U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 32A – Planning and Concept Design

1.0 PURPOSE

This Monitoring Procedure (MP) describes FRA requirements for the Monitoring and Technical Assistance Contractor (MTAC) when evaluating the Grantee's planning processes and its planning work products. This MP covers State rail planning, regional and corridor planning, and station area planning.

2.0 KEY PRINCIPLES

To decide how something should be in the future requires a vision or idea of a desired state; it requires investigation and analysis of existing and potential future conditions to understand where change is necessary, possible, and desirable; and it requires synthesis to crystalize and develop a coherent new reality. These three planning activities link knowledge to collective action. The planning process brings many "actors" or stakeholders together to identify a vision, establish goals, discuss existing conditions and possible alternatives, arrive at an agreed approach, and move into implementation.

Planning for intercity passenger rail and high-speed rail aims to improve connectivity between cities and towns as well as intermodal access within station cities. Passenger rail planning reflects input from many stakeholders: State elected representatives and governors, the passenger rail project sponsor, host railroads, rail operators, advisory boards, local jurisdictions, transit operators, community and industry groups, and other interested parties.

FRA funds passenger rail planning at the multi-state, regional, State, corridor, and station area levels. Planning at the multi-state and State levels becomes the platform for regional and corridor plans, which in turn provide a foundation for project design, construction, and operations.

The MTAC's evaluation of the Grantee's planning processes and work products provides critical input to FRA's determination of the likelihood that the plan can achieve its stated purposes and goals through subsequent project implementation.

One aspect of the planning process is coordination with the environmental review process. All federally-funded projects require appropriate environmental documentation to be prepared consistent with the National Environmental Policy Act (NEPA.) Coordinating the planning and environmental analyses requires "a clear and complete understanding of all project elements, reached through sound engineering and railroad planning. . ."[1]

The following table is a guide to the transition from the planning to the design phase. The planning activities listed can apply at the multi-state, region, State, and corridor levels, and station areas.

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[1] Railroad Corridor Transportation Plans: A Guidance Manual, July 2005 (available at http://www.fra.dot.gov/eLib/Details/L04161).

Transition from Planning to PE

Planning and Concept Design / Tier 1 NEPA	Preliminary Engineering / Tier II or Project NEPA
Rationale	
Identify a vision Establish rationale for project or service Establish goals, objectives, and desired outcomes. Develop NEPA Purpose and Need Statement for the corridor	Develop NEPA Purpose and Need Statement for the project
Service Planning	
Service planning and analysis as part of Alternatives Analysis; includes general selection among alternatives. Data analyses of existing conditions, consider possible alternative future conditions, and concepts for selected alternative: • Identify challenges and opportunities • Identify and select markets to serve • Consider modal alternatives and make selection • Conduct travel demand and revenue forecasts • Analyze and project capacity conditions • Perform conceptual railroad operations modeling including timetables, equipment, infrastructure, outputs such as trip-time, reliability, frequency, capacity • Identify stations including spacing, general location • Develop Op & Maintenance cost estimates • Identify and confirm entities responsible for administering, managing, and overseeing services • Prepare contents for Service Outcomes Agreement (agreement is pursued once funding for construction is identified)	For the proposed alternative, completion of service analyses and planning (refinement if necessary for ridership and revenue forecasts, railroad and train capacity analysis, and detailed operations modeling with timetables.) Development and finalization is required for: • Station location, form, intermodal connections, and access • Detailed Op & Maintenance cost estimates • Confirmation of entities responsible for services such as equipment maintenance, maintenance of way, and train operations • Agreements / draft agreements with host railroads and other rail entities • Agreements for integration of service with other passenger transport • Prepare contents for Service Outcomes Agreement (agreement is pursued once funding for construction is identified)

