Iowa Connections

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# *Draft Service Development Plan*

# Chicago to Council Bluffs-Omaha

## Regional Passenger Rail System Planning Study

November 19, 2013

Iowa Department of Transportation

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## 1.0 Introduction

This Service Development Plan (SDP) describes the operation, maintenance, equipment, infrastructure, organization, implementation schedule, finances and economics of a regional passenger railroad transportation service proposed to operate between Chicago, Illinois, and Council Bluffs, Iowa. The passenger transportation service contemplated in this SDP would be incrementally implemented from east to west, and through frequency increases, until it ultimately delivers four round-trips per day between the end point cities, operating at a maximum speed of 79 mph. The service would be owned and operated by the States of Iowa and Illinois. The passenger rail service described in this SDP will be formally known as the Chicago to Council Bluffs-Omaha Passenger Rail Service, referred to formally in this document as the "Service." The SDP does not commit Iowa or Illinois to implementation. Incremental service improvements will be made in later implementation phases, depending on needs and funding.

This SDP is a component of a Tier 1 Environmental Impact Statement (EIS) for the Chicago to Council Bluffs/Omaha, Nebraska, corridor. That EIS contemplates a further increase of passenger rail service in this corridor consisting of a geographic extension from Council Bluffs to Omaha; a frequency increase to seven round-trips per day between Chicago and Des Moines, Iowa, and five round-trips per day between Des Moines and Omaha; and an increase in maximum speed to 110 mph. The proposed Service would be a component of the Midwest Regional Rail System (MWRRS), a passenger-rail system that will hub at Chicago and provide service radiating from Chicago to major population centers and intermediate stations throughout the Midwest. Components of the MWRRS currently in development include Chicago-St. Louis, and Chicago-Detroit/Pontiac, Michigan, and components currently in planning include Chicago-Milwaukee-St. Paul/Minneapolis.

Previously in this Tier 1 EIS, a route was identified for the Service. This route, identified as Route Alternative 4-A, consists principally of the BNSF Railway (BNSF) between Chicago Union Station and Wyanet, Illinois, and the Iowa Interstate Railroad (IAIS) between Wyanet, Illinois, and Council Bluffs, Iowa. This route also contains trackage owned and operated by Amtrak at Chicago Union Station, trackage owned and operated by BNSF at Colona and Moline, Illinois, and trackage owned and operated by Union Pacific Railroad (UP) at Des Moines, Iowa. Additionally, the Government Bridge, which the route uses to cross the Mississippi River between Rock Island, Illinois, and Davenport, Iowa, is owned by the U.S. Army, Rock Island Arsenal. Route 4-A between Chicago and Council Bluffs is approximately 475 miles in length. Route 4-A was identified in the Final Alternatives Analysis Report dated October 30, 2012, and the Final Environmental Impact Statement/ Record of Decision dated August 2, 2013.

The proposed Service could be implemented incrementally as presented in Table 1.0-1 below. Incremental implementation will enable funding to be obtained incrementally, enable the States of Iowa and Illinois to reduce implementation cost and schedule risks for the overall Service by reducing the scope of each phase compared to the overall Service, applying lessons learned in each phase to succeeding phases, and reduce revenue and ridership forecasting risk by measuring actual results of each phase prior to design and implementation of each subsequent phase. The initial two phases of the Service—Chicago to Moline, Illinois, and Moline to Iowa City, Iowa—have received for their implementation a

Federal Railroad Administration (FRA) grant equivalent to 80 percent of the estimated implementation costs. State of Illinois and Iowa funds will provide the remaining 20 percent of the estimated implementation costs, and State of Illinois and Iowa funds will provide operating and maintenance cost not recovered from farebox and onboard food and beverage sales.

**Table 1.0-1: Phased Service Implementation for the Chicago to Quad Cities to Council Bluffs-Omaha Service**

| Phase | Implementation Year | Service | Round-Trips Daily | Speed | Funded |
|---|---|---|---|---|---|
| 1 | 2015 | New service between Chicago and Moline (Quad Cities) | 2 | 79 mph | Yes* |
| 2 | 2017 | Extension of service from Moline to Iowa City | 2 | 79 mph | Yes** |
| 3 | 2022 | Extension of service from Iowa City to Des Moines | 2 | 79 mph | No |
| 4 | 2025 | Increase frequency between Chicago and Des Moines | 4 | 79 mph | No |
| 5 | 2030 | Extension of service from Des Moines to Council Bluffs | 4 | 79 mph | No |

**Funded by FRA and the State of Illinois*

***Funded by FRA.  State of Iowa match pending.*

The Service will use the same trackage as existing Amtrak long-distance and regional intercity service for the portion its route between Chicago and Wyanet, Illinois. Intermediate stations on the Chicago to Council Bluffs service currently served by existing Amtrak services are La Grange Road, Naperville, Plano, Mendota, and Princeton, Illinois. At present there is no passenger rail service to the remaining proposed stations on the Chicago to Council Bluffs route, which are Geneseo and Moline, Illinois, and Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa. Amtrak's *California Zephyr* serves Chicago and Omaha, Nebraska. The *California Zephyr's* route parallels, approximately 50 miles to the south, the route that would be used by the Service through Iowa. The Service also will use the same trackage as existing Metra commuter-rail service between Chicago and Aurora, Illinois. The transportation service plan of the Service is designed to preclude its use as an alternative to Metra commuter-rail service by restricting boardings and alightings at station stops in the Metra territory to intercity boardings and alightings only.

The passenger transportation schedule for the Service (the timetables) is designed to provide convenient and efficient intercity travel. Intermodal connectivity through local bus and transit systems will be provided at stations with cities which have transit systems at present, and through the service's use of Chicago Union Station. At Chicago Union Station, connectivity will be provided with other Amtrak intercity services and a substantial portion of Metra's Chicago commuter rail network, as this is the hub station for Amtrak's Midwest network and many of Metra's services. The Service would ultimately incorporate single-through-ticket bus connections (e.g., Amtrak Thruway bus service) from many of its stations to enable passengers to travel to and from cities beyond the immediate corridor such as Cedar Rapids, Waterloo, Ames, Boone, and Sioux City, Iowa, and Lincoln, Nebraska.

Trains operated by the Service would be comprised of bi-level coaches and café/lounge cars of the design currently being procured for Amtrak's Midwest regional rail network, including the first phase of the Service between Chicago and Moline. Locomotives would be diesel-electric. Onboard passenger amenities would include workstation tables, light dining and beverage service, wireless internet service and power ports, baggage space, and bicycle racks. All passenger cars would be Americans with Disabilities Act (ADA) compliant.

Infrastructure improvements to host railroads will be necessary to support the various phases and frequencies of passenger rail service and to mitigate effects of passenger train operation on existing and future freight rail traffic on the lines of the host railroads and intersecting railroads. Infrastructure improvements in general will consist of:

- Sidings to perform meet/pass events between passenger trains, between passenger and freight trains, and between passenger trains and maintenance-of-way equipment and gangs
- Bypass routes through terminals with freight train congestion, at the Quad Cities of Illinois and Iowa (Moline, Rock Island, Davenport, and Bettendorf), and Des Moines
- Yard capacity improvements at Eola, Illinois, on BNSF
- Improvement of the main track on the IAIS portion of the route from Class 3 to Class 4, providing the track class that is necessary for passenger trains to operate at a maximum speed of 79 instead of the 60 mph allowed with Class 3
- Implementation of wayside signaling on the IAIS portion of the route to enable passenger trains to operate using Centralized Traffic Control and at 79 mph, instead of the 59 mph allowed under the existing non-block Method of Operation of the IAIS
- Grade-crossing signal improvement to provide active warning devices at all public at-grade road crossings not closed as part of the project
- Implementation of Positive Train Control on the IAIS portion of the route;
- Station facilities consisting of platforms, canopies, lighting, shelters, ticket machines, and parking where not otherwise sufficient (municipalities may independently also provide additional development at stations)
- A permanent train layover/maintenance facility at Council Bluffs, and temporary facilities at interim phase terminals (Moline, Iowa City and Des Moines)

Certain components of this infrastructure that support implementation of the Service between Chicago and Moline are in the process of design, permitting, and construction. All elements of the proposed Service and the implementation of the Service are outlined in subsequent sections of this SDP.

## 2.0 Purpose and Need

The Chicago to Council Bluffs-Omaha Passenger Rail Service, and the Midwest Regional Rail System of which the Service is a component, are intended "to meet current and future regional travel needs through significant improvements to the level and quality of passenger rail service," as defined by the Midwest Regional Rail Initiative (MWRRI) in its Midwest

Regional Rail System Executive Report (MWRRI, September 2004). The Service would provide competitive passenger rail transportation between Chicago and Council Bluffs-Omaha to help meet existing and future travel demand. The Service would create a competitive passenger rail transportation alternative to the available automobile, bus, and air service and would meet needs for more efficient travel between major urban centers by:

- Decreasing travel times
- Increasing frequency of service
- Improving reliability
- Providing an efficient transportation option
- Providing amenities to improve passenger ride quality and comfort
- Promoting environmental benefits, including reduced air pollutant emissions, improved land use options, and fewer adverse impacts on surrounding habitat and water resources

The need for the Service stems from the increasing travel demand resulting from population growth and changing demographics along the Corridor as well as the need for competitive and attractive modes of travel (MWRRI, June 2004).

## 2.1 Transportation Challenges

Travel demand is the total demand for travel services in the Corridor. Demand for an intercity passenger rail service must take into account the volume and nature of the population it serves. Between 2000 and 2010, the Chicago and Omaha/Council Bluffs metropolitan statistical areas (MSAs) have seen growth of 3.3 and 20.7 percent, respectively (U.S. Census Bureau, 2010). As shown in Table 2.1-1, the combined population in Illinois, Iowa, and Nebraska has increased by 14.8 percent between 1970 and 2010 (U.S. Census Bureau, March 27, 1995, and 2010). Not only is population increasing in the area, but it is also becoming more urbanized, with expanded access to and demands for public transportation (Iowa DOT, December 27, 2010). For example, Iowa has historically had a mostly rural population; however, in 2003, that trend shifted, and 60 percent of the population is projected to live in urban areas by 2030 (Iowa DOT, December 27, 2010).

Table 2.1-1: Population Change

| State | Total Population | | | Percent Increase Between 1970 and 2010 |
|---|---|---|---|---|
| | 1970 | 2000 | 2010 | |
| Illinois | 11,113,976 | 12,419,293 | 12,830,632 | 15.4 |
| Iowa | 2,824,376 | 2,926,324 | 3,046,355 | 7.9 |
| Nebraska | 1,483,493 | 1,711,263 | 1,826,341 | 23.1 |
| **Total** | **15,421,845** | **17,056,880** | **17,703,328** | **14.8** |

*Sources: U.S. Census Bureau, March 27, 1995, "County Population Census Counts 1900-90," retrieved on December 5, 2011, http://www.census.gov/population/www/censusdata/cencounts/index.html.*
*U.S. Census Bureau, 2010, Census 2010, Summary File 1, Table P12: SEX BY AGE - Universe: Total population, generated by Kelly Farrell using American FactFinder, retrieved on December 19, 2011, http://factfinder2.census.gov/main.html.*

The population in the Corridor is also aging and is increasingly seeking alternative modes of transportation. As shown in Table 2.1-2 below, between 2000 and 2010, the population of individuals who are 65 years of age and over in Illinois, Iowa, and Nebraska has increased by 7.3, 3.8, and 6.2 percent, respectively (U.S. Census Bureau, 2000 and 2010). Within the Chicago and Omaha MSAs, the population of individuals who are 65 years of age and over, a population segment who tend to rely more on public transportation, is 8.2 and 25.9 percent higher, respectively, in 2010 compared to 2000 (Iowa DOT, 2012; Iowa DOT, December 27, 2010; U.S. Census Bureau, 2000 and 2010).

### Table 2.1-2: Population 65 Years of Age and Over

| State | Total Population 65 Years of Age and Over (Percentage of Total Population) | | Percent Increase Between 2000 and 2010 |
|---|---|---|---|
| | 2000 | 2010 | |
| Illinois | 1,500,025 (12.1) | 1,609,213 (12.5) | 7.3 |
| Iowa | 436,213 (14.9) | 452,888 (14.9) | 3.8 |
| Nebraska | 232,195 (13.6) | 246,677 (13.5) | 6.2 |
| **Total** | **2,168,433 (12.7)** | **2,308,778 (13.0)** | **6.5** |
| Chicago MSA | 998,464 (10.9) | 1,079,893 (11.4) | 8.2 |
| Omaha MSA | 76,345 (10.6) | 96,098 (11.1) | 25.9 |

*Source: U.S. Census Bureau, 2010, Census 2010, Summary File 1, Table P12: SEX BY AGE - Universe: Total population, generated by Kelly Farrell using American FactFinder, retrieved on December 19, 2011, http://factfinder2.census.gov/main.html.*

Travel modes available to the public along the Corridor include automobile, air, bus, and conventional-speed long-distance passenger rail. The travelling public selects travel modes based on a combination of trip time, cost, and convenience. Trip time includes the total travel time between a traveler’s initial origin or final destination (such as a residence or place of business) to a mode change location such as an airport, rail station, or bus station, plus the travel time between mode change locations. Approximately 98 percent of existing travel between city pairs in the Corridor is estimated to occur by automobile, with air, bus, and passenger rail travel making up the remainder. The predominant mode of travel in the region is the automobile. Highway access between Chicago and Omaha is provided through Interstate 80 (I-80) and Interstate 88 (I-88), approximately 160 miles of which is tolled from the Chicago metropolitan area west to Sterling, Illinois, as well as a number of federal and state highways. Table 2.1-3 shows the total trips estimated by mode within the Corridor for the year 2020.

### Table 2.1-3: Total Trips by Mode for the Year 2020

| Mode of Travel | Total Trips[a] | Percent of Total |
|---|---|---|
| Automobile | 72,883,000 | 97.7 |
| Air | 1,233,000 | 1.7 |
| Bus | 359,000 | 0.4 |
| Passenger Rail | 113,000 | 0.2 |
| **Total** | **74,588,000** | **100** |

*Note:*
[a] *Excludes short trips of less than 100 miles.*

The primary automobile travel route is I-88 between Chicago and East Moline, approximately 160 miles, and I-80 between East Moline and downtown Omaha, approximately 313 miles, for a total of 473 miles. From southern Chicago, the entire route along I-80 from Chicago to Omaha is approximately 470 miles. A one-way trip by automobile between Chicago and Omaha along either of these routes at posted interstate speeds would take about 8 hours during off-peak hours. Using the current Internal Revenue Service (IRS) standard of $0.555 per mile, the cost of driving round-trip between Omaha and Chicago with one day of parking in either Omaha ($5) or Chicago ($35) is $547.10 and $577.10, respectively (FRA and Iowa DOT, 2012).

I-80 is also a major regional and interstate truck route in the Midwest. Between 2010 and 2030, vehicle miles traveled in Iowa on I-80 are expected to increase by more than 65 percent. If no capacity improvements are made, nearly 75 percent of I-80 in Iowa would be bordering on unstable traffic flow, at or beyond capacity (Iowa DOT, January 24, 2012). In Chicago, Des Moines, and Omaha, I-80 currently has peak-period congestion and capacity issues due to a volume/service flow ratio[1] greater than 0.95 that results in stop-and-go traffic conditions (Federal Highway Administration [FHWA], November 2010). The remainder of the Corridor is not currently experiencing substantial traffic congestion. By 2040, if no capacity improvements are made, the I-80 corridor between Chicago and Omaha with the exception of rural parts of Illinois will be experiencing peak-period congestion issues due to a volume/service flow ratio greater than 0.95 with stop-and-go traffic conditions (FHWA, November 2010).

Air service is currently available between major cities in the Corridor. Commercial air service is provided at Chicago (Chicago O'Hare International Airport and Chicago Midway International Airport), Moline (Quad Cities International Airport), Des Moines (Des Moines International Airport), and Omaha (Eppley Airfield). Near to the corridor, service is provided at Cedar Rapids, Iowa (Eastern Iowa Airport). Direct flight service between Chicago and Omaha is provided by American Airlines, Southwest Airlines, United Airlines, and U.S. Airways. Typical flight times range from 1 hour and 20 minutes to 1 hour and 40 minutes. Direct flight service between Chicago and Des Moines is provided by American Airlines, Southwest Airlines, United Airlines, and U.S. Airways. Typical flight times range from 1 hour and 15 minutes to 1 hour and 25 minutes. Direct flight service between Chicago and the Quad Cities is provided by American Airlines, United Airlines, and U.S. Airways. Typical flight times range from 52 minutes to 56 minutes. There is no direct service between Moline and Omaha or between Des Moines and Omaha; typical connections go through Chicago or Minneapolis. Between February 2011 and February 2012, the 17 daily flights between Chicago and Omaha were reliable an average of 79 percent of the time, with the other 21 percent of flights either delayed 15 minutes or more or cancelled (FRA and Iowa DOT, 2012). Tickets purchased two weeks in advance varied considerably and typically cost between $210 and $1,400 (FRA and Iowa DOT, 2012).

[1] The volume/surface flow ratio represents the relationship between actual traffic volumes and the maximum capacity of the roadway. No roadway congestion is present when the volume/surface flow ratio is 0.0. Roadways are considered congested when the volume/surface flow ratio is between 0.75 and 0.95. A roadway with a volume/surface flow ratio of 0.95 to 1.0 has traffic volumes approaching or equal to the surface flow is considered to be highly congested, and experiences stop-and-go traffic conditions.

Bus service is provided in a majority of mid-to-large sized cities in the Corridor, with intermittent service to smaller towns. Service between Chicago and Omaha, with multiple stops, is provided by Burlington Trailways (service until August 15, 2012, was provided by Greyhound) and Megabus. Typical bus service includes two trips per day, one in the early morning and one in the late evening. Typical travel time by bus between Chicago and Omaha ranges from 9 hours and 15 minutes for express service to 9 hours and 40 minutes for regular service (Greyhound, 2011). On August 15, 2012, Burlington Trailways took over the Greyhound routes from Omaha (though Greyhound is still maintaining the terminals), including the route from Omaha to Chicago, which features stops in Des Moines, Iowa City, Davenport, and Moline. Bus ticket prices vary from $40 to $126 (FRA and Iowa DOT, 2012).

Megabus, a subsidiary of Coach USA, is a low-fare express bus service that recently added daily service between Chicago and Omaha with stops in Iowa City and Des Moines. Megabus provides two round-trips per day, one in the morning and one in the late evening. The full one-way trip from Chicago to Omaha takes 8 hours and 50 minutes. Megabus offers amenities including Wi-Fi service and 110-volt power ports at each seat. However, Megabus does not always provide traditional sheltered station stops. In Chicago, the station stop is located downtown, adjacent to Union Station. In Omaha, the station stop is adjacent to the parking garage at Crossroads Mall on the city's west side (Megabus.com, 2012).

Amtrak provides passenger rail service between Chicago and Omaha with the *California Zephyr*, a once-daily (each way) long-distance passenger train between Chicago and Oakland, California. The *California Zephyr* does not provide departure and arrival times that are convenient between cities in the Corridor. Travel time from Chicago to Omaha is scheduled for 8 hours and 55 minutes, and travel time from Omaha to Chicago is scheduled for 9 hours and 36 minutes (Amtrak, January 14, 2013). Coach tickets purchased two weeks in advance typically cost $69 to travel from Chicago to Omaha and $108 to travel from Omaha to Chicago (FRA and Iowa DOT, 2012). Long-distance trains are designed for long-distance passengers and are often inconvenient for regional travelers. The westbound arrival time in Omaha is 10:55 pm, and the eastbound departure time from Omaha is 5:14 am. The only major metropolitan community in Iowa that currently has access without a lengthy drive to the nearest station for the *California Zephyr* is Council Bluffs (Iowa DOT, December 27, 2010).

## 2.2 Transportation Opportunities

The introduction of intercity passenger rail service connecting major urban centers between Chicago and Council Bluffs would provide a competitive, attractive, and cost-efficient alternative to personal autos, commercial air, and commercial bus service for travel in the Corridor. This opportunity is described below.

Intercity passenger rail service would offer an alternative to traditional highway and air travel between major urban centers in the face of a growing and aging population and increasing congestion on Midwest highways and at Midwest airports. For example, highway vehicle miles traveled in Iowa have increased 37 percent since 1990, and I-80 through Chicago, Des Moines, and Omaha currently experiences peak-period congestion and capacity issues. Chicago O'Hare International Airport is the second busiest airport in the nation (Iowa DOT, 2012; U.S. DOT, January 2012). Furthermore, inclement winter weather in the Corridor often creates conditions that impact both highway and air travel, creating a need for an alternative passenger transportation mode that is less prone to winter service interruptions. For example, winter storms (storms lasting four or more hours with snowfall rates of 0.20 inch per hour or more) in Iowa reduce traffic volumes by an average of 29 percent (ranging from 16 to 47 percent) depending on total snowfall and wind speeds (Knapp, Kroeger, and Giese, February 2000).

## 3.0 Service Rationale

The service rational developed as part of Task 2-Preliminary Service Planning and Alternatives and Task 3-Tier 1 EIS and Record of Decision is presented in this section. This includes the geography and population of the Corridor and connectivity to other transportation modes.

## 3.1 Geography and Population of Service Area

The Service extends from Chicago Union Station, in downtown Chicago, Illinois, on the east to a terminal in Council Bluffs, Iowa, on the west. In Illinois, the route alignment runs generally west from Chicago Union Station, which is the hub for the MWRRS, to the Mississippi River. In Iowa, the route alignment runs west from the Mississippi River for approximately 300 miles across the entire state of Iowa to the Missouri River at Council Bluffs. Council Bluffs lies on the east bank of the Missouri River, and Omaha immediately to the west on the west bank.

The service area of the Service includes the major population areas of Chicago, the Quad Cities of Illinois and Iowa, Iowa City, Des Moines, and Council Bluffs-Omaha. Between these major urban areas are numerous small rural communities. The geography of this region is open and low relief and generally does not restrict or channel travel routes with the exception of bridges over the Mississippi River and Missouri River.

As described in Section 2.0 of this SDP, the combined population in Illinois, Iowa, and Nebraska has increased by 14.8 percent between 1970 and 2010 (U.S. Census Bureau, March 27, 1995, and 2010), and the population is becoming more urbanized and more elderly.

Chicago, the largest city in the Midwest, with a Metropolitan Statistical Area (MSA) population of 9,461,105 (2010 U.S. Census), provides comprehensive national and international transportation connections. Chicago is the third largest MSA in the U.S., and one of the largest commercial, education, entertainment, tourism, and industrial centers in North America.

The Quad Cities area has a MSA population of 379,960 (2010 U.S. Census), and is a major manufacturing and commercial location supplying agricultural implements and earthmoving machinery worldwide. Augustana College at Rock Island, Illinois (student population approximately 2,500) draws students nationwide and internationally. Other universities in the Quad Cities include St. Ambrose University and Western Illinois University’s Quad Cities Campus. The Quad Cities are also a major visitor draw from both Illinois and Iowa, with attractions including its scenic Mississippi River frontage, river boating and riverboat casinos, and several museums and convention centers. Approximately 60 percent of the visitors to the Quad Cities are from the Chicago area.

The Iowa City area has a MSA population of 152,586 (2010 U.S. Census), and is nationally recognized for its medical centers and the University of Iowa. Over 5,000 of the university's student population of nearly 30,000 are from the Chicago metropolitan area. Iowa City is a major commercial manufacturing location, with a highly developed agricultural processing and heavy capital goods manufacturing sector. Adjacent to the proposed route is Cedar Rapids, Iowa, with a metropolitan statistical area population of 257,940 (2010 U.S. Census). Downtown Cedar Rapids is 27 miles north of the proposed rail station in Iowa City. Cedar Rapids is also a major commercial manufacturing location, with agricultural processing and heavy capital goods manufacturing.

The Des Moines area has a MSA population of 569,633 (2010 U. S. Census), and is the capital and largest metropolitan area in Iowa. The city is home to many state government offices; financial, insurance, and publishing companies; and a varied array of distributors, heavy capital goods manufacturers, and agricultural processors. Several educational institutions, including Drake University, Grand View University, Simpson College, and Upper Iowa University are located in Des Moines. Iowa State University is located 35 miles north of the proposed Des Moines station, in Ames, Iowa.

The Omaha-Council Bluffs area has a MSA population of 865,350 (2010 U.S. Census). Council Bluffs is a major commercial manufacturing and distribution location. Council Bluffs draws visitors with its scenic Loess Hills, Missouri River frontage, and riverboat casinos. Omaha is the largest city in Nebraska and is a major commercial and manufacturing and agricultural/food processing location as well as a hub for banking, insurance, telecommunications, construction, and transportation firms. Many educational institutions, including the University of Nebraska at Omaha and Creighton University, are located in Omaha. Omaha is also a major visitor draw, with many attractions, museums, and entertainment venues, convention centers, and sporting and musical events.

## 3.2 Connectivity to Other Transportation Modes

Travel modes available to the public along the Chicago to Council Bluffs-Omaha corridor include automobile, air, bus, and long-distance passenger rail service.

### 3.2.1 Air

Air service is currently available between major cities in the Service area. Regional airline service is offered between Chicago and the Quad Cities, Cedar Rapids, Des Moines, and Omaha. Commercial air service is provided in Chicago (Chicago O'Hare International Airport and Chicago Midway International Airport), Moline (Quad Cities International Airport), Cedar Rapids (Eastern Iowa Airport) Des Moines (Des Moines International Airport), and Omaha (Eppley Airfield). Direct flight service between Chicago and Omaha is provided by American Airlines, Southwest Airlines, United Airlines, and U.S. Airways. Direct flight service between Chicago and Des Moines is provided by American Airlines, Southwest Airlines, United Airlines, and U.S. Airways. Direct flight service between Chicago and the Quad Cities is also served by American Airlines, United Airlines, and U.S. Airways. There is no direct service between Moline, Cedar Rapids, Des Moines, or Omaha except by connections through Chicago, Denver, or Minneapolis.

### 3.2.2 Transit/Commuter

Chicago offers extensive and highly developed intermodal connectivity to passengers arriving or departing from Chicago. This includes the Chicago Transit Authority (CTA), an integrated rail rapid transit and bus system; PACE, the metropolitan Chicago bus system; and Metra, a commuter rail system. The CTA's Blue Line and Orange Line rapid transit services stop near Union Station and link downtown Chicago with O'Hare Airport and Midway Airport, respectively. Local bus services exist at Moline (Quad Cities), Iowa City, Des Moines, and Council Bluffs-Omaha. At Moline and Des Moines, bus services hub at transit centers immediately adjacent to the Service's proposed station locations.

### 3.2.3 Intercity and Long Distance Passenger Rail Services

Connections to Amtrak's network of Midwest intercity corridor services (including trains for Milwaukee, Minneapolis/St. Paul, St. Louis, Kansas City, Indianapolis, and Detroit) and long-distance trains for other parts of the U.S. can be made at Chicago Union Station.

### 3.2.4 Intercity Bus

Intercity bus service is provided to a majority of mid-to-large sized cities in the Midwest, and can be accessed by the proposed trains of the Service.

Greyhound and Megabus intercity and long-distance buses are accessible in Chicago. Connections to the intercity buses of Burlington Trailways can be made at Chicago, Naperville, Moline, Iowa City, Des Moines, and Omaha. Connections to the express intercity buses of Megabus can be made at Chicago, Iowa City, Des Moines, and Omaha. In Chicago, buses of all three carriers terminate in close proximity to Union Station. Bus service may also be provided by the Service through "Thruway" single-ticket bus services, effectively extending the service from its stations to cities in Iowa, Illinois, and Nebraska.

### 3.2.5 Automobiles

Connectivity of highways with the proposed Service is extremely high, but is affected by significant traffic congestion on highways that approach and penetrate the Chicago metropolitan area and lesser traffic congestion in the Quad Cities, Des Moines, and Council Bluffs/Omaha. The proposed intercity passenger rail service lies in an established, regular travel corridor with well-developed highway connections (Interstate, U.S., State, and Local roadways) between proposed station stops and communities and to each end of the corridor. Rental cars are available in every medium and large city along the Chicago to Council Bluffs-Omaha corridor, and provide riders with a means for reaching rural areas and other urban centers in the immediate area not presently served by rail or connecting intercity bus lines. At this time, rental cars are not available at the Service's proposed station stops.

Further, the trains of the Service also make connections with networks of established bicycle routes and recreational trails in most major cities.

## 4.0 Identification of No-Build and Build Route Alternative

This section identifies the initial range of route alternatives proposed for consideration for the Study. Route alternatives are the alternatives for the overall Service route and identify the termini and alignment for the service. The screening criteria and multi-step process used to evaluate these route alternatives, and the results of the alternatives analysis are also described. Subsequent to the route screening process, options for service (speeds, frequencies, and station stops) were identified, reviewed, and screened, and design options for route connectivity through the Des Moines, Iowa, area and the Council Bluffs, Iowa, and Omaha, Nebraska, area were considered. Although preliminary design would address specific infrastructure needs during the Tier 2 NEPA process, which may include the evaluation of design options, connectivity options were initially addressed during the Tier 1 NEPA process. The No-Build Alternative and Build Alternative (including its phased implementation) are described in this section.

The range of route alternatives evaluated included the No-Build Alternative and existing or former freight-only or freight-passenger routes that may have been previously identified by the MWRRI and other studies. The No-Build Alternative, five previously established passenger rail routes in the Corridor (Route Alternatives 1 through 5), and the combination of Route 4 and Route 5 (Route Alternative 4-A) compose the initial range of route alternatives proposed for consideration for the Study. These route alternatives are shown in Figure 4.0-1, including the major cities through which they travel. The No-Build Alternative is included to provide a basis of comparison to the other route alternatives.

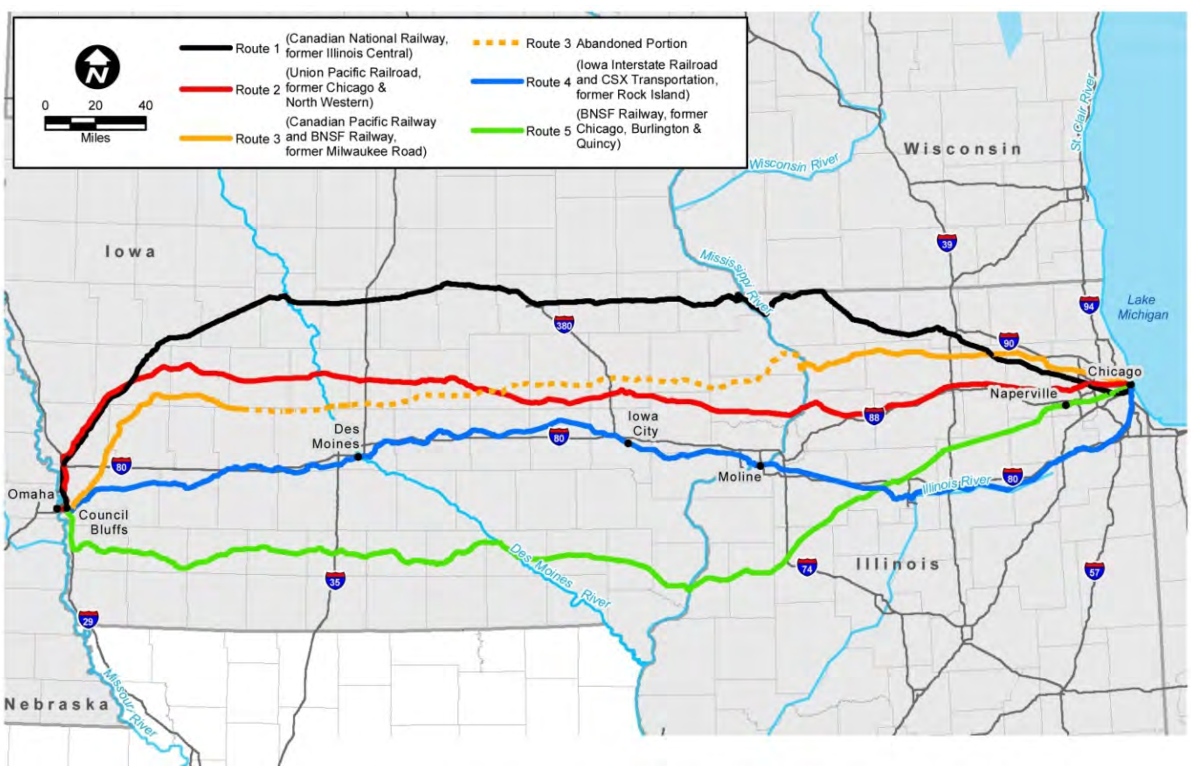


Figure 4.0-1: Study Area

## 4.1 Summary of Route Evaluation Process

A two-step screening process—coarse-level screening and fine-level screening—was used to evaluate proposed Chicago to Council Bluffs-Omaha route alternatives using the four screening criteria. The purpose of the two-step screening process was to eliminate route alternatives burdened by major challenges. The coarse-level screening was applied to the initial range of route alternatives. Unreasonable alternatives were eliminated from further consideration. Fine-level screening was applied to the remaining alternatives, and the one or more alternatives that passed through the fine-level screening process were carried forward for detailed evaluation under the Tier 1 NEPA process.

### 4.1.1 Coarse-Level Screening of Route Alternatives

Coarse-level screening is a high-level evaluation to determine which route alternatives meet the purpose and need, are technically and economically feasible, and are environmentally reasonable. Route alternatives that met all of these criteria were carried forward to fine-level screening. Route alternatives that did not meet all of these criteria were eliminated from further consideration. The route alternatives that did meet purpose and need were evaluated based on technical, economic, and environmental criteria. These criteria and their factors for evaluation are presented in Table 4.1-1. The Purpose and Need criterion and the Environmental Concerns criterion each have sub-criteria defined for evaluation. Information gained during the scoping process was used to help compare and screen route alternatives.

A 500-foot-wide buffer was applied to each of the route alternatives analyzed in the coarse-level screening. This buffer provided a conservative limit for screening of the route alternatives.

Table 4.1-1: Coarse-Level Screening Criteria

| Criteria | Factors |
|---|---|
| Purpose and Need: Travel Demand | Other than the Chicago and Omaha/Council Bluffs metropolitan areas, what is the population served by the route alternative? |
| Purpose and Need: Competitive and Attractive Travel Modes | Would the route alternative provide a time-competitive route compared to other route alternatives? |
| Technical Feasibility | Would the route alternative involve substantially more technical hurdles than other route alternatives? Factors considered include:<br>• Major construction efforts, such as major earthwork and major new bridges<br>• Potential for freight train traffic conflicts and scope of engineering solutions for such conflicts |
| Economic Feasibility | Would the route alternative have costs far in excess of its anticipated benefits? Would the route alternative be substantially more expensive than other route alternatives? |
| Environmental Concerns: Major Challenges | Based on qualitative analysis, does the route alternative have major environmental (natural and human environment) challenges compared to other considered route alternatives? |
| Environmental Concerns: Sensitive Areas | Based on qualitative analysis, would the route alternative traverse substantially more environmentally sensitive areas (such as wetlands, wildlife and waterfowl refuges, cultural resources, and park and recreation lands) than other route alternatives? |
| Environmental Concerns: Right-of-Way | Would the route alternative require substantially more right-of-way acquisition than other route alternatives? |

### 4.1.2 Fine-Level Screening of Route Alternatives

Fine-level screening was conducted to determine which remaining route alternatives would be carried forward for detailed evaluation in this Tier 1 EIS. During fine-level screening, route alternatives carried forward from the coarse-level screening were further screened for their ability to offer the highest potential ridership, the least potential construction, operation, and maintenance cost; and the least potential impact on the natural and human environment.

In order to estimate potential impacts, a preliminary impact area was identified for each route alternative. Existing right-of-way was assumed to be 100 feet wide throughout each route alternative. A buffer ranging from 25 to 50 feet wide was then applied where necessary to accommodate additional track needs, to promote efficient track maintenance, and to mitigate any operating disruptions generated by passenger trains. Therefore, the buffer area applied is specific to each route alternative. The preliminary impact area analyzed for each route alternative in the fine-level screening included the estimated 100-foot-wide right-of-way and the 25- to 50-foot-wide buffer area for additional track.

The criteria and their factors evaluated during fine-level screening are listed in Table 4.1-2. Purpose and Need, Technical Feasibility, and Environmental Concerns each have sub-criteria defined for evaluation. The environmental criteria were selected from those resources that were readily quantifiable, and often include constraints on project development. Some of the resources selected for screening would also require permits or approvals. Consequently, although not every environmental resource included in the NEPA effort was considered for initial screening of alternatives, the resources selected for screening were known to be key constraints.

Table 4.1-2: Fine-Level Screening Criteria

| Criteria | Factors |
|---|---|
| Purpose and Need: Travel Demand | Does a preliminary travel demand analysis indicate that the route alternative would attract a substantially greater or lesser number of riders compared to other route alternatives? Would the route alternative attract sufficient ridership to be an economically feasible alternative? |
| Purpose and Need: Competitive and Attractive Travel Modes | Based on information from coarse-level screening, determine if running times can be further refined for each route alternative. Would the route alternative provide a time-competitive route compared to other route alternatives? |
| Technical Feasibility: Passenger and Freight Capacity | Determine general infrastructure improvements that would be required to deliver desired passenger train speeds and schedules. Determine general infrastructure improvements required to maintain existing and future freight train services while enabling prioritized passenger-train operation. |
| Technical/Economic Feasibility: Alignment | Would the route alternative involve a more challenging alignment or grading problems, including flyovers, in order to meet speed and capacity requirements? |
| Technical/Economic Feasibility: Structures | Establish conceptual costs for structures for each route alternative for purposes of comparison. |
| Technical/Economic Feasibility: Grade Crossings | Determine the number of new and expanded grade crossings and grade separations for each route alternative for purposes of comparison. |
| Economic Feasibility: | Determine high-level project cost for route alternative comparison utilizing subcomponents that address alignment, structures, grade crossings, etc. Determine operating and maintenance costs for each route alternative as a basis for comparison. |

| Criteria | Factors |
|---|---|
| Environmental Concerns: Environmental Impacts | Upon initial evaluation of the route alternative and quantification of conceptual environmental effects, would the route alternative have the potential to impact substantially more environmentally sensitive areas in the following categories compared with other route alternatives?<br>• Streams<br>• Floodplains<br>• Wetlands<br>• Farmland<br>• Threatened and endangered species<br>• Cultural resources<br>• Potential Section 4(f)/6(f) protected properties<br>• Environmental justice<br>• Noise and vibration<br>• Hazardous materials |
| Environmental Concerns: Right-of-Way | Determine conceptual right-of-way acquisition for each route alternative for purposes of comparison (refined from coarse-level screening). Would the route alternative require acquisition and demolition/disruption of substantially more structures, developments, agricultural resources, or features of the existing built environment (including homes, businesses, farms, and historic properties listed on the NRHP) than other route alternatives? |

### 4.1.3 Identification of Routes and Results of Route Alternative Screening

The six total routes that were studied to support the Chicago to Council Bluffs-Omaha service are identified in Figure 4.1-1. Each was subjected to the coarse- and fine-level screening process of route alternatives and was documented in detail in the Final Alternatives Analysis Report (FRA and Iowa DOT, 2012).

The coarse-level screening process eliminated Route Alternative 3 from further consideration because it would have the highest cost; require a substantial permitting effort; result in unacceptably high impacts on landowners because of the right-of-way needs; and cause extensive impacts on communities, infrastructure, wetlands, streams, and wildlife habitat. The fine-level screening process eliminated Route Alternatives 1, 2, 4, and 5 from further consideration. Therefore, Route Alternative 4-A was the only route alternative carried forward for further analysis in the Tier 1 EIS.

Below is a summary from the Alternatives Analysis Report providing the rationale for eliminating or carrying forward the aforementioned route alternatives.

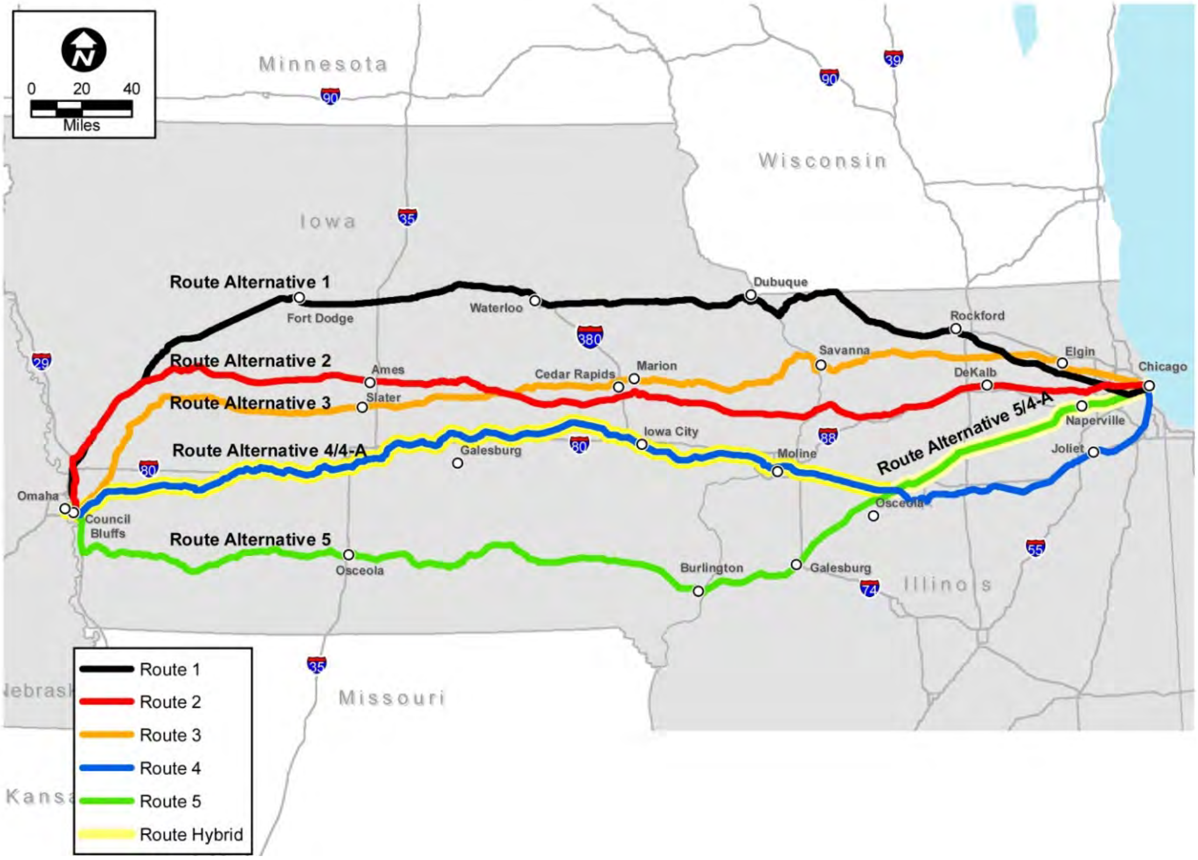


Figure 4.1-1: Route Alternatives Chicago to Council Bluffs-Omaha

#### 4.1.3.1 Route Alternative 1

Route Alternative 1 did not meet the purpose and need for the Project because it would not attract the necessary ridership from Iowa communities and the Omaha/Council Bluffs metropolitan area to generate adequate revenue. In addition, because this route alternative is longest and slowest of the route alternatives, it would not offer a competitive travel time, and because of its length, Route Alternative 1 would have excessive operations and maintenance costs. Route Alternative 1 also did not meet the technical/economic criteria because it would likely require a major new structure over the Mississippi River and its costs were excessive compared to the base case of preliminary cost estimates for improvement of Route Alternative 4, which had the least-expensive costs. Route Alternative 1 was determined to be neither reasonable nor feasible.

#### 4.1.3.2 Route Alternative 2

Despite the fact that it has the shortest travel time, Route Alternative 2 did not meet the purpose and need because it would neither attract adequate ridership nor generate the necessary revenue to make the service viable. Route Alternative 2 also did not meet the technical/economic criteria; it would require extensive new right-of-way and likely require a major new structure over the Mississippi River. Route Alternative 2 did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 2 would cost approximately $1 billion more than the base case, without providing any additional service or ridership benefits. Route Alternative 2 was determined to be neither reasonable nor feasible.

#### 4.1.3.3 Route Alternative 3

Of the six route alternatives, the greatest challenges are presented by Route Alternative 3. Not only would Route Alternative 3 have the highest cost, but also the permitting effort would be substantial. Establishing approximately 225 miles of new railroad right-of-way would create unacceptably high impacts on landowners, and the resulting permitting process would be extremely long. An extended permitting process could void the early baseline data prior to the permit being issued, thus requiring a second round of baseline data gathering and potentially requiring a re-evaluation of the findings of the Tier 1 EIS. Constructing essentially greenfield railroad for Route Alternative 3 would have significant impacts on communities, infrastructure, wetlands, streams, and wildlife habitat. Former bridges across major rivers would need to be reconstructed at high costs and environmental impacts. In addition to the high cost of right-of-way acquisition and bridge reconstruction, track and infrastructure would also need to be reestablished at an appreciable cost. As a result of the extremely high environmental and economic hurdles to re-establishing this abandoned rail corridor and anticipated local opposition and controversy, Route Alternative 3 was deemed unreasonable and was eliminated from further study.

#### 4.1.3.4 Route Alternative 4

Route Alternative 4 does not meet the purpose and need for the project because the Chicago termini of Route Alternative 4 is at LaSalle Street Station instead of Chicago Union Station and provides substantially less modal interconnectivity at Chicago. It would not provide for the connection to the MWRRI high-speed network, which is connected through the Chicago hub at Chicago Union Station. This connection would be costly, have impacts on urban areas that the connection would be constructed through, and is not practical. Route Alternative 4 was the least costly (not accounting for a connection from La Salle Street Station to Chicago Union Station) and was considered to represent the base case for comparison of preliminary costs of the other route alternatives, and it would attract adequate ridership and would generate adequate revenue.

Route Alternative 4 comprises, east of Wyanet, Illinois, the former Chicago, Rock Island & Pacific Railroad (CRI&P), which served La Salle Street Station in Chicago. A potential connection alignment between the former CRI&P track to La Salle Street Station, now owned by Metra and used for commuter passenger trains, and parallel tracks approximately one mile to the west, now owned by Union Pacific Railroad and Norfolk Southern Railway, that provide a direction connection to Chicago Union Station, has been identified in conjunction with studies for Chicago terminal entries for the Chicago to St. Louis high-speed passenger rail corridor. This connection alignment would utilize an existing Norfolk Southern line that departs from the Metra (former CRI&P) line and passes underneath the NS and UP lines. It would require a new connection track to be constructed in the northeast quadrant of this underpass to afford Chicago to Omaha passenger trains to move directly between Chicago Union Station and the former CRI&P route without a reverse movement west of the underpass. This connection track would be constructed through an urban neighborhood and require the acquisition and demolition business establishments on at least one city block. It would also require grade separation structures that would require additional property acquisition in this neighborhood. Capacity of the former CR&IP line, now used by Metra commuter trains, is limited, and placement of the Chicago to Omaha passenger trains on this line would likely require significant capacity improvements such as an additional main track. The right-of-way of the former CRI&P line is in most locations fully occupied by the existing main tracks and additional right-of-way would require extensive acquisitions of adjoining homes and business establishments. Based on the lack of a connection from La Salle Street Station to Union Station, and the lack of capacity on the Metra commuter line, and the associated cost and impacts of constructing a connection and capacity, Route Alternative 4 was determined to be neither reasonable nor feasible.

#### 4.1.3.5 Route Alternative 5

Route Alternative 5 did not meet the purpose and need because it would not attract adequate ridership or generate the necessary revenue to make the service viable. Route Alternative 5 also did not meet the technical/economic criteria; it would require extensive new right-of-way and likely require a major new structure over the Mississippi River. Route Alternative 5 did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 5 would cost approximately $1.2 billion more than the base case, without providing any additional service or ridership benefits. Route Alternative 5 was determined to be neither reasonable nor feasible.

#### 4.1.3.6 Route Alternative 4-A

Route Alternative 4-A was identified as the only reasonable route alternative to carry forward for further analysis in the Tier 1 EIS. Route Alternative 4-A was carried forward for detailed evaluation is described in greater detail in Section 4.3.

## 4.2 No-Build Alternative

The No-Build Alternative would consist of the current trackage and passenger- and freight-railroad operations with the present level of maintenance and no appreciable change to current track configuration or operations. The No-Build Alternative would not involve construction and operation of intercity passenger rail service from Chicago to Council Bluffs-Omaha (excepting the existing Amtrak *California Zephyr)*, but independently planned construction of passenger rail service from Chicago to Moline would still occur. This project is referred to as the Chicago to Quad Cities Expansion Program and includes operation of two round-trips per day at speeds of up to 79 mph, a connection to join BNSF and IAIS track near Wyanet, Illinois, as well as improvements at BNSF's Eola Yard in Eola, Illinois. Construction for the Chicago to Quad Cities Expansion Program is anticipated to commence in 2014 and the service to be operational by late 2015 or early 2016.

Other transportation projects in the vicinity of the proposed Chicago to Council Bluffs-Omaha Regional Passenger Rail System could occur independently, with or without the Service, and include the following projects:

- MWRRI Projects:
  - Chicago to Detroit/Pontiac, Michigan
  - Chicago to St. Louis, Missouri
  - Chicago to Milwaukee, Wisconsin, to Minneapolis/St. Paul, Minnesota, to Duluth, Minnesota

- Chicago Metra Projects:
  - BNSF Line: Aurora to Oswego, Illinois, Extension
  - STAR Line (new service)
  - Southeast Service (new service)
  - Union Pacific Northwest Line (service expansion)
  - Union Pacific West Line (service expansion)
- Additional projects to facilitate passenger rail systems in Illinois and Iowa:
  - Illinois: Midwest Bi-Level Equipment Acquisition
  - Illinois: Midwest Next Generation Locomotive Procurement and Acquisition
  - Illinois: Chicago Terminal Limits Projects for the Midwest Regional Rail System
  - Illinois: Chicago to St. Louis High-Speed Rail Corridor
  - Illinois: Amtrak's *Illinois Zephyr, Carl Sandburg,* and *California Zephyr* Galesburg Congestion Relief Project
  - Illinois: Chicago to Rockford/Dubuque (Iowa) Intercity Passenger Rail Service Development Program
  - Iowa: BNSF Ottumwa Subdivision Capitalized Maintenance on existing Amtrak route
  - Iowa: BNSF Ottumwa Subdivision Crossover Improvements on existing Amtrak route
- Major roadway projects:
  - Illinois: *Move Illinois*
  - Illinois: *Congestion Relief Program*
  - Illinois: Illiana Expressway
  - Illinois: Elgin-O'Hare West Bypass
  - Iowa and Nebraska: Council Bluffs Interstate System Improvements Project

Other passenger rail services that currently operate within or adjacent to the Chicago to Council Bluffs-Omaha Corridor, including Amtrak's *California Zephyr* and *Southwest Chief,* and Illinois' state-supported, Amtrak-operated *Illinois Zephyr* and *Carl Sandburg* services, are assumed to continue to operate under the No-Build Alternative. The *California Zephyr* and *Southwest Chief* are categorized as long-distance trains, with schedules and accommodations oriented for passengers traveling beyond the scope of the Midwest intercity network, such as between Chicago and California. Accordingly, these trains have schedules designed primarily to serve their target long-distance markets, and include both sleeper and full-service diner accommodations for passengers. These trains operate within or adjacent to the Chicago to Council Bluffs-Omaha Service area, but they are not specifically designed to meet the needs of intercity travelers within that corridor. The *Illinois Zephyr* and *Carl Sandburg* are operated by Amtrak under contract to the State of Illinois and are supported by financial assistance provided through appropriations by the Illinois Legislature. They are categorized as regional trains with daytime schedules, begin and end their trips between their endpoints within the same calendar day, and do not offer sleeper or full-service diner accommodations for passengers. While the design of the operation of these services is similar to what is contemplated for the Chicago to Council Bluffs-Omaha, they generally service different geographic markets.

Similarly, under the No-Build Alternative, other forms of long-distance and regional transportation, such as commercial airline and bus services, are assumed to continue operating within the corridor in the same manner as current operations.

The No-Build Alternative would not meet the Service purpose and need because intercity passenger rail service would not be reestablished in Iowa City or Des Moines, and there would be no establishment of an attractive alternative to highway or airline travel. Furthermore, without intercity passenger rail service, congestion of existing transportation modes in the corridor would not be reduced. As population increases, the demand for regional and long-distance travel services is projected to respond correspondingly, which would mean that the number of flights, bus trips, and personal vehicle trips would increase, thus causing further congestion.

The No-Build Alternative was retained for detailed analysis to allow equal comparison to the Build Alternative carried forward and to help decision makers and the public understand the consequences of taking no action. Additionally, NEPA requires consideration of no action to serve as a baseline for comparison with the proposed action and other alternatives carried forward.

Table 4.2-1 illustrates the factors for comparison of routes and the rationale employed to come to the conclusions about each of the route alternatives and the no-build alternative.

## Table 4.2-1: Route Alternative Comparison

| Criteria | Relative Ranking of Route Alternative | | | | | |
|---|---|---|---|---|---|---|
| | Route Alternative 1 | Route Alternative 2 | Route Alternative 4 | Route Alternative 5 | Route Alternative 4-A | No-Build Alternative |
| **Purpose and Need: Travel Demand** | 774,000 total population served | 523,940 total population served | 1,034,000 total population served | 167,000 total population served | 1,034,000 total population served | No additional service |
| *Ridership Forecast* | 505,000 to 715,000 | 375,000 to 550,000 | 640,000 to 885,000 | 255,000 to 370,000 | 680,000 to 935,000 | None |
| *Revenue Forecast* | $15.2 to $22.2 million | $14.7 to $22.0 million | $22.9 to $32.2 million | $11.2 to $16.6 million | $24.2 to $33.9 million | None |
| *Preliminary Running Time* | • Base 79 + 43 minutes<br>• Base 90 + 43 minutes<br>• Base 110 + 40 minutes | • Base 79<br>• Base 90<br>• Base 110 | • Base 79 + 17 minutes<br>• Base 90 + 22 minutes<br>• Base 110 + 25 minutes | • Base 79 + 18 minutes<br>• Base 90 + 16 minutes<br>• Base 110 + 13 minutes | • Base 79 + 4 minutes<br>• Base 90 + 8 minutes<br>• Base 110 + 14 minutes | Not Applicable |
| **Purpose and Need: Competitive and Attractive Travel Modes** | • 516 miles long<br>• Excessive travel time | • 479 miles long<br>• Competitive travel time | • 490 miles long<br>• Competitive travel time<br>• Lack of connection to Chicago Union Station | • 496 miles long<br>• Competitive travel time | • 474 miles long<br>• Competitive travel time | No new travel mode |
| **Technical Feasibility: Passenger and Freight Capacity** | • New Mississippi River Bridge<br>• Freight congestion Dubuque terminal<br>• Partial second main track | • New Mississippi River Bridge<br>• New third main track entire distance | • Freight congestion Des Moines terminal<br>• Partial second main track | • New Mississippi River Bridge<br>• New third main track entire distance | • Freight congestion Des Moines terminal<br>• Partial second and third main track | No change to existing capacity |

### Table 4.2-1: Route Alternative Comparison (continued)

| Criteria | Relative Ranking of Route Alternative | | | | | |
|---|---|---|---|---|---|---|
| | Route Alternative 1 | Route Alternative 2 | Route Alternative 4 | Route Alternative 5 | Route Alternative 4-A | No-Build Alternative |
| **Technical/ Economic Feasibility: Alignment** | • Heavy curvature on approaches to Mississippi River valley<br>• Moderate curvature in Iowa<br>• Heavy earthwork requirements on approaches to Mississippi River valley | • Light curvature<br>• Heavy earthwork requirements to add third main track | • Moderate curvature along Illinois River<br>• Moderate curvature between Des Moines and Atlantic<br>• Moderate earthwork requirements | • Light curvature<br>• Heavy earthwork requirements to add third main track | • Moderate curvature between Des Moines and Atlantic<br>• Moderate earthwork requirements | • No change to existing alignments |
| **Technical/ Economic Feasibility: Structures** | • New or improved East Dubuque Tunnel<br>• New Mississippi River bridge | • New Mississippi and Des Moines (Kate Shelly) bridges | • Grade separation with UP at Des Moines | • New Mississippi River bridge | • Grade separation with UP at Des Moines | • No changes to structures |
| **Technical/ Economic Feasibility: Grade Crossings** | High number of grade crossings, but not technically complicated | Substantial challenges at each grade crossing | High number of grade crossings, but not technically complicated | Substantial challenges at each grade crossing | High number of grade crossings, but not technically complicated | No changes to grade crossings |
| **Economic Feasibility:** | Base + $550 million | Base + $1,005 million | Base | Base + $1,230.6 million | Base + $147.2 million | Not applicable |
| **Environmental Concerns: Environmental Impacts** | No unreasonable environmental resource issues identified | No unreasonable environmental resource issues identified | No unreasonable environmental resource issues identified | No unreasonable environmental resource issues identified | No unreasonable environmental resource issues identified | No unreasonable environmental resource issues identified |
| **Environmental Concerns: Right-of-Way** | 2,200 acres needed (600 urban/1,600 rural) | 3,200 acres needed (950 urban/2,250 rural) | 2,100 acres needed (800 urban/1,300 rural) | 3,000 acres needed (850 urban/2,150 rural) | 2,200 acres needed (800 urban/1,400 rural) | None |
| **Meets Purpose and Need** | **No** | **No** | **No** | **No** | **Yes** | **No** |
| **Carried forward** | **No** | **No** | **No** | **No** | **Yes** | **Yes**[a] |

*Note:* [a] *While the No-Build Alternative does not meet purpose and need, it is carried forward to provide a basis of comparison to any route alternative (40 CFR 1502.14; 64 FR 28545).*

## 4.3 Route Alternative 4-A, BNSF Railway and Iowa Interstate Railroad (former Chicago, Burlington & Quincy Railroad and former Chicago, Rock Island & Pacific Railroad)

As previously identified, the Route 4-A alternative proved to best fit the criteria in the fine-level screening process and was carried forward as the preferred alternative in the Tier 1 EIS for the Chicago to Council Bluffs-Omaha Service, as it:

- Meets Service purpose and need (purpose and need).
- Has relatively low construction complexity and relative low construction cost (technical and economic feasibility).
- Is the shortest route alternative (purpose and need).
- Has grade crossing complexity similar to all route alternatives (technical feasibility).
- Does not appear to require a new bridge over the Mississippi River (technical and economic feasibility).
- Has a competitive passenger train travel time (purpose and need).
- Serves the largest population (purpose and need).
- Has the highest ridership and farebox revenue forecast (purpose and need, and economic feasibility).
- Has direct access to Chicago Union Station (technical and economic feasibility).
- Has no unreasonable environmental resource issues (environmental concerns).

The Service consists of the improvements to accommodate up to four round-trip intercity passenger trains per day at maximum speeds of up to 79 mph. Current maximum train speeds vary along the corridor due to existing operations, traffic volumes, and infrastructure condition.

The Service route, shown in Figure 4.3-1, is approximately 475 miles long and consists of tracks currently owned and operated by four rail carriers between Chicago and Council Bluffs-Omaha. Figure 4.3-1 also shows the route of the *California Zephyr;* this service to the south of the Route 4-A Alternative is anticipated to continue regardless of whether the Service is constructed. These four rail carriers and the approximate distances of trackage[2] on which the Build Alternative would operate are as follows:

- Amtrak – 1.6 miles from Chicago Union Station to 21st Street in Chicago
- BNSF – 110.5 miles from 21st Street in Chicago to a proposed connection with IAIS near Wyanet, Illinois
- IAIS – 45.9 miles from a proposed connection with BNSF near Wyanet, Illinois, to its connection with BNSF near Silvis, Illinois
- BNSF – 5.1 miles from its connection with IAIS near Silvis, Illinois, to its connection with IAIS near Rock Island, Illinois

[2] The distances of trackage are only approximate because there have been changes in mileposts over the 150 years that the railroads have been operating, and in several locations, the length depends on which main track the mileage is estimated along.

- IAIS – 172.7 miles from its connection with BNSF near Rock Island, Illinois, to its connection with Union Pacific Railroad (UP) near Short Line Yard, East Des Moines, Iowa (this section includes the Government Bridge, a multiple-span movable bridge across the Mississippi River owned and maintained by the U.S. Army, Rock Island Arsenal, and administered by the U.S. Army Corps of Engineers [USACE])
- UP – 12 miles from its connection with IAIS near Short Line Yard, East Des Moines, Iowa, to its connection with IAIS near West Des Moines, Iowa
- IAIS – 125 miles from its connection with UP near West Des Moines, Iowa, to its connection with UP at Pool Yard, Council Bluffs, Iowa
- UP – 2.5 miles from its connection with IAIS at UP Pool Yard, Council Bluffs, Iowa, to its connection with BNSF at Tower A, Omaha, Nebraska
- BNSF – 0.5 mile from its connection with UP at Tower A, Omaha, Nebraska, to the vicinity of the Omaha Amtrak station (the final location of an Omaha station, and terminus of the corridor, would be determined in a subsequent Tier 2 study).

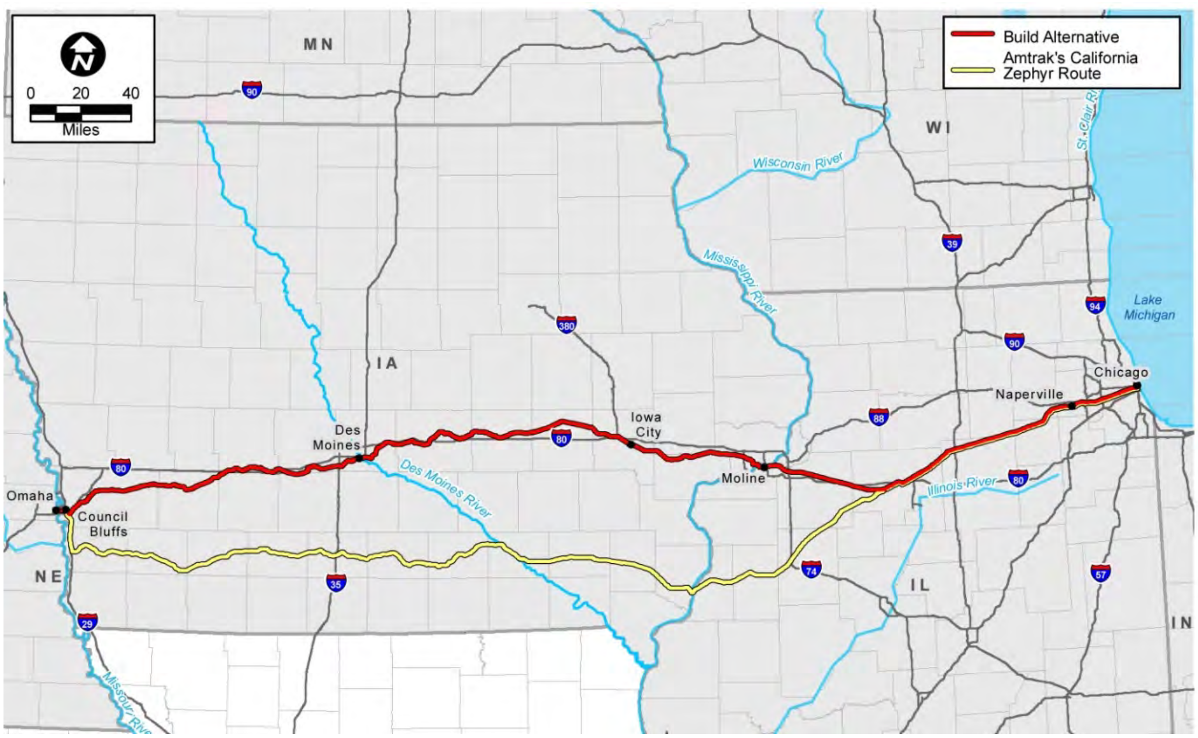


Figure 4.3-1: Chicago and Council Bluffs-Omaha Build Alternative

Phased implementation is planned for the Chicago to Council Bluffs-Omaha passenger rail service to allow Iowa DOT, Illinois DOT, and FRA to provide incremental benefits of the service by taking advantage of funding as it becomes available. This would involve launch of an initial service consisting of two daily round-trips operating at 79 mph between Chicago and Moline, which is currently under development by the Illinois DOT with a 2015 start. Subsequently, it is anticipated that these two daily round-trips would be extended westward into Iowa, first to Iowa City in 2017, and second, to Des Moines in 2022. Later service expansion would involve the establishment of four daily round-trips between Chicago and Des Moines in 2025, which would ultimately be extended to Council Bluffs in 2030. The long-term goal for the corridor is to implement 110-mph maximum speed service with seven round-trips serving Chicago-Des Moines and five round-trips Des Moines-Omaha, but no implementation schedule has been established. Improvements required to implement phases could include: Construction of track, signaling, structures and stations; improvements to track and signaling to enable higher train speeds; acquisition of additional equipment (locomotives and passenger cars); and implementation of amenities at stations or on-board trains.

## 5.0 Environmental Impact Statement and Record of Decision

The purpose of the Tier 1 EIS is to provide environmental resource and regulatory agencies, the public, and decision makers with a full understanding of the service-wide environmental impacts of the Service alternatives. Decisions made through the Tier 1 EIS process included selection of a preferred corridor and identification of communities served by station stops, frequency of service, speed of service, and plan for potential phased implementation of service. Prior to implementation of passenger rail service between Chicago and Omaha, Tier 2 NEPA documents will be developed.

The Tier 1 EIS:

1. Identifies the Purpose and Need for the Service
2. Describes the Alternatives Screening Process Conducted
3. Summarizes the Potential Impacts of Alternatives Carried Forward
4. Summarizes Potential Mitigation Requirements
5. Summarizes Comments and Coordination Conducted with Agencies, Tribes, and Stakeholders
6. Identifies the Next Steps in the Service development process

## 5.1 Purpose and Need

The Service and the Midwest Regional Rail System are intended "to meet current and future regional travel needs through significant improvements to the level and quality of passenger rail service," as defined by the MWRRI in its Midwest Regional Rail System Executive Report of September 2004. The Chicago to Council Bluffs-Omaha Regional Passenger Rail System would provide competitive passenger rail transportation between Chicago and Omaha to help meet future travel demands in the Study Area. The Service would create a competitive passenger rail transportation alternative to the available automobile, bus, and air service and would meet needs for more efficient travel between major urban centers by:

- Decreasing travel times
- Increasing frequency of service
- Improving reliability
- Providing an efficient transportation option
- Providing amenities to improve passenger ride quality and comfort
- Promoting environmental benefits, including reduced air pollutant emissions, improved land use options, and fewer adverse impacts on surrounding habitat and water resources

The need for the Service stems from the increasing travel demand resulting from population growth and changing demographics along the Corridor, as well as the need for competitive and attractive modes of travel. Population in the Service area is increasing and becoming more urbanized, with expanded access to, and demands for public transportation. The population is also aging and is increasingly seeking alternative modes of transportation. Currently, the predominant mode of travel in the region is the automobile, estimated to account for approximately 98 percent of travel between city pairs in the Service area.

## 5.2 Identification of Preferred Alternative

The screening process included two steps: an initial coarse-level screening to identify whether any route alternative was hindered by major challenges (and would thus be eliminated from further evaluation) and a subsequent fine-level screening to evaluate each route alternative in greater quantitative and qualitative detail. This two-step screening process was intended to allow the Tier 1 EIS to focus on only those route alternatives that would meet the purpose and need for the service and that are reasonable and feasible.

The coarse-level screening process eliminated Route Alternative 3 from further consideration because it would have the highest cost; require a substantial permitting effort; result in unacceptably high impacts on landowners because of the right-of-way needs; and cause extensive impacts on communities, infrastructure, wetlands, streams, and wildlife habitat. The fine-level screening process eliminated Route Alternatives 1, 2, 4, and 5 from further consideration because of not attracting the necessary ridership to generate adequate revenue; having excessive potential construction, operating, and maintenance costs; and having substantial impacts on the natural and human environment. Therefore, Route Alternative 4-A is the only route alternative carried forward for further analysis in the Tier 1 EIS. Below is a summary providing the rationale for carrying forward Route Alternative 4-A (the Preferred Alternative).

The Tier 1 EIS evaluated various implementation alternatives of Route Alternative 4-A to incorporate the decisions made by FRA. Iowa DOT, and Illinois DOT concerning infrastructure improvements on the Chicago to Iowa City corridor. The Tier 1 EIS also evaluated the reasonable alignment options in the Des Moines, Iowa, vicinity to accommodate the freight traffic interference with the at-grade Union Pacific railroad crossing at Short Line Junction and Union Pacific's Short Line Yard, while still providing the passenger service benefits. In addition, the Tier 1 EIS evaluated the reasonable alternatives for connecting the new passenger rail service between Council Bluffs, Iowa and Omaha, Nebraska.

The Tier 1 EIS also evaluated the various service levels and station locations. With respect to service levels, the Tier 1 EIS evaluated three possible speed regimes (79 mph, 90 mph, and 110 mph) and several different reasonable service frequencies for the passenger rail service. In addition, reasonable alternatives for cities to be served were also evaluated in the Tier 1 EIS. The Tier 1 EIS analysis provided a basis for selecting the service level (operating speed, station stops, and frequency) that will best meet the purpose and need for the new passenger rail service.

When compared to the other route alternatives considered, Route Alternative 4-A is the Preferred Alternative because it:

- Meets Service purpose and need (purpose and need).
- Has relatively low construction complexity and relatively low construction costs (technical and economic feasibility).
- Has grade-crossing complexity similar to all route alternatives (technical feasibility).
- Does not appear to require a new bridge over the Mississippi River (technical and economic feasibility).
- Has a competitive passenger-train travel time (purpose and need).
- Serves the largest population (purpose and need).
- Has the highest ridership and farebox revenue forecast (purpose and need, and economic feasibility).
- Has direct access to Chicago Union Station (technical and economic feasibility).
- Has no unreasonable environmental resource issues (environmental concerns).

Route Alternative 4-A is fully compatible with the selected route for Chicago to Iowa City intercity passenger rail service, which received an FRA service development grant award and is being actively pursued and developed for the Chicago to Moline portion by Illinois DOT and for the Moline to Iowa City portion by Iowa DOT.

## 5.3 Environmental Findings and Mitigation

The potential impacts of the No-Build Alternative and the Preferred Alternative based on the detailed analysis of the social, economic, and environmental resources documented in Chapter 3 of the Tier 1 EIS. The No Build Alternative does not meet the Service purpose and need, but was retained for detailed analysis to allow equal comparison to the Build Alternative.

The existing railroad right-of-way along the Corridor was assumed to be 100 feet wide; although the actual right-of-way varies; this assumption was determined to represent a reasonable average width. A buffer was then applied to accommodate additional track needs to promote efficient track maintenance and mitigate operating disruptions to freight trains. The existing right-of-way and estimated additional right-of-way that would be necessary for main track and siding construction and improvements at station locations constitutes the Potential Impact Area. The anticipated amount of additional right-of-way required was conservatively estimated to allow for future design and to accommodate design constraints. Consequently, the Potential Impact Area overestimates the area that would be directly impacted by Service construction to account for estimated right-of-way needs and multiple potential alignments in particular areas.

The summary of potential impacts described in this section is based on the ultimate proposed implementation of the Build Alternative, providing new passenger rail service between Chicago and Omaha, with anticipated speeds up to 110 mph, and seven round-trips per day. The initial implementation of the Service, as described previously to operate two round-trips per day in discrete phases between Chicago and Moline, Iowa City, and Des Moines at 79 mph, less right-of-way for improvements would generally result in fewer impacts and fewer benefits than that of the ultimate proposed implementation. As the Service extends westward, more impacts and benefits would occur within or adjacent to the Potential Impact Area.

Table 5.3-1 summarizes the potential impacts of the No-Build Alternative and the Build Alternative based on the detailed analysis of the social, economic, and environmental resources documented in Chapter 3 of the Tier 1 EIS.

