by Congress through Federal Authorization Acts. MDT combines these federal funds with state funds to preserve and improve highways and bridges on the Interstate, NHS, and the Primary Highway systems, and to address other needs such as safety and operational transportation improvements for all users. Within certain federal guidelines, states determine their own processes for allocating federal funding to highway systems, types of work and regions, and for selecting projects.

The Px3 process is used by MDT to determine how to maintain and improve the state's Interstates, NHS, and Primary Systems given limited resources.

Using This Document

The information is intended to help a broad range of users better understand the various elements of Px3. The following lists anticipated user types and the relevant information this document provides them.

INPUTTERS - *MDT staff that provide data, management system outputs, assumptions, analysis, and other inputs that inform Px3*

Relevant information includes what data and inputs are used and how they are applied throughout Px3

ANALYZERS - *MDT Planning Division staff that conduct Px3 and generate its outputs*

Relevant information includes how tradeoff analyses are performed to arrive at recommended allocation levels

USERS - *MDT District and Bridge personnel that work from Px3 outputs to nominate projects*

Relevant information includes funding levels by district, system, and type of work to guide project nomination decisions

POLICY MAKERS - *Elected and appointed officials (e.g., Governor, MDT Director, and Commissioners)*

Relevant information includes the performance goals for system condition and progress towards goals to inform MDT's resource allocation decisions

GENERAL PUBLIC - *Citizens and stakeholders that have an interest in understanding how MDT makes resource allocation decisions*

Relevant information includes an overview of the resource allocation process and how Px3 fits into MDT's broader decision-making processes

If you would like more information on the Px3 process, contact information for MDT staff members involved in the process are listed at the back of this document. Or, visit the Department's website at: www.mdt.mt.gov.

The Big Picture

MDT uses the Px3 to determine the annual allocation of bridge and pavement investments associated with transportation asset management on the Interstate System, NHS, and Primary System. The allocation of funding for other programs is considered non-Px3 and is determined based on information system outputs, federal apportionment requirements, state law or policy, and/or other considerations.[1] Roughly 70 percent of MDT's capital funding is allocated by Px3 with the remaining 30 percent allocated through non-Px3 processes.

The Px3 recommended district and bridge distributions, along with any funding reserves, are provided to the Commission for approval. The approved distributions lead to the final fund plan, including non-Px3 funding allocations, which is used to generate the fund plan for the development of the tentative construction plan. The TCP is also approved by the Commission.

***Transportation Asset Management** is a process to strategically manage the transportation system in a cost-effective, safe, efficient, and environmentally sensitive manner. It is based on managing for results by focusing on performance.*

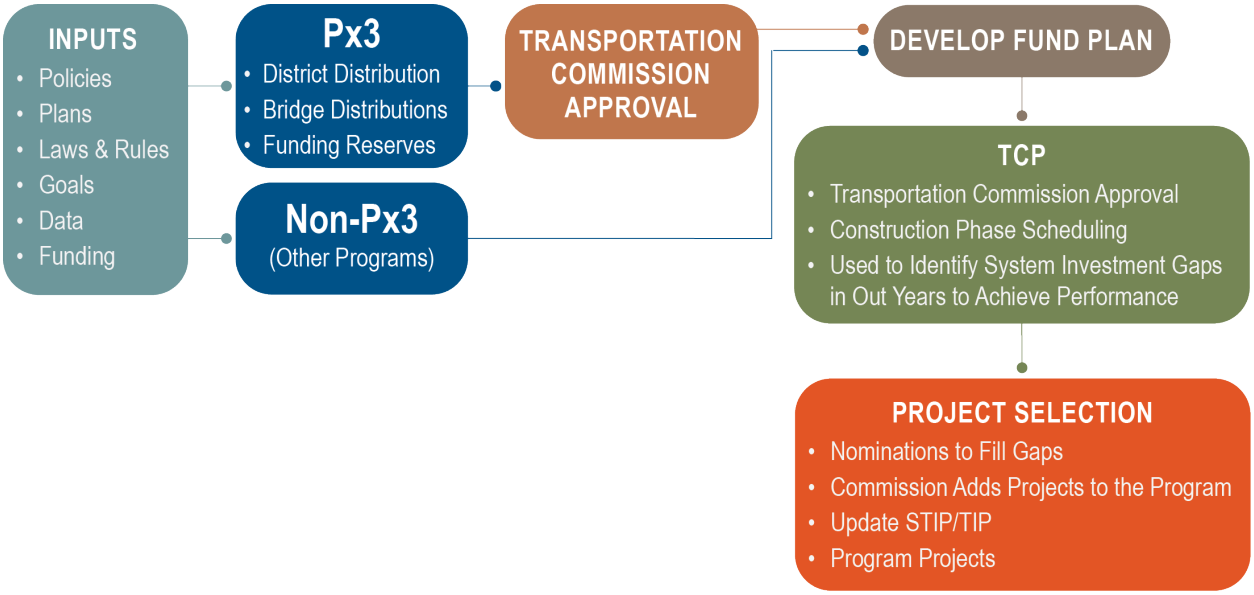


Figure 1: Project Identification and Selection Process

[1] *Other programs include, but are not limited to, the Highway Safety Improvement Program (HSIP), the Congestion Mitigation and Air Quality Improvement Program (CMAQ), the Surface Transportation Program Urban (STPU) and Surface Transportation Program Secondary (STPS), and the Transportation Alternatives Set-Aside Program.*

Px3 does not choose projects, but rather guides the project nomination process by defining funding levels that MDT's districts use to guide their nomination of projects. While the identification of candidate projects is heavily informed by data management system outputs, public input also influences which specific projects are put forward.