Transition from Planning to PE	
Planning and Concept Design / Tier 1 NEPA	**Preliminary Engineering / Tier II or Project NEPA**
Infrastructure Planning and Design	
Systems planning and cost estimating as part of Alternatives Analysis. Includes general selection among alternatives. • GENERAL LOCATION - horizontal and vertical alignment of railroad and general location of stations • Conceptual estimate of capital cost • Development of project schedule by phase • Consider methods of project delivery	Physical design including specific selection among alternatives. • SPECIFIC LOCATION - horizontal and vertical alignment of railroad and stations; access; intermodal connections • Development of design to at least 30% completion, to generate reliable cost estimate for construction and operations • Estimate of capital cost reliable enough to remain unchanged through construction completion • Development of detailed project schedule • Decision re method of project delivery
Environmental Analysis	
NEPA environmental evaluation of service and infrastructure; includes public participation. Includes development and review of alternatives, selection of preferred alternative; determination in EA, or EIS. Refer to MP 32B.	Completion of project environmental evaluation. Includes development and review of alternatives and selection. Finalization of CE, FONSI for EA, or Record of Decision for EIS, before start of Final Design.
Finance Planning	
Includes development of draft financial plan. Refer to MP 49.	Includes finalization of financial plan including funding sources, cash flow, securing funding commitments for construction before start of Final Design.

3.0 REQUIRED DOCUMENTS

1. The MTAC should obtain applicable documents from the Grantee, such as:

a. Background studies

b. Planning narratives including rationale, assumptions, and planning criteria

c. Agreements:
   - Grantee's agreement with FRA for the work
   - Construction and Maintenance
   - Operations
   - Service Outcome Agreement
   - Real estate agreements

d. Planning analyses of:
   - Passenger rail needs and opportunities
   - Passenger rail market potential
   - Railroad infrastructure network and train capacities
   - Railroad and train operations

e. Analysis of alternatives:

i. Concept design studies:
   - Horizontal and vertical alignments in the context of existing development
   - Civil works, track, bridges, tunnels, stations, maintenance facilities, systems
   - Real estate acquisition
   - Rolling stock

ii. Plans and forecasts:
   - Railroad infrastructure network and train capacity plans
   - Passenger rail ridership and revenue forecasts
   - Operations plans for all entities providing service
   - Station plans, station area plans

iii. Associated environmental documents

iv. Cost estimates:
   - Capital cost
   - Operations and maintenance costs

v. Schedules:
   - For planning work
   - High-level schedule for full build-out (including design, construction)

vi. Preliminary assessment of risks

vii. Financial projections

4.0 SCOPE OF WORK

The MTAC will apply its planning expertise, knowledge, and experience in the railroad industry to the study and evaluation of the Grantee's railroad planning activities and documents, will provide its professional opinion on their adequacy and merits, and make recommendations for their improvement.

4.1 Network Planning for Multi-state Regions

The MTAC may be asked to participate in FRA-led multi-state regional network planning activities. Presently, the work is focused on regional rail in the Southwest and Northeast. FRA expects to initiate work in other regions of the country soon. Regional network plans are based on evaluation of potential markets for passenger rail service, and optimal network integration and sequencing of rail corridors. The work includes identification of funding strategies and consideration of project development and delivery issues associated with multi-state service. Regional network plans influence the direction and content of passenger rail corridor investment plans. FRA has developed a regional network planning tool called "CONNECT" -- contact FRA Planning for more information.

4.2 Corridor Planning

For high-speed and intercity passenger rail corridor plans, Grantees will develop a Service Development Plan (SDP) and typically, a corresponding Tier 1 or Programmatic environmental review with a Service NEPA.[2] The SDP brings together many inter-related projects that collectively produce benefits greater than the sum of individual projects.

[2] Refer to MP 32B for definition of Service NEPA.

An SDP comprehensively addresses the planning, design, construction and acquisition of infrastructure, equipment, stations, and facilities required to operate high-speed and intercity passenger rail service. It establishes the overall scope and approach for the proposed service.

Primary objectives of the SDP include:

- Clear demonstration of the rationale for new or improved intercity passenger rail service
- Analysis of alternatives for the proposed new or improved intercity passenger rail service and detail the alternative selected [through the NEPA process if applicable]
- Demonstration of the operational and financial feasibility of the proposed alternative
- If applicable, description of how implementation may be divided into discrete phases

Key References:

- Appendix A SDP Outline – July 2010 NOFA for Service Development Programs[3] (below)
- Appendix B Planning and Concept Design – Additional Information and Requirements (below)
- *Railroad Corridor Transportation Plans: A Guidance Manual*, July 2005 (available at http://www.fra.dot.gov/eLib/Details/L04161)

4.3 State Rail Planning

The State Rail Plan describes the State's long-term vision for rail service and its role in the statewide multimodal transportation system. Based on an inventory of the existing rail system, and an assessment of needs and opportunities, the Plan prioritizes future projects, programs, policies, laws, and funding necessary to achieve the long-term vision. In addition, since it is State policy, the Plan demonstrates political, legal, and financial support for rail development. For FRA's State Rail Plans Guidance, September 2013, see http://www.fra.dot.gov/eLib/Details/L04760.