Table 5.3-1: Summary of Potential Impacts

| Resource Topic | No-Build Alternative | Build Alternative |
|---|---|---|
| Transportation | Increased traffic congestion on highway system | Competitive transportation alternative; reduced freight traffic interference |
| Land Use, Zoning, and Property Acquisitions | Minor impacts (much less than Build Alternative) | Impacts on land use, primarily on industrial and farmland |
| Agricultural Resources | Minor impacts (much less than Build Alternative) | 3,190 acres prime farmland; 840 acres statewide important farmland |
| Socioeconomic Environment | Minor improvements to socioeconomic conditions (Chicago to Quad Cities only) | Economic benefits provided through job creation, joint development, improved accessibility, and increased economic activity (Chicago to Omaha) |
| Title VI and Environmental Justice | No disproportionately high and adverse impacts | Beneficial economic and mobility impacts; potential impacts on Environmental Justice population area in Des Moines |
| Elderly and People with Disabilities | New accessible service between Chicago and Quad Cities | New accessible service between Chicago and Omaha |
| Public Health and Safety | Improvements to at-grade crossings and signals (Chicago to Quad Cities) | Improvements to at-grade crossings and signals (Chicago to Omaha) |
| Noise and Vibration | Minor impacts (much less than Build Alternative) | 1.6 noise impacts per mile;<br>7 vibration impacts per mile |
| Air Quality | Increase in pollutant emissions over time due to fewer modal shifts | Decrease of most pollutant emissions due to increased modal shifts |
| Hazardous Waste and Waste Disposal | Minor impacts (much less than Build Alternative) | Minor impacts on 3 Superfund sites, 34 leaking underground storage tanks, 27 Non-National Priorities List sites, and 1 wastewater treatment facility site |
| Cultural Resources | No Service impacts | 60 historic properties (37 buildings, 1 structure, 3 bridges, and 19 historic districts) |
| Parks and Federally or State-Listed Natural Areas | No Service impacts | 44 parks, 24 recreation areas, and 22 natural areas |
| Section 4(f) and 6(f) Properties | No Service impacts | 44 public parks, 21 public recreation areas, 8 public refuges, and 60 historic properties |
| Visual Resources and Aesthetic Quality | Minor impacts on sensitive receptors | Impacts on visual resources (parks, natural areas, riparian corridors) and sensitive receptors in Des Moines |
| Waterways and Water Bodies | Minor impacts | Streams :104,150 linear feet<br>Lakes: 32 acres<br>Ponds: 33 acres |
| Wetlands | Minor impacts | 238 acres (1 acre aquatic bed, 84 acres emergent, 33 acres scrub-shrub, and 120 acres forested) |

| Resource Topic | No-Build Alternative | Build Alternative |
|---|---|---|
| Water Quality | Minor potential impacts | 24 streams on 303(d) list of impaired water bodies; more impacts than No-Build Alternative |
| Floodplains | Minor impacts | 1,657 acres |
| Topography, Geology, and Soils | Minor impacts | More impacts than No-Build Alternative, but minor impacts on Loess Hills |
| Natural Habitats and Wildlife | Minor impacts | 178 acres of natural terrestrial habitat; aquatic habitat impacts; increase in noise and vibration, train collisions, and water pollution |
| Threatened and Endangered Species | Suitable habitat for federally and state-listed species | Suitable habitat for federally and state-listed species with potential for impact from constructing a new Missouri River crossing |
| Energy Use and Climate Change | Increase in energy consumption and greenhouse gas emissions due to fewer modal shifts | Long-term decrease in energy consumption and greenhouse gas emissions due to increased modal shifts |
| Construction Impacts | Minor, temporary impacts | Substantially more impacts than No-Build, but temporary in nature |
| Irreversible and Irretrievable Commitments of Resources | Minor commitments of land, construction materials, financial resources, and energy consumption by automobiles | Substantial commitments of land, construction materials, financial resources, and energy consumption |
| Short-Term Use versus Long-Term Productivity | Short-term construction impacts of other projects, including benefit of construction employment; minimal reduction in long-term productivity of natural resources; and improvement in transportation network | Short-term construction impacts (including benefit of construction employment) and reduction in air pollutant emissions and long-term productivity of natural resources beyond that of the No-Build; improved long-term socioeconomic productivity through transportation network enhancement |
| Indirect and Cumulative Impacts | Increase in vehicular traffic congestion and decrease in air quality and energy | Reduced traffic congestion and vehicle emissions; reduced ridership of other transportation modes; improved air quality and safety; indirect impacts on parks, natural areas, and wildlife; increased chance of hazardous material incidents and water pollution; transit-oriented development near stations |

*Note: All potential impacts shown are preliminary and have been evaluated at a Tier 1 level of analysis. Impacts will be reviewed and revised as necessary within future Tier 2 NEPA documents.*

Table 5.3-2 introduces potential mitigation for impacted resources, as identified through the Tier 1 NEPA process. Specific mitigation measures, to the extent required, will be identified and discussed during Tier 2 analysis after design details are known, recorded in NEPA documents as specific impacts are identified, and implemented prior to construction.

Table 5.3-2: Potential Mitigation

| Impacted Resource | Potential Mitigation |
|---|---|
| Transportation | Signal upgrades to address safety concerns at intersections and to limit disruption of existing freight rail service. Specific mitigation measures, to the extent required, will be discussed in Tier 2 NEPA documents. |
| Land Use, Zoning, and Property Acquisition | Where property acquisition cannot be avoided, the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act will be followed. During Tier 2 analyses, the extent of land use, zoning, and property acquisition impacts will be analyzed for potential mitigation issues that may be identified through agency coordination and public involvement. |
| Agricultural Resources | As part of the Tier 2 NEPA process, coordination would take place with the NRCS. Form NRCS-CPA-106, Farmland Conversion Impact Rating for Corridor Type Projects, would be required to determine if farmland impacts are above the threshold level for consideration of farmland protection measures. |
| Socioeconomic Environment | In the Tier 2 analysis, potential impacts on socioeconomic conditions (neighborhoods, community facilities, businesses, employment) will be identified along with strategies to avoid, minimize, or mitigate these impacts. In addition, public involvement and agency coordination activities may result in identification of potential mitigation needs. |
| Title VI and Environmental Justice | Potential mitigation measures will be determined in the Tier 2 NEPA studies, if it is determined that adverse human health or environmental effects occur to minority and/or low-income populations, and if those effects are determined to be disproportionately high. |
| Elderly and People with Disabilities | Adverse impacts on the elderly and people with disabilities could be mitigated by providing beneficial ADA compliant services and facilities for those populations. A more detailed analysis of adverse impacts on the elderly and disabled populations, mitigation measures, and the public involvement process will be provided in the Tier 2 NEPA documents. |
| Public Health and Safety | Due to the increased speed of the proposed passenger rail service, the Tier 2 NEPA studies will address safety measures and strategies to protect the health and safety of passengers, as well as motor vehicles and pedestrians, at existing or new at-grade crossings. |
| Noise and Vibration | Minimizing locomotive horn use would be the greatest opportunity to mitigate potential noise impacts. Other mitigation measures could include upgrading of some electronic circuitry through installation of constant time circuitry (warning lights) at public at-grade roadway-rail crossings. Municipalities can choose to initiate the process of developing quiet zones to take advantage of the infrastructure provided by the proposed Service. |
| Air Quality | Mitigation such as policy changes or converting fleet vehicles to alternative fuels may be required for $NO_x$ emissions due to its output being above the *de minimis.* All other emissions are below their *de minimis* thresholds. General air quality conformity analysis modeling may be required in Tier 2 NEPA documents to verify these findings. |
| Hazardous Waste and Waste Disposal | Potential impacts on or from NPL Superfund sites and other non-NPL sites will be further evaluated in the Tier 2 NEPA studies, to determine level of risk and potential mitigation or cleanup procedures. Mitigation requirements may include safety procedures and protection of human health and the environment to help ensure that there would be no further contamination of adjacent sites, and to provide a safe working environment during construction. In addition, solid waste materials generated during construction could be recycled or properly disposed of. |

| Impacted Resource | Potential Mitigation |
|---|---|
| Cultural Resources | If, during the preparation of Tier 2 NEPA documents, it is determined that the Service will adversely affect NRHP-eligible historic resources, mitigation measures may be developed in accordance with the terms of a PA between FRA and consulting parties, including the ACHP and SHPOs. Potential mitigation measures could include recordation of site information, improvement of other sites, changes in Service design, or other options. |
| Parks and Federally or State-Listed Natural Areas | Specific mitigation measures, to the extent required, will be discussed in Tier 2 NEPA documents as specific impacts are identified. Potential mitigation measures may include replacement of equipment and facilities, purchase of similar properties, planting of woodlands, or development of wetlands in nearby locations. |
| Section 4(f) and 6(f) Properties | During the preparation of Tier 2 NEPA documents minimization and mitigation measures for adverse impacts will be determined, to the extent required, through consultation with the official of the agency owning or administering the resource. Potential mitigation measures could include replacement of equipment and facilities in another location within existing parkland, purchase of similar properties, planting of woodlands, or development of wetlands in nearby locations.<br><br>For 6(f) LWCF lands that cannot be avoided, mitigation would include replacement property that is of at least equal fair market value as the impacted property, and of reasonably equivalent usefulness for recreation purposes. |
| Visual Resources and Aesthetic Quality | Through the public involvement process, residents' concerns about the potential views of the railroad facilities will be determined. Mitigation and impact minimization efforts will be addressed in more detail in the Tier 2 NEPA documents. Mitigation could include consideration of measures such as appropriate re-vegetation of disturbed areas of the scenic resources, visual screening of railroad facilities from adjacent residential areas, appropriate landscaping, and aesthetic design of new stations that would complement and blend with the context of the surrounding visual environment. In addition, mitigation for land disturbance within the Loess Hills area could include buffer zones and re-establishing native vegetation. Mitigation measures could also include shaping areas to blend into the natural character of the surrounding hills. |
| Waterways, Water Bodies, and Wetlands | Mitigation options for unavoidable impacts on waterways, water bodies, and wetlands will be discussed in more detail during the Tier 2 NEPA documents. Mitigation measures could include mitigation banking, in-lieu fees, and on-site or off-site mitigation. During the design process, coordination will take place with the USACE and appropriate state resource agencies to develop mitigation strategies. |
| Water Quality | The Tier 2 NEPA documents would address mitigation measures and control of pollutants and sediments in regard to the National Pollutant Discharge Elimination System (NPDES) permitting, Storm Water Pollution Prevention Plans (SWPPPs), and Best Management Practices (BMPs). In addition, each state's required Section 401 Water Quality Certifications would be addressed. Impacts on mapped or unmapped water wells, including proper abandonment of the wells (such as plugging and sealing) to prevent groundwater pollution would also be addressed. |

| Impacted Resource | Potential Mitigation |
|---|---|
| Floodplains | During the Tier 2 NEPA process, coordination with the State Emergency Management Agencies (SEMAs), the DNRs of each state, and local floodplain administrators would be initiated to discuss floodplain development permitting and potential mitigation measures, such as restoring natural and beneficial floodplain values by seeding with native vegetation, and proper design of bridges and culverts so as to not restrict flood flows. |
| Topography, Geology, and Soils | No requirements for mitigation related to topographic, geologic, and soil conditions are anticipated, with the exception of impacts on the Loess Hills area as discussed under Visual Resources. Specific impacts and potential mitigation measures will be investigated and evaluated in further detail in the Tier 2 NEPA documents. |
| Natural Habitats and Wildlife | During the Tier 2 process, avoidance and minimization of impacts would be assessed, and unavoidable impacts to natural habitats would be coordinated with the state agencies to determine compliance with regulatory requirements and potential mitigation measures to offset impacts, which could include restrictions on construction activities in specific areas during the breeding/nesting seasons. Coordination with Iowa DNR will also take place regarding mitigation of woodland impacts, which require replacement according to Iowa Code 314.23, Environmental Protection. |
| Threatened and Endangered Species | During the Tier 2 process, avoidance and minimization of impacts would be assessed. If it is determined, through Section 7 consultation with USFWS, that the Build Alternative could have the potential to affect a federally listed species, a biological assessment would be prepared to determine the Build Alternative's potential effect on one or more species. When a potential impact to a federally listed species is identified, the USFWS would prepare a biological opinion on whether the proposed activity would adversely affect (jeopardize the continued existence of) a listed species. Mitigation measures for unavoidable adverse impacts would be determined as part of the formal consultation.<br><br>Avoidance and minimization of impacts on state-listed species would also be assessed during the Tier 2 NEPA documents. If it is determined that unavoidable impacts on state-listed species would occur, coordination with the Illinois DNR, Iowa DNR, and NGPC, as appropriate, would take place to determine potential mitigation measures. |
| Energy Use and Climate Change | Mitigation may not be required for energy and climate change due to the positive impact and the diverted trips from other modes of transportation, lowering the overall amount of $CO_2$ emissions along the Study Area. Verification will be made during the Tier 2 NEPA studies. |

| Impacted Resource | Potential Mitigation |
|---|---|
| Construction Impacts | Impacts from construction activities will be reviewed and mitigation will be considered during the development of the Tier 2 NEPA documents. The potential for Service construction impacts may be mitigated through the following measures:<br>• Waste Disposal – Recycling of construction debris, testing of hazardous waste encountered, and properly disposing of waste materials.<br>• Water Quality – Management of stormwater runoff, implementation of BMPs for control of soil erosion and other pollutants, and proper storage of hazardous materials away from water resources.<br>• Air Quality – Adherence to construction permit conditions and all state and local regulations, which may include prohibitions against burning of construction debris, and control measures to limit pollution if tree trunks and limbs are permitted to be burned on site.<br>• Noise and Vibration – Equipping and maintaining muffling equipment for trucks and other construction machinery.<br>• Access – Development of a traffic mitigation plan for construction sequencing, including special provisions to accommodate emergency vehicle access to the site and adjacent properties.<br>• Traffic and Safety – Coordination with Illinois DOT, Iowa DOT, and the Nebraska Department of Roads as well as local jurisdictions to develop and implement a traffic control and safety plan. |
| Indirect and Cumulative Impacts | Specific mitigation measures, to the extent required, will be discussed in Tier 2 NEPA documents as specific indirect and cumulative impacts are identified. |
| Permits | During the Tier 2 studies, specific mitigation measures will be explored in more detail when more specific construction impacts are known, and will be implemented as appropriate per each individual permit and approval. |

## 6.0 Planning Methodology of Preferred Alternative

This Service Development Plan has been developed consistent with the FRA guideline, as well as Iowa DOT and Illinois DOT planning processes. The specific planning methodologies and approach for each SDP element are described in the individual sections. Discussed in this section are the planning horizon, the public involvement activities, the overarching assumptions, and the approach that Iowa DOT and Illinois DOT have adopted to mitigate risk.

## 6.1 Planning Horizon

Iowa DOT and Illinois DOT adopted a 20-year planning horizon for the Chicago to Council Bluffs-Omaha Service Development Program. This 20-year planning horizon, which is generally 2012 to 2032, is consistent with FRA guidelines and allows for a reasonable estimate of both the needs of the traveling public, expected population growth, and expected freight rail service. Iowa DOT and Illinois DOT believe that this 20-year planning horizon provides a reasonable blueprint to guide the development of the initial phases of the Chicago to Council Bluffs-Omaha passenger rail service, using proven forecasting tools while at the same time avoiding unreasonable speculation.

However, consistent with the overall approach adopted for the Midwest Regional Rail System, and as described in this SDP, Iowa DOT and Illinois DOT intend to develop the Chicago to Council Bluffs-Omaha passenger rail service under a phased implementation. This 20-year planning horizon focuses on the interim implementation and recognizes that achieving the long term vision of five to seven round-trips per day at 110 mph between Chicago and Omaha will require additional phases extending beyond the planning horizon of this SDP.

## 6.2 Public Involvement

The Chicago to Council Bluffs-Omaha Service Development Program has a broad base of public support along the corridor, as demonstrated by the comment summaries that are attached to the Tier 1 EIS. Iowa DOT and Illinois DOT have an active program to share information with the public and obtain public comments on the Program. Both states maintain active websites with the latest information on the status of the Program and the states have participated in a number of public information meetings to help the public better understand the Program.

NEPA requires that agencies make diligent efforts to involve the public in preparing and implementing their NEPA procedures. Agency coordination, tribal coordination, and public involvement have taken place during the development of the Tier 1 EIS.

Agency coordination has included interaction through email notices, email responses, in person meetings, and teleconferences. An early coordination (EC) packet and invitation to the agency scoping meeting was provided to 14 federal agencies, 13 Illinois state agencies, 14 Iowa state agencies, 9 Nebraska state agencies, and several county/regional and municipal governmental organizations within or near the various route alternatives. Agency input on the Study and Service was received during the agency scoping meetings on February 21, 2012, in Ames, Iowa, and on February 22, 2012, in Chicago, Illinois, as well as through responses to the EC packet distributed on April 1, 2012. Federal and state resource agencies provided guidance concerning potential environmental requirements, including permitting and approvals needed for the Service. Representatives from counties and local municipalities generally noted their support for the Service, primarily for economic purposes, with a preference for route alternatives within or near their jurisdiction. In addition, on October 24, 2012, a teleconference was conducted with cooperating agencies prior to completion of the Tier 1 Draft EIS to discuss the proposed approach for NEPA compliance as well as other environmental requirements. Tier 1 Final EIS Appendix O has been supplemented with specific agency comments on the Tier 1 Draft EIS, and Tier 1 Final EIS Appendix Q includes a table of comments on the Tier 1 Draft EIS and responses to those comments. FRA anticipates that these agencies would continue to be cooperating agencies through participation in future Tier 2 NEPA processes associated with the Service.

A coordination packet that described the Study and Service and included a figure of the route alternatives was mailed to representatives of 15 Native American groups, including tribes, on May 17, 2012. At the request of the Yankton Sioux Tribe, 14 additional Sioux Tribes of the region were sent EC packets on July 5, 2012. The Kickapoo Tribe in Kansas does not currently have sufficient staffing to provide input on the Service and deferred to other Native American groups, including tribes, with similar historical ties. The Winnebago Tribe of Nebraska reviewed the route alternatives and indicated that it has cultural properties in some of the areas that could undergo construction. The Yankton Sioux Tribe noted that the proposed route alternatives fall within its ancestral lands and is requesting further coordination for conducting a traditional cultural property (TCP) study and including other Sioux tribes in the region as part of Service coordination.

At the onset of the Study, Iowa DOT conducted a Stakeholder Analysis to identify public stakeholders in Illinois, Iowa, and Nebraska who may be affected by or have data related to the Study. The stakeholder database expanded as more members of the public engaged in the Study through the public outreach process. All identified stakeholders are receiving updates at Study milestones via various outreach tools, including a Study webpage on Iowa DOT's website, a Service website for hosting online meetings, a toll free Study information line, an online community tool kit (including a community survey), and an email mailing list.

Iowa DOT, in conjunction with FRA, hosted an online open-house meeting from February 13 to April 16, 2012, for the public to understand and comment on the scope of the Study and the initial range of route alternatives. The online scoping meeting was held on the Service website (http://chicagotoomaha.com/). Public comments from the online scoping meeting were collected through online comment forms, email messages, letters mailed or faxed to Iowa DOT, and the toll-free Study information line. Based on automatic electronic login recordation for the online open-house meeting, there were 2,789 attendees, and 994 comments were collected.

A set of three public information meetings was held in May 2012 to obtain input from the public on preliminary results from screening the initial range of route alternatives. The public information meetings were conducted both through in-person open-house meetings held in three locations and through an online, self-directed open-house meeting. During the comment period for the alternatives analysis, 208 comments were received from agencies, organizations, and the public. The majority of commenters noted that they would use the Service and cited a variety of reasons, including personal or business travel. In addition, 134 commenters noted their support for the Service, including a preference for Route Alternative 4 or Route Alternative 4-A, as well as potential economic benefits. Six comments were submitted by those who were not in support of the Service. Non-supportive comments cited the use of taxpayer money and the lack of a market for long-term use. In addition to the public information meetings, two Stakeholder Meetings were held in May 2012 with invited municipal representatives, elected officials, and community leaders to discuss the same information that was presented at the in-person and online open-house meetings.

Through an online community survey, which began April 13, 2012 and ended December 26, 2012, public opinion of the proposed service was gathered. This survey was qualitative in nature and reflects the opinion of only those 1,934 people who elected to respond. The vast majority of respondents indicated that they would use the service for business travel or both business and personal travel, support the establishment of regional passenger rail, and think it will have a positive economic impact.

After the Tier 1 Draft EIS was published, Iowa DOT and FRA held public hearings in the vicinity of the proposed Service in Chicago, Illinois, Des Moines, Iowa, and Council Bluffs, Iowa on December 11 through 13 2012. In all, 152 people signed in at the three public hearings, with the highest attendance (74 people) occurring at the Des Moines, Iowa, hearing. Each hearing included a formal presentation at 5:30 p.m., followed by a question-and-answer session concluding at 6:15 p.m. Iowa DOT and consultant staff were available for discussion between 4:00 and 5:30 p.m., and then following the question-and-answer session between 6:15 and 7:00 p.m. Discussions were held with attendees at the information boards and aerial maps of the Study Area. Attendees wishing to provide comments were invited to complete and submit a comment form either in person or through direct mail, or to use one of the many other Service comment mechanisms, discussed below.

In addition to the public hearings, Iowa DOT hosted an online open-house meeting from November 9 through December 26, 2012, on the Service website (http://chicagotoomaha.com/) for those who were unable to attend the in-person public hearings or who preferred not to attend. Through a series of web pages, the online visitor had the opportunity to review all the information boards, watch videos from Iowa DOT staff, and provide comments. The online open-house meeting presented the same information as the public hearings. The online open-house meeting garnered 910 unique visitors through the end of the comment period on December 26, 2012.

Following the last public hearing, a Stakeholder Meeting was held on December 14, 2012, in Council Bluffs, Iowa, with municipal representatives, elected officials, and community leaders. Formal invitations were sent to municipal representatives, elected officials, and community leaders asking them to meet with the project team to discuss the same information that was presented at the in-person public hearings and online open-house meeting.

Comments on the Service were collected through comment forms submitted at the in person public hearings, comment forms or letters mailed or faxed to Iowa DOT, online comment forms, email messages, and the toll-free Study information line. If a comment required an immediate response, such as a media inquiry, or if a comment included questions concerning the comment period or public hearings, a response was drafted and provided either by telephone, email, or letter. Comments received by the close of the comment period, which ended on Wednesday, December 26, 2012, were included in the official record for the Service. Very few public comments expressed concern with potential impacts on the natural and physical environment, either from not constructing the Service or from constructing and operating the Service. The majority of commenters supported development of the Service and cited a variety of reasons for their support, including fuel efficiency, reliability, safety, comfort, competitive cost, and economic development. Those not in favor of the Service gave several reasons, including that current bus service is sufficient and that taxpayer funds should not be used for the Service.

Several resource agencies provided comments; Tier 1 Final EIS Appendix O has been supplemented with agency comments, and Tier 1 Final EIS Appendix Q includes the comments and responses to the comments.

The Tier 1 Final EIS will be available for review for 30 days, and FRA can take no action for implementing the proposed action during the comment period. Subsequent to the end of the comment period, FRA will issue a Record of Decision (ROD) to document its decision on a proposed action. The ROD will address public input on the Tier 1 Final EIS and will document the selected alternative as well as specific mitigation measures and other environmental commitments. The issuance of the ROD will complete the Tier 1 process.

Commencement of Tier 2 is dependent on the allocation of federal funding, with state contributions, for various sections of the Service. Chapter 5 (Next Steps) of the Chicago to Iowa City Intercity Passenger Rail Service Tier 1 Service Level Environmental Assessment document, provides a detailed discussion of the potential sections of the Service and the opportunity for additional involvement during Tier 2.

## 6.3 Major Assumptions

This SDP is based on a number of assumptions as discussed in the various sections and analysis in this SDP. However, Iowa DOT and Illinois DOT recognize that the SDP is contingent on certain major assumptions concerning the Chicago to Council Bluffs-Omaha passenger rail service.

Development of the passenger rail service is dependent on forging strategic partnerships among the local, state, federal and private entities. In many cases, the partnerships will be cemented in binding agreements that impose tangible and enforceable commitments on the parties. Iowa DOT and Illinois DOT are not underestimating the challenges of negotiating these agreements.

The capital cost of implementing the new passenger rail service will require a federal investment. Iowa and Illinois will need to compete for these federal funds in an era of increasingly tight public resources.

The design of this passenger rail service is based in part on various projections and forecasts. These include population projections, rail freight forecasts, cost estimates, ridership projections, and revenue forecasts. Iowa DOT and Illinois DOT have used generally accepted methodologies for the projections, but recognize the inherent uncertainty associated with trying to predict the future by extrapolation from the past.

## 6.4 Risk Identification and Mitigation

Iowa DOT and Illinois DOT primary risk mitigation strategy is their decision to implement the new passenger rail service in increments. The incremental approach, which is consistent with the philosophy of the Midwest Regional Rail Initiative, will allow Iowa DOT and Illinois DOT to better manage the capital requirements and will provide the opportunity to gain passenger rail operating experience and to apply that experience to subsequent increments. This incremental approach will also allow the traveling public to adjust to the introduction of a modal travel option.

The first increment, undergoing Tier 2 study, is service between Chicago and Moline, Illinois. This increment is part of the first phase of the service, which will introduce passenger rail service between Chicago and Iowa City, Iowa. This first phase is funded by a FRA grant. However, the remaining increments of the service to Council Bluffs-Omaha have not been funded. Iowa DOT and Illinois DOT have identified a series of Tier 2 studies and a phased implementation plan for the development of the passenger rail service, which will better define the infrastructure requirements, capital cost, and schedule for each phase.

In addition to the Tier 2 studies, mitigation for impacts would also be developed. Anticipated types of mitigation include wetland mitigation, construction timing restrictions for threatened and endangered species, implementation of a stormwater pollution prevention plan, implementation of best management practices, and documentation of historic railroad structures and other historic properties. Specific mitigation during the Tier 2 process would be determined in consultation with the federal or state agency responsible for assessing impacts on a given resource. As needed, formal consultation would occur with resource agencies to address obligations to minimize and mitigate impacts, such as those obligations under Section 7 of the ESA and Section 106 of the NHPA. For example, a Section 106 PA could be developed after the Tier 1 process that would address the process of consultation between FRA, Iowa DOT, Illinois DOT, and the Illinois, Iowa, and Nebraska SHPOs, as well as other consulting parties, for meeting historic preservation compliance requirements.

During the Tier 1 process, Iowa DOT and Illinois DOT made the commitment to continue to engage the public, resource agencies, and Native American groups, including tribes, to identify specific mitigation measures during the Tier 2 process and subsequently implement those measures.

## 7.0 Conceptual Engineering and Capital Programming

This section describes the conceptual engineering efforts utilized to identify improvements required to the existing infrastructure to enable passenger rail service through the corridor. The conceptual engineering was completed in a manner to allow for phased implementation of the service including the potential for sequential geographic extensions, increases in maximum speed, increases in service frequency, or additional station stops and schedule revisions to provide additional passenger service options. Appendix A contains the conceptual engineering plans.

## 7.1 Capital Cost Estimating Methodology

Infrastructure needs were developed based on review of previous studies, discussions with host railroads, field review, and the results of operations simulation modeling using the Rail Traffic Controller (RTC) model developed by Berkeley Simulation Software, completed as party of this study. The proposed infrastructure needs are detailed in the Chicago to Council Bluffs-Omaha Regional System Passenger Rail Service Conceptual Engineering Drawings. A capital cost estimate was then developed based on the Conceptual Engineering Drawings by itemizing the proposed improvements into several categories. The estimates were developed based on quantities established by the conceptual engineering and current unit prices for the 2013 base year.

## 7.2 Project Identification

### 7.2.1 Corridor Infrastructure

Conceptual engineering efforts commenced during the process of selection of the preferred route alternative between Chicago and Council Bluffs-Omaha. These initial efforts conceptually identified improvements to existing infrastructure that will be required to implement passenger rail service at 79 mph, 90 mph, or 110 mph. Following the selection of Alternative 4-A, the conceptual engineering effort was developed in greater detail. It considered a phased approach that could reasonably consist of sequential geographic extensions, an increase in maximum speeds, increase in frequency of service, or additional station stops and schedule revisions that provide additional passenger-service options. The Chicago to Council Bluffs-Omaha Passenger Rail Service Conceptual Engineering Drawings are overlaid on the routes of the host railroads in order to provide a comparison with the existing infrastructure. The host railroads consist of Amtrak at Chicago Union Station, BNSF between Chicago and Wyanet, Illinois, IAIS between Wyanet, Illinois, and East Des Moines, Iowa, UP between East Des Moines and Des Moines, Iowa, and IAIS between Des Moines and Council Bluffs, Iowa. The drawings are attached to this Service Development Plan.

#### 7.2.1.1 Main Track Improvement

Proposed track improvements will be required on IAIS main track between Wyanet, Illinois, and Council Bluffs, Iowa, to upgrade the track from Class 3 to Class 4, implement a wayside signaling system and Positive Train Control, and in some cases install new bridges and drainage structures, or repair existing bridge and drainage structures. No main track improvements are anticipated on BNSF main track between Chicago and Wyanet excepting the construction of the Eola Yard improvement project and the connection track between BNSF and IAIS at Wyanet. The general intent of the main track work is to deliver from Chicago to Council Bluffs, continuously, a maintainable main track capable of 79 mph maximum passenger train speeds (where not limited by curvature or other operating conditions), equipped with Centralized Traffic Control (CTC) and Positive Train Control (PTC), and second main track or controlled sidings sufficient to hold the longest regularly operated freight trains, at intervals sufficient to deliver a reliable passenger train system that can deliver the required 90 percent on-time performance, and mitigation of passenger-train impacts on existing and expected future freight trains.

In general, improvements to the main track structure necessary to upgrade it from Class 3 to Class 4 consist of replacing remaining jointed rail, curve and grade-worn rail, with Continuous Welded Rail (CWR); spot replacement of crossties; surfacing, lining, and addition of ballast; spot undercutting; and replacement or repair of grade-crossing surfaces. This will ultimately yield a railroad composed of CWR of 115 lb. or heavier section throughout the IAIS main track plus key sidings, and portions of UP-owned trackage in Des Moines that will be incorporated into the route. No track improvements will be necessary on the BNSF portion of the route between Chicago and Wyanet excepting the construction of Eola Yard improvements currently being designed as part of the Chicago-Quad Cities program; however, the BNSF's industrial trackage between East Moline and Rock Island, Illinois (used by IAIS) will be upgraded in the same manner as the IAIS main track.

Several existing sidings on IAIS between Wyanet and Council Bluffs will require turnout replacement, surface-and-line improvements and additional of ballast, and crop-and-weld of jointed rail. This process includes replacement of existing No. 10 and No. 11 hand-throw turnouts with No. 15 power-operated turnouts to enable 30 mph operating speeds entering and leaving siding. As a supplement to existing sidings, new sidings approximately 10,000 feet in length with No. 20 power-operated turnouts and welded rail to enable 40 mph operating speeds are proposed for several locations on IAIS. Mainline-to-mainline crossover movements and other speed-critical areas will be made through power-operated No. 15 or No. 20 turnouts. The decision of which sidings or crossovers use No. 20 turnouts is based on whether the main track operating speeds in the vicinity of the siding or crossover justify the greater cost of a #20 turnout. All sidings intended for meet-and-pass events for through freight and passenger trains will be bonded controlled sidings enabling entrance and exit at the maximum speed afforded by the turnout size. Certain sidings that will be used normally for local freight activity will be signaled with power-operated turnouts but not bonded, or remain as hand-throw turnouts with leaving signals or electric locks.

In all cases, the rail on IAIS will be constructed on main line-grade wood ties. Rehabilitation of the existing IAIS roadbed would be further advanced by undercutting where necessary, which would replace existing ballast with fresh screened and crushed rock main line ballast. Rehabilitation of the roadbed will not be necessary on the BNSF portion of the route.

Wayside signaling, described in greater detail later, will implement speed-signaled CTC with a PTC overlay between Chicago and Council Bluffs. BNSF is currently implementing PTC on its already CTC-equipped main tracks between Chicago and Wyanet. Active grade-crossing warning signals will be upgraded or replaced to include constant-warning time devices on all public road crossings that are not closed, consolidated or grade-separated, as well as certain high-traffic or high-risk private grade crossings. Most private grade crossings will be equipped with passive grade-crossing warning signals.

#### 7.2.1.2 Freight and Other Passenger Train Mitigation Improvements

Conceptual engineering drawings for the Chicago to Council Bluffs-Omaha route have been generated and can be found in Appendix A of this SDP.

No freight mitigation improvements are anticipated in this SDP for the BNSF portion of the route excepting the construction of Eola Yard and the Wyanet Connection. The Eola Yard project will enable BNSF to advance coal trains destined for interchange in Chicago from their current staging locations on one of the main tracks between Aurora and Wyanet into Eola Yard. This will enable BNSF to have two main tracks open between Eola and Wyanet for passenger train and through freight train movement, instead of the current operation, which in essence treats coal train staging locations as temporary sections of single main track.

This SDP does not include anticipate mitigation for freight, commuter passenger, or other long-distance passenger services between Chicago Union Station (CUS) and Aurora, or at CUS, that would be required for four round-trip passenger trains per day between Chicago and Council Bluffs. BNSF and Amtrak have stated that the capacity of this infrastructure is sufficient for two round-trips per day, based on slot times at CUS and in the CUS to Aurora commuter territory that were provided to the Chicago to Quad Cities/Iowa City implementation program that is progressing at present. Any additional infrastructure required to mitigate the two additional round-trips or the proposed frequencies would be costly due to the close proximity of dense urban development to the existing infrastructure, the lack of available space for additional trackage on the existing right-of-way, and the need to operate existing passenger and freight trains without excessive or contractually disallowed delay during construction of new infrastructure.

Determination of the effects of the proposed passenger trains schedules and frequency in this SDP on CUS and the CUS to Aurora commuter train territory would be complex and require extensive operations simulation modeling of the Chicago Terminal to incorporate existing and programmed freight, intercity passenger, and commuter passenger trains, existing and programmed infrastructure, and proposed future freight, intercity passenger, and commuter passenger trains. This modeling would require participation by multiple intercity high-speed rail corridor services currently in proposal or implementation, which include Chicago-Detroit/Pontiac, Chicago-St. Louis, Chicago-Dubuque, and Chicago-Milwaukee-Twin Cities. Accordingly, this SDP assumes that a comprehensive study of the Chicago Terminal will be undertaken in the future to incorporate all of these services as well as proposed Metra commuter train expansions, and at that time the infrastructure and train operations will be mutually coordinated and planned.

The Wyanet Connection will depart from BNSF Main Track 1 using a No. 20 turnout. A right-hand facing crossover from BNSF Main Track 1 to BNSF Main Track 2 will eliminate a lengthy counterflow operation from Zearing (presently the nearest crossover to Wyanet, 16.6 miles to the east of the connection) and reduce congestion for freight and other passenger trains on BNSF.

Substantial freight train mitigation improvements and improvements necessary for the fluid and reliable operation of passenger trains are anticipated between Wyanet and Council Bluffs. The remainder of this section describes these improvements.

Infrastructure capacity improvements will be necessary to support the various phases and frequencies of passenger rail service as well as to mitigate passenger-train caused delays or capacity loss to existing and future freight rail traffic on the lines of the host railroads. Included are upgrades in track, wayside signaling, and system capacity to accommodate comingled passenger and freight operations safely and efficiently. All improvements are shown in the conceptual engineering drawings contained in Appendix A of this SDP.

Key to mitigation against operating conflicts on the Service route is the construction of new sidings spaced proportionately along segments of single-track main line, as well as bypasses and second main track in complex and congested terminal areas.

Existing sidings in most cases are used as industry switching leads, industry car storage tracks, or maintenance-of-way set-out tracks. Many IAIS sidings are of insufficient length to meet two IAIS through freight trains. IAIS operations are designed so that the majority of through train meet/pass events occur at terminals. The proposed Chicago to Council Bluffs Service creates a need for sidings of sufficient length to hold IAIS through freight trains to enable the Service to have the desired on-time performance in light of the proposed schedule, future passenger train or IAIS freight-train schedules that may shift meet-pass events that would occur today, and the increased maintenance-of-way activity necessary to maintain the IAIS portion of the route at Class 4 with minimal slow orders that degrade on-time performance instead of its existing Class 3 with a higher tolerance for slow orders. Accordingly, a maximum siding spacing of approximately one-half hour running time (30 miles) for a passenger trains has been instituted. This will enable a passenger train that is running behind schedule to continue its trip without more than an additional 30 minute delay for out-of-slot meet/pass events with opposing passenger trains, or more than 30 minutes impact on freight train performance. It also enables the Service to substantially revise passenger-train schedules in the future to better suit market conditions with a low probability that the proposed new schedule could be accommodated by the infrastructure proposed in this SDP.

To create this capacity and flexibility, the alignment was studied to space 10,000 foot long controlled sidings at intervals of approximately 30 minutes running time for passenger trains. Where possible, existing sidings not otherwise currently in use for industry support or storage, or with public at-grade crossings that would limit their utility, were incorporated into this spacing scheme. Existing sidings that were incorporated into this scheme would be bonded, signalized, improved to enable 30 mph track speed, and equipped with power-operated No. 15 turnouts or better. Where existing sidings were not available for incorporation, new controlled sidings nominally 10,000 feet in length would be constructed using CWR and No. 20 power-operated turnouts to enable 40 mph operating speeds. Main tracks and sidings would be spaced nominally at 15 foot track centers. A specific exception to this spacing would occur at locations where freight customers are engaged in loading or unloading rail cars at industrial tracks or sidings closely adjacent to the main track, and workers are walking or working between the main track and rail cars spotted for loading or unloading in side tracks. At these locations, track centers would be increased to at least 20 feet to enable construction of fencing between the main track and the side track to enable loading and unloading activities to proceed separated from passenger train movements.

A description from east to west of the siding revision, siding construction work, second main track construction, or other major improvements to IAIS track configuration follows. New sidings—including some fashioned from existing tracks—and certain control points have been assigned names to enable discussion and identification of these locations. Names have been chosen that reference former Chicago, Rock Island & Pacific Railroad timetable stations at or near that location, natural features, local history, or IAIS officials. Actual names for these locations would be determined by IAIS in the future. Note that the term "controlled siding" means that turnouts will be power-operated, the siding will be signalized, and the track bonded to enable trains to enter on a signal indication better than restricted speed. Speeds shown for sidings would be maximum authorized track speed and signal aspects and power-turnout sizes would enable operation at maximum authorized track speed.

- Wyanet, Illinois: a new 40-mph controlled siding capable of 40 mph speed would be constructed to enable passenger/freight meet pass events, particularly overtakes of westbound IAIS freight trains by passenger trains entering onto IAIS from the Wyanet Connection. No. 20 turnouts are used throughout. A universal crossover at the east end of this siding enables passenger trains to meet freight trains that are holding either on the main track or the siding.
- Patriot, Illinois: No.15 power-operated turnouts would be installed to enable unit ethanol and DDG trains serving this non-controlled industrial track to exit the main track without stopping to hand-operate turnouts, or to enter without stopping to line the turnout or leave it reversed behind them. This location has been given a name to enable timetable designation, but it is not a normal meet/pass event location for passenger or IAIS freight trains, unless the IAIS train occupying the siding is a train serving the facility.

- Atkinson, Illinois: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding. No. 15 power-operated turnouts would be installed.
- Gentry (east of Colona), Illinois. A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed. Gentry will offer a place to hold freight trains immediately outside of the congested Quad Cities terminal area.
- Colona, Illinois: The existing BNSF/IAIS interlocking that limits IAIS trains to 10 mph will be reconfigured with No. 20 turnouts that are straight-rail for IAIS-to-IAIS movements to enable maximum authorized speed of 79 mph passenger/ 40 mph freight for IAIS-to-IAIS movements, and 40 mph for BNSF-to-BNSF movements.
- Quad Cities (Illinois/Iowa): A controlled second main track will be constructed from East Silvis (MP 171.0) to Farnham (MP 186.5) to enable passenger trains to pass through the Quad Cities terminal area without interference from freight trains, and to provide locations for freight trains to clear passenger trains. Power-operated No. 15 crossovers would be installed at 7th Street, Moline, 12th Street, Rock Island, and Missouri Division Junction to enable freight trains to crossover to serve industries, to enter or exit main lines that join this section from both the north and south sides, and to interchange freight cars between IAIS, BNSF, and CP. The east switch of this double-track section would be a No. 15 as westward freight trains will be slowing to enter Silvis Yard at restricted speed, and eastward freight trains will be limited by turnout sizes in Silvis Yard. The west switch of this double-track section is No. 20 to enable eastward freight trains to more rapidly clear the single main track from the west, and westward freight trains to achieve a higher speed as they enter the single main track to the west. The typical operation would be freight trains normally operate on Main Track 1 (the north track), except for crossover moves to industries or other lines, while passenger trains would normally operate on Main Track 2. The existing main track (to become Main Track 1) between Silvis and Farnam is improved to Class 4 track. While this existing main track would not normally be used by passenger trains, the congestion in this area means that maintenance-of-way time will be difficult to obtain. Accordingly, during maintenance-of-way activities passenger trains may operate on some portion of Main Track 1, and single-tracking of sections of Main Track 1 or 2 between control points may occur, thus the improvement of the existing main track enables fluidity and passenger train on-time performance to be maintained to the greatest extent possible.
- Walcott, Iowa: The existing siding would be extended eastward to 10,000 feet nominal length and become a controlled siding with No. 15 power-operated turnouts.
- Twin States, Iowa: The existing siding would be upgraded and become a controlled siding with No. 15 power-operated turnouts to reduce interference with passenger-train operation by intensive industrial switching activity at this location.

- North Star, Iowa: The existing siding will be upgraded and become a controlled siding with No. 15 power-operated turnouts to enable meet/pass events and to reduce interference with passenger-train operation by intensive industrial switching activity at this location.
- Atalissa, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- West Liberty, Iowa: The existing siding would be upgraded and become a controlled siding with No. 15 power-operated turnouts to reduce interference with passenger-train operation by intensive industrial switching activity at this location.
- Iowa City, Iowa: A controlled second main track would be constructed from Midway (MP 232.6) to Iowa City (MP 236.9) to enable passenger trains to pass through the Iowa City terminal area without interference from freight trains, and to provide locations for freight trains to clear passenger trains. The normal westward passenger train route would be on Main Track 2 from Midway to a single right-hand crossover just east of the Iowa City station, then Main Track 1 to the station and to the end of two main tracks. The normal eastward passenger train route would be the reverse. Freight trains would use Main Track 1 east of the single crossover east of the station for meet/pass events with passenger trains, and either main track for switching and through movements clear of passenger trains. A No. 15 power-operated crossover would be constructed at 1st Ave. to enable switching moves between Main Track 1 and the industrial spurs south of Main Track 2. Main Track 1 would be upgraded to Class 4 track to enable meet/pass fluidity and passenger train on-time performance to be maintained to the greatest extent possible during maintenance-of-way work.
- Coralville, Iowa: Potential location of a passenger-train layover facility using a No. 11 power-operated turnout.
- Miller, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- South Amana, Iowa: A 79-mph passenger-train bypass track of IAIS's South Amana yard would be constructed using No. 15 turnouts at its east and west end. The straight-rail route at the ends of the bypass would be for passenger trains and the diverging route for freight trains. The connection wye to Cedar Rapids would be equipped with No. 15 power-operated turnouts and signalized to enable freight trains entering or exiting the main track to the east to more expeditiously clear the main track.
- Marengo, Iowa: The existing siding would be upgraded and become a controlled 30-mph siding with No. 15 power-operated turnouts to reduce interference with passenger-train operation by industrial switching activity at this location.

- Brooklyn, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Posner, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- Grinnell, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding with No. 15 power-operated turnouts.
- Jasper, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- Kellogg, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Newton, Iowa: The yard lead would be extended eastward to provide head-room for switching the yard without interfering with passenger trains. No. 15 power-operated turnouts would be installed at the east and west entrances to the yard leads.
- Colfax, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Adventure, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- Altoona, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a non-controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Des Moines, Iowa: A passenger train-only bypass track would be constructed from East Des Moines (MP 352.0) to MP 356.6. This bypass would fly over Union Pacific Railroad’s Trenton Subdivision and bypass UP’s Short Line Yard to create a clear path for passenger trains. At present, the IAIS main track passes through Short Line Yard and crosses the Trenton Subdivision at grade. Extensive and constant switching activity occurs in the yard, and the Trenton Subdivision is occupied almost continuously by switch engines pulling back to the south or north from Short Line Yard onto the Trenton Subdivision, or by freight trains exiting or entering the yard, or waiting for a clear route. A second main track would be constructed from MP 356.6 to Water Works (MP 360.3) to provide passenger trains with a clear route avoiding UP, IAIS, BNSF, and NS switching and interchange activities that occur on and through the existing main track. Power

operated No. 11 or No. 15 crossovers east and west of the Des Moines station location would enable passenger trains to use Main Track 1 for station stops; otherwise the normal route for passenger trains is Main Track 2. A No. 15 power-operated turnout at the east end of the bypass and a No. 20 power-operated turnout at the west end of Main Track 2 are both straight-rail for normal passenger trains moves. Both main tracks will be constructed or upgraded (track shifts are employed) to Class 4 from 5th Street to the west end of two main tracks to enable meet/pass fluidity and passenger train on-time performance to be maintained to the greatest extent possible during maintenance-of-way work.

- West Des Moines, Iowa: The junction switch will be revised to be straight rail for passenger-train movements and a power-operated No. 15 turnout will be installed.
- Booneville, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Earlham, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 40-mph siding. No. 20 power-operated turnouts would be installed.
- East Menlo/Menlo, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a non-controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Casey, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Divide, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- Adair, Iowa: A power-operated No. 15 turnout will be installed to reduce passenger-train interference from extensive industrial switching at this location.
- Anita, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Atlantic, Iowa: A new yard track will be installed to replace lost capacity. The east and west yard switches will become No. 15 power-operated turnouts to reduce interference with passenger-train operation. Yard tracks will be non-controlled.
- Hunt, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.

- Hillis, Iowa: The existing siding currently operated at restricted speed with hand-throw turnouts would be improved to become a controlled 30-mph siding to reduce interference with passenger-train operation by industrial switching activity at this location. No. 15 power-operated turnouts would be installed.
- Hancock Junction, Iowa: A power-operated No. 15 turnout will be installed at this junction.
- Peter, Iowa: A new 40-mph controlled siding with No. 20 power-operated turnouts would be constructed.
- Rigg, Iowa, to Council Bluffs: A new passenger-train station lead will be constructed. A No. 20 power-operated turnout will enter the new passenger-train lead.
- Council Bluffs, Iowa: A passenger-train layover facility will be constructed. A station bypass track will enable passenger-train switching moves to occur while staging a passenger train at the station.

Additional Tier 2 (project) NEPA studies will be conducted for the Service within the Chicago Terminal area, the commuter territory between Chicago and Aurora, and in freight railroad bottleneck areas such as the Quad Cities, Iowa City, Des Moines, and Council Bluffs, where capacity is restricted and the reliable operation of passenger trains (while allowing adequate additional capacity for maintenance-of-way work) is paramount. Other areas possessing freight railroad congestion may also be the subject of a follow-up Tier 2 (project) NEPA analyses.

#### 7.2.1.3 Meet-Pass Event Improvement

The proposed infrastructure improvements described above are analyzed in further detail for their operational characteristics and freight railroad mitigation in Section 10.2.

#### 7.2.1.4 Communications and Signaling

Upgrades or new installation of wayside signaling equipment, traffic control, and dispatching systems, communications platforms, and grade crossing protection is necessary to support the trains of the Service. At present, the BNSF portion of the route is equipped with CTC and BNSF expects to have implemented PTC on this portion of the route prior to implementation of any phases of the Service. Communications and signaling improvements on BNSF would be restricted to Eola Yard and the Wyanet Connection.

At present, IAIS's Method of Operation is Track Warrant Control (TWC) between Wyanet and Council Bluffs. At the Quad Cities, Iowa City, and Des Moines, IAIS's Method of Operation is Yard Limits. Additionally, IAIS operation on BNSF in Moline uses BNSF (GCOR) Rule 6.28 as its Method of Operation, and IAIS operation on UP in Des Moines is Yard Limits. Manual interlockings between Wyanet and Council Bluffs are encountered at Colona (BNSF control), and Des Moines (UP control). An automatic interlocking with UP is encountered at Grinnell. To enable reliable 79-mph maximum speed operation between Wyanet and Council Bluffs, CTC and PTC will be installed, controlled from IAIS's dispatching office at Cedar Rapids, Iowa. Installation of one or more PTC-compatible CTC dispatching desks and a PTC back-office server will be necessary for the IAIS dispatching center.

Due to the proposed increase to 79 mph passenger train speeds (compared to the existing maximum freight train speeds of 40 mph) on the IAIS portion of the route (which includes UP and BNSF trackage rights encountered between Wyanet and Council Bluffs) and the anticipated corresponding variance between passenger and freight speeds, all public at-grade crossings with active warning devices will receive constant warning time devices and bells, flashers, and two-arm gates. High-traffic private at-grade crossings may also be upgraded with constant warning time devices and bells, flashers, and two-arm gates. Other private crossings will be equipped with passive warning devices. Signage, brush clearance, and crossing surface improvement, where required, will be implemented at all at-grade crossings. No upgrades to at-grade crossings on the BNSF portion of the route have been identified or are anticipated in conjunction with the Service, excepting potential for work at Eola Yard or Wyanet.

#### 7.2.1.5 Stations

Station infrastructure for the Program consists of buildings, platforms and canopies, and fare collection systems and equipment. Site work will be necessary to provide for facilities at all new station locations. Station projects and requirements are described in Section 7.3.2.

The proposed Chicago to Council Bluffs-Omaha trains would supplement service on the existing Amtrak route over BNSF between Chicago and Wyanet, including existing service to stations at Chicago, La Grange Road, Naperville, Plano, Mendota, and Princeton. It would establish new service to Geneseo and Moline, Illinois, and Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa. The station at Moline is being studied in an ongoing Tier 2 NEPA study. Stations at Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs would be studied in Tier 2 NEPA studies prior to implementation of the Service. The location of the initial terminal station in Council Bluffs station does not preclude an extension of service to the ultimate terminal for the service within the Omaha Metropolitan Area. A preferred station site for the Omaha terminal will be identified in a subsequent Tier 2 NEPA study.

#### 7.2.1.6 Maintenance and Layover Facilities

Layover facilities will be necessary at terminal points to facilitate maintenance, cleaning, and resupply of consumables for cars and locomotives; secure and stage passenger trains when not in operation; store supplies and spare equipment; and provide an on-duty point for passenger-train crews. Establishment of interim layover facilities would follow the phased implementation of service between Chicago and Council Bluffs: Moline for the Chicago-Quad Cities service scheduled to begin service in 2015, Coralville (Iowa City) for the proposed Chicago-Iowa City service in 2017, and Des Moines in 2022. A permanent layover facility would be constructed at Council Bluffs. This facility would be intended to be continued in use and expandable when frequency or speed is increased in the future, and the Service extended westward to Omaha. Layover facilities are more fully described in Section 7.3.3.

#### 7.2.1.7 Operating Equipment

The Service requires acquisition of locomotives, passenger cars, and an initial inventory of capital spare parts to maintain both. Equipment implementation will be phased in concordance with the phased implementation of geographic extensions and frequency increases of the Service. Equipment will be compatible with other MWRRS corridors and capable of maximum speeds of 110 mph.

Purchases of equipment for the initial Chicago to Iowa City High Speed Intercity and Passenger Rail Program now under development between Chicago and Moline by Illinois DOT, and the eventual full Chicago to Council Bluffs-Omaha service discussed in this study, will be consistent with the specifications developed by the Next Generation Corridor Equipment Committee (NGEC), created by Section 305 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) to establish a fleet of standardized rail corridor equipment. The equipment consists of locomotives and conventional, non-tilting bi-level passenger coaches which will be capable of operating at the 79, 90, and 110 mph speeds described in the Tier 1 EIS for the Service, and for speeds as high as 125 mph. The passenger cars will come in three configurations to match the full needs and functionality of existing and proposed services: coach car, café/lounge car, and coach/cab-car. All will be fully capable of pooling with other Amtrak and MWRRI intercity services in the Chicago hub.

Each standard trainset will have 374 standard revenue seats, weigh 647 tons, and measure 565 feet in length. Phase 1 implementation between Chicago and Moline, and Phase 2 implementation between Chicago and Iowa City, will use single-locomotive trainsets, with a locomotive on one end and a coach/cab car on the other. Phase 3, 4, and 5 implementation will use two locomotives to ensure reliability of passenger-train service, as freight train movements west of South Amana are low and highly variable. A passenger-train locomotive failure may result in a stranded passenger train for 8 or more hours, potentially without heat, air-conditioning, or lighting, before a freight locomotive can be made available and travel to the location of the passenger train. In Phases 3, 4, and 5, there is no requirement for coach/cab cars and these cars could be released to other MWRRI corridors and replaced with ordinary coaches.

The standard consist for Phases 1 and 2 will be arranged as follows:

- 1 locomotive (west end)
- 2 coach cars
- 1 café/lounge car
- 1 coach car
- 1 coach/cab-car

The standard consist for Phases 3, 4, and 5 will be arranged as follows:

- 1 locomotive (west end)
- 2 coach cars
- 1 café/lounge car
- 2 coach cars (1 of which could be a coach/cab-car)
- 1 locomotive (east end)

Locomotives would be the type specified by the NGEC. Because specifics of these locomotives are not yet available, operational planning assumed that locomotive specifications would be similar to General Electric P42-type locomotives currently in use by Amtrak. Locomotives would be HEP equipped. Each trainset will have a locomotive or cab car on each end, to assure a push-pull mode of operation, and will not require infrastructure for turning.

## 7.3 Service Cost Estimates

The Service cost-estimate is high-level and conceptual, as appropriate to a Tier 1 NEPA analysis. Detailed cost estimates would be prepared as part of a Tier 2 NEPA analysis or project preliminary engineering. The general cost estimate methodology is to be conservative to not create unrealistic expectations about the cost to implement the Service.

The capital cost estimate has been itemized into several categories of similar improvements to allow for identification of major cost categories and application of appropriate contingencies to each category.

### 7.3.1 Track Structures and Track

A significant portion of the Service involves upgrading existing track and construction of new sidings, double track, and mainline bypasses on IAIS between Wyanet and Council Bluffs. This category was further split into structural items and track items, with multiple subcategories for each section. When items are estimated on a per-mile basis, the intention is to develop a cost to be split among individual projects along the corridor based on the scope of the individual project and not to require that each route mile receive the same funding. The subcategory heads below align with the cost estimate.

- Existing bridge improvements were estimated by assuming that all open-deck bridges on the IAIS will have to be replaced as part of the capital program to bring the rail alignment over the bridges to Class 4 standard. Approximate length of deck replacement was calculated from aerial imagery and a unit cost was applied per foot of deck replacement. Bridge repairs outside of open-deck bridge replacements were calculated on a per-mile basis over the length of the IAIS portion of the route and then an allowance was provided per mile. This item is intended to cover costs associated with stiffening existing structures and minor component replacement to meet Class 4 criteria. A lump sum was added for potential repairs to the Government Bridge over the Mississippi River between Rock Island, Illinois, and Davenport, Iowa, that would be necessary to achieve the reliability of the Service. Major repairs or replacement of this bridge, or any other existing bridge, is not included as the expectation is that these repairs or replacements would be normal to continued freight-railroad operation of the route, and not incremental to the addition of the Service.
- New Bridges in areas with proposed new second main track or sidings were estimated by assuming that new bridges would be constructed to match existing structures on the existing main track. New bridges were then separated by proposed structure type (concrete, steel beam span, or deck plate girder) and a unit price per foot of proposed structure was applied. An additional lump sum was included for the proposed flyover structure of UP’s Trenton Subdivision at Des Moines. This lump sum was developed based on construction costs for similar structures under construction for Class 1 railroads at present.
- Culverts and drainage structures were estimated by assuming that existing culverts would be extended in-kind under proposed adjacent tracks and that new culverts would be installed to match upstream/downstream culverts where the proposed track is not adjacent to an existing track. The proposed improvements

were then separated by proposed extension or new culvert type (extend concrete box, extend pipe culvert 48" or less, extend pipe culvert 54" or greater, new pipe culvert, or new box culvert) and a unit price per location was applied. Additional miscellaneous drainage items (ditching, etc.) were estimated on a per mile basis with an allowance provided per mile.

- Track Structure-Miscellaneous was estimated on a per mile basis with an allowance provided per mile.
- Track-New Construction was estimated based on the proposed track construction depicted in the conceptual engineering drawings. Track construction was separated into proposed passenger sidings, new main track, 2nd main track, and extensions of existing freight sidings or modifications of existing yard trackage. A unit cost per mile of new construction was then applied depending on the type of track to be constructed. The unit cost per mile is assumed to include the rail, ties, miscellaneous track materials, ballast, subballast, and grading associated with that track. Existing track to be removed was also calculated on a per mile basis from the conceptual engineering drawings and a unit cost applied to cover removal of the track, ballast, and subballast.
- Track-Special Track Work was estimated by itemizing proposed turnouts, turnout replacement, and turnout removal depicted in the conceptual engineering drawings. New turnouts were itemized by turnout size and operation (powered vs. hand-thrown) and a cost per location for each installed turnout was applied. Turnout replacements were itemized by turnout size and operation and a cost per location for each existing turnout removed and replaced with a new turnout was applied. Turnout removal was itemized per each location and a cost including removal of the turnout and replacement with new track was applied.
- Track-Major Interlockings was estimated as a lump sum item for each of three major projects through the Service limits: BNSF Eola Yard Improvements, Wyanet Connection, and Colona Junction. The estimates for the Eola Yard Improvements and Wyanet Connection were derived by escalating estimates from previous studies and verifying appropriateness based on track length and number of turnouts. The estimate for Colona Junction was based on track and turnout construction through the limits of the interlocking.
- Track-Rehabilitation – Ballast and Surfacing was estimated based on the conceptual engineering drawings and includes track surfacing, track shifts and curve reductions, and track undercutting. Track surfacing was estimated on a per mile basis over the length of the Service and separated into existing mainline surfacing, converting an existing siding to Class 4 track, and converting an existing siding to Class 3 track. Mileage was calculated assuming the entire IAIS main line would be surfaced with the exception of areas with a proposed main line bypass, and that all sidings being rehabilitated with power operated turnouts would be surfaced as well. Track shifts were calculated based on actual mileage of track to be shifted from the conceptual engineering. Curve reductions were calculated based on the length of the existing curve to be reduced with an cost per mile of total curve reductions applied to cover the costs associated with any

grading, track work, and surfacing required to complete the curve reduction. Track undercutting was calculated assuming that 10 percent of the existing mainline mileage to be surfaced would be undercut. Additional spot undercutting locations were assumed on the basis of one location per mile of track. Final undercutting locations will be determined with input from the host railroad.

- Track Rehabilitation – Component Replacement was estimated based on the conceptual engineering drawings and includes rail replacement and crosstie replacement. Replacement of jointed rail with CWR was estimated utilizing IAIS track charts from 1997 with information updated based on limited field review. All jointed rail will be eliminated along the corridor from the main line and any other tracks potentially utilized by passenger trains. Joint elimination in existing CWR territory was calculated on the basis of 1 location per mile over the length of the corridor. CWR replacement in curves was calculated on the basis of replacing 50 percent of the rail in curves over 2°00' (less than 2865' radius) and 100 percent of the rail in curves over 4°00' (less than 1433' radius). Tie replacement was spilt into existing main line replacement and replacement in sidings being converted to Class 3 or Class 4 track. Existing main line tie replacement was calculated per tie based on replacing 30 percent of the ties in the existing main line assuming ties are spaced at 19.5" centers. Tie replacement in sidings being upgraded to Class 3 track was calculated per tie based on replacing 30 percent of the ties in sidings to be upgraded assuming ties are spaced at 24" centers. Tie replacement in sidings being upgraded to Class 4 track was calculated per tie based on replacing 40 percent of the ties in sidings being upgraded assuming existing ties spaced at 24" centers and ties being re-spaced to 19.5" centers.

### 7.3.2 Stations and Terminals

Proposed station layouts and requirements were developed for each proposed station along the corridor between Wyanet and Council Bluffs. No work is assumed for existing station locations on the BNSF portion of the route as part of this Service. Each station location was estimated separately and costs grouped into the categories of buildings, platforms, site work, and fare collection. Detailed estimates for the Geneseo, Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs stations can be found in the System Stations Report. The Moline station was estimated based on the Chicago to Iowa City ARRA Grant Application.

- Station Buildings were estimated on a lump sum basis for each location and include either construction of a new building/warming shelter or rehabilitation of an existing structure as well as the cost of any utility service to the building.
- Platforms were estimated on a lump sum basis for each location and include the construction of a platform, canopy, any handrail/guardrail required, passenger information systems, and railroad flagging required for construction.
- Site Work was estimated on a lump sum basis for each location and includes parking, sidewalks, modifications to existing streets, site lighting, landscaping, utility relocation, miscellaneous structural items, and signage.

- Fare Collection Systems and Equipment was estimated on a lump sum basis for each location and includes the cost associated with QuickTrak ticketing kiosks for each station. Stations at Geneseo, Grinnell, and Atlantic were assumed to require 1 ticketing kiosk; stations at Moline, Iowa City, Des Moines, and Council Bluffs were assumed to require 2 ticketing kiosks.

### 7.3.3 Support Facilities

Proposed layover facility layouts and requirements were developed for proposed layover facilities at Iowa City, Des Moines, and Council Bluffs. Theses locations were selected for layover facilities to support the phased approach to expanded the proposed service from Chicago to Iowa City, then Des Moines, and finally to Council Bluffs. The layover facility at Iowa City will be temporary in nature and some of the components may be able to be relocated to layover facilities at Des Moines or Council Bluffs as the service expands; however, the estimate does not account for such reuse. The layover Council Bluffs will be permanent and is required to support the proposed ultimate build-out of the service. The layover facility at Des Moines could be temporary if there is no anticipation of a future increase in frequency between Chicago and Des Moines that did not extend to Council Bluffs. Each layover facility was estimated separately and costs grouped into the categories of the maintenance facility and any yard track to support the layover. Detailed estimates for the layover facilities can be found in Section 9.0.

- Maintenance Facilities were estimated on a lump sum basis for each location and include a building, site preparation, access roads and parking, utilities services, standby power for the train sets, security fencing, and site lighting.
- Yards and Yard Track for maintenance facilities were estimated based on the conceptual engineering for each facility included in Section 9.0. Yard track was estimated on a per foot basis and turnouts were estimated per each turnout for the facility. Power-operated turnouts were assumed off the main track and hand-throw turnouts were assumed within the limits of the layover facility.

### 7.3.4 Site Work, Right-of-Way, Land

Right-of-way is assumed to be required for several of the proposed projects along the length of the IAIS portion of the corridor. In addition to the purchase of right-of-way, in some instances household and/or business relocation will be required. It is also assumed that some allowances will be required for utility relocation, hazardous material mitigation, and environmental mitigation.

- Purchase or Lease of Real Estate was estimated on a per mile basis for proposed siding construction assuming acquisition of a 25-foot strip along the length of the siding, which yields 3 acres per mile of construction. Right-of-way for the Wyanet Connection, Colona Junction, Moline 2$^{nd}$ main, Davenport 2$^{nd}$ main, Iowa City 2$^{nd}$ main, Homestead Yard Bypass, Des Moines Yard Bypass/2$^{nd}$ main, West Des Moines 2$^{nd}$ main, and Council Bluffs 2$^{nd}$ main were estimated on a per acre basis based on the conceptual engineering drawings and then a cost per acre based on the character of the land to be acquired was applied. Costs per acre were derived based on publically available rates for farmland in Iowa in rural areas and recent comparable sale data in urban areas. Property for the proposed stations and layover facilities were estimated on a lump sum basis based on the amount and character of the land to be purchased.

- Demolition, Clearing, and Site Preparation was estimated on a per mile basis for proposed new construction.
- Site Utilities and Utility Relocation was estimated on a per mile basis for proposed new construction.
- Hazardous Material Mitigation was estimated on a per mile basis for proposed new construction.
- Environmental Mitigation was estimated on a per mile basis for proposed new construction.
- Relocation of Existing Households and Businesses was estimated on lump sum basis to relocate existing businesses occupying station facilities at Geneseo, Moline, Iowa City, and Des Moines as well as households being relocated by construction of the Grinnell station and the Des Moines Yard Bypass.

### 7.3.5 Communications & Signaling

To accommodate the proposed passenger service at 79 mph and future service at higher speeds a traffic control system including wayside signaling, dispatching, and communications will have to be installed on the IAIS between Wyanet and Council Bluffs. The IAIS is currently a regional railroad that operates using TWC or Yard Limits without wayside signaling except at interlockings at Colona, the Government Bridge, Des Moines, and Grinnell. In addition at-grade road crossings will have to be upgraded over the IAIS portion to improve surfaces and ensure that all public grade crossings have gates and flashers with constant warning circuitry. Private crossings will be upgraded to ensure adequate sight-distance, proper surface, and automatic or manual gates where warranted. Communications and Signaling were estimated by developing an initial signal spacing scheme, and developing characteristics for each wayside signal location, including grade-crossing predictors that would be integrated with wayside signal locations. Grade-crossing signal systems were estimated by developing an implementation scheme for each location. Current Class 1 cost-estimates were used to derive a total cost for wayside and grade-crossing signaling. PTC and dispatching office costs were estimated by assuming a Wayside Interface Unit (WIU) at each wayside signal location, and a lump sum for communications backbone, PTC office server, CTC dispatching console, and Railroad Product Safety Plan development. Current anticipated Class 1 railroad costs for PTC implementation were used. Communications and signaling costs are inclusive of design, testing, and commissioning.

- Wayside Signaling was estimated on a lump sum basis for each portion of the route on IAIS. A detailed estimate was developed based on the conceptual engineering drawings and the results were rolled up into the overall cost estimate.
- Traffic Control and Dispatching Systems was estimated on a lump sum basis and split proportionally between the different portions of the route on IAIS. This item is assumed to include all costs associated with a dispatching center and implementing a PTC system associated with the dispatching software.

- Communications was estimated on a lump sum basis and split proportionally between the different portions of the route on IAIS. This item is assumed to include all costs associated with installing a communications network along the route to allow constant communication between the dispatching center and trains operating on the route.
- Grade Crossing Protection was estimated on a lump sum basis for grade crossing signalization improvements on each portion of the route on IAIS. A detailed estimate was developed based on the conceptual engineering drawings including necessary modifications to all public crossings as well as any private crossings to be signalized. The results of the detailed estimate were then rolled up into the overall cost estimate. Improvements to crossing surfaces were estimated on a per each location basis for each of the following types of crossings:
    - Private residential crossing for single track and for double track
    - Private farm or industrial crossing for single track and for double track
    - Private farm or industrial crossing for single track with a proposed new 2nd track and for double track with a proposed new 3rd track
    - Local public road for single track and for double track
    - Local public road for single track with a proposed new 2nd track
    - Highway or urban public road for single track and for double track
    - Highway or urban public road for single track with a proposed new 2nd track and for double track with a proposed new 3rd track

Private crossings were generally assumed to require minor improvements to the profile and potentially the additional of manual gates or automatic gates where traffic conditions warrant. Public crossings were generally assumed to require minor improvements to the profile and surface approaches as well as installation of automatic crossing gates or upgrades to existing crossings gates. In instances where an additional track was added through a crossing more significant modifications to the crossing profile were assumed as well as relocation/replacement of any existing crossing gates and relocation of any crossing signage.

### 7.3.6 Vehicles

Train sets for the proposed service are anticipated to meet the requirements of the Midwest Regional Rail program procurement. Each train set is intended to include a combination of passenger locomotives, coaches, café/lounge cars, and coach/cab cars. The equipment is assumed to be acquired over time as the service is expanded geographically and additional round-trips are added to the schedule.

- Vehicle Acquisition-Non-Electric Locomotives was estimated on a per unit cost assuming a total of 15 units for the full service including 12 for regular service (2 per train) and 3 spares.
- Vehicle Acquisition-Rolling Stock was estimated on a per unit cost for each type of equipment. A total of 20 coaches are assumed for the full service including 18 for regular service (3 per train) and 2 spares. A total of 8 café/lounge cars and 8 coach/cab cars are assumed for the full service including 6 of each for regular service (1 each per track) and 2 spares for each.

- Vehicle Acquisition-Spare Parts was estimated on a lump sum basis for capital spare parts for the Service with the total cost for capital spare parts being split proportionally between the different segments of the route.

### 7.3.7 Professional Services

To take the corridor from the current planning stage through design and into implementation, professional services will be required to complete preliminary and final design of each segment as well as perform and necessary environmental studies. Additional services will be required for project management during design and construction as well as construction administration and management.

- Preliminary Engineering/Project Environmental was estimated on a lump sum basis with the preliminary engineering for the track design assumed to be 2 percent of the construction cost of the track improvements and preliminary engineering for the stations and layover facilities assumed to be 4 percent of the construction cost of the facilities. An additional lump sum item for Operations Planning was included and split proportionally between the segments. A lump sum was provided for Tier 2 NEPA studies for each of the following: Illinois track improvements, Iowa track improvements, each station location, each layover facility location, the Wyanet Connection, Colona Junction, the Des Moines area improvements, and the Council Bluffs area improvements.
- Final Design was estimated on a lump sum basis with final design for the track improvements assumed to be 4 percent of the construction cost for the track improvements and final design of the stations and layover facilities assumed to be 6 percent of the construction cost for the facilities. Additional lump sum items were provided for the wayside and crossing signal design that were estimated based on the signal requirements of the conceptual engineering drawings. Lump sum items for PTC and Traffic Control Design as well as Communications System design were developed and split proportionally between project segments.
- Project Management for Design and Construction was estimated on a lump sum basis with both track improvements and station/layover facilities assumed to be 5 percent of their respective construction costs.
- Construction Administration & Management was estimated on a lump sum basis with both track improvements and station/layover facilities assumed to be 4 percent of their respective construction costs.

### 7.3.8 Maintenance of Way

A significant part of the strategy for reducing long-term maintenance costs for the Service is to ensure that the initial capital construction program is robust enough to provide a solid starting point from which to begin. Special attention was paid to the IAIS portion of the route, which is Class 3 track (or less) and does not at present host passenger trains. The IAIS portion of the route is composed primarily of the former Rock Island main line between Chicago and Omaha. The Rock Island was dissolved following bankruptcy and cessation of operations in 1980, and a significant portion was eventually purchased to become what is now the IAIS. Prior to the Rock Island bankruptcy, maintenance on the Wyanet-Council Bluffs portion of the Service's route was deferred and track, bridge, and signaling condition deteriorated in some cases to the point of inoperability. IAIS has made substantial investment in its track structure and bridges since it acquired the route; however, it remains a Class 3, low-density railroad with maintenance practices commensurate with its track levels and revenues. Accordingly, the maintenance program below and its associated cost estimate assumes that the incremental cost for Class 3 to Class 4 main track, siding improvements, signaling, and PTC will be borne by the passenger service, as these improvements otherwise would not be constructed or implemented by IAIS. After the initial capital program has been implemented, additional annual maintenance expenditure will be required to maintain the railroad at Class 4 including more frequent and more detailed inspections of track, structures, and signaling, and a regular surfacing and tie replacement program as well as some undercutting and rail replacement will be required. Structures will have to be maintained to a higher level. All of the new track and turnouts proposed in the conceptual engineering plans will have to be maintained.

- Track Structure-Bridge Repair was estimated on a per mile basis to develop an annual allowance for repairs to existing bridges. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile. An additional lump sum item has been provided for annual maintenance to the Government Bridge.
- Track Structure- New Bridges was estimated on a per mile basis for inspection and maintenance of new bridges constructed as part of the capital program. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile. Additional lump sum items have been provided for annual inspection and maintenance of the flyover structure proposed on the east side of Des Moines in the conceptual engineering drawings.
- Track Structure-Culverts and Drainage Structures was estimated on a per mile basis to develop an annual allowance for repairs to existing culverts. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile. Additional lump sum items have been provided for annual inspection and maintenance of new culverts constructed as part of the capital program.
- Track Structure-Miscellaneous was estimated on a per mile basis to develop an annual allowance for repairs to existing and proposed miscellaneous structures along the corridor. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile.
- Track-New Construction was estimated on a per mile (new track only) basis for inspection and maintenance of new track constructed as part of the capital program.
- Track-Special Track Work was estimated on a per turnout basis (new turnouts only) for inspection and maintenance of new turnouts constructed as part of the capital program.

- Track-Major Interlockings was estimated on a lump sum basis for each project for inspection and maintenance of the track and turnouts associated with each project. Lump sums have been provided for the Eola Yard Improvements, Wyanet Connection, and Colona Junction.
- Track: Rehabilitation – Ballast and Surfacing was estimated on a per mile basis for both the existing and proposed trackage. It was assumed that 10 percent of the total trackage would be surfaced in any given year and that 1 percent of the total trackage would be undercut in any given year.
- Track Rehabilitation – Component Replacement was estimated on a per mile basis for the existing track only. It was assumed that 2 percent of the total trackage would have rail replaced in any given year and 2 percent of ties in the existing main track would be replaced in any given year.
- Station Platforms was estimated on a lump sum basis per station. All maintenance costs associated with the station buildings and site are assumed to be covered by the local municipality.
- Support Facilities were estimated on a lump sum basis per layover facility.
- Wayside Signaling was estimated on a per mile basis to develop an annual allowance for repairs to wayside signaling. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile.
- Grade Crossing Protection was estimated on a per mile basis to develop an annual allowance for repairs to grade crossing signaling and crossing panels. The annual allowance is intended to be utilized over the entire IAIS portion of the corridor and is not intended to be split equally per route mile. Annual maintenance to the crossing approaches is assumed to be provided by the highway department with jurisdiction over the route.

## 7.4 Service Schedule and Prioritization

### 7.4.1 Implementation Schedule

Phased implementation is planned for the passenger rail service between Chicago and Council Bluffs-Omaha to enable Iowa DOT, Illinois DOT, and FRA to provide incremental project funding as it becomes available. This would involve launch of an initial service consisting of two daily round-trips operating at 79 mph between Chicago and Moline, which is currently under development by the Illinois DOT with an anticipated start of service in 2015. Subsequently, in Phase 2 these two daily round-trips would be extended westward to Iowa City in 2017, and in Phase 3 to Des Moines in 2022. Phase 4 would establish four daily round-trips between Chicago and Des Moines in 2025, and Phase 5 would extend these four round-trips to Council Bluffs in 2030. A long-term goal for the corridor is to implement 110 mph maximum speed service with seven round-trips serving Des Moines and five round-trips to Omaha, but no implementation schedule has been established at this time. All future planning, design, and construction activities would be outlined in the Program Implementation Schedule generated for each phase of the Service.

#### 7.4.1.1 Tier 2 Project NEPA and Preliminary Engineering

If the State of Iowa decides to move forward with implementation of the Service and funding is secured, Tier 2 studies and NEPA documentation would be advanced for logical sections of the phased implementation in the corridor. Separate Tier 2 NEPA documentation would be prepared for each of the sections identified. Each of the sections would have independent utility and, therefore, could be improved with or without improvements to other sections. Preliminary engineering design and NEPA documentation would be conducted in support of those Tier 2 studies because such details are necessary to identify the land area that would be required for construction activities.

At this time, the following Tier 2 sections are anticipated subsequent to implementation by Illinois DOT of Chicago to Moline service, but these sections may be combined or modified in the future based on project prioritization and available funding:

- Chicago to Aurora, Illinois, Track Improvements
- Aurora, Illinois, to the Wyanet Connection near Wyanet, Illinois, Track Improvements
- Wyanet Connection near Wyanet, Illinois, to Iowa City, Iowa, Track Improvements
- Government Bridge (Mississippi River) (Illinois/Iowa)
- Iowa City, Iowa, Station
- Iowa City, Iowa, Temporary Layover and Maintenance Facility
- Iowa City to Short Line Yard, Des Moines, Iowa, Track Improvements
- Grinnell, Iowa, Station
- Des Moines, Iowa, Short Line Yard Bypass/Trenton Subdivision Flyover
- Des Moines, Iowa, Station
- Des Moines, Iowa, Temporary Layover and Maintenance Facility
- Des Moines to Council Bluffs, Iowa, Track Improvements
- Atlantic, Iowa, Station
- Council Bluffs, Iowa, Station
- Council Bluffs, Iowa, Permanent Layover and Maintenance Facility

#### 7.4.1.2 Final Design

Based on the outcome of the Tier 2 studies and the preliminary engineering process, and in collaboration with the Iowa DOT and Illinois DOT, Amtrak, and the host railroads BNSF and IAIS (as well as UP, NS, and CP coordination), a final design of each phase of the phase implementation of the Service will be crafted. Final Design elements include generation of final engineering plans, project specifications, and construction schedule and estimates, as well as completion of the environmental permitting process.