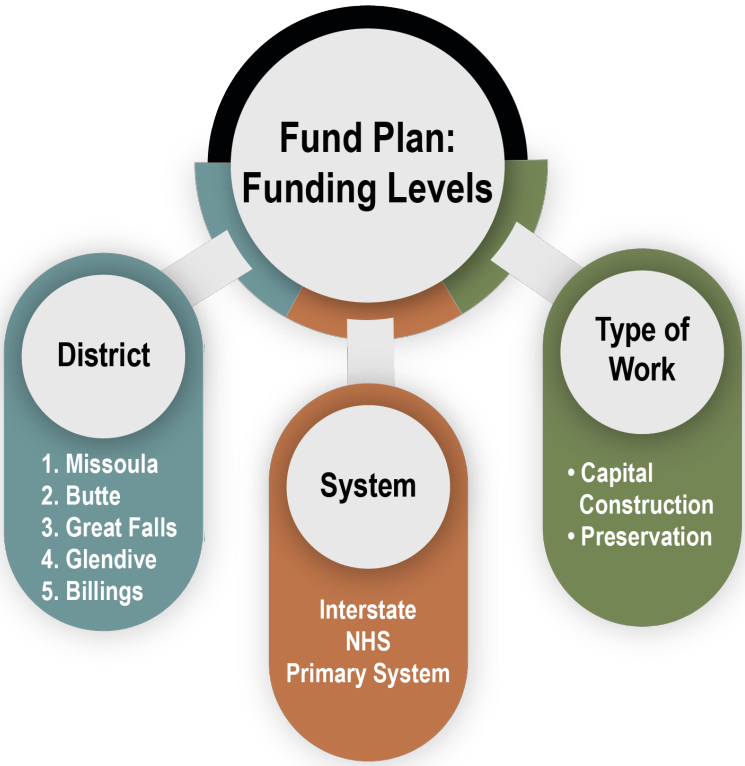


Figure 2: MDT Fund Plan Funding Levels

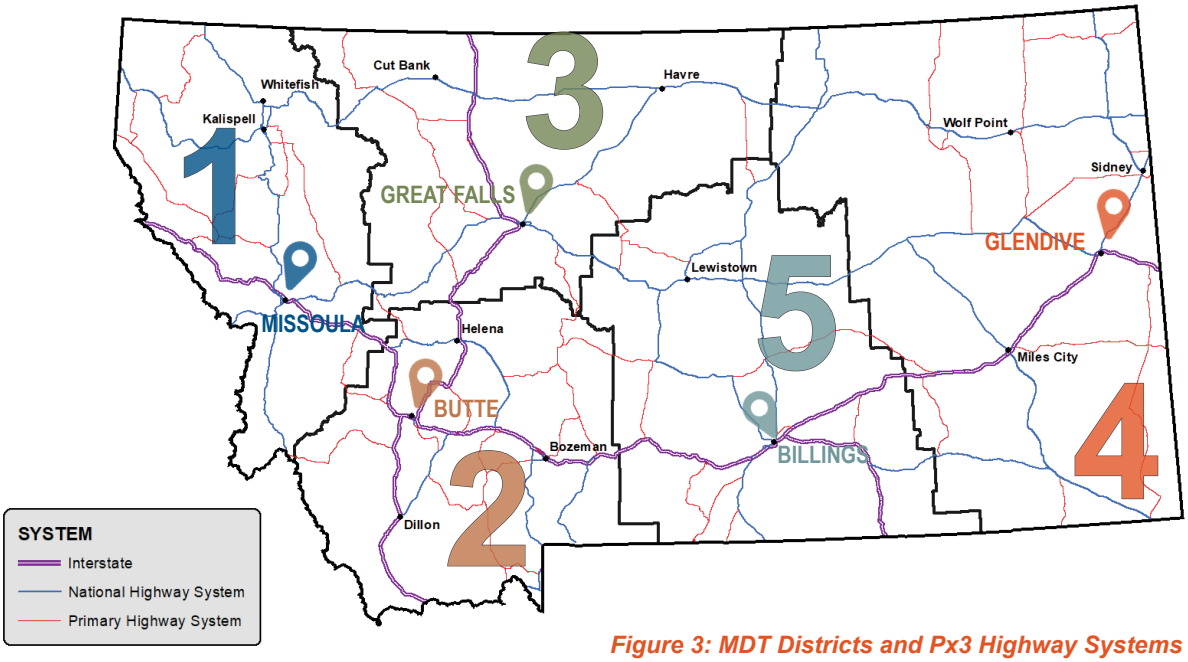


Figure 3: MDT Districts and Px3 Highway Systems

Px3 Core Principles

Px3 is a performance-based asset management strategy overseen and executed by MDT's Rail, Transit, and Planning Division (Planning Division). It answers a critical question for MDT: *How do we most efficiently spend our money on long-term transportation infrastructure investments to achieve performance goals?* With that question in mind, MDT developed the following core principles for Px3:

Performance-Based

- ***What:*** *Allocation of resources should support the most efficient and effective investments.*
- ***How:*** *Px3 compares forecasted and actual outcomes to established targets.*

Data-Informed

- ***What:*** *Use current and accurate data on system conditions and other factors that influence performance.*
- ***How:*** *MDT uses an annual data collection program and computer-based management systems to track the condition of the roadway network.*

Customer-Driven

- ***What:*** *Strategic direction should align with TranPlanMT goals established through public and stakeholder input.*
- ***How:*** *MDT conducts significant outreach with stakeholders and the public in the development of its long-range transportation plan (TranPlanMT) and through periodic surveys.*

Continuous Improvement

- ***What:*** *Continually refine the process to integrate best practices.*
- ***How:*** *In advance of conducting Px3, MDT adjusts and calibrates its management systems and processes by refining inputs, assumptions, and methodologies to reflect changes in key factors, MDT capabilities, and national best practices.*

Transparency and Accountability

- ***What:*** *Clearly explain and document the process, and subsequently monitor and report performance.*
- ***How:*** *MDT provides documentation and other resources to explain how Px3 facilitates resource allocation and performance tracking.*

Px3 Overview

The Px3 portion of MDT's resource allocation process utilizes several inputs to support the Planning Division in updating assumptions and conducting tradeoff analyses to recommend the best allocation of resources for MDT to achieve its goals. These recommendations then become an important input to MDT project nomination, selection, and project delivery.