1. The MTAC will review the adequacy of the State Rail Plan in:

f. Providing a long-term vision for rail in the State

g. Evaluating:
    - Existing transportation conditions including rail, highway, and air
    - Trends for fuel costs, congestion, industry, etc.
    - Trends and factors related to demographics and the overall economy

h. Analyzing:
    - Railroad capacity
    - Needs and opportunities for passenger and freight rail service
    - Impacts of rail on transportation, economy, environment

i. Demonstrating input from Plan stakeholders

[3] USDOT, FRA HSIPR Program. Notice of funding availability for Service Development Programs; issuance of interim program guidance; pg. 38344, Federal Register / Vol. 75, No. 126 / Thursday, July 1, 2010 / Notices (available in Appendix A of this MP).

j. Providing a prioritized list of near- and long-term projects based on goals to achieve the vision, using evaluations, analyses, and inputs from capital cost estimates and funding plans for near-term projects

4.4 Station Area Planning

The Station Area Plan describes the vision for the one-quarter to one-half mile radius around a passenger rail station. The Plan includes the station itself – its horizontal and vertical location, form and mass, public-space implications, and architecture. It includes enhancements to transportation connections between rail, transit, automobiles, biking, walking, and passenger loading. It also includes development plans– form, mass, types of development, and urban design parameters and motifs. The Station Area Plan can guide the insertion of a new station into a context and illustrate how the station is networked to the city and region through enhancements to transportation and development.

For FRA's recommendations titled "Station Area Planning for High-Speed and Intercity Passenger Rail," June 2011, see http://www.fra.dot.gov/eLib/Details/L03759.

The MTAC will review the Station Area Plan for its adequacy in addressing station location, transportation connections, and urban design and infill development.

APPENDIX A

SDP Outline – July 2010 NOFA for Service Development Programs

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Excerpt from:

Federal Register / Vol. 75, No. 126 / Thursday, July 1, 2010 / Notices
DEPARTMENT OF TRANSPORTATION
Federal Railroad Administration
High-Speed Intercity Passenger Rail (HSIPR) Program
AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).
ACTION: Notice of funding availability for Individual Projects; issuance of interim program guidance.

Appendix 2.1 Service Development Program Planning

The Service Development Plan (SDP) is prepared during the planning phase for HSIPR Service Development Programs and lays out the overall scope and approach for the proposed service. Among the primary objectives of the SDP are:

- To clearly demonstrate the purpose and need for new or improved HSIPR service;
- To analyze alternatives for the proposed new or improved HSIPR service and identify the alternative that would best addresses the identified purpose and need;
- To demonstrate the operation and financial feasibility of the alternative that is proposed to be pursued; and
- As applicable, to describe how the implementation of the HSIPR Service Development Program may be divided into discrete phases.

The following model outline for the SDP describes the specific elements and content that optimally would be included in an SDP. While nearly all of the topics addressed in the major sections of this outline are necessarily interrelated, and should be addressed through an iterative analytical process, this outline's organization highlights the major disciplines and analytical capabilities that should be brought together in the development of an SDP.

1. Purpose and Need

The fundamental starting point of any transportation planning effort, including SDPs developed under the HSIPR program, is the identification of the purpose and need for an improvement to the transportation system service in a given geographic market. In outlining a transportation problem in need of a solution, the Purpose and Need section should provide, at a minimum, a description of the transportation challenges and opportunities faced in the markets to be served by the proposed service, based on current and forecasted travel demand and capacity conditions.

2. Rationale

The rationale demonstrates how the proposed new or improved HSIPR service would cost-effectively address transportation and other needs. The rationale is based on current and forecasted travel demand and capacity condition. This section should demonstrate how the proposed service can cost-effectively address transportation and other needs considering system alternatives (highway, air, other, as applicable).

Development of the program rationale considers multimodal system alternatives (highway, air, other, as applicable), including a qualitative and quantitative assessment of the costs, benefits, impacts, and risks of the alternatives. Program rationale also explores synergies between the proposed service and large-scale goals and development plans within its service region and communities.