#### 7.4.1.3 Construction

The complexity of the Service and the multiple partners involved requires an integrated and organized approach toward project delivery and will be addressed in a Program Management Plan. The outputs of the Final Design phase will be used to gain project approval, create agreements with the host railroads, and solicit bids from prospective contractors. Design and construction contracts will be structured in a logical manner to ensure coordination of not only the design and performance of related elements of work, but also coordination of the construction schedules, a critical consideration for a service of this magnitude with many interrelated elements of work let under separate contracts. Certain portions of the infrastructure are wholly within a given state, and the respective state DOT will be responsible for those improvements. However, Iowa DOT will be responsible for overall service implementation and for portions which span jurisdictional boundaries. For example, Iowa DOT (working closely with Illinois DOT) will be responsible for additional equipment acquisition to the initial equipment acquisition for Chicago-Moline service, negotiation of final agreements with BNSF, IAIS, and Amtrak, and integration of PTC across the entire system. Economies of scale, in addition to systems integration considerations, favor a unified approach under a single contract.

While many aspects of the Service involving infrastructure are addressed in a time frame and manner typical of projects involving the initiation of passenger rail service, note that the equipment acquisition process would commence almost immediately in each Phase in which additional equipment is required, since construction and delivery of equipment is likely to require a long lead time. Also, note that there is an extensive testing phase that begins when rolling stock is delivered and the complete system is available for testing (e.g., rolling stock, track and signal upgrades, PTC, etc.). This phase is intended to not only test the recently delivered equipment, but also to test the overall operating system, to train crews and dispatching staff, establish operating patterns in conjunction with the freight railroad hosts and the operator, and to identify any issues early in the implementation of each service phase, while there is still time to resolve such issues.

Depending upon funding availability and the progress of agreements with the host railroads and Amtrak, there is the potential to start some of the railroad rehabilitation activities (rail and tie renewal on IAIS or upgrade of the less complex grade crossing warning devices, for example) earlier in the overall project timeline. If agreements are in place, some of the rehabilitation contracts could be accelerated, with earlier potential start dates.

### 7.4.2 Phased Implementation Alternatives

#### 7.4.2.1 Service Segments with Independent Utility

The phased implementation planned for the Chicago to Council Bluffs-Omaha Service enables Iowa DOT, Illinois DOT, and FRA to provide incremental benefits of the overall vision by taking advantage of funding as it becomes available. Each of the phases of the service is designed with independent utility in mind and serves growing demand for intercity passenger rail service through discrete, stand-alone segments.

The first discrete phase would involve launch of an initial service consisting of two daily round-trips operating at 79 mph between Chicago and Moline, which is currently under development by Illinois DOT and scheduled for a 2015 start. Subsequently, it is anticipated that these two daily round-trips would be extended geographically westward into Iowa, first to Iowa City in 2017, and second, to Des Moines in 2022. Later service expansion to Council Bluffs would occur in 2030. No timetable has been released for an ultimate westward service expansion to Omaha.

Infrastructure improvements required to implement new service segments and mitigate against conflicts with freight trains on the host railroads could include construction of track, signaling, structures, stations, and layover/maintenance facilities; improvements to track and signaling to enable higher train speeds; acquisition of additional equipment (locomotives and passenger cars); and implementation of amenities at stations or on-board trains.

#### 7.4.2.2 Frequency Increases

In addition to geographical expansion in discrete stages, the Service's phased implementation also allows for an increase in the frequency of passenger trains on each service segment. This strategy similarly allows Iowa DOT, Illinois DOT, and FRA to provide incremental benefits of the service by taking advantage of funding as it becomes available. Any additional train frequencies would allow the states of Illinois and Iowa to build on the ridership, schedule, experience, and best practices of the previous service incarnations in the corridor.

The first proposed frequency increase would involve growth from two round-trips to four round-trips between Chicago and Des Moines in 2025. The four round-trip frequency would extended to Council Bluffs in 2030. The long-term goal for the corridor, and the second proposed frequency increase, would result from the implementation of 110 mph maximum speed service with seven round-trips serving Des Moines and five round-trips to Omaha. No implementation schedule has been established for this ultimate expansion.

Any increase in the number of trains in the corridor would have to take into account the cost-effectiveness of additional infrastructure and equipment needs and would be subject to the verification of capacity on the host railroads. Constraints could exist on Amtrak at Chicago Union Station where there time and platform space to handle the extra trains may be insufficient. Infrastructure improvements required to implement frequency increases and accommodate comingled passenger and freight operations safely and efficiently on the host railroads could include construction of track, signaling, structures and stations; enhancements to track and signaling to enable higher train speeds; acquisition of additional equipment (locomotives and passenger cars); and implementation of amenities at stations or on-board trains.

#### 7.4.2.3 Additional Station Stops

Intermediate station stops could be added to the service in a subsequent implementation phase or independent of the defined implementation phases, if demand warrants. Operations, environmental, and financial analysis would be performed to determine if a new station stop is feasible and how it would affect the efficiency and marketability of the overall passenger train service in service at that time. New station infrastructure would be required for any further stops, which includes buildings, platforms, and fare collection systems and equipment. Site work of an unknown degree would be necessary to accommodate station facilities at all new station locations. Furthermore, additional track infrastructure may be required to handle the adjustment in train operations that results from the addition of one or more stops, and its possible effect on freight train operations of the host railroad in the shared corridor.

## 8.0 Station and Access Analysis

The purpose of this station analysis is to identify station improvements and associated cost estimates that would be required to operate the intercity passenger rail service as proposed by the Chicago to Council Bluffs-Omaha Regional Passenger Rail System Planning Study. More detailed analysis and engineering would be required in subsequent Tier 2 NEPA studies to refine the required station improvements and provide a more detailed cost estimate for new stations. In some locations, final site selection would also be required.

The general station concept for each of the new stations at Geneseo and Moline, Illinois, and Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa, follows Amtrak and FRA standards and guidelines for passenger waiting areas, platform height and length, platform canopy length, fare collection and ticketing systems, and parking.

## 8.1 Station Analysis Methodology

Station requirements are dependent, in part, upon the anticipated passenger ridership at each location. Table 8.1-1 below shows the annual boardings and alightings projected for 2040 that were estimated for the stations of the new service. The ridership figures were based on four round-trips between Chicago and Council Bluffs with a maximum speed of 79 mph. It was assumed ridership growth would be roughly proportional to the anticipated population growth. Therefore, a compounded annual average growth rate of two percent was used to project the 2040 figures using a 2020 base year.

Table 8.1-1: Station Ridership (2040)

| Type | Location | Annual Boardings and Alightings |
|---|---|---|
| Existing Illinois stations | Union Station, La Grange Road, Naperville | 544,715* |
| | Plano | 29,371 |
| | Mendota | 28,349 |
| | Princeton | 114,754 |
| New stations | Geneseo | 14,221 |
| | Moline | 232,525 |
| | Iowa City | 214,509 |
| | Grinnell | 31,595 |
| | Des Moines | 383,674 |
| | Atlantic | 31,637 |
| | Council Bluffs | 235,488 |

*Source: AECOM ridership forecast Option 15C. January 13, 2013.*

**Aggregate total, boardings and alightings for these individual stations were not available for this analysis.*

The general method for assessing the stations included the following steps:

- Conducted station site visits.
- Documented existing conditions.
- Determined space needs based on ridership projections and Amtrak and railroad requirements.
- Estimated parking requirements for each station.

- Compared the existing conditions to the space and parking requirements to identify recommended improvements for the new service.
- Developed a conceptual station site plan and prepared a conceptual cost estimate. (This only pertains to Iowa City, Grinnell, Atlantic, Des Moines and Council Bluffs. A cost estimated was also updated for Geneseo.)
- Documented the findings in this section.

Table 8.1-2 below provides basic information about the station design standards that were used to assess the station requirements. Calculations for station sizing are provided in Appendix B.

### Table 8.1-2: Standard Requirements for Stations

| Item | Standard | Source |
|---|---|---|
| Classification | Large (400,000+ riders)<br>Medium (50,000+ riders)<br>Small (10,000+ riders)<br>Basic (< 10,000 riders) | Amtrak's Station Program and Planning – Standard and Guidelines 2008 |
| Passenger wait area | Amtrak formula for waiting room capacity (assumed 200 square feet minimum) | Amtrak's Station Program and Planning – Standard and Guidelines 2008 |
| Platform length | 300 to 700 feet (600 to 700 feet desired for efficient boardings/alightings) | Amtrak's Station Program and Planning – Standard and Guidelines 2008 |
| Platform height | Platform height of 8" above top of rail was assumed for new stations to provide consistency with existing station platforms in Illinois. Federal regulations (49 CFR parts 37 and 38) allow passenger railroads to seek concurrence from FRA to use 8" platforms where tracks are shared with freight. Final platform height would be coordinated with FRA during future Tier 2 Project NEPA studies and 30 percent design. | FRA regulations (49 CFR parts 37 and 38) |
| Canopy | Two-thirds length of platform | Amtrak's Station Program and Planning – Standard and Guidelines 2008 |
| Parking | Parking requirements were calculated with the following assumptions:<br>• 50% of the daily ridership would need to park at the station<br>• Not all parkers would drive alone and the number of persons per vehicle would depend on the type of traveler<br>• 60% of the riders assumed to be leisure related and 40% of the riders assumed to be business related<br>• Leisure travelers typically have 2.5 persons per vehicle and business travelers typically have 1.2 persons per vehicle | Based on comparable passenger rail systems in the United States. |

## 8.2 Existing Illinois Stations

This section reviews the existing stations in Illinois that currently have Amtrak service and determines if the facilities would be able to accommodate the planned four round-trips for the proposed Chicago to Council Bluffs-Omaha service. The stations include: the Chicago area stations at Union Station, La Grange Road, and Naperville, and stations in Plano, Mendota, and Princeton.

### 8.2.1 Chicago Union Station

Chicago Union Station is located at 225 South Canal Street and is the eastern terminal station for the proposed Chicago to Council Bluffs-Omaha service. The station is the third busiest railroad terminal in the United States and serves over 300 trains per weekday and about 120,000 boardings and alightings daily.[3] The station serves Metra commuter trains and it is the Midwest hub for Amtrak's regional and national trains.

The City of Chicago Department of Transportation (CDOT), in coordination with Metra, Amtrak and other stakeholders, completed the Chicago Union Station Master Plan in 2012 to identify options for accommodating future growth at the station. The concourse at Chicago Union Station currently operates at or near capacity and growth is expected to continue with Metra commuter rail, Amtrak's existing intercity and long distance services, and planned high-speed rail services.

The study identified ideas for increasing capacity and improving passenger flows over the short-term, medium-term, and long-term. In the short-term, Amtrak is planning to make improvements within the station to reduce crowding. Also, the CDOT is planning to improve local street traffic flows and curbside access. Medium-term recommendations include: converting the baggage platforms for commuter use; converting the unused mail platform for intercity passenger train use; reconfiguring space within the concourse; and rebuilding Canal Street to improve street access. Over the long-term, the study explored concepts for significantly expanding or completely replacing the existing intercity and/or commuter station facilities. The master plan points out that many short-term activities are already funded, but more planning and design work would be required to implement medium and long-term plans.

It is assumed that improvements called for in this plan would address the needs of the Chicago to Council Bluffs-Omaha service in the short and medium terms. The Iowa and Illinois DOTs would continue to work with Amtrak and the CDOT to coordinate train frequencies and schedules.

### 8.2.2 La Grange Road Station

The La Grange Road station is an existing Amtrak and Metra station located at 25 West Burlington Avenue in La Grange, Illinois. The village of La Grange is a southwest suburb of Chicago that had a population of 15,617 in 2011, according to the U.S. Census Bureau. The station had 15,120 Amtrak boardings and alightings during fiscal year 2012 and is currently considered a "small" station by Amtrak standards. For station planning purposes, it is assumed the La Grange Road station would remain a small station through 2040.

[3] Chicago Union Station Master Plan Study. Final Report. Chicago Department of Transportation. May 2012.

#### 8.2.2.1 Site

The station site and facilities are owned by BNSF Railway. The railroad corridor is located on the north side of the building and contains two passenger tracks and one freight track. Figure 8.2-1 shows an aerial map of the station.

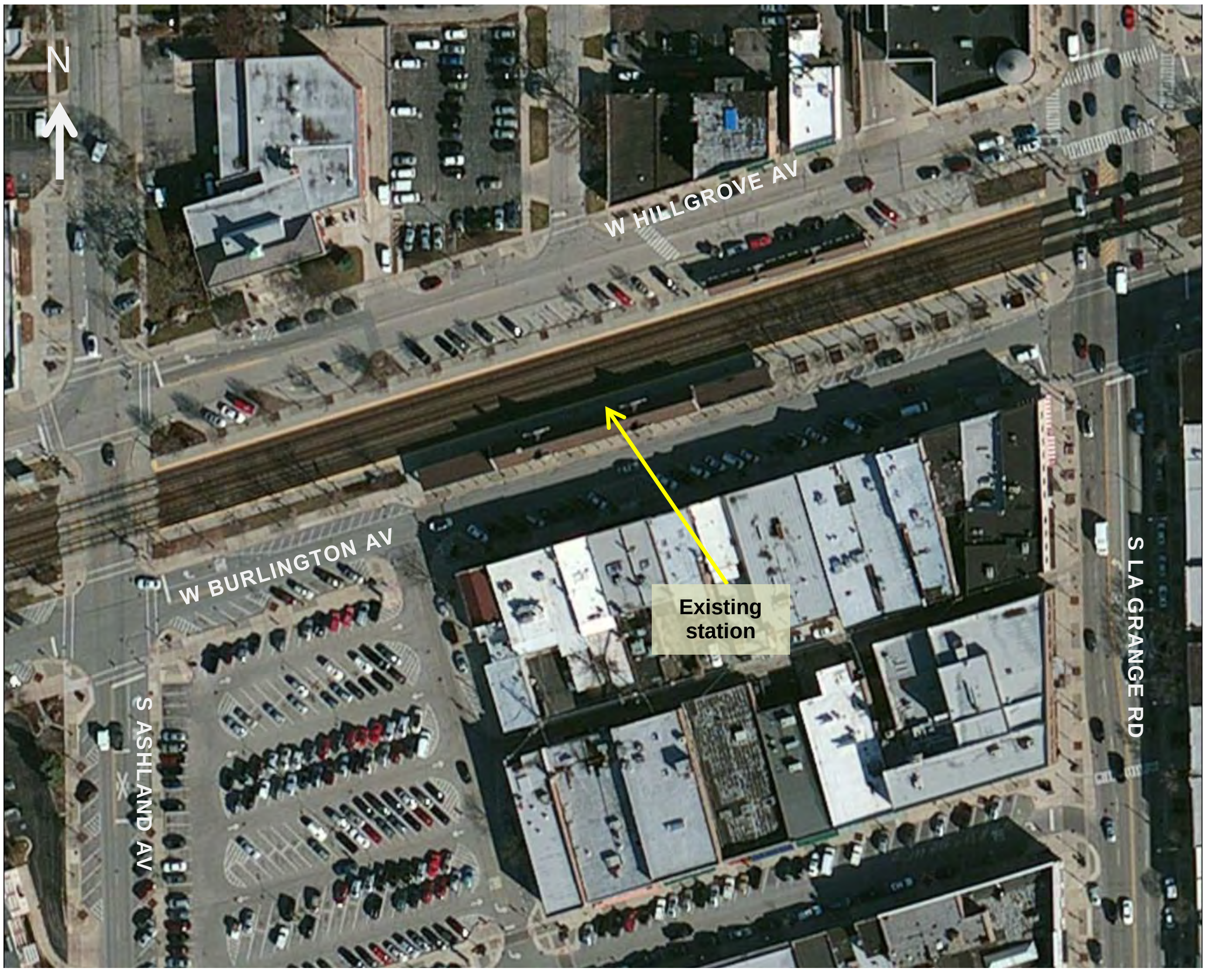


Figure 8.2-1: La Grange Road Station Location

#### 8.2.2.2 Surrounding Land Use

The station is located at the northern end of La Grange just north of downtown. It is surrounded by low rise (one to three floors) mixed-use commercial, entertainment and government land uses. The U.S. Post Office and other commercial uses are located across the railroad corridor to the north.

#### 8.2.2.3 Station Access and Circulation

The station has vehicular access from W. Burlington Avenue. The local streets around the station have sidewalks and the station provides bicycle parking facilities. Metra provides daily service at the train station.

The station does not have dedicated on-site Amtrak parking. Short-term on-street parking is available south of the station along W. Burlington Avenue. Additionally, on-street parking is available north of the tracks along W. Hillgrove Avenue. The village of La Grange owns or controls seven surface parking lots and one parking structure within six blocks of the train station. The surface parking lot just across W. Burlington Avenue allows three hour parking and has about 180 parking spaces. In total, the village has over 650 short-term parking spaces within walking distance to the station.

#### 8.2.2.4 Building Characteristics

The station was built in 1926 by the Chicago, Burlington and Quincy Railroad. The building is approximately 150 feet by 20 feet in size and includes an enclosed waiting area. The building also includes two overhangs on the east and west sides that provide additional protection from the weather. The station does not have a ticket office and does not provide a Quik-Trak ticketing kiosk. No baggage service is provided.

#### 8.2.2.5 Platform Area

The station's double sided platform is approximately 650 feet long and has a tactile warning strip. An underground tunnel connects the two platforms. A shelter building is located next to the northern platform. Amtrak installed new wheelchair lifts and enclosures at the station with funding from the American Recovery and Reinvestment Act of 2009.

Figure 8.2-2: Exterior View of La Grange Road Station Building and Platforms

Figure 8.2-3: Interior View of La Grange Road Station Building

#### 8.2.2.6 Conclusions/Recommendations

The La Grange Road station is a well-developed existing Amtrak and Metra station that should accommodate the new corridor service. The station has an adequately sized station building with an indoor waiting area. A shelter building along the northern platform provides weather protection for passengers waiting to board on the far side of the station. The platforms are in good condition and the length meets Amtrak standards for corridor service. Ample short-term parking is available in close proximity to the station, but no dedicated overnight or long-term parking facilities are available. As the demand for parking at the station increases, additional options for dedicated parking could be explored with the village of La Grange. The addition of a Quik-Trak ticketing kiosk is also recommended.

### 8.2.3 Naperville Station

The Naperville, Illinois, station is an existing Amtrak and Metra station located at 105 E. 4th Avenue. Naperville had a population of 142,773 in 2011, according to the U.S. Census Bureau, and is located to the west of Chicago in DuPage and Will counties. The station had 54,213 Amtrak boardings and alightings during fiscal year 2012 and is currently considered a medium station by Amtrak standards. For station planning purposes, it is assumed the Naperville station would remain a medium station in 2040.

#### 8.2.3.1 Site

The station site and building are owned by the city of Naperville. The tracks and platform are owned by BNSF. The railroad corridor contains two passenger tracks and one freight bypass track. Figure 8.2-4 shows an aerial map of the station.


Figure 8.2-4: Naperville Station Location

#### 8.2.3.2 Surrounding Land Use

The station is located approximately six blocks north of downtown Naperville. The primary land use around the station is residential consisting mostly of single family homes and a few low rise multifamily structures. Burlington Square Park is across the street from the station immediately to the south. A large factory that has been converted to mixed uses is located on the north side of the railroad corridor, northeast of the station building.

#### 8.2.3.3 Station Access and Circulation

The primary access point for the station is along E. 4th Avenue via N. Ellsworth Street. Station facilities on the north side of the tracks are connected by a pedestrian tunnel below the BNSF tracks at the east end of the train station. The station is accessible from multiple modes of transportation including taxi, bicycle and walking. Metra provides daily service at the train station with over 4,100[4] weekday users. Also, 15 PACE bus routes stop at the station.

[4] Naperville Metra Station Bus Depot and Commuter Access Feasibility Study, 2012

On-site parking, on-street parking and adjacent surface lot parking is available at the station. The station has 20 daily fee spaces on-site. Five spaces are reserved for Amtrak passengers by obtaining a permit from the Amtrak agent. Approximately 200 on-street parking spaces are available and over 1,200 surface parking lot spaces are available within 4 blocks of the station. The city of Naperville owns or controls six surface parking lots within four blocks of the station. In total, nearly 1,500 parking spaces are available near the Naperville station. Parking at the station is in high demand and the overall occupancy parking rate is 90 percent.[5]

In 2009, the city of Naperville adopted the Fifth Avenue Study to evaluate future land use, commuter parking, and multimodal circulation in the vicinity of the station. The study identified a wide range of opportunities to enhance multimodal commuter access to the station including a bus depot concept. In 2012, the city commissioned a study to select a site for the bus depot and make other recommendations to improve transit access in the vicinity of the station. In April 2012, the Naperville City Council accepted the study and directed staff to implement some of the improvements as part of the city's Fiscal Year 2014-2018 Capital Improvement Program. However, the Council decided the bus depot would not be implemented until future transit demand, redevelopment opportunities and congestion issues warrant its construction.

#### 8.2.3.4 Building Characteristics

The station building was built in 1910 and contains a 1,500 square foot enclosed waiting area for passengers. The building also includes two overhangs on the east and west sides that provide additional protection from the weather and includes bike racks. The station has a ticketing office and Quik-Trak ticketing is available. The station does not provide baggage service.

#### 8.2.3.5 Platform Area

The station's double sided platform is approximately 1,000 feet long and has a tactile warning strip. Enclosed outdoor shelters are provided next to both platforms for waiting passengers. A pedestrian tunnel is provided under the railroad tracks to connect the two platforms. Amtrak installed new wheelchair lifts and enclosures at the station with funding from the American Recovery and Reinvestment Act of 2010.

[5] Naperville Metra Station Bus Depot and Commuter Access Feasibility Study, 2012

Figure 8.2-5: Exterior View of Naperville Station Platforms and Building

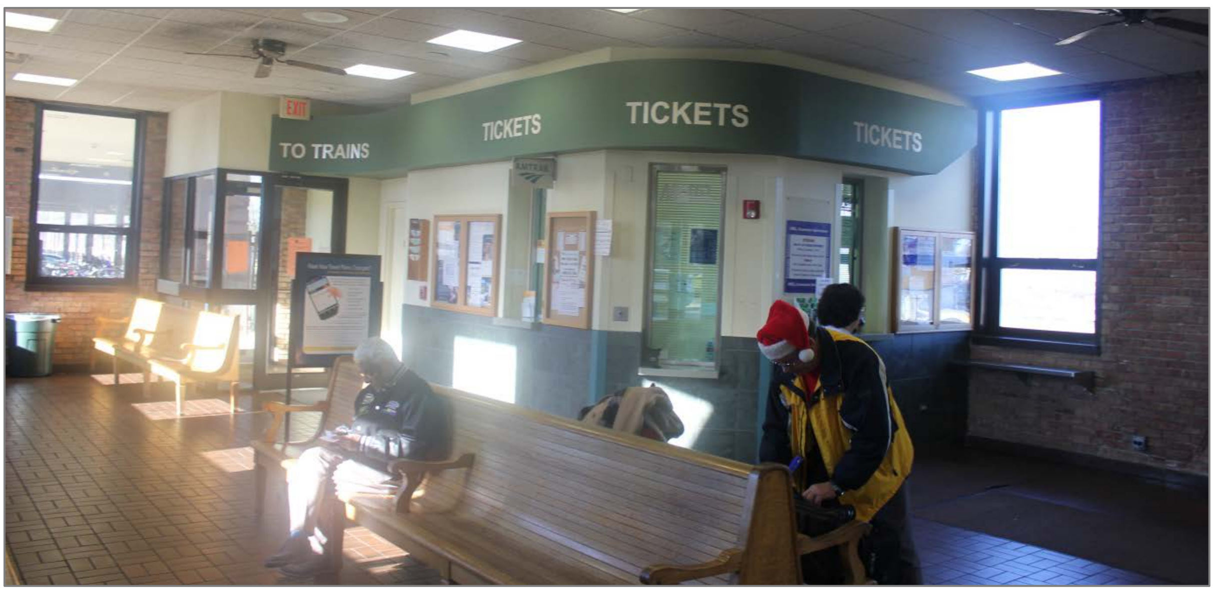


Figure 8.2-6: Interior View of Naperville Station Building

### 8.2.3.6 Conclusions/Recommendations

Naperville is a major Metra station and existing Amtrak station that would provide adequate facilities for the new corridor service. The station building has an indoor waiting area and outdoor shelters provide additional space for passengers waiting to board trains. The length of the platforms exceeds Amtrak's standards for corridor service and would accommodate the trains for the Chicago to Council Bluffs-Omaha service. The station has very limited dedicated overnight or long-term parking available. As the demand for parking at the station increases, additional options for dedicated parking could be explored with the city of Naperville.

### 8.2.4 Plano Station

The Plano, Illinois, station is an existing Amtrak station located at 101 W. Main Street. Plano is located in Kendall County about 60 miles east of Chicago. According to the U.S. Census Bureau, it had a population of 11,035 in 2011.

The Plano station had 6,344 boardings and alightings during fiscal year 2012. According to Amtrak standards, stations with annual ridership below 10,000 are considered "basic" unstaffed stations.

It is estimated that the Chicago to Council Bluffs-Omaha corridor service would contribute 29,371 boardings and alightings in 2040 to the Plano station. This is in addition to ridership attributed to existing Amtrak services. For planning purposes, it is assumed the Plano station would be reclassified as a "small" station after the Chicago to Council Bluffs-Omaha service is implemented.

#### 8.2.4.1 Site

The city of Plano owns the station site and building. The BNSF corridor is on the south side of the building and contains two tracks. BNSF owns the double sided platform. Figure 8.2-7 shows an aerial map of the station.


Figure 8.2-7: Plano Station Location

#### 8.2.4.2 Surrounding Land Use

The station is centrally located in downtown Plano and is part of the community's main street district. The primary land uses around the station are small commercial/retail uses.

#### 8.2.4.3 Station Access and Circulation

The station has two vehicular access points along W. Main Street and driveways along S. Center and S. West streets. The station has two on-site surface parking lots that contain about 50 spaces in total. A municipal parking lot with about 60 spaces is located to the south of the station with access from S. Center and W. John streets. Also, about 32 on-street parking spaces are available in front of the station along W. Main Street. The existing parking should be able to accommodate the Chicago to Council Bluffs-Omaha service since it is estimated that the new service would create demand for about 30 parking spaces in 2040.

#### 8.2.4.4 Building Characteristics

The station building was erected in 1913 and placed on the National Register of Historic Places in 1993. The building also houses the Plano Police and Fire Commission.

The building contains a 300 square foot waiting area for Amtrak passengers and has restrooms. According to Amtrak's standards, about 160 square feet of waiting room space would be required to accommodate the projected riders utilizing the Chicago to Council Bluffs-Omaha service. Since the existing waiting room exceeds this minimum, it is assumed the existing facility would accommodate the new service as well as the existing Amtrak services. The station does not have a ticketing office and a Quik-Trak ticketing kiosk is not available. No baggage service is provided.

#### 8.2.4.5 Platform Area

The station has platforms on the north and south side of the tracks. The north side platform is approximately 120 feet long and the south side platform is about 100 feet long. The platform lengths do not meet Amtrak's standards for corridor service. The platforms should be a minimum of 300 feet long to allow for efficient boardings and alightings. A canopy is provided along a portion of the platform on the south side of the tracks.

#### 8.2.4.6 Conclusions/Recommendations

Plano is an existing Amtrak station that would accommodate the new corridor service. The site has an adequately sized enclosed waiting area and the existing parking facilities should be sufficient to meet the parking demand created by the Chicago to Council-Bluffs-Omaha service. The demand for parking should be evaluated over time to make sure adequate parking remains available. The platforms may require an upgrade to Amtrak standards in the future; however, this cost was not included in the estimate as the existing station is not known to be inadequate at present.

### 8.2.5 Mendota Station

The Mendota, Illinois, station is an existing Amtrak station located at 783 Main Street. Mendota is in north-central Illinois in LaSalle County. According to the U.S. Census Bureau, Mendota had a population of 7,346 in 2011.

The Mendota station had 24,250 boardings and alightings during fiscal year 2012 and is currently considered a "small" station by Amtrak standards. It is estimated that the Chicago to Council Bluffs-Omaha service would contribute 29,371 boardings and alightings in 2040 to the Mendota station. This is in addition to ridership attributed to existing Amtrak services. For planning purposes, it is assumed the Mendota station would be reclassified as a "medium" station after the Chicago to Council Bluffs-Omaha service is implemented.

#### 8.2.5.1 Site

The Mendota Museum and Historical Society owns the station site and building. The BNSF corridor runs along the east side of the station and contains two tracks. The west side of the station has two stub end tracks. Figure 8.2-8 below shows an aerial map of the station.

#### 8.2.5.2 Surrounding Land Use

The station is located on the eastern edge of downtown Mendota. Land uses to the east of the station consist of small commercial uses that are part of the downtown area. A rail yard is located immediately west of the station.

#### 8.2.5.3 Station Access and Circulation

Vehicular access to the station is provided from a driveway along 8th Street. The driveway leads to a parking lot on the south side of the station site. The parking lot has about 30 spaces available for passengers including both short-term and long-term spaces. In addition, about 40 on-street parking spaces are available along Main Street within two blocks of the station.

It is estimated that at least 30 dedicated parking spaces would be required to serve riders utilizing the Chicago to Council Bluffs-Omaha service in Mendota. It is likely that the existing on-site parking spaces would not be able to accommodate the increased parking demand from the new service and additional dedicated parking spaces in close proximity to the station should be identified.

#### 8.2.5.4 Building Characteristics

The station was originally built in 1888 and included a passenger waiting area, a hotel, restaurants and rooms for railroad employees. All but the north end of the building, which included the passenger waiting area and ticket office, was torn down in the 1940s. The remaining portion of the building was renovated in 1997 by the Mendota Museum and Historical Society and the city of Mendota. The building currently houses the Union Depot Railroad Museum and the Amtrak station.

The building contains a 625 square foot waiting area for passengers. According to Amtrak's standards, a minimum of 150 square feet of waiting room space would be required to accommodate the projected riders utilizing the Chicago to Council Bluffs-Omaha service. Since the existing waiting room exceeds this minimum, it is assumed the existing facility would accommodate the new service as well as the existing Amtrak services. The station does not have a ticketing office and does not have a Quik-Trak ticketing kiosk. No baggage service is provided.

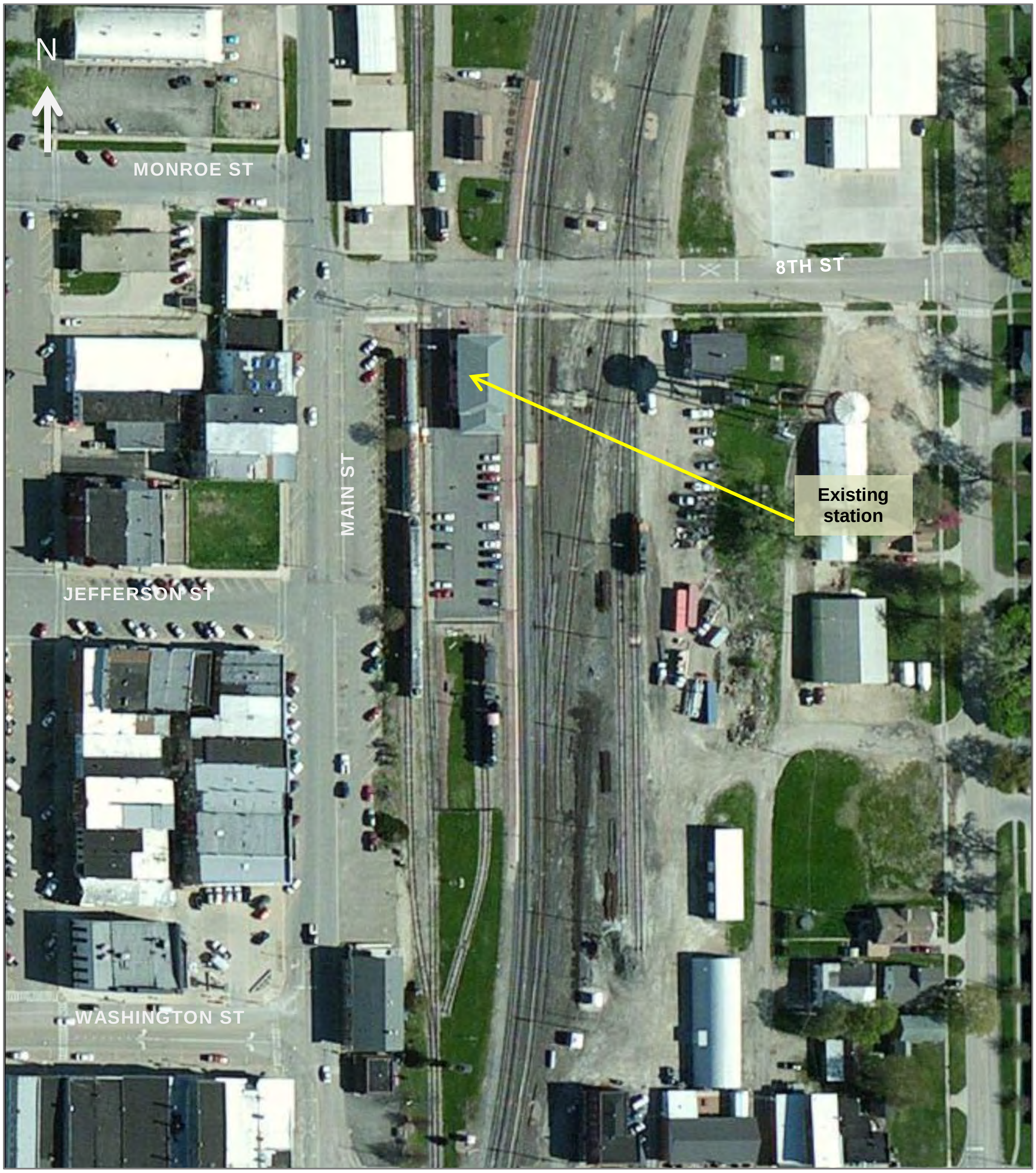


Figure 8.2-8: Mendota Station Location

### 8.2.5.5 Platform Area

The station has a single platform to the east of the station building. It was reconstructed in the late 1990s along with the other station renovations. The platform is bisected by 8$^{th}$ Street. The main portion of the platform on the south end is roughly 690 feet and the segment on the north is about 230 feet. The platform has a tactile warning strip and is in good condition. The length of the platform meets Amtrak's standards.

#### 8.2.5.6 Conclusions/Recommendations

Mendota is an existing Amtrak station that would accommodate the new corridor service. The station has an updated platform and an enclosed passenger waiting area. As the demand for parking at the station increases, additional options for dedicated parking could be explored with the City of Mendota.

### 8.2.6 Princeton Station

The Princeton, Illinois, station is an existing Amtrak station located at 107 Bicentennial Drive. Princeton is located in north-central Illinois in Bureau County. According to the U.S. Census Bureau, Princeton had a population of 7,581 in 2011.

The Princeton station had 34,713 boardings and alightings during fiscal year 2012 and is currently considered a small station by Amtrak standards. It is estimated that the Chicago to Council Bluffs-Omaha service would contribute 114,754 boardings and alightings in 2040 to the Princeton station. This is in addition to ridership from existing Amtrak services. For planning purposes, it is assumed the Princeton station would be reclassified as a medium station after the Chicago to Council Bluffs-Omaha service is implemented.

#### 8.2.6.1 Site

BNSF owns the station site, building and platforms. The BNSF corridor runs along the north side of the station and contains two tracks. Figure 8.2-9 below shows an aerial map of the station.

#### 8.2.6.2 Surrounding Land Use

The station is located at the north end of downtown Princeton which is centered on Main Street. Darius Miller Park is located immediately to the southeast of the station. Other uses in the vicinity of the station include warehouse/industrial uses and commercial businesses.

#### 8.2.6.3 Station Access and Circulation

The station has vehicular access from N. Pleasant Street and Bicentennial Park Drive. The station has about 10 on-site paved parking spaces available on the east side of the building next to the platform. Approximately 40 on-site spaces are available on a gravel parking lot immediately south of the station building. Overflow parking is also available on the grass area just south of the gravel parking lot. In addition, about 30 on-street parking spaces are located next to the station along Bicentennial Park Drive.

Ridership attributed to the Chicago to Council Bluffs-Omaha service would increase the demand for on-site parking. It is estimated that at least 120 parking spaces would be required to serve riders utilizing the Chicago to Council Bluffs-Omaha service in Princeton. Many of these spaces could be accommodated by paving and striping the gravel parking areas and green spaces surrounding the station.


Figure 8.2-9: Princeton Station Location

### 8.2.6.4 Building Characteristics

The station was originally built in 1911 and renovated in 1998. The building contains an enclosed 200 square foot waiting area for Amtrak passengers and restrooms.[6] The station does not have a ticketing office and does have a Quik-Trak ticketing kiosk. No baggage service is provided.

According to Amtrak's standards, a minimum of 600 square feet of waiting room space would be required to accommodate the riders utilizing the Chicago to Council Bluffs-Omaha service. As ridership increases, the interior of the building may need to be reconfigured to make sure adequate wait space is available for existing and new services.

### 8.2.6.5 Platform Area

Two new platforms were installed as part of the 1998 station renovation project. The platforms are about 650 feet long and contain tactile warning strips and lighting. The platform length meets Amtrak's standards for corridor service.

[6] Waiting area square feet provided by Amtrak.

#### 8.2.6.6 Conclusions/Recommendations

Princeton is an existing Amtrak station that would accommodate the new corridor service. The interior of the station building may need to be reconfigured to provide adequate passenger waiting space as ridership increases over time. The existing parking areas and adjacent green spaces could be paved and striped to maximize dedicated on-site parking. Additional parking adjacent to the station may be required as demand for parking increases over time.

## 8.3 Planned New Stations

New station stops are planned at Geneseo and Moline in Illinois, and at Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs in Iowa. Conceptual site plans are shown for these stations in Appendices C through I. Appendix B shows the methodology and calculations for station facility sizing requirements. Certain station stops require new depot buildings or renovated depot buildings, as detailed in the subsections for each station.

Prior planning work was completed for Geneseo, Moline, and Iowa City as part of the Chicago to Iowa City Intercity Passenger Rail Study. The station in Geneseo and Moline are part of a first phase that would provide two round-trips between Chicago and Moline. The Illinois Department of Transportation (IDOT) is leading the implementation of this initial service that is anticipated to begin in 2015. Service to the remaining cities would be phased in over time and eventually up to four round-trips would be provided.

This section identifies basic station requirements and preliminary cost estimates for the new stations. The station plans are sized for four round-trips between Chicago and Council Bluffs based on ridership projected for 2040.

### 8.3.1 Geneseo Station

Geneseo is located about 20 miles east of the Illinois/Iowa border in Henry County. According to the U.S. Census Bureau, Geneseo had a population of 6,566 in 2011.

Boardings and alightings for the Chicago to Council Bluffs-Omaha service are expected to be 14,221 in 2040 for Geneseo. According to Amtrak standards, this would classify Geneseo as a “small” station.

The prior planning work completed for Geneseo as part of the Chicago to Iowa City Intercity Passenger Rail Study was reviewed to determine if additional improvements would be required for the four round-trips proposed for the Chicago to Council Bluffs-Omaha service.

#### 8.3.1.1 Site

The Geneseo station is proposed at the former railroad depot located at the northeast corner of E. 1st Street and N. Oakwood Avenue. See Figure 8.3-1 below.

The Illinois Department of Transportation, in coordination with the city of Geneseo, is also considering other station sites including building a new station next to the former depot. A final decision is expected by the fall of 2013 with construction of the station to begin in 2014.

The depot building is currently privately owned and would need to be acquired by the city of Geneseo. The city already owns the adjacent vacant lot to the east of the depot building.

The main track of the IAIS is located on the north side of the building and a paved asphalt parking lot is located on the south side of the building.


Figure 8.3-1: Geneseo Station Location

### 8.3.1.2 Surrounding Land Use

The business district of Geneseo is located across from Oakwood Avenue, to the west of the station. City Hall is located south of the station on Oakwood Avenue. The observed businesses within the business district include banks, financial advisors, realtors, and antique shops. There is on-street parking available throughout much of the business district and at a few municipal lots located near Oakwood Avenue.

The area immediately north of the station consists of a seasonal agricultural business, storage for phone company equipment, and a construction company. The area immediately south of the station is primarily residential.

#### 8.3.1.3 Access and Circulation

The station has vehicular access from E. 1st Street via S. Oakwood Street and N. Spring Street. Sidewalks are available along S. Oakwood Street and portions of E. 1st Street. It is estimated that a station in Geneseo would require at least 15 on-site parking spaces to accommodate the Chicago to Council Bluffs-Omaha service. The station plans outlined for the Chicago to Iowa City Intercity Passenger Rail Study recommended 20 parking spaces.

#### 8.3.1.4 Station Building

The original depot building was composed of two rectangular parts, with a main waiting room and ticket office in the higher section to the west and station office and freight storage in the lower portion to the east. There is a small office section that projects out on the north side central to the main building. The main building measures approximately 25 feet wide by 50 feet long. The station office and freight storage measures approximately 20 feet wide by 25 feet long. In the early 1980s, an additional rectangular section was added to the easternmost end with a smaller footprint and lower roof profile. The depot is privately owned and currently contains three businesses that would need to be relocated.

The existing depot does not currently have a platform. The station building is only about 10 feet from the centerline of the track, which does not provide sufficient space for passengers on the platform and presents safety issues. As a result, the station building would need to be relocated approximately five to 10 feet to the south to accommodate the platform.

If the former depot building is not renovated as part of the initial two round-trips between Chicago and Moline, then the station building should be renovated as part of the Chicago to Council Bluffs-Omaha service. A new building could also be constructed to the east of the depot building. According to Amtrak's standards, a small station should include an enclosed passenger waiting area that contains at least 80 square feet of enclosed passenger waiting space, restrooms and other ancillary space. For planning purposes, it is assumed a minimum of 200 square feet for the passenger wait area would be provided.

#### 8.3.1.5 Platform

A 600-feet long platform that is eight-inches above the top of rail is proposed for the Geneseo station. The platform would include adequate lighting and a 24-inch wide tactile warning strip along the platform's entire public use area. A canopy would provide coverage for two-thirds the length of the platform to meet Amtrak's standards.

The area between S. Oakwood Avenue and N. Spring Street does not fit a 600-foot long platform, which is needed to accommodate efficient boardings and alightings. As a result, it is proposed to realign Spring Street about 10 feet to the east to accommodate the desired platform length and to avoid blocking traffic while a passenger train is stopped at the station.

#### 8.3.1.6 Conceptual Site Plan

The following improvements demonstrate the basic station requirements for projected 2040 ridership at the Geneseo station to support the Chicago to Council Bluffs-Omaha service:

- Renovate the depot building and provide at least 200 square feet for a passenger waiting area and provide restrooms and other ancillary station space.
- Construct a single 600-foot long platform that is 8-inches above top of rail. Include tactile warning strip, canopy and adequate lighting.

- Install a canopy for up to two-thirds the length of the platform.
- Relocate the depot building five to 10 feet away from the tracks.
- Provide at least 15 on-site parking spaces.
- Improve pedestrian access.
- Provide a Quik-Trak ticket kiosk.
- Realign Spring Street about 10 feet to the east to accommodate a 600-foot platform.
- Acquire the station site and the depot building. Relocate the business tenants.

Appendix C shows the conceptual site plan developed for the Chicago to Iowa City Intercity Passenger Rail Study, which demonstrates the basic station requirements.

#### 8.3.1.7 Cost Estimate

The Chicago to Iowa City station report estimated the proposed improvements would cost about $3 million (2009 dollars), which did not include a cost for renovating the depot. The cost estimate was updated to reflect current conditions and basic station requirements for four round-trips. Table 8.3-1 below shows an updated preliminary cost estimate for the Geneseo station. The cost estimate is based on station requirements that are sized for 2040 projected ridership.

**Table 8.3-1: Station Cost Estimate – Geneseo**

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Base Cost** | Platform Construction Incl. Tactile | LF | 600 | $700 | $420,000 |
| | Relocate Station Away From Track | L SUM | 1 | $159,760 | $159,760 |
| | Utility/Fiber Optic Relocation | L SUM | 1 | $75,000 | $75,000 |
| | Renovate Station Building | SQ FT | 2,000 | $215 | $430,000 |
| | Canopy | LF | 400 | $700 | $280,000 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical Service | L SUM | 1 | $26,630 | $26,630 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | QuickTrak ticketing kiosks | EACH | 1 | $27,700 | $27,700 |
| | Property Acquisition (Land & Building) | ALLOW | 1 | $532,540 | $532,540 |
| | Tenant Relocation | L SUM | 1 | $30,000 | $30,000 |
| | Exterior Signage | L SUM | 1 | $26,630 | $26,630 |
| | Concrete Sidewalk | SQ FT | 4,433 | $6 | $26,598 |
| | Landscaping | L SUM | 1 | $35,000 | $35,000 |
| | Parking (Surface), Construction | SQ FT | 29,840 | $5 | $149,200 |
| | Realign Spring Street | L SUM | 1 | $25,000 | $25,000 |
| | Reconstruct E. 1st Street | L SUM | 1 | $21,310 | $21,310 |
| | **Subtotal** | | | | **$2,559,568** |
| | Contingency 30% | | | | $767,870 |
| | **Base Cost Total** | | | | **$3,327,438** |

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Design and Construction** | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $133,098 |
| | Final Design (6%) | | | | $199,646 |
| | Proj Mgmt - Design/Const (5%) | | | | $166,372 |
| | Const. Admin/Mgmt (4%) | | | | $133,098 |
| | 5% Mgmt Contingency | | | | $41,611 |
| | 5% Unallocated Contingency | | | | $210,063 |
| | **Design and Construction Total** | | | | **$1,083,887** |
| **Total Cost Estimate** | | | | | **$4,411,325** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars*
2. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction*
3. *Cost of QuickTrak ticketing kiosks are initial costs only and do not include monthly fees.*
4. *Platform height is 8" above top of rail*
5. *The cost for property acquisition is a placeholder. Land & Building - $532,540*
6. *Station Relocation is required to obtain Amtrak-required 600' platform.*
7. *Assume existing storm drainage system can accommodate additional flow*
8. *Canopy is assumed to be required along 2/3 of the length of the platform.*
9. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.)*

### 8.3.2 Moline Station

A station is planned in Moline, Illinois, as outlined in the Chicago to Iowa City Intercity Passenger Rail Study. Moline is one of four cities that make up the area known as the Quad Cities. Moline is located near the Illinois and Iowa border and is located in Rock Island County. According to the U.S. Census Bureau, Moline had a population of 43,489 in 2011.

In 2011, the city secured $16 million, including $10 million of federal TIGER II funds, to finance station improvements. As mentioned previously, an initial two round-trips between Chicago and Moline are being implemented by IDOT with service anticipated to begin in 2015.

According to discussions with city staff, Moline and MetroLink, the local transit provider, are in the process of designing the station in conjunction with a private development firm. The city expects construction to begin in the summer of 2013 and be completed by the end of 2014.

The boardings and alightings for the four round-trips proposed for the Chicago to Council Bluffs-Omaha service are expected to be 232,525 in 2040 for Moline. This classifies Moline as a “medium” station, according to Amtrak standards.

The following station analysis focuses on reviewing current plans for the new station in Moline and determining if the plans would adequately serve the proposed four round train trips that are planned for the Chicago to Council Bluffs-Omaha service.

### 8.3.2.1 Station Site

The station site is located in downtown Moline, east of 12th Street between the railroad tracks and 4th Avenue. The BNSF's Rock Island spur is located on the north side of the site. The IAIS also owns right of way south of the BNSF, although there is no track in this location. Protected, at grade crossings are located at 12th and 15th streets. A second track is proposed for the Chicago to Moline service.

The site is owned by the city of Moline and contains a six-story historic building that was once a Sears department store. The building is also known as the former O'Rourke building based on its previous ownership. The station site is located across the tracks from Centre Station, a local transit terminal, as shown in Figure 8.3-2.

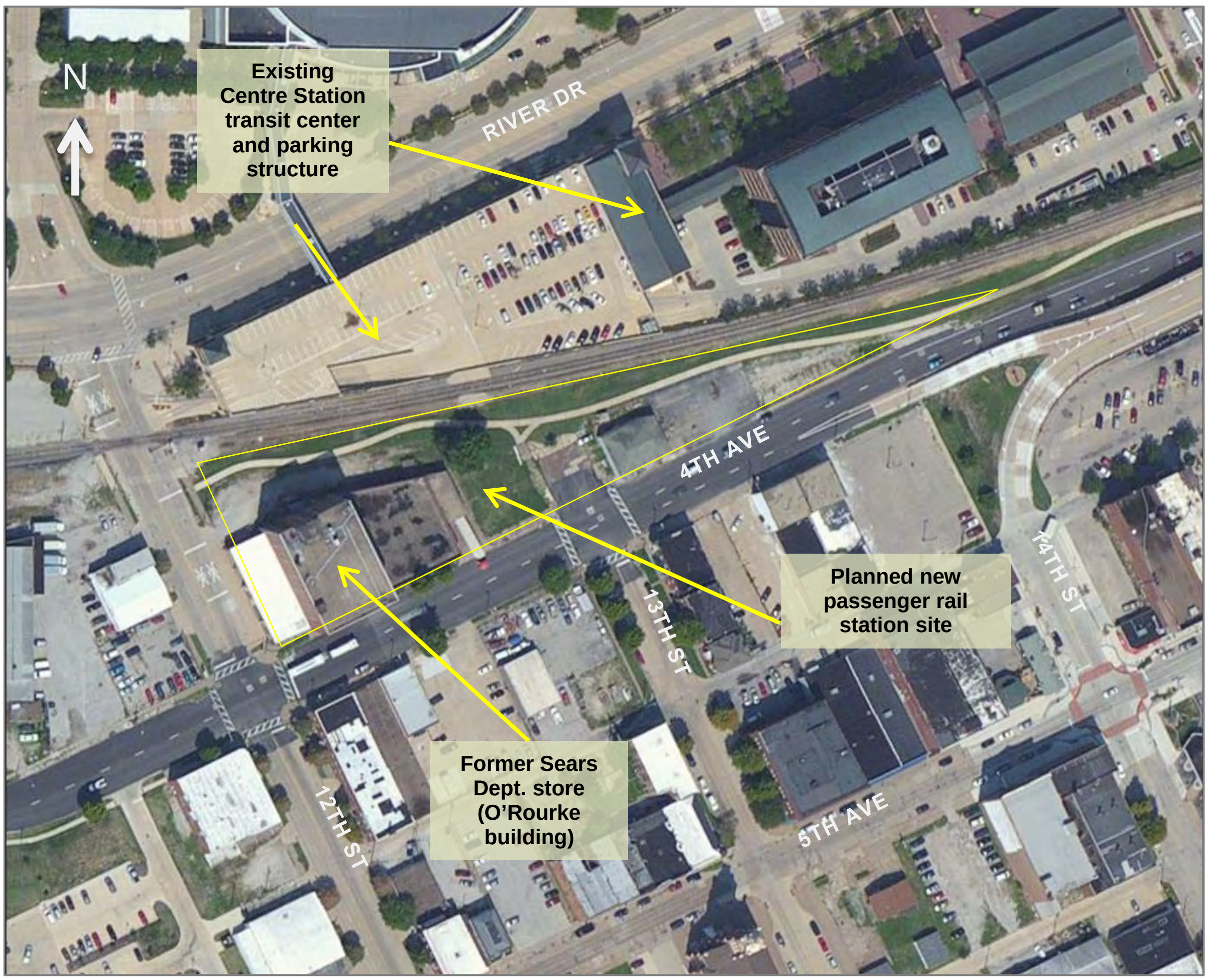


Figure 8.3-2: Moline Station Location

### 8.3.2.2 Surrounding Land Use

The station site is located in the central business district of downtown Moline. It is near entertainment venues, office complexes, tourist attractions, parking facilities, and pockets of industrial and residential land uses. As mentioned above, the station site is located to the south of Centre Station, the city's existing transit hub. The i-Wireless Center, a major entertainment venue, is located to the north of the station site on the north side of River Drive. The entertainment venue is connected to the Centre Station parking garage with an overhead pedestrian walkway.

#### 8.3.2.3 Access and Circulation

The station site is accessible from 12th Street and 4th Avenue. The city expects the passenger drop off area would be located to the east of the Sears/O'Rourke building between approximately 13th and 14th streets. Sidewalks along the local road network would provide pedestrian access to the station. Also, the station would be served by local public transportation. Centre Station is a local transit hub that serves local and regional bus, paratransit, intercity bus, and water taxi. A 315-space parking garage is located above the bus terminal.

At the time of this report, the demand for parking was still being evaluated for the station to determine the overall parking needs for rail passengers and the private development components. It is likely that some on-site parking would be provided to the east of the former Sears/O'Rourke building. Additional parking is available on adjacent surface parking lots to serve the parking demand for the initial two round train trips. As the demand for parking increases due to more passenger train activity and more private development, the city will evaluate parking needs and consider building a new parking structure.

It is estimated that at least 250 spaces would be needed to serve the planned four round train trips proposed for the Chicago to Council Bluffs-Omaha service. As a result, coordination with the city of Moline would be required to ensure adequate parking is available as service is expanded.

#### 8.3.2.4 Station Building

The city of Moline and MetroLink are working jointly with a private development firm to prepare design plans for the renovation of the former Sears/O'Rourke building along with station improvements. They anticipate the first floor of the building will include retail uses and have shared, open spaces that will be used by rail passengers and customers of the retail tenants. A Quik-Trak ticket kiosk will be available on the first floor. The private developer is planning to renovate the upper five floors of the building for extended stay hotel units.

As service is expanded to four round-trips, the available space should be evaluated to make sure the planned configuration of the first floor would accommodate passengers waiting for trains. Based on Amtrak standards, the Moline station should include a passenger waiting area that has at least 1,200 square feet.

#### 8.3.2.5 Platform

A 600-foot-long platform is planned for the Moline station. At the time of this report, the height of the platform was still being determined. Overhead pedestrian access will be created to provide a direct connection to Centre Station. The proposed length of the platform meets Amtrak's standards and is expected to accommodate trains for the Chicago to Council Bluffs-Omaha service.

#### 8.3.2.6 Conclusions/Recommendations

The improvements proposed by the city of Moline and MetroLink should be adequate for the four round-trips proposed for the Chicago to Council Bluffs-Omaha service. As the demand for parking increases additional parking would need to be identified. Appendix D shows the conceptual station site plan that was developed for Moline as part of the Chicago to Iowa City Intercity Passenger Rail Study. Although all the details were not worked out at the time of this report, the city's overall plans appear to be consistent with this plan that demonstrates basic station requirements.

### 8.3.3 Iowa City Station

Iowa City is the sixth largest city in Iowa and had an estimated population of 68,947 in 2011, according to the U.S. Census Bureau.

The boardings and alightings for the Chicago to Council Bluffs-Omaha service are expected to be 214,509 in 2040 for Iowa City. According to Amtrak standards, this classifies Iowa City as a "medium" station.

Prior planning work was completed for the Iowa City station for the Chicago to Iowa City Intercity Passenger Rail Study. However, plans did not move forward due to fiscal constraints with the Iowa State Legislature. As a result, the plans have been updated to reflect current conditions and to account for the four round-trips proposed by the Chicago to Council Bluffs-Omaha service.

#### 8.3.3.1 Site

The proposed station site is at the former Chicago, Rock Island and Pacific Railroad depot located at 109 Wright Street. As shown in Figure 8.3-3 below, the depot site is bracketed by the railroad track to the south, Wright Street to the north, South Clinton Street to the west and South Dubuque Street to the east. A single freight track used by IAIS runs along the south side of the building. A second main track is proposed at this location. The parcel is currently privately owned and contains the station building and two parking lots. Per discussions with Iowa City, the city intends to acquire the parcel for station purposes.


Figure 8.3-3: Iowa City Station Location

#### 8.3.3.2 Access and Circulation

Vehicular access to the station is along Wright Street via South Clinton and South Dubuque streets. All three streets have sidewalks and the station is within walking distance to the University of Iowa.

Public transportation is provided by Iowa City Transit and the University of Iowa CamBus. Several Iowa City Transit routes are located within one to three blocks of the station and the CamBus provides service within one block of the station. The hub for Iowa City Transit bus routes is approximately four blocks from the station site. The City of Iowa City intends to make direct bus connections with the station for both transit services. This would improve access for residents in the University dormitories and for downtown employees.

A high proportion of riders are expected to arrive at the station via transit and other modes such as walking and biking due to the stations downtown location and proximity to the University. However, adequate parking would still be important for the station.

It is estimated that at least 114 spaces would be needed to serve both short-term and long-term parking demand. The current station site has two small parking lots with nine spaces on the east side and 10 spaces on the west side.

Additional opportunities for parking include:

- Acquiring or leasing land for additional parking spaces within one block of the station.
- Improving transit access between the station and existing parking facilities such as the nearby publicly owned lots at the intersection of South Clinton and East Prentiss streets and the existing parking structures in the downtown area.
- Dedicating nearby on-street parking for short-term parking needs.

A passenger drop-off area is recommended on the north side of the depot off Wright Street. The drop off area should be suitable for use by local buses and intercity buses such as Amtrak Thruway services. Since Wright Street is narrow, the west side of the site may be needed for additional drop off space.

#### 8.3.3.3 Station Building

The depot is a brick one-story building that was constructed in 1898. It was added to the National Register of Historic Places in 1966. The original station contained two rectangular sections connected via a breezeway. The west side was used for freight offices and storage and the east side was used for a passenger waiting room and ticket office. A two-story octagonal station office that was connected to the waiting room can be seen on the south side of the depot. A covered carriage way for passenger drop offs can be seen on the north side of the building fronting Wright Street.

The main building measures approximately 25 feet wide by 50 feet long and the station office and freight storage area measures approximately 20 feet wide by 25 feet long. In the early 1980s, the breezeway was filled in for use as offices. The interior of the building retains many of the depot's original features and is in good condition.

The building would need to be renovated and modifications to its interior layout would be required for the Chicago to Council Bluffs-Omaha service. The businesses that currently occupy the depot would need to be relocated. Based on estimated daily users, a waiting area with at least 1,200 square feet of space should be provided.

#### 8.3.3.4 Platform

A single 600-foot long platform that is 8 inches above top of rail is planned for the station. The platform would include adequate lighting and a 24-inch wide tactile warning strip along the platform's entire public use area. A canopy should provide coverage for two-thirds the length of the platform to meet Amtrak's standards.

Due to the length of the platform, an evaluation during Tier 2 environmental and engineering studies should be conducted to determine if South Dubuque Street would need to be closed. The potential closure of Dubuque Street would avoid the train from blocking traffic while stopped at the station and provide for efficient boardings and alightings.

Figure 8.3-4: View of Iowa City Depot Looking at the South and West Sides of the Building

Figure 8.3-5: View of the Original Carriage Way on the North Side of the Depot along Wright Street

#### 8.3.3.5 Conceptual Site Plan

A conceptual site plan, as shown in Appendix E, was developed for Iowa City to demonstrate basic station requirements for projected 2040 ridership and to develop a preliminary cost estimate. The conceptual site plan assumes the following improvements would be made:

- Renovate the building for passenger uses and provide a waiting area with at least 1,200 square feet.
- Construct a 600-foot long platform that is 8 inches above top of rail. Include tactile warning strip, canopy and adequate lighting.
- Evaluate the potential closure of South Dubuque Street to construct the platform.
- Work with the City of Iowa City to identify adjacent land for additional parking to obtain a total of at least 114 dedicated parking spaces. Maintain existing on-site parking to the extent possible and explore other nearby on-street and off-street parking options.
- Provide a drop off area on the north side of the building along Wright Street.
- Provide appropriate pedestrian access and ADA accommodations.
- Add a QuickTrak ticketing kiosk.
- Provide security systems, passenger information displays and station signage.
- Acquire the station site/building and acquire or lease one or more adjacent parcels for parking.

Refinements to the site plan are expected during future Tier 2 environmental and engineering analyses.

#### 8.3.3.6 Cost Estimate

Table 8.3-2 below shows a preliminary cost estimate for the Iowa City station. The cost estimate is based on station requirements that are sized for 2040 projected ridership and four round-trips.

Table 8.3-2: Station Cost Estimate – Iowa City

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Base Cost** | Renovate Station Building (includes utility room, office & bathrooms) | L SUM | 1 | $1,171,575 | $1,171,575 |
| | Platform Construction Incl. Tactile | LF | 600 | $700 | $420,000 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | Retaining wall for east end of platform | SQ FT | 4,000 | $100 | $400,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical/Water/Data Service | L SUM | 1 | $26,630 | $26,630 |
| | Platform Pedestrian Handrail/Guardrail | LF | 450 | $150 | $67,500 |
| | Canopy | LF | 400 | $700 | $280,000 |
| | Utility Relocation (Fiber, Elec, etc.) | L SUM | 1 | $75,000 | $75,000 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | Quick-Trak ticketing Kiosks | EACH | 2 | $27,700 | $55,400 |
| | Property Acquisition (Land, Building, Parking) | L SUM | 1 | $1,057,210 | $1,057,210 |
| | Tenant Relocation | L SUM | 1 | $50,000 | $50,000 |

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| | Exterior Signage | L SUM | 1 | $30,000 | $30,000 |
| | Concrete Sidewalk | SQ FT | 1,400 | $6 | $8,400 |
| | Potential Street Closure (S. Dubuque St.) | L SUM | 1 | $50,000 | $50,000 |
| | Landscaping | L SUM | 1 | $35,000 | $35,000 |
| | Parking (Surface), Construction | SQ FT | 91,114 | $5 | $410,013 |
| | Reconstruct Wright Street | L SUM | 1 | $50,000 | $50,000 |
| | Pedestrian Protection (Chain-link Fence) | LF | 400 | $25 | $10,000 |
| | **Subtotal** | | | | **$4,490,928** |
| | Contingency 30% | | | | $1,347,278 |
| | **Base Cost Total** | | | | **$5,838,206** |
| **Design and Construction** | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $233,528 |
| | Final Design (6%) | | | | $350,292 |
| | Proj Mgmt - Design/Const (5%) | | | | $291,910 |
| | Const. Admin/Mgmt (4%) | | | | $233,528 |
| | 5% Mgmt Contingency | | | | $65,463 |
| | 5% Unallocated Contingency | | | | $360,646 |
| | **Design and Construction Total** | | | | **$1,735,369** |
| **Total Cost Estimate** | | | | | **$7,573,575** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars.*
2. *Station renovation cost is based on Iowa City renovation estimate.*
3. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction.*
4. *Platform height is 8" above top of rail.*
5. *Canopy is assumed to be required along two-thirds the length of the platform.*
6. *Cost of QuickTrak ticketing kiosk is initial cost only and does not include monthly fees.*
7. *The cost for property acquisition is based on 2011 assessed value. Land - $132,160; Building - $295,050.*
8. *Property acquisition includes cost for additional parking at adjacent site to be determined. Cost is based on average 2011 assessed land value of $360k/acre. Estimate 1.75 acres required for additional parking.*
9. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.).*
10. *Parking (surface) construction assumes the reconstruction of the existing parking area, drop-off lane and the construction of an additional 1.75 acres at adjacent site to be determined.*
11. *Reconstruction of Wright Street includes reconstruction of the radius returns, concrete curb and gutter, and milling and resurfacing of existing roadway*

### 8.3.4 Grinnell Station

A new station is proposed in Grinnell, Iowa for the Chicago to Council Bluffs-Omaha service. Grinnell is located in Poweshiek County and had an estimated population of 9,169 in 2011, according to the U.S. Census Bureau.

The projected 2040 annual boardings and alightings for the Chicago to Council Bluffs-Omaha service are expected to be 31,595 for Grinnell. According to Amtrak standards, this classifies Grinnell as a “small” station.

#### 8.3.4.1 Site

The proposed site is bound by the IAIS to the south, the Union Pacific Railroad to the west, and 3rd Avenue to the north as shown in Figure 8.3-6 below. A dedicated passenger track would be constructed along with a main line/freight bypass track.

The site is currently privately owned and contains a "Quonset" style commercial building. It is assumed the city of Grinnell would acquire the parcel for station purposes and be the owner of station. An alternate station site could also be considered on the south side of the tracks. Final site selection would occur during a Tier 2 environmental study.

The proposed station is adjacent to the former Chicago, Rock Island and Pacific Railroad depot currently occupied by a restaurant. The former depot is not being considered because a stopped passenger train on the Iowa Interstate would block the Union Pacific Railroad track and the signal circuit where the two lines cross, and the platform would cross the UP track.

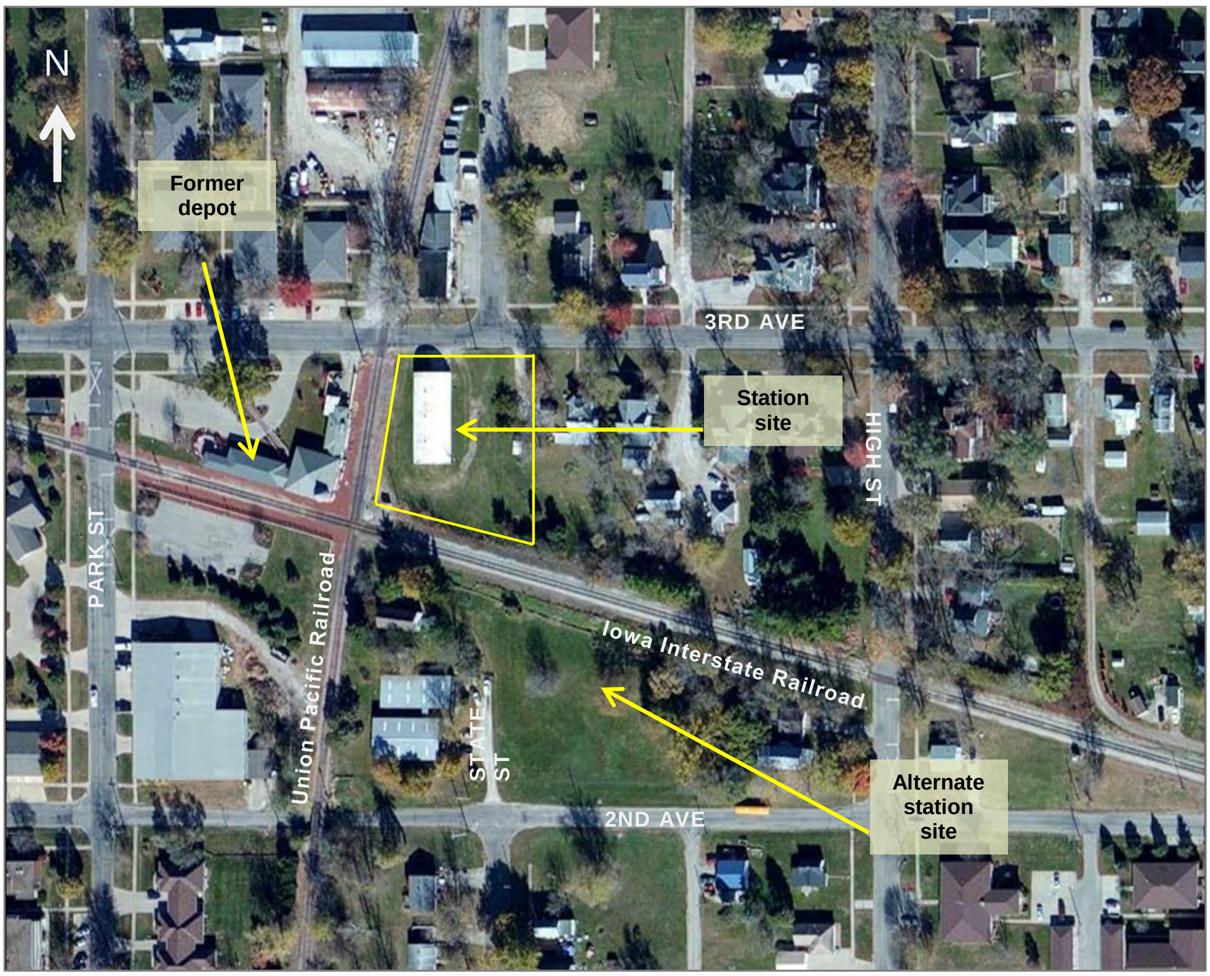


Figure 8.3-6: Grinnell Station Location

#### 8.3.4.2 Surrounding Land Use

The station is located to the east of downtown Grinnell approximately two to three blocks from Main Street. The parcels around the station site are primarily single-family and multi-family residential uses. A few warehouse/storage structures are present in the vicinity of the station site. The former railroad depot is located immediately west of the site on the west side of the Union Pacific tracks and contains a restaurant called Peppers Crossing.

#### 8.3.4.3 Access and Circulation

Vehicular access to the site would be available from 3rd Avenue. A drop off lane would be provided at the entrance of the building and would accommodate intercity bus services. No local transit is available. Based on the projected ridership, at least 34 parking spaces would be required to meet the parking demand at the station. All spaces would be provided on-site.

#### 8.3.4.4 Station Building

A new station building would be constructed. According to Amtrak standards, the building should contain at least 170 square feet for a passenger waiting area. For planning purposes, 200 square feet is considered the minimum for passenger waiting areas. A Quik-Trak ticketing kiosk would be provided.

#### 8.3.4.5 Platform

A single 700-foot-long platform that is eight-inches above top of rail is planned for the station. The platform would include adequate lighting and a 24-inch wide tactile warning strip along the platform's entire public use area. A canopy should provide coverage for two-thirds the length of the platform to meet Amtrak's standards.

Due to the length of the platform, an evaluation during Tier 2 environmental and engineering studies should be conducted to determine if High Street would need to be closed. The potential closure of High Street would avoid the train from blocking traffic while stopped at the station and provide for efficient boardings and alightings.

#### 8.3.4.6 Conceptual Plan

A conceptual site plan, as shown in Appendix F, was developed for Grinnell to demonstrate basic station requirements for projected 2040 ridership and to develop a preliminary cost estimate. The conceptual site plan assumes the following improvements would be made:

- Build a new station building with a waiting area that is at least 200 square feet.
- Construct a 700-foot long platform that is 8-inches above top of the rail. Include tactile warning strip, canopy and adequate lighting.
- Provide at least 34 parking spaces on-site.
- Construct a drop off and pick area near the entrance.
- Incorporate appropriate pedestrian access and ADA accommodations.
- Install a QuickTrak ticketing kiosk.
- Provide security systems, passenger information displays and station signage.
- Evaluate the potential closure of High Street to construct the platform.
- Acquire the station site.

Refinements to the site plan are expected during future Tier 2 environmental and engineering analyses.

#### 8.3.4.7 Cost Estimate

Table 8.3-3 below shows a preliminary cost estimates for the Grinnell station. The cost estimate is based on station requirements that are sized for 2040 projected ridership and four round-trips.

**Table 8.3-3: Station Cost Estimate – Grinnell**

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Base Cost** | New Station Building (includes utility room, office & bathrooms) | SQ FT | 670 | $215 | $144,050 |
| | Platform Construction Incl. Tactile | LF | 700 | $700 | $490,000 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical/Water/Data Service | L SUM | 1 | $26,630 | $26,630 |
| | Platform Pedestrian Handrail/Guardrail | LF | 472 | $150 | $70,800 |
| | Canopy | LF | 467 | $700 | $326,667 |
| | Utility Relocation (Fiber, Elec, etc.) | L SUM | 1 | $75,000 | $75,000 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | QuickTrak Ticketing Kiosks | EACH | 1 | $27,700 | $27,700 |
| | Property Acquisition (Land & Building) | L SUM | 1 | $178,060 | $178,060 |
| | Tenant Relocation | L SUM | 1 | $10,000 | $10,000 |
| | Exterior Signage | L SUM | 1 | $30,000 | $30,000 |
| | Concrete Sidewalk | SQ FT | 560 | $6 | $3,360 |
| | Potential Street Closure (High Street) | L SUM | 1 | $50,000 | $50,000 |
| | Landscaping | L SUM | 1 | $35,000 | $35,000 |
| | Parking (Surface), Construction | SQ FT | 21,600 | $5 | $97,200 |
| | Pedestrian Protection (Chain-link Fence) | LF | 1,650 | $25 | $41,250 |
| | **Subtotal** | | | | **$1,899,917** |
| | Contingency 30% | | | | $569,975 |
| | **Base Cost Total** | | | | **$2,469,892** |
| **Design and Construction** | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $98,796 |
| | Final Design (6%) | | | | $148,194 |
| | Proj Mgmt - Design/Const (5%) | | | | $123,495 |
| | Const. Admin/Mgmt (4%) | | | | $98,796 |
| | 5% Mgmt Contingency | | | | $33,464 |
| | 5% Unallocated Contingency | | | | $158,632 |
| | **Design and Construction Total** | | | | **$861,375** |
| **Total Cost Estimate** | | | | | **$3,331,267** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars*
2. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction.*
3. *Station building cost assumes new construction.*
4. *Platform height is 8" above top of rail*
5. *Canopy is assumed to be required along 2/3 of the length of the platform.*

6. *Cost of QuickTrak ticketing kiosks are initial costs only and do not include monthly fees*
7. *The cost for property acquisition is based on 2012 assessed values from a sample of parcels in close proximity to the station site. These values were averaged to a per acre cost of $342,423 and the station site is 0.52 acres*
8. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.)*
9. *Parking (Surface), Construction assumes the construction of proposed parking area and drop-off*

### 8.3.5 Des Moines Station

A new station is proposed in Des Moines, Iowa for the new corridor service. Des Moines is the largest city in Iowa and had an estimated population of 206,599 in 2011, according to the U.S Census Bureau. The five-county area (Polk, Dallas, Warren, Madison, and Guthrie) that makes up the Des Moines-West Des Moines Metropolitan Statistical Area had an estimated population of 580,255 in 2011, according to the U.S. Census Bureau.

The projected 2040 annual boardings and alightings are expected to be 383,674 for Des Moines. This would classify the Des Moines station as a “medium” station, according to Amtrak standards.