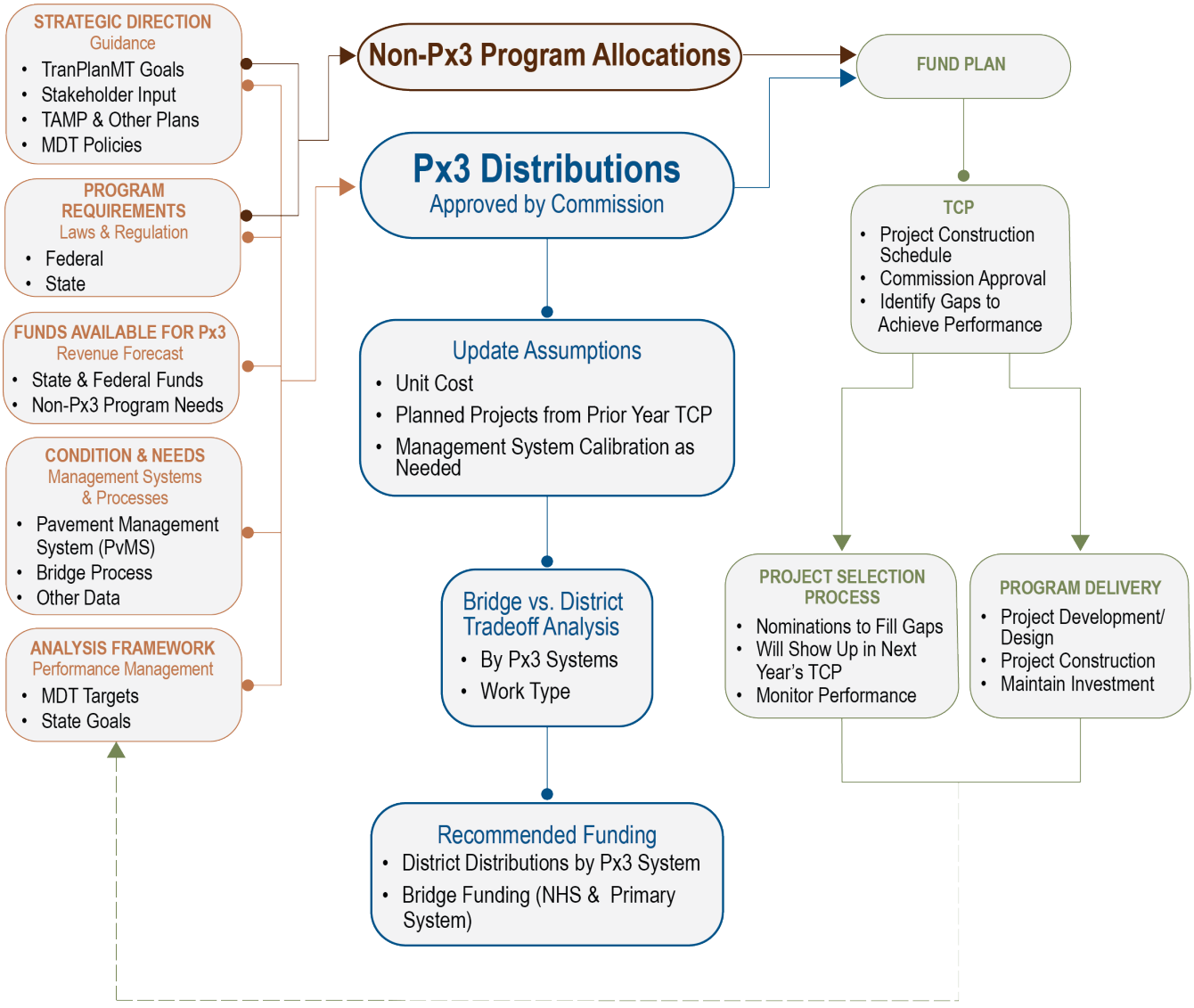


Figure 4: Px3 Process Details

Px3 Development Cycle

The overall Px3 process, including development of process inputs and incorporation of its outputs into decision-making and documentation occurs over a period of a year and a half. The key steps in this process cycle are illustrated in the figure below.