3. Identification of Alternatives

This section describes the alternative transportation improvements, including HSIPR improvements and improvements to other modes, which have been considered within the SDP to address the underlying transportation purpose and need. At a minimum, this section should identify a base case (also known as a ‘‘do-nothing’’ or ‘‘do-minimum’’ case), against which these alternatives have been analyzed within the SDP, and provide a rationale for the selection of the base case.

4. Planning Methodology

The SDP should clearly describe the basic elements of the methodology used in developing the plan. This may address a wide array of topics, but at a minimum, it should address:

a. The planning horizon utilized;
b. Any major, cross-cutting assumptions employed throughout the SDP; and
c. The level of public involvement in developing the plan.

5. Demand and Revenue Forecasts

The SDP should address the methods, assumptions, and outputs for travel demand forecasts, and the expected revenue from the service. It should provide information on the following topics and outputs:

a. Demand Forecasts
    - Methodology—Document the modeling methodology and approach used to forecast passenger rail demand (e.g., a four-step model), including competing modes, HSIPR alternatives considered, and the method for reflecting passenger capacity constraints (such as equipment, station, and station access capacity) within the HSIPR service.
    - Study Area Definition—Describe the extent of the study area, road network extent, rail stations, airports, intercity bus terminals considered.
    - Data sources—Provide the assumptions and data used to quantify the existing travel market and forecast year travel market.
    - Travel Model—
        i. Show the demand model structure including example equations and elasticities.
        ii. Describe the base and future year model, including specific travel network and service characteristics. This should include pricing assumptions (including the

rationale and basis for including or excluding both revenue-maximizing and public benefit-maximizing pricing models) and travel time-related assumptions (including frequency, reliability, and schedule data for the service). Also include the manner in which exogenous growth (e.g., related to general economic, employment, or population growth), has been accounted for in the model.

iii. Include the mode choice model structure such as logit nested diagrams.

iv. iv. Explain the model calibration and validation.

- Model Forecasts—Present and explain the detailed base and forecast year ridership outputs including trip-table outputs), along with the ramp-up methodology employed for determining ridership during the intermediate years between project completion and the model forecast year.

d. Revenue Forecasts
   - Ticket Revenue Forecasts—Explain base and forecast year ticket revenue forecasts.
   - Auxiliary Revenue Forecasts—If applicable provide base and forecast year auxiliary revenue, including but not limited to, food and beverage revenue, mail and express revenue.

6. Operations Modeling

This section describes the underlying operational analyses, including railroad operation simulations and equipment and crew scheduling analyses, which in turn reflect such variables as travel demand and rolling stock configuration. The modeling should include all rail activity in the corridor including freight and commuter rail.

If the new or improved HSIPR service contemplated under the SDP makes use of facilities that would be shared with rail freight, commuter rail, or other Intercity Passenger Rail services, the existing and future characteristics of those services—as developed cooperatively with the rail freight, commuter, and Intercity Passenger Rail operators—should be included as an integral element to the SDP. In particular, the SDP should show how the proposed Service Development Program will protect the quality of those other services through a planning horizon year. In general, operations modeling performed in accordance with FRA's publication ''Railroad Corridor Transportation Plans: A Guidance Manual'' would support an SDP. The section on operations modeling should provide information on the following topics and outputs.

a. Modeling Methodologies
   - Describe in detail the Service Network Analysis models and methodologies used, including the method through which potential infrastructure improvement were identified and incorporated into the modeling effort.
   - Specifically describe how stochastic operations variation, in terms of operational reliability of scheduled rail service, operational variability of non-scheduled rail service, and equipment and infrastructure reliability, has been incorporated into the modeling effort.

e. Operating Timetables

- Provide base case and alternative-specific schedules for existing and new HSIPR service and commuter rail service, and operating windows or schedules, if applicable, for rail freight and other activities (e.g., maintenance of way). Include both revenue operations and all scheduled or likely non-revenue (deadhead) movements.