#### 8.3.5.1 Site

The proposed station site is at the former Chicago, Rock Island and Pacific Railroad depot located at 100 4th Street.[7] The site, as shown in Figure 8.3-7 below, includes the depot located on the west side of 4th Street and does not include the former baggage facility located on the east side of 4th Street. The site is bound by 5th Avenue to the west and 4th Street to the east. A single freight track used by IAIS runs along the south side of the building. A second main track is proposed through the station area.

The depot parcel is privately owned by a business publications firm. It is assumed the city of Des Moines or another local entity would acquire the property and consider joint development opportunities.

#### 8.3.5.2 Access and Circulation

A passenger drop off area is proposed on the north side of the building with access to 4th Street and 5th Avenue. This would require utilizing some land on the adjacent city-owned parking lot immediately north. The passenger drop off would have three lanes to accommodate passenger drop offs, local and intercity bus services and through traffic.

It is estimated that at least 200 dedicated station parking spaces would be required to meet the station’s parking demand. As mentioned above, the station site is located adjacent to existing publically-owned surface parking lots. Also, three public parking structures are within three blocks of the station. Coordination with the city of Des Moines would be required to identify spaces within existing nearby facilities that could be dedicated for passenger parking. Dedicated passenger parking could also be coordinated with future redevelopment plans at sites in the vicinity of the station.

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[7] Station site recommended by Des Moines Area Metropolitan Planning Organization as documented in the Des Moines Area Passenger Rail Station Feasibility Study. July 2010.


Figure 8.3-7: Des Moines Station Location

#### 8.3.5.3 Station Building

The former depot building was a principal Des Moines passenger rail station from the time it opened in 1901 until passenger rail service ended in 1970. According to the Polk County assessor's site, the building contains a total of 20,591 square feet and the ground floor has just over 9,850 square feet. Based on the projected ridership, the enclosed passenger waiting area should be at least 2,100 square feet. Additional space would be required for ticketing, restrooms and other ancillary station requirements. The remainder of the building could be shared with private development.

#### 8.3.5.4 Platform

To meet Amtrak's standards for platforms, a single 635-foot-long platform that is 8 inches above top of rail is recommended for the station on the south side of the building. The platform would include adequate lighting and a 24-inch-wide tactile warning strip along the platform's entire public use area. A canopy should provide coverage for two-thirds the length of the platform.

The recommended platform would potentially require closing 4th Street at the railroad tracks to avoid the train from blocking traffic while stopped at the station and to allow for efficient boardings and alightings. An evaluation during Tier 2 environmental and engineering studies would be conducted to finalize the details of the platform and to make a determination on the proposed street closure. Coordination with the Federal Railroad Administration would be required since they are responsible for enforcing federal regulations related to platforms and ADA accessibility.

Activated grade-crossing signal systems would potentially block 5th Street while trains are making station stops. To mitigate this concern, grade-crossing and wayside signaling systems and platform design would be arranged if feasible so that trains when stopped would not be in the island circuit of the 5th Street grade-crossing signal system. Remote starts could be used to activate grade-crossing signal systems if this is not feasible.

#### 8.3.5.5 Conceptual Plan

A conceptual site plan, as shown in Appendix G, was developed for Des Moines to demonstrate basic station requirements for projected 2040 ridership and to develop a preliminary cost estimate. The conceptual site plan assumes the following improvements would be made:

- Renovate the station and provide a waiting area with at least 2,100 square feet.
- Construct a 635-foot long platform that is 8 inches above top of the rail.
- Evaluate the potential closure of 4th Street to construct the platform.
- Identify at least 200 dedicated passenger parking spaces within existing nearby parking facilities or as part of future redevelopment plans.
- Construct a drop off and pick up area on the north side of the building.
- Incorporate appropriate pedestrian access and ADA accommodations.
- Provide QuickTrak ticketing kiosks.
- Provide security systems, passenger information displays and station signage.
- Acquire the station site and building.

Refinements to the site plan are expected during future Tier 2 environmental and engineering analyses.

Figure 8.3-8: View of Station's South Side Adjacent to the Railroad Tracks

Figure 8.3-9: View of Station's North Side Looking from the Municipal Parking Lot

#### 8.3.5.6 Cost Estimate

Table 8.3-4 below shows a preliminary cost estimates for the Des Moines station. The cost estimate is based on station requirements that are sized for 2040 projected ridership and four round-trips.

Table 8.3-4: Station Cost Estimate – Des Moines

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Base Cost** | Renovate Station Building (includes utility room, office & bathrooms) | SQ FT | 5,000 | $215 | $1,075,000 |
| | Platform Construction Incl. Tactile | LF | 700 | $700 | $444,500 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical/Water/Data Service | L SUM | 1 | $26,630 | $26,630 |
| | Platform Pedestrian Handrail/Guardrail | LF | 420 | $150 | $63,000 |
| | Canopy | LF | 423 | $700 | $296,333 |
| | Utility Relocation (Fiber, Elec, etc.) | L SUM | 1 | $75,000 | $75,000 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | QuickTrak ticketing Kiosks | EACH | 2 | $27,700 | $55,400 |
| | Property Acquisition (Land and Building) | L SUM | 1 | $961,600 | $961,600 |
| | Tenant Relocation | L SUM | 1 | $30,000 | $30,000 |
| | Exterior Signage | L SUM | 1 | $30,000 | $30,000 |
| | Pick-up/drop-off Area | L SUM | 1 | $100,000 | $100,000 |
| | Concrete Sidewalk | SQ FT | 4,665 | $6 | $27,990 |
| | Potential Street Closure (4th Street) | L SUM | 1 | $50,000 | $50,000 |
| | Landscaping | L SUM | 1 | $35,000 | $35,000 |
| | Parking (Surface), Construction | SQ FT | 67,083 | $5 | $301,874 |
| | Pedestrian Protection (Chain-link Fence) | LF | 1,100 | $25 | $27,500 |
| | **Subtotal** | | | | **$3,592,153** |
| | Contingency 30% | | | | $1,077,646 |
| | **Base Cost Total** | | | | **$4,669,799** |
| **Design and Construction** | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $186,792 |
| | Final Design (6%) | | | | $280,188 |
| | Proj Mgmt - Design/Const (5%) | | | | $233,490 |
| | Const. Admin/Mgmt (4%) | | | | $186,792 |
| | 5% Mgmt Contingency | | | | $54,363 |
| | 5% Unallocated Contingency | | | | $290,571 |
| | **Design and Construction Total** | | | | **$1,432,196** |
| **Total Cost Estimate** | | | | | **$6,101,996** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars*
2. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction.*

3. *Station building cost assumes renovation area of 5,000 sq ft. Remaining building renovation assumed will be done by private development.*
4. *Platform height is 8" above top of rail.*
5. *Canopy is assumed to be required along 2/3 of the length of the platform.*
6. *Cost of QuickTrak ticketing kiosks are initial costs only and do not include monthly fees.*
7. *The cost for property acquisition is based on 2011 assessed value. Land - $640,400; Building - $321,600.*
8. *Land acquisition costs for parking were not included. It is assumed the city of Des Moines will development station parking at adjacent parking lots under existing public ownership or in conjunction with future redevelopment plans.*
9. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.)*
10. *Construction of pick-up/drop-off includes removals, subgrade preparation, aggregate base, concrete curb and gutter, and HMA pavement*
11. *Parking (surface), construction assumes reconstruction or construction of the acquired existing parking area or proposed parking area.*

### 8.3.6 Atlantic Station

A new station is proposed in Atlantic, Iowa, for the new corridor service. Atlantic is located in western Iowa in Cass County. According to the U.S. Census Bureau, Atlantic had an estimated population of 7,041 in 2011.

The projected annual boardings and alightings for Atlantic are expected to be 31,637 in 2040. This would classify Atlantic as a “small” station, according to Amtrak standards.

#### 8.3.6.1 Site

The proposed site, as shown in Figure 8.3-10 below, is bound by the IAIS to the north, 1st Street to the south, Locust Street to the west and Chestnut Street to the east. The sidings associated with the rail yard to the north would be reconfigured.

The site is adjacent to the former Chicago, Rock Island and Pacific Railroad depot currently occupied by the Atlantic Area Chamber of Commerce. The former depot is being considered as a possible station for the service.

The site is a nearly 3-acre vacant parcel that is privately owned. It is assumed the city of Atlantic would acquire the parcel for station purposes and be the owner of the station and its facilities.


Figure 8.3-10: Atlantic Station Location

#### 8.3.6.2 Surrounding Land Use

The station is located on the north end of Atlantic one block north of the community's main street district, which extends south along Chestnut Street. The land use to the north of the tracks contains an existing rail yard and is industrial in nature. The area contains recycling facilities and various storage/small manufacturing structures and truck parking. The parcels immediately south of the site contain commercial businesses including a gas station, an automotive repair shop, and a hardware store.

#### 8.3.6.3 Access and Circulation

Vehicular access to the site can be achieved from Chestnut and 1$^{st}$ streets. Based on the projected ridership, at least 34 parking spaces would be required to meet the parking demand at the station. All spaces should be accommodated on-site. A shared parking lot and driveway with the Atlantic Area Chamber of Commerce is proposed.

#### 8.3.6.4 Station Building

A new station building could also be constructed. According to Amtrak standards, the building would contain at least 170 square feet for a passenger waiting area and a minimum of 200 square feet was assumed for planning purposes. The building would also include restrooms and other ancillary spaces.

#### 8.3.6.5 Platform

A single 600-foot long platform that is 8 inches above top of rail would be required to serve the station. The platform would include adequate lighting and a 24-inch wide tactile warning strip along the platform's entire public use area. A canopy would provide coverage for two-thirds the length of the platform.

#### 8.3.6.6 Conceptual Plan

A conceptual site plan, as shown in Appendix H, was developed for Atlantic to demonstrate basic station requirements for projected 2040 ridership and to develop a preliminary cost estimate. The conceptual site plan assumes the following improvements would be made:

- Build a new station building and provide a passenger waiting area with at least 200 square feet.
- Construct a 600-foot long platform that is 8 inches above top of rail. Include tactile warning strip, lighting and a canopy.
- Provide at least 34 parking spaces on-site plus additional spaces to replace Chamber of Commerce parking.
- Construct a drop off and pick area near the entrance.
- Incorporate appropriate pedestrian access and ADA accommodations.
- Provide a QuickTrak ticketing kiosk.
- Provide security systems, passenger information displays and station signage.
- Acquire the station site.

Refinements to the site plan are expected during future Tier 2 environmental and engineering analyses.

#### 8.3.6.7 Cost Estimate

Table 8.3-5 below shows a preliminary cost estimate for the Atlantic station. The cost estimate is based on station requirements that are sized for 2040 projected ridership and four round-trips.

## Table 8.3-5: Station Cost Estimate – Atlantic

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| Base Cost | New Station Building (includes utility room, office & bathrooms) | SQ FT | 670 | $215 | $144,050 |
| | Platform Construction Incl. Tactile | LF | 600 | $700 | $420,000 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical/Water/Data Service | L SUM | 1 | $26,630 | $26,630 |
| | Platform Pedestrian Handrail/Guardrail | LF | 580 | $150 | $87,000 |
| | Canopy | LF | 400 | $700 | $280,000 |
| | Utility Relocation (Fiber, Elec, etc.) | L SUM | 1 | $75,000 | $75,000 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | QuickTrak ticketing Kiosks | EACH | 1 | $27,700 | $27,700 |
| | Property Acquisition (Land only) | L SUM | 1 | $29,700 | $29,700 |
| | Exterior Signage | L SUM | 1 | $30,000 | $30,000 |
| | Concrete Sidewalk | SQ FT | 3,310 | $6 | $19,860 |
| | Landscaping | L SUM | 1 | $35,000 | $35,000 |
| | Parking (Surface), Construction | SQ FT | 29,150 | $5 | $131,175 |
| | Pedestrian Protection (Chain-link Fence) | LF | 580 | $25 | $14,500 |
| | Reconstruct 1st Street | L SUM | 1 | $70,000 | $70,000 |
| | **Subtotal** | | | | **$1,684,815** |
| | Contingency 30% | | | | $505,445 |
| | **Base Cost Total** | | | | **$2,190,260** |
| Design and Construction | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $87,610 |
| | Final Design (6%) | | | | $131,416 |
| | Proj Mgmt - Design/Const (5%) | | | | $109,513 |
| | Const. Admin/Mgmt (4%) | | | | $87,610 |
| | 5% Mgmt Contingency | | | | $30,807 |
| | 5% Unallocated Contingency | | | | $141,861 |
| | **Design and Construction Total** | | | | **$788,818** |
| **Total Cost Estimate** | | | | | **$2,979,077** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars.*
2. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction.*
3. *Station building cost assumes new construction.*
4. *Platform height is 8" above top of rail.*
5. *Canopy is assumed to be required along two-thirds of the length of the platform.*
6. *Cost of QuickTrak ticketing kiosk is initial costs only and does not include monthly fees.*
7. *The cost for property acquisition is based on 2012 assessed value. Land - $29,700*
8. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.).*
9. *Parking (surface), construction assumes the construction of proposed parking area and drop-off.*
10. *Reconstruction of 1st Street includes reconstruction of existing roadway, milling and resurfacing.*

### 8.3.7 Council Bluffs Station

A new station is planned for Council Bluffs, Iowa. It would serve as the end point for the new corridor service. If the service is extended to Omaha in the future, Council Bluffs would remain as an intermediate station. The former Chicago, Rock Island and Pacific Railroad depot located west of the IAIS yard has been repurposed as a museum and is not being considered as a station for the Service due to its proximity to grade crossings.

Council Bluffs had an estimated population of 62,466 in 2011. It is the seventh largest city in Iowa and it is part of the Omaha-Council Bluffs Metropolitan Statistical Area that had a population of 877,110 in 2011.

The projected 2040 annual boardings and alightings are expected to be 235,488. This would classify the Council Bluffs station as a "medium" station, according to Amtrak standards.

#### 8.3.7.1 Site

The proposed station site, as shown in Figure 8.3-11 below, is located to the west of the IAIS yard, east of Highway 192, and north of the system interchange for Interstates 80 and 29. The site is located on a privately owned parcel that would have to be acquired by the city of Council Bluffs.

Two new tracks would be constructed to serve the Council Bluffs station and the train layover facility that is proposed just north of the station. The tracks would extend north through the eastern side of the site from the IAIS just north of Interstate 80. The tracks would connect back to the IAIS to the north of the layover facility.

#### 8.3.7.2 Surrounding Land Use

The station is about two miles southeast of downtown Council Bluffs. The current land uses in the vicinity of the station are used primarily for storage and transport of freight containers and bulk materials such as coal. Much of the land is used for outside storage and only a few structures are present. One exception is the grain elevator facility located on 4th Street just east of Highway 192.

#### 8.3.7.3 Access and Circulation

Vehicular access to the site is available from 29th Avenue via Highway 192. Twenty-Ninth Avenue currently extends east from Highway 192 to the Iowa Interstate Railroad yard.

Twenty-Ninth Avenue will be realigned as part of the Interstate 80/29 reconstruction project that is being undertaken by the Iowa Department of Transportation. The existing 29th Avenue/Highway 192 intersection will be eliminated and replaced with a connection to the north at 23rd Avenue.

At least 250 parking spaces would be provided on-site. A drop off area would be provided near the entrance of the building and should be able to accommodate local and intercity buses that could serve the station in the future.

#### 8.3.7.4 Station Building

A new station building would be constructed that provides a passenger wait area with at least 1,300 square feet as well as additional space for restrooms, storage and other building functions.

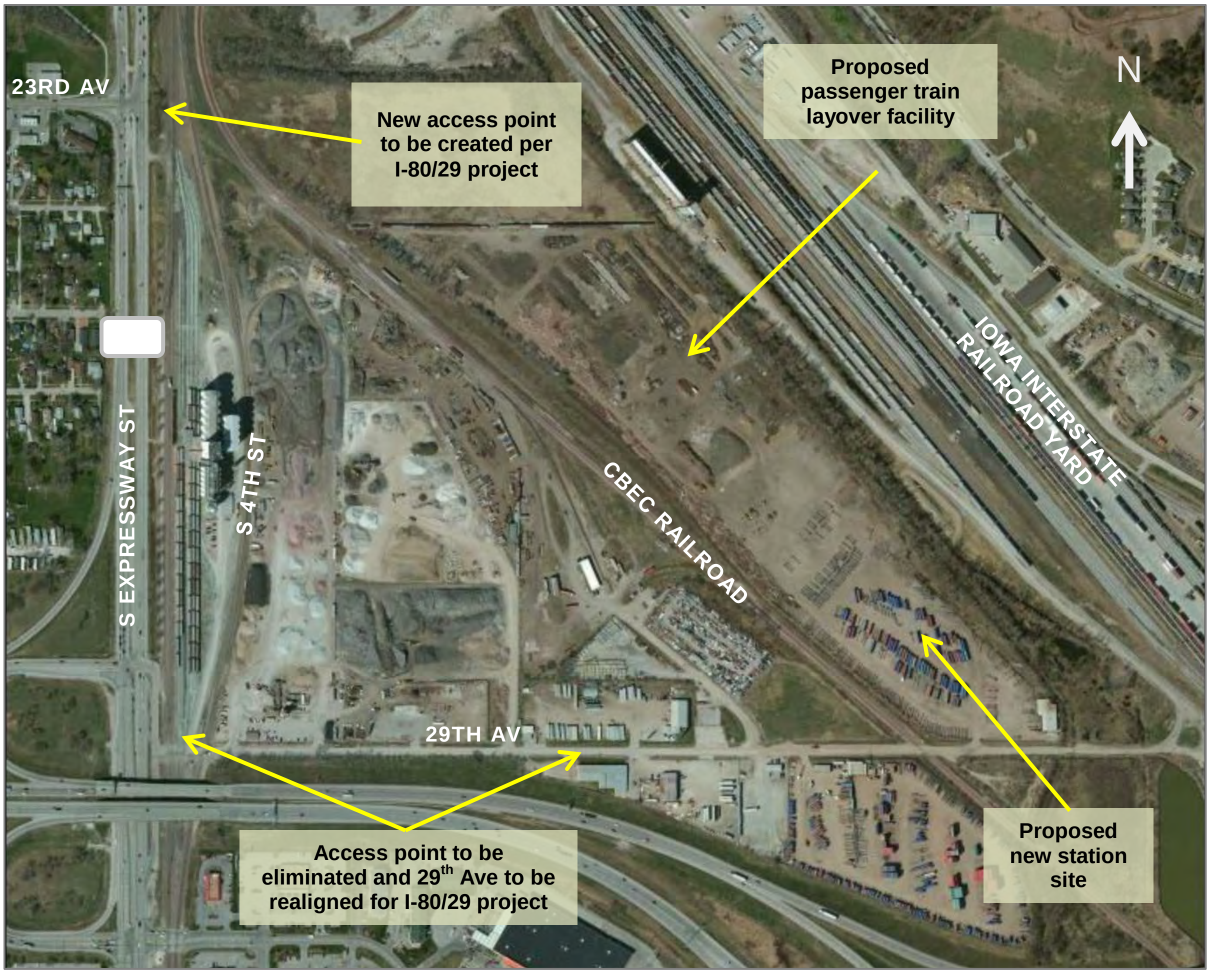



Figure 8.3-11: Council Bluffs Station Location

#### 8.3.7.5 Platform

The station would contain a single platform that is 700 feet long and eight-inches above top of the rail. The platform would include adequate lighting and a 24-inch wide tactile warning strip along the platform's entire public use area. A canopy would provide coverage for two-thirds the length of the platform.

#### 8.3.7.6 Conceptual Plan

A conceptual site plan, as shown in Appendix I, was developed for Council Bluffs to demonstrate basic station requirements for projected 2040 ridership and to develop a preliminary cost estimate. The conceptual site plan assumes the following improvements would be made:

- Build a new station building and provide a waiting area with at least 1,300 square feet.
- Construct a 700-foot long platform that is 8 inches above top of rail. Include tactile warning strip, lighting and a canopy.
- Provide at least 250 on-site parking spaces.
- Construct a drop off and pick area near the entrance.

- Incorporate appropriate pedestrian access and ADA accommodations.
- Provide QuickTrak ticket kiosks.
- Provide security systems, passenger information displays and station signage.
- Acquire the station site.

Refinements to the site plan are expected during future Tier 2 environmental and engineering analyses.

#### 8.3.7.7 Cost Estimate

Table 8.3-6 below shows a preliminary cost estimate for the Council Bluffs station. The cost estimate is based on station requirements that are sized for 2040 projected ridership and four round-trips daily.

Table 8.3-6: Station Cost Estimate – Council Bluffs

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Base Cost** | New Station Building (includes utility room, office & bathrooms) | SQ FT | 5,000 | $215 | $1,075,000 |
| | Platform Construction Incl. Tactile | LF | 700 | $700 | $490,000 |
| | Platform & Parking Lighting | L SUM | 1 | $200,000 | $200,000 |
| | PA System/Passenger Information Display | L SUM | 1 | $30,000 | $30,000 |
| | Electrical/Water/Data Service | L SUM | 1 | $26,630 | $26,630 |
| | Platform Pedestrian Handrail/Guardrail | LF | 600 | $150 | $90,000 |
| | Canopy | LF | 467 | $700 | $326,667 |
| | Utility Relocation (Fiber, Elec, etc.) | L SUM | 1 | $75,000 | $75,000 |
| | Flagging | DAYS | 60 | $1,070 | $64,200 |
| | QuickTrak ticketing Kiosks | EACH | 2 | $27,700 | $55,400 |
| | Property Acquisition (Land only) | L SUM | 1 | $595,930 | $595,930 |
| | Exterior Signage | L SUM | 1 | $30,000 | $30,000 |
| | Concrete Sidewalk | SQ FT | 2,420 | $6 | $14,520 |
| | Landscaping | L SUM | 1 | $70,000 | $70,000 |
| | Parking (Surface), Construction | SQ FT | 86,800 | $5 | $390,600 |
| | Pedestrian Protection (Chain-link Fence) | LF | 575 | $25 | $14,375 |
| | **Subtotal** | | | | **$3,548,322** |
| | Contingency 30% | | | | $1,064,497 |
| | **Base Cost Total** | | | | **$4,612,818** |
| **Design and Construction** | NEPA | | | | $200,000 |
| | Preliminary Design (4%) | | | | $184,513 |
| | Final Design (6%) | | | | $276,769 |
| | Proj Mgmt - Design/Const (5%) | | | | $230,641 |
| | Const. Admin/Mgmt (4%) | | | | $184,513 |
| | 5% Mgmt Contingency | | | | $53,822 |
| | 5% Unallocated Contingency | | | | $287,154 |
| | **Design and Construction Total** | | | | **$1,417,411** |
| **Total Cost Estimate** | | | | | **$6,030,229** |

*Cost Estimate Notes:*

1. *All costs are in December 2012 dollars.*

2. *Cost of railroad signalization, crossing signals, and track reconstruction is not included. These costs are assumed to be part of track and signal design/construction.*
3. *Station building cost assumes new construction.*
4. *Platform height is 8" above top of rail.*
5. *Canopy is assumed to be required along two-thirds of the length of the platform.*
6. *Cost of QuickTrak ticketing kiosks are initial costs only and do not include monthly fees.*
7. *The cost for property acquisition is based on 1/3 2012 assessed value, remaining 2/3 cost will be associated with Council Bluffs Layover Facility.*
8. *Per the City of Council Bluffs the assessed land value of $595,930 was multiplied by 3, to $1,787,790.*
9. *A $75k allowance has been assumed for buried utility relocation (fiber optic, natural gas, electrical, etc.).*
10. *Parking (surface), construction assumes the construction of proposed parking area and drop-off.*

# 9.0 Maintenance and Layover Facilities

## 9.1 Implementation Strategy

A strategy to implement intercity regional passenger rail service between Chicago and Omaha has been developed by Iowa DOT. This strategy seeks to expand the service geographically across Iowa first, and then expand frequency and speed to increase ridership and revenue.

The implementation is anticipated to begin with two round-trips per day from Chicago to Moline at a maximum speed of 79 mph. This first segment of the service is currently undergoing final planning for implementation by Illinois DOT and is independent of future phases. Future phases extend the service westward from Moline to Iowa City, to Des Moines, and to Council Bluffs with a maximum speed of 79 mph and up to four daily round-trips. The long-term implementation goal for the corridor is to implement 110 mph maximum speed service with seven round-trips serving Des Moines and five round-trips to Omaha. Facilities will be needed at the route terminus for each of these phases to allow for the overnight storage, cleaning and light maintenance of the trains as described below.

## 9.2 Layover Facility Requirements

An overnight train layover and light maintenance facility will be required at each route terminus for this service. These facilities will provide tracks on which to store trains and to provide cleaning, servicing, and light maintenance. In addition these locations must include facilities for train crews going on and off duty. The minimal requirements for these facilities are as follows:

- Track (with access pad) to accommodate the trainsets required for each service phase
- Small building (approximately 2000 square feet) for crews to go on/off duty
- Employee parking and access to public road network
- Potable water and general utility services
- 480V electrical service for standby power
- Perimeter security fencing
- Site lighting

Any fueling of trains at these layover facilities would be done from trucks so permanent storage tanks and fueling facilities will not be required.

Based on the phasing plan for the service, layover facilities to provide for overnight storage and light maintenance of trainsets will be needed as follows:

- Temporary layover facilities located at or near:
  - Moline (Phase 1)
  - Iowa City (Phase 2)
  - Des Moines (Optional Future Phase)
- Permanent layover facility located at:
  - Des Moines (Optional Long-Term Implementation of 110 mph service)
  - Council Bluffs (Optional Future Phase and Long-Term Implementation)

In addition to the light maintenance services provided at these locations, a facility to provide heavy maintenance for locomotives and trainsets will be required. The method by which such maintenance would be performed has not yet been determined. Methods for providing heavy maintenance could include construction of a dedicated maintenance facility for the Service, contracting with existing Amtrak or Metra heavy maintenance facilities in Chicago, or contracting with a third-party contractor using an existing railroad heavy maintenance facility at some other location. The Des Moines and Council Bluffs layover locations could potentially be expanded to include facilities to support heavy maintenance activities. If it is determined that the best approach is to construct a heavy maintenance facility as part of the Service then site selection and detailed evaluation would occur through Tier 2 EIS analysis.

## 9.3 Phasing of Layover Facilities

### 9.3.1 Phase 1: Two Round-Trips, Chicago to Moline

A layover/storage facility will be built in Moline to support the Chicago – Quad Cities service being initiated by Illinois DOT. This service is anticipated to launch in 2015.

### 9.3.2 Phase 2: Two Round-Trips, Chicago to Iowa City

In Phase 2 service will be extended from Moline to Iowa City. Two daily round-trip trains will operate between Iowa City and Chicago, one of which will layover in the Iowa City area each evening. Service will be a push-pull operation so facilities to turn a train or locomotive will not be required. The proposed layover facility will be built in Coralville, just west of Iowa City and will meet the following requirements:

- One train will be stored overnight Iowa City; the second train will be stored overnight in Chicago.
- Train will consist of one locomotive and a maximum of five coaches (will include a food service car). Maximum train length: 600 feet.
- Facility will include the following:
  - Turnout off of main track
  - One 700-foot-long stub-end track

  - Small building (possibly trailer or other temporary structure) for crew change and maintenance base. Includes room to store basic cleaning supplies and minor replacement items (light bulbs, consumables, etc.)
  - Parking for five to 10 vehicles
  - Track access pad adjacent to storage track to support service vehicles. At a minimum this pad should be long enough to provide access to the locomotive and one passenger car
  - Potable water and general utility services
  - 480V electrical service for standby power
  - Perimeter security fencing
  - Site lighting

There are numerous potential sites in Coralville where a layover facility could be built adjacent to the IAIS right-of-way. The layout for a facility at the preferred location just west of 25th Avenue is shown in Figure 9.3-1 below.

### 9.3.3 Phase 3: Two Round-Trips, Chicago to Des Moines

Under this phase, service will be extended from Iowa City to Des Moines. The service frequency will continue to be two round-trips per day. While Des Moines is identified as a temporary layover facility location in this optional future phase, the long-term implementation plan calls for seven daily round-trips, five of which will terminate in Omaha/ Council Bluffs, and two which will terminate in Des Moines. Therefore the Des Moines facility will initially be temporary and designed to support two round-trips, but it could become a permanent layover location once the long-term service is fully implemented.

The proposed layover facility site in Des Moines is approximately 0.8 mile east of the proposed station location, just west of East 7th Street. This facility will meet the following requirements:

- Track to store one train overnight
- Trains will consist of two locomotives and a maximum of five coaches (will include a food service car) with a maximum train length of 600 feet.
- Facility will include the following:
  - Single turnout off of main track
  - One 700-foot-long stub-end track
  - Small building (possibly trailer) for crew change and maintenance base. Includes room to store basic cleaning supplies and minor replacement items (light bulbs, consumables, etc.)
  - Parking for five to 10 vehicles
  - Track access pad
  - Potable water and general utility services
  - 480V electrical service for standby power
  - Perimeter security fencing
  - Site lighting

This facility will be constructed in a manner to allow for expansion to accommodate the additional storage requirements anticipated for long-term service implementation (see below).

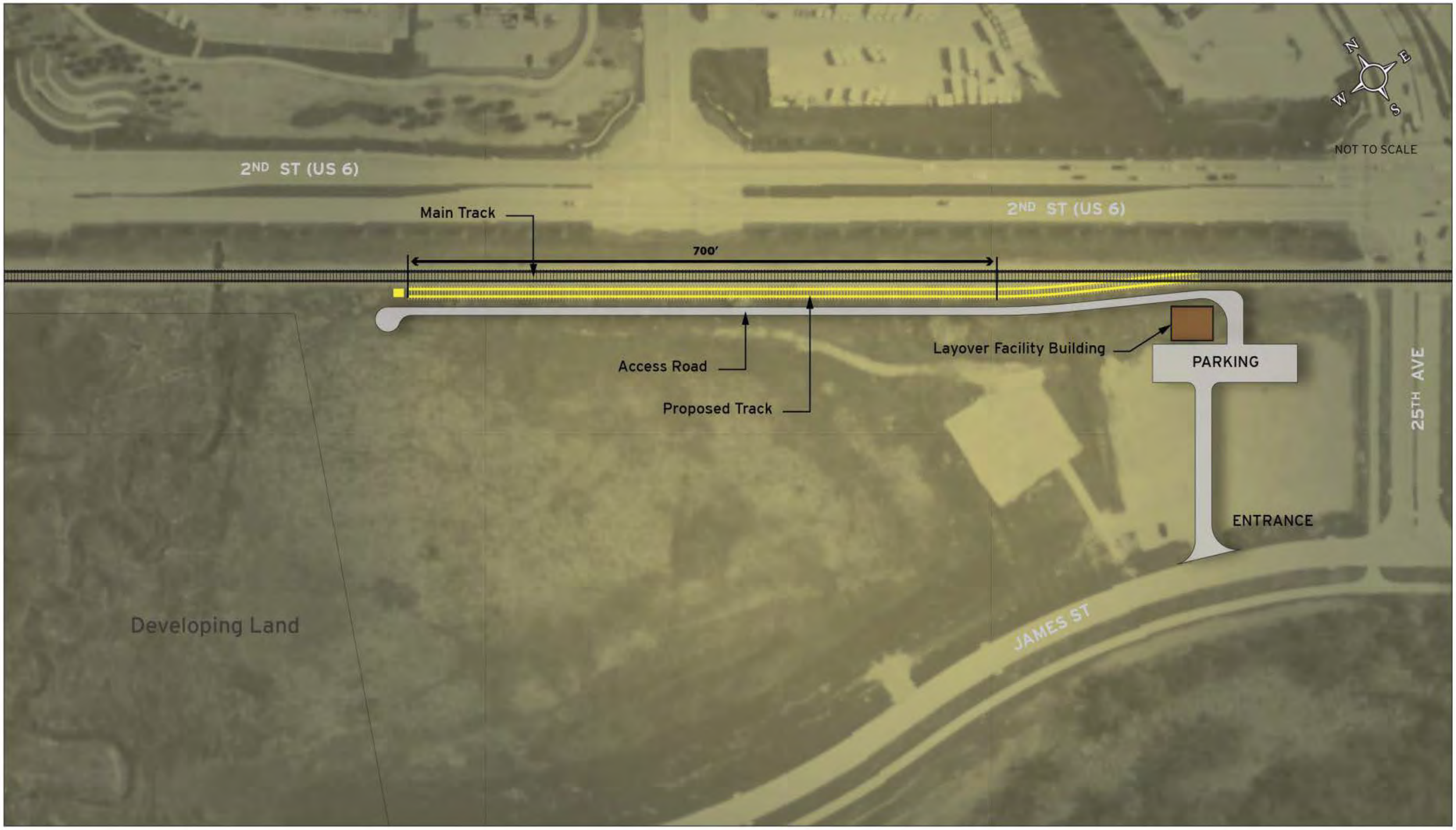



Figure 9.3-1: Coralville Conceptual Layover Facility Site Plan (Coralville, Iowa)

The electric power, water, and other utility services should be situated in this area so that they can be easily accessed from a second track when it is built. Fencing and lighting will be constructed to accommodate the future second layover track as well.

Figure 9.3-2 below shows the layout of the Des Moines facility with both the initial layover track and the future track.

### 9.3.4 Phase 4: Four Round-Trips, Chicago to Des Moines

In this phase, Des Moines will continue to be the western terminus for rail service and frequencies will be increased from two to four trains per day. Under this service scenario two trainsets will layover in Des Moines, so a second storage track 700 feet in length will need to be constructed adjacent to the first track. This second track is shown as the “Future Track” in Figure 9.3-2. No other additional facilities will be needed to accommodate this second trainset.

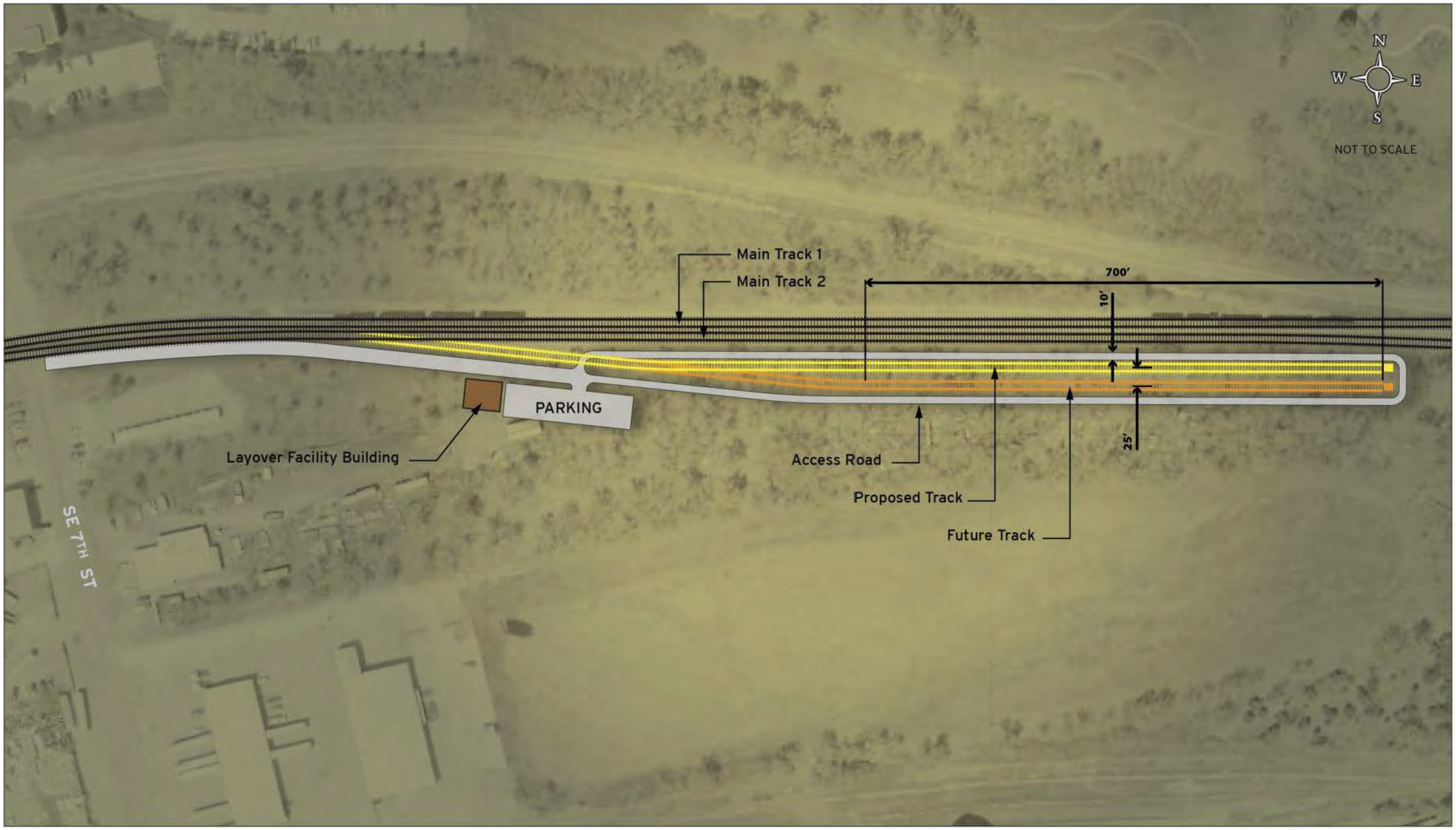



Figure 9.3-2: Des Moines Conceptual Layover Facility Site Plan (Des Moines, Iowa)

### 9.3.5 Phase 5: Four Round-Trips, Chicago to Council Bluffs

In this phase the four round-trips per day will be extended to the route terminus in Council Bluffs. Storage will be needed for three trainsets initially, and a fourth track will be provided for spare equipment. Room will be provided for a fifth storage track to accommodate the optional long-term implementation of five round-trips per day.

Trains will initially consist of two locomotives and a maximum of five coaches and have a maximum length of 600 feet. To accommodate future higher speed operations and increased demand trains could be expanded to two locomotives and seven coaches, so the maximum train length could grow to 750 feet.

The Council Bluffs layover facility will be designed to meet the following requirements:

- Track to store three trains overnight and provide room for storage of a spare trainset.
- Room to construct an additional storage track to accommodate future service expansion
- Trains will consist of two locomotives and a maximum of seven coaches (may include a food service car) with a maximum train length of 700 feet.
- Facility will include the following:
    - Single turnout off of main track
    - Four 750' long stub-ended sidings connected via ladder track to main switch, with provisions for a fifth track for future service
    - Permanent building of approximately 2,000 square feet for crew change and maintenance base. Includes room to store basic cleaning supplies and minor replacement items (light bulbs, consumables, etc.)
    - Parking for 10 – 20 vehicles
    - Track access pad
    - Potable water and general utility services
    - 480V electrical service for standby power
    - Perimeter security fencing
    - Site lighting

The proposed Council Bluffs layover facility will be located in a former rail yard just north of the Interstate 80/Interstate 29 interchange and adjacent to the proposed Council Bluffs passenger station. The layout for both the layover facility and station is shown in Figure 9.3-3 below.

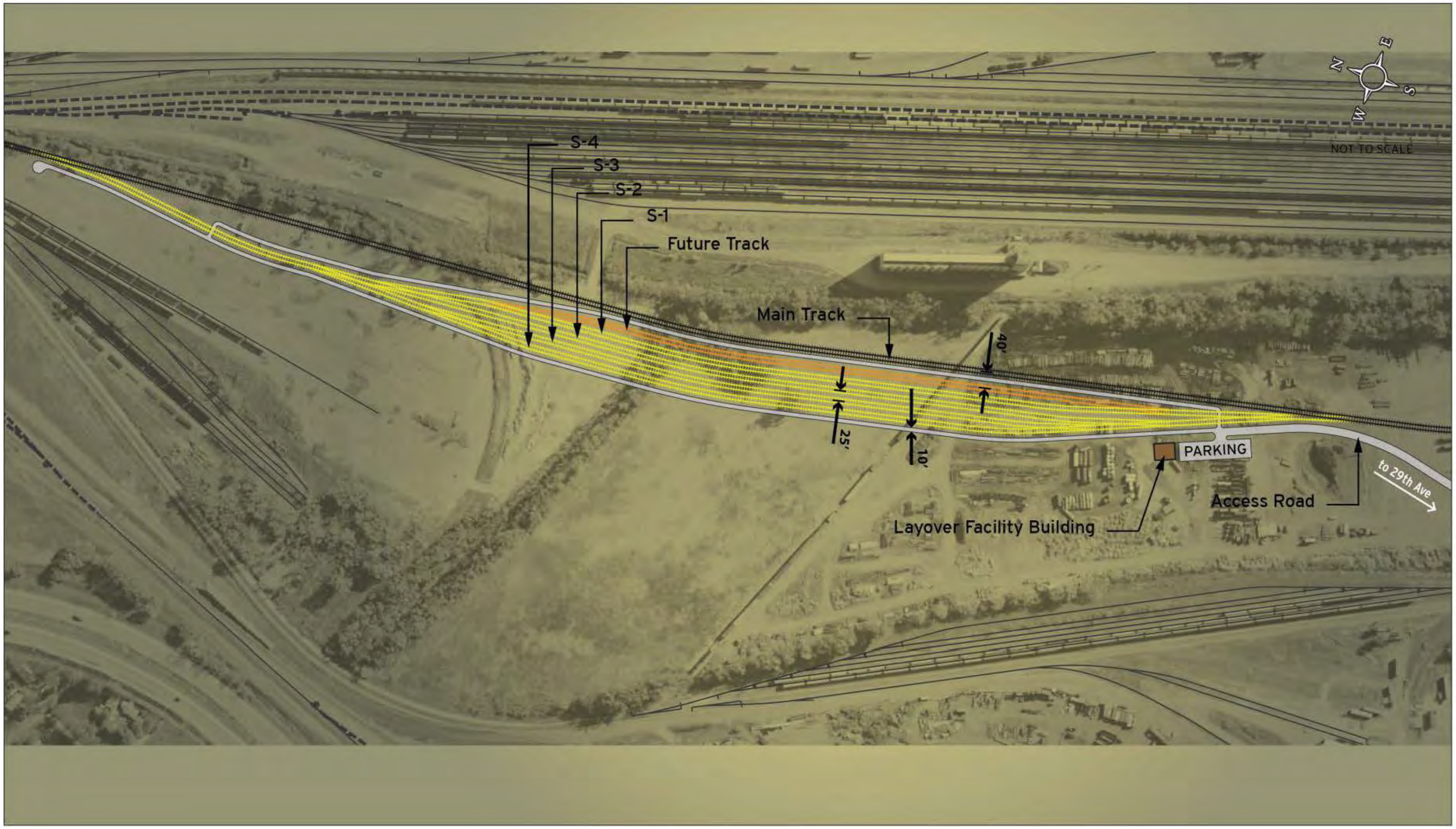



Figure 9.3-3: Council Bluffs Conceptual Layover Facility Site Plan (Council Bluffs, Iowa)

## 9.4 Cost Estimates

Cost estimates were prepared for each of the three layover facility locations described above. The full costs of each of these sites was calculated independently, but there may be some opportunities for reducing costs by transferring equipment and materials from the temporary facilities to the permanent locations. For example, when the decision is made to implement Phase 2 service to Des Moines, it may be possible to relocate the track and switches from the Coralville site to the Des Moines site.

All costs have been estimated using available industry data for unit costs and are shown in 2012 dollars. A 30 percent contingency has been added to all costs.

### 9.4.1 Cost Estimates for Coralville Layover Facility

Estimated costs for a temporary layover facility in Coralville, Iowa, to support the Phase 2 service of two round-trips per day between Chicago and Iowa City are shown in Table 9.4-1.

Table 9.4-1: Coralville Layover Facility Cost Estimate

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Layover Facility** | Building | Sq Ft | 2,000 | $90 | $180,000 |
| | Land Acquisition | AC | 1.5 | $229,100 | $343,650 |
| | Clearing & Grubbing | AC | 3.6 | $5,000 | $18,000 |
| | Subgrade Preparation (Compaction, Treatment, etc.) | AC | 3.6 | $9,680 | $34,848 |
| | Aggregate SubBase for Access Road/Pad (6") | SY | 1,350 | $94 | $126,900 |
| | Asphalt Parking - HMA (6") | SY | 1,313 | $60 | $78,780 |
| | Aggregate Base Course (6") | SY | 2,663 | $12 | $31,956 |
| | Potable Water & Gen Util. Services | L Sum | 1 | $100,000 | $100,000 |
| | 480V Elec. Service for Standby Power | L Sum | 1 | 300,000 | $300,000 |
| | Perimeter Security Fencing | LF | 1400 | $35 | $49,000 |
| | Site Lighting | L Sum | 1 | 300,000 | $300,000 |
| | **Subtotal** | | | | **$1,563,134** |
| | **Contingency 30%** | | | | **$469,000** |
| | **Base Cost Total** | | | | **$2,032,134** |
| **Yards and Yard Track** | Track | TF | 860 | $250 | 215,000 |
| | #15 Power Operated Turnout | Each | 1 | $180,000 | $180,000 |
| | **Subtotal** | | | | **$395,000** |
| | **Contingency 30%** | | | | **$118,500** |
| | **Base Cost Total** | | | | **$513,500** |
| **Total Coralville Layover Facility Cost Estimate** | | | | | **$2,442,224** |

### 9.4.2 Cost Estimates for Des Moines Layover Facility

For the extention of two daily round-trips to Des Moines, a layover facility is proposed at a site 0.8 mile east of the Des Moines Station between East 7th Street and S.E. 14th Street (U.S. Route 69).The estimated cost for this facility is shown in Table 9.4-2.

Table 9.4-2: Des Moines Layover Facility Cost Estimate

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Layover Facility** | Building | Sq Ft | 2,000 | $90 | $180,000 |
| | Land Acquisition | AC | 3.6 | $46,800 | $168,480 |
| | Clearing & Grubbing | AC | 5.0 | $5,000 | $25,000 |
| | Subgrade Preparation (Compaction, Treatment, etc.) | AC | 5.0 | $9,680 | $48,400 |
| | Aggregate SubBase for Access Road/Pad (6") | SY | 4,195 | $94 | $394,330 |
| | Asphalt Parking - HMA (6") | SY | 890 | $60 | $53,400 |
| | Aggregate Base Course (6") | SY | 5,085 | $12 | $61,020 |
| | Potable Water & Gen Util. Services | L Sum | 1 | $100,000 | $100,000 |
| | 480V Elec. Service for Standby Power | L Sum | 1 | 300,000 | $300,000 |
| | Perimeter Security Fencing | LF | 1,900 | $35 | $66,500 |
| | Site Lighting | L Sum | 1 | 300,000 | $300,000 |
| | **Subtotal** | | | | **$1,697,130** |
| | **Contingency 30%** | | | | **$509,200** |
| | **Base Cost Total** | | | | **$2,206,330** |
| **Yards and Yard Track** | Track | TF | 1,128 | $250 | $282,000 |
| | #15 Power Operated Turnout | Each | 1 | $180,000 | $180,000 |
| | **Subtotal** | | | | **$462,000** |
| | **Contingency 30%** | | | | **$38,600** |
| | **Cost Total** | | | | **$600,600** |
| **Total Des Moines Layover Facility Cost Estimate** | | | | | **$2,806,930** |

When four daily round-trips to Des Moines are implemented, a second storage track would be required at the layover facility. The estimated cost for this track and associated turnout is shown in Table 9.4-3.

Table 9.4-3: Des Moines Layover Facility Cost Estimate with Optional Track for Future Phase

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Yards and Yard Track** | Track | TF | 955 | $250 | $238,750 |
| | #10 Hand Throw Turnout | Each | 1 | $130,000 | $130,000 |
| | **Subtotal** | | | | **$368,750** |
| | **Contingency 30%** | | | | **$110,700** |
| | **Cost Total** | | | | **$479,450** |
| **Total Des Moines Layover Facility Cost Estimate w/ Optional Track** | | | | | **$3,286,380** |

### 9.4.3 Cost Estimate for Council Bluffs Layover Facility

For the extension of four daily round-trips to Council Bluffs, a layover facility adjacent to the proposed passenger station is recommended. This site is to the west of the IAIS yard, east of Iowa Highway 192, and north of the system interchange for Interstates 80 and 29. The estimated cost for this facility is shown in Table 9.4-4.

Table 9.4-4: Council Bluffs Layover Facility Cost Estimate

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Layover Facility** | Building | Sq Ft | 2,000 | $90 | $180,000 |
| | Land Acquisition (2/3 of total land cost) | L Sum | 1 | $1,191,860 | $1,191,860 |
| | Clearing & Grubbing | AC | 13.1 | $500 | $6,550 |
| | Subgrade Preparation (Compaction, Treatment, etc.) | AC | 13.1 | $9,680 | $126,808 |
| | Aggregate SubBase for Access Road/Pad (6") | SY | 8,562 | $94 | $804,828 |
| | Asphalt Parking - HMA (6") | SY | 915 | $60 | $54,900 |
| | Aggregate Base Course (6") | SY | 9,477 | $12 | $113,724 |
| | Potable Water & Gen Util. Services | L Sum | 1 | $100,000 | $100,000 |
| | 480V Elec. Service for Standby Power | L Sum | 1 | 300,000 | $300,000 |
| | Perimeter Security Fencing | LF | 4,900 | $35 | $171,500 |
| | Site Lighting | L Sum | 1 | 300,000 | $300,000 |
| | **Subtotal** | | | | **$3,350,170** |
| | **Contingency 30%** | | | | **$1,005,100** |
| | **Base Cost Total** | | | | **$4,355,270** |
| **Yards and Yard Track** | Track | TF | 10,203 | $250 | $2,550,750 |
| | #11 Hand Throw Turnout | Each | 6 | $150,000 | $900,000 |
| | #11 Power Operated Turnout | Each | 2 | $180,000 | $360,000 |
| | **Subtotal** | | | | **$3,810,750** |
| | **Contingency 30%** | | | | **$1,143, 300** |
| | **Cost Total** | | | | **$4,954,050** |
| **Total Des Moines Layover Facility Cost Estimate** | | | | | **$9,309,320** |

If the full service option of seven daily round-trips (five terminating in Council Bluffs and two terminating in Des Moines) is implemented, an additional storage track would be required at the layover facility. The estimated cost for this track and associate switch is shown in Table 9.4-5.

Table 9.4-5: Council Bluffs Layover Facility Cost Estimate with Optional Track for Future Phase

| Type | Items | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Yards and Yard Track** | Track | TF | 1,495 | $250 | $373,750 |
| | #11 Hand Throw Turnout | Each | 2 | $150,000 | $300,000 |
| | **Subtotal** | | | | **$673,750** |
| | **Contingency 30%** | | | | **$202,200** |
| | **Cost Total** | | | | **$875,950** |
| **Total Des Moines Layover Facility Cost Estimate w/ Optional Track** | | | | | **$10,185,270** |

# 10.0 Operations Plan

## 10.1 Service Requirements

This section describes in detail the technical basis for establishing the passenger-rail transportation service of the Chicago to Council Bluffs-Omaha Regional Passenger Rail System Service. It furthermore translates the purpose and need for the Service, established in Section 2.0 of this SDP into the technical parameters of a passenger-rail service that will be developed between Chicago and Council Bluffs-Omaha and will fulfill the Service requirement in a cost-effective and feasible manner. Requirements will include those necessary to design, build, operate, and maintain the service, as it expands incrementally through phased implementation from Chicago to the Quad Cities initially, and later west in segments to Iowa City, Des Moines, and Council Bluffs-Omaha.

Elements of this process included development of:

- An understanding of the present-day function, geometry, multimodal connectivity, and operating and engineering feasibility for high-speed passenger rail in the corridor
- An understanding of the present-day freight and passenger rail uses of corridor, in order to best-fit the needs of the Program with the needs of other users of the routes
- A final corridor selected during an Alternatives Analysis of possible routes, in conjunction with the Tier 1 NEPA/EIS process
- Optimization of the combination of infrastructure investment and operating requirements
- Rail Traffic Controller (RTC) models of the corridor to validate conceptual infrastructure planning, proposed schedules, and proposed operating plans (two RTC models were conducted, one for the IAIS portion of the route between Wyanet and Council Bluffs, and one for a portion of the intersecting BNSF Barstow Subdivision, which crosses IAIS at Colona)
- A final operating plan Equipment, station, and equipment maintenance facility requirements necessary to meet the proposed schedule and operating plan
- Infrastructure, equipment, operating, and maintenance cost estimates

## 10.2 Operations Modeling

### 10.2.1 Methodology

As part of the Service, operations modeling was performed using the Berkeley Simulations Rail Traffic Controller (RTC) model between Wyanet and Council Bluffs, and for the BNSF Barstow Subdivision between Alpha and Fenton, Illinois.. RTC modeling for the Chicago commuter territory between Chicago Union Station and Aurora will be deferred until Tier 2 project studies. BNSF has previously modeled Aurora to Wyanet for two round-trips per day; a Tier 2 RTC model for four round-trips per day would be conducted in this line segment to incorporate potential freight, Metra commuter, and other intercity passenger services that may be using all or part of this corridor in the future.

The general plan of the RTC modeling was to identify the total improvements required for four round-trips per day between Wyanet and Council Bluffs, so that an upper-boundary cost estimate could be developed, and to understand the total infrastructure requirement so that phased infrastructure construction does not create rework. The proposed implementation plan defers geographic extensions beyond Iowa City and increases in frequency for a long period of time. Accordingly, the RTC model would need to be updated at such time as an implementation phase approaches.

The accuracy of the results gained from RTC modeling was dependent upon cooperation from host freight railroads, Amtrak, and Iowa and Illinois DOT. RTC modeling relies upon inputs for freight operations from host railroads, including existing train schedules, work events, and proposed future freight service plans; train characteristics for each freight train type; train growth rates, if any for each train type, proposed location, frequency, and operating plan for future freight train customers within a 20-year horizon post construction; employee timetables and track charts; current operating plans for local and industry switchers; current typical operating plans for through trains; train symbols; and consists including locomotive types, train tonnage, train length, and typical ranges of variability; and identification of rail customers served within the corridor limits. Inputs for Amtrak operations include scheduled slot times at Chicago Union Station and crew and equipment scheduling, rotation, assignment, and maintenance-planning information.

The output metrics of RTC modeling include:

- Initial Train Performance Calculator (TPC) runs for the proposed passenger trains on the Chicago to Council Bluffs-Omaha corridor for unimpeded end-to-end runs for 79 mph, 90 mph, and 110 mph maximum track speeds, including initial proposed station stops and operating restrictions imposed by horizontal and vertical track characteristics, to establish a range of general performance
- Stringlines and TPC runs for the proposed passenger train schedule at the final determined maximum speed and operating plan
- Stringlines for the proposed passenger train schedule with freight stringlines overlaid for a typical week period for proposed 20-year traffic volumes after implementation of the proposed service
- Presentation and analysis of operating requirements for proposed new track infrastructure
- Recommendations for proposed additional or revised infrastructure, as validated or required for successful prosecution of the RTC model runs
- Delay ratios for freight trains with and without proposed infrastructure and passenger train schedules, to demonstrate the host railroad freight mitigation is delivered by the proposed infrastructure and operating plan

### 10.2.2 Route Description

Selection of the proposed Chicago to Council Bluffs-Omaha route was conducted during the Tier 1 NEPA/Alternatives Analysis process using input from rail operations and engineering experts, the host railroads and Amtrak, the cities that could be served by the Service, and the public. The process was informed by initial conceptual-level passenger-train schedules, assessments of existing infrastructure, discussions with freight and passenger rail users to determine existing and likely future uses of the proposed routes, and initial cost estimates.

The route selection process concluded with the selection of a combined BNSF Railway/Iowa Interstate Railroad route originating at Chicago Union Station, following the existing BNSF commuter route to Chicago's western suburbs; transitioning from BNSF to IAIS at a new connection to be built at Wyanet, Illinois; and continuing on IAIS to the Quad Cities, Iowa City, Des Moines, and Council Bluffs. The existing conditions of this route, the current-day operating environment and infrastructure, and the effects of these conditions and uses on the Study's operating plan are described in the following sections.

#### 10.2.2.1 BNSF Railway Route Segment

*Background*

The Chicago and Mendota Subdivisions of the BNSF Railway, which will be used by the passenger trains in the Service, formerly comprised a portion of the principal east-west corridor of the Chicago, Burlington & Quincy Railroad, and predecessor to today's BNSF. The Chicago Subdivision extends from Chicago Union Station to Montgomery, Illinois, 41 miles, and the Mendota Subdivision extends from Montgomery to Galesburg, Illinois, continuing past Wyanet, 71 miles west of Montgomery. Similar to the history of the Rock Island Railroad, described below, the "Q" as it was known colloquially, operated a fleet of fast streamlined passenger trains mixed with overhead and locally generated freight. Most of the freight traffic was classified at its yard in Cicero, Illinois, just west of Chicago. The Burlington merged with Northern Pacific, Great Northern, and Spokane, Portland & Seattle in 1970, and finally with the Atchison, Topeka & Santa Fe Railway in 1995 to form Burlington Northern Santa Fe Railway (now BNSF Railway). It was this last merger that changed the operational complexion of the corridor from Chicago through Wyanet to Galesburg, as the primary Santa Fe corridor tapped directly into the Pacific Southwest trade corridor offering significant time saving and strategic advantages over the CB&Q corridor. With the development of logistics centers and intermodal yards along the former Santa Fe alignment in Illinois at Willow Springs and at Logistics Park near Joliet, and with few capacity constraints, much of BNSF's time-critical traffic from Southern California, Arizona, and Texas, is now moved on the Santa Fe corridor through Illinois to Chicago as opposed to the CB&Q corridor. Another former CB&Q mainline—the north-south BNSF Barstow Subdivision between Savanna and Galesburg, Illinois—crosses the Iowa Interstate corridor used by passenger trains of the Service at grade in Colona, Illinois.

*Present BNSF*

The Chicago and Mendota Subdivisions transport Pacific Northwest intermodal goods, manifest freight, and grain, as well as a large portion of BNSF's Powder River Basin coal traffic including virtually all of its coal traffic to the Great Lakes states. As of early 2013, approximately 20 to 28 freight trains operate daily on the Mendota Subdivision, with an additional 20 to 28 freight trains daily entering or leaving at Aurora, MP 38.4, just east of Montgomery, for a total of 40 to 56 freight trains daily on the Chicago Subdivision. These trains average 6,000 to 7,000 feet in length with 8,800 to 13,200 horsepower on each train, with both conventional power placement as well as distributed power. At Montgomery, the single-track Aurora Subdivision joins with the double-track Mendota Subdivision to form the double-tracked, then triple-tracked Chicago Subdivision. Two each-way daily long-distance Amtrak trains, the *Southwest Chief* and *California Zephyr,* as well as two round-trip daily state-supported Chicago to Quincy, Illinois, trains, the *Carl Sandburg* and *Illinois Zephyr,* also operate on this corridor. From Aurora (entering BNSF's corridor at West Eola on the Chicago Subdivision) and Naperville to Chicago's Union Station, 94 Metra local and express trains operate Monday through Friday with a lesser number operating through the weekend.

BNSF holds loaded coal trains west of Aurora on the double-tracked Mendota Subdivision until the shipper or connecting railroad at Chicago can accommodate them. Typically these trains are held on one of the two main tracks between the control points at Earlville and Somonauk, Illinois. During the time these trains are staged, only one main track is available for service for this 15-mile stretch between the Earlville and Somonauk crossovers.

BNSF maintains the Chicago and Mendota Subdivision to FRA Class 4 standards, which allows 79 mph for passenger and 60 mph for freight. Current maximum operated speeds on the BNSF portion are 79 mph passenger and 60 mph freight, with permanent speed restrictions reducing these speeds at locations such as curves, stations, and terminal areas. Train movements on the Chicago and Mendota Subdivisions are governed by Centralized Traffic Control (CTC). The Mendota Subdivision typically is equipped with universal No. 20 crossovers (BNSF typically allows 35 mph through the diverging side of the turnout for freight trains and 40 mph for passenger trains) at control points located as indicated in Table 10.2-1 below. Operations and maintenance activities on the Chicago Subdivision are handled in a similar fashion on this primarily three and four-track main line, although crossovers are more frequently No. 24's for which BNSF allows 50 mph through the diverging side of the turnout. Maximum track speed is 70 mph with track maintained to FRA Class 4 standards. BNSF is in the process of installing PTC on this corridor, from Chicago to Galesburg, Illinois, which will be completed in 2014.

BNSF's Barstow Subdivision runs between Savanna and Galesburg, Illinois, and crosses the IAIS at a level crossing at Colona, Illinois. Approximately 18 to 24 BNSF trains cross the Service route each day at Colona, with trains that average approximately 6,000 to 7,000 feet in length. BNSF uses the Barstow Subdivision to bypass crowded Chicago terminals and to funnel a considerable volume of agricultural, bulk, and general manifest traffic between the Upper Midwest and the south and west via its major classification yard at Galesburg, Illinois. The Colona crossing is a manual interlocking where each train is advanced across the crossing "diamond" by the BNSF dispatcher. Maximum speed through the interlocking on the BNSF is 30 mph. In the Moline-Rock Island area, BNSF operates an average of two through trains and two locals a day between Silvis and Rock Island with an occasional grain train (loaded and empty) also operating through this corridor once a week. The two locals occupy the BNSF/IAIS joint track between Moline and Rock Island approximately four to five hours each day.

Passenger platforms for current Amtrak passenger trains (and Metra commuter trains on the Chicago Subdivision) are located on both sides of the BNSF corridor except at Mendota, where the platform is only located on the north side of the double-track main line.

Table 10.2-1: BNSF Interlocking Locations, Chicago and Mendota Subdivisions

| Location | MP | Type of Operation | Turnout Size | Speed through Turnout (MPH) | Comments |
|---|---|---|---|---|---|
| **Chicago Subdivision Maximum Speed MP 0.0 to 38.4 = 70 MPH; MP 38.4 to 41.0 = 79 MPH** | | | | | |
| Halsted St./Union Ave | 1.8 | 4 main tracks CTC | No. 20 | 35 | |
| Western Ave | 3.7 | | No. 15 | 10 | |
| Cicero | 7.0 | | No. 20 | 35 | |
| La Vergne | 9.0 | 3 main tracks CTC | No. 15 & 20 | 30 | |
| Berwyn | 9.6 | | No. 24 | 50 | |
| Brookfield/Congress Park | 12.3 | | No. 24 | 40 | |
| Highlands | 16.3 | | No. 20 | 35 | |
| West Hinsdale | 17.8 | | No. 20 | 35 | |
| Fairview/Downers Grove | 21.1 | | No. 20 | 35 | |
| Lisle | 24.4 | | No. 24 | 50 | |
| Naperville | 28.4 | | No. 20 | 35 | |
| Eola | 33.4 | | No. 15 | 30 | |
| West Eola | 35.3 | | No. 15 | 30 | |
| Aurora | 38.4 | 2 main tracks CTC | No. 20 | 35 | |
| **Mendota Subdivision Maximum Speed MP 41.0 to MP 112.0 (Wyanet) = 79 MPH** | | | | | |
| Bristol | 45.5 | 2 main tracks CTC | No. 20 | 35 | RH Crossover only |
| Somonauk | 59.2 | | No. 20 | 35 | |
| Earlville | 72.1 | | No. 20 | 35 | |
| Electrics | 80.5 | | No. 20 | 35 | |
| Zearing | 95.3 | | No. 20 | 35 | |
| Wyanet (proposed) | 112.0 | | No. 24 | 50 | To be constructed |

### 10.2.2.2 Iowa Interstate Railroad Route Segment

*Background*

Iowa Interstate Railroad (IAIS) between Wyanet and Council Bluffs was once an Automatic Block signaled, double-track main line of the Chicago, Rock Island & Pacific Railroad (Rock Island Railroad) reaching westward from Chicago and ultimately reaching to Kansas City, Missouri; St. Paul, Minnesota; Denver, Colorado; Dallas and Houston, Texas; and Tucumcari, New Mexico (double-track existed from Chicago to Iowa City, Iowa, and through Des Moines, Iowa). The route featured a slate of streamlined intercity and long-distance passenger trains well into the 1960s, directly connecting Chicago with Peoria, the Quad Cities, Des Moines, Council Bluffs-Omaha, Denver, Kansas City, and Los Angeles, California (partner Southern Pacific Railroad hosted this service west of Tucumcari). The last vestige of Rock Island's long-distance service—a daily Chicago-Des Moines-Council Bluffs service across Iowa—was cut back to Rock Island, Illinois, in 1970. The Rock Island did not join Amtrak in 1971, and instead ran the last of its own passenger trains from Chicago to

Rock Island and Peoria with financial assistance from the state of Illinois until discontinuance of the Quad Cities train in 1978.

The Rock Island also funneled a large volume of overhead freight traffic to and from its yard at Blue Island in Chicago, on their east-west main route (which includes the segment between Wyanet and Council Bluffs) to Western origins and destinations. The Rock Island failed to merge with the larger Union Pacific Railroad in the 1970s, and ultimately became a victim of railroad regulation when it was forced to declare bankruptcy and ordered for liquidation by a federal judge after several failed reorganization efforts. Rock Island ceased operations in 1980, but a trustee oversaw the railroad's dismemberment and sold its assets piecemeal to other carriers through 1984. In the Chicago to Council Bluffs-Omaha corridor in particular, the Chicago to Joliet, Illinois, portion was sold to Metra for commuter rail; Joliet to Bureau, Illinois, was sold to CSX for freight service; Bureau to Council Bluffs, Iowa, ultimately became the IAIS; and Rock Island's trackage rights over UP and the Missouri River Bridge between Council Bluffs and Omaha were suspended.

Iowa Interstate Railroad emerged in 1984 as the operator of the majority of the Chicago-Council Bluffs corridor to provide rail service between Bureau, where it intercepted CSX, and Council Bluffs, where it connected with several railroads, including transcontinental UP. This restored rail service to many of the corridor's on-line shippers for the first time since 1980. In order to interchange with Class 1 carriers in Chicago, the IAIS obtained trackage rights from Bureau to Joliet over CSX and from Joliet to Blue Island over Metra, which assumed operation of the former Rock Island commuter service in the Chicago metropolitan area.

By this time, most of the Chicago-Omaha route was fraught with crumbling infrastructure and slower operating speeds, as a result of deferred maintenance and insufficient capital investment by the Rock Island during its final decades. Wayside signals were removed from service and the main line was single-tracked west of Joliet. This now requires IAIS to switch most of its on-line customers directly from the main track rather than clearing the main track to switch customers.

Because the volume of through rail traffic had plummeted, only a limited number of sidings, including many fashioned from the former second main track or longer sidings, were still required. Rock Island's major yards in Blue Island and Silvis, Illinois, and Des Moines, Iowa, were abandoned or taken over by other carriers, leaving IAIS to switch trains from smaller secondary yards in Rock Island, Illinois, and Iowa City, Newton, and Council Bluffs, Iowa. Because few, if any, through trains and no passenger trains continued to operate over the corridor, the main track cost-effectively became the switching lead for these yards, a practice that continues to the present.

#### *Present IAIS*

IAIS is managed from its corporate headquarters located in Cedar Rapids, Iowa, and is broken into distinct operating segments: Subdivision 1 from LaSalle, Illinois, to Iowa City, Iowa; Subdivision 2 from Bureau to Peoria, Illinois; Subdivision 3 from Iowa City to Des Moines, Iowa; and Subdivision 4 from Des Moines to Council Bluffs, Iowa. IAIS has developed a diverse on-line traffic base, whereas the Rock Island once handled that plus a substantial overhead traffic from Western connections at Council Bluffs and Denver, Colorado. Shippers along this corridor have come to rely on timely, consistent, efficient, and more cost-effective rail service provided by IAIS to transport their goods to market. The railroad continues to grow and diversify its traffic base steadily, and it had a record-breaking year in 2012 by originating 125,000 cars. Both CSX and Metra provide daily time slots on their congested main tracks in Illinois that IAIS trains must meet to move the final miles to and from Chicago. These specified times must be met in order to minimize disruption to Metra's daily commuter train operations between Chicago and Joliet. These slot times, in turn, set the schedule for train operations on the rest of the IAIS.

IAIS serves customers and conducts interchange with connecting railroads over the length of its system daily. Each IAIS train is designated by a symbol which provides information about its station of origin and destination. The daily each way combination through-train/ roadswitchers with train symbols BICB and CBBI provide the backbone of IAIS operations between Blue Island (Chicago) and Council Bluffs and carry a mixture of general manifest, intermodal, grain, and ethanol traffic. These trains pick and set out cars for other IAIS trains at Silvis, Illinois; and Iowa City, South Amana, and Atlantic, Iowa, and can be dispatched to handle any customer service requirements en route. The trains frequently shuttle cars to and grain from western and central Iowa origins bound for the ADM grain-processing complex in Cedar Rapids. The BICB and CBBI average 7,000 feet in length and are typically pulled by two 4,400 horsepower locomotives totaling 8,800 horsepower.

Trains BICB and CBBI are supplemented by trains BISI and SIBI east of Silvis. These through trains shuttle traffic of all kinds between Blue Island (Chicago) and Silvis that cannot be accommodated on trains BICB/CBBI, and operate when volume warrants, usually about four to five days a week.

A pair of daily roadswitchers, trains SASI and SISA between South Amana and Silvis, shuttle a substantial volume of interchange traffic between the Cedar Rapids and Iowa City Railway (CIC) at Cedar Rapids and Silvis, where it is added to or subtracted from trains BICB/CBBI and SIBI/BISI or interchanged to BNSF and Canadian Pacific Railway (CP). Frequent commodities handled by these trains from Cedar Rapids include construction materials, corn syrup, animal feed, and ethanol, and will also handle online customer switching between Durant and Davenport, Iowa, as needed. The trains average between 6,000 and 7,000 feet in length and employ total locomotive horsepower of between 8,800 and 13,000. Some of this traffic is assembled into unit trains at Silvis, which is picked up by a BNSF crew and taken to Galesburg, Illinois (these BNSF unit trains operate over a short segment of IAIS from Silvis to the interchange track with the BNSF Barstow Subdivision at Colona).

The ethanol boom created additional rail-served business with large-scale facilities located along the IAIS at Annawan (Patriot), Illinois, and Menlo, Iowa. These facilities generate unit trains averaging 5,200 feet in length several times weekly; as well as loose carload traffic on a daily basis. Unit trains have 8,800 total locomotive horsepower.

Unit grain trains are common on IAIS. Once weekly, IAIS receives a haulage unit grain train from the NS at Des Moines and forwards it to Peoria and it also handles a grain shuttle from Hancock Junction to Council Bluffs for BNSF. Unit trains average 5,200 to 6,500 feet in length and have 13,000 total locomotive horsepower. Additional loose carloads and blocks of grain from western and central Iowa are picked up by train CBBI and set out at South Amana for forwarding to Cedar Rapids (empties for loading return on train BICB).

IAIS also handles occasional unit coal trains between Peoria, Illinois, and Cedar Rapids, Iowa, averaging 7,200 to 7,500 feet in length and total locomotive horsepower of 11,000. These trains are often held on the IAIS awaiting acceptance by the shipper or connecting railroad.

Switchers based in Bureau, Silvis, Rock Island, South Amana, Newton, Atlantic, and Council Bluffs build trains, stage cars for pick up by through trains, and serve concentrated clusters of online customers.

The Bureau Switcher serves customers between Bureau and Atkinson (west of Wyanet) and makes a turn to Silvis to swap cars with trains BICB/CBBI and SASI/SISA three days a week. It assembles unit ethanol trains as required, and also handles customers and interchanges between Bureau and LaSalle and Peoria, Illinois, to the east on other days.

Daily, around-the-clock service to customers and interchange partners in the Quad Cities is facilitated by a pair of daily Silvis-based and a pair of daily Rock Island-based switchers. CP also interchanges daily with IAIS and with BNSF using the BNSF bridge to access Rock Island and Moline/Silvis Yards; a CP local typically passes through Moline and Rock Island once daily, occupying the same main track as IAIS through trains and switch engines, and BNSF's each-way daily through trains and locals, a total of five trains daily in addition to the IAIS trains. The BNSF locals frequently require three hours to move between the BNSF connection at 7$^{th}$ Street in East Moline and Rock Island Yard, due to train congestion and switching and interchange activity. As a result, this corridor is occupied by at least one, and frequently three to four, trains and switch engines from one to three different railroads virtually around the clock.

South Amana is at the midpoint of the railroad between Chicago and Council Bluffs and became the operational center of the IAIS in 2012. A pair of daily switchers—SACR-1 and SACR-2—exercise trackage rights over the CIC to bridge traffic between the CIC interchange at Cedar Rapids and the yard at South Amana, where cars are added to or subtracted from IAIS trains BICB/CBBI and SASI/SISA. The daily South Amana Switcher serves customers between Marengo (west of South Amana) and Durant (east of South Amana), Iowa, and on the Hills Branch out of Iowa City.

The daily Newton Switcher serves customers between Des Moines (west of Newton) and Grinnell (east of Newton) and on the Prairie City Branch out of Altoona. The train also interchanges cars with NS and UP at Des Moines, builds a pick up for through trains BICB/CBBI at one location, and assembles and forwards unit grain trains, as required.

The daily Atlantic Rover serves online customers between Hancock Junction (west of Atlantic) and Des Moines (east of Atlantic) and the Grimes Branch out of Des Moines. It builds the pick-up for through trains BICB/CBBI at one location, and assembles and forwards unit grain and ethanol trains and their empty counterparts, as required.

In Council Bluffs, customers are served and interchanges with BNSF, Kansas City Southern (KCS), and UP are facilitated around the clock by a pair of daily switchers.

Union Pacific utilizes trackage rights over IAIS between Council Bluffs and Des Moines occasionally, as a means of detouring trains around its parallel mainline to the north during maintenance periods or in the case of a derailment.

IAIS track between Wyanet and Council Bluffs is generally single track maintained to FRA Class 3 standards, allowing for maximum operating speeds of 40 mph for freight, except for limitations imposed by permanent speed restrictions on some curves and in terminal areas. Segments of the former double-track mainline have been retained for use as sidings and are used more as locations for staging for connecting roads and industries, and for industry switching support, then for meets and passes. Track speeds are 10 mph on these sidings, through the yards at Silvis, Rock Island, Iowa City, South Amana, Des Moines, and Council Bluffs, and through interlockings. The siding lengths, locations, turnout size, siding speed, and primary function of the siding are shown in Table 10.2-2 below. Trains enter these sidings by hand-throwing the entering switch and, once clear of the main track, leave the mainline switch in the open position. Train movements over the IAIS are governed by a series of Track Warrant Control (TWC) and Yard Limit segments, except were IAIS trains pass through interlockings at Colona, Illinois, and Grinnell and Des Moines, Iowa, and a manual interlocking that governs train movement on the Government Bridge over the Mississippi River at Rock Island, Illinois. At these locations, IAIS trains are governed by signal indication.