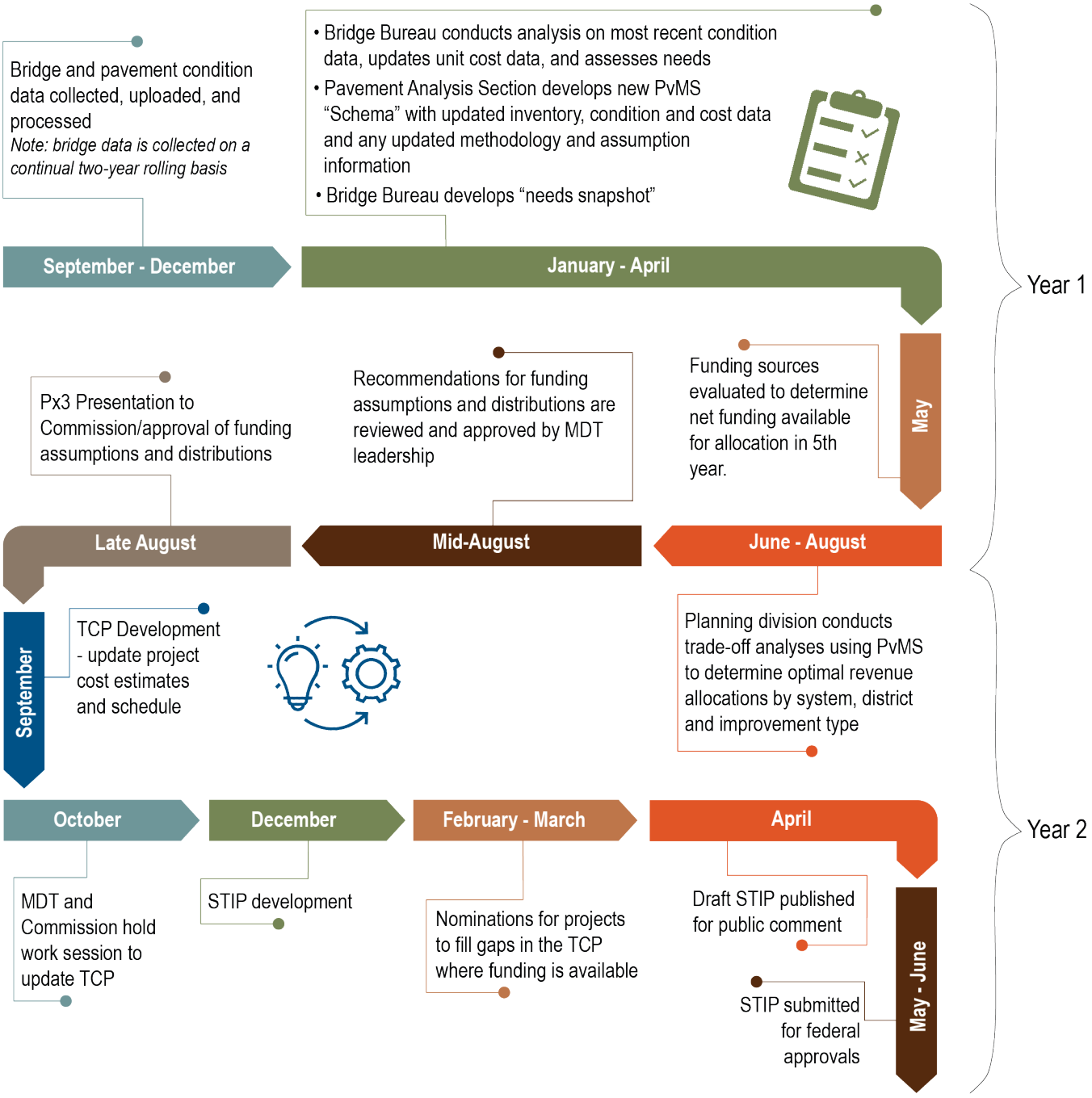


Figure 5: Development Cycle

Px3 Inputs

Px3 is informed or influenced by a wide range of inputs. These inputs support the MDT Planning Division in conducting tradeoff analyses to determine the best allocation of resources between highway systems (Interstate, NHS, Primary) and type of work (capital construction and preservation). This section describes the main sources for the Px3 inputs.

TranPlanMT

In addition to providing an inventory of Montana's transportation system and assessing its condition, the Montana statewide long-range transportation plan, TranPlanMT, identifies MDT's system goals and investment priorities as shown in **Figure 6**.

TranPlanMT included significant outreach with stakeholders and the public to gain their input on how MDT manages Montana's transportation system and implements its programs. Public and stakeholder comments that are relevant to Px3 and thus influence the process include:

- **Investment Priorities** – Maintaining road pavement condition and safety are the public's top priorities;
- **Methodologies** – Utilize state-of-the-art technology and practices; balance public input/ desires with available resources, knowledge, and needs;
- **Communications** – Communicate information to the public, stakeholders, and elected officials more effectively; and
- **Transparency** – Keep public involvement and input processes transparent and provide more clarification to local jurisdictions regarding the decision-making process, MDT fund distributions, and justifications for decisions.

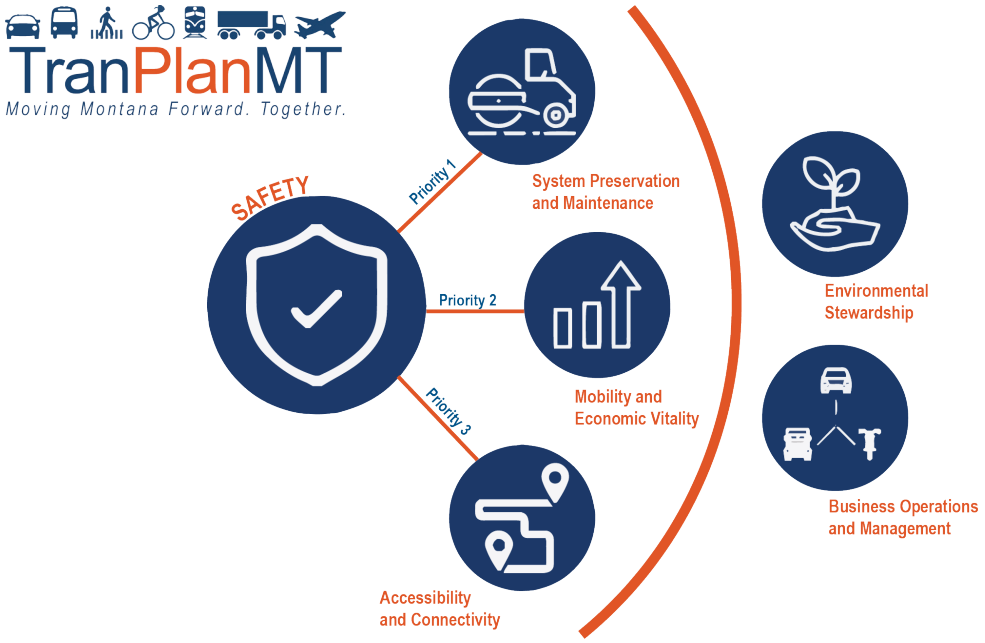


Figure 6: TranPlanMT Goals and Investment Priorities

Systems Condition Assessment

MDT collects information on current bridge and pavement condition, estimates future needs, and forecasts performance by system using its performance-based management systems and processes.