f. Equipment Consists
   - Describe the equipment consists for all services included in the operations modeling, including motive-power (locomotive or multiple-unit) characteristics (e.g., weight, horsepower, tractive effort, etc.), non-powered equipment characteristics (e.g., consist lengths in units and distance, trailing tonnage, etc.), and any use of distributed power, electronically controlled pneumatic (ECP) braking systems, or other practices affecting train performance.
   - Provide baseline acceleration rates and braking curves for all trains included in the operations modeling, consistent with the consist characteristics described.

g. Rail Infrastructure Characteristics
   - Describe the origin on the rail infrastructure network employed in the operations modeling, including whether or not it was provided by the infrastructure owner or independently developed.
   - Describe any major infrastructure-related assumptions employed in the operations modeling, including signal system characteristics, maximum unbalance, and turnout speeds.

h. Outputs
   - Provide detailed outputs from the operations modeling of all base case and alternative scenarios, including stringline (time and distance) diagrams, delay matrices, and train-performance calculator speed and distance graphs.

i. Equipment and Train Crew Scheduling
   - Provide outputs of HSIPR equipment and train crew schedule modeling, demonstrating how equipment and train crews will turn at endpoints, and the total equipment and train crew resources required to meet each modeled HSIPR operating timetable.

j. Terminal, Yard, and Support Operations
   - Provide outputs of detailed modeling of operations at major terminals, demonstrating the adequacy of identified platform tracks, pocket tracks, yard capacity, and maintenance of equipment facilities to meet the requirements of each modeled HSIPR operating timetable.

7. Station and Access Analysis

This section of the SDP addresses the location of the stations to be served by the proposed new or improved HSIPR service, how these stations will accommodate the proposed HSIPR service, how passengers will access those stations, and how these stations will be integrated with connections to other modes of transportation. The topics addressed under this section will depend greatly on whether the SDP is intended to support the introduction of a new HSIPR service on a new route, or whether it relates to the improvement of an existing HSIPR service—generally, the latter, in serving existing

stations, will not require detailed planning of station locations. This section of the SDP should provide information on the following topics and outputs.

a. Station Location Analysis
   - An analysis of potential alternatives for station locations, with the identification of preferred locations.
   - A description of the methodology employed in selecting station locations, including consideration of zoning, land use, land ownership, station access, demographics, and livable community factors (such the relative consideration of center-city and ‘‘beltway’’ type stations).
   - A description of any planned joint use or development of each station facility by other passenger rail operators, other transportation operators (e.g., transit, intercity bus, air transport), or commercial or residential real estate developments.

k. Station Operations
   - An analysis to determine the adequacy of Station capacity to meet the needs of the HSIPR service, including platform length, platform and concourse pedestrian capacity, ticketing capacity, compliance with Americans with Disabilities Act (ADA) requirements, and compatibility between station facilities and HSIPR equipment (e.g., platform and equipment floor heights).

l. Intermodal Connectivity
   - A detailed description of all non-HSIPR passenger transportation operations and services to be integrated into each station.
   - A description of the degree on integration of intermodal connections with each station facility (e.g., complete collocation, short distance proximity, distant proximity, etc.), including estimates of door- to-door passenger transfer times (excluding waiting, ticketing, and/or check-in time) from one mode to another (e.g., the time it would take to go from the an HSIPR service platform to a subway station entrance, or an airline check-in counter).
   - A description of additional intermodal integration measures to be employed, such as integrated ticketing, schedule coordination, travel information integration, etc.

m. Station Access
   - An analysis of how passengers will access each station, and how these access options will provide sufficient capacity to satisfy forecasted ridership to and from the station, including public transportation, road network capacity, vehicle pick-up/drop-off, and parking.

8. Conceptual Design and Capital Programming

The SDP describes the rail equipment and infrastructure improvements (and other investments) required for each discrete phase of service implementation. If applicable, the SDP should prioritize improvements for each phase. The SDP presents estimated capital costs for projects and project groups, with documentation of assumptions and methods.

a. Project Identification

- The SDP should identify in detail each discrete project that will be necessary to implement the planned new or improved HSIPR service, such as construction of specific stations, individual sections of additional or upgraded track, locomotive and rolling stock purchases, etc.
- ''Projects'' should be defined at a level of detail sufficient to delineate between elements of the overall scope with differing geographic locations, different types of investments (e.g., track improvements vs. station projects vs. equipment purchases), and different implementation schedules. The manner in which the proposed scope is likely to be divided into contracts for implementation may also be considered in identifying the scope of discrete ''projects.'' In general, each ''project'' should be defined with the aim of making its scope easily comprehensible and identifiable to a layperson.
- The identification of discrete projects should likewise be consistent with proper usage of the Work Breakdown Structure (WBS) tool for project management—the ''projects'' themselves should constitute one of the top levels of the Service Development Program's overall WBS.