Table 10.2-2: IAIS Siding Locations and Current Characteristics, Wyanet to Council Bluffs

| Location (east to west) | West MP | East MP | Siding length (feet) | Turnout size | Siding Speed (MPH) | Notes |
|---|---|---|---|---|---|---|
| Annawan | 145.0 | 143.0 | 10,000 | No.10 | 10 | Industry |
| Atkinson | 152.0 | 150.0 | 9,500 | No.10 | 10 | Meets/passes |
| Silvis | 174.4 | 172 | 12,000 | No.10 | 10 | Classification Yard; meets/passes |
| Moline | 178.5 | 177 | 6,000 | No.10 | 10 | Storage; industry |
| Rock Island | 181.3 | 181 | Yard | No.10 | 10 | Classification Yard; meets/passes |
| Walcott | 194.3 | 193.0 | 6,900 | No.10 | 10 | Meets/passes; storage |
| Twin States | 204.5 | 204 | 4,980 | No.10 | 10 | Industry |
| North Star (Wilton) | 210.9 | 209 | 12,272 | No.10 | 10 | Meets/passes; industry |
| West Liberty | 222.2 | 221 | 4,200 | No.10 | 10 | Meets/passes; storage |
| Iowa City | 236.8 | 235 | 8,676 | No.10 | 10 | Classification Yard; meets/passes |
| Homestead | 256.8 | 256 | 2,995 | No.10 | 10 | |
| South Amana | 262.0 | 258.0 | Yard | No.10 | 10 | Classification Yard; meets/passes |
| Marengo | 267.7 | 267 | 5,330 | No.10 | 10 | Meets/passes; industry |
| Brooklyn | 288.2 | 287 | 7,835 | No.10 | 10 | Meets/passes |
| Grinnell | 302.4 | 302 | 4,110 | No.10 | 10 | Meets/passes |
| Newton | 320.9 | 319 | 7,620 | No.10 | 10 | Yard; meets/passes; storage |
| Colfax | 335.8 | 335 | 5,980 | No.10 | 10 | Meets/passes |
| Des Moines | 360.0 | 359 | 4,800 | No.10 | 10 | Meets/passes |
| Booneville | 372.7 | 372 | 6,030 | No.10 | 10 | Meets/passes |
| Earlham | 389.2 | 387 | 10,000 | No.10 | 10 | Meets/passes |
| Stuart | 398.7 | 398 | 4,980 | No.10 | 10 | |
| East Menlo | 403.0 | 401 | 8,000 | No.10 | 10 | Industry |
| Casey | 410.4 | 410 | 2,220 | No.10 | 10 | |
| Anita | 425.8 | 425 | 4,980 | No.10 | 10 | Meets/passes |
| Atlantic | 440.8 | 440 | 6,200 | No.10 | 10 | Yard; meets/passes |
| Hillis | 455.5 | 455 | 4,190 | No.10 | 10 | |
| Council Bluffs | 490.0 | 486.0 | Yard | No.10 | 10 | Yard; meets/passes; storage |

### 10.2.2.4 Union Pacific Railroad Route Segment

#### *Background*

Union Pacific Railroad (UP) between East Des Moines and West Des Moines, Iowa, was once an Automatic Block signaled, double-track main line of the Chicago, Rock Island & Pacific Railroad (Rock Island) through the Des Moines metropolitan area. After the demise of the Rock Island in 1980, UP predecessor Chicago & North Western (C&NW) acquired this segment (and ultimately single-tracked it) as well as Rock Island's Short Line Yard as a means of connecting disjointed portions of its own system and increasing its presence and yard capacity in Des Moines. UP later acquired C&NW in 1995.

#### *Present UP*

Between 10 and 20 UP trains a day operate over this segment, although the predominant activity involves switchers within Short Line Yard and through manifest freight trains off of UP's north-south Trenton Subdivision mainline which pick up or set out cars in the yard. Much of the route used by IAIS—and a segment of the route to be used by the passenger trains of the Service through greater Des Moines—involves trackage rights over UP. Between East Des Moines and Short Line Junction, IAIS must pass through UP's Short Line Yard and cross the UP's Trenton Subdivision at grade. The West Des Moines Industrial Lead between Short Line Junction and West Des Moines is owned primarily by UP, but is leased, maintained, and dispatched by IAIS. UP operates over its full length, and exercises trackage rights over the short portion owned by IAIS through downtown Des Moines. The track is restricted to speeds of 10 or 25 mph.

UP maintains an extensive yard and terminal facility along its busy east-west transcontinental mainline in Council Bluffs where numerous trains originate or terminate and through trains pick up or set out freight traffic of all varieties. The UP yard is situated west of the former Rock Island yard now used by IAIS and connects with the latter carrier via a short segment of the former Rock Island mainline (until 1980, Rock Island employed trackage rights over UP from Council Bluffs to access Omaha and the continuation of its Chicago-Denver mainline). Passenger trains of the Service could follow this path and be routed through or around UP's Council Bluffs yards in order to reach the Missouri River Bridge and Omaha, but a final route has not yet been identified.

### 10.2.3 Rail Traffic Controller Modeling for Base Case and Build Case Scenarios

As a major component of this study, the Iowa DOT has completed Rail Traffic Controller (RTC) analyses of the IAIS main line between Wyanet (where it joins the BNSF Mendota Subdivision) and Council Bluffs and the BNSF Barstow Subdivision between Alpha and Fenton, Illinois, which intersects IAIS at Colona, Illinois. BNSF has modeled the Aurora to Wyanet segment of the corridor on the Chicago and Mendota subdivisions as part of various studies. Between Chicago and Aurora, however, BNSF will require as part of a future Tier 2 study the conduct of operations simulation using a more sophisticated tool than RTC, that incorporates signal aspect progressions and signal shadowing. This future study will consider effects on existing Metra commuter, Amtrak intercity, and BNSF freight services of the proposed Chicago to Council Bluffs-Omaha Service. BNSF has stated that the Chicago to Aurora portion of the corridor may require significant infrastructure improvements, redesign of maintenance-of-way activities, or both, to obtain sufficient capacity for the Service. A separate operations simulation study of the Amtrak platform capacity, track capacity, and maintenance facility capacity at Chicago Union Station will also be required as a future Tier 2 study to determine the operating plan and infrastructure needs for the Service at Chicago Union Station.

Several simulations were performed that took into account the base case and build-case scenarios involving an increase in freight traffic on existing routes and the addition of passenger trains and improved infrastructure. These models include: (1) the Base Case with existing operations and infrastructure (as they existed in late 2012); (2) the Future Freight Case with Existing Infrastructure (as it exists in the 20-year horizon, or 2032); and (3) the Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades (as it exists in the 20-year horizon, or 2032). Only the proposed service from Chicago to Council Bluffs—and not the phased implementation to Moline, Iowa City, and Des Moines—was modeled to demonstrate the full vision of the Service.

The results of these scenarios are displayed in various formats including Time/Distance Diagrams (stringlines), Train Performance Calculations (TPCs), Animations (of the scenarios), and Delay Ratios. Freight growth on IAIS and BNSF was calculated at a 2 percent compounded annual growth rate for the 2032 year planning horizon and was added to the future freight case scenarios. Freight train growth can be accommodated in several ways, including (1) adding more freight train frequency, (2) operating longer trains, and/or (3) operating heavier rail cars. Each approach affects the overall capacity of the system. Option one was selected to model, and with two additional manifest trains and one additional unit train each way daily between Wyanet and Council Bluffs as a means of illustrating likely growth in IAIS traffic.

Train operations on the IAIS were modeled using the RTC software tool. Freight train data based on IAIS's operations in late 2012 was obtained by past discussions with company operating officials and subsequent field study and research. IAIS dispatcher train sheets from September 2012, which show all train movements for a one-week period over the Wyanet-Council Bluffs segment, were referred to but the information was averaged because the Base Case RTC model is the future. IAIS freight train growth, which is assumed to include originating approximately 186,000 cars by the year 2032 (this figure was obtained by taking the 125,000 carloads handled in 2012 and increasing it at the FRA standard compounded annual growth rate of 2 percent), could be managed by IAIS by operating additional through-type trains. In cases where major meet-pass conflicts involving IAIS freight trains occurred in the Future Freight scenarios, schedules were adjusted slightly to eliminate delays or to significantly improve velocity. This method is consistent with the IAIS practice of shifting schedules rather than installing significant infrastructure upgrades to accommodate the vagaries of and increases in freight traffic flow on its network.

The BNSF Barstow Subdivision model between Alpha and Fenton, Illinois, was developed to better understand the interaction between the addition of the eight passenger trains of the Service and existing and future freight on the BNSF Barstow Subdivision which crosses the IAIS at Colona, Illinois. Approximately 18 to 24 BNSF trains cross the Service's route each day with trains that average approximately 6,000 to 7,000 feet in length. The Barstow Subdivision is a single-track mainline with a maximum authorized speed of 60 mph on the main line and 30 mph through the Colona interlocking. Sidings in the 53-mile modeling area straddling Colona measure between 8,000 and 10,500 in length and include, from south to north: Alpha, Warner, Hillsdale, and Fenton. BNSF also maintains a yard at Barstow (three miles north of Colona), where the Barstow Subdivision meets with the BNSF Rock Island Spur for East Moline and Rock Island.

RTC output was reviewed for accuracy and noted that several existing and proposed passenger train schedules required adjustment. On that basis, numerous modified stringlines were generated to display the modeling scenarios on the IAIS between Wyanet and Council Bluffs and on the BNSF Barstow Subdivision for each day of a hypothetical week. The full results of this review are included in Appendix J through O and a representative sample day for each is included below. Figure 10.2-1 illustrates the Base Case – existing IAIS freight trains and BNSF Barstow Subdivision trains only under current operating patterns with BNSF maintaining priority over IAIS at Colona; Figure 10.2-2 illustrates existing freight trains on the BNSF Barstow Subdivision; Figure 10.2-3 illustrates the Future Freight Case with IAIS and BNSF trains added to the existing infrastructure (BNSF maintains priority over IAIS at Colona); Figure 10.2-4 illustrates the Future Freight Case on the BNSF Barstow Subdivision with existing infrastructure; Figure 10.2-5 illustrates the Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades (track, signals, 79 mph operation) on IAIS; and Figure 10.2-6 illustrates the BNSF Barstow Subdivision as a Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades on the IAIS portion. In the latter two scenarios, passenger trains receive dispatching priority over all freight train movements. However, several existing and future IAIS freight schedules operate during the time-of-day that Amtrak proposes to run. Accordingly, these schedules were simulated using RTC to develop the attached time/distance graphs.

Table 10.2-3 below explains the relationship between operational conditions portrayed in the stringline diagrams below and the corresponding color to illustrate each. Trains of IAIS, BNSF, and UP are labeled by symbol where space permits. In each of the figures, the horizontal axis indicates a station by name and its milepost location and time is illustrated in one hour increments on the vertical axis.

Table 10.2-3: Time/Distance Diagram Color Legend

| Operating Scenario | Color |
|---|---|
| Very early | Green |
| Early | Light blue |
| On time | Blue |
| Late | Purple |
| Very late | Red |
| Short-time crew | Orange |
| Expired crew | Yellow |

For the proposed Amtrak passenger service between Chicago and Council Bluffs-Omaha, TPC runs were based on five coaches with a locomotive on either end of the consist. These graphs below indicate the topography; the proposed station stops; the maximum authorized operating speeds; locomotive throttle, dynamic brake, and air brake settings; and resulting train speeds. These TPCs were used in combination with time/distance diagrams to establish cumulative run times for the passenger train runs, which in turn were used to determine a schedule time. The TPCs shown in Figures 10.2-7 and 10.2-8 portray the a sample eastbound and westbound run for the express service between Chicago and Council Bluffs and Figures 10.2-9 and 10.2-10 show a sample eastbound and westbound run for the local service between Chicago and Council Bluffs.

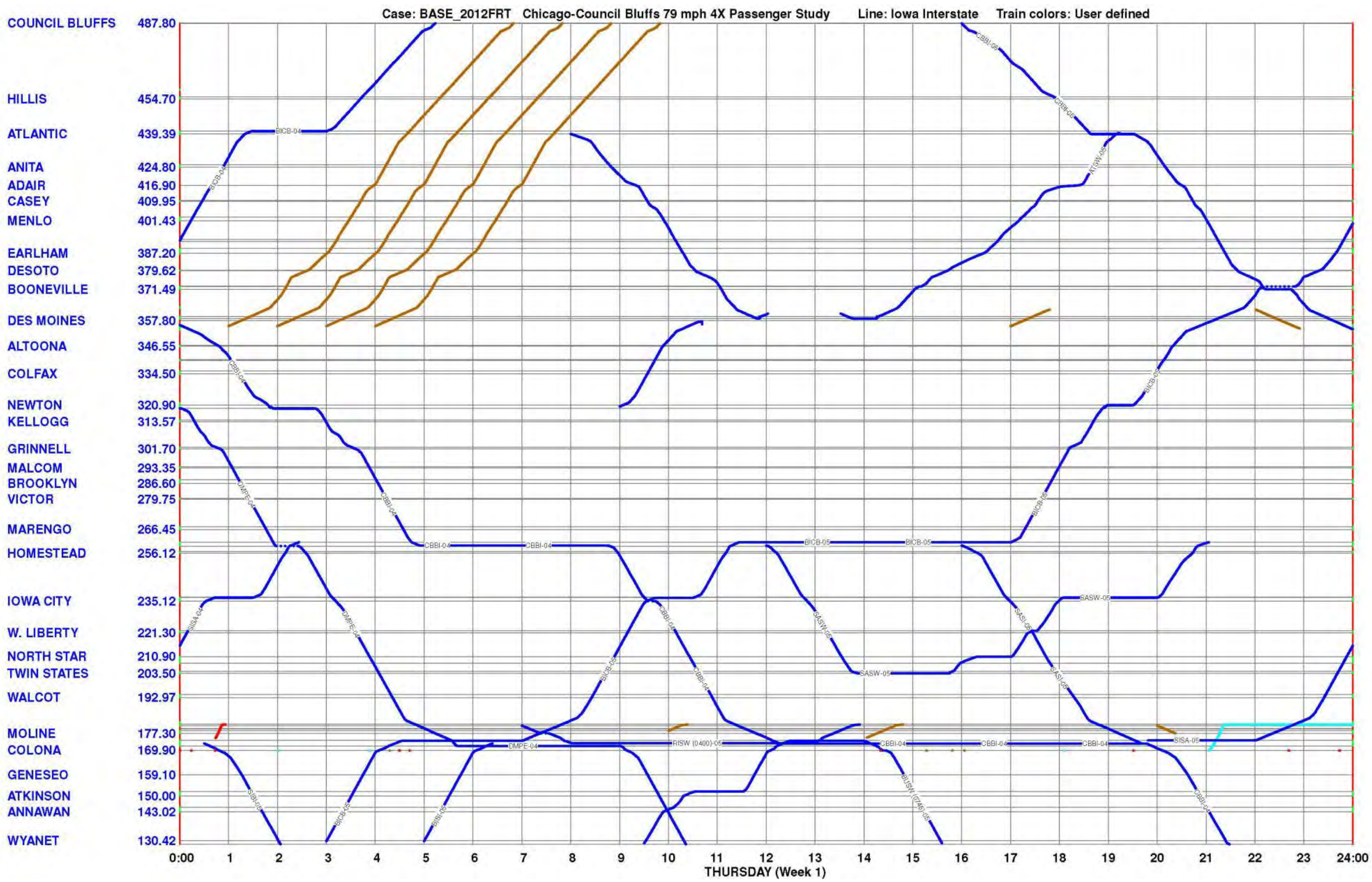



Figure 10.2-1: RTC Base Case – IAIS Wyanet to Council Bluffs (Thursday)

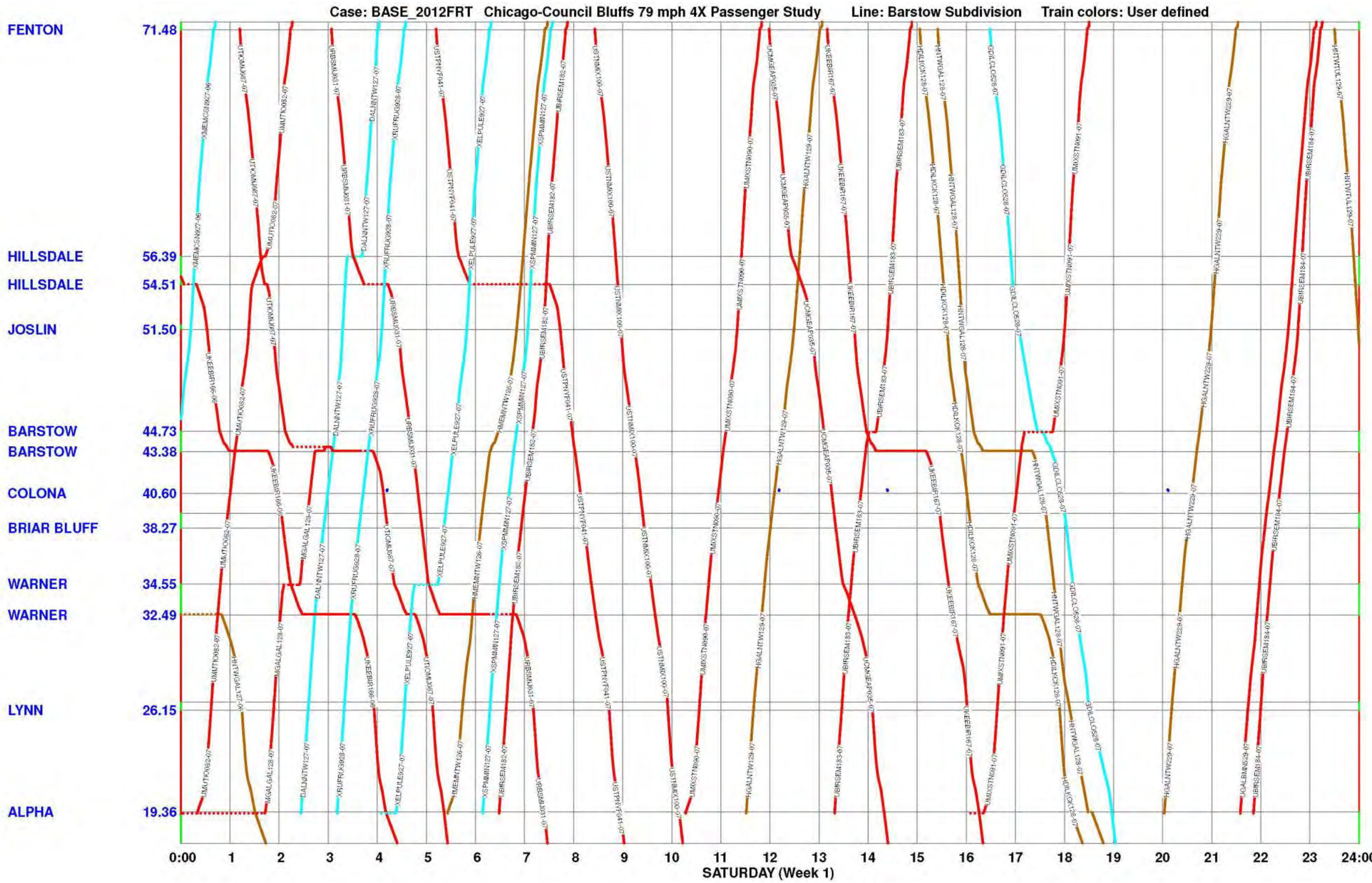



Figure 10.2-2: RTC Base Case – BNSF Barstow Subdivision (Saturday)

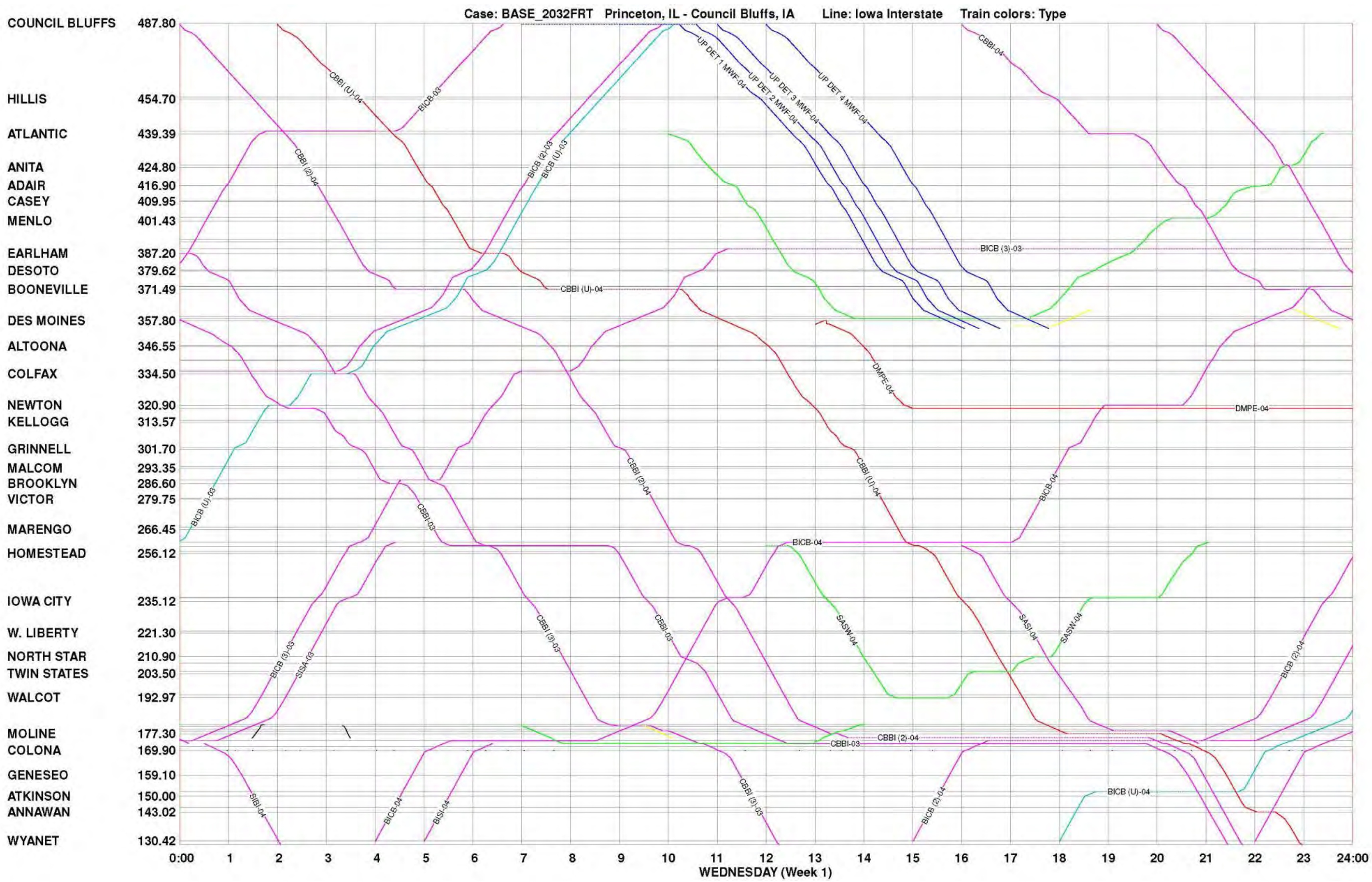



Figure 10.2-3: RTC Future Freight Case with Existing Infrastructure – IAIS Wyanet to Council Bluffs (Wednesday)

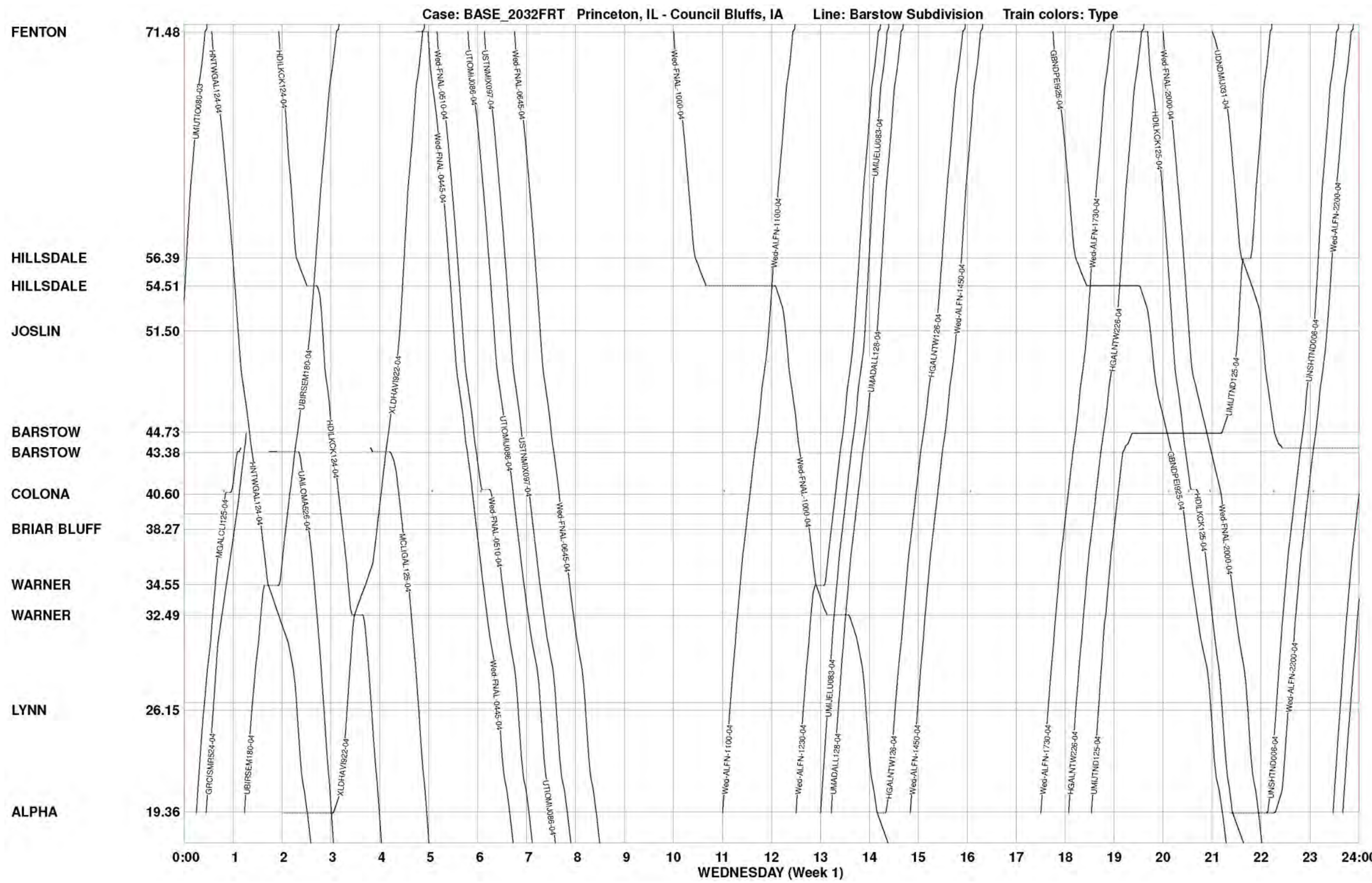



Figure 10.2-4: RTC Future Freight Case with Existing Infrastructure – BNSF Barstow Subdivision (Wednesday)

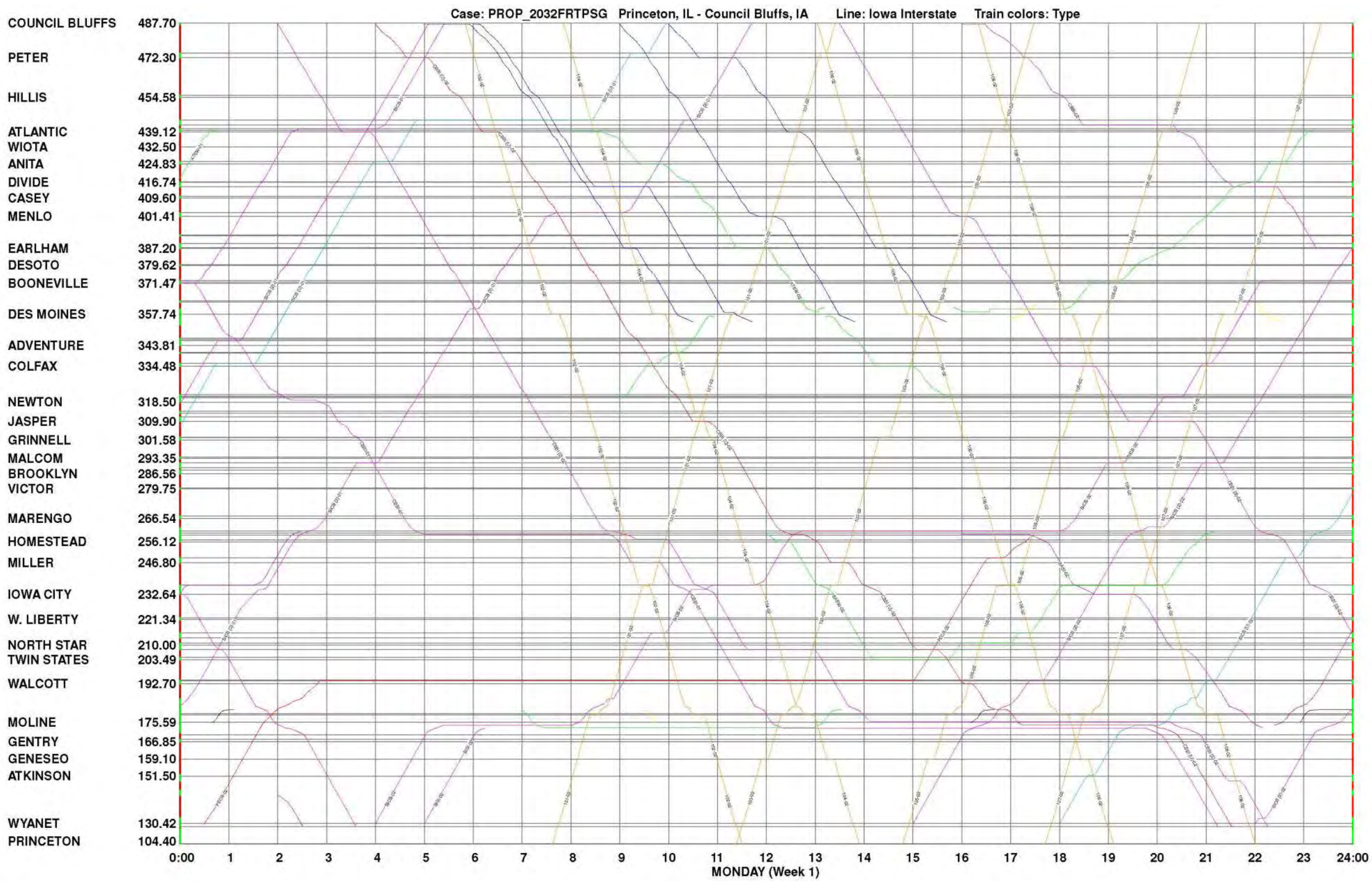



Figure 10.2-5: RTC Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades – IAIS Wyanet to Council Bluffs (Monday)

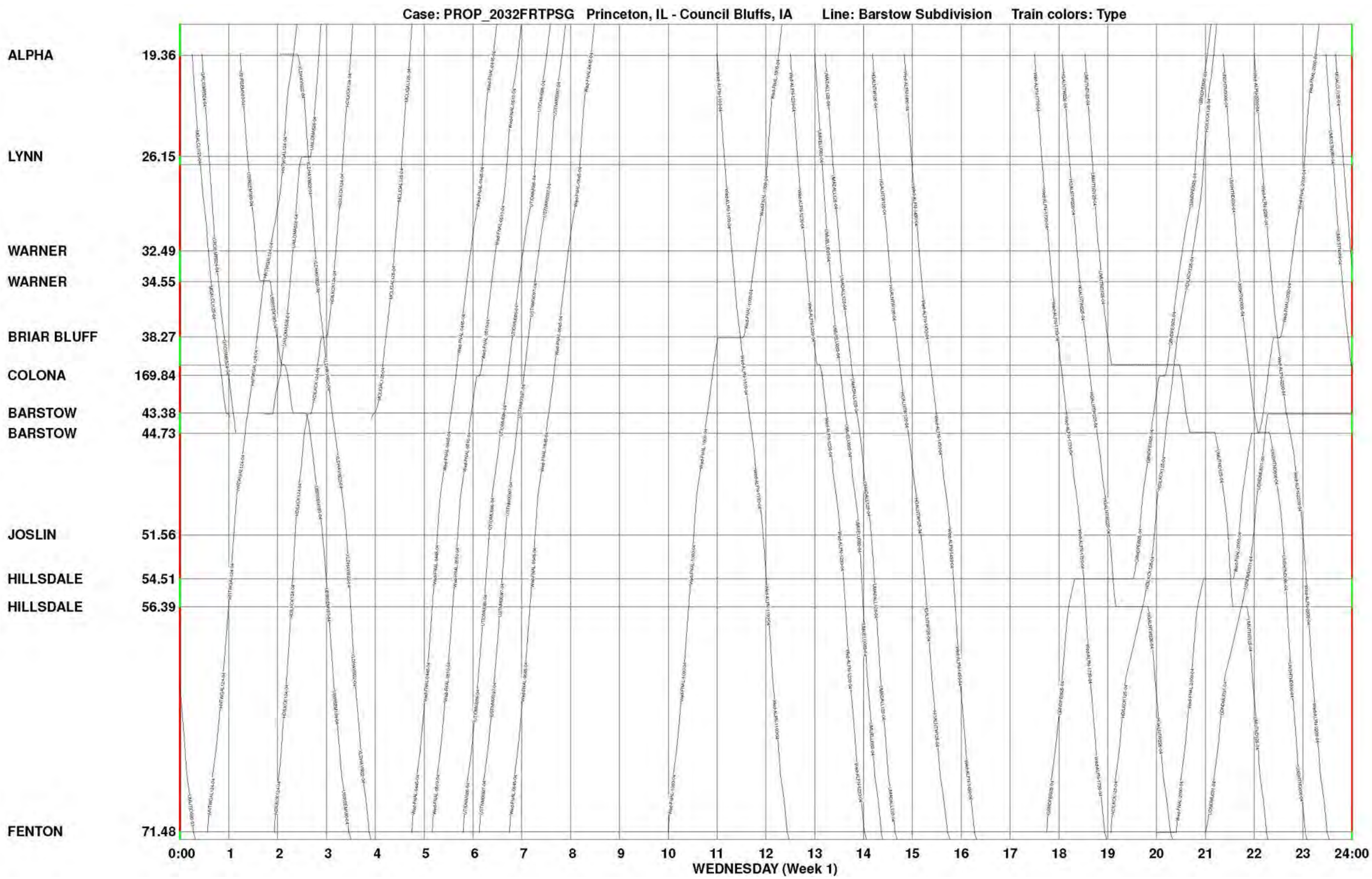



Figure 10.2-6: RTC Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades – BNSF Barstow Subdivision (Wednesday)

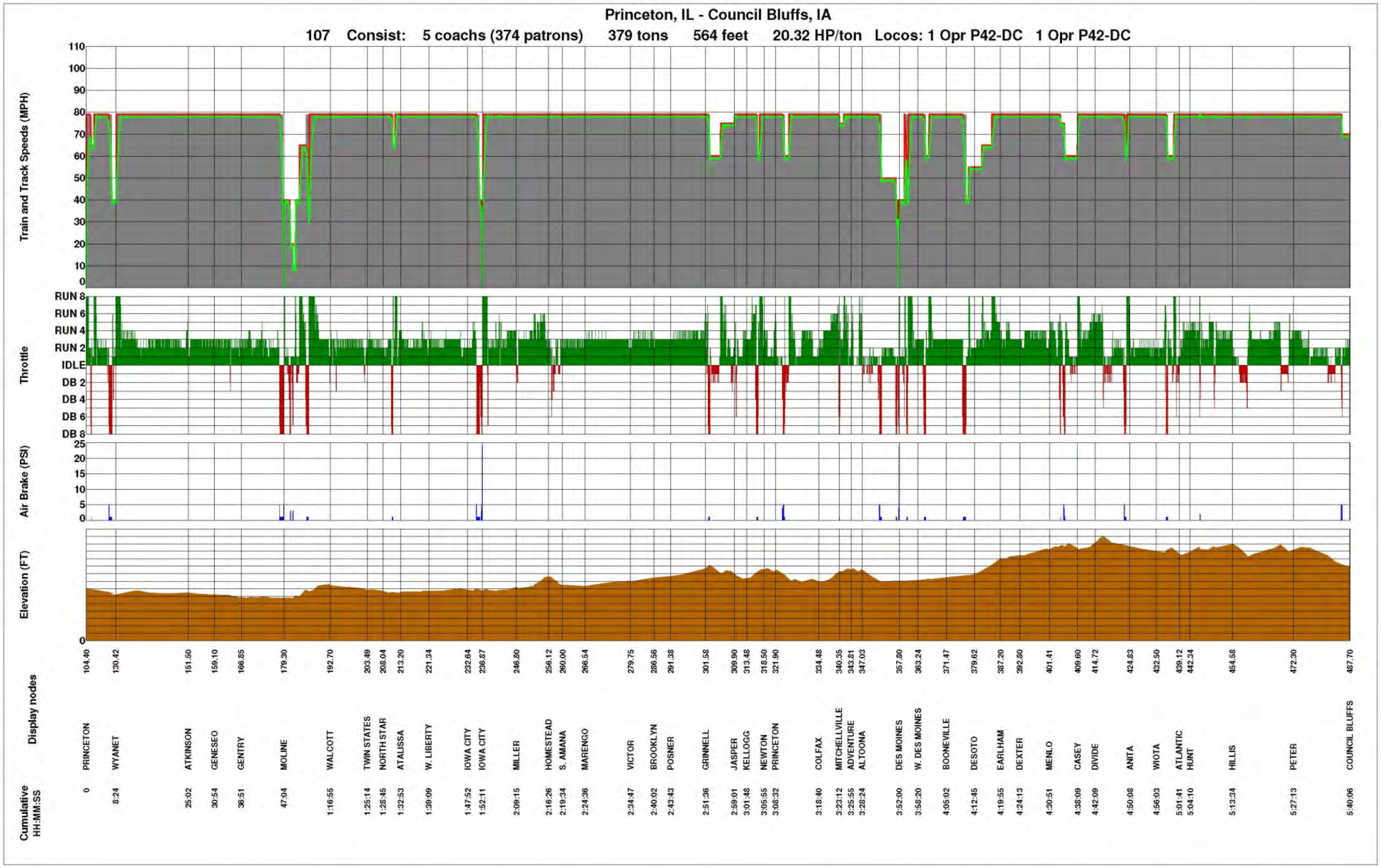



Figure 10.2-7: TPC Chicago to Council Bluffs Westbound Express Train

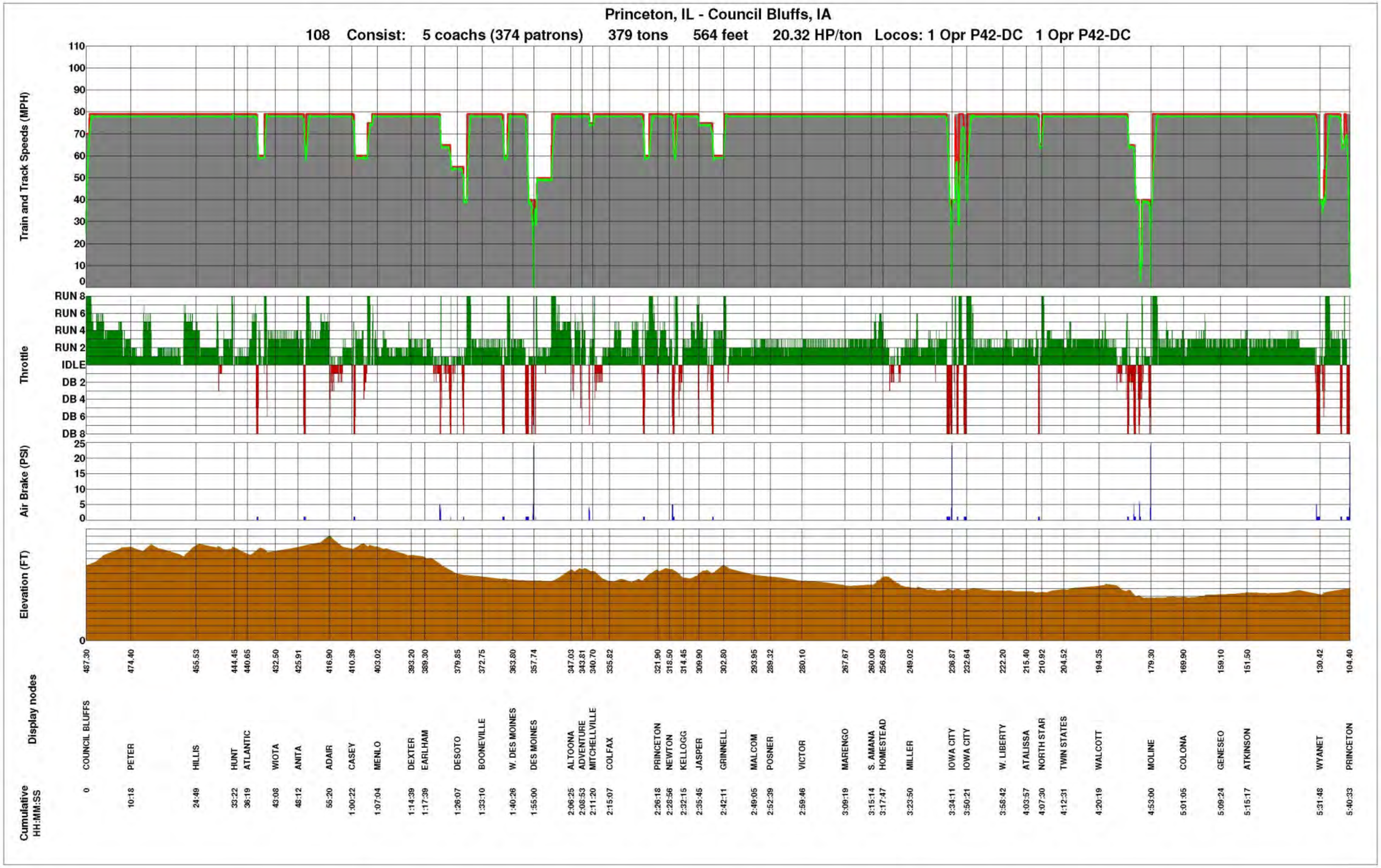



Figure 10.2-8: TPC Council Bluffs to Chicago Eastbound Express Train

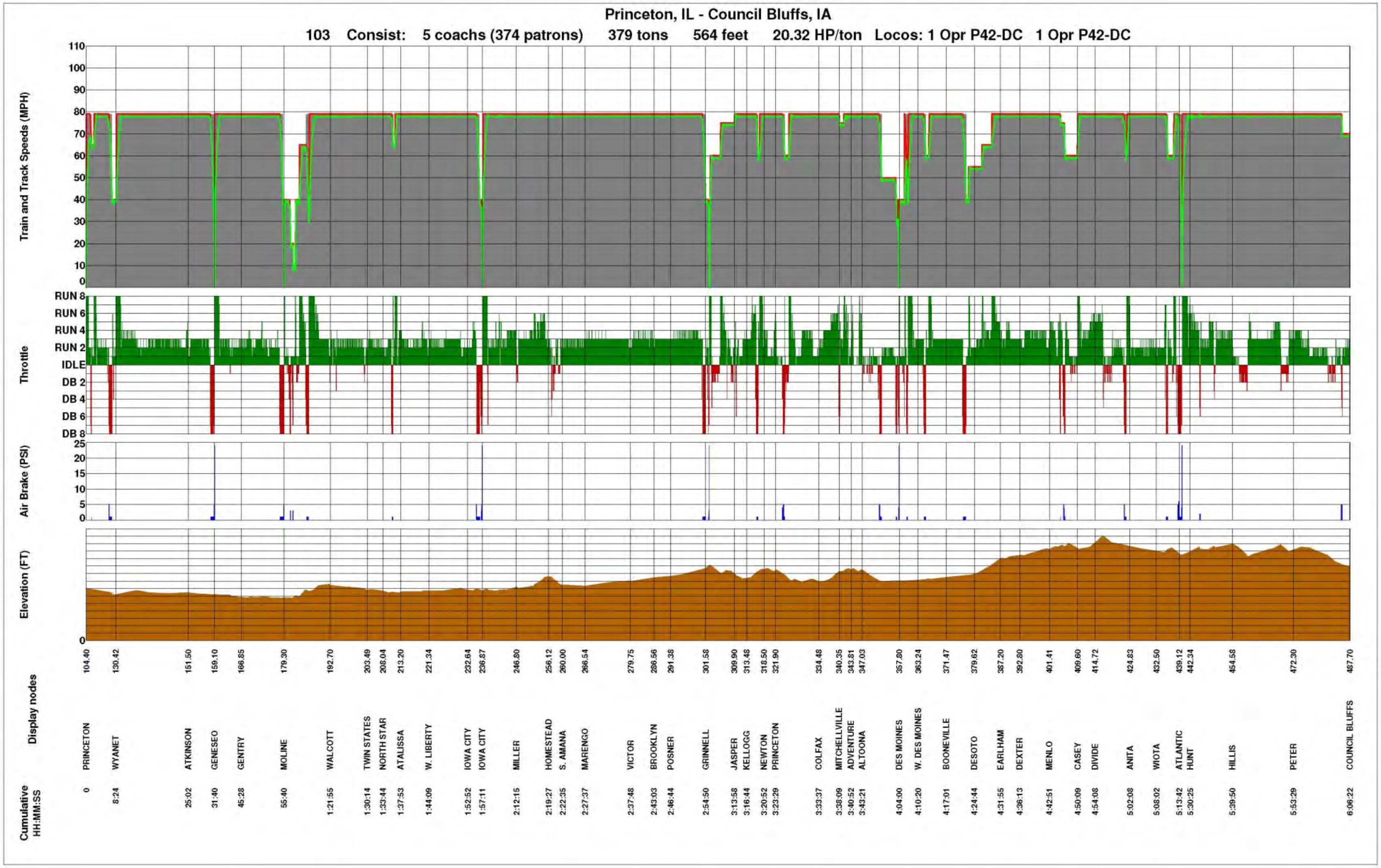



Figure 10.2-9: TPC Chicago to Council Bluffs Westbound Local Train

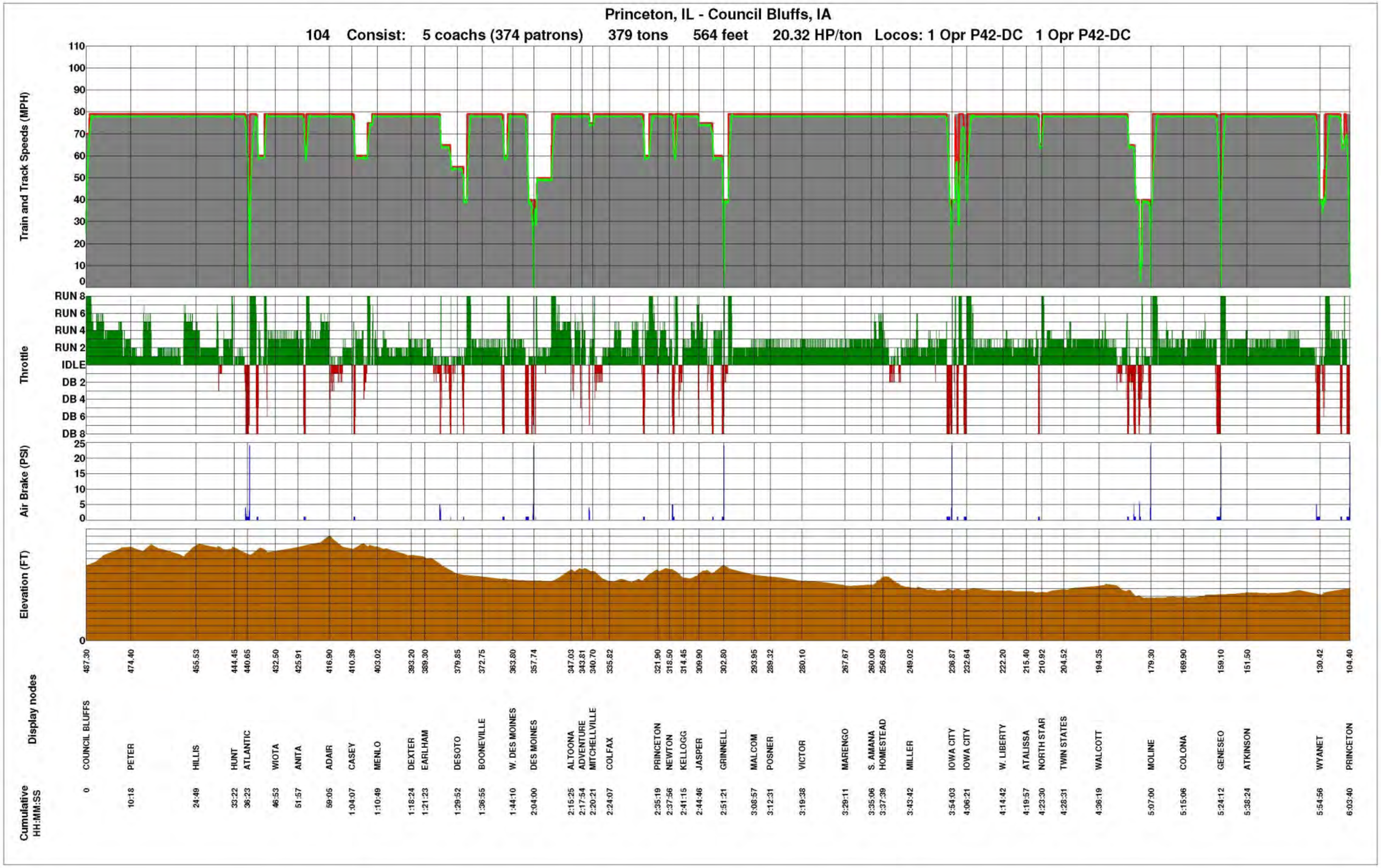



Figure 10.2-10: TPC Council Bluffs to Chicago Eastbound Local Train

### 10.2.4 Findings

One of the advantages of the RTC modeling effort is that it allows a quantitative comparison between the various scenarios. Using the data derived from the unadjusted modeling runs, train delay ratios were calculated that result from the proposed infrastructure modification. The Base Case model establishes what level of delay (to the freight trains currently operating) might be considered normal, which is then used to validate the track and signal improvements to be implemented in order to reach these same delay ratio numbers once future freight trains and passenger trains have been added to the schedule.

Delay ratios shown for Scenario 1 in Table 10.2-4 below were derived to allow a comparison in terms of overall delay likely to be incurred on a daily basis by either the freight trains or passenger trains based on the three scenarios tested. The delay ratios in this table represent the delays incurred under the current IAIS operating plan, with the current level of traffic, in late 2012.

Table 10.2-4: Base Case Delay Ratios

| Scenario 1 (Base Case) | Train Count | Base Original Speeds | |
|---|---|---|---|
| Operation | | Delay Percentage | Delay Minutes Per 100 Train Miles |
| IAIS Freight (Wyanet - Council Bluffs) | 125 | 1.09 | 2.98 |
| BNSF Freight (Barstow Subdivision) | 134 | 17.55 | 35.008 |

Table 10.2-5 below lists these ratios based on the operation of all trains modeled between Wyanet and Council Bluffs. Included are the BNSF trains that cross the IAIS on BNSF's Barstow Subdivision at Colona. The results shown in the table were based on nine days of RTC modeling of aggregate operations, Monday through Sunday with a one-day "warm-up" and one-day "cool-down" period. Dispatch metrics including train counts, delay percentage, and a figure representing the number of delay minutes per 100 train miles and are presented for the two future case scenarios in Table 10.2-5 below.

Scenario 2 shows future freight with no changes in infrastructure or freight train operations. Scenario 3 was modeled for future freight traffic and the passenger trains using improved main track with critical sidings upgraded and additional trackage installed (such as between Silvis and Rock Island and at Iowa City, South Amana, Des Moines, and Council Bluffs) to facilitate more favorable meet-pass events and to enable the IAIS freight trains to conduct their switching assignments while simultaneously operating the proposed trains of the Service.

Table 10.2-5: Build Case Delay Ratios

| Operations / Train Type | Train Count | Scenario 2: Future Freight Case with Existing Infrastructure | | Scenario 3: Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades | |
|---|---|---|---|---|---|
| | | Delay Percentage | Delay Minutes Per 100 Train Miles | Delay Percentage | Delay Minutes Per 100 Train Miles |
| Passenger (Wyanet - Council Bluffs) | 56 | 0 | 0 | 0.33 | 0.288 |
| IAIS Freight (Wyanet - Council Bluffs) | 154 | 31.53 | 80.886 | 30.16 | 63.991 |
| BNSF Freight (Barstow Subdivision) | 199 | * | * | 20.58 | 39.358 |

** In Scenario 2, the model to illustrate BNSF Barstow Subdivision freight traffic for 2032 did run.*

The results of RTC modeling for the Base Case scenarios revealed that the existing infrastructure on the IAIS between Wyanet and Council Bluffs and on the BNSF Barstow Subdivision is adequate for the volume of traffic, mode of operation, and train schedules presently in effect on each railroad. Dispatch statistics from the modeling effort revealed an acceptable delay of 2.98 minutes per 100 train miles for IAIS (125 weekly trains) and 35.008 minutes per 100 train miles for BNSF (134 weekly trains). Delays to IAIS trains at Colona, where BNSF has operating priority through the interlocking, were minimal.

In the scenario illustrating the Future Freight case with Existing Infrastructure, the time/distance diagrams and associated dispatch statistics demonstrated that the existing infrastructure was insufficient to efficiently support anticipated future freight traffic consisting of 154 weekly trains on IAIS. It is important to note that any additional train frequencies are at this time hypothetical and would ultimately be based on negotiations with CSX and with Metra as freight operations on IAIS are dictated on slot time capabilities over these railroads between LaSalle, Illinois, and Chicago. Many of the trains could operate, but excessive delays from unfavorable meet-pass events and severely constrained yard operations at Silvis, Illinois, would make it difficult for trains to maintain a reliable schedule and would lead to an inefficient use of railroad resources and labor to continue operations. This unsustainable condition could be mitigated through phased enhancement of railroad capacity and infrastructure, including the establishment of additional sidings for meet-pass events between Wyanet and Council Bluffs and additional yard trackage at Silvis, conducted independently by IAIS.

The model of the BNSF Barstow Subdivision freight traffic for 2032 did not run. This is largely attributable to an insufficient number of passing sidings on the single-track line between Alpha and Fenton via Barstow. This condition could only be mitigated through expansion of railroad capacity and infrastructure, including additional sidings for meet-pass events, conducted independently by BNSF.

In the scenario illustrating the Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades, the time/distance diagrams and associated dispatch statistics indicate that the expanded infrastructure between Wyanet and Council Bluffs would enable the proposed passenger trains (56 weekly) to meet the 100 percent on-time performance criteria established for the Service. The infrastructure would support future freight traffic on IAIS (154 trains weekly) more effectively and allow the railroad to meet its through-transportation, shipper, and interchange obligations more efficiently than in the Future Freight case with Existing Infrastructure model, as enumerated in the delay ratio statistics. Past practice on IAIS has involved the shifting of train schedules to maximize infrastructure and produce more favorable meet-pass events between terminals, and this method was followed during the RTC modeling process. This strategy could be further employed to refine operations and minimize possible periods of congestion at the Silvis Yard, as presented in the time/distance diagrams earlier in this section.

The capacity constraints to BNSF Barstow Subdivision operations (199 trains weekly) in the Future Freight case with Existing Infrastructure were eliminated via two methods. First, expansion of infrastructure on IAIS improved velocity for trains on that segment and similarly lessened delays to BNSF trains at the Colona interlocking. A second measure involved extension of the existing Briar Bluff siding on the Barstow Subdivision from 2000 feet to 9500 feet in length in the RTC model. The new siding is located immediately south of Colona and was of considerable value in accommodating additional meet-pass events efficiently. A cost for this work is not included in the estimate.

The model exhibits the proposed four daily round-trip passenger trains of the Service overlaid on the future freight case trains of BNSF and IAIS and the proposed infrastructure and identifies the interaction of all trains in the corridor. RTC dispatches the higher priority trains first then finds slots for all the lower priority trains. Amtrak trains receive dispatching priority in the corridor. Infrastructure improvements offer a greater flexibility in operations for trains of all types and classes.

According to schedules developed for a 79 mph operation between Chicago and Council Bluffs-Omaha and the RTC modeling for the Wyanet-Council Bluffs segment over IAIS, the schedule would create 12 passenger train on passenger train meets in every 24-hour period. As illustrated in the time/distance diagram showing passenger trains operating with a 100 percent on-time performance and five-minute dwells at Des Moines and two-minute dwells at all other stations (indicated by short horizontal lines) in Figure 10.2-11, two of these meet-pass events would occur east of the modeling area on the existing infrastructure of the BNSF double-track Mendota Subdivision between Aurora and Wyanet. The other 10 would occur on the IAIS main line on new infrastructure identified in the Conceptual Engineering process, including segments of double-track in the Quad Cities, Iowa City, and Des Moines, and at the new sidings of Gentry (east of Colona, Illinois), Miller (west of Tiffin, Iowa), Jasper (east of Kellogg, Iowa), Adventure (east of Altoona, Iowa), Hunt (west of Atlantic, Iowa), and Peter (east of McClelland, Iowa). Many of the meets and passes between the proposed passenger trains of the Service and freight trains between Wyanet and Council Bluffs occur in terminal areas in the Quad Cities, Iowa City, South Amana, and Des Moines. New infrastructure has been identified to accommodate these events via construction of double-track or yard bypasses. These infrastructure improvements are outlined in greater detail in Section 10.2.4.1.

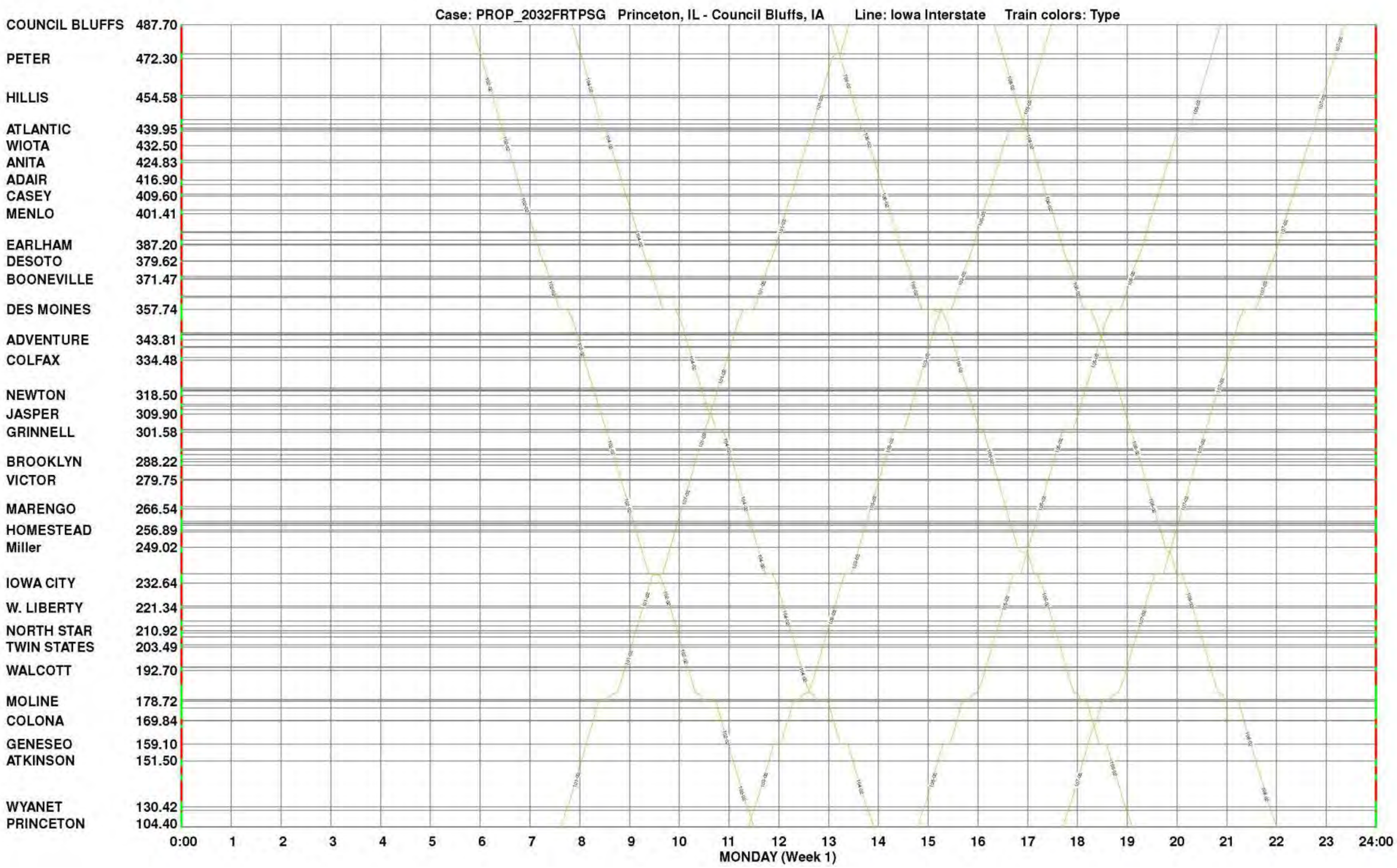



Figure 10.2-11: RTC Proposed Passenger Trains and Proposed Infrastructure Upgrades – IAIS Wyanet to Council Bluffs

However, RTC outputs are only a snapshot of what might be considered an idealized world of train operations. It is rare for these perfect-world conditions to be replicated in the day-to-day operations experienced by Amtrak, IAIS, and BNSF. Even a slight delay to any or all of these passenger trains could create a shift from the ideal meeting place to another location, which could have repercussions for the efficiency of freight train operations. That fact necessitates additional infrastructure to assure that passenger schedules and freight train velocity can be recovered in the wake of delays and unforeseen operating events.

#### 10.2.4.1 Infrastructure Needs Overview

Improvements to the physical plant along the BNSF-IAIS route between Chicago and Council Bluffs-Omaha are necessary to match the operation modeled in the scenario for Future Freight Case with Passenger Trains and Proposed Infrastructure Upgrades. These are concentrated on the following projects with the exception of the Eola Main Track Capacity Improvement Project and the BNSF-IAIS Wyanet Connection Project on BNSF, which will be discussed in Section 10.5.3.

The BNSF segment already supports a total of eight passenger trains daily at a maximum speed of 79 mph. Accordingly, most of the work described herein is focused on upgrading the IAIS segment between Wyanet and Council Bluffs, which is currently FRA Class 3 track (with a maximum passenger train speed of 60 mph), to accommodate 79 mph operation (FRA Class 4 track), and to create capacity in the IAIS portion for the new proposed passenger trains operating on the proposed schedule with high reliability and on-time performance. Currently there is no regular scheduled passenger service on the IAIS. However, this corridor formerly handled an array of very fast, streamlined passenger trains. These trains operated on the double-track corridor between Chicago and Rock Island until 1978. Given that much of the double-track has been removed, the remaining railroad may or may not support the high speed spirals necessary for the proposed 79 mph maximum track speed. During the track improvement phase when the track is surfaced and raised, the alignment will be surveyed to ensure that the appropriate spirals are in place.

Proposed rail improvements are detailed in the Conceptual Engineering section of the Program, but will ultimately result in a railroad composed of Continuous Welded Rail (CWR) throughout the IAIS main track plus key sidings constructed on wood ties, as described below. The existing ballast on the segment from Wyanet to Council Bluffs is washed and screened, crushed rock main line ballast. The proposed track improvement projects will be constructed utilizing washed and screened main line ballast.

Existing turnouts on the segment from Chicago to Wyanet (primarily on BNSF) are No. 24, No. 20, and No. 15 power-operated for main line crossovers and main line-to-sidings, with No. 11 hand-throw for yard and industry tracks. Existing turnouts on the segment from Wyanet to Council Bluffs (primarily on IAIS with short segments on BNSF and UP) are No. 10 and No. 11 hand-throw switches. Proposed turnouts for the segment from Wyanet to Council Bluffs are No. 20, No. 15, and No. 11 power-operated for main-line crossover and mainline-to-sidings and other speed-critical areas, and No. 11 hand-throw for yard and industry tracks. Turnouts on controlled passing sidings from Wyanet to Council Bluffs will be upgraded from the existing No. 10 and No. 11 hand-throw turnouts to No. 15 power-operated turnouts. Passenger trains will operate at 30 mph and IAIS freight trains will be able operate at 25 mph over the diverging side of the No. 15 turnouts. As a supplement to existing passing tracks, new sidings nominally 10,000 feet in length with No. 20 power-operated turnouts and welded rail to enable 40 mph operating speeds are proposed for several locations between Wyanet and Council Bluffs.

Proposed project upgrades to support 79 mph passenger service between Wyanet and Council Bluffs include installation of Centralized Traffic Control (CTC) and Positive Train Control (PTC), including power-operated, remote-control switches at sidings and junctions with frequent meet-pass events or where trains need to enter and exit the main track quickly in order to maintain main-track capacity and flexibility.

Due to the proposed significant increase in passenger train speed (compared to the existing freight train speeds) on the IAIS and the anticipated large variance in speed between passenger and freight, all public at-grade crossings with active warning devices will receive constant-time warning devices and bells, flashers, and two-arm gates. Selected high-risk private crossings will also be upgraded. No bridges, culverts, and other drainage structures have been identified for repair or replacement in conjunction with the proposed service of the Service.

In addition to track, grade crossing, and structures rehabilitation projects to improve general maximum speed limits to 79 mph, several projects were identified through RTC modeling and past interviews of IAIS officials, to create necessary capacity and operational reliability of passenger trains. Generally, track and signal improvements validated by the RTC model focus on those locations where IAIS trains occupy the same trackage during the same time of day that Amtrak is proposed to operate. Table 10.2-6 outlines infrastructure improvements needed to accommodate the proposed passenger service and IAIS freight trains.

### Table 10.2-6: Reference Table of Infrastructure Improvements Necessary to Accommodate the Proposed Passenger Schedule and IAIS Freight Train Operation Patterns

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| Wyanet | 130.64 | 132.8 | 10,464 feet | No. 20 universal crossover east end (MP 130.64); No. 20 turnout west end (MP 132.8) | 40 mph | Yes | Construct new siding and a universal crossover to the existing IAIS main track; provides location for IAIS and Amtrak trains to meet at the Wyanet Connection with BNSF Mendota Subdivision. |
| Patriot (Annawan) | 143.07 | 145.07 | 9,910 feet | No. 15 | 30 mph departure for IAIS trains | Yes | Existing industrial siding for IAIS meets and car staging; install new turnouts |
| Atkinson | 149.39 | 152.01 | 13,183 feet | No. 15 | 30 mph | Yes | Upgrade and extend existing siding on east end; install new turnouts |
| Gentry | 165.85 | 167.85 | 9,620 feet | No. 20 | 40 mph | Yes | Construct new siding; provides a location to meet-pass/stage IAIS trains immediately east of the Quad Cities terminal area. |
| Colona | 169.84 | 169.87 | N/A | No. 20 | 40 mph through interlocking for BNSF trains | Yes | Modify interlocking for BNSF Barstow Subdivision diverging move and IAIS/Amtrak straight move. |
| Silvis to 7th Street (East Moline) | 171.0 | 175.38 | 4.38 miles | No. 15 turnout at east end (MP 171.0) | 30 mph departure for IAIS/BNSF trains out of Silvis Yard | Yes | According to IAIS and verified by RTC model runs, numerous trains meet-pass or perform switching in IAIS Silvis Yard. IAIS trains include BICB and CBBI (all sections), BISI, SIBI, SASI, SISA, RISW, SISW, DMPE, PEDM, PECR, CRPE, and MNBI. Existing main line to become yard lead and drilling track for IAIS Silvis Yard; Amtrak trains to use new main track/bypass to be constructed south of the yard. |

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| 7th Street (East Moline) to 12th Street (Moline) | 175.38 | 179.5 | 4.12 miles | Universal crossover with No. 15 turnouts at 7th Street (MP 175.7) | 30 mph for mainline crossover turnouts; 30 mph departing speeds from diverging routes and yard leads | Yes | According to IAIS, BNSF, and CP and verified by RTC model runs, numerous trains of the three freight carriers meet-pass or perform switching on this segment. Upgrade existing main track in this segment and construct a second main track. Install a new universal crossover at 7th Street (East Moline) to improve traffic flow for IAIS/BNSF/CP trains over the joint BNSF Industrial Track between East Moline and Rock Island and to assure maximum operating flexibility for Amtrak trains. Alignment is improved where BNSF's Rock Island Spur and CP's Nitrin Branch join the existing IAIS main track at 7th Street. |
| 12th Street (Moline) to Rock Island (Government Bridge) | 179.5 | 182.0 | 2.5 miles | Universal crossover with No. 15 turnouts at 12th Street (MP 179.5) and Rock Island (MP 181.2); No. 15 turnout for diverging IAIS/BNSF/CP industrial track at MP 181.35 | 30 mph for mainline crossover turnouts; 30 mph departing speeds from diverging routes and yard leads | Yes | Install a new universal crossover between the two main tracks at 12th Street. Existing main track west of 12th Street to become lead and drilling track for IAIS and BNSF Rock Island Yards; Amtrak trains to use new main track/bypass constructed to the south of the yard. Install a new universal crossover at Rock Island to allow BNSF and CP trains bound for the Crescent Bridge and IAIS trains bound for Milan to depart the IAIS Rock Island Yard and diverge to the west from the new main track bypass |
| Rock Island (Government Bridge), Illinois, to Farnam, Iowa | 182.0 | 186.52 | 4.52 miles | Universal crossover with No. 15 turnouts at Missouri Division Junction (MP 183.5); No. 15 turnout for diverging lead to CP's Nahant Yard (MP 183.6); and No. 20 turnout at west end of double track (MP 186.52) | 40 mph through No. 20 mainline turnouts; 30 mph through No. 15 mainline crossover turnouts; and 30 mph departing speeds from diverging routes | Yes | Upgrade existing main track in this segment and construct a second main track. Install a new universal crossover at Missouri Division Junction (Davenport) to improve traffic flow for IAIS and CP trains and to assure maximum operating flexibility for Amtrak trains. |
| Walcott | 192.7 | 194.35 | 8,062 feet | No. 15 | 30 mph | Yes | Upgrade and extend existing siding on east end and install new turnouts; provides a location to meet-pass/stage IAIS trains immediately west of the Quad Cities terminal area |

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| Twin States | 203.49 | 204.52 | 4,980 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| North Star | 208.04 | 210.92 | 14,556 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Atalissa | 213.2 | 215.4 | 10,676 feet | No. 20 | 40 mph | Yes | Construct new siding |
| West Liberty | 221.34 | 222.2 | 4,200 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Midway to Iowa City | 232.64 | 237.0 | 4.36 miles | No. 20 turnouts at east and west ends of double track (MP 232.64 and MP 237.0); universal crossover with No. 15 turnouts at 1st Avenue (MP 235.1); No. 15 turnouts for crossover movement between main tracks at Iowa City Yard (MP 236.14 and MP 236.69); and No. 11 turnouts for access to Iowa City Yard on the east and west ends (MP 236.25 and MP 236.69) | 40 mph through No. 20 turnouts; 30 mph through No. 15 turnouts; and 20 mph departing speed from yard leads | Yes | According to IAIS and verified by RTC model runs, numerous trains meet-pass Amtrak trains and each other or perform switching at IAIS Iowa City Yard. Trains include BICB and CBBI (all sections), SASI, SISA, SASW, DMPE, PEDM, PECR, CRPE, and MNBI. Connect existing passing and industrial sidings and extend/upgrade track to create a second main track; modify existing yard throat at Iowa City. |
| Miller | 246.8 | 249.02 | 10,781 feet | No. 20 | 40 mph | Yes | Construct new siding |
| East South Amana to West South Amana | 257.2 | 262.9 | 5.8 miles | No. 15 | 30 mph departure out of yard for IAIS trains | Yes | According to IAIS and verified by RTC model runs, numerous trains meet-pass or perform switching at the South Amana Yard. Regular IAIS trains include: BICB and CBBI (all sections), SASI, SISA, SACR (all sections), SASW, DMPE, PEDM, PECR, CRPE, MNBI. Existing main line to become yard lead and drilling track for IAIS yard; Amtrak trains to use new main track/bypass to the south of yard. |
| Marengo | 266.54 | 267.67 | 5,330 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Brooklyn | 286.56 | 288.22 | 7,835 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Posner | 289.32 | 291.38 | 9,936 feet | No. 20 | 40 mph | Yes | Construct new siding |
| Grinnell | 301.58 | 302.8 | 5,500 feet | No. 20 | 40 mph | Yes | Convert existing main track to siding and upgrade; remove existing siding and construct a new main track; install new turnouts. |
| Jasper | 309.9 | 311.9 | 9,620 feet | No. 20 | 40 mph | Yes | Construct new siding |
| Kellogg | 313.48 | 314.45 | 4,471 feet | No. 15 | 30 mph | Yes | Upgrade and extend existing siding/turnouts |

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| Newton | 318.5 | 320.91 | 12,074 feet | No. 15 | 30 mph departure from yard for IAIS trains | Yes | Extend existing IAIS Newton Yard siding on east end to allow for additional meet-pass events and for car staging activity. Install new turnouts and remove existing crossover at MP 320.3. |
| Colfax | 334.48 | 335.82 | 5,980 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Adventure | 343.81 | 345.99 | 10,570 feet | No. 20 | 40 mph | Yes | Construct new siding |
| Altoona | 346.45 | 347.03 | 2,412 feet | No. 15 | 30 mph departure for IAIS trains | Yes | Extend existing industrial siding and install new turnouts. |
| East Des Moines to SE 14th Street (Des Moines) | 353.05 | 356.54 | 3.32 miles | No. 15 at East Des Moines (MP 353.05); No. 11 hand-throw turnout at Des Moines (MP 356.47) to access the lead to NS yard; No. 11 hand-throw turnout at Des Moines (MP 356.54) to connect with the existing IAIS Subdivision 4/UP West Des Moines Industrial Lead | 30 mph departure from UP Short Line Yard for IAIS trains at East Des Moines | Yes/No | Numerous UP trains meet-pass or perform switching in UP Short Line Yard (IAIS has trackage rights through the UP yard, between East Des Moines and Short Line Junction in Des Moines where it crosses the UP Trenton Subdivision at grade). Construct a single track bypass to the south of the UP Short Line Yard and a grade-separated crossing of the UP Trenton Subdivision for use by Amtrak trains. Reconfigure connection to NS yard at Des Moines. |
| SE 14th Street (Des Moines) to 5th Street (Des Moines) | 356.54 | 357.1 | 0.56 mile | N/A | N/A | Yes/No | Construct second main track for Amtrak trains; existing IAIS Subdivision 4/UP West Des Moines Industrial Lead will be for IAIS and UP use only. Install new hand-throw turnout off existing main track to access industrial trackage in Des Moines. |

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| 5th Street (Des Moines) and Water Works (Des Moines) | 357.1 | 360.32 | 3.22 miles | Universal crossover with No. 15 turnouts at 5th Street (MP 357.2); left-handed No. 15 crossover between main tracks at MP 358.12 (immediately to the west of the station and allows Amtrak trains to crossover to the station on the north side of the mainline); right-handed No. 11 crossover between main tracks at MP 358.53 (allows IAIS trains to crossover for access to the IAIS Des Moines Yard to the north); No. 11 turnout for east lead to IAIS Des Moines Yard; No. 15 turnout for west lead to IAIS Des Moines Yard; and No. 20 turnout at the west end of double track at Water Works (MP 360.3). | 40 mph through No. 20 mainline crossover turnouts; 30 mph through No. 15 mainline crossover turnouts; 20 mph through No. 11 mainline crossover turnouts; 20 mph departure for eastbound IAIS trains out of Des Moines Yard; 30 mph departure for westbound IAIS trains out of Des Moines Yard. | Yes | RTC model runs revealed congestion caused by meeting Amtrak trains with IAIS trains BICB/CBBI (all sections), ATSW, NTSW, DMPE, and PEDM and UP detour trains (operating over IAIS between Council Bluffs and Des Moines). Upgrade existing main track and construct second main track in this segment. Add a new siding at IAIS Des Moines Yard for meeting and staging trains. Install new mainline turnouts. |
| West Des Moines | 362.55 | N/A | N/A | No. 15 | 30 mph departure for movements from UP Perry Subdivision | Yes | Modify existing junction for UP diverging move and IAIS/Amtrak straight move. |
| Booneville | 371.47 | 372.75 | 6,030 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Earlham | 387.25 | 389.28 | 9,778 feet | No. 20 | 40 mph | Yes | Modify industrial track connection on east end; upgrade existing siding/turnouts. |
| East Menlo | 401.41 | 403.02 | 7,850 feet | No. 15 | 30 mph departure for IAIS trains | Yes | Existing industrial siding for IAIS meets and car staging; install new turnouts. |
| Casey | 409.6 | 410.39 | 3,521 feet | No. 15 | 30 mph | Yes | Extend existing siding on east end and install new turnouts. |
| Divide | 414.74 | 416.74 | 9,620 feet | No. 20 | 40 mph | Yes | Construct new siding |
| Anita | 424.83 | 425.91 | 4,980 feet | No. 15 | 30 mph | Yes | Upgrade existing siding/turnouts |
| Atlantic | 439.12 | 440.63 | 7,322 feet | No. 15 | 30 mph | Yes | Extend existing siding on east end, upgrade, and install new turnouts; reconfigure and lengthen tracks at IAIS Atlantic Yard for switching and car staging by trains BICB, CBBI, and ATSW. |

| Location | IAIS East Milepost | IAIS West Milepost | Track Length | Turnouts (Power Operated, unless otherwise stated) | Speed Into Diverging Route | Controlled | Engineering and Operations Comments |
|---|---|---|---|---|---|---|---|
| Hunt | 442.34 | 444.45 | 10,000 feet | No. 20 | 40 mph | Yes | Construct new siding |
| Hillis | 454.58 | 455.53 | 4,366 feet | No. 15 | 30 mph | Yes | Extend existing siding on east end, upgrade, and install new turnouts. |
| Hancock Junction | 459.23 | N/A | N/A | No. 15 | 30 mph departure for IAIS/BNSF trains | Yes | Install new turnout; expedites IAIS/BNSF grain train movements off of the IAIS Hancock Spur. |
| Peter | 472.3 | 474.4 | 10,148 feet | No. 20 | 40 mph | Yes | Construct new siding; provides a location to meet-pass/stage IAIS trains immediately outside the Council Bluffs terminal area. |
| Rigg to Council Bluffs | 486.67 | 488.94 | 2.27 miles | No. 20 at east end | 40 mph departure for IAIS trains at east end of Council Bluffs Yard (straight side of turnout) and 40 mph for Amtrak trains (diverging side of turnout) | Yes | Existing main line to become yard lead and drilling track for IAIS Council Bluffs Yard; Amtrak trains to use new main track/bypass to the south of yard. West end of bypass to reconnect with existing IAIS main track at MP 488.94 to provide a connection for eventual extension of Amtrak service to Omaha. |

## 10.3 Operating Plan and Timetables

### 10.3.1 Background

Phased implementation is planned for the Chicago to Council Bluffs-Omaha passenger rail service and would first involve launch of an initial service consisting of two daily round-trips operating at 79 mph between Chicago and Moline, which is currently under development by Illinois DOT for a 2015 launch. Subsequently, it is anticipated that these two daily round-trips would be extended westward into Iowa, first to Iowa City in 2017, and second, to Des Moines in 2022. Later service expansion would involve the establishment of four daily round-trips between Chicago and Des Moines in 2025, which would ultimately be extended to Council Bluffs-Omaha in 2030. A preliminary passenger train schedule and operating plan highlighting the full Chicago to Council Bluffs-Omaha Service vision is presented in this section.