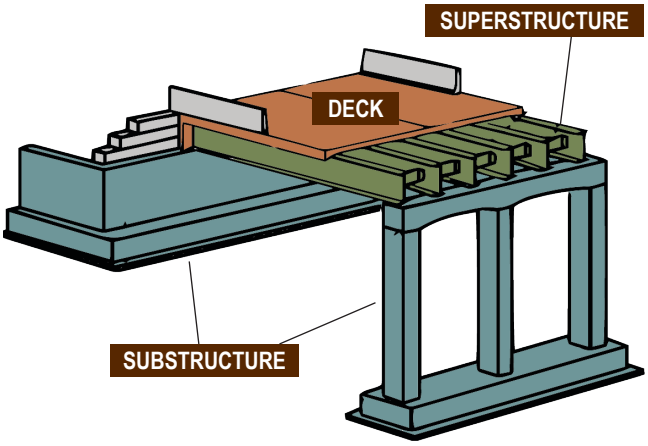


Figure 7: Bridge Elements

Bridges

The MDT Bridge Bureau collects current condition data on bridges to determine bridge needs and forecast bridge conditions. This data includes ratings for all bridges in the state based on a 9-point scale for three bridge elements:

- **Deck** – The surface vehicles drive on;
- **Superstructure** – Bridge elements supporting the deck; and
- **Substructure** – Bridge elements transferring load to foundation.

Through this rating system, the data provides information on the current conditions of all bridges.

Pavement

The MDT Pavement Analysis Bureau collects data each year on the Interstate, NHS, and Primary Systems with respect to smoothness, rutting, and cracking for every 0.1-mile segment of roadway in accordance with state and federal guidelines. This data is stored and maintained in the Pavement Management System (PvMS). The smoothness data is used to generate a "ride index," which is the primary metric MDT uses to monitor and report on pavement preservation performance.

The PvMS uses annual pavement inventory data along with other inputs and assumptions such as costs, degradation rates, improvement models, and benefit-cost considerations to forecast future pavement conditions.

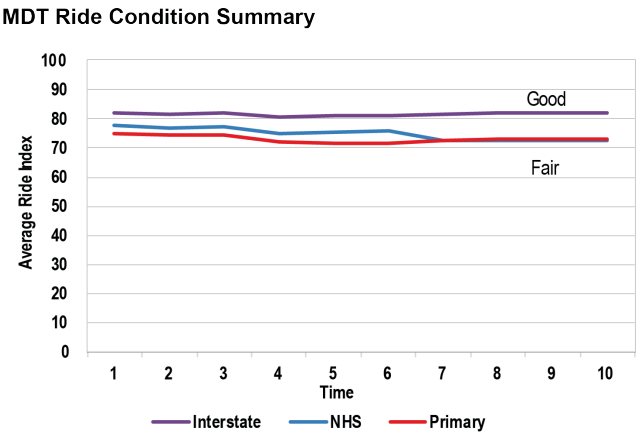


Figure 8: MDT Ride Condition Summary

Tentative Construction Plan (TCP)

MDT identifies highway construction timing for projects planned within the next five years through its TCP. Px3 informs the development of all years of the TCP. The current Px3 analysis largely informs the addition of final (fifth) year projects, while prior years are mostly driven by outputs from previous Px3 cycles. The projects included in the prior year TCP are considered in determining funding needs to achieve performance requirements in subsequent Px3 cycles.

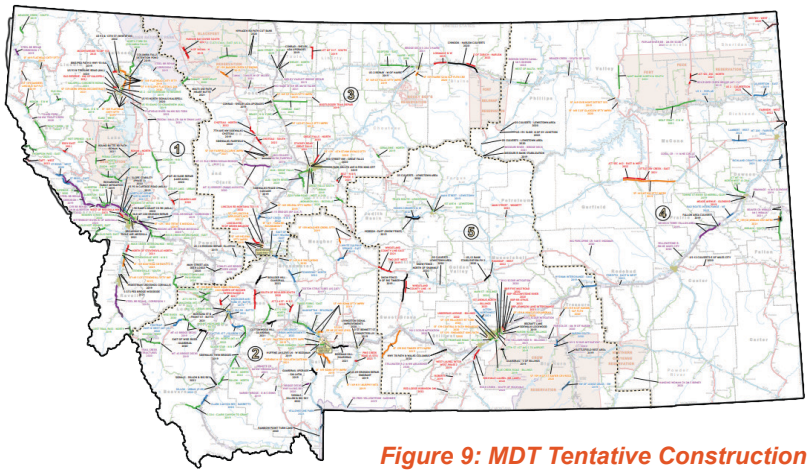


Figure 9: MDT Tentative Construction Plan Map 2019-2023

Revenue Forecasts

The MDT Planning Division works with other MDT business units to develop a revenue forecast for annual Px3 activities. **Figure 10** shows the key elements of revenue forecasts.