n. Project Cost Estimates
   - The SDP should include project costs estimates in both the WBS and HSIPR Standard Cost Category format.
   - The SDP should include the documentation of the cost estimates in their original format, illustrating exactly how those cost estimates were calculated.
   - The cost estimates should be supported by a detailed description of the methodology and assumptions used in developing the estimates, including values and sources of unit costs for labor, materials, and equipment; overhead costs or other additives; allocated and unallocated contingencies; credit value of salvaged materials; and cost escalation factors. The source of unit costs should be explained for cost estimates based on broad, top-down ''indicative project'' prices. Unless explicitly justified, total contingencies for cost estimates developed during the planning phase should be no greater than 30 percent.

o. Project Schedule and Prioritization
   - The SDP should present the proposed schedule for the implementation of the Service Development Plan organized in the format of Work Breakdown Structure and consistent the phases of projects development.
   - The schedule should illustrate the duration of each activity within the WBS, the earliest date at which each activity could commence, and the dependencies between the various activities.

p. Conceptual Design Documentation
   - The SDP should include basic visual depictions of the projects encompassed by the proposed Service Development Program, including maps and track charts.
   - Track charts should clearly show the current and proposed future track configurations throughout the geographic area encompassed by the Service Development plan (and any proposed interim configurations, if phased implementation is proposed). Track charts should be drawn to an appropriate linear scale for the level of complexity of

the track configuration in a particular segment, and should clearly show turnout sizes, road crossings, overhead and undergrade bridges, station and yard locations, junctions, track curvature, grade, signal location, signal rule applicability (e.g., CTC, ATC, PTC, DTC, etc.) and maximum authorized speeds. The physical location of specific projects should be shown clearly, including the limits of any linear-oriented projects (e.g., roadbed rehabilitation, rail replacement, tie replacement, etc.).

9. Operating and Maintenance Costs and Capital Replacement Forecast

The SDP should include operating and financial projections for each phase of the planned intercity passenger rail service. The SDP should address the methods, assumptions and outputs for operating expenses for the train service including maintenance of way, maintenance of equipment, transportation (train movement), passenger traffic and services (marketing, reservations/information, station, and on-board services), and general/administrative expenses. Cost-sharing arrangements and access fees with infrastructure owners and rail operators should also be included. Where applicable, allocation of costs across routes should also be discussed.

a. Costing Methodology and Assumptions
   For each different cost area, the SDP should provide the basis for estimation (application of unit costs from industry peers or a detailed resource build-up approach) of operating expenses. The SDP should include documentation of key assumptions and provide back-up data on how unit costs and quantities and cost escalation factors were derived. Typical cost areas include:
   - Maintenance of way—Includes the cost of maintaining the MOW, signals, buildings, structures, bridges etc.
   - Maintenance of equipment—Includes the cost of layover and turnaround servicing, preventive maintenance, bad orders, wreck & accidents, and contractor maintenance.
   - Transportation (train movement)—Includes the cost of trainmen, enginemen, bus connections, train fuel, propulsion power, railroad access and incentive payments.
   - Marketing and Information—Includes the cost of advertising, marketing, reservations, information.
   - Station—Includes the cost of station staff (ticketing, baggage, red caps, porters etc.), building rent, maintenance, utilities, security.
   - On-board services—Includes the cost of on-board service staff, food and provisions.
   - General/administrative expenses.

q. Summary of Operating Costs

r. Route Profit and Loss Statement
   Estimate the Profit and Loss Statement for the route based on revenue and operating cost forecasts.

s. Capital Replacement Costs
   The SDP should provide detailed estimates of any additional capital costs, beyond those incurred in the initial implementation of the Service Development Program, that are anticipated to be required due to lifecycle replacement or other factors through the planning horizon of the SDP.