### 10.3.2 Operating Plan

An operating plan has been assembled using the outputs from the RTC modeling process and performance enhancements resulting from the infrastructure improvements defined in the conceptual engineering. The plan includes initial descriptions of equipment infrastructure requirements and scheduling, maintenance facilities, stations, operational organization and operating methods.

The proposed train consists of the Chicago to Council Bluffs-Omaha service are based on considerations of ridership, maximum speeds, infrastructure requirements to support the proposed train length and curve-speed capability, technical maturity of equipment designs, and costs. The Service would require six trainsets and 56 train crew starts to accommodate four daily round-trips, seven days a week (8 trains x 7 days = 56 crew starts). Two of the daily round-trips are a local service and stop at all stations in the corridor, while the other two daily round-trips operate as an express service that stop only at the principal stations of Chicago, Naperville, Princeton, Moline, Iowa City, Des Moines, and Council Bluffs.

Each of the six trainsets is 565 feet in length, weighs approximately 647 tons, and would accommodate five inches of cant deficiency (or unbalance). Each of the locomotives would likely be a P42-type or equivalent, capable of generating 4,250 horsepower with 3,650 horsepower available for tractive effort after subtraction for head-end power (HEP) to the passenger cars for heating, cooling, ventilation, and lighting, resulting in a 20.32 horsepower/trailing ton ratio. Passenger cars would include three coaches, one coach/cab-car, and one café/lounge. The intent is that Amtrak would service locomotives and equipment at Chicago, while at the Council Bluffs layover facility, Amtrak or potentially a sub-contractor would provide service. Consists would be initially made-up for push-pull operation at Amtrak's 14$^{th}$ Street Yard in Chicago and would generally remain unbroken, except in cases when it is necessary to perform routine maintenance that cannot be accommodated at a layover facility on line or scheduled heavy maintenance or overhaul on a car. In those instances, spare equipment from the available Amtrak pool at Chicago would be substituted.

Owing to the length of the route and duration of the proposed schedule, only two of the six trainsets would make a round-trip each day, while the other four would make a one-way trip. At Chicago's 14th Street Yard, all westbound trains would be spotted in Chicago Union Station by Amtrak's hostlers prior to the proposed schedule departures each day for express train No. 101 at 6:00 a.m. (Trainset 1), local No. 103 at 9:36 a.m. (Trainset 2), local No. 105 at 1:00 p.m. (Trainset 3), and express No. 107 at 4:05 p.m. (Trainset 4, which arrived from Council Bluffs earlier in the day as Train 102). These trains would arrive in Council Bluffs at 1:48 p.m., 5:52 p.m., 9:16 p.m., and 11:53 p.m., respectively.

Operating at a maximum speed of 70 mph, the four daily departures stop momentarily at La Grange Road and at Naperville (each with a two-minute dwell) to receive passengers. Just west of Aurora, the service enters the double track BNSF Mendota Subdivision increasing its speed to 79 mph, and stopping to receive and discharge passengers each with a two-minute dwell at Plano, Mendota, and Princeton, Illinois. Over a connecting track constructed for the proposed service at Wyanet, the eight passenger trains would operate over the single-track IAIS at a 79 mph maximum speed, stopping to receive and discharge passengers at Geneseo and at Moline (both with a two-minute dwell) before crossing over the Mississippi River on the Department of the Army-owned Government Bridge into Iowa.

After proceeding through the urbanized Davenport area, the train passes through eastern Iowa farmland before reaching the station at Iowa City. Following a two-minute station stop, these trains proceed through central Iowa farmland to Grinnell (two-minute station stop) and urbanized Des Moines. After a five-minute station stop in Iowa's capital and largest city, trains strike across undulating western Iowa farmland, bridging many small rivers and drainages and crossing the watershed divide between the Mississippi and Missouri rivers at Adair in the process (where the highest elevation in the Chicago to Council Bluffs-Omaha corridor is attained, 1402 feet above sea level). Trains make a two-minute stop at Atlantic, the only intermediate station on the route between Des Moines and Council Bluffs. The last stretch of the route traverses a sparsely populated hill and dale terrain, until reaching a terminal in the level Missouri River Valley in urbanized Council Bluffs.

At Council Bluffs station, all eastbound trains would be spotted by the train crew just prior to the proposed scheduled departures each day for express train No. 102 at 5:50 a.m. (Trainset 4), local No. 104 at 7:51 a.m. (Trainset 5), local No. 106 at 1:03 p.m. (Trainset 6), and express No. 108 at 4:20 p.m. (Trainset 1, which arrived from Chicago earlier in the day as Train 101). These trains would arrive in Chicago at 1:38 p.m., 4:07 p.m., 9:19 p.m., and 12:08 a.m., respectively.

A discussion of the train crews required to protect the service can be found in section in Section 10.6.2.

### 10.3.3 Passenger Train Schedule Development

The Iowa DOT's investigation, coordination, and RTC modeling; review of the new requirements and guidelines of the Railroad Safety Improvement Act of 2008 (RSIA), Passenger Rail Investment and Improvement Act of 2008 (PRIIA), American Recovery and Reinvestment Act of 2009 (ARRA); and compliance with FRA guidelines identified requirements for freight-train capacity and for safety improvements, and for practical methods to improve passenger-train speed, on-time performance, accountability, and reliability. Accordingly, the Iowa and Illinois DOT performed combined rail operations, engineering, and environmental analysis studies that identified cost-effective methods to deliver faster passenger train speeds and reduced trip times, while simultaneously addressing the changed requirements for freight-train capacity, safety, passenger train on-time performance, and other requirements of the Acts. A potential scenario involving improved infrastructure scenarios was modeled using the RTC tool, generating TPC (Train Performance Calculator) outputs and RTC time/distance diagrams (graphs that plot the geographic location versus time for freight and passenger trains) that were assessed for cost-effectiveness against the infrastructure that would be required to operate the Service. The RTC tool identified a cost-effective passenger-train performance that provided the higher speeds encouraged by PRIIA and by FRA guidelines.

An overall passenger train schedule was determined using the RTC-generated TPC runs based on trainsets consisting of two locomotives plus five coaches, with the aim of providing reasonable and consistent running times between Chicago and Council Bluffs-Omaha. The proposed schedule maintains consistency with the running times between Chicago Union Station and Princeton recognized in the Chicago-Iowa City Feasibility Study created by Amtrak on April 18, 2008. Only slight variations from the feasibility study schedule have been advanced for the scheduled arrival and departure times of the Chicago to Council Bluffs-Omaha trains at CUS. No arrivals and departures are scheduled at CUS from 7:45 a.m. to 8:30 a.m. and 4:45 p.m. to 5:30 p.m. due to commuter traffic requirements. These slot times and the associated platform and station trackage use at Chicago Union Station are difficult to revise or move to different times of the day without creating extensive impacts onto Amtrak and Metra train schedules, crew and equipment scheduling and utilization, and track maintenance windows. Accordingly, the proposed schedule is hinged at Aurora, Illinois, in suburban Chicago with all improvements in running times and speeds, and all changes in recovery time, essentially restrained to the route between Aurora and Council Bluffs.

Two of the daily round-trips are a local service and stop at all stations in the corridor, while the other two daily round-trips operate as an express service that stop only at the principal stations of Chicago, Naperville, Princeton, Moline, Iowa City, Des Moines, and Council Bluffs. Overall schedule time over the 470.8 route miles between Chicago and Council Bluffs—including pure running time, station dwell time, and schedule recovery time—totals 7 hours and 48 minutes for the express trains and 8 hours and 16 minutes for the local trains. A preliminary schedule for the Service has been developed using the outputs of the TPC and performance improvements resulting from the infrastructure improvements defined in the Conceptual Engineering Drawings. It is shown in Table 10.3-1.

## Table 10.3-1: Chicago to Council Bluffs-Omaha Proposed 79 MPH Passenger Train Schedules

| Westbound (Read Down) | | | | | Station | | Eastbound (Read Up) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 101 | 103 | 105 | 107 | | | | 102 | 104 | 106 | 108 |
| 6:00 AM | 9:36 AM | 1:00 PM | 4:05 PM | DP | Chicago (CUS) | AR | 1:38 PM | 4:07 PM | 9:19 PM | 12:08 AM |
| | 9:53 AM | 1:17 PM | | DP | La Grange Road* | DP | | 3:31 PM | 8:43 PM | |
| 6:31 AM | 10:10 AM | 1:34 PM | 4:36 PM | DP | Naperville* | DP | 12:46 PM | 3:14 PM | 8:26 PM | 11:16 PM |
| | 10:35 AM | 1:59 PM | | DP | Plano | DP | | 2:49 PM | 8:01 PM | |
| | 11:03 AM | 2:27 PM | | DP | Mendota | DP | | 2:21 PM | 7:33 PM | |
| 7:37 AM | 11:23 AM | 2:47 PM | 5:42 PM | DP | Princeton | DP | 11:40 AM | 2:01 PM | 7:13 PM | 10:10 PM |
| | 12:02 PM | 3:26 PM | | DP | Geneseo | DP | | 1:23 PM | 6:35 PM | |
| 8:34 AM | 12:25 PM | 3:49 PM | 6:39 PM | DP | Moline, IL | DP | 10:43 AM | 12:58 PM | 6:10 PM | 9:13 PM |
| 9:38 AM | 1:27 PM | 4:51 PM | 7:43 PM | DP | Iowa City, IA | DP | 9:35 AM | 11:52 AM | 5:04 PM | 8:05 PM |
| | 2:30 PM | 5:54 PM | | DP | Grinnell | DP | | 10:52 AM | 4:04 PM | |
| 11:29 AM | 3:27 PM | 6:51 PM | 9:34 PM | DP | Des Moines | DP | 7:45 AM | 9:55 AM | 3:07 PM | 6:15 PM |
| | 4:51 PM | 8:15 PM | | DP | Atlantic | DP | | 8:31 AM | 1:43 PM | |
| 1:48 PM | 5:52 PM | 9:16 PM | 11:53 PM | AR | Council Bluffs | DP | 5:50 AM | 7:51 AM | 1:03 PM | 4:20 PM |

**La Grange Road and Naperville Westbound – Stops only to receive passengers*
** Naperville and La Grange Road Eastbound – Stops only to discharge passengers*

*Overall schedule time (includes pure running time, station dwell time and recovery time):*
*Local: 8 hours, 16 minutes*
*Express: 7 hours, 48 minutes*

*Assumptions:*

- *Schedules were developed using TPC runs conducted on December 10, 2012, and were updated March 24, 2013*
- *Schedules are for simulation purposes only*
- *The train consist is two P-42 locomotives and five bi-level PRIIA cars- 4 coaches and 1 café*
- *Maximum speed is 79 mph where permitted*
    - *Note: Maximum speed in Chicago commuter territory (Chicago-Aurora) is 70 mph*
    - *IAIS infrastructure has been upgraded to 79 mph maximum speed where permissible*
- *Running times between CUS and Princeton are from the Chicago-Iowa City Feasibility Study created by Amtrak on April 18, 2008*
- *No arrivals or departures are scheduled at CUS from 7:45 AM to 8:30AM and 4:45 PM to 5:30 PM due to commuter traffic requirements*
- *Station dwell times are 2 minutes, except for Des Moines which is 5 minutes*
- *Recovery time distribution is based upon current Amtrak standard of 8% of total running time and is applied as:*
- *Westbound Local: 38 minutes total*
    - *Geneseo: 3 minutes*
    - *Iowa City: 5 minutes (Mississippi Bridge traffic)*
    - *Grinnell: 3 minutes*
    - *Des Moines: 3 minutes*
    - *Atlantic: 4 minutes*
    - *Council Bluffs: 20 minutes*

- *Westbound Express: 35 minutes total*
  - *Moline: 3 minutes*
  - *Iowa City: 8 minutes (Mississippi Bridge traffic)*
  - *Des Moines: 6 minutes*
  - *Council Bluffs: 18 minutes*
- *Eastbound Local: 38 minutes total*
  - *Des Moines: 6 minutes*
  - *Grinnell: 3 minutes*
  - *Iowa City: 3 minutes*
  - *Moline: 5 minutes (Mississippi Bridge traffic)*
  - *Princeton: 2 minutes*
  - *Chicago Union Station: 19 minutes*
- *Eastbound Express: 35 minutes total*
  - *Des Moines: 4 minutes*
  - *Iowa City: 6 minutes*
  - *Moline: 5 minutes (Mississippi Bridge traffic)*
  - *Princeton: 2 minutes*
  - *Chicago Union Station: 18 minutes*

This schedule assumes that trains will travel at 79 mph where permitted, except for the Chicago commuter territory between Chicago and Aurora which has a maximum speed of 70 mph. Dwell (stop) times at all intermediate stations between Chicago and Council Bluffs are two minutes, save for Des Moines which is five minutes.

Recovery time is derived to account for delays that the passenger trains could incur en route and the small deviations from the schedule that could result. These times were generated to craft padding in the schedule for the Service. A schedule pad or recovery time of 8 percent is current Amtrak standard and higher than the 7 percent recommended by FRA (for operation on multiple-track routes) in its "Railroad Corridor Transportation Plans" revised in July 2005. Working through the formula provided by FRA for operation over single-track routes (which reflects the need to accommodate occasional out-of-slot passenger-on-passenger meets) suggests that the 8 percent recovery time should accommodate FRA's 7 percent pad plus the additional elements that FRA states should be factored into the pad calculation. This understanding is based on the fact that (1) most of the meets between opposing passenger trains will occur on the IAIS west of Wyanet, (2) IAIS and BNSF freight trains will be working on segments of double-track (to be constructed) at the Quad Cities, Iowa City, and Des Moines, that (3) the passing sidings on single-track sections are located between 10 and 15 miles apart, and (4) that the maximum operating speed will be 79 mph (or 1.3 miles per minute).

For the Chicago to Council Bluffs service, recovery time equates to 35 minutes for each of the two eastbound and westbound express trains, and 38 minutes for each of the two eastbound and westbound local trains. These contingencies have been added to the run-time explored in the TPCs and are distributed proportionally between stations, as outlined in the footnotes of Table 10.3-1 above.

Two particular operating events involving the trains of the Service and of the recovery time assigned to each warrant further discussion. Three minutes westbound and two minutes eastbound of recovery time has been added to the schedule between Princeton and Geneseo to allow for the interchange coordination between the two host railroads at Wyanet. Whether this lag time would be added to the schedule will be determined during agreement negotiations with host railroads, BNSF and IAIS. Recovery time has been similarly added to the run-time between Moline and Iowa City for a potential Government Bridge lift for river traffic on the Mississippi: Five minutes for all eastbound trains and westbound local trains and eight minutes for all westbound express trains. According to the Department of the Army, operator of the bridge, approximately 15 vessels navigate up and down the river each day when the river is open for navigation. The river is frozen over from mid-December to mid-February, but a total of 3,000 to 4,000 vessels pass the bridge annually during navigation season. Each bridge lift averages 13 minutes in duration from a typical minimum of eight minutes to a typical maximum of 30 minutes of bridge-open time.

It is important to note that the proposed infrastructure that underlies the RTC model varies from the infrastructure proposed in Amtrak's 2007 and 2008 feasibility studies for service between Chicago and the Quad Cities and Iowa City and the Chicago to Iowa City High Speed Intercity Passenger Rail Program of 2010, but that it has the capability to deliver faster passenger-train speeds and that it also reflects the infrastructure necessary to meet the freight capacity, safety, and passenger-train reliability requirements that have appeared since the Amtrak feasibility studies were conducted.

Subsequent to this Service Development Plan, the intent of the States is to further refine the proposed schedule in cooperation with Amtrak, BNSF, and IAIS, who will review and judge its feasibility as a basis for future on-time performance guarantees and final agreements. The goal of the States is to develop schedules that deliver the best trip times possible, while also attaining the on-time performance and cost-effectiveness required by PRIIA and FRA guidance, and being practical to deliver. Final schedules will be used to develop updated ridership and revenue predictions, final operating and maintenance costs, and to develop a financial plan. In turn these documents will form the basis of final agreements between the States, Amtrak, and BNSF and IAIS.

### 10.3.4 Future Higher Operating Velocities

The BNSF-predecessor railroads began in the West Chicago, Illinois, area in 1848 and the competing parallel Rock Island predecessor was chartered in 1851 with construction beginning in 1854, and the railroad building the first bridge over the Mississippi River at the Quad Cities in 1856. Because these railroads were constructed relatively early in terms of overall regional settlement, both alignments were not heavily influenced by existing settlement patterns. Accordingly, both could be located with fairly long sections of tangent (straight) track connected by a series of gentle one to two degree curves. This enabled very fast running times for passenger trains as track quality and railroad infrastructure was later improved. On the Rock Island, for instance, running times in 1949 between Chicago La Salle Street Station (near Chicago Union Station) and Iowa City were as fast as 3 hours and 55 minutes westbound and 4 hours 15 minutes eastbound. During the same time period, running times for Chicago to Des Moines were as fast as 5 hours and 55 minutes westbound and 6 hours and 15 minutes eastbound, and those between Chicago and Council Bluffs were as fast as 8 hours and 25 minutes westbound and 8 hours and 40 minutes eastbound (in that year, Rock Island still operated via its original mainline alignment in western Iowa, which was 10 miles longer between Atlantic and Council Bluffs than the present Atlantic Cutoff route opened in 1953 and still used by IAIS today). These very fast run-times were accomplished using the longer all-Rock Island route on its original alignment (28.9 miles longer than the BNSF-IAIS route covered in the Service) that passes through Joliet and

LaSalle, Illinois, portions of which accommodated 90 mph passenger train speeds. These historic run-times are slightly better than the 79 mph RTC-generated schedule used in this analysis even though the routing used the BNSF to Wyanet, thence west on the IAIS (former Rock Island). These run-times could only be generated by a 90 to 110 mph maximum operating speed on tangent track. What these historic run-times indicate is that both the BNSF and the IAIS alignments are highly suited to operate higher speed trains. Using a 3.5-inch super-elevation and 5-inch unbalance, passenger trains operating on the BNSF-IAIS alignment would need to slow below either 90 or 110 mph based on Table 10.3-2.

Table 10.3-2: Maximum Passenger-Train Velocity Obtainable on Curves of Varying Degrees for 5-Inch Unbalance and 3.5-inch Maximum Superelevation

| Degrees | Velocity (mph) |
|---|---|
| 0.75 | 110 |
| 1.0 | 110 |
| 1.25 | 95 |
| 1.5 | 85 |
| 2.0 | 75 |
| 2.5 | 65 |
| 3.0 | 60 |
| 3.5 | 55 |
| 4.0 | 55 |

As the table above illustrates, if 90 mph is the maximum velocity desired, any curve exceeding 1.25 degrees will either need to be reduced (or softened) or the speed must be reduced. If 110 mph is desired, then any curve over 1 degree must be reduced or the speed reduced. Increasing the operating velocity around curves can be improved by operating tilt-body equipment. Modern equipment is capable of achieving twice the unbalance as older conventional equipment. For instance, if 6 inch unbalance-capable equipment was used, then all curves 1.55 degrees or less could be safely negotiated at 90 mph and a curve of 1.05 degrees or less for trains operating at 110 mph, again with 6-inch unbalance.

#### 10.3.4.1 Passenger Operation at 90 mph

BNSF has indicated it would consider 90 mph operation on its portion of the corridor west of Montgomery, where allowed by current maximum track speeds with respect to curves, terminal trackage, and local conditions. Historically, 90 mph passenger train operation was practiced on the former Chicago, Burlington & Quincy (BNSF predecessor) and the Chicago, Rock Island & Pacific (IAIS predecessor). Both railroads generally possess long stretches of tangent track connected by gentle curves. The Rock Island in particular employed superelevation liberally on its mainline in order to maximize speed on curves and maintain competitive passenger and freight schedules in the grossly competitive Chicago-Omaha corridor. Table 10.3-3 below indicates where existing curves would limit the ability of the Service trains to reach 90 mph between Montgomery (BNSF Milepost 41.0) and Council Bluffs (IAIS Milepost 489.0) over the combined BNSF-IAIS route. The entire corridor is suitable for 90 mph except for these 128 curves that cannot accommodate 90 mph today (Rock Island successor IAIS later reduced the superelevation on many curves to match the requirements of its 40 mph freight-only operation and reduce rail wear). Of this total, several curves are located at station stops, along waterways, and speed restricted bridges.

### Table 10.3-3: Curves that Affect 90 mph and 110 mph Maximum Operating Speed in the Chicago to Council Bluffs-Omaha Corridor

| Nearest Station | East MP | West MP | Curvature | Speed (mph) | Comments |
|---|---|---|---|---|---|
| BNSF | | | | | |
| Mendota | 82.16 | 82.84 | 2°-00' | 75 | |
| Mendota | 82.86 | 82.99 | 3°-15' | 60 | |
| Mendota | 83.01 | 83.18 | 4°-45' | 50 | |
| Princeton | 104.08 | 104.32 | 2°-00' | 75 | |
| Princeton | 104.38 | 104.68 | 2°-00' | 75 | |
| Princeton | 105.97 | 106.48 | 2°-00' | 75 | |
| Wyanet | 111.99 | 112.73 | 4°-00' | 55 | Wyanet Connection to IAIS |
| Wyanet | 112.91 | 113.16 | 3°-00' | 60 | Wyanet Connection to IAIS |
| Wyanet | 113.25 | 113.38 | 2°-00' | 75 | Wyanet Connection to IAIS |
| IAIS | | | | | |
| Colona | 169.87 | 170.19 | 1°-30' | 85 | BNSF Interlocking |
| Silvis | 172.46 | 172.89 | 1°-55' | 80 | |
| Moline | 178.23 | 178.46 | 2°-00' | 75 | |
| Moline | 179.12 | 179.25 | 2°-30' | 65 | |
| Moline | 179.35 | 179.51 | 1°-30' | 85 | |
| Moline | 179.38 | 179.5 | 3°-00' | 60 | |
| Moline | 180.43 | 180.47 | 2°-00' | 75 | |
| Rock Island | 180.61 | 180.65 | 3°-00' | 60 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 181.36 | 181.6 | 6°-00' | 40 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 181.36 | 181.6 | 7°-30' | 40 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 182.36 | 182.4 | 9°-00' | 35 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 182.63 | 182.77 | 6°-15' | 40 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 182.63 | 182.9 | 7°-30' | 40 | Permanent slow order at Bridge will dictate speed |
| Government Bridge | 182.72 | 182.77 | 7°-30' | 40 | Permanent slow order at Bridge will dictate speed |
| Davenport | 184.04 | 184.83 | 2°-20' | 70 | |
| Davenport | 185.19 | 185.68 | 2°-30' | 65 | |
| Moscow | 211.03 | 211.41 | 2°-30' | 65 | |
| Iowa City | 236.73 | 236.8 | 3°-30' | 55 | |
| Iowa City | 236.73 | 236.79 | 5°-00' | 45 | |
| Iowa City | 236.89 | 236.96 | 3°-00' | 60 | |

| Nearest Station | East MP | West MP | Curvature | Speed (mph) | Comments |
|---|---|---|---|---|---|
| Iowa City | 236.91 | 236.95 | 5˚-00' | 45 | |
| Iowa City | 237.01 | 237.07 | 3˚-00' | 60 | |
| Iowa City | 237.22 | 237.6 | 3˚-00' | 60 | Permanent slow order at Bridge will dictate speed |
| Oxford | 248.56 | 248.74 | 1˚-30' | 85 | |
| Homestead | 254.4 | 254.5 | 1˚-30' | 85 | |
| Homestead | 254.78 | 255.14 | 1˚-40' | 85 | |
| Marengo | 267.4 | 267.56 | 1˚-50' | 80 | |
| Grinnell | 303.0 | 303.25 | 3˚-00' | 60 | |
| Grinnell | 304.41 | 304.85 | 2˚-00' | 75 | |
| Grinnell | 305.32 | 305.75 | 3˚-00' | 60 | |
| Grinnell | 306.21 | 306.64 | 2˚-00' | 75 | |
| Grinnell | 306.71 | 307.08 | 1˚-30' | 85 | |
| Kellogg | 308.75 | 309.15 | 2˚-00' | 75 | |
| Kellogg | 309.45 | 309.77 | 2˚-00' | 75 | |
| Kellogg | 310.75 | 311.08 | 1˚-55' | 80 | |
| Kellogg | 314.81 | 315.0 | 1˚-55' | 80 | |
| Kellogg | 315.84 | 316.13 | 1˚-55' | 80 | |
| Kellogg | 316.79 | 317.08 | 3˚-00' | 60 | |
| Newton | 319.02 | 319.47 | 1˚-55' | 80 | |
| Newton | 323.71 | 323.88 | 1˚-55' | 80 | |
| Newton | 324.5 | 324.87 | 3˚-00' | 60 | |
| Newton | 325.09 | 325.18 | 3˚-00' | 60 | |
| Newton | 325.52 | 325.65 | 3˚-00' | 60 | |
| Newton | 325.79 | 326.34 | 1˚-30' | 85 | |
| Colfax | 327.52 | 327.7 | 1˚-55' | 80 | |
| Colfax | 332.45 | 333.59 | 1˚-30' | 85 | |
| Mitchellville | 340.52 | 341.11 | 2˚-00' | 75 | |
| Mitchellville | 341.25 | 341.57 | 2˚-00' | 75 | |
| Altoona | 348.8 | 348.91 | 1˚-55' | 80 | |
| East Des Moines | 350.05 | 350.52 | 1˚-55' | 80 | |
| East Des Moines | 352.75 | 353.06 | 4˚-15' | 50 | |
| East Des Moines | 353.1 | 353.35 | 2˚-15' | 70 | |
| East Des Moines | 353.2 | 353.36 | 3˚-00' | 60 | |
| Des Moines | 355.18 | 355.36 | 1˚-30' | 85 | |
| Des Moines | 355.71 | 355.99 | 2˚-00' | 75 | |
| Des Moines | 356.23 | 356.46 | 2˚-00' | 75 | |
| Des Moines | 356.49 | 356.53 | 1˚-30' | 85 | |

| Nearest Station | East MP | West MP | Curvature | Speed (mph) | Comments |
|---|---|---|---|---|---|
| Des Moines | 356.94 | 357.07 | 2°-00' | 75 | |
| Des Moines | 358.26 | 358.57 | 2°-22' | 70 | |
| Des Moines | 358.32 | 358.41 | 5°-00' | 45 | |
| Des Moines | 358.46 | 358.51 | 5°-00' | 45 | |
| Des Moines | 358.6 | 358.63 | 2°-00' | 75 | |
| Des Moines | 358.78 | 359.18 | 2°-40' | 65 | |
| West Des Moines | 360.58 | 360.75 | 1°-55' | 80 | |
| West Des Moines | 362.6 | 363.01 | 1°-55' | 80 | |
| West Des Moines | 365.25 | 365.5 | 1°-55' | 80 | |
| West Des Moines | 365.64 | 365.89 | 3°-00' | 60 | |
| West Des Moines | 365.89 | 366.22 | 2°-00' | 75 | |
| DeSoto | 377.24 | 377.61 | 5°-10' | 45 | |
| DeSoto | 377.64 | 377.88 | 5°-00' | 45 | |
| DeSoto | 377.95 | 378.23 | 3°-40' | 55 | |
| DeSoto | 378.47 | 378.78 | 3°-00' | 60 | |
| DeSoto | 380.16 | 380.38 | 3°-00' | 60 | |
| DeSoto | 380.38 | 380.55 | 2°-00' | 75 | |
| DeSoto | 380.55 | 380.72 | 4°-00' | 55 | |
| DeSoto | 381.03 | 381.65 | 3°-00' | 60 | |
| DeSoto | 382.33 | 382.45 | 2°-00' | 75 | |
| Winear | 382.65 | 382.77 | 2°-00' | 75 | |
| Winear | 383.52 | 383.66 | 2°-30' | 65 | |
| Winear | 383.79 | 384.07 | 2°-30' | 65 | |
| Winear | 384.07 | 384.23 | 2°-00' | 75 | |
| Winear | 384.33 | 384.53 | 2°-00' | 75 | |
| Winear | 385.57 | 385.7 | 2°-00' | 75 | |
| Dexter | 395.01 | 395.33 | 1°-55' | 80 | |
| Stuart | 396.02 | 396.72 | 1°-55' | 80 | |
| Stuart | 397.77 | 397.91 | 1°-30' | 85 | |
| Stuart | 398.83 | 399.14 | 1°-55' | 80 | |
| Stuart | 400.37 | 400.58 | 1°-55' | 80 | |
| Menlo | 401.45 | 401.89 | 1°-55' | 80 | |
| Menlo | 402.6 | 402.92 | 1°-55' | 80 | |
| Menlo | 403.82 | 404.14 | 1°-55' | 80 | |
| Menlo | 404.67 | 405.3 | 2°-00' | 75 | |
| Menlo | 405.41 | 405.8 | 2°-00' | 75 | |

| Nearest Station | East MP | West MP | Curvature | Speed (mph) | Comments |
|---|---|---|---|---|---|
| Menlo | 406.03 | 406.2 | 2˚-30' | 65 | |
| Casey | 406.79 | 407.07 | 3˚-00' | 60 | |
| Casey | 407.13 | 407.47 | 3˚-00' | 60 | |
| Casey | 407.47 | 407.74 | 1˚-38' | 85 | |
| Casey | 408.21 | 408.75 | 3˚-00' | 60 | |
| Casey | 408.94 | 409.15 | 3˚-00' | 60 | |
| Casey | 409.15 | 409.42 | 2˚-00' | 75 | |
| Casey | 412.25 | 413.14 | 1˚-30' | 85 | |
| Adair | 413.85 | 414.48 | 1˚-30' | 85 | |
| Adair | 421.75 | 422.08 | 1˚-55' | 80 | |
| Anita | 422.29 | 422.46 | 1˚-30' | 85 | |
| Anita | 422.69 | 422.88 | 1˚-55' | 80 | |
| Anita | 423.52 | 423.78 | 3˚-00' | 60 | |
| Anita | 424.58 | 424.69 | 1˚-55' | 80 | |
| Anita | 426.14 | 426.33 | 1˚-55' | 80 | |
| Wiota | 435.82 | 436.27 | 3˚-00' | 60 | |
| Atlantic | 436.92 | 437.11 | 2˚-00' | 75 | |
| Atlantic | 437.11 | 437.42 | 3˚-00' | 60 | |
| Atlantic | 437.87 | 438.13 | 1˚-30' | 85 | |
| Atlantic | 440.83 | 441.52 | 1˚-30' | 85 | |
| McClelland | 478.88 | 479.15 | 1˚-55' | 80 | |
| McClelland | 479.24 | 479.53 | 1˚-55' | 80 | |
| McClelland | 479.77 | 479.99 | 1˚-55' | 80 | |
| McClelland | 480.88 | 481.26 | 1˚-55' | 80 | |
| Council Bluffs | 486.13 | 486.28 | 1˚-34' | 85 | |
| Council Bluffs | 486.37 | 486.66 | 2˚-00' | 75 | |

*(shows curves between Montgomery (Aurora), Illinois, on BNSF and Council Bluffs, Iowa, on IAIS)*

*Red type indicates double main track curve data*

#### 10.3.4.2 Passenger Operation at 110 mph

While BNSF has indicated that it will consider 90 mph operation, if train velocities in excess of that rate are desired, then a stand-alone alignment will likely become necessary due to freight congestion, overtake issues, and maintenance requirements. Given the lower volume of freight activity on IAIS, it might consider 110 mph operating velocities shared with freight trains on its track provided that capacity was created for freight train overtakes, work events, meet-pass events, and track maintenance outages. If so, the FRA Class of Track would need to be upgraded from the Service's proposed Class 4 (79 mph passenger) to FRA Class 6 (110 mph passenger). Table 10.3-3 above indicates where existing curves would limit the ability of the Service trains to reach 110 mph between Montgomery and Council Bluffs over the combined BNSF-IAIS route.

Each railroad may also have sufficient property to accommodate a stand-alone passenger-only main track as the railroads' rights-of-way are approximately 100 feet in width, at least through rural areas. Locations that will require closer scrutiny include the community centers along the corridor including the Greater Chicago area, Aurora, Plano, Sandwich, Somonauk, Leland, Earlville, Mendota, Arlington, Princeton, Zearing, and Wyanet along the BNSF alignment; Sheffield, Mineral, Annawan, Atkinson, Geneseo, Colona, Silvis, and Moline along the IAIS alignment in Illinois, and Davenport, Walcott, Stockton, Durant, Wilton, Atalissa, West Liberty, the Greater Iowa City area, Tiffin, Oxford, Homestead, Marengo, Ladora, Victor, Brooklyn, Malcom, Grinnell, Kellogg, Newton, Colfax, Mitchelville, Altoona, the Greater Des Moines area, West Des Moines, Booneville, DeSoto, Earlham, Dexter, Stuart, Menlo, Casey, Adair, Anita, Wiota, Atlantic, Hillis, Hancock Junction, McClelland, and Council Bluffs along the IAIS alignment in Iowa. Critical structures along the route could further constrain the ability to construct a stand-alone alignment. These include bridges over the Fox River (two bridges at 200' and 240') at Aurora, the Rock River (three bridges totaling 1945') between Colona and Silvis, Sylvan Slough (1500') and the Mississippi River (1700') between Rock Island and Davenport, the Cedar River (870') at Moscow, the Iowa River (345') just west of the station stop at Iowa City, the Des Moines River at Des Moines (approximately 500'), the Raccoon River (588') at Booneville, the Nishnabotna River (538') at Hancock Junction, Middle Silver Creek (219') west of Hancock Junction, and Keg Creek (250') east of McClelland.

The entire corridor between Aurora (BNSF Milepost 38.4) and Council Bluffs is (IAIS MP 489.0) can accommodate 110 mph operation except in many places where curves in excess of 1 degree would constrain velocity to 90 mph, 79 mph, or slower speeds. Of this total, several curves are located at station stops, along waterways, and speed restricted bridges. The cost to soften or straighten curves or construct bypasses to circumnavigate existing alignments (particularly in constrained urban areas) would like exceed any benefits that could be realized by 110 mph operation.

#### 10.3.4.3 Modeling Results for 90 and 110 mph Speeds

Several RTC time/distance diagrams (Figure 10.3-1 and Figure 10.3-2 below) were generated that indicate the hypothetical overall run-time between Chicago Union Station and Council Bluffs for 90 and 110 mph speeds, using a similar consist with two locomotives and similar upgraded infrastructure proposed for the 79 mph schedule. Table 10.3-4 below summarizes the differences between the run-times based on the maximum operating velocities of 79, 90, and 110 mph which are all based on a maximum of 3.5 inches of super-elevation installed in the track with the equipment capable of handling 5-inch unbalance. It is likely that if higher speeds are desired, then the equipment may be capable of accommodating 6 inches or more unbalance which would greatly improve the running-times shown below.


Figure 10.3-1: Hypothetical 90 MPH TPC Run Chicago to Council Bluffs

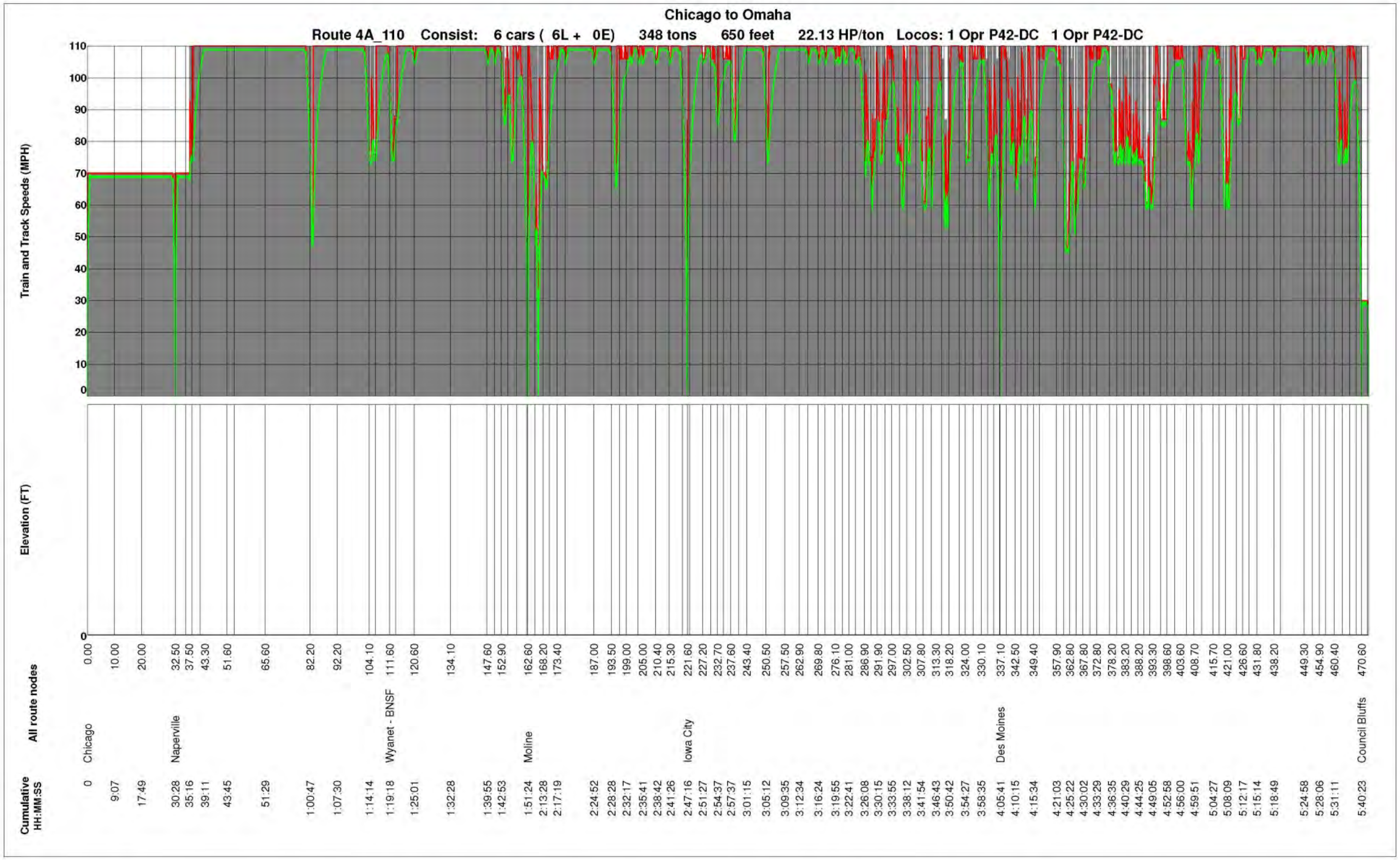



Figure 10.3-2: Hypothetical 110 MPH TPC Run Chicago to Council Bluffs

Table 10.3-4: Overall Hypothetical Trip Times Comparison for 79, 90, and 110 mph Operation between Chicago and Council Bluffs

| Speed | Overall Trip Time |
|---|---|
| 79 mph | 7 hours, 48 minutes |
| 90 mph | 6 hours, 11 minutes |
| 110 mph | 5 hours, 40 minutes |

This data indicates that the 79 mph schedule is only slightly slower than the 90 or 110 mph schedules. Extraction of value from the higher speeds will require either extensive improvements in track speeds in the Chicago commuter corridor and in terminal areas, marked infrastructure improvements on IAIS, reduction in the number of stops, or increase in train horsepower/trailing ton ratio. It was also noted that consists with a single locomotive and a cab car for push-pull operation exhibit substantial loss of acceleration capability above 79 mph. This acceleration is improved with two locomotives, but the key reason for two locomotives for service extension to Des Moines and Council Bluffs is for protection of schedules and passenger safety and comfort in case of a locomotive failure on a single-locomotive train.

### 10.3.5 Equipment Requirements

The proposed train consists of the Service are based on considerations of ridership, maximum speeds, infrastructure requirements to support the proposed train length and curve-speed capability, technical elements of equipment designs, and costs. Train consists were iterated to arrive at a proposed consist, which is comprised of one 4,250 horsepower locomotive (3,650 horsepower available for traction), two coaches, one café/lounge car, one coach, a coach/cab-car, and/or a second locomotive on the opposite end of the train. Each trainset (six are required to meet the schedule) would be initially made-up at Amtrak's 14th Street Yard located immediately south of Chicago Union Station, with each consist remaining unbroken except for programmed heavy maintenance events or unplanned maintenance events that cannot be performed during daily layover periods.

Each train is 565 feet in length, weighs roughly 647 tons, and would accommodate five inches of cant deficiency (or unbalance). Each of the locomotives would likely be a P42-type or equivalent, capable of generating 4,250 horsepower with 3,650 horsepower available for tractive effort after subtraction for head-end power (HEP) to the passenger cars for heating, cooling, ventilation, and lighting, resulting in a 20.32 horsepower/trailing ton ratio.

### 10.3.6 Passenger Stations

The proposed Chicago to Council Bluffs-Omaha service would use six stations in the existing Amtrak-BNSF corridor between Chicago and Princeton, Illinois, and seven new stations in the proposed IAIS corridor at Geneseo and Moline, Illinois; and Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa. The location of the initial terminal station in Council Bluffs station does not preclude an extension of service to the ultimate terminal for the service within the Omaha Metropolitan Area. A preferred station site for the Omaha terminal will be identified in a subsequent Tier 2 NEPA study. Amtrak's present long-distance California Zephyr service between Chicago and the San Francisco Bay Area stops at small facility across from Omaha Union Station and adjacent to the former Burlington Station (neither of these historic stations serves railroad operations presently).

These stations, identified in the Amtrak feasibility study between Chicago and Iowa City, the Chicago to Iowa City High Speed Intercity Passenger Rail Program, and via subsequent analysis and study between Iowa City and Council Bluffs-Omaha, were reviewed in this Service Development Plan for criteria that include convenience to users, cost of any required infrastructure, location in relationship to existing high-use transportation patterns, parking space for personal vehicles, connectivity to other transportation modes, population concentrations, and number of stations. The number and spacing of stations influences both total transit times and accessibility of the passenger rail system to users, and a balance should be struck between overall service convenience and impacts on train times. Detailed discussion of each station and more information regarding the proposed scope of work and initial cost estimates for stations can be found in Section 8.0.

### 10.3.7 Maintenance and Layover Facilities

Layover facilities are required at terminal points to facilitate light maintenance, cleaning, and fueling of cars and locomotives; secure and stage passenger trains when not in operation; store supplies and spare equipment; and provide an on and off-duty point for passenger train crews. Establishment of interim layover facilities would mirror the phased implementation of service in the Chicago to Council Bluffs-Omaha corridor: Moline for the Chicago-Quad Cities service under development, Coralville (Iowa City) for the proposed Chicago-Iowa City service, and at Des Moines, as the next phase of the proposed service. A permanent layover facility would be constructed at Council Bluffs, once the full Service is established on the entire corridor.

Following is a basic description of each of the layover facilities in the Service corridor:

- **Moline:** The facility will be located near the Moline station and will consist of a layover building, parking lot with an access road, and a 700-foot stub-ended service track which will accommodate one standard trainset.
- **Coralville (Iowa City):** The facility will be located 2.5 miles west of the Iowa City station and to the south of the IAIS main track. It consists of a layover building, parking lot with an access road, and a 700-foot stub-ended service track which will accommodate one standard trainset.
- **Des Moines:** The facility will be located one mile east of the Des Moines station and to the south of the IAIS main tracks. It consists of a layover building, parking lot with an access road, and two, 700-foot stub-ended service tracks which can accommodate two standard trainsets.
- **Council Bluffs:** The facility will be located immediately west of the Council Bluffs station and to the south of the proposed passenger main track. It will consist of a layover building, parking lot with an access road, and a storage yard comprised of five service tracks 750 feet or greater in length. There will be capacity to store five standard trainsets, as well as spare locomotives and equipment when required.

In addition to the light maintenance facilities identified, a facility will be required to provide heavy maintenance for locomotives and trainsets, which attends to major repairs, inspections, and overhauls. Methods for providing heavy maintenance for the Service have not yet been determined, but could involve construction of a new facility, upgrade of an existing interim layover facility into a dedicated facility, or contracting with Amtrak or Metra in Chicago or a third-party contractor elsewhere. If it is decided to construct a heavy maintenance facility as part of the Service, then site selection and detailed evaluation would occur during Tier 2 EIS analysis.

Further discussion of and a cost estimate for each maintenance and layover facility has been developed in Section 9.0.

### 10.3.8 Operational Organization and Operating Methods

For the purposes of the SDP, Amtrak is assumed to be the operator of the passenger trains for each phase of the Service implementation between Chicago and Council Bluffs-Omaha under an agreement with the Illinois and Iowa DOTs. The territory over which the passenger trains of the Program operate would be controlled, managed, and maintained by the host railroads: Amtrak at Chicago Union Station (0.8 mile); BNSF from Chicago to Wyanet (111.2 miles); and IAIS from Wyanet to Council Bluffs (358.8 miles). Amtrak would oversee the trains of the Program from its offices in Chicago and via field management from principal locations on the route.

Method of Operation is a term for a body of practice, operating rules, and regulations that encapsulate a specific method for operating trains on a railroad track.

Amtrak dispatches all train movements at CUS. The BNSF portion of the route between Chicago and Wyanet is mostly double and triple track with some quadruple main track. Its Method of Operation is Centralized Traffic Control, and currently supports passenger service at speeds up to 79 mph (Amtrak between Chicago and Wyanet and Metra between Chicago and Aurora). BNSF dispatchers control all train movements on this route remotely from Fort Worth, Texas, and local operations management is based at terminals and yards in greater Chicago, Galesburg (west of Wyanet), and Barstow (Quad Cities).

The method of operation on the IAIS portion of the route between Wyanet and Council Bluffs is Track Warrant Control. This single-track route supports freight service up to 40 mph and is non-block territory without signals except at interlockings with BNSF at Colona and UP at Grinnell and Des Moines. All movements on IAIS are coordinated by a dispatcher in Cedar Rapids, Iowa, who grants track warrant authority to trains and engines by radio, telephone (with restrictions), or facsimile device to occupy the main track outside of terminal areas. Movements off the main track within principal yards are often coordinated with train crews by a trainmaster or other field operations managers, who are located in the Quad Cities, Cedar Rapids, South Amana, and Council Bluffs. IAIS enjoys trackage rights over short segments of the BNSF through the Quad Cities and the UP in Des Moines. CP has trackage rights over the IAIS between Rock Island and Davenport and UP has trackage rights over IAIS between Des Moines and Council Bluffs. Currently, there is no regular scheduled passenger service on the IAIS.

Operations over both segments are subject to the General Code of Operating Rules (GCOR), a uniform set of safety rules and regulations employed by most Class 1 and Class 2 railroads in the U.S. The document outlines field safety practices, procedures for proper train handling, accident management, signaling, and any scenario that could potentially disrupt safe railroad operations. Each railroad supplements the GCOR with its own version of a Timetable, General Orders and Notices, System Special Instructions, Air Brake and Train Handling Instructions, and Hazardous Materials Instructions custom tailored to fit its individual mode and style of operations. All Amtrak train and engine crews would possess a copy of and adhere to the rules of the host railroads over which they are operating.

## 10.4 Operating Equipment

### 10.4.1 Trainset and Locomotive Equipment Plan

Purchases of equipment for the initial Chicago to Iowa City High Speed Intercity and Passenger Rail Program now under development between Chicago and Moline by Illinois DOT, and the eventual full Chicago to Council Bluffs-Omaha service discussed in this document, will be consistent with the specifications developed by the Next Generation Corridor Equipment Committee (NGEC), created by Section 305 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) to establish a fleet of standardized rail corridor equipment. The equipment—locomotives and conventional, non-tilting bi-level passenger coaches—will be capable of operating at the 79, 90, and 110 mph speeds explored for the Service, and as high as 125 mph. The passenger cars will come in three configurations to match the full needs and functionality of existing and proposed services and expectations of users: Coach car, café/lounge car, and coach/cab-car. All will be fully capable of pooling with other Amtrak intercity services in the Chicago hub, and will be included in the fleet of equipment necessary to sustain future MWRRS services.

Standardization with the trainsets of Amtrak and the full MWRRS is a long-established goal of Illinois DOT, Iowa DOT, and Amtrak, to enable pooling of equipment for maintenance or overhaul outages, and to provide interoperability of equipment at the Chicago Terminal to avoid congestion while trainsets unique to different lines are shuttled between Chicago Union Station and the Amtrak maintenance facility near the station. Pooled equipment would enable, for example, an arriving Des Moines train to be immediately redispatched as a Detroit train, while an inbound St. Louis train in turn becomes the next Council Bluffs train. This will greatly increase the platform and track capacity at Chicago Union Station as opposed to dedicated equipment sets for each rail line.

All equipment identified for the Service meets the goals of the capacity, comfort, convenience, and amenities required by this Service Development Plan and used industry-review processes to craft equipment specifications. These specifications require equipment that meets or exceeds Environmental Protection Agency (EPA) emissions regulations, and emphasize superior fuel economy, noise reduction, and domestic sourcing. Opportunities to innovate and employ sustainable practices such as diesel/battery hybrid locomotives, bio-fueled locomotives, and reduced energy consumption passenger-car heating and cooling were sought for the Service.

Underscoring the States' commitment to the development of passenger service in the entire corridor, Iowa and Illinois DOT previously served on the NGEC's Executive Committee to participate in the development of equipment procurement strategies and the Technical Subcommittee which provided a forum for exploring potential new technologies that are compatible with the "GreenLine" vision of the Program. Iowa DOT also participated on the Locomotive group of the Technical Subcommittee in order to pursue the development of fuel efficient, environmentally responsible locomotives that will help to achieve the "GreenLine" vision.

In 2011, Illinois DOT and California DOT (Caltrans) reached a cooperative agreement with the FRA as lead agencies to launch a multi-state procurement of 130 of the standardized PRIIA bi-level passenger cars for use on existing and projected passenger rail corridors in the Midwest (including Iowa) and on the West Coast. As part of the Midwest coalition, Illinois and Iowa will receive 88 of these cars, some of which will be used only for the initial two round-trip Chicago to Moline service under development by Illinois DOT, and available for the first corridor service extension to Iowa City by Iowa DOT and possibly in a subsequent extension to Des Moines. Additional bi-level equipment constructed to identical specifications would be necessary to support extensions of the service and train frequency increases west to Des Moines and Council Bluffs-Omaha, thus requiring a subsequent car order. Discussion later in this section outlines how many cars and locomotives, including spares, and the inventory of capital spare parts that are necessary to support the full service to Council Bluffs-Omaha.

The joint procurement process involved leveraging of federal investment and matching state capital to maximize the return on investment by realizing manufacturing synergies and encouraging cost reduction through the lower-per-unit cost created by the volume of this cooperative order. Creation of the passenger equipment necessary for the Service is subject to U.S. Department of Transportation Buy America guidelines and FRA High Speed Rail Program regulations (49 U.S.C. Chapters 244, 246; § 24405). These stipulations serve to maximize economic benefits by requiring that the steel, iron, and manufactured goods used in the manufacture of the bi-level cars are produced and acquired from domestic suppliers, as well as to encourage manufacturers to assemble the cars in the U.S. with American labor. Nippon-Sharyo USA and its partner Sumitomo Corporation of America were awarded a $352 million contract in November 2012 to manufacture the bi-level equipment at a new plant in Rochelle, Illinois, west of Chicago. The cars will be manufactured under a "100 percent Buy America" plan and will be delivered in stages during 2015-2018. The 33 accompanying locomotives will be acquired in a separate agreement, for which a contract has not yet been awarded.

### 10.4.2 Equipment Requirements

The Chicago to Council Bluffs-Omaha service will be accomplished through phased implementation. Two trainsets will be necessary to support the schedule for the initial two round-trip-per-day Chicago to Moline service and the first extension to Iowa City, with each trainset performing one round-trip every 24 hours. Two trainsets will be necessary to support an extension of these two round-trips to Des Moines (assuming that the existing schedule from Chicago to Iowa City is extended to Des Moines and that no alterations occur), and five trainsets will be needed to support a subsequent service increase to four round-trips. A total of six trainsets will be required to support the full four-round-trip-daily Chicago to Council

Bluffs-Omaha service explored in detail in this SDP. Four trainsets will make just a one-way trip each day, while two trainsets (used on the first morning departures from Chicago and Council Bluffs) will make a full round-trip in each 24-hour period. Spare locomotives and equipment have not been considered in these trainset figures.

Each standard trainset will have 374 standard revenue seats, weigh 647 tons, and measure 565 feet in length.

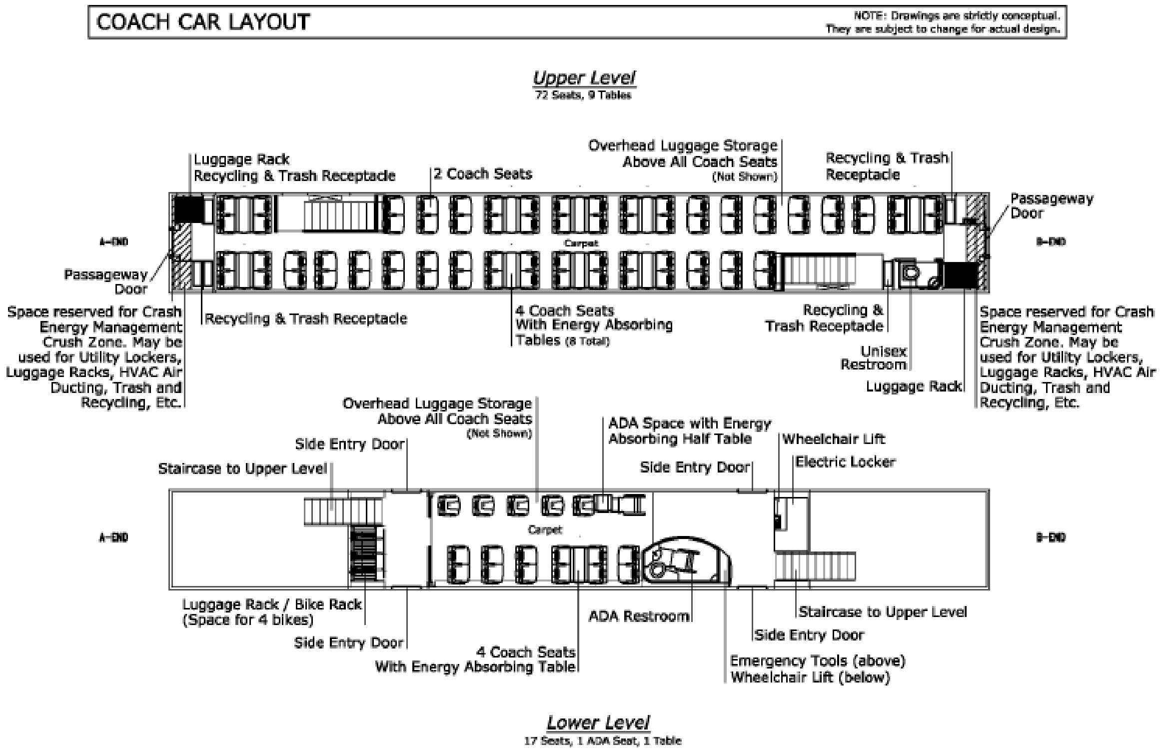
The standard consist for Chicago-Council Bluffs service will be arranged as follows:

- 1 locomotive (west end)
- 2 coach cars
- 1 café/lounge car
- 1 coach car
- 1 coach/cab-car
- 1 locomotive (east end) (only one locomotive will be provided for the Chicago-Moline and Chicago-Iowa City implementation phases; the second will be provided for the Chicago-Des Moines and Chicago-Council Bluffs implementation phases)

Locomotives for the proposed service are similar to those powering existing intercity and corridor-service Amtrak trains and commuter trains nationwide. Planning assumed that locomotive specifications would be similar to P42-type diesel-electrics of 4,250 net horsepower after deduction for parasitic loads, with 3,650 or greater flywheel horsepower after deduction for Head-End Power supplied to the trainset. P42-type locomotives currently manufactured weigh 134 tons and are 70 feet in length. Each trainset will have a locomotive or coach/cab car on each end, to assure a push-pull mode of operation, without an infrastructure requirement (a wye, balloon track, or turntable, for example) for turning trainsets at Chicago, Moline, Coralville (Iowa City), Des Moines, and Council Bluffs. Train Performance Calculations with this consist on the route demonstrated that a P42-type locomotive could adequately accelerate from station stops and permanent speed restrictions to the 79 mph maximum track speed proposed by the infrastructure, with the proposed trainset, on the corridor's exiting vertical alignment.

Locomotive reliability may decrease as mileage increases. New-design locomotives may require robust warranty protection potentially including on-site manufacturer support and/or manufacturer-provided spares to ensure the necessary passenger-train on-time performance during the warranty period and initial operating experience. After five years of service, locomotive reliability and power output may degrade to the degree that two locomotives per train are required to maintain schedule reliability, particularly during winter weather. Two locomotives per train may also be required when train lengths temporarily increase for special events or holiday travel peaks.

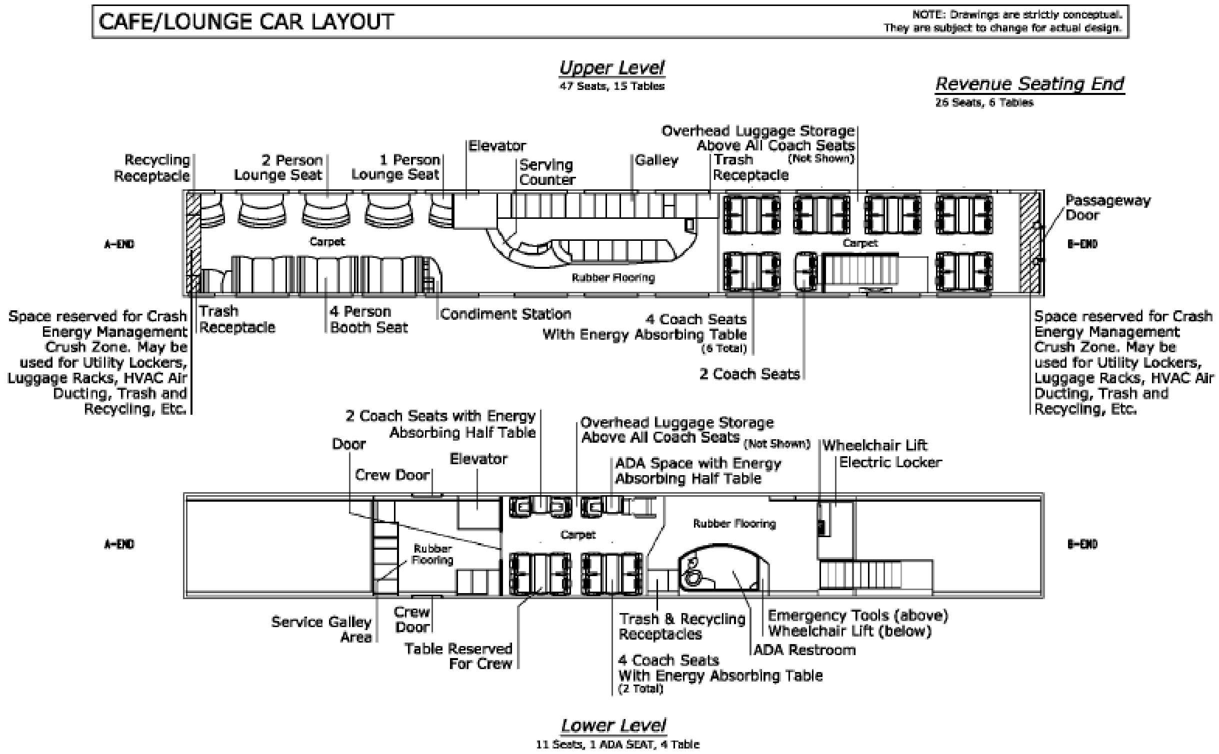
According to Amtrak and PRIIA equipment specifications released in 2012, the coach cars are proposed to be configured with seating for 89 passengers, as shown in Figure 10.4-1 below. Each coach will be equipped with reclining seats, workstation tables, overhead luggage storage, convenience outlets, wireless internet service, and ADA accessible lavatories. The car weighs 75 tons and is 85 feet in length.




*Source: PRIIA 305-001/Amtrak 962 Technical Specification. Copyright 2012, Amtrak.*

Figure 10.4-1: Coach Car Layout

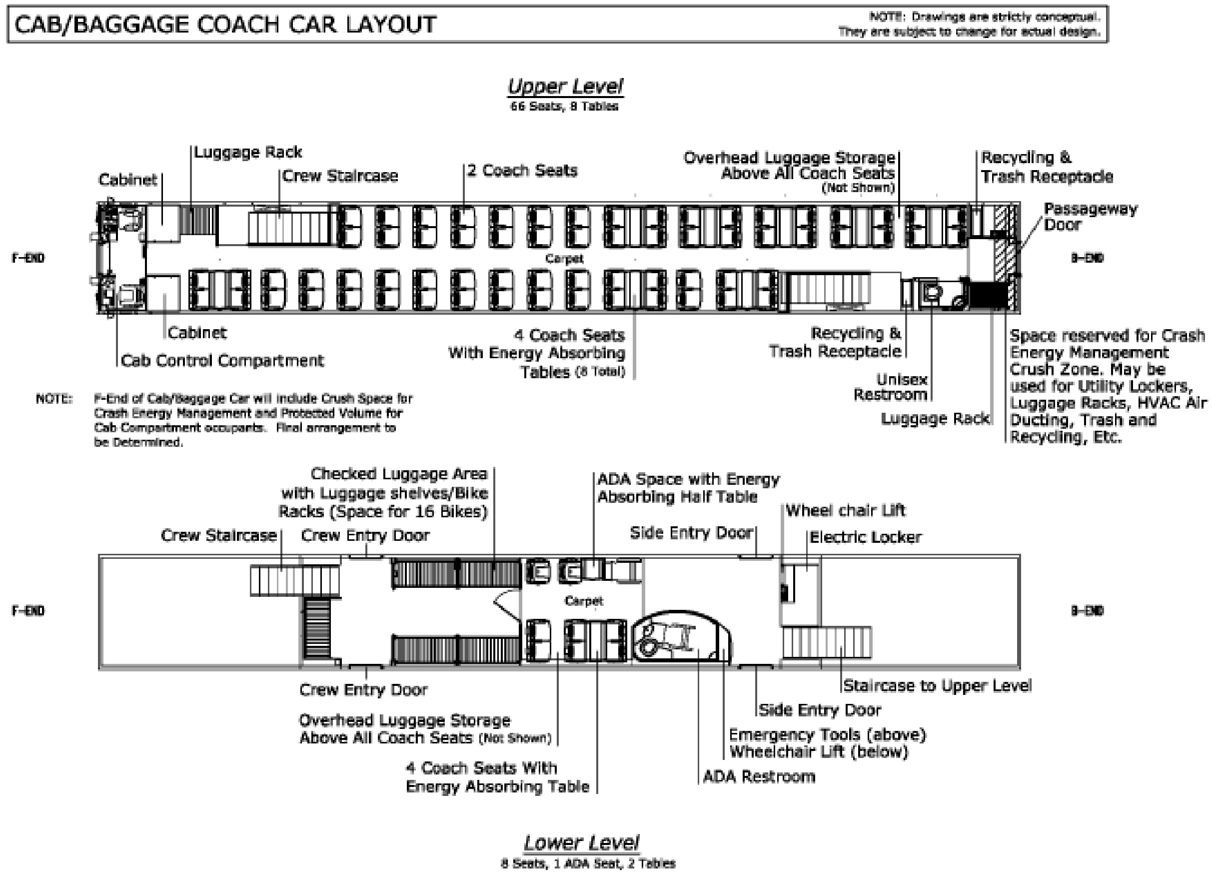
Café/lounge cars are proposed to be configured with 33 revenue seats, 21 non-revenue lounge seats, and 4 crew workstation seats, as well as space for a food-preparation and service area, as shown in Figure 10.4-2 below. These cars will include dining furnishings, lounge seating, reclining coach seats, workstation tables, overhead luggage storage, convenience outlets, wireless internet service, and ADA accessible lavatories. Reserved business class seating will be accommodated in this equipment. The car weighs 77 tons and is 85 feet in length.




*Source: PRIIA 305-001/Amtrak 962 Technical Specification. Copyright 2012, Amtrak.*

Figure 10.4-2: Café/Lounge Car Layout

In lieu of a second locomotive in the trainset, a coach/cab-car can be placed at the other end of the consist as a control unit to facilitate push-pull operation (the initial service from Chicago to Moline and the first service extension to Iowa City will employ this practice). Each coach/cab-car is proposed to seat 74 passengers and would include reclining seats, workstation tables, overhead luggage storage, convenience outlets, wireless internet service, ADA accessible lavatories, and accommodation for checked baggage and bicycles, as shown in Figure 10.4-3 below. The car weighs 77 tons and is 85 feet in length.




*Source: PRIIA 305-001/Amtrak 962 Technical Specification. Copyright 2012, Amtrak.*

Figure 10.4-3: Coach/Cab-Car Layout

The PRIIA equipment complies with the Crash Energy Management (CEM) guidelines set forth by APTA Standard SS-C&S-34-99, Section 6. Each car embodies a durable shell which can absorb collision energy and substantially improve crashworthiness, thus reducing the likelihood of death or injury to passengers and crew members in an accident. CEM technology employs energy-absorbing sections at the end (bulkheads) of each car, redesigned seats and workstation tables, and push-back coupler assemblies connecting the cars.

Vehicle to platform boarding height interface is dictated by U.S. Department of Transportation ADA regulations, and requires platform heights of 15 inches above head of rail for startup intercity passenger rail services. Traditional, low-level platforms 8 inches above the head of rail are the standard on all platforms used on existing Amtrak intercity services on the BNSF corridor between Chicago and Princeton, and as the Chicago to Council Bluffs-Omaha service is an extension of this corridor, all station platforms west of Princeton on the IAIS corridor will be established at the 8-inch standard. The PRIIA cars have a lower floor height of 18 inches above the head of rail, thus requiring a portable step box be placed by a member of the train crew to bridge the gap for boarding and alighting passengers. All cars in the service will be fully ADA accessible and every station in the Service will have lifts to allow level boarding for wheelchairs. The platform at every new station will possess a canopy along two-thirds of its length that clears the body of the PRIIA cars, and will shelter riders from inclement weather.

Train Performance Calculator runs (TPC runs) were conducted to compare the performance of the design trainset against the schedule requirements and proposed infrastructure, with all station stops included. TPC runs showed that the proposed infrastructure and trainsets could meet or exceed the proposed schedule, using appropriate station dwell times.

### 10.4.3 Equipment Cost Estimates

In order to develop a cost for the acquisition of new motive power and passenger coaches for the Chicago to Council Bluffs-Omaha service, order of magnitude estimates were made after review of recent orders (including purchases by Metrolink and the Caltrans/Illinois DOT as lead agencies in the multi-state procurement of bi-level PRIIA cars), discussions with manufacturers, and cost escalations that are likely.

The review took the following locomotives and equipment into consideration:

- Locomotive. The most recent similar U.S. locomotive purchase was made by Los Angeles commuter rail agency Metrolink in 2012 and will be delivered in 2015. This 10-unit order was for F125 Tier 4 locomotives from Electro-Motive Division for $6,300,000 each. The States estimate that the locomotives purchased for the Chicago to Council Bluffs-Omaha service could be equal to or less than the Metrolink figure, based on a higher degree of standardization for locomotives to power the standardized PRIIA consists for Amtrak and the MWRRS.
- Equipment. The most recent bi-level passenger coaches purchased for U.S. service was the multi-state coalition led by Illinois DOT and Caltrans for standardized PRIIA intercity equipment. A $352 million contract was awarded to Nippon-Sharyo USA and its partner Sumitomo Corporation of America in 2012 to manufacture 130 pieces of bi-level equipment in three varieties: Coach, café/lounge car, and cab-car. Specific costs per car type are subject to confirmation, but for the sake of the study, an overall average of $2.7 million per car is employed. Additional equipment to support the full Chicago to Council Bluffs-Omaha corridor could potentially be secured through the acquisition of pre-owned coaches and coach/cab-cars from commuter agencies and other passenger carriers, which may or may not require mechanical and cosmetic refurbishment before entering service. Commuter agencies nationwide, including Chicago's Metra, have realized an appreciable cost savings over new equipment by following this practice.