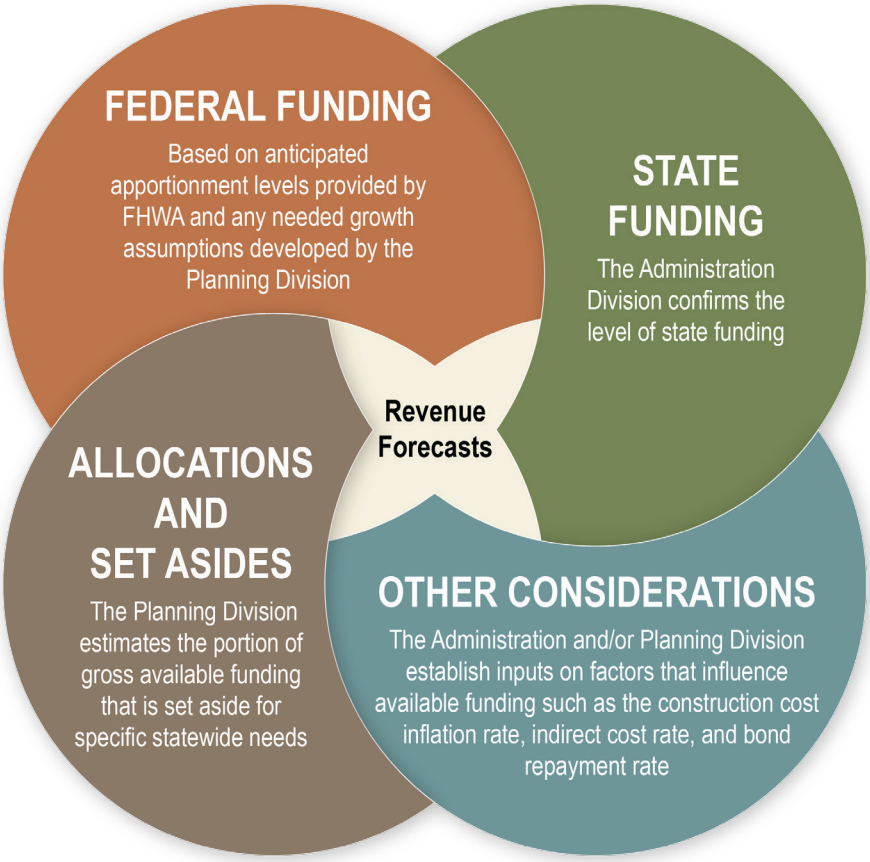


Figure 10: Revenue Forecasts - Key Elements

Performance Objectives, Measures, and Targets

MDT established performance objectives, measures, and targets to both facilitate Px3 tradeoff analyses and enable monitoring and reporting on performance results as show in **Table 1** below.

Table 1: Px3 Performance Measures

Goal Area	Objective	Measure	Target
PAVEMENT	• Preserve highway pavement condition at existing or higher levels on the Interstate, NHS, and Primary Systems • No significant difference in ride condition between districts	• Ride index • % Interstate pavement in good/poor condition • % NHS pavement in good/poor condition	• Interstate – Maintain current ride index • NHS – Improve current ride index • Primary System – Maintain current ride index (if possible)
BRIDGE	Maintain or improve the condition of the bridges on the NHS	• % of NHS bridge deck area in good condition • % of NHS bridge deck area in poor condition	• Increase percentage of good NHS bridges • Decrease percentage of poor NHS bridges
SAFETY	Improve safety of the state's highway system	• Number of fatalities • Number of serious injuries	• Reduce the number of fatalities and serious injuries by half by 2030

State and Federal Requirements

Several state and federal laws and regulations influence Px3 either directly or indirectly through the establishment of performance management, program allocation, and planning process/product requirements. These include:

- **State System Allocations** – Montana state law places conditions on the use of certain federal-aid funds with respect to primary, secondary, and urban highway system funding requirements.
- **Federal Transportation Performance Management (TPM)** – Federal statute and FHWA rules established national system goals and requirements for states to set performance targets and report results for pavement condition (Interstate and non-Interstate NHS), bridge conditions (NHS facilities), travel time reliability (Interstate and non-Interstate NHS), freight movement (Interstate only), and safety (all facilities).
- **Transportation Asset Management Plan (TAMP) and Management Systems** – Federal statute and FHWA rules require states to produce a compliant TAMP and develop pavement and bridge management systems (and associated data management programs) that meet federal requirements.

The Analysis

When the recommended funding distribution for bridges and Px3 District systems is established, along with any recommended funding reserves, it is presented to the Commission for approval. Once approved, the Px3 distributions are combined with the non-Px3 allocations to develop the Fund Plan. The Fund Plan is used for the development of the TCP, where program managers match funding available to the construction schedule of projects under development for a 5-year period. The TCP also is approved by the Commission.