10. Public Benefits Analysis

The SDP should include a description and quantification of benefits, whether operational, transportation output-related, and economic in nature, with particular focus on job creation and retention, ‘‘green’’ environmental outcomes, potential energy savings, and effects on community livability. Except where clearly unmonetizable, the SDP should provide the estimated economic value of those benefits. At a minimum, this section of the SDP should include:

a. Operational and Transportation Output Benefits
   The SDP should clearly identify the operational and transportation output-related benefits that will be generated by the project. Examples of operational benefits include trip-time improvements, reliability improvements (as measured by train delay-minutes), frequency increases, and passenger capacity increases (as measured by seat-miles). Transportation output benefits include increases in HSIPR passenger-trips and passenger-miles traveled, reductions in passenger-delay-minutes, and passenger-travel time savings resulting from faster scheduled trips times.

t. User and Non-User Economic Benefits
   The SDP should include an analysis of the monetized economic benefits to user and non-user that will be generated by the project, regardless of how or where those benefits are generated. User benefits include items such as the value of travel time savings to rail users, while non-user benefits include items such as the monetized value of emissions reductions, community development, and travel time savings due to congestion reduction for users of other modes from which demand is anticipated to shift to the new or improved HSIPR service.

u. Benefits by Rail Service Type
   All user and non-user benefits should be delineated by the type of improved rail service (i.e., HSIPR, commuter, or freight) that will generate those benefits. For example, user benefits in the form of travel time savings generated by a project for HSIPR passengers should be shown delineated from those travel time savings accruing to users of a commuter rail service that will also benefit from the project. Likewise, non-user benefits in the form of emission reductions resulting from the shift of passengers to HSIPR service should be separated from benefits resulting from a shift of road freight transport to rail freight service.

Planning and Concept Design Additional Information / Requirements		
Description	**MP**	Refer to Monitoring Procedures listed
Legal Authority		
		Grantee's review of State statutes to demonstrate its authority to implement the project, and its knowledge of requirements and constraints flowing from State law that may impact project cost and schedule if not addressed proactively.
Summary Planning Documents		
At completion of this phase for a major corridor, the summary documents include: Alternatives Analysis Report, Service Development Plan, Tier I NEPA and decision document.		These documents describes the establishment of a project rationale; the alternatives considered; their characteristics with respect to markets served, service provided, infrastructure changes required, environmental impacts, costs, and funding; and the alternative that is selected and taken to a higher level of development.
PMP and subplans		
	20	Project Management Plan
	21	Management & Technical Capacity/Capability
	22	Safety and Security Management Plan
	23	Real Estate Acquisition and Management Plan
	24	QA/QC Plan
	38	Vehicle Acquisition and Management Plan
	49	Finance Plan
Service Planning	32A	
Service Development Plan (see Appendix A) Service Outcome Agreements (SOA) Other Agreements		Service planning considers market and service alternatives, and physical and service contraints/opportunities. Through an SOA, the Grantee (Rail Project Sponsor), Passenger Train Operator, and Host Railroad agree to targets for daily round trips, average scheduled trip time, and minutes of delay. The SOA also covers agreement enforcement, dispute resolution, agreement term, modification procedures, and O & M commitments related to the project. The SOA references the following agreements between/among the following parties: - Grantee and FRA for the project; Grantee and Passenger Train Operator; Grantee and Host Railroad; Grantee and other Real Estate owners - Passenger Train Operator, Host Railroad, and Feeder Railroads

Planning and Concept Design Additional Information / Requirements		
Description	**MP**	Refer to Monitoring Procedures listed
Concept Design - Drawing Attributes	32C	
Alternatives Analysis		**Screening, Individual Alternatives, Development of Selected Alternative**
FRA expects well developed concept design drawings during the Planning phase so that a good basis for further design is established, capital costs can be roughly but confidently estimated, and choices among alternatives can be made knowledgeably. The MTAC should review the Grantee's concept design work for completeness and coordination, recognizing that much of the information is treated broadly.		For screening of alternatives, drawings will indicate lengths of typical construction conditions; for example, typical on-grade ROW and track and station type; and atypical construction conditions, for example, special elevated or tunnel lengths. For development of individual alternatives, design criteria including safety/security criteria will be developed. Concept drawings will show the alignment divided into discrete segments based on topography and land use, as well as on typical and atypical construction conditions. Conceptual / diagrammatic plans and cross-sectional drawings based on design criteria will be developed for each segment, showing relationship to grade, track quantity and configuration, and real estate acquisition. For the selected alternative, planning diagrams and concept design drawings will be developed into typical and atypical segments and station areas. In addition, studies will be prepared for land use, real estate, economic development, along with descriptive narratives and design criteria.
Concept Design Activity		**Type/Level of Design Detail**
Design Objectives and Basic Criteria		Grantee's accepted design criteria / standards and performance objectives
Aerial Photography		Digitized aerial photo background with limited controls (e.g. to support reasonably accurate scaling of dimension of physical features)
		Areas of sensitivity, identified in environmental document
Real Estate, ROW		Right-of-way limits, existing and proposed (indicating actual or potential takes). These limits would not be necessarily be field surveyed but would indicate general dimensions.
		A list of real estate agreements required for access, e.g. bridge commissions, city or private land owners, railroads
Renderings		Concept renderings of major project features (e.g., stations, railway segments)
Transportation Facilities-Civil		Basic railroad guideway facility dimensions, indicating footprints and limits of proposed improvements - track and track components, including turnouts, railroad crossings, and highway crossings