The equipment cost data above, in conjunction with the TPC runs was used as a basis for determining the makeup of and the estimated cost of the standard consist designated for the Chicago to Council Bluffs-Omaha service.

While any locomotive and equipment acquisitions would match the phased implementation of service in the corridor, the figures presented here reflect only the requirements for the operation of the full service between Chicago and Council Bluffs-Omaha. Costs and equipment needs for the earlier phases to Moline, Iowa City, and Des Moines are outlined in the financial discussion in Section 12.0.

Included in the roster are three spare locomotives and two spares for each of the three types of equipment to support regular maintenance cycles, based on the assumption that one locomotive, one coach, and one café/lounge car could be out of service for major repairs or heavy maintenance simultaneously at any given time. These figures are explained in Table 10.4-1 below.

Table 10.4-1: Chicago to Council Bluffs-Omaha Passenger Service Equipment Cost

| Equipment Type | Unit Cost | Total Cost |
|---|---|---|
| Locomotives | | |
| Locomotives: | 15 at $6.3 million each<br>(12 regular and 3 spares) | $94,500,000 |
| Capital Spare Parts: | Locomotives and Equipment | $5,307,249 |
| Passenger Cars | | |
| Coaches: | 20 at $2.4 million each<br>(18 regular and 2 spares) | $48,000,000 |
| Café/lounge: | 8 at $3.0 million each<br>(6 regular and 2 spares) | $24,000,000 |
| Coach/cab-car: | 8 at $2.7 million each<br>(6 regular and 2 spares) | $21,600,000 |
| **Subtotal** | | $193,407,249 |
| **30% Contingency** | | $58,022,175 |
| **Total:** | | $251,429,424 |

### 10.4.3.1 Capital Spares for Rolling Stock

The study estimates an allowance of 10 percent critical spare parts to be obtained with equipment acquisition. These costs in 2013 dollars have been incorporated into operating and maintenance cost estimates. Below is a list of major components in this category with an approximate cost for the sake of illustration.

*Capital Spare Parts*

| | |
|---|---|
| Locomotive Bogie Complete with Traction Motor Combos: | $2,062,500 |
| Locomotive Spare PTC Hardware Package: | $330,000 |
| Locomotive Spare Brake Valves: | $206,250 |
| Locomotive Spare Event Recorder | $330,000 |
| Coach/Cab-Car Bogie Complete: | $700,000 |
| Cab-Car Spare PTC Unit: | $176,000 |
| Coach Spare Air Conditioning Unit (2): | $140,000 |
| Cab-Car Spare Event Recorder: | $176,000 |
| Coach/Cab-Car Spare Brake Valves: | $98,000 |
| Coach Seats in Repair Pool (128 x $495): | $63,360 |

### *Locomotives Capital Renewal*

During the 20-year period after implementation of the first phase of the proposed service (2015), it is not anticipated that each of the locomotives will require a mid-life rebuild program. However, they will require two, eight-year overhauls of all rotating components that will be Unit Exchanged (UTEX) by sending the in-service units back to the supplier for rebuilding of electric components and trucks.

| | |
|---|---|
| Locomotive Truck Complete (2): | $126,500 |
| Main Power Plant (UTEX): | $379,500 |
| Main Alternator (UTEX): | $253,000 |
| Locomotive Traction Motor (UTEX):<br>($25,000 each – 4 required) | $126,500 |
| Locomotive Air Compressor (UTEX): | $31,625 |
| Locomotive Equipment Blowers (UTEX): | $44,275 |
| Locomotive Rebuild PTC Air Brake Interface: | $6,325 |
| Locomotive Rebuild Brake Valve Set: | $2,530 |
| Locomotive Rebuild Event Recorder: | $1,265 |
| **Total Cost of Overhaul:** | **$958,870** |

The maximum total projected cost of one Locomotive Overhaul Program for the fleet (will vary by the number of locomotives and when they are actually purchased), to be completed in ownership-year eight, is $14,383,050.

### *Coaches Capital Renewal*

Each of the coaches in all configurations will be designed to accommodate a minimum service life of 30 years. During the 20-year period after implementation of the first phase of the proposed service (2015), each of the coaches will not require a mid-life rebuild program; they will however require two, eight-year overhauls of rotating equipment and critical electronic components. The inventory below is not all necessarily found in the PRIIA bi-level cars under manufacture, but they will provide a framework of essential components until specific car maintenance requirements and costs are confirmed.

| | |
|---|---|
| Trailer Coach/Cab-Car Truck Complete (2): | $6,325 |
| Cab-Car/NPCU rebuild PTC Unit: | $6,325 |
| Coach Air Conditioning Unit (2) (UTEX): | $12,650 |
| Cab-Car/NPCU Rebuild Event Recorder: | $1,265 |
| Coach/Cab-Car rebuild Brake Valves: | $2,530 |
| Replace all Exterior Windows (20 x $275): | $6,325 |
| Replace All Seat Bottoms (80 x $220): | $20,240 |
| **Total Cost of One Single Car Overhaul:** | **$55,660** |

The maximum total projected cost of one Car Overhaul Program, to be completed in ownership-year eight, is estimated at $2,003,760.

#### 10.4.3.2 Cost Estimates for Operations Labor and Train Operations

Operating and maintenance cost estimates for the States based on synergies that Amtrak has with its Midwest operations and projections of Amtrak future costs, have been prepared and can be found in the Program Financial Plan attached to the SDP.

Crew requirements for the Chicago to Council Bluffs-Omaha service are subject to agreements with Amtrak and the host railroads, BNSF and IAIS. It is anticipated that each of the eight train crews will have five people, and will include two engineers, one conductor, one assistant conductor, and one café/lounge service attendant. The first group of four Chicago-based Amtrak train crews would take trains west to the Council Bluffs station and later the layover facility, take their federally mandated rest at a nearby hotel, and then take a train east to Chicago the following day, on a first-in, first-out basis. Also on the following day, the other four Chicago-based crews would take a train west to Council Bluffs in order to complete the operating cycle. Due to the length of the run (approximately 10 to 11 hours on-duty, which includes the time necessary to conduct a job briefing before the run and to yard equipment and complete paperwork after the run) and consideration of the Federal Hours of Service regulations which restrict operating department railroad employees to no more than 12 hours of work, no Chicago crews would be able to run west to Council Bluffs and then return east to Chicago in the same shift. Present Amtrak labor regulations require assignment of two engineers to the crew of any train with a run of six hours in duration or longer. Outlined below is the estimated annual expense for train and engine personnel.

*Estimated Train and Engine Personnel Operating Expense*

| | |
|---|---|
| Each crew: | |
| Engineer (two required at $93,500 each): | $187,000 per year |
| Conductor: | $88,000 per year |
| Assistant Conductor: | $82,500 per year |
| Café/Lounge Service: | $66,000 per year |
| Total wages: | $423,500 per year |
| Burden rate of 1.8: | $762,300 per crew, per year |
| For eight crews: | $6,098,400 per year |
| Four crew overnights at Council Bluffs per day (Lodging, meals, transportation – arbitraries of 25 percent): | $540,000 per year |
| **Total T&E Labor:** | **$6,638,400 per year** |
| One RFE/TM (Non-Agreement): | $200,000 |
| **Total operations department labor:** | **$6,838,400 per year** |

### *Estimated Fuel Expense*

Amtrak uses a fuel consumption model to estimate the gallons of fuel necessary to operate service. The model takes into account the weight of each car, the proposed schedule, and the physical characteristics of the track. The Iowa DOT used the TPC runs from the RTC model to extract probable fuel consumption. Amtrak reported that its national average for fuel consumption amounted to 2.2 gallons per train-mile in January 2013. This figure is weighted by several long-distance trains, many of which must traverse mountain grades and all of which are longer and heavier than the proposed intercity trains of the Chicago to Council Bluffs-Omaha service. Therefore, for the sake of the calculations below a balance was struck between the TPC result of 0.85 gallon per train-mile and Amtrak's national average of 2.2 gallons per train-mile for fuel consumption to create a basis of 1.28 gallons per train-mile to derive fuel consumption figures and costs for the Service.

Taking into account the four daily round-trips between Chicago and Council Bluffs, the service would require:

| Gallons per day for: | Gallons |
|---|---|
| Eastbound operations between Council Bluffs and Chicago | 2353.8 |
| Westbound operations between Chicago and Council Bluffs: | 2542.5 |
| Layover/idle fuel usage at Chicago and Council Bluffs: | 158.4 |
| (4.95 gallons per hour x 2 hours per locomotive x 16 locomotives) | |
| **Total (Gallons per day):** | **5054.7** |

*Figures include HEP factor (204 KW load for 5 cars)*

Multiplying the figure of 5054.7 gallons by 365 days yields a figure of 1,844,965.5 gallons of fuel consumed per year. Multiplying the annual volume of fuel consumed by an industry average of $3.22 per gallon for diesel fuel yields an estimated annual fuel expense of $5,940,788.91.

### 10.4.3.3 Equipment Provisioning

Restocking of café/lounge car supplies (food, beverages, and sundry items) would occur during train layover periods at Chicago and Council Bluffs. The annual cost for on-board services was determined on a train-mile basis as $5,365,311.

### 10.4.3.4 Car and Locomotive Maintenance Costs

Amtrak bases car and locomotive maintenance costs on the proposed change in unit miles. Operations and maintenance figures here include a maintenance cost-per-car mile calculation. This cost is made up of two elements: Direct costs-per-mile and indirect costs-per-mile. The cost-per-mile or locomotive miles break down as follows:

| | Coaches | Locomotives |
|---|---|---|
| Direct Costs | $0.141 | $0.854 |
| Indirect Costs | $0.150 | $0.243 |
| Total Costs | **$0.291** | **$1.097** |

The equipment maintenance elements included in the direct cost-per-mile figures for coaches and locomotives include:

- Wheel True
- Locomotive and Coach Axle Combo Change
- Locomotive and Coach Truck Change
- Locomotive or Cab-Car PTC and 92-Day Air Brake
- Locomotive or Cab-Car Annual Inspection (365 Day)
- Locomotive or Cab-Car 736-Day Inspections
- Locomotive or Cab-Car Three Year Inspection (Allow 5 Days)
- Coach Periodic Inspections (Allow 3 days)
- Locomotive Running Repairs
- Coach, in all configurations, running repair

The equipment maintenance elements included in the indirect cost-per-mile figures for coaches and locomotives include:

- External Car Wash
- Locomotive and Coach Disc Brake Pit Inspection (Brake Shoes, Disc Pads, etc.)
- Class One Daily Air Brake, and Equipment Mechanical Inspections (Brake Shoes, Disc Pads, Air Hoses, Light Bulbs, etc.)
- Locomotive Six-Year Air Brake Valve Rebuild
- Coach Six-Year Air Brake Valve Rebuild
- Spare parts
- Tools
- All Consumables not otherwise specified (lube oil, window washing fluids, sand, supplies for coach cleaning, etc.)

### *Mechanical at Council Bluffs Layover Facility*

Facility will require 12 employees to handle all light maintenance and equipment servicing tasks. One night shift employee will be used to clean the layover/maintenance facility once weekly.

| | |
|---|---|
| Straight Time<br>$36.30 per hour ($1,452 per week per employee): | $17,424.00 per week |
| Overtime (20 percent of straight time): | $3,484.80 per week |
| ***Total wages:*** | ***$1,087,258.00 annually*** |
| Expenses (5 percent of straight time): | $ 45,302.40 annually |
| ***Subtotal:*** | ***$1,132,560.40 annually*** |
| Four pick-up trucks ($900/month/each) | $43,200.00 annually |
| Locker rooms/facilities as part of Council Bluffs facility | $0 annually |
| **Total:** | **$1,175,760.40 annually** |

*Assumptions:*

- *Twelve employees (six on day shift and six on night shift, seven days per week)*
- *Working foreman or lead mechanic*
- *Mechanical contractor*
- *Rate of pay of $24.20 per hour*
- *1.5 for burden rate*

Annual mechanical expense includes the elements above and was estimated at $14,789,216 using a per-mile formula.

#### 10.4.3.5 Station Operating and Maintenance Cost Breakdown

This section takes into consideration all seven stations (Geneseo, Moline, Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs) and a layover facility (Council Bluffs).

| Servicing and Cleaning at Stations Only (annually) | |
|---|---|
| Servicing/cleaning of layover facility, once weekly<br>(performed by mechanical employee) | $ 0 |
| Trash pick-up and straightening daily, 1 hour per station per day:<br>($11 per hour, 1.5 burden rate) | $42,158 |
| E-clean once a quarter, 8 hours per station:<br>($11 per hour, 1.5 burden rate) | $ 3,696 |
| All electronics for stations – On contract basis:<br>($1650 per day for 26 days per year)<br>Includes:<br>• Cameras<br>• Full service-intrusion alarms<br>• Fiber optic or Cat 5<br>• Train Arrival and departure display both visual and audio, as required by ADA | $ 100,100 |
| Contract snow removal as needed for parking lots, walkways, and station platforms<br>($1,100 per day all in, contingency contract): | $30,800 |
| Walking vacuum machine for parking lots:<br>($220 per month per station) | $18,480 |
| Landscaping ($110 per station, per week 36 weeks): | $27,720 |

Note that there is potential to lease out a parking concession to a third party. Annual station operating and maintenance costs were estimated at $2,710,000.

#### 10.4.3.6 Other Operating and Maintenance Costs

Other annual expenses, calculated on a track-mile basis, include $1,031,772 for payments to host railroad BNSF to cover the cost of track maintenance and train dispatching (host railroad payments to IAIS are included elsewhere) and $10,397,553 to cover all remaining direct costs (insurance, overhead positions, police, utilities, advertising, etc.) for the full Chicago to Council Bluffs-Omaha service.

## 10.5 Rail Infrastructure Requirements

### 10.5.1 Overview

Physical characteristics of the host routes were examined for their influence on train schedules, train service benchmarks, costs, and suitability for a passenger-rail corridor that must also continue to host freight and passenger trains of other railroads without significant negative effects on their capacity, speed, reliability, costs of operation, or operational flexibility. These characteristics were used to develop the attached Conceptual Engineering documents that describe, illustrate, and quantify new track, train-control, and communications infrastructure that will be required to deliver the proposed service reliably, at reasonable cost, and for the 30-year time horizon required by the FRA. These engineering documents consist of track plans, signal straightlines, station plans, and narrative description. Stakeholders involved in the development of these documents include Iowa DOT, Illinois DOT, Amtrak, BNSF, and IAIS.

### 10.5.2 Existing Conditions

The existing route and track mileage for the host railroads and Amtrak as well as the current volume and speed information of the proposed route from Chicago to Council Bluffs is as follows:

- Amtrak
    - 112.0 route miles (Chicago to Wyanet)
    - 0.8 track miles (at Chicago Union Station)
    - 8 trains per day, Chicago to Wyanet
    - 79 mph maximum speed
    - Passenger railroad
- BNSF (BNSF operates Metra commuter services in Chicago-Aurora corridor)
    - 117.1 route miles (BNSF trackage Chicago-Wyanet and East Moline-Rock Island)
    - 116.2 track miles
    - 94 Metra trains each weekday (fewer trains on weekends), Chicago to Naperville and Aurora; 40-56 freight trains per day, Chicago to Montgomery, and 20-28 freight trains per day, Montgomery to Wyanet, and 4-6 freight trains per day, 7th Street (East Moline) to Rock Island
    - 60 mph freight, 79 mph passenger maximum speed
    - Class 1 railroad per Surface Transportation Board rules
    - 286,000 lbs. maximum gross weight
- IAIS
    - 358.8 route miles
    - 357.6 track miles
    - 10-20 trains per day (Wyanet-Council Bluffs)
    - 40 mph maximum speed
    - Class 2 carrier per Surface Transportation Board rules
    - 286,000 lbs. maximum gross weight
- UP
    - 9.07 route miles
    - 9.07 track miles
    - 10-20 trains per day (East Des Moines-Des Moines Short Line Yard-West Des Moines)
    - 25 mph maximum speed
    - Class 1 carrier per Surface Transportation Board rules
    - 286,000 lbs. maximum gross weight

Existing FRA track classification for the Chicago – Wyanet segment (primarily on BNSF) is Class 4. The segment between Wyanet and Council Bluffs (primarily on IAIS) is mostly FRA Class 3, laid with welded and jointed rail of 115 lb. or larger. Rail weight for sidings and yard track along the route varies, but is predominantly jointed rail with a weight of 119 lb. or less. The existing ballast on the segment is washed and screened crushed rock mainline ballast and ties are 7"x9" hardwood.

The approximate amount of curvature along the Wyanet – Council Bluffs segment is as follows:

| Tangent | 287.4 miles |
|---|---|
| Less than 2 degrees | 59.9 miles |
| 2 – 4 degrees | 10.1 miles |
| 4 – 6 degrees | 0.8 miles |
| More than 6 degrees | 0.4 miles |

Existing turnouts are described in Section 10.5.3. Public and private grade crossings are tabulated in the attached System Safety Plan.

Fencing in the existing Wyanet – Council Bluffs corridor is limited to primarily to urban areas to protect against trespassers. Location requirements of any proposed right-of-way fencing will be determined as part of the final design and in consultation with the System Safety Plan.

There is no ownership of air-rights along the Wyanet – Council Bluffs corridor and utilities rights-of-way will be verified during final design.

BNSF and IAIS own parallel, adjoining rights-of-way in the corridor between 7th Street in East Moline and Rock Island, where each road has its own yard. BNSF classifies its track segment as the BNSF Industrial Track while all of the IAIS track is removed in the corridor, save for a short segment used as a siding in Moline. IAIS dispatches the BNSF Industrial Track and IAIS and CP exercise trackage rights over the BNSF on this segment. The track is of jointed rail construction and speed is restricted to a maximum speed of 10 mph due to track conditions and operations in a constrained urban environment.

Much of the IAIS route through greater Des Moines involves trackage rights over UP. Between East Des Moines and Short Line Junction, IAIS must pass through UP's Short Line Yard and cross the UP Trenton Subdivision mainline at grade. The West Des Moines Industrial Lead between Short Line Junction and West Des Moines is owned primarily by UP, but is leased, maintained, and dispatched by IAIS. UP operates over its full length, and exercises trackage rights over the short portion owned by IAIS through downtown Des Moines. The track is of welded and jointed rail construction and is restricted to speeds of 10 or 25 mph due to track conditions and operations in a constrained urban environment.

#### 10.5.2.1 IAIS Infrastructure Requirements

Infrastructure on the IAIS between Wyanet and Council Bluffs (including the BNSF portion through the Quad Cities and the UP portion through Des Moines) is not sufficient to host the proposed service without substantial additions of track and improvement in track structure. The IAIS infrastructure at present is matched to its role as a regional railroad with some overhead freight traffic and no passenger traffic. IAIS has little spare capacity for additional trains, or trains of higher speeds than the freight traffic, and very little capability for recovery of schedule should unforeseen events delay train meet-and-pass events, or reduce track speeds. IAIS local freight trains at present occupy the main track continuously while switching industries tributary to the main track. Industrial switching operations can consume one or more hours per industrial spur location, during which time no through trains can operate past that location because the local train is occupying the main track. IAIS freight trains operate on a nominal rather than a regular schedule, but as is common in North American freight-train operation, schedules can regularly vary by eight hours or more, as a result of variations in when shippers load or unload freight cars, variations in freight traffic released for rail movement daily and seasonally, and variations in weather, maintenance activities, and congestion on other connecting railroads.

Accordingly, in order to operate a mixed passenger-freight rail system with a high degree of reliability for the passenger trains, sufficient infrastructure must be provided for the freight trains to clear the main track for the passenger trains. This infrastructure must incorporate allowance for a high degree of variability in freight operations (freight-passenger meet-pass events will be unlikely to occur in the same location every day), or freight operations must have temporal separation for the passenger trains, or freight operations must accept lower efficiency of operation. IAIS freight shipper needs, and IAIS efficiency needs, are incompatible with either a temporal separation or a lower efficiency of freight-train operation, thus infrastructure must be provided to accommodate the proposed passenger trains without creating undue delays for freight trains, or undue restrictions on when freight trains can switch customers. This infrastructure consists of installing additional tracks where trains can meet and pass, improvements to track structure to improve speeds and ride conditions, and installation of high- capacity train-control systems.

Infrastructure needs on the IAIS that are deemed necessary through conservative RTC modeling and in view of on-time performance goals to support the proposed passenger-train service are as follows:

- Installation of sidings, crossovers, and second main track to enable passenger trains and freight trains to make meet-pass events and operate without creating either delays for passenger trains or loss of efficiency for freight trains.
- Improvement of track structure to increase nominal maximum non-urban track speed from 40 mph to 79 mph, and urban track speed through the Quad Cities, Iowa City, Des Moines, and Council Bluffs from 10 to 20 mph, to 30 to 40 mph, or greater.
- Installation of CTC to enable passenger trains to operate at speeds of up to 79 mph, and to enable a high degree of train dispatcher control, flexibility, and to increase the capability of the train dispatcher to issue more frequent control decisions.
- Installation of PTC to enable the entire route to be in compliance with the Railroad Safety Improvement Act of 2008.

The IAIS portion of the route between Wyanet and Council Bluffs is single track and supports freight service at speeds up to 40 mph. Currently, there is no regular scheduled passenger service on the IAIS.

#### 10.5.2.2 BNSF Infrastructure Requirements

The BNSF portion of the proposed route includes the portion between Chicago Union Station and Wyanet, Illinois, and the Rock Island Spur (BNSF Industrial Track) in the Quad Cities. This latter portion is operationally controlled by IAIS so is discussed under that railroad's portion. BNSF has unusually high traffic densities between Chicago and Aurora and high traffic densities between Aurora and Wyanet. The Chicago to Aurora segment hosts 94 commuter passenger trains on weekdays (not all continue as far as Aurora), eight Amtrak long-distance or corridor passenger trains daily, plus 40 to 56 freight trains daily. From Aurora to Wyanet, the route hosts the eight Amtrak trains plus 20 to 28 freight trains daily. Maximum passenger train speeds on the BNSF portion are 70 mph from Chicago to Aurora, and 79 mph from Aurora to Wyanet.

Power-operated, remote-control crossovers at regular intervals enable train dispatchers to maintain traffic flow and flexibility, including during track maintenance outages.

Infrastructure on the BNSF was deemed sufficient by BNSF to accommodate the proposed passenger rail service, with the following key exceptions:

- At Eola Yard, a major BNSF freight-car classification facility in west suburban Chicago, BNSF has requested that a bypass track be constructed around the yard to reduce congestion of passenger and freight trains that would otherwise occur (Eola Main Line Improvements).
- At Wyanet, a new connection with IAIS is required. The connection will be made with a right-hand facing crossover between the two BNSF main tracks, which will join the northernmost main track (Main Track 1). Typically trains on the Mendota Subdivision run right-hand, with westward trains on Main 1 and eastward trains on Main 2. Westward trains would thus be able to enter the Wyanet Connection track directly, but eastward trains would have to run "wrong-way" on Main 1 for 15 miles to the first existing crossover at Zearing, then crossover to Main 2. The right-hand crossover at Wyanet will eliminate this counterflow operation and reduce congestion for freight and other passenger trains on the Mendota Subdivision.
- The installation of PTC and required re-equipping of CTC and communications infrastructure on the Mendota and Chicago Subdivisions that is necessary to support PTC implementation. As originally envisioned and required, PTC was to be implemented by December 31, 2015, on all U.S. Class 1 railroads hosting intercity or commuter passenger trains, or carrying Toxic Inhalation Hazard (TIH) commodities, under the Railroad Safety Improvement Act of 2008 (RSIA 2008), but due to technical obstacles and the time necessary for the development, certification, and installation of such systems, the FRA reported in August 2012 that it is not likely that most railroads will meet the deadline. Nonetheless, BNSF efforts to implement PTC between Chicago and Wyanet are progressing independent of the Program. BNSF has completed the PTC installation on the Mendota Subdivision and will finish the Chicago Subdivision in 2014.

The BNSF portion of the route between Chicago and Wyanet is mostly double and triple track with some quadruple main track, and currently supports passenger service at speeds up to 79 mph.

### 10.5.3 Proposed Infrastructure Improvements

Infrastructure on the joint BNSF-IAIS route requires some improvements on the BNSF portion, and significant improvements on the IAIS portion, in order to support the proposed passenger- train schedule and to obtain sufficient track capacity on each railroad to enable its freight trains and hosted passenger trains to continue to operate efficiently. The proposed improvements to the physical plant of the route will allow both BNSF and IAIS the ability to operate their freight service in a timely manner, providing cost-efficient and satisfactory freight service to their on-line and through-traffic customers. Absent these improvements, rail-served shippers will possibly incur higher transportation costs due to slower transit times, higher inventory volumes, and unreliable shipping schedules. The goal is to construct a rail network that provides for on-time performance for both the proposed passenger service as well as the existing freight service.

As part of this Service, proposed improvements, the segment between Wyanet and Council Bluffs (primarily on IAIS) will be upgraded to FRA Class 4 from its current FRA Class 2 or 3. The proposed track improvement projects will be constructed utilizing washed and screened mainline ballast. Surfacing, ballast dressing, tamping, and aligning to improve track geometry and reduce track maintenance frequency needs will also be addressed as part of the proposed improvements.

In addition, existing turnouts will be upgraded from Wyanet to Council Bluffs. The existing turnouts will be replaced with No. 20, No. 15, and No. 11 power-operated for mainline crossover and mainline to sidings and other speed-critical areas, and No. 11 hand-throw turnouts for yard and industry tracks. Turnouts on existing passing sidings from Wyanet to Council Bluffs will be upgraded from the existing No. 10 and No. 11 hand-throw to No. 15 or No. 20 power operated.

Due to the proposed significant increase in speed on the IAIS and the anticipated large variance in speed between passenger and freight, all at-grade crossings with active warning devices on IAIS will be upgraded with constant-time warning devices and be equipped with bells, flashers, and gates.

Along with these general improvements, several key track infrastructure projects were identified along the route and are described in the following sections.

#### 10.5.3.1 Illinois Track Improvements on IAIS

On IAIS between Wyanet and the Illinois/Iowa state border, several rail improvements are required, which will serve to eliminate jointed rail and replace curve and grade-worn rail, where applicable. Rail weights and proposed improvements for this segment are:

| Segment | Rail Weights | Proposed Improvements |
|---|---|---|
| Wyanet to Colona | predominantly 132 lb CWR with some 119 lb CWR | |
| Colona to East Moline | 115 lb, 119 lb, and 132 lb jointed rail | to be replaced by 115 lb minimum CWR |
| East Moline to Rock Island (on BNSF trackage) | CWR of various weights with miscellaneous joints | that will be mostly replaced by 115 lb minimum CWR |

Existing sidings between Wyanet and the Illinois/Iowa state line will require extension, turnout replacement, surface-and-line improvements, and addition of ballast as required, as well as crop-and-weld of jointed rail. At Atkinson, this includes a short extension to create a 10,000-foot-long siding, replacing the existing No. 10 and No. 11 hand-throw turnouts with No. 15 power-operated turnouts, surface-and-line improvements, and crop-and-weld of jointed rail to enable 30 mph speeds. The existing No. 11 hand-throw turnouts at the Patriot siding east of Annawan will be operated at restricted speed, but be upgraded to No. 15 powered-turnouts to allow freight operations to better clear the main track for passenger trains and to better hold alignment under heavy freight loading.

As a supplement to existing passing tracks, new sidings nominally 10,000 feet in length with No. 20 power-operated turnouts and welded rail to enable 40 mph operating speeds are proposed for the following locations in Illinois, from east to west: Wyanet and Gentry (east of Colona). The latter siding is expected to significantly minimize delays to passenger and freight trains, as it will offer a place to hold immediately outside of the congested Quad Cities terminal area.

#### 10.5.3.2 Iowa Track Improvements on IAIS

Between the Illinois/Iowa state border and Council Bluffs, several rail improvements are required, which will serve to eliminate jointed rail and replace curve and grade-worn rail, where applicable. Rail weights and proposed improvements for this segment are as follows.

| Segment | Rail Weights | Proposed Improvements |
|---|---|---|
| Davenport | 112 lb jointed rail | to be replaced by 115 lb minimum CWR |
| Davenport to Iowa City | predominantly 115 lb CWR with some 119 lb CWR | |
| Iowa City | 115 lb jointed rail | to be replaced by 115 lb minimum CWR |
| Iowa City to Altoona | predominantly 115 lb CWR with some 119 lb CWR | |
| Altoona to East Des Moines | predominantly 112 lb jointed rail | to be replaced by 115 lb minimum CWR |
| East Des Moines to West Des Moines (predominantly on UP trackage) | 100 lb and 112 lb CWR and 110 lb and 112 lb jointed rail | to be replaced by 115 lb or heavier CWR |
| West Des Moines to Council Bluffs | predominantly 112 lb, 115 lb, and 119 lb CWR with some jointed rail of the same three weights; | all jointed rail to be replaced with 115 lb minimum CWR |

There are several existing sidings between the Illinois/Iowa state line and Council Bluffs that will require turnout replacement, surface-and-line improvements and additional of ballast as required, and crop-and-weld of jointed rail. This includes replacing the existing No. 10 and No. 11 hand-throw turnouts with No. 15 power-operated turnouts to enable 30 mph operating speeds. From east to west, these sidings are located at Walcott, Twin States (west of Durant), North Star (east of Wilton), West Liberty, Marengo, Brooklyn, Kellogg, Colfax, Altoona, Booneville, Casey (existing siding to be extended), Anita, Atlantic, and Hillis (existing siding to be extended). Sidings at Newton (existing siding to be extended) and East Menlo would be operated at restricted speed, but would receive an upgrade to No. 15 power-operated turnouts allowing for 30 mph departure over switches.

As a supplement to existing passing tracks, new sidings nominally 10,000 feet in length with No. 20 power-operated turnouts and welded rail to enable 40 mph operating speeds are proposed for the following locations in Iowa, from east to west: Atalissa, Miller (west of Tiffin), Posner (west of Brooklyn), Grinnell (accomplished through a shift of the mainline and partial refashioning of existing siding into the mainline), Jasper (east of Kellogg), Adventure (east of Altoona), Earlham (existing siding to be upgraded), Divide (east of Adair), Hunt (west of Atlantic), and Peter (east of McClelland).

#### 10.5.3.3 Eola Main Line Improvements

The Eola Main Line Improvements is a capacity project that would create a new staging location at BNSF's Eola Yard for Chicago-bound trains. The yard is situated immediately west of the BNSF connection to Canadian National's former Elgin, Joliet and Eastern Railway belt line around the perimeter of Chicago, and many of BNSF's eastward coal trains move through Chicago on the CN-EJ&E. The Eola project is the best possible location for staging because it places the train immediately at hand when the connecting road can accept it. Staging trains east of Eola places them on the triple-track Metra commuter territory where all tracks are needed to attain schedule-keeping and provide movement capacity for the 94 Metra, 12 Amtrak, and 56 BNSF trains that use that portion of BNSF's Chicago Subdivision.

The project involves construction of a new main track between the East and West Eola Yard interlockings. This track would be constructed and signaled as main track to enable BNSF to flexibly stage a coal train on this new track or any of three other main tracks between East and West Eola. Other components of the project include installation of No. 15 power-operated crossovers and turnouts capable of 30 mph diverging-route speeds, associated upgrades and revisions to yard lead and ladder tracks, and revisions and additions to the wayside signaling system. No roadway grade-crossings are affected by the project. The existing flexibility and capacity for the Metra trains that operate each day between Metra's Aurora Transportation Center just west of Eola, freight trains, and Amtrak long-distance and corridor trains would be retained.

As of February 2013, a Preliminary Environmental Site Assessment (PESA) for the Eola Yard project has been completed and distributed for review, and BNSF environmental review is underway.

#### 10.5.3.4 Wyanet Connection

A connection is required to enable passenger trains to travel from the BNSF to the IAIS at Wyanet. The connection would be built in the northwest quadrant of the grade-separated intersection of the two railroads and was designed by Design Nine, Inc. in 2001. It is shown in the attached Conceptual Engineering Plans. However, this design exceeds the desired super-elevation for the design speed for this connection. These plans have been incorporated into the Conceptual Engineering Plans with a reduced super-elevation, meeting a 4-inch maximum with 3-inch unbalance with a design speed of 40 mph. This decreased super-elevation reduces the long-term maintenance costs for the curve and is more in line with the desired maximum super-elevation used by freight railroads. A proposed universal crossover with No. 20 power-operated turnouts on the double-track BNSF Mendota Subdivision at Wyanet would allow passenger trains to crossover to reach the switch for the IAIS connection. The connection track would leave the BNSF and enter IAIS Subdivision 1 via the diverging side of No. 20 power-operated turnouts, which would allow 40 mph operation through the switches. A survey of the proposed mainline alignment and the immediate topography is scheduled to occur in early 2013. Once completed, it is assumed that this connection would be controlled by IAIS.

#### 10.5.3.5 Colona Junction Improvements

As part of the proposed improvements for the Service, the existing junction between BNSF and IAIS at Colona (once an at-grade "diamond" crossing, which was later replaced with a shoo-fly and two diverging switches for movement on IAIS) will realign the IAIS curved main track for straight movement and BNSF's Barstow Subdivision for diverging movement. The design will permit 79 mph maximum speeds on the IAIS and 30 mph maximum speeds through the curves and over the No. 20 power-operated turnouts on the freight-only BNSF through the junction. This arrangement will preserve the ability of the carriers to seamlessly interchange unit trains operating between Silvis, Illinois, on IAIS (west of Colona), and BNSF at Galesburg, Illinois (south of Colona), without the construction of any additional track infrastructure. Provision for possible future double-tracking of the IAIS through the interlocking will be maintained.

#### 10.5.3.6 Quad Cities Second Main Track

Current conditions through the Quad Cities area of Illinois and Iowa are restrictive for providing efficient freight and passenger operations with the addition of the passenger service proposed by the Program. Thus, it is proposed that the existing BNSF Industrial Track between East Moline and Rock Island be partially reconfigured and fully reconstructed and a second main track with crossovers at selected locations be established between a point on IAIS east of Silvis, through East Moline, Moline, Rock Island, and Davenport to Farnam. Assembly of a second main track will be accomplished through new track construction and upgrading of existing industrial track and sidings that IAIS fashioned from the former second main track of its predecessor, Rock Island. This will create the infrastructure and capacity necessary for the Study's passenger trains to travel through the congested region at significantly faster speeds (mostly 40 and 79 mph versus the existing 10 and 25 mph), without interference from through freight trains and switch engines, and to remove adverse impacts to BNSF, IAIS, and CP freight trains.

The east end of the proposed double-track alignment begins east of the IAIS Silvis Yard, where the existing freight main (Main 1) leaves the proposed passenger main (Main 2) through the diverging side of a No. 20 power-operated turnout, allowing for 30 mph maximum departure speeds over the switch. Main 1 will continue to see significant use as a switching lead and would be operated at restricted speed through Silvis Yard, while Main 2 with a maximum speed of 79 mph would parallel Main 1 to the south and bypass considerable, around-the-clock freight switching operations in the adjacent yard. West of Silvis Yard at 7$^{th}$ Street, Main 1 will converge with BNSF's Rock Island Spur and CP's

Nitrin Branch at a realigned junction before connecting with the proposed Main 2 at a universal crossover possessing No. 15 power-operated turnouts (30 mph maximum speed through switches). Maximum speeds of 79 mph would be attained on both mains between 7th Street and 23rd Street, just east of the proposed Moline station. Maximum speed from 23rd Street through the station (on the south side of the tracks) and as far west as 12th Street would be 40 mph on both main tracks. A universal crossover at 12th Street with No. 15 power-operated turnouts would be installed to enable freight trains to cross expeditiously from Main 2 to Main 1 (and vice-versa) at 25 mph and to provide access to the east lead of the IAIS and BNSF Rock Island yards west of 44th Street. Main 1, the existing freight main through the IAIS yard, would be operated at restricted speed and used as a switching lead between 12th Street and the Government Bridge as well as a place to meet freight trains. Main 2 will bypass Rock Island Yard to the south, thus eliminating possible conflicts with BNSF and IAIS yard operations, and is 40 mph from 12th Street to the Government Bridge. Another universal crossover between Main 1 and Main 2 at Rock Island is proposed to allow BNSF and CP trains bound for Davenport via the Crescent Bridge as well as IAIS Rock Island based switchers bound for the IAIS Milan Branch, to depart from the yard and diverge from Main 2. Maximum speed for Main 1 and Main 2 is 10 mph over the Government Bridge and through a tight curve soon thereafter, then 40 mph through additional curves and urban Davenport, where the IAIS mainline is almost entirely grade separated. Missouri Division Junction would receive a universal crossover with No. 15 power-operated turnouts, thus allowing CP and IAIS trains to cross between mains and take the diverging route to the south for CP's Nahant Yard at 25 mph. Curves constrain maximum speeds on both mains to 65 mph west of Missouri Division Junction. Speeds resume to 79 mph just before Farnam, and the west end of double-track occurs where Main 1 rejoins with Main 2 through the diverging side of a No. 20 power-operated turnout at a maximum speed of 40 mph.

#### 10.5.3.7 Iowa City Second Main Track

A second main track is proposed on IAIS from immediately west of the Iowa City station to Midway on the east side of Iowa City, utilizing a combination of new track construction and rehabilitation of the existing south siding and industrial lead trackage. The existing freight main will be designated Main 1 and the new track, Main 2. Turnouts at the end of double-track will be No. 20 power-operated and capable of 40 mph diverging route speeds to and from Main 2. This section will be bisected by a universal crossover with No. 15 power-operated turnouts at First Avenue, allowing for 30 mph maximum speeds between main tracks. This arrangement will allow for better flow of passenger and freight operations within the Iowa City vicinity, and to better enable passenger trains to make moves to and from the interim layover facility to the west at Coralville without interfering with freight trains.

#### 10.5.3.8 South Amana Yard Bypass

A 5.8-mile bypass is proposed for South Amana, Iowa, so that passenger trains can operate at a maximum speed of 79 mph and avoid conflicts with numerous IAIS switchers and through-train movements that originate and terminate in the South Amana Yard (the operations center and primary locomotive and equipment maintenance facility, west of Homestead, Iowa) and at Yocum Connection, where IAIS trains off of the Cedar Rapids & Iowa City Railway join with the present IAIS main track via a wye. The existing freight main (Main 1) will leave the proposed passenger main (Main 2) through the diverging side of a No. 15 turnout at either side and enter the yard at restricted speed. Freight trains may depart over these switches at 30 mph.

#### 10.5.3.9 Des Moines Area Improvements

Delays to and interference with passenger train schedules and present and future freight train efficiency in the congested Des Moines terminal area is best mitigated by a proposed passenger bypass, circumvention of an existing yard and at-grade railroad crossing where through train and switching movements occur continuously and without a regular schedule, and via construction of a second main track through the station area and central business district.

Key to this infrastructure improvement is the separation of passenger trains from freight activity on the east side of Des Moines to the maximum extent possible. A bypass of the existing freight main between East Des Moines and Des Moines (on which IAIS presently exercises trackage rights over UP) is proposed to avoid interference with switching movements at UP Short Line Yard and conflicts with 12-16 daily through trains off of UP's perpendicular Trenton Subdivision which cross the freight main at-grade through an interlocking at Short Line Junction and regularly enter the yard on connecting tracks to pick up or set out blocks of cars.

To accomplish this goal, five potential route alternatives through the east side of Des Moines have been identified for the Program and are illustrated in the Conceptual Engineering Plans. From north to south, they are:

- **Route Alternative 1:** Construction of a single-track passenger bypass from the IAIS freight main at East Des Moines to the UP West Des Moines Industrial Lead near S.E. 14th Street (west of Short Line Junction) along the north side of UP's Short Line Yard. This alignment would require four flyover structures—three over UP's Trenton Subdivision mainline and leads to Short Line Yard and one over S.E. 18th Street—and would be capable of 50 mph maximum speed.
- **Route Alternative 2:** Construction of a single-track passenger bypass from the IAIS freight main at East Des Moines to the UP West Des Moines Industrial Lead near S.E. 14th Street (west of Short Line Junction) along the south side of UP's Short Line Yard. This alignment would require a flyover structure to bridge UP's Trenton Subdivision mainline and would be capable of 50 mph maximum speed.
- **Route Alternative 2-A:** Construction of a single-track passenger bypass from the IAIS freight main at East Des Moines to the UP West Des Moines Industrial Lead at S.E. 14th Street (west of Short Line Junction) along the south side of UP's Short Line Yard. This alignment would require a flyover structure to bridge UP's Trenton Subdivision mainline and a BNSF/NS industrial lead. Maximum operating speed would be 50 mph.
- **Route Alternative 3:** Construction of a single-track passenger bypass from the IAIS freight main at East Des Moines to the UP West Des Moines Industrial Lead at S.E. 14th Street (west of Short Line Junction). The alignment would travel in southwesterly direction south of Scott Avenue before turning west to parallel the Des Moines Southeast Connector roadway (under development) and crossing a

BNSF/NS industrial track and the UP Trenton Subdivision mainline via two flyover structures. Maximum operating speed would be 50 mph.

- **Route Alternative 3-A:** Construction of a single-track passenger bypass from the IAIS freight main at East Des Moines to the UP West Des Moines Industrial Lead at S.E. 14th Street (west of Short Line Junction). The alignment would travel in a southerly direction before turning west to parallel the Des Moines Southeast Connector roadway (under development) and crossing a BNSF/NS industrial track and the UP Trenton Subdivision mainline via two flyover structures. Maximum operating speed would be 50 mph.

Each of the alternatives includes identical proposed infrastructure improvements between S.E. 14th Street in Des Moines and West Des Moines, which would involve upgrading the existing main track (UP West Des Moines Industrial Lead) for speeds of up to 79 mph and construction of a parallel second main track through downtown Des Moines, as outlined later in this section.

The five alternatives are similar from an operations standpoint, but Route Alternative 2 (3.32 miles in length) was selected as the basis for the service design and operations modeling explored for the Program. The physical and operating characteristics of this route are outlined in greater detail in the next paragraph. A final route will be selected during the Tier 2 study process and will take into account the cost of property acquisition and construction; environmental mitigation; and input from the freight railroads, Amtrak, Iowa DOT, and the City of Des Moines.

In Route Alternative 2, the existing IAIS Subdivision 3 freight main (Main 1) will leave the proposed passenger bypass (Main 2) through the diverging side of a No. 15 crossover at East Des Moines and enter Short Line Yard at restricted speed (freight trains may depart over this switch at 30 mph, however). Main 2 will have a maximum operating speed of 50 mph and a flyover will be constructed south of Short Line Junction to assure a grade-separated crossing with the present interlocking. At S.E. 14th Street west of Short Line Junction, Main 1 (existing IAIS Subdivision 4/UP West Des Moines Industrial Lead) and Main 2 will rejoin via a No. 11 hand-throw switch at S.E. 14th Street, and a realigned connection to the BNSF/NS yard will be made via a No. 11 hand-throw switch off of Main 2. The two main tracks will run parallel from that point, through downtown Des Moines to S.E. 5th Street, with Main 2 operating at a maximum speed of 40 and 50 mph. The existing freight-only Main 1 provides access to several IAIS, BNSF, and NS industrial leads east of downtown and will be operated at restricted speed from Short Line Junction to 5th Street. A proposed universal crossover with No. 15 power-operated turnouts at 5th Street will mark the effective beginning of fully utilized double-track and will allow passenger trains to switch from Main 2 to Main 1 at 30 mph to access the Des Moines station, which is on the north side of the tracks. Maximum speed on Main 1 and Main 2 between 5th Street and Martin Luther King Jr. Parkway (east of Water Works) will be 40 mph. Two crossovers are proposed on the double-track between Des Moines and Water Works: A No. 15 power-operated turnout immediately west of the Des Moines station to allow passenger trains to cross between Main 1 and Main 2 at 30 mph, and a No. 11 power-operated crossover just east of 16th Street to allow IAIS freight trains to switch from Main 2 to Main 1 at 20 mph to access a lead that connects to a freight-only siding, run-around, and industrial lead north of the main tracks. The west end of double-track at Water Works is marked by a No. 20 power-operated turnout, permitting

40 mph speeds through the diverging side of the switch to Main 1. The single-track mainline from Water Works to West Des Moines is the existing West Des Moines Industrial Lead owned by UP and operated over by UP and IAIS and would be upgraded from the present 10 and 25 mph operating speeds to 79 mph maximum speed. UP's Perry Subdivision will leave the main track via the diverging side of a proposed No. 15 power-operated turnout at West Des Moines. IAIS Subdivision 4 will take the straight rail path through the switch.

#### 10.5.3.10 Atlantic Yard Modifications

Modifications are proposed to the existing siding and IAIS yard in Atlantic to accommodate meet-pass events and to provide the track capacity necessary to reduce the likelihood of IAIS switching movements conflicting with the proposed passenger trains. Included in the improvements are an extension of the existing siding, shifting of a No. 11 hand-throw crossover to allow freight trains to diverge from the main track to the yard, reconfiguration of two adjacent yard tracks, and extension of a third yard track to compensate for the existing IAIS storage track which will be removed to free up property anticipated for placement of the passenger station.

#### 10.5.3.11 Council Bluffs Area Improvements

At Council Bluffs, a passenger main to the south of the existing main track is proposed to effectively eliminate conflicts with through trains and switchers, which operate continuously in the IAIS Council Bluffs Main Yard. The bypass leaves the existing main track east of the yard at Rigg through the diverging side of a No. 20 power-operated turnout, allowing for 40 mph operation through the switch and as far the approach to the station. A passenger train run-around is proposed at the Amtrak station and a layover facility and storage yard will be situated along the passenger main west of the station and adjacent to the IAIS yard. Beyond the terminal area, the passenger main would join the lead to the IAIS West Yard, CBEC mainline, and the BNSF Bayard Subdivision and then course through a long crossover track to reach the parallel IAIS main track, thus providing a link in the future passenger service to nearby Omaha. The three turnouts in this segment would be of the No. 11 power-operated variety, allowing for 20 mph maximum speeds through switches.

### 10.5.4 Right-of-Way

The existing right-of-way was determined based on IAIS track charts and BNSF, IAIS, and UP valuation maps. Based on those sources, right-of-way needs were identified for track work in various locations. The Wyanet Connection identified in the 2001 Chicago to Quad Cities Amtrak Passenger Service study developed by Design Nine would require acquisition of 7 acres. Similarly, right-of-way acquisition would be necessary to accommodate the South Amana yard bypass, each of the five possible Des Moines passenger bypass alternative alignments, and the Council Bluffs passenger main.

Right-of-way and property acquisition needs for the passenger stations at Geneseo, Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs were identified during the site review process. Costs for the acquisition of station property in Geneseo and Iowa City were developed in conjunction with the cities, and arrangements in Grinnell, Des Moines, Atlantic, and Council Bluffs will be developed in a similar manner. Right-of-way/property acquisition needs and costs for the Moline passenger station were developed as part of the 2009 Quad Cities TOD + Intermodal study and those values were utilized as a basis in this study.

### 10.5.5 Cost Estimate

All design and construction costs for the Program were developed utilizing a base year of 2012. Due to the scope of the Service program, final design is anticipated to take several years, and its year of conclusion is not yet known. Construction on the initial Chicago-Moline service phase is anticipated to begin in 2014 and conclude in 2015 with operations beginning in 2015 after six months of operations and equipment testing. In order to more accurately capture the design and construction costs for the total Service and its anticipated extensions to Iowa City in 2017, Des Moines in 2022, and Council Bluffs in 2030, the costs associated with individual activities were escalated by three percent per year to account for inflation between the base year and the year of expenditure when the costs are anticipated to be incurred.

Infrastructure needs were identified based on reviews of previous studies, discussions with the host railroads, and field visits and incorporated in the Conceptual Engineering Plans. The previous studies reviewed included:

- Chicago to Quad Cities Amtrak Passenger Service, 7/27/2001, developed by Design Nine
- Midwest Regional Rail System, 09/2004 (updated 11/2006), developed by TEMS
- Feasibility Report on Proposed Amtrak Service, Chicago – Quad Cities, 12/5/2007, developed by Amtrak
- Feasibility Report on Proposed Amtrak Service from Chicago to Iowa City via Quad Cities, 4/18/2008 (an Addendum to the above noted 12/5/2007 report), developed by Amtrak
- Quad Cities TOD + Intermodal Plan, 08/2009, developed by S.B. Friedman & Company
- Chicago to Iowa City High-Speed Intercity Passenger Rail Program Service Development Plan, 08/06/2010, developed by HDR Engineering
- Chicago to Council Bluffs-Omaha Regional Passenger Rail System Planning Study Tier 1 Service Level Environmental Impact Statement, 10/2012

Recommendations for improvements between Wyanet and Council Bluffs to structures were provided by the IAIS based on bridge and culvert inspections.

All estimated costs were assembled and categorized into FRA Standard Cost Categories for Capital Projects. Contingency factors commensurate with the level of project development were applied to each major cost category. Unit Costs were developed based on typical industry unit costs and prior experience. Documentation of unit costs and detailed cost breakdowns are included in the Project Financial Plan attached to this SDP.

### 10.5.6 Signaling and Communications

The proposed route of the Chicago to Council Bluffs-Omaha service via BNSF and IAIS consists of two types of train-control systems. The BNSF portion is equipped with Centralized Traffic Control (CTC) from Chicago Union Station to Wyanet. Track Warrant Control (TWC) is used as the Method of Operation on IAIS from Wyanet to Council Bluffs.

#### 10.5.6.1 Train Control, Signaling, and Positive Train Control Background

Track Warrant Control (TWC) is a common Method of Operation for line-haul railroads of moderate train traffic density and speeds, as it has a low cost of implementation and execution. While TWC is often sufficient for moderate-speed passenger trains, it is limited by regulation to a maximum passenger-train speed of 59 mph. TWC is also inefficient for high-density or complex rail operations because of the high "time per instruction" workload it requires of the train dispatcher, and long latency time for the passage of instructions from the train dispatcher to the train, and acknowledgement of compliance with instructions from the train to the dispatcher. Execution of a single instruction typically requires up to 5 minutes in normal practice, and in some cases requires the train that is receiving the instruction to stop and stay stopped during the instruction process. During the time an instruction is being issued or acknowledged, the train dispatcher cannot engage in other tasks.

Positive Train Control (PTC) is an emerging protective technology charged with improving railroad safety by substantially reducing the probability of train collisions, field worker casualties, and locomotive overspeed accidents. According to FRA mandate, "PTC systems are integrated command, control, communications, and information systems for controlling train movements." PTC is required on Class 1 railroad main tracks that host intercity passenger trains (like BNSF) by the Railroad Safety Improvement Act of 2008, as codified in 49 CFR 236 Subpart I. The IAIS, as a Class 2 railroad as classified by its revenue by the U.S. Surface Transportation Board, could potentially be exempt from the requirement to install PTC on its portion of the route. The means by which the IAIS could apply for an exemption is described in the exemption methodology prescribed in 49 CFR 236.1019, "Main Line Track Exemptions." The relevant exemption is if the IAIS carries less than 15 million gross tons per year on the main track on which the Service's passenger trains operate. The IAIS portion of the route may beeligible for an exemption under 49 CFR 236.1019 on the basis of tonnage or under other pathways described in this rule.

#### 10.5.6.2 BNSF Communications and Signaling Improvements

No changes are anticipated to be required in the train-control, wayside signaling, and grade-crossing signal systems on the BNSF portion of the route between Chicago and Wyanet. However, PTC is currently being implemented by BNSF between those points, independently of the establishment of the Program's passenger service to Moline, Iowa City, Des Moines, and Council Bluffs-Omaha. BNSF has already installed PTC on the Mendota Subdivision and will complete the same for the Chicago Subdivision in 2014.

#### 10.5.6.3 IAIS Communications and Signaling Improvements

In contrast, implementation of a CTC system on the IAIS between Wyanet and Council Bluffs, in conjunction with a PTC overlay and grade-crossing signal system upgrades and new installations, is proposed as a major project component of the Chicago to Council Bluffs-Omaha service. This physical location of this system and its wayside signal elements are discussed below and illustrated on the conceptual signal engineering drawing attached to this Service.

To obtain 79 mph operation on IAIS for passenger trains, a block system of operation is required. While in some cases manual block operation has enabled such speeds, in general practice only automatic block systems are employed. The industry-standard system consists of a CTC overlay on an Absolute-Permissive Block (APB) system. The APB system provides the detection and automatic separation of trains, and protects turnouts. The CTC overlay enables a train dispatcher to choose priority of trains and route selection, and issue requests to the APB-CTC system that it translates as signal instructions to trains, and grants if conditions are safe.

Additionally, a PTC overlay has been specified for the IAIS route portion that is compatible with PTC expected being installed on the BNSF route portion. If possible under FRA regulations, PTC will not be implemented on the IAIS portion of the route; however, in case PTC is required, an implementation concept and cost estimate is incorporated into this SDP. A preliminary train-control system and wayside signal design was developed with input from IAIS based on the operational requirements of the existing freight service and proposed passenger service. This preliminary design incorporates appropriate braking curves for the maximum authorized train speeds, train tonnage, and vertical profile of the IAIS, and includes locations of absolute and intermediate signals, ancillary signal and communication equipment and appurtenances, insulated joints, cabling, and other features. Signal spacing for future 90 mph and 110 mph maximum speeds was considered in this conceptual design.

PTC infrastructure on the IAIS portion of the route is, under this Service, intended to emulate BNSF standards and practices to reduce operational handoff complications at Wyanet and Colona, and to reduce the cost of implementation, operation, maintenance and administration, and training and familiarization. BNSF proposes to use a system on its Chicago to Wyanet portion (and throughout its U.S. rail system) it has called “Electronic Train Management System” (ETMS), a non-vital overlay of PTC onto vital CTC systems. This Program will seek to emulate to the greatest possible degree BNSF’s software architecture, communications protocols and frequencies, hardware, and implementation strategy. This will enable the IAIS portion to emulate BNSF’s Product Safety Plan (PSP), Railroad Product Safety Plan (RPSP), and enable locomotives operating on the route to have full interoperability with BNSF as well as Metra, Amtrak lines serving Chicago, and other Class 1 rail lines serving the Chicago rail network. In turn, this will improve the capability for the Program’s locomotives to pool with the MWRRS system.

Work required to implement PTC on IAIS includes:

- Development of the system requirements, systems management strategy and implementation strategy, PSP, and RPSP;
- Creation of sufficient communications bandwidth of high reliability to assure system robustness and minimization of train delay or dispatching delay;
- Construction of wayside interface units to tie the wayside signal system to the PTC system;
- Installation of PTC equipment on passenger-train and IAIS locomotives;
- Installation of a PTC-compatible CTC dispatching desk and PTC back-office server in the IAIS dispatching center at Cedar Rapids, Iowa; and
- Testing, commissioning, and implementation of a management and configuration method for long-term operation.

#### 10.5.6.4 System Compatibility for Higher Velocity and Frequency of Operations

The wayside signal and PTC infrastructure intended by the Service will be designed to support incremental maximum passenger-train speed increases to 90 and 110 mph, and to support additional increase in passenger train frequency as well as anticipated future growth in freight train frequency.

## 10.6 Equipment and Train Crew Scheduling

### 10.6.1 Equipment Rotation Plan

The Chicago to Council Bluffs-Omaha service would require six trainsets and 56 train crew starts to accommodate four daily round-trips, seven days a week (8 trains x 7 days = 56 crew starts). An equipment rotation plan has been assembled to match this schedule.

Owing to the length of the route and duration of the proposed schedule, only two of the six trainsets would make a round-trip each day, while the other four would make a one-way trip. At Chicago Union Station, all westbound trains would be spotted by Amtrak's hostlers just prior to the proposed schedule departures each day for train No. 101 at 6:00 a.m. (Trainset 1), No. 103 at 9:36 a.m. (Trainset 2), No. 105 at 1:00 p.m. (Trainset 3), and No. 107 at 4:05 p.m. (Trainset 4, which arrived from Council Bluffs earlier in the day as Train 102). At Council Bluffs station, all eastbound trains would be spotted by the train crew just prior to the proposed scheduled departures each day for No. 102 at 5:50 a.m. (Trainset 4), No. 104 at 7:51 a.m. (Trainset 5), No. 106 at 1:03 p.m. (Trainset 6), and No. 108 at 4:20 p.m. (Trainset 1, which arrived from Chicago earlier in the day as Train 101).

The trainsets will operate in a push-pull configuration and will not require turning as a matter of routine practice. However, should it be necessary, arrangements could be made for locomotives of the Service to turn on wyes at Chicago (Amtrak), South Amana (IAIS), and Des Moines (UP). Consists would be initially made-up at Amtrak's 14$^{th}$ Street Yard in Chicago and would generally remain unbroken, except in cases when it is necessary to perform routine maintenance that cannot be accommodated at a layover facility on line or scheduled heavy maintenance or overhaul on a car. In those instances, spare equipment from the available Amtrak pool at Chicago would be substituted.

### 10.6.2 Train Crew Scheduling

Crew requirements to accommodate the Chicago to Council Bluffs-Omaha service are subject to agreements with Amtrak and the host railroads, BNSF and IAIS. It is anticipated that each of the eight train crews will have four fully qualified people, and will include an engineer, conductor, assistant conductor, and café/lounge service attendant. The first group of four Chicago-based Amtrak train crews would report for duty one hour prior to departure on a train to Council Bluffs and protect the westbound service as follows: No. 101 (Train Crew 1), No. 103 (Train Crew 2), No. 105 (Train Crew 3), and No. 107 (Train Crew 4). Upon arrival at Council Bluffs, each crew would ferry the train to the layover facility before completion of duty and taking their federally mandated rest at a nearby hotel. Due to the fact that the length of the run would require each crew to be on duty approximately 10 to 11 hours (which includes the time necessary to conduct a job briefing and review paperwork before the run and to yard equipment and complete paperwork after the run) and in consideration of the Federal Hours of Service regulations which restrict operating department railroad employees to no more than 12 hours of work, no Chicago crews would be able to run west to

Council Bluffs and then return east to Chicago during the same shift. On that basis, each of these crews would take a train east to Chicago on a first-in, first-out pattern the following day and protect the eastbound service as follows: No. 102 (Train Crew 1), No. 104 (Train Crew 2), No. 106 (Train Crew 3), and No. 108 (Train Crew 4). Also on the following day, the other four Chicago-based crews (Train Crews 5, 6, 7, and 8) would take a train west to Council Bluffs in order to complete the operating cycle necessary to protect the service in both directions. Train crew vacancies and rest periods would be covered from an extra board of qualified employees in Chicago.

## 10.7 Terminal, Yard and Support Operations

More detailed operations analysis and RTC modeling for the Chicago Terminal and commuter rail territory as far west as Aurora, Illinois; Council Bluffs-Omaha; and major intermediate terminals in the Quad Cities and Des Moines that may be penetrated by the proposed Chicago to Council Bluffs-Omaha service will occur in subsequent Tier 2 NEPA studies.

### 10.7.1 Equipment Rotation Plan

The Chicago to Council Bluffs-Omaha service would require six trainsets and eight regular train crews to accommodate four daily round-trips. An equipment rotation plan has been assembled to match this schedule.

Owing to the length of the route and duration of the proposed schedule, only two of the six trainsets would make a round-trip each day, while the other four would make a one-way trip. At Chicago Union Station, all westbound trains would be spotted by Amtrak's hostlers just prior to the proposed schedule departures each day for train No. 101 at 6:00 a.m. (Trainset 1), No. 103 at 9:30 a.m. (Trainset 2), No. 105 at 1:00 p.m. (Trainset 3), and No. 107 at 4:00 p.m. (Trainset 4, which arrived from Council Bluffs earlier in the day as Train 102). At Council Bluffs station, all eastbound trains would be spotted by the train crew just prior to the proposed scheduled departures each day for No. 102 at 6:00 a.m. (Trainset 4), No. 104 at 8:00 a.m. (Trainset 5), No. 106 at 1:00 p.m. (Trainset 6), and No. 108 at 4:30 p.m. (Trainset 1, which arrived from Chicago earlier in the day as Train 101).

The trainsets will operate in a push-pull configuration and will not require turning as a matter of routine practice. However, should it be necessary, arrangements could be made for locomotives of the Program service to turn locomotives on wyes at Chicago (Amtrak), South Amana (IAIS), and Des Moines (UP). Consists would be initially made-up at Amtrak's 14$^{th}$ Street Yard in Chicago and would generally remain unbroken, except in cases when it is necessary to perform routine maintenance that cannot be accommodated at a layover facility on line or scheduled heavy maintenance or overhaul on a car. In those instances, spare equipment from the available Amtrak pool at Chicago would be substituted.

### 10.7.2 Train Crew Scheduling

Crew requirements to accommodate the Chicago to Council Bluffs-Omaha service are subject to agreements with Amtrak and the host railroads, BNSF and IAIS. It is anticipated that each of the train crews will have five fully qualified people, and will include two engineers, one conductor, one assistant conductor, and one café/lounge service attendant. The first group of four Chicago-based Amtrak train crews would report for duty one hour prior to departure on a train to Council Bluffs and protect the westbound service as follows: No. 101

(Train Crew 1), No. 103 (Train Crew 2), No. 105 (Train Crew 3), and No. 107 (Train Crew 4). Upon arrival at Council Bluffs, each crew would ferry the train to the layover facility before completion of duty and taking their federally mandated rest at a nearby hotel. Due to the fact that the length of the run would require each crew to be on duty approximately 10 to 11 hours (which includes the time necessary to conduct a job briefing and review paperwork before the run and to yard equipment and complete paperwork after the run) and in consideration of the Federal Hours of Service regulations which restrict operating department railroad employees to no more than 12 hours of work, no Chicago crews would be able to run west to Council Bluffs and then return east to Chicago during the same shift. On that basis, each of these crews would take a train east to Chicago on a first-in, first-out pattern the following day and protect the eastbound service as follows: No. 102 (Train Crew 1), No. 104 (Train Crew 2), No. 106 (Train Crew 3), and No. 108 (Train Crew 4). Also on the following day, the other four Chicago-based crews (Train Crews 5, 6, 7, and 8) would take a train west to Council Bluffs in order to complete the operating cycle necessary to protect the service in both directions. Train crew vacancies and rest periods would be covered from an extra board of qualified employees in Chicago.

# 11.0 Ridership and Revenue Forecasts

## 11.1 Methodology

Analysis was performed to generate the demand and revenue forecasts for the preferred corridor. Outputs included are: travel demand and revenue from the service including ridership and revenue forecasts that specify the number of passengers and boardings/ disembarkments at stations.

The train schedules, developed during the RTC operations modeling, were used as a basis for the demand and revenue forecasts. It is assumed that the train will operate within the 6:00 a.m. to 11:59 p.m. timeframe, seven days a week.

The AECOM detailed travel demand model was used for the forecasting for the preferred corridor. Three key sets of data inputs were developed: 1) travel market data; 2) socio-economic data and 3) service characteristics by mode.

Travel market data was assembled from existing sources to address the full range and scope of rail alternatives. Key issues to be considered include geographic detail (e.g., analysis zones) needed to distinguish among alignment/station alternatives and scope of areas impacted by the proposed service (study area). Key sources of travel data include: data developed in previous studies; Iowa and Illinois statewide model data; Amtrak ridership; FAA passenger data; other national data (particularly for interstate markets); and the Volpe Center's inter-regional auto trip model (as needed to supplement/benchmark data from the above sources).

Socio-economic data and forecasts were used to estimate market growth throughout the corridor markets. Three key measures used in the model include population/households, employment and personal income. Data and forecasts provided by official state sources in Iowa and Illinois were used where available. These data were supplemented by national economic data and forecasts prepared by Moody's Economy.com. All socio-economic data and forecasts were represented using the same level of geographic detail developed for the travel market data.

Current service characteristics provide the key independent variables required for mode choice modeling and developing the base year calibration. The major mode specification characteristics used in the model include line haul travel time, access/egress time, travel cost, and frequency of service. Key inputs were refined/updated based on highway network and service data obtained from: service data developed specifically for the Program; Iowa and Illinois statewide highway network and service data; published timetables (air, rail, etc.); average auto costs (based on latest data and estimates for fuel prices and other operating costs); and published fares or (average yields).

Once all the new inputs and data were assembled and input, the model was reviewed and adjusted as needed to match existing conditions. This entailed applying the model to the existing conditions and adjusting it so that it accurately forecasts the actual current ridership volumes. Although there is no existing corridor service in Iowa (only an Amtrak long distance train), existing corridor services in Illinois (including the nearby Chicago to Quincy) service provided a basis for validating the model.

The model was then applied to the preferred corridor to produce ridership and revenue forecasts. Future proposed rail service was defined in a way consistent with the proposed passenger timetable. The key characteristics included the following dimensions: alignment and station locations; station-to-station travel times; train service frequency; and fare structure.

The forecasts are summarized to include: total rail system ridership and revenue; rail passenger activity (ONs and OFFs) by station; rail passenger station-to-station volumes; and travel demand impacts by market, including quantifying trips diverted from existing modes.

Additionally, sensitivity analysis was performed to more thoroughly test model assumptions and/or the impact of certain service characteristics.

## 11.2 Ridership Forecasts

Ridership forecasts are provided in Tables 11.2-1 through 11.2-5 below.

## Table 11.2-1: Forecast Results

| | | | | | | | 2020 Annual Forecast, New Trains | | | 2020 Annual Forecast, Net* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Option Number | Design Speed | Daily Frequency | | Stations Served Stopping Pattern | Average Run Time | | | Revenue | Passenger | | Revenue | Passenger |
| | | CHI-CNB | CHI-DMS | | CHI-CNB | CHI-DMS | Ridership | (2012$) | -Miles | Ridership | (2012$) | -Miles |
| New15A | 79 mph | | 2 | All Stations from Chicago to Des Moines | | 6:01 | 333,500 | $10,100,000 | 73,000,000 | 309,500 | $9,150,000 | 68,000,000 |
| New15B | 79 mph | | 4 | All Stations from CHI to DMS: 2 run express | | 5:53 | 496,000 | $15,000,000 | 107,500,000 | 467,500 | $13,850,000 | 101,500,000 |
| New15C | 79 mph | 4 | 4 | All Stations from CHI to CNB: 2 run express | 8:07 | 5:53 | 605,000 | $19,650,000 | 143,000,000 | 571,000 | $18,200,000 | 134,500,000 |

** net incremental ridership and revenue (taking account of ridership and revenue diverted from parallel Illinois state-supported and Amtrak train services)*

## Table 11.2.2: Forecast Results

| | | | | | | | Annual Train-Miles (millions) | 2020 Annual Forecast, New Trains | | | Performance Measures | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Option Number | Design Speed | Daily Frequency | | Stations Served Stopping Pattern | Average Run Time | | | | Revenue | Passenger | Passenger-Miles | Revenue |
| | | CHI-CNB | CHI-DMS | | CHI-CNB | CHI-DMS | | Ridership | (2012$) | -Miles | per Train-Mile | per Train-Mile |
| New15A | 79 mph | | 2 | All Stations from Chicago to Des Moines | | 6:01 | 0.520 | 333,500 | $10,100,000 | 73,000,000 | 140.3 | $19.44 |
| New15B | 79 mph | | 4 | All Stations from CHI to DMS: 2 run express | | 5:53 | 1.040 | 496,000 | $15,000,000 | 107,500,000 | 103.5 | $14.41 |
| New15C | 79 mph | 4 | 4 | All Stations from CHI to CNB: 2 run express | 8:07 | 5:53 | 1.450 | 605,000 | $19,650,000 | 143,000,000 | 98.6 | $13.55 |

## Table 11.2-3: Forecast Results

| | | | | | | | Source of 2020 Incremental Ridership | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Option Number | Design Speed | Daily Frequency | | Stations Served Stopping Pattern | Average Run Time | | Diverted | Diverted | Diverted | New | Total |
| | | CHI-CNB | CHI-DMS | | CHI-CNB | CHI-DMS | from Auto | from Air | from Bus | Induced | Increment |
| New15A | 79 mph | | 2 | All Stations from Chicago to Des Moines | | 6:01 | 209,000 | 2,000 | 70,500 | 28,000 | 309,500 |
| New15B | 79 mph | | 4 | All Stations from CHI to DMS: 2 run express | | 5:53 | 313,000 | 3,000 | 109,000 | 42,500 | 467,500 |
| New15C | 79 mph | 4 | 4 | All Stations from CHI to CNB: 2 run express | 8:07 | 5:53 | 379,500 | 9,000 | 130,500 | 52,000 | 571,000 |

### Table 11.2-4: Station Forecast Results

| Station | Incremental Ons+OFFs by Option and Station | | |
|---|---|---|---|
| | New 15A | New 15B | New 15C |
| Chicago, IL - Union Station | 162,163 | 285,744 | 292,711 |
| Chicago, IL - Other Stations* | 36,256 | 60,003 | 76,730 |
| Council Bluffs, IA | 0 | 0 | 98,655 |
| Des Moines, IA | 128,030 | 177,507 | 192,690 |
| Iowa City, IA | 62,665 | 95,192 | 112,095 |
| Mendota, IL | 34,646 | 20,267 | 21,566 |
| Moline, IL | 132,942 | 227,831 | 246,590 |
| Omaha, NE | -504 | -878 | -6,008 |
| Princeton, IL | 17,389 | 43,450 | 54,877 |
| Plano, IL | 39,966 | 28,391 | 33,785 |
| Atlantic, IA | 0 | 0 | 17,207 |
| Grinnell, IA | 16,306 | 11,767 | 15,385 |
| Geneseo, IL | 5,883 | 5,883 | 5,883 |
| Other Stations* | -16,743 | -20,158 | -20,166 |
| Total (ONs + OFFs) | 619,000 | 935,000 | 1,142,000 |

** La Grange Road & Naperville*

*Note: Existing stations served by parallel Illinois state-supported and Amtrak train service*

### Table 11.2-5: Segment Forecast Results

| Station Link | | | 2020 Annual Passengers Onboard New Trains | | |
|---|---|---|---|---|---|
| | | | New 15A | New 15B | New 15C |
| Chicago Area | - | Plano, IL | 219,476 | 370,930 | 397,528 |
| Plano, IL | - | Mendota, IL | 254,202 | 394,080 | 426,072 |
| Mendota, IL | - | Princeton, IL | 282,095 | 407,595 | 440,886 |
| Princeton, IL | - | Geneseo, IL | 285,972 | 429,591 | 476,451 |
| Geneseo, IL | - | Moline, IL | 291,855 | 435,474 | 483,107 |
| Moline, IL | - | Iowa City, IA | 197,488 | 269,294 | 335,685 |
| Iowa City, IA | - | Grinnell, IA | 143,734 | 188,672 | 271,965 |
| Grinnell, IA | - | Des Moines, IA | 128,030 | 177,507 | 264,417 |
| Des Moines, IA | - | Atlantic, IA | 0 | 0 | 115,275 |
| Atlantic, IA | - | Council Bluffs, IA | 0 | 0 | 98,655 |
| Council Bluffs, IA | - | Omaha, NE | 0 | 0 | 0 |

*Note: Existing stations served by parallel Illinois state-supported and Amtrak train service*

## 12.0 Financial Plan and Performance

This Financial Plan for intercity regional passenger rail service from Chicago to Council Bluffs-Omaha consists of three elements: 1) a capital program showing annual capital requirements for infrastructure and equipment; 2) a pro forma statement of forecast annual operating revenues, ridership and operating costs; and 3) an inventory of possible funding sources.

The Financial Plan is based on the corridor implementation schedule, as shown in Table 12.0-1 below. The Chicago to Council Bluffs-Omaha passenger rail service proceeds in five phases from 2015 through 2030. Phase I begins with service to Moline, Illinois with two round-trips. Phase II provides service to Iowa City with two round-trips. Phase III extends passenger rail service to Des Moines. Phase IV increases the number of round-trips between Chicago and Des Moines from two to four round-trips, and Phase V extends these four round-trips from Des Moines to Council Bluffs.

Table12.0-1. Implementation Plan and Schedule

| Phase | Community Served | Round-Trips | Initiation of Service |
|---|---|---|---|
| Phase I | Moline | 2 | 2015 |
| Phase II | Iowa City | 2 | 2017 |
| Phase III | Des Moines | 2 | 2022 |
| Phase IV | Des Moines | 4 | 2025 |
| Phase V | Council Bluffs | 4 | 2030 |

After the completion of the Tier 1 NEPA and Service Development Plan for the entire corridor, each of these phases will follow a standard NEPA documentation, engineering and construction sequence:

- Tier 2 project NEPA documentation and 30 percent preliminary engineering (one to two years)
- Final design plans (one year)
- Construction and equipment procurement (two years)

Tier 2 NEPA and preliminary engineering for the Phase II Iowa City Service is expected to be completed in one year because of the extensive work that has been or will be completed for the corridor including final design to Moline. Tier 2 NEPA and preliminary engineering work is expected to take two years for Phases III, IV, and V. Construction is expected to take two years for all phases (Phase IV is an equipment procurement only) to mitigate effects on existing freight and passenger rail operations, to provide adequate constructability in regards to inclement weather, and to provide adequate lead times for procurement of materials and equipment, contract letting, and mobilization.. Equipment manufacturing and testing of the completed work and equipment will take place during the second year of each construction period.

Equipment will be purchased as required for each phase of the Service as follows:

- Phase I, Moline – three train sets (includes one spare trainset)
- Phase II, Iowa City – no additional equipment required

- Phase III, Des Moines 2X frequency – Two additional locomotives (one per each operating train for reliability) for the Phase 1 trainsets
- Phase IV, Des Moines 4X frequency – Two Additional Round-Trips: Three additional train sets
- Phase V, Council Bluffs – One additional train set plus one additional spare locomotive

## 12.1 Capital Program for Infrastructure and Equipment

Table 12.1-1 summarizes the annual Capital Program for the full build-out of the Chicago to Council Bluffs Service. For purposes of the SDP, it is assumed that this takes place over an 18-year period from 2012 through 2029, with NEPA documentation, engineering, and construction following the five-phase implementation schedule discussed above.

A well-thought out capital program is important for state financial planning. It enables state officials to understand the annual costs of a major, multi-year transportation program such as this. This understanding is critical so that federal capital grant applications can be prepared; state match dollars can be identified in the state budgetary and legislative process; and financial planning can begin to determine the proper mix of federal grant funds, state appropriations, bond funds, local contributions and in some cases private sector funding.