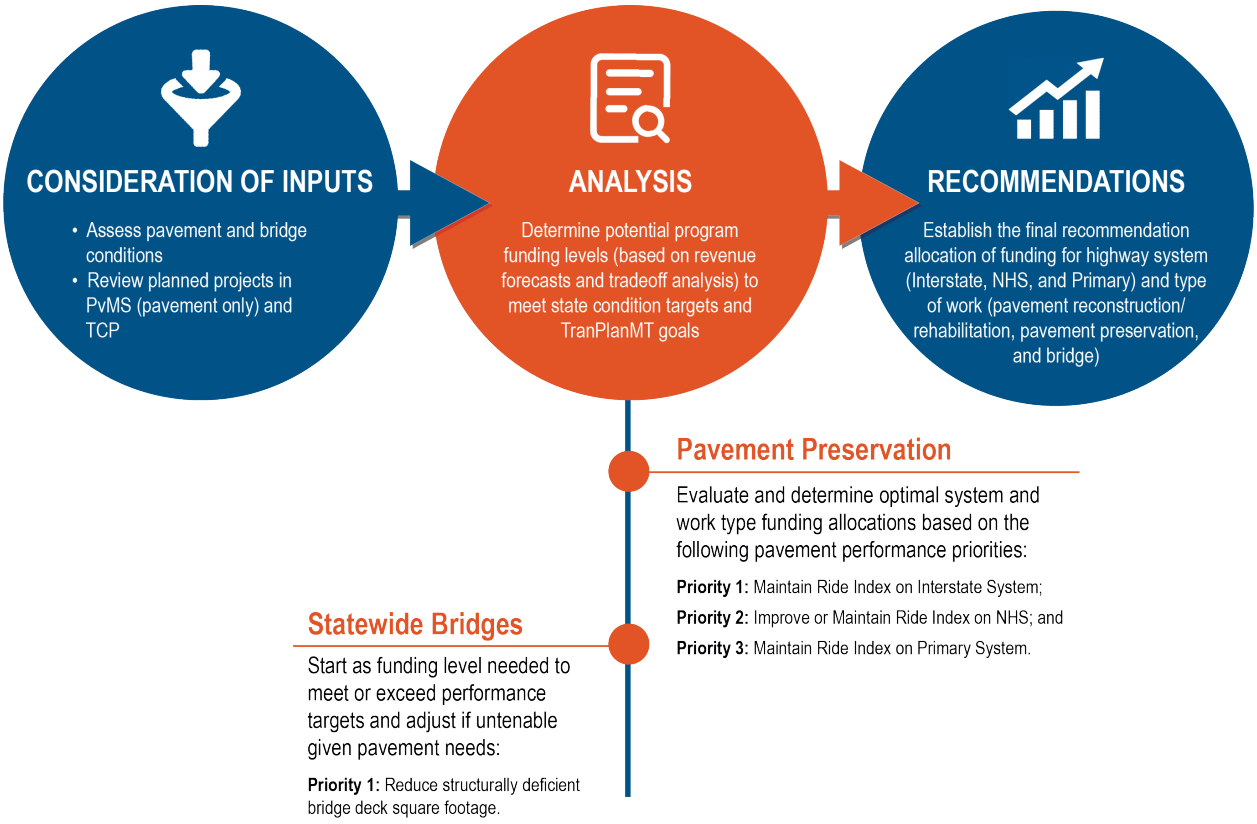


Figure 11: Px3 Analysis Key Steps

Outputs and Implementation

Project Nomination

Upon approval of the TCP, the Planning Division reviews the planned projects compared to the needed investments for the Px3 systems and identifies any gaps (programs without sufficient planned projects) to achieve MDT's performance targets, by Px3 system and work type. The Planning Division will request new project nominations from the appropriate District or Bridge program manager to address these gaps. Project nominations must be consistent with the criteria of the request, and MDT's strategic goals (see **Figure 4**). New project nominations are presented to the Commission for approval and require the appropriate STIP/TIP actions before programming.

Once all approvals are received, the new nominated project is programmed and project development activities begin. These new projects will show up in the following year TCP.

Performance Monitoring

In addition to establishing the District and Bridge program funding distributions, Px3 also generates performance forecasts as part of the tradeoff analyses effort. The performance forecast identifies how implementation of the Px3 recommended funding distribution is expected to affect bridge and pavement performance. MDT uses these forecasts to monitor Px3 implementation and to assess if MDT's investments are effectively advancing towards established performance targets.

Px3 Illustrative Example

Figure 12 below provides an illustration of how MDT gets from its gross annual revenue to the annual Px3 distributions. Please note that this is a hypothetical illustration based on figures that represent rough order of magnitude, not actual amounts or percentage allocations.