Planning and Concept Design Additional Information / Requirements		
Description	**MP**	Refer to Monitoring Procedures listed
Transportation Facilities - Structures		Structure types, including examples of typical/similar designs indicating dimensions and proposed locations; typical sections through civil and site structures such as bridges, tunnels, culverts, and retaining walls
Civil and Site Structures		Location and relocation of major utilities (e.g., high voltage overhead or underground power, commercial power, underground major sewer, gas, water, other pipeline, communications lines); drainage channels, other. Access roads to utility infrastructure.
		Related highway and street improvements, including any traffic signals
Systems Elements		Description of signal systems elements (including, but not limited to, communications, signals including PTC, signal power, and highway crossing signalization, operations control, and safety and security emergency systems planned); performance characteristics and capacities.
		Description of traction power facilities and infrastructure. Proposed locations of major equipment (e.g., traction power stations, catenary alignment and possible configuration, etc.)
Stations		Basic footprint, locations of stations, including platforms; basic indication of station accessways for pedestrians, transit, and autos
Maintenance Facilities		Overall site plan (schematic indicating proposed limits, general features)
		Basic footprint of new or expanded yards, shops/garages Description of improvements to control centers
Vehicle		Outline specification for rolling stock, including both cars and locomotives; including type, basic dimensions, dynamic envelope
Project Delivery Methods	32D	Consideration of project delivery options (design-bid-build, design-build, etc.)

Planning and Concept Design Additional Information / Requirements		
Description	**MP**	Refer to Monitoring Procedures listed
Capital Cost Estimate	33	
Alternatives Analysis		**Screening, Individual Alternatives, Development of Selected Alternative**
Grantee consultant design teams are expected to have sufficient knowledge and experience to produce reliable cost estimates. A cost estimating methodology report should be submitted to explain the estimating approaches used, assumptions made, specific items such as lump sum values, the method for developing unit costs, and cost estimating relationships.		For screening of alternatives, parametric cost estimating is appropriate. Aggregated unit costs should be based on similar projects in the recent past. Typical and atypical construction conditions are the basis for estimating. For development of an individual alternative, segment-based cost estimating is appropriate. Costs are estimated based on diagrammatic plans, cross-sectional drawings, and design criteria for each segment. For the selected alternative the segment-based costing approach is used augmented by risk identification. The cost estimate should be built from the bottom up to address all scope elements, real estate, professional services, contingency, financing costs, and inflation costs to yield a cost in year-of-expenditure dollars.
Project Schedule	34	
		For the selected alternative, the Grantee should develop a concept schedule that shows at a high-level the PE, FD, and construction phases, so as to reflect the anticipated project delivery method. Construction phasing or sequencing shall be shown in the schedule.
Risk and Contingency Considerations	40	
		Focus on Risk Identification. Inadequate consideration of uncertainty during alternatives analysis and the resulting underestimation of capital costs creates a delivery problem for projects and a credibility problem for the industry. Uncertainties in design, delivery method, construction, funding, and political and institutional support should be identified, quantified, and isolated if possible. The Grantee should develop and populate a risk register that includes known risks, uncertainties, and unknowns. The risks can then be categorized by type, project phase, and potential severity. The risk register is useful during alternatives analysis as well as after a preferred alternative has been selected.
Before and After Study	27	