The Capital Program in the table shows the capital cost for each phase of the Service along with the federal, state and local funding that will be required each year to fund it. The total capital cost for the full build out of the corridor is estimated at $1.22 billion. The Capital Program is modeled on the federal/state partnership in the federal highway program. Based on federal authorizing legislation contained in the Passenger Rail Investment and Improvement Act (PRIIA), the Capital Program assumes that implementation will be able to obtain 80 percent federal funding with a 20 percent state and local match. Local governments will be expected to pick up the 20 percent federal match for station improvements in Iowa and the state will match all other capital costs. The total federal grant amount is estimated at $978.7 million.

As is the case in most interstate rail corridors, the Capital Program assumes that the states of Iowa and Illinois will match all improvements excepting stations within their boundaries. The cost of fully building out the infrastructure to serve Moline in Phase I is $292.3 million. Another $15.3 million is required to reach the state border at the Mississippi River to extend service to Iowa City (plus the Iowa portion of the cost). The existing federal grant award of $177 million for the Chicago to Iowa City project along with an Illinois match of $45 million is assumed to cover $222 million of these costs as a “committed project”. Future 80/20 federal and Illinois state funds will cover the rest. Similarly, the first three train sets used for the Phase I service to Moline will be funded with a federal Next Generation Equipment grant to Iowa DOT. The State of Illinois is currently procuring this equipment.

For the assumed schedule, for Iowa, $162.9 million in state match funds will be required over the 17-year build-out period from 2013 through 2029, with an average cost of $9.6 million per year. The lowest Iowa expenditure is programmed to be $366,752 in years 2025 and 2026, with the highest being $32.5 million in 2021. Local governments in Iowa will be responsible for $4.2 million in matching funds for station improvements.

## Table 12.1-1. Annual Capital Program

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHASE I**<br>Chicago to Moline (2 RT)<br>*Service assumed to begin December 31, 2015* | PE/PE $3,568,054<br>Contingency $178,403 | Final design $8,252,003<br>Contingency $412,600 | Construction $90,027,783<br>Contingency $4,501,389 | Construction $90,027,783<br>Vehicles $86,509,800<br>Contingency $8,826,879 | | | | | | | | | | | | | | |
| **PHASE II**<br>Extend Moline to Iowa City (2 RT)<br>*Service assumed to begin in 2017* | | PE/PE $2,751,770<br>Contingency $137,589 | Final design $7,256,396<br>Contingency $362,820 | Construction $79,810,793<br>Contingency $3,990,540 | Construction $79,810,793<br>Contingency $3,990,540 | | | | | | | | | | | | | |
| **PHASE III**<br>Extend Iowa City to Des Moines (2 RT)<br>*Service assumed to begin in 2022* | | | | | | PE/PE $2,187,231<br>Contingency $109,362 | PE/PE $2,187,231<br>Contingency $109,362 | Final design $9,814,111<br>Contingency $490,706 | Construction $147,744,657<br>Contingency $7,387,233 | Construction $147,744,657<br>Vehicles $16,887,650<br>Contingency $8,231,615 | | | | | | | | |
| **PHASE IV**<br>Add 2 RT Chicago to Des Moines (4 RT)<br>*Service assumed to begin in 2025* | | | | | | | | | | | | | Vehicles $108,547,956<br>Contingency $5,427,398 | | | | | |
| **PHASE V**<br>Extend Des Moines to Council Bluffs (4 RT)<br>*Service assumed to begin in 2030* | | | | | | | | | | | | | | PE/PE $1,746,440<br>Contingency $87,322 | PE/PE $1,746,440<br>Contingency $87,322 | Final design $8,175,878<br>Contingency $408,794 | Construction $115,428,658<br>Contingency $5,771,433 | Construction $115,428,658<br>Vehicles $39,484,017<br>Contingency $7,745,634 |

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | TOTAL PROJECT COST ▼ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL ANNUAL COST/CONTRIBUTION** | **$3,746,457** | **$11,553,962** | **$102,148,388** | **$269,165,795** | **$83,801,333** | **$2,296,592** | **$2,296,592** | **$10,304,816** | **$155,131,890** | **$172,863,923** | — | — | **$113,975,354** | **$1,833,762** | **$1,833,762** | **$8,584,671** | **$121,200,091** | **$162,658,309** | **$1,233,395,698** |
| Federal Grant Support (80%) | $2,997,166 | $9,243,170 | $81,718,711 | $215,332,636 | $67,041,066 | $1,837,274 | $1,837,274 | $8,243,853 | $124,105,512 | $138,291,138 | — | — | $91,180,283 | $1,467,010 | $1,467,010 | $6,867,737 | $96,960,072 | $130,126,647 | $978,716,559 |
| Illinois State Match (20%) | $749,291 | $1,775,486 | $18,488,622 | $38,000,004 | $1,441,837 | — | — | — | — | $1,688,765 | — | — | $11,397,535 | — | — | — | — | $3,948,402 | $77,489,943 |
| Iowa State Match (20%) | — | $535,306 | $1,426,330 | $14,878,546 | $14,878,546 | $459,318 | $459,318 | $2,060,963 | — | $32,545,948 | — | — | $11,397,535 | $366,752 | $366,752 | $1,716,934 | $23,418,501 | $27,761,743 | $162,960,800 |
| Local Contribution - Moline (20% of station costs) | — | — | $514,726 | $514,726 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | $1,029,451 |
| Local Contribution - Iowa City (20% of station costs) | — | — | — | $439,883 | $439,883 | — | — | — | — | — | — | — | — | — | — | — | — | — | $879,767 |
| Local Contribution - Des Moines (20% of station costs) | — | — | — | — | — | — | — | — | $338,072 | $338,072 | — | — | — | — | — | — | — | — | $676,144 |
| Local Contribution - Council Bluffs (20% of station costs) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | $821,517 | $821,517 | $1,643,035 |

PE/PE = Preliminary Engineering/Project Environmental

Final Design

Construction/Equipment Procurement

RT = Roundtrips

**ASSUMPTIONS:**

1: Calcuations are in 2012 dollars.

2: Tier 1 EIS for Chicago to Iowa City is complete and therefore remaining Tier 2 EIS and Preliminary Design can be completed in one year.

3: Unallocated contingency was distributed proportionately among the project tasks within each phase.

4: Preliminary engineering, project environmental, and final design were all extracted from category 70 (Professional Services) of the Capital Cost Estimate spreadsheet provided by HDR. The category contingency was distributed proportionately among the tasks within the category.

5: Preliminary engineering and project environmental for the Chicago to Moline service has been assumed to have occurred in 2012. It is shown on this schedule to provide a complete picture of the project.

6: It is assumed that the cost of track improvements needed for 4 roundtrips is paid for and constructed at during the construction period of each phase regardless of the service scenario.

7: $222 million in funding is committed for the Chicago to Moline service only. $177 million was jointly received by Iowa and Illinois from Federal grants. $45 million has been matched by Illinois.

8: Assumed equipment procurement schedule - (2015) three train sets plus spares; (2021) two additional locomotives; (2024) three train sets; (2029) one train set plus one spare locomotive.

## 12.2 Pro Forma Annual Operating Revenues and Costs

A key performance measure of any proposed intercity passenger rail service is the degree to which it is forecast to cover its operating cost with ticket revenues or other sources of revenue. All conventional speed (79 mph) Amtrak corridor services require federal or state operating support to cover annual operating deficits. The larger the operating surplus, or the smaller the operating deficit, the more feasible the service will be, particularly to the state governments, which will be responsible for appropriating state funds to support it.

The farebox recovery rate is another measure of the viability and performance of a given service. The farebox recovery rate is expressed in terms of the percent of operating costs recovered by operating revenues. Again, the greater the farebox recovery rate, the better the route performance. An increasing trend in farebox recovery over time is also an indicator of the long-term viability of a given service and the implementation plan associated with it.

Table 12.2-1 below provides a pro forma statement of annual operating revenues and operating costs for the Chicago to Council Bluffs Service for the period from 2017 to 2037. This pro forma financial statement documents the extension of service to Iowa City in 2017, Des Moines in 2022, two additional frequencies to Des Moines in 2025, and service to Council Bluffs in 2030. Ridership forecasts are also provided for each year, along with operating deficit and fare box recovery rates for each year.

Revenue and ridership forecasts were derived from forecasts for the corridor prepared by AECOM for each of the implementation plan phases. These 2020 forecasts were reduced by two percent (compounded annually) each year for the years from 2017 to 2019 prior to 2020, and escalated by two percent (compounded annually) each year for the ensuing years from 2021 to 2037 to account for the effects of population and economic growth in the corridor.

Revenues are broken out by passenger ticket revenues and food and beverage revenues. Operating costs were forecast for eight standard cost categories. These include:

- Maintenance: track, structure, and signal maintenance costs allocated to the passenger operations by the host railroad
- Host Railroad: services performed by the host railroad such as dispatching
- Fuel: locomotive fuel costs
- T & E Labor: train and engine crew labor costs for engineers, conductors etc.
- Onboard Services: labor and food costs associated with food services etc.
- Mechanical: train maintenance costs including labor, spare parts, and supplies consumed
- Stations: operating costs associated with stations including labor
- Other Direct Costs: the operator’s training, supervision, marketing, police, yard operations, and ticket sales overhead, etc.

## Table 12.2-1. Pro Forma Annual Operating Revenues and Costs

| | *Service to Iowa City* | | | | | *Service to Des Moines* | | | *Two Additional Round-trips* | | | | | *Service to Council Bluffs* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 |
| REVENUE | | | | | | | | | | | | | | | | | | | | | |
| Passenger Revenue | $4,617,379 | $4,709,727 | $4,803,922 | $4,900,000 | $4,998,000 | $10,508,040 | $10,718,201 | $10,932,565 | $16,561,212 | $16,892,436 | $17,230,285 | $17,574,891 | $17,926,389 | $23,953,240 | $24,432,305 | $24,920,951 | $25,419,370 | $25,927,758 | $26,446,313 | $26,975,239 | $27,514,744 |
| Food & Beverage Revenue | $400,000 | $408,000 | $416,160 | $424,483 | $432,973 | $604,219 | $616,303 | $628,629 | $1,208,436 | $1,232,605 | $1,257,257 | $1,282,402 | $1,308,050 | $1,643,879 | $1,676,757 | $1,710,292 | $1,744,498 | $1,779,387 | $1,814,975 | $1,851,275 | $1,888,300 |
| **Total Revenue** | **$5,017,379** | **$5,117,727** | **$5,220,082** | **$5,324,483** | **$5,430,973** | **$11,112,259** | **$11,334,504** | **$11,561,194** | **$17,769,648** | **$18,125,041** | **$18,487,542** | **$18,857,293** | **$19,234,439** | **$25,597,119** | **$26,109,062** | **$26,631,243** | **$27,163,868** | **$27,707,145** | **$28,261,288** | **$28,826,514** | **$29,403,044** |
| RIDERSHIP | | | | | | | | | | | | | | | | | | | | | |
| **Total Projected Ridership** | **186,109** | **189,831** | **193,627** | **197,500** | **201,450** | **346,973** | **353,913** | **360,991** | **547,624** | **558,577** | **569,748** | **581,143** | **592,766** | **737,492** | **752,241** | **767,286** | **782,632** | **798,285** | **814,250** | **830,535** | **847,146** |
| EXPENSES | | | | | | | | | | | | | | | | | | | | | |
| Maintenance | $4,359,255 | $4,359,255 | $4,359,255 | $4,359,255 | $4,359,255 | $8,391,515 | $8,391,515 | $8,391,515 | $8,391,515 | $8,391,515 | $8,391,515 | $8,391,515 | $8,391,515 | $12,762,755 | $12,762,755 | $12,762,755 | $12,762,755 | $12,762,755 | $12,762,755 | $12,762,755 | $12,762,755 |
| Host Railroad | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 | $1,031,772 |
| Fuel | $1,445,551 | $1,445,551 | $1,445,551 | $1,445,551 | $1,445,551 | $2,183,575 | $2,183,575 | $2,183,575 | $4,367,151 | $4,367,151 | $4,367,151 | $4,367,151 | $4,367,151 | $5,940,789 | $5,940,789 | $5,940,789 | $5,940,789 | $5,940,789 | $5,940,789 | $5,940,789 | $5,940,789 |
| T&E Labor | $2,846,000 | $2,846,000 | $2,846,000 | $2,846,000 | $2,846,000 | $3,519,200 | $3,519,200 | $3,519,200 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 | $6,838,400 |
| Onboard Services | $1,310,782 | $1,310,782 | $1,310,782 | $1,310,782 | $1,310,782 | $1,975,730 | $1,975,730 | $1,975,730 | $3,951,461 | $3,951,461 | $3,951,461 | $3,951,461 | $3,951,461 | $5,365,311 | $5,365,311 | $5,365,311 | $5,365,311 | $5,365,311 | $5,365,311 | $5,365,311 | $5,365,311 |
| Mechanical (labor, running spares, consumables) | $3,600,000 | $3,600,000 | $3,600,000 | $3,600,000 | $3,600,000 | $5,435,872 | $5,435,872 | $5,435,872 | $10,871,744 | $10,871,744 | $10,871,744 | $10,871,744 | $10,871,744 | $14,789,216 | $14,789,216 | $14,789,216 | $14,789,216 | $14,789,216 | $14,789,216 | $14,789,216 | $14,789,216 |
| Stations | $1,320,000 | $1,320,000 | $1,320,000 | $1,320,000 | $1,320,000 | $1,990,000 | $1,990,000 | $1,990,000 | $1,990,000 | $1,990,000 | $1,990,000 | $1,990,000 | $1,990,000 | $2,710,000 | $2,710,000 | $2,710,000 | $2,710,000 | $2,710,000 | $2,710,000 | $2,710,000 | $2,710,000 |
| Other Direct Costs | $5,060,000 | $5,060,000 | $5,060,000 | $5,060,000 | $5,060,000 | $7,643,376 | $7,643,376 | $7,643,376 | $7,643,376 | $7,643,376 | $7,643,376 | $7,643,376 | $7,643,376 | $10,397,553 | $10,397,553 | $10,397,553 | $10,397,553 | $10,397,553 | $10,397,553 | $10,397,553 | $10,397,553 |
| **Total Direct Expenses** | **$20,973,360** | **$20,973,360** | **$20,973,360** | **$20,973,360** | **$20,973,360** | **$32,171,040** | **$32,171,040** | **$32,171,040** | **$45,085,419** | **$45,085,419** | **$45,085,419** | **$45,085,419** | **$45,085,419** | **$59,835,796** | **$59,835,796** | **$59,835,796** | **$59,835,796** | **$59,835,796** | **$59,835,796** | **$59,835,796** | **$59,835,796** |
| **Operating Surplus/Deficit** | **$(15,955,981)** | **$(15,855,633)** | **$(15,753,278)** | **$(15,648,877)** | **$(15,542,387)** | **$(21,058,781)** | **$(20,836,536)** | **$(20,609,846)** | **$(27,315,771)** | **$(26,960,378)** | **$(26,597,877)** | **$(26,228,126)** | **$(25,850,980)** | **$(34,238,677)** | **$(33,726,734)** | **$(33,204,553)** | **$(32,671,928)** | **$(32,128,651)** | **$(31,574,508)** | **$(31,009,282)** | **$(30,432,752)** |
| **Fare Box Recovery** | **24%** | **24%** | **25%** | **25%** | **26%** | **35%** | **35%** | **36%** | **39%** | **40%** | **41%** | **42%** | **43%** | **43%** | **44%** | **45%** | **45%** | **46%** | **47%** | **48%** | **49%** |

**ASSUMPTIONS**

1: Calculations are made in 2012 dollar.

2: Assumed construction and service schedule:
- Chicago to Moline (two round-trips): Construction 2014-2015; service begins December 31, 2015
- Chicago to Iowa City (two round-trips): Construction 2015-2016; service begins 2017
- Chicago to Des Moines (two round-trips): Construction 2020-2021; service begins 2022
- Chicago to Des Moines (four round-trips): equipment procurement 2024, service begins 2025
- Chicago to Council Bluffs (four round-trips): Construction 2028-2029; service begins 2030

3: Wholesale food and beverage costs are considered in onboard service.

4: Passenger revenue figures were obtained from AECOM for all service scenarios in forecast year 2020 at 2012 dollars (received from HDR 4/10/13). A 2% annual economic growth rate was applied to those base numbers to reflect population and economic growth in those years since the forecasted year. Years prior to 2020 were discounted at the 2% annual growth rate.

5: Food and beverage revenues were received from HDR on April 3, 2013 for all service scenarios in the year the service is programed to start. A 2% annual economic growth rate was applied to those base numbers to reflect the growth in those years since the forecasted year.

6: Expenses were received from HDR on April 5, 2013 for all service scenarios.

7: Passenger ridership figures were obtained from AECOM for all service scenarios in forecast year 2020. A 2% annual economic growth rate was applied to those base numbers to reflect population and economic growth in those years since the forecasted year. Years prior to 2020 were discounted at the 2% annual growth rate.

In reviewing the pro forma information provided in Table 12.2-1 above, the annual operating deficit increases from $15.9 million to $30.4 million as the service is extended from Iowa City to Council Bluffs. This pro forma analysis does not attempt to allocate these costs among the states of Iowa, Illinois and potentially Nebraska. There are a variety of cost-sharing formulations that might be negotiated among the states based on possible factors such as: passengers originating in each state, passenger miles traveled in each state, route miles in each state, and train miles in each state.

The farebox recovery rate increases positively from 24 percent to 49 percent as the service is initiated across the entire corridor and operating efficiencies are achieved. This is driven by a 486 percent increase in total revenues between 2017 and 2037 ($5.01 million to $29.4 million) compared to a 185 percent increase in operating costs ($20.9 million to $59.8 million). Ridership increases 355 percent during this same period, from 186,109 to 847,146 riders per year.

## 12.3 Federal Programs for Passenger Rail Development

Historically, states have relied on a variety of relatively small federal and state funding programs to develop state passenger rail systems. With the passage of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the American Recovery and Reinvestment Act of 2009 (ARRA), the federal funding picture has changed—especially for passenger rail development. PRIIA provides a multi-year capital funding framework which emphasizes the role of states in U.S. passenger rail development. In 2009, ARRA subsequently provided $8 billion in federal capital funding for state sponsored high-speed and intercity passenger rail projects and $1.5 billion for the Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program, which can fund freight and passenger rail as well as other modal projects. The Transportation authorization bill enacted in 2012, known as Moving Ahead for Progress in the 21$^{st}$ Century Act (MAP-21), does not include a specific rail chapter, but it does provide a variety of funding programs that can potentially be used to support the development of rail transportation.

### 12.3.1 Moving Ahead for Progress in the 21$^{st}$ Century Act

On July 6, 2012, President Obama signed into law P.L. 112-141, the Moving Ahead for Progress in the 21$^{st}$ Century Act (MAP-21). Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 is the first transportation authorization enacted since 2005. MAP-21 represents a milestone for the U.S. economy—it provides needed funds and, more importantly, it transforms the policy and programmatic framework for investments to guide the growth and development of the country's vital transportation infrastructure.

MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 authorizes $82 billion in federal funding for FYs 2013 and 2014 for road, bridge, bicycling, and walking improvements. In addition, MAP-21 enhances innovative financing and encourages private sector investment through a substantial increase in funding for the Transportation Infrastructure Finance and Innovation Act (TIFIA) program. It also includes a number of provisions designed to improve freight movement in support of national goals.

MAP-21 builds on and refines many of the highway, transit, bike, and pedestrian programs and policies established in 1991. While it does not have a rail section and does not include any new funding programs specifically for rail, passenger rail projects may be eligible for funding if certain conditions are met to match the requirements of several MAP-21 programs. MAP-21 only provides authorizations for two years, and work has already begun in Congress to re-authorize PRIIA (which expires in October 2013) and potentially combine it with a new transportation authorization bill when MAP-21 expires in June 2014.

This section highlights the major features of the federal funding programs incorporated in MAP-21. It also describes other federal funding programs available for passenger and freight rail projects.

### 12.3.2 FHWA Section 130 Railway – Highway Crossing Program

MAP-21 continues and enhances the Federal Highway Administration (FHWA) Section 130 Crossings Program, which provides grants for safety improvements to reduce the number of fatalities, injuries, and crashes at public grade crossings. This includes: separation or protection of grades at crossings; the reconstruction of existing railroad grade crossing structures; and the relocation of highways or rail lines to eliminate grade crossings.

Funds from the FHWA Section 130 Program can be used for passenger and freight projects which improve the safety of at-grade crossings. This may include a variety of methods such as installation of warning devices, elimination of at-grade crossings by grade separation or consolidation, and closing of crossings. Work may also include replacement of crossing surfaces, improvement of road approaches, installation of new bells/gates/flashers, and installation of other safety signal equipment. Funding may also be used for elimination of crossing hazards should a state choose to use the funds for this purpose. For example, any repair, construction, or reconstruction of roads and bridges affected by a project would be eligible.

Federal funds for grade-crossing safety improvements are available at a 90 percent federal share, with the remaining 10 percent to be paid by state and/or local authorities and/or the railroad. The federal share may amount to 100 percent for the following projects: signing; pavement markings; active warning devices; the elimination of hazards; and crossing closures. The decision on whether to allow 100 percent federal funding rests with the individual states.

Activities funded under this program are also eligible for funding under the broader Highway Safety Improvement Program (HSIP). The Surface Transportation Program (STP) also includes eligibility for funding of railway-highway crossings projects.

### 12.3.3 Congestion Mitigation and Air Quality Improvement Program

MAP-21 continues the Congestion Mitigation and Air Quality Improvement Program (CMAQ), which provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) as well as former nonattainment areas that are now in compliance (maintenance areas). States with no nonattainment or maintenance areas may use their CMAQ funds for any CMAQ- or STP-eligible project.

CMAQ funding may be used for passenger rail projects which accomplish the program's air quality goals. Eligible activities include capital projects that shift traffic demand to nonpeak hours or other transportation modes, and as well as support for passenger rail operating expenses for up to a three year period when air quality benefits can be justified. The federal cost share is typically 80 percent, although 100 percent funding is also available under certain circumstances.

### 12.3.4 FHWA Surface Transportation Program

The FHWA Surface Transportation Program (STP) (MAP-21 Sec. 1108; Title 23 USC Section 133) provides flexible funding for projects that may be used by states and localities for projects to preserve and improve the conditions and performance on any federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

### 12.3.5 FHWA Traffic Mitigation Funding

FHWA Traffic Mitigation project funding is available to federally eligible highway projects to address congestion resulting from construction activities in a given highway corridor under the Work Zone Safety and Mobility Rule (23 CFR 630 Subpart J). Where cost-effective, as documented in a project Transportation Management Plan (TMP), new or enhanced intercity passenger rail service can be considered as a traffic congestion mitigation measure. Federal highway funding can then be used to subsidize all or part of the passenger rail operating costs during the life of the construction project. This funding option is most applicable to major multi-year highway improvement projects on high-volume interstate highways where intercity rail service operates in parallel to the highway corridor. The federal cost share can be either 80 or 90 percent with the higher figure dependent on whether the rail project is associated with mitigating congestion on an interstate highway.

### 12.3.6 Transportation Alternatives Program

MAP-21 establishes the new Transportation Alternatives Program (TAP) to provide for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs. The TAP replaces the funding from pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, Safe Routes to School, and several other discretionary programs, wrapping them into a single funding source.

The purpose of this program is to fund projects which allow communities to strengthen the local economy, improve the quality of life, enhance the travel experience, and protect the environment. Transportation Alternatives Program funds can be used for preservation and rehabilitation of historic transportation facilities, and conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other non-motorized transportation users. The federal grant share is generally not less than 80 percent.

#### 12.3.7 Transportation Infrastructure Finance and Innovation Act

MAP-21 continues the Transportation Infrastructure Finance and Innovation Act (TIFIA) Program, which provides federal credit assistance to eligible surface transportation projects, including highway, transit, intercity passenger rail, some types of freight rail, and intermodal freight transfer facilities. The program is designed to fill market gaps and leverage substantial private co-investment by providing projects with supplemental or subordinate debt. Eligible projects include:

- Intercity passenger bus or rail facilities and vehicles, including those owned by Amtrak
- Public freight rail projects
- Private freight rail projects that provide public benefit for highway users by way of direct highway-rail freight interchange (a refinement of the SAFETEA-LU eligibility criterion)
- Intermodal freight transfer facilities
- Projects providing access to, or improving the service of, the freight rail projects and transfer facilities described above
- Surface transportation infrastructure modifications necessary to facilitate direct intermodal interchange, transfer and access into and out of a port

The TIFIA program applicants may be states, localities, or other public authorities, as well as private entities undertaking projects sponsored by public authorities, three types of financial assistance:

- Secured loans are direct federal loans to project sponsors offering flexible repayment terms and providing combined construction and permanent financing of capital costs
- Loan guarantees provide full-faith-and-credit guarantees by the federal government to institutional investors, such as pension funds, that make loans for projects
- Lines of credit are contingent sources of funding in the form of federal loans that may be drawn upon to supplement project revenues, if needed, during the first 10 years of project operations.

MAP-21 also newly authorizes “master credit agreements,” under which DOT may make a contingent commitment of future TIFIA assistance (subject to the availability of future funding) for a program of projects secured by a common revenue pledge.

TIFIA is not a funding source, but rather a method of financing projects through assisted borrowing. In the case of passenger rail projects, TIFIA financing is only workable where investment grade revenue and operating cost forecasts show the project has the potential to provide a substantial revenue stream after a significant public investment is typically made in infrastructure and/or equipment. Projects receiving TIFIA credit assistance must obtain an investment grade rating from at least one nationally recognized credit rating agency.

The TIFIA program has been significantly expanded under MAP-21. SAFETEA-LU authorized $122 million per year for TIFIA. MAP-21 authorizes $1.75 billion in budget authority for the TIFIA program ($750 million in FY13 and $1 billion in FY14). Since each dollar of budget authority can leverage approximately $10 in lending capacity, it is expected that the U.S. Department of Transportation will be able to offer an estimated $17 billion in TIFIA credit assistance based on the MAP-21 authorized funding level.

## 12.4 Passenger Rail Investment and Improvement Act of 2008 (PRIIA)

In October 2008, Congress passed the Passenger Rail Investment and Improvement Act (PRIIA). This legislation reauthorizes funding for Amtrak, and in addition, provides a new statutory framework for a federal/state partnership to fund and develop U.S. high-speed and intercity passenger service using 80 percent federal and 20 percent state capital grants. The PRIIA legislation authorizes $3.4 billion in capital grants over five years to states, groups of states, interstate compacts, public agencies, and in some cases Amtrak.

Congressional action is required each year to appropriate the amounts authorized. Section 301 of the Act provides grants for Intercity Passenger Rail Service Capital Assistance. Section 501 provides capital grants for High Speed Rail Corridor Development for federally designated corridors with planned speeds of 110 mph or greater. Section 302 Congestion Grants are focused on relieving rail congestion bottlenecks.

## 12.5 American Recovery and Reinvestment Act of 2009 (ARRA) and Transportation Investment Generating Economic Recovery (TIGER)

In February 2009, Congress passed the American Recovery and Reinvestment Act (ARRA), which appropriated $8 billion in 100 percent federal funding providing “capital assistance for high speed corridors and intercity passenger service.” This program is based on the statutory framework provided by PRIIA and focused funding on state sponsored projects.

ARRA also provided $1.5 billion in 100 percent flexible multimodal funding under the TIGER Discretionary Grant Program. Another $600 million in 80 percent federal funding was appropriated in 2010 for the TIGER II Discretionary Grant Program.

The U.S. Department of Transportation was authorized to award another $526.9 million in TIGER Discretionary Grants pursuant to the Appropriations Act 2011 (Pub. L. 112-010, April 15, 2011). This appropriation is similar, but not identical, to the appropriation for the TIGER program authorized and implemented pursuant to ARRA and the National Infrastructure Investments or TIGER II program under the FY 2010 Appropriations Act. The deadline for submission of applications was October 31, 2011.

Most recently, Congress has appropriated another $500 million in 2012 TIGER Grant funds. In its Notice of Funding Availability (NOFA) dated January 31, 2012, the Federal Railroad Administration (FRA) has made available up to $100 million of these funds for high speed and intercity passenger rail projects. The TIGER program has proven to be very popular with the states, but there were no provisions to continue this funding in MAP-21.

## 12.6 FRA High Speed and Intercity Passenger Rail (HSIPR)

In developing guidance for ARRA grants as well as grants offered under subsequent PRIIA appropriations, a structure for the FRA's High Speed and Intercity Passenger Rail (HSIPR) Program has evolved. The current structure is best reflected in the most recent NOFAs for FY 2010 appropriations for 80/20 percent federal/state grants under three program areas:

- *Service Development Program Grants* issued in the Federal Register on July 1, 2010
- *Individual Project Grants*, also issued on July 1, 2010
- *Planning Grants* issued in the Federal Register on April 1, 2010

Under the FY 2010 appropriation for these programs, $2.1 billion was provided for Service Development Program Grants, $245 million was provided for Individual Projects and $50 million was provided for planning grants. The basic features of each program are outlined below. No new appropriations were provided for HSIPR in FY 2011 or 2012. It is anticipated that any future rail funding appropriations will be distributed to the states following the HSIPR procedures established by FRA.

### 12.6.1 Service Development Program Grants

Investment in Service Development Programs (SDP) is "the long-term interest" of the new FRA HSIPR Program. The FRA requires the development of an SDP before funding for final design and construction can be granted. SDP grants focus on developing new high speed or intercity passenger services or substantially upgrading existing services. A SDP grant provides an 80 percent federal/20 percent state basis and in-kind contributions are allowable with FRA approval. An SDP grant application will typically contain sets of inter-related projects which constitute the entirety or a distinct phase (or geographic section) of a long-range SDP. These projects will collectively produce benefits greater than the sum of each individual project and will generally address, in a comprehensive manner, the construction and acquisition of infrastructure, equipment, stations, and facilities necessary to operate high speed and intercity passenger service.

Major SDPs are unique because the award instrument will be a "Letter of Intent" for the cost of the entire program, containing milestones, grant conditions, and other requirements agreed upon by FRA and the grantee, which must be fulfilled prior to any disbursement of funds. Funding will be obligated through cooperative agreements and disbursed to grantees as the agreed upon milestones are achieved. The award instrument for the Standard SDP is a traditional "cooperative agreement" with funding made available to grantees on a reimbursable basis. Major SDPs will typically require a two-tiered NEPA approach: utilizing a Tier 1 EIS to address broad service issues (Service NEPA document); followed by a Tier 2 EIS, Environmental Assessment (EA), or Categorical Exclusion (CE) to address site-specific project environmental review requirements To be eligible for a Major SDP Grant, an applicant must have completed and submitted a NEPA document satisfying FRA's Service NEPA requirement with the application. A project's preliminary engineering, site-specific NEPA, final design, and construction activities are eligible for funding.

### 12.6.2 Individual Project Grants

Individual Project Grants are intended to assist applicants with the capital costs of improving existing high speed or intercity passenger rail service. Individual Project Grants are provided on an 80 percent federal/20 percent state basis and in-kind contributions are allowable with FRA approval. Awards are for projects which involve final design and construction, or projects already having completed site-specific NEPA documentation; or completion of project NEPA and preliminary engineering documentation. Completion of the grant activities should result in all of the documentation necessary for the project to move into the FD/construction stage. The intent is to fund discrete individual projects which result in operation or other tangible improvements (e.g., station rehabilitation) benefiting one or more existing high speed or intercity passenger services.

All individual projects must be addressed in a SDP, State Rail Plan, or similar planning document. Final design and construction projects must have project NEPA documentation completed as well as PE. Grants for PE/NEPA work must be developed sufficiently to support immediate commencement of FD. There is no requirement for a "tiered" NEPA approach. All individual project grants must have operational independence upon implementation; the project will provide measurable benefits with no additional investment.

### 12.6.3 Planning Grants

There are two types of eligible planning projects under HSIPR: (1) Passenger Rail Corridor Service Development Plans (SDP) and (2) State Rail Plans. Grants are provided on an 80/20 percent federal/state basis and in-kind contributions are allowable with FRA approval.

Passenger Rail Corridor Investment Plans must include both SDPs and Corridor-Wide Environmental Documentation meeting Tier 1 service NEPA requirements. If an applicant has completed one of these documents, FRA must have accepted the document to receive a grant to complete the remaining component(s).

SDPs must include: a corridor development program rationale; service plan; capital investment need assessment; financial forecast; public benefits assessment; and program management approach. Corridor-Wide Environmental Documents must satisfy FRA service NEPA requirements. FRA has defined service NEPA as at least a programmatic/Tier 1 environmental review (using tiered reviews and documents), or alternatively, a project environmental review addressing broader questions and likely environmental effects for the entire corridor. Simple corridor programs can be addressed with a project NEPA approach while more complex programs will require a tiered approach.

State Rail Plans must meet PRIIA requirements and specific requirements included in the notice of funding availability. These include:

- State multimodal goals addressing the role of rail
- Description of the existing rail system and its performance
- Discussion of the existing state rail program and analysis of the economic and environmental effects of rail
- Discussion of existing rail proposals
- Vision for rail transportation
- 5- and 20- year service and investment program for passenger and freight rail with an assessment of public and private benefits
- Description of public and stakeholder participation as well as coordination with other transportation programs

## 12.7 IRS Tax Exempt Private Activity Bonds

Private Activity Bonds (PABs) are federally tax-exempt bonds used to finance the activities of private firms. Congress introduced private activity bonding eligibility for transportation projects through the amendment of Section 142 of the Internal Revenue Code. SAFETEA-LU added PAB eligibility for highway and freight transfer facilities (including highway-rail transfer). Mass transit projects and high speed rail facilities (over 150 mph) were already eligible for PABs, up to a $15 billion limit for transportation-related PABs.

State and local governmental authorities must issue the bonds and the authorities traditionally serving as conduits for bond issuance include Development Authorities and Downtown Development Authorities, among others. Qualified projects include “any surface transportation project which receives federal assistance under Title 23, United States Code. This includes rail facilities and vehicles as long as these projects are also receiving TIFIA credit assistance. This requirement brings TIFIA and PABs together on surface transportation projects to encourage more private equity investment to transportation.

An application for funding allocation is required on an annual basis and is subject to the federal cap on PABs established for each state. Requirements to be included in the application include proposed date of bond issuance, financing/development team information, borrower information, project description, project schedule, financial structure, and a description of Title 23/49 funding received by the project. If a project receives an allocation and the schedule agreed upon in the application is not met, the allocation may be withdrawn.

## 12.8 FHWA Grant Anticipation Revenue Vehicle Bonds

Grant Anticipation Revenue Vehicle (GARVEE) bonds can be issued by states under the guidelines in Section 122 of Title 23 of the United States Code. These bonds can be used for transportation projects with no stated limitations on transportation mode. GARVEE bonds may only be used for projects receiving federal funding and the project details must be approved by the FHWA. States repay the funds using anticipated federal funds. While FHWA must approve the project for federal funding, they do not approve the financing method. A state or local government must notify FHWA they will be using GARVEE bonds.

GARVEE bonds are useful when it is desirable to bring a project to construction quicker than otherwise would be possible. Inflation, increased congestion, and lost economic development benefits associated with delay provide offsets to the additional interest costs of debt financing. Grant Anticipation Bonds are typically intended to meet short term funding needs, usually less than one year to maturity, but sometimes as long as two to three years.

The PRIIA “Letter of Intent” provisions of the FRA HSIPR Program can provide a basis for documenting to investors the availability and commitment of future federal grant funding. These bonds are not guaranteed by the federal government and the states do not guarantee the federal government will provide the expected financing. The state’s share of the bond is backed by the state and it may elect to either carry high interest rates or use other sources of revenue as security on the federal portion of the bonds.

## 12.9 Intercity Passenger Rail Financing Case Studies

The two case studies below illustrate how several of the federal funding sources discussed above have been used by the State of Wisconsin to support intercity passenger rail projects. The Milwaukee Intermodal Terminal Project is a public/private partnership, where private equity funds leveraged federal FHWA CMAQ and FTA Bus Capital funds, state bond funds and local funds. The Hiawatha case study illustrates how CMAQ and FWHA Congestion Mitigation funds were used to provide a substantial portion of the required state operating support for a successful intercity corridor service.

### 12.9.1 Financing Case Study: Milwaukee Intermodal Terminal Project – Wisconsin Department of Transportation

The Milwaukee Intermodal Terminal Project is a $19 million public-private partnership to redevelop the Milwaukee Amtrak Station into a mixed-use intermodal terminal for passenger rail and intercity bus operations. This case study provides an excellent example of how a variety of federal, state, local and private sector funding sources can be pieced together to fund a major intercity passenger rail transportation project.

In 2001 the Wisconsin Department of Transportation (WisDOT) issued a request for qualifications for a developer to design, build, finance, lease, and manage a new intermodal terminal to replace the existing downtown Milwaukee Amtrak Station. The existing station served the highly successful, state-supported *Hiawatha Service* with seven round-trips between Milwaukee and Chicago as well as Amtrak's *Empire Builder* long distance train between Chicago and Seattle. However, the 1960s-era structure had fallen into disrepair and had deteriorated both functionally and aesthetically.

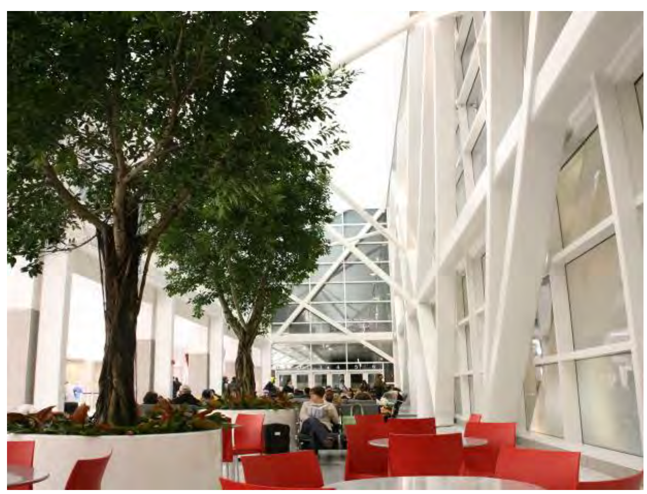
The Department's goal was to redevelop the building into an intermodal transportation hub for Amtrak, local transit, and intercity bus operators serving Milwaukee, as shown in Figure 12.9-1 below. The intention was also to provide opportunities for mixed-use development on the site which would stimulate nearby redevelopment activities.

Milwaukee Intermodal Partners (MIP) responded with an investment proposal which resulted in a private sector equity contribution of $2.9 million which leveraged $7.4 million in federal FTA Bus Capital and FHWA CMAQ funds, a $6.0 million contribution of tax incremental finance (TIF) district funds from the City of Milwaukee, and $2.7 million in appropriations and bond funds from the State of Wisconsin. MIP received a 20-year lease on the property with two options for renewal and was responsible for designing the new terminal, supervising rehab and construction work, negotiating leases with Amtrak, intercity bus operators and other tenants and finally overseeing the day to day operations of the facility.

The new Milwaukee Intermodal Terminal, which opened in November 2007, features a 7,000 sq. ft. three-story glass "Galleria" addition to the front of the building. In addition to serving Amtrak, the intermodal terminal supports Milwaukee Greyhound operations and three other intercity bus operators. Improvements consist of new Amtrak and intercity bus ticketing, baggage handling and back office space, HVAC and fire sprinkler improvements, canopies and parking for bus operations, and 270 dedicated public parking spaces. A first floor restaurant has opened and WisDOT has leased the third floor of the building for their state-of-the-art "freeway operations center" overseeing the Milwaukee County Freeway System as well as other interstate highways throughout Wisconsin.

Figure 12.9-1: Milwaukee Intermodal Terminal

### 12.9.2 Operating Funding Case Study: Hiawatha Service – Wisconsin Department of Transportation



A major challenge for any state which currently supports or is contemplating supporting intercity passenger rail service is the provision of operating funding where current revenues do not cover operating costs. This issue is a particular concern today when states are experiencing challenging budgetary and economic conditions in the face of new "Section 209" provisions of PRIIA which require many states to make a greater contribution towards Amtrak operating costs. This case study of the Wisconsin Department of Transportation's support for the Hiawatha service illustrates how both federal CMAQ and Transportation Mitigation funding were creatively used to provide operating support for an important intercity passenger rail service.

The State of Wisconsin has supported Amtrak *Hiawatha Service* since 1989. The *Hiawatha* provides seven round-trips between Milwaukee and Chicago - the greatest number of frequencies outside of Amtrak's Northeast Corridor (NEC) and California Operations.

The Hiawatha served over 838,000 passengers in federal fiscal year 2012 and ridership has increased steadily. The service consistently is among the highest performing Amtrak corridors in terms of on-time performance.

As required by Amtrak, state support by Wisconsin for the Hiawatha was approximately $7.1 million in 2012. FHWA Traffic Mitigation funding tied to a multiyear improvement program on the I-94 North-South Freeway between Milwaukee and Chicago provides 90 percent funding for Wisconsin's share of Hiawatha operating costs. Wisconsin's 10 percent match share is approximately $710,000.

While increased ridership and revenues have reduced the operating subsidy, Wisconsin began looking for other sources of funding in the late 1990s to offset its impact on the state budget. From 1998 to 2007, Wisconsin used CMAQ funds (80 percent) to support the service. Eligibility was driven by the fact that both the Milwaukee and Chicago Metropolitan Areas are air quality standard non-attainment areas. The CMAQ funding ended in 2007 as CMAQ regulations were issued limiting operating support funding to three years. In 2008, the State of Wisconsin began using FHWA Traffic Mitigation funds tied to a series of federally funded highway projects in the Milwaukee-Chicago corridor. The federal cost share has varied from 80 to 90 percent depending on whether the project was on a state route or interstate highway.


Figure12.9-2: Hiawatha Service Area

## 13.0 Benefit-Cost Analysis

This section describes the public benefits that the Program. The benefits include:

- Economic impacts of construction projects necessary to construct, operate and maintain the intercity passenger rail service including job creation (short- and long-term), spending of employee wages and salaries, and related economic development benefits;
- Creation of economic value from services provided to the traveling public, such as time spent in travel, reliability of travel, and cost of purchasing travel.
- Creation of economic value from changes in externalized cost of transportation such as highway congestion, highway safety, highway maintenance, and air emissions;
- Improvements in community livability through the establishment of transit-oriented development, reductions in transportation congestion, and improved access to transportation, particularly for the elderly, disabled, and people who cannot afford personal automobiles and airline transportation.
- Improved in sustainability through reductions in motor fuel consumption, air emissions including greenhouse gases, and reduction sin capacity increases that would otherwise be required for airports and highways.

The State's position is that public benefits are not an effect of the Program as much as they are a rationale for the Program. The Program's goal is ultimately to create an intercity passenger rail transportation that is a tool that addresses the public needs, and enables the State to comprehensively improve transportation, sustainability, community livability, and economic development over the long term.

### 13.1 Methodology, Principles, Guidance, and Assumptions

The economic assessment methodology used combines state-of-the art cost benefit analysis tools and transparency in the estimation procedure. The process allows for full transparency of the model logic behind each category of benefits (avoiding the "black box" issue) and presents findings in a simplified framework that meets FRA guidance to support the Program.

The six-step process used for the economic analysis is:

1. **Identify Public Net Benefit Categories:** The net private and public benefit categories to be evaluated were formalized. User and non-user public benefit categories include: efficiency and reliability of movement of passengers and goods; reductions in operations and/or maintenance costs for existing services (e.g., highway maintenance costs); reductions in vehicle operating costs; mobility and low income mobility; environmental effects; accident reductions; congestion relief; creation of new jobs; and other public benefits.

2. **Define Structure and Logic of the Forecasting Problem:** A structure and logic model was developed which depicts the variables and cause and effect relationships that underpin the forecasting problem. Although the structure and logic model is written down mathematically to facilitate the analysis, it is also depicted diagrammatically to permit stakeholder scrutiny and modification. For

each of the benefit categories identified, logic models were developed and presented to build consensus with respect to methodology to be used in calculating public and private return on investments.

3. **Collect Data and Assign Estimates:** Each benefit and cost category is composed of multiple variables. Available data was collected and assumptions specified where data was not available. Key input values were checked for consistency and where appropriate, FRA guidelines are sourced.
4. **Review and Populate Benefit Categories and Model Logic**: Review of the primary model inputs occurred for the structure of the public benefits estimation framework and to identify key uncertainties in the data for inclusion in the sensitivity analysis.
5. **Test Sensitivity of Results against Key Variables:** Key variables were flagged for testing and the model was re-run and results generated based on key material events (e.g., delay in implementation, significantly lower than anticipated ridership, etc.).
6. **Issue Results:** Once the model runs were complete, the results were issued and documented. This includes a description of the evaluation approach, data and assumptions used, and presents the results and the sensitivity analysis conducted.

Two separate documents were prepared to support the benefit-cost analysis, one being the actual Benefit-Cost Analysis, Appendix P, and the other is the Economic Impact Statement, Appendix Q. Refer to these documents for further details regarding methodology, principles, guidance and assumptions. The Benefit-Cost Analysis framework is a comparison of values—the cost to build and operate the service related to the benefits of the improvement to the social welfare delivered by the Program. The total benefits must exceed the total cost of the program on a present value basis, and/or the rate of return on the funds invested should exceed the cost of raising capital. The Benefit-Cost Analysis includes: transportation benefits from new improved intercity passenger rail service, transportation network integration such as intermodal connections and transportation safety; economic recovery such as preserving and creating jobs in the short and long terms; and other public benefits such as environmental quality, energy efficiency and livable communities.

Both short-term economic impacts that result from the engineering, right-of-way acquisition, and construction spending associated with the program as well as the long-term economic impacts that result from additional rail service provided by the Program were analyzed. The IMPLAN input-out model was used as a basis for the assessment. State input-output models were incorporated with the IMPLAN model. The outputs of the modeling will provide short- and long-term job creation, residential, business and economic impacts to the state economies and also the U.S. economy.

## 13.2 Cost Benefit Analysis Results

The benefits of the rail service are evaluated in this analysis based on the HSIPR funding evaluation criteria published in CFR Vol. 74 No. 119 Docket No. FRA-2009-0045. Additional guidance is provided in section D of the FRA application forms.

### 13.2.1 Operational and Ridership Benefits Metrics

Ridership estimates were developed for each of the five Service phases. The ridership forecast values for the opening year of each Service phase are shown in Table 13.2-1 below. It was assumed there would be an annual growth rate in ridership of 2.00 percent in subsequent years after opening.

Table 13.2-1: Chicago to Council Bluffs – Omaha Project Construction, Level of Service, and Ridership Forecasts

| Phase | Construction Start Year | Construction End Year | Opening Year | Round-Trips Per Day | Initial Ridership (In Opening Year) |
|---|---|---|---|---|---|
| Phase 1 - Chicago to Moline (Base Case) | 2014 | 2015 | 2015 | 2 | 120,009 |
| Phase 2 - Chicago to Iowa City (Build Case) | 2015 | 2016 | 2017 | 2 | 186,109 |
| Phase 3 - Chicago to Des Moines (Build Case) | 2020 | 2021 | 2022 | 2 | 346,973 |
| Phase 4 - Chicago to Des Moines (Build Case) | 2024 | 2024 | 2025 | 4 | 547,624 |
| Phase 5 - Chicago to Council Bluffs (Build Case) | 2028 | 2029 | 2030 | 4 | 737,492 |

Table 13.2-2 below shows the estimated average annual level of ridership for the HSR passenger service from Chicago to Council Bluffs over the 21 year analysis period. In addition, the table shows how many HSR passengers are diverted from other modes (auto, air and bus) or represent newly induced trips.

Table 13.2-2: Incremental Ridership by Source

| | Value |
|---|---|
| Average Annual Level of HSR Ridership | 505,439 |
| Average Annual Trips Diverted from Auto | 338,644 |
| Average Annual Trips Diverted from Air Travel | 5,054 |
| Average Annual Trips Diverted from Bus | 116,251 |
| Average Annual Induced Trips | 31,693 |

As a result of the above-mentioned diversion of trips from auto to HSIPR, Table 13.2-3 below shows the total amount of auto trips diverted throughout the study period and estimated average annual reduction in vehicle miles traveled (VMT). Induced trips are not included in these calculations, since induced users previously made no trips at all.

Table 13.2-3: VMT and Auto Reduction

| | Value |
|---|---|
| Total Auto Trips Reduced | 3,797,840 |
| Average Annual vehicle miles traveled (VMT) Reduced | 66,941,081 |

A result of the diversion from auto usage to the HSIPR, Table 13.2-4 below show the total VMT avoided over 21 years in addition to the pavement maintenance cost savings.

Table 13.2-4: VMT Reduction and Pavement Maintenance Savings

| | Value |
|---|---|
| Total VMT Avoided | 1,673,527,015 |
| Pavement Maintenance Savings ($M) | $7.5 |

*Note: Monetary values were discounted using a 7 percent rate.*

In terms of Vehicle Operating Cost savings, Table 13.2-5 below illustrates the net Vehicle Operating Cost savings, in addition to the induced demand benefits for new HSIPR users. Induced demand benefits accrue to users who were not making the trip between Chicago and Council Bluffs using the available modes of transportation prior to the Service, and are now using the rail service for the trip.

Table 13.2-5: Vehicle Operating Cost Net Savings to New Users and Induced Demand Benefits

| | Value |
|---|---|
| Net Vehicle Operating Cost Savings ($M) | $254.5 |
| Induced Demand Benefits ($M) | $0.0 |

*Note: Monetary values were discounted using a 7 percent rate.*

Benefits to remaining highway users include average annual VMT reduction, which results in a reduced cost of congestion and reduced accident costs (from fewer accidents). Table 13.2-6 below shows these benefits.

Table 13.2-6: Benefits to Remaining Highway Users and Safety Benefits

| | Value |
|---|---|
| Average Annual VMT Reduced | 66,941,081 |
| Reduced Cost of Congestion ($M) | $46.0 |
| Reduced Accident Costs ($M) | $40.2 |

*Note: Monetary values were discounted using a 7 percent rate.*

### 13.2.2 Environmental Benefits

Environmental benefits are calculated by: (1) estimating the reduction in vehicle emission from trips being diverted to rail; and, (2) estimating the increase in emission from introducing new passenger rail service. Table 13.2-7 indicates the total life-cycle emission reduction for the Service.

**Table 13.2-7: Environmental Reduction**

| | Value |
|---|---|
| Reduced Gallons of Fuel | 7,261,530 |
| Reduced $NO_x$ Emissions (tons) | 467 |
| Reduced PM Emissions (tons) | 20.1 |
| Reduced VOC Emissions (tons) | 533 |
| Reduced $CO_2$ Emissions (tons) | 676,862 |

Meanwhile, Table 13.2-8 below shows the net emission savings over the 21 year analysis period.

**Table 13.2-8: Emission Cost Savings**

| | Value |
|---|---|
| Environmental Benefits ($M) | $12.1 |
| $NO_x$ Cost Savings ($M) | $1.0 |
| PM Cost Savings ($M) | $2.3 |
| VOC Cost Savings ($M) | $0.3 |
| $CO_2$ Cost Savings ($M) | $8.5 |
| Noise Emission Savings ($M) | $1.7 |

*Note: Monetary values were discounted using a 7 percent rate.*

### 13.2.3 Findings and Overall Results

Table 13.2-9 below summarizes the CBA findings. Annual costs and benefits are computed over a long-run planning horizon and summarized over the life-cycle of the project. The time horizon for the project has a study period of 21 years used in the analysis. Construction is expected to be completed in phases as shown in Table 13.2-1 above, but operating costs continue through the whole project horizon. Benefits also accrue during the full operation of the project.

At a 7 percent discount rate, a $709 million investment (capital and O&M) results in fully $728 million of benefits. This yields a benefit to cost ratio of approximately 1.03. At a 3 percent discount rate, a $1,064 million investment (capital and O&M) results in fully $1,408 million of benefits. This yields a benefit to cost ratio of approximately 1.32.

**Table 13.2-9: Overall Results of the Cost**

| CHI-OMA Benefit Cost Analysis Results | 7% Discount Rate | 3% Discount Rate | Undiscounted |
|---|---|---|---|
| Total Construction Capital Cost ($ millions) | $517 | $711 | $931 |
| Average Annual O&M Cost ($ millions) | $8 | $15 | $25 |
| Total O&M Cost ($ millions) | $192 | $353 | $581 |
| Total Costs ($ millions) | $709 | $1,064 | $1,512 |
| Total Benefits ($ millions) | $728 | $1,408 | $2,398 |
| **Benefit - Cost Ratio** | **1.03** | **1.32** | **1.59** |
| **Net Present Value ($ millions)** | **$20** | **$344** | **$885** |

Table 13.2-101: Detailed Results of the Cost Benefit Analysis

| Summary of Primary Selection Criteria - Long Term Outcomes | 7% Discount Rate | 3% Discount Rate |
|---|---|---|
| **Transportation Benefits** | | |
| Benefits to High Speed Rail Users | | |
| Total Increased Ridership | 7,394,977 | 7,394,977 |
| Average Annual Increased Ridership | 352,142 | 352,142 |
| Average Annual Reduction in VMT | 66,941,081 | 66,941,081 |
| Transportation Cost Savings to New Users ($ millions) | $548.5 | $1,066.1 |
| Induced Demand Benefits ($ millions) | $0.0 | $0.0 |
| Revenues ($ millions) | $72.6 | $136.4 |
| Benefits to Traffic | | |
| Congestion Cost Savings ($ millions) | $46.0 | $87.8 |
| Accident Cost Savings ($ millions) | $40.2 | $76.8 |
| Pavement Maintenance Savings ($ millions) | $7.5 | $14.3 |
| **Economic Recovery Benefits** | | |
| Additional Employment (No. of Jobs) | | |
| Direct Employment | | |
| Indirect Employment | | |
| Induced Employment | | |
| Short-Term Employment Benefits ($ millions) | | |
| **Environmental Benefits** | | |
| Emissions Benefits | | |
| Reduced Emissions (tons) | 677,882 | 677,882 |
| NOx | 467 | 467 |
| PM | 20 | 20 |
| VOC | 533 | 533 |
| CO2 | 676,862 | 676,862 |
| Environmental Benefits ($ millions) | $12.0 | $23.1 |
| NOx | $1.0 | $1.9 |
| PM | $2.3 | $4.3 |
| VOC | $0.3 | $0.5 |
| CO2 | $8.5 | $16.4 |
| Other Environmental Benefits | | |
| Gallons of Gasoline Avoided | 7,261,530 | 7,261,530 |
| Noise Pollution Savings ($ million) | $1.7 | $3.3 |
| **Benefit Cost Analysis Results** | | |
| Total Discounted Benefits ($ millions) | $728.5 | $1,407.8 |
| Total Discounted Costs ($ millions) | $708.8 | $1,063.8 |
| Benefit - Cost Ratio | 1.03 | 1.32 |
| Net Present Value ($ millions) | $19.7 | $344.0 |
| Internal Rate of Return | 7.43% | 7.43% |

## 13.3 Economic Impact Statement

Economic impacts of a project can be divided into two broad categories of impacts:

- Jobs, income and related impacts of the project in question that are attributable to the project either directly or indirectly through supplier-purchasing relationships and re-spending of employee wages and salaries
- Economic development and other benefits and impacts of the project

The first category of impacts represents the traditional metrics evaluated in economic impact studies that quantify the effects of the various rounds of expenditures and economic activities that are initiated throughout the economy as a result of an initial expenditure or business activity. These metrics are commonly referred to as "direct impacts," "indirect impacts," and "induced impacts" and can be defined as follows:

- Direct impacts are impacts directly attributable to the initial investment required for the project, or the expenditures required to start and complete the project. These are the immediate economic outcomes occurring as the result of activity related to the construction/ development and subsequently operations of project being evaluated.
- Indirect impacts are the results of the spillover effects in the markets for intermediate goods, or economic activities that result from purchases of production inputs, goods and services throughout the production and distribution chain. These purchases allow for production activities and employment at the supplier firms generating further rounds of economic activity down the production chain.
- Induced impacts result from the spending and re-spending of dollars earned by individuals who become employed as a result of the direct and indirect impacts. Re-spending of employment wages and salaries on consumer goods and services results in further economic impacts throughout the economy.

The total economic impact is the sum of the direct, indirect and induced effects of the institution or the project being evaluated.

The above impacts are different from "user" impacts and benefits of a particular proposed facility or project typically included in a cost-benefit analysis, and treated separately as another aspect of the various impacts of the proposed project.

The second category of effects captures various other effects on local economies where the project will operate, frequently specific to the project and frequently difficult to quantify and convert into employment and business revenue terms. These benefits may include broader social impacts, quality of life improvements, or productivity improvements in the regional economy that are possible through the projects.

This assessment focuses and estimates only the first category of impacts, i.e. the direct, indirect, and induced effects of the proposed project—all in terms of business revenues, jobs, value added and employment income that would be generated as a result of the proposed project. Both the impacts of construction expenditures as well as the ongoing operation and maintenance expenditures once the project is completed are taken into account.

Table 13.3-1 below shows the estimated total cumulative construction cost of the proposed project as well as operation and maintenance costs at full project build-out broken down by the state in which they occur (Illinois and Iowa). Note that Phase 1 of the Service (Chicago to Moline) has been excluded from this assessment as it is assumed to proceed regardless of whether the full Chicago to Council Bluffs-Omaha build-out is completed. All costs have been classified by a broad type of costs.[8] As the table shows, the total costs including construction as well as engineering and other related construction costs are estimated at over $931 million, and the operation and maintenance costs of the proposed facility are estimated at $44.2 million.

Table 13.3-1: Project Expenditures

| Category of Costs | Illinois | Iowa | Total Cost | BEA Industry Classification |
|---|---|---|---|---|
| Construction | | | | |
| Purchase or Lease of Real Estate | $0 | $16,172,490 | $16,172,490 | Not Included in economic impact assessment |
| Communications and Signaling Equipment | $1,520,553 | $234,081,158 | $235,601,711 | INDUSTRY 14. Electrical Equipment and Appliance Manufacturing |
| Vehicles | $0 | $164,919,624 | $164,919,624 | Not Included in economic impact assessment |
| Professional Engineering and Technical Services | $1,561,805 | $66,438,193 | $67,999,997 | INDUSTRY 47. Professional, Technical, and Scientific Services |
| Construction (civil works) | $12,240,038 | $434,157,144 | $446,397,182 | INDUSTRY 7. Construction |
| **Total Construction** | **$15,322,396** | **$915,768,608** | **$931,091,003** | |
| Operations | | | | |
| Operations and Maintenance Expenditures | $112,350 | $44,135,807 | $44,248,157 | INDUSTRY: 30. Rail Transportation |

Direct impacts (number of jobs, employment income, and GDP) were estimated from industry economic activity data such as industry gross output, employment, value added, and salaries. This data, at the state or national level and for the industry that best matches the project expenditures, we used to derive ratios such as direct employment in the industry per $1 million of output, or GDP as a share of grow industry output.

Indirect and induced impacts were estimated with input-output multipliers from Bureau of Economic Analysis (BEA). The multipliers are available for a range of industries or industry groupings as Type 1 multipliers and Type II multipliers. The former give the total of direct and indirect impacts and the latter give direct, indirect and induced impacts. For each type, there are two sets of multipliers for each industry: final demand multipliers and direct effect multipliers. Final demand multipliers give total impact (in terms of output, jobs, GDP, and

[8] All cost estimates include contingencies. Contingencies specific to a cost category were included in the total cost estimate. The general unallocated contingency was distributed proportionately across all cost categories.

employment income) for each $1 million of final demand change in the industry in question. Direct effects multipliers give total job effects for 1 direct job and total employment impact effects for $1 in direct salaries. For all multipliers, the total estimated effects include the original industry impact.

Direct jobs and direct employment income were also estimated using the multipliers and the implied relationships between final and direct multipliers for jobs and employment income. Direct GDP was estimated from economic activity data for the industry that best matches the project expenditures and the share of GDP in gross industry revenue.

Table 13.3-1 above also shows the classification of the project cost categories into best matching BEA input-output industrial sectors. It can be seen that the majority of costs fall into the electrical equipment manufacturing industry and the construction industry. A relatively smaller fraction of the costs is related to planning and engineering and was classified into the Professional, Technical, and Scientific Services Industry. The project costs also include those related to the purchase or lease of real estate and vehicles (rolling stock). The cost of purchase of real estate was excluded from the analysis as these costs are in its essence a transfer of wealth and do not re-circulate in the economy in the same manner as other project expenditures. Vehicles costs were excluded as vehicles would likely to be purchased in one of the states on the East Coast, or overseas. For the purpose of this analysis, it assumed that all other expenditures take place in each of the states where they were attributed.

The impacts of construction costs and annual operation and maintenance costs were estimated separately to generate separate assessments of impacts during the construction period and ongoing impact of the proposed project once it is competed and operational.

### 13.3.1 Results

#### 13.3.1.1 Construction Period

Table 13.3-2 below shows the results of economic impact simulations quantified as business output, employment, value added, and employment income, and in terms of direct, indirect, induced, and total impacts. All impacts presented in the table are cumulative impacts over the entire construction period.

Specifically, Table 13.3-2 below shows that during the construction period the total employment impact of the proposed project amounts to 9,919.6 job-years. This includes 5,847 direct jobs, 1,604.4 indirect jobs, and 2,468.2 induced jobs. The vast majority of employment and other impacts take place in Iowa (where also the vast majority of expenditures takes place).

### Table 13.3-2: Economic Impacts of Proposed Project Construction; Cumulative over Construction Period

| Type of Impact | Illinois | Iowa | Total |
|---|---|---|---|
| Direct Impacts | | | |
| Output, $ millions | $15.32 | $734.68 | $750.00 |
| Employment, number of jobs (FTE equivalents) | 106.1 | 5,740.9 | 5,847.0 |
| Earnings, $ millions | $5.91 | $250.18 | $256.08 |
| Value Added, $ millions | $6.32 | $265.37 | $271.69 |
| Indirect Impacts | | | |
| Output, $ millions | $8.43 | $258.78 | $267.21 |
| Employment, number of jobs (FTE equivalents) | 45.2 | 1,559.2 | 1,604.4 |
| Earnings, $ millions | $2.33 | $66.44 | $68.77 |
| Value Added, $ millions | $6.09 | $182.57 | $188.66 |
| Induced Impacts | | | |
| Output, $ millions | $12.03 | $284.62 | $296.66 |
| Employment, number of jobs (FTE equivalents) | 85.1 | 2,383.1 | 2,468.2 |
| Earnings, $ millions | $3.37 | $76.43 | $79.80 |
| Value Added, $ millions | $6.61 | $205.66 | $212.27 |
| Total Impacts | | | |
| **Output, $ millions** | **$35.78** | **$1,278.08** | **$1,313.86** |
| **Employment, number of jobs (FTE equivalents)** | **236.5** | **9,683.2** | **9,919.6** |
| **Earnings, $ millions** | **$11.60** | **$393.05** | **$404.65** |
| **Value Added, $ millions** | **$19.02** | **$653.60** | **$672.62** |

*Note: All monetary impacts are in terms of 2013 dollars.*

#### 13.3.1.2 Ongoing Operations

Table 13.3-3 below shows the results of economic impact simulations resulting from the operation and maintenance of the passenger rail service in Illinois and Iowa, quantified as business output, employment, value added, and employment income, and in terms of direct, indirect, induced, and total impacts. All impacts presented in the table represent annual ongoing impacts once the Service is fully operational.

Table 13.3-3 below shows that ongoing impacts of the proposed Service include 278.2 jobs, $103.98 million of business output, $33.5 million of value added, and $14 million of employment income. In the total of 278.2 jobs, there are 86.6 direct jobs, 106.6 indirect jobs, and 85 induced jobs. The majority of the impacts occur in Iowa where also the majority of incremental operating expenditures take place.

Table 13.3-3: Economic Impacts of Proposed Service; Ongoing Annual Impacts after Service Completion

| Type of Impact | Illinois | Iowa | Total |
|---|---|---|---|
| Direct Impacts | | | |
| Output, $ millions | $0.11 | $44.14 | $44.25 |
| Employment, number of jobs (FTE equivalents) | 0.2 | 86.3 | 86.6 |
| Earnings, $ millions | $0.02 | $6.81 | $6.83 |
| Value Added, $ millions | $0.05 | $18.88 | $18.93 |
| Indirect Impacts | | | |
| Output, $ millions | $0.08 | $16.29 | $16.38 |
| Employment, number of jobs (FTE equivalents) | 0.4 | 106.2 | 106.6 |
| Earnings, $ millions | $0.02 | $4.43 | $4.45 |
| Value Added, $ millions | $0.05 | $8.45 | $8.51 |
| Induced Impacts | | | |
| Output, $ millions | $0.15 | $43.20 | $43.35 |
| Employment, number of jobs (FTE equivalents) | 0.4 | 84.6 | 85.0 |
| Earnings, $ millions | $0.02 | $2.71 | $2.73 |
| Value Added, $ millions | $0.02 | $6.04 | $6.06 |
| Total Impacts | | | |
| **Output, $ millions** | **$0.35** | **$103.63** | **$103.98** |
| **Employment, number of jobs (FTE equivalents)** | **1.1** | **277.1** | **278.2** |
| **Earnings, $ millions** | **$0.06** | **$13.94** | **$14.00** |
| **Value Added, $ millions** | **$0.13** | **$33.37** | **$33.50** |

## 14.0 Corridor Service Implementation and Phasing Plan

This section describes the proposed Implementation and Phasing Plan of the States of Iowa and Illinois for the Chicago to Council Bluffs/Omaha Passenger Rail Service. It includes the States' proposed funding plan, the institutional and management structures the States will employ to implement and manage the Service, and the States' proposed funding plan. It identifies agreements necessary to implement, manage, operate, and maintain the Service.

## 14.1 Proposed Service

The proposed Passenger Rail Service consists of a four time per day round-trip service between Chicago Union Station and a station to be located in or near Council Bluffs, Iowa. The service would operate as a "day coach regional service," i.e., trains would begin and complete their trips the same day (or slightly after midnight), as opposed to an overnight long-distance service that would offer sleeping accommodations. Trains would operate at a maximum speed of 79 mph. The service would be designed to the greatest degree possible for convenient departure and times at the cities it serves, in order that passengers would be afforded the most efficient use of their daytime activities. The proposed station stops are designed to serve the major metropolitan areas encountered en route, as well as selected suburban stops in Chicago that would provide connectivity to bus routes and Chicago's freeway network. The service would provide coach seating with WiFi connectivity and

110-volt power outlets to enable passengers to work and use electronic devices en route. Food and beverage service would be provided in a café car.

## 14.2 Phased Implementation Plan

The States propose a phased implementation plan that would incrementally increase train frequency and extend the Service westward geographically. The purpose of the phased implementation is to enable the States to provide funding on a less-demanding burden than would be required if the Service were implemented in a single phase, and in the expectation that federal funding may be disbursed in limited amounts each year. The proposed implementation plan is as follows (2X indicates 2 round-trips daily; 4X indicates 4 round-trips daily), for each Phase with its proposed initial service year:

- Phase 1: 2015 – Implement 2X service between Chicago and Moline, Illinois (this service is already funded and is in the process of being implemented by Illinois DOT)
- Phase 2: 2017 – Extend 2X service from Moline to Iowa City, Iowa (this service is already funded)
- Phase 3: 2022 – Extend 2X service from Iowa City to Des Moines, Iowa
- Phase 4: 2025 – Increase service frequency from Chicago to Des Moines to 4X
- Phase 5: 2030 – Extend 4X service from Des Moines to Council Bluffs.

Future service improvements may include a frequency increase, speed increase (to a maximum of 110) mph, and extension of service from Council Bluffs to Omaha, Nebraska. Because of the anticipated cost of these improvements, no implementation schedule has been determined for them.

## 14.3 Funding Plan

The States anticipate that 80 percent federal funding will be available for implementation of Phases 3 through 5 of the Service, under terms and conditions similar to the funding already obtained for Phases 1 and 2. The states will provide 100 percent funding for operating and maintenance costs of the Service not recovered from farebox revenue and onboard food and beverage sales.

The key terms and conditions of the States' expectations and planning for implementation funding are as follows:

- Federal funding is for construction, equipment, design, permitting, and construction management only.
- The States would provide 20 percent matching funds for construction, equipment, design, permitting, and construction management, except for stations.
- Municipalities served by stations from Geneseo to Council Bluffs inclusive would provide 20 percent matching funds for construction, equipment, design, permitting, and construction management for stations, for basic facilities, e.g., platforms, canopies, parking, ticket machines, and lighting. Municipalities would provide 100 percent funding for any additional facilities, e.g., structures and amenities. Municipalities may apply for TIGER or other federal grant programs, or use Public-Private partnerships, to obtain some or all funds for station facilities.

- Illinois will have responsibility for the cost of all fixed capital projects within the borders of Illinois, including cost overruns. Iowa will have responsibility for the cost of all fixed capital projects within the borders of Illinois, including cost overruns. The States will allocate based on mileage within each state of the entire corridor between Chicago Union Station and Council bluffs the costs of fixed assets that are necessary for the implementation of the corridor, such as a train dispatching center, and on a train-mile basis within each state for the rolling stock and capital spares for rolling stock.

The key terms and conditions of the States' expectations and planning for operating and maintenance funding are as follows:

- The States would be responsible for 100 percent funding for operation and maintenance of the service excepting stations. Ticket revenues ("farebox revenue") and on-board food and beverage sales would reduce this funding requirement.
- Municipalities from Geneseo to Council Bluffs inclusive would be responsible for 100 percent funding for operation and maintenance of stations.
- For Chicago Union Station, the States would contract with Amtrak for an allocated share of the Service's cost of use.
- For La Grange Road, Mendota, Princeton, and Plano, the States would contract with Metra for an allocated share of the Services' cost of use.
- The States will determine an equitable allocation formula between the States for the Service's operating and maintenance costs.
- The States will determine an equitable allocation formula between the States for the amount of the Service's revenue that apportions to each state's accounts.

## 14.4 Policy Actions

The States intend to manage the Service through rail offices established as a department of each State's DOT to implement and manage passenger rail services. The rail offices would coordinate and cooperate to make management decisions such as selection of operator, audit of expenses and revenue, changes in services, and allocation of costs and revenues.

The States have put into place agreements and enabling legislation that fully contemplate the long-term commitment to rail passenger transportation service that is required to implement, operate, and maintain the Chicago to Council Bluffs Service. The agreements and enabling legislation contemplate the commitment of capital, operating and maintenance funding, organization and leadership, and management resources that the Program explicitly and implicitly requires of the States. Agreements and enabling legislation that have been created to date, and the status of the States process toward final agreements and enabling legislation, are described in this section.

The States began to create the agreements and processes with their commitment to the Midwest Regional Rail Initiative (MWRRI) in 1996. This process has enabled the States to develop a sophisticated understanding of the organizational and operational implications of undertaking a passenger-train implementation program. In addition, the lengthy involvement of Illinois with state-supported trains has provided Illinois with a deep body of experience and expertise that makes Illinois particularly adept with passenger-rail implementation and operation.

Once the States determined that they wished to pursue a Chicago to Council Bluffs/Omaha intercity passenger rail service, the States began to create the necessary agreements, interim funding mechanisms, and organizational structures necessary to commence and carry forward to completion the Program that is the subject of this Grant Application. Initially, the States pursued an implementation between Chicago and Moline, and Chicago and Iowa City, which will form Phases 1 and 2 of the Chicago to Council Bluffs service.

The States executed a Memorandum of Understanding (MOU) on July 27$^{th}$, 2009. The MOU detailed the general approach to establishing new passenger rail service from Chicago Union Station to Iowa City, and established the basis for cost sharing between the States for capital and subsidy costs.

An Agreement in Principle (AIP) between the State DOTs was executed subsequently that further detailed the roles and responsibilities of each State in implementing the Service. The AIP identified how the project level environmental studies and design will be administered and completed. Per the AIP, Iowa DOT became the responsible agency for receiving and disbursing High-Speed Intercity Passenger Rail (HSIPR) program funds that may become available through this Grant Application. Iowa DOT will also be responsible for providing to the Federal Railroad Administration (FRA) records of payments and other reporting requirements. The AIP clearly notes the full commitment of both States to implement all aspects of the Service, and notes that risks and benefits will be shared between the States.

Both States also have enabling legislation in place to accommodate passenger rail service, as inserted herein.

### 14.4.1 Iowa Enabling Legislation

CHAPTER 327J
PASSENGER RAIL SERVICE
327J.1 Definitions.
327J.2 Passenger rail service revolving fund.
327J.3 Administration.

#### *327J.1 Definitions*

As used in this chapter, unless the context otherwise requires:

1. "AMTRAK" means the national railroad passenger corporation created under 45 U.S.C. § 541.
2. "Department" means the state department of transportation.
3. "Director" means the director of transportation.
4. "Fund" means the passenger rail service revolving fund created under section 327J.2.
5. "Midwest regional rail system" means the passenger rail system identified through a multistate planning effort in cooperation with AMTRAK.

6. "Passenger rail service" means long-distance, intercity, and commuter passenger transportation, including the Midwest regional rail system, which is provided on railroad tracks.

92 Acts, ch 1210, §2; 2000 Acts, ch 1168, §1; 2009 Acts, ch 97, §16 NEW subsection 6

### *327J.2 Passenger Rail Service Revolving Fund*

1. Fund created. The passenger rail service revolving fund is established as a separate fund in the state treasury under the control of the department. Moneys deposited in the fund shall be administered by the director and shall be used to pay the costs associated with the initiation, operation, and maintenance of passenger rail service.
2. Funding. To achieve the purposes of this chapter, moneys shall be credited to the passenger rail service revolving fund by the treasurer of state from the following sources:
   a. Appropriations made by the general assembly.
   b. Private grants and gifts intended for these purposes.
   c. Federal, state, and local grants and loans intended for these purposes.
3. No reversion. Notwithstanding section 8.33, any balance in the fund on June 30 of any fiscal year shall not revert to the general fund of the state.

92 Acts, ch 1210, §3; 2009 Acts, ch 97, §17

Legislative intent that moneys directed to be deposited in road use tax fund under §312.1 not be used for loans, grants, or other financial assistance for passenger rail service; 2000 Acts, ch 1168, §4 Subsections 1 and 2 amended

### *327J.3 Administration*

1. The director may expend moneys from the fund to pay the costs associated with the initiation, operation, and maintenance of passenger rail service. The director