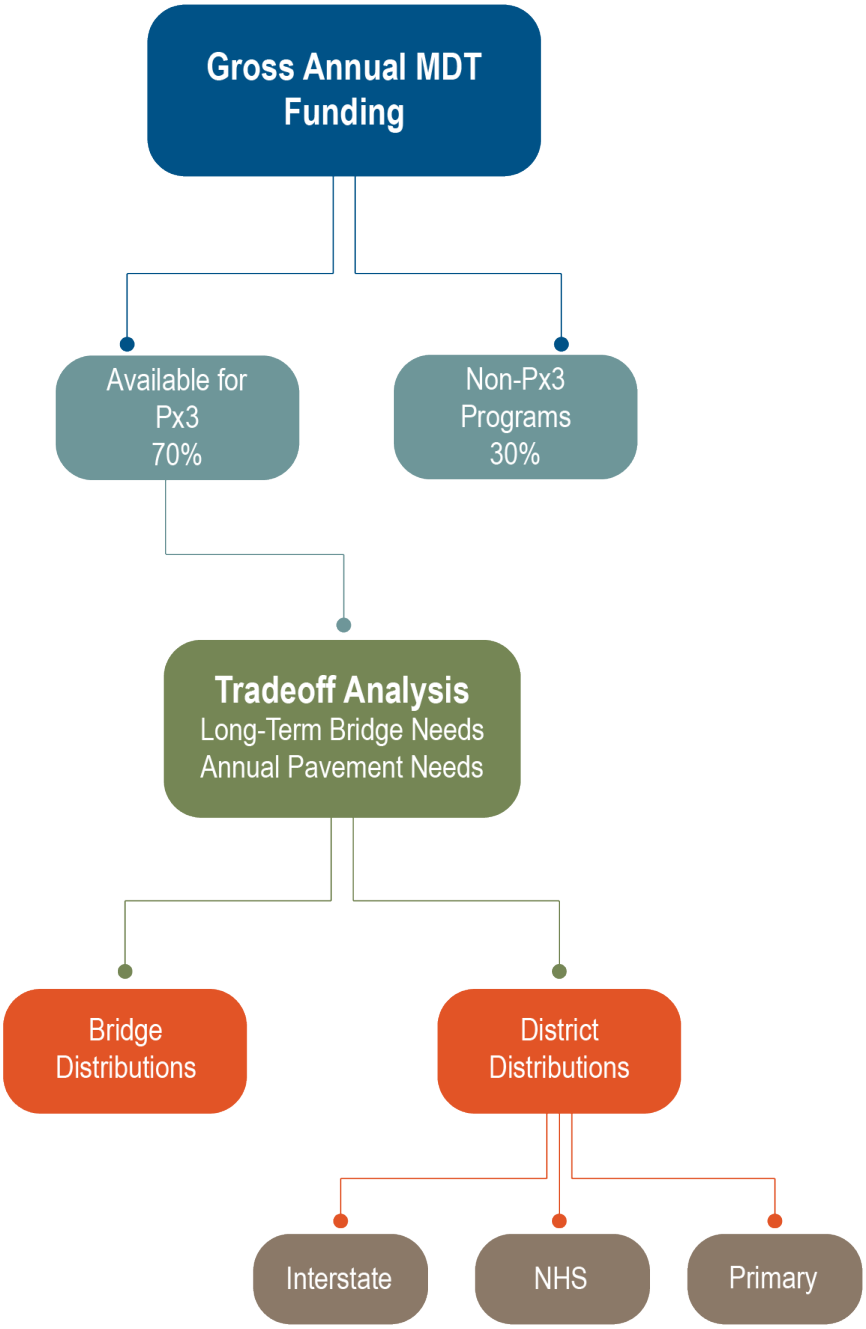


Figure 12: Illustrative Example

Appendix A:

Glossary of Px3 Terminology

Apportionment	The amount of federal-aid highway funding authorized to states for the programs as stated through the most recent federal authorization acts per Title 23 of the United States Code of Federal Regulations.
Asset Management	A business process intended to provide a framework for cost-effective and efficient performance-based expenditures to preserve and maintain transportation facilities. The framework is guided by performance measures and targets, and provides resource allocation and programming decisions to achieve the greatest value to the system.
Fixing America's Surface Transportation (FAST) Act	The federal surface transportation act, signed into law on December 4, 2015. The act authorizes over $305 billion in federal funding for highways, transit, and other transportation investments for fiscal years 2016-2020.
Federal-aid Highway Program (FAHP)	The official name of the federal highway program authorized by the FAST Act that provides resources for Interstate, NHS, and other eligible routes, and is funded through the Federal Highway Trust Fund.
Fund Plan	Consolidates the outputs from the Px3 and non-Px3 allocation processes to define program funding levels by system tier, district, and type of work (e.g, capital construction and preservation).
National Highway System (NHS)	The national system of roadways that includes the Interstate System and other significant routes. The NHS is the primary focus of federal performance management requirements.
Obligation	An obligation is a legal commitment; a promise to pay a state for the federal share of a project's eligible cost. Obligated funds are considered "used" even though no cash is transferred.
Performance Targets	The performance objectives that guide MDT's infrastructure investment decision-making processes. Achieving these objectives requires data analysis to monitor performance progress. TranPlanMT identifies performance measures, based on goals set at the national level.
Surface Transportation Program Primary (STPP)	The federal and state funds available under this program are used to finance transportation projects on the commission-designated Primary Highway System. Funding allocations for these roadways are determined by Px3.

Surface Transportation Program Secondary (STPS)	The federal and state funds available under this program are used to finance transportation projects on the Commission-designated Secondary Highway System (i.e., highways not classified as a local route or rural minor collector and that has been selected by the Montana Transportation Commission to be placed on the Secondary Highway System). Funding allocations for these roadways are not determined by Px3.
Surface Transportation Program Urban (STPU)	The federal and state funds available under this program are used to finance transportation projects on the Commission-designated Urban Highway System. Allocations are based on per capita distribution, and are not determined by Px3.
System	The specific highway system; for Px3 purposes, these include the Interstate System, the NHS, and the Primary Systems.
Tentative Construction Plan (TCP)	MDT's scheduling and budgeting document that matches approved/confirmed projects with available federal-aid and state funding through the next five years. Projects included in the TCP are submitted by each district after a nomination process. The TCP exists in an Excel spreadsheet that is managed by the Administration Division.
Tradeoff Analysis	The process of evaluating different ways to allocate funding and pursue different investment strategies. It involves using management systems to assess how performance changes as allocations are shifted between bridges and pavement, and between different systems and different work types.
TranPlanMT	Montana's statewide long-range transportation plan, it defines transportation policy direction for the next 20 years.
Type of Work (aka Improvement Type)	The type of construction activity planned for a particular transportation investment. The three main categories are reconstruction, rehabilitation, and resurfacing.

Contacts for Px3 Activities

TranPlanMT – Statewide Long-Range Transportation Plan

Division Administrator
Rail, Transit, and Planning
(406) 444-3445

Bureau Chief
Multimodal Planning
(406) 444-9240

Bureau Chief
Policy, Program & Performance Analysis
(406) 444-9233

Performance Goals and Statewide Transportation Improvement Program

Manager
Project Analysis
(406) 444-7259

Project Nominations

Billings District – (406) 657-0229

Butte District – (406) 494-9600

Glendive District – (406) 345-8200

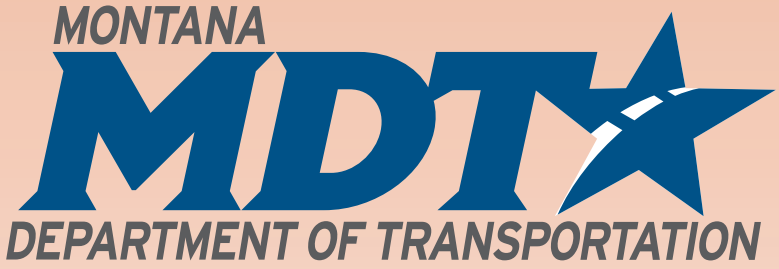
Great Falls District – (406) 454-5880

Missoula District – (406) 523-5800

Bridge Bureau Chief – (406) 444-6260

Additional Information

Copies of MDT publications (such as TranPlanMT, STIP, Biennial Public and Stakeholder surveys and Comprehensive Highway Safety Plan) can be accessed at www.mdt.mt.gov.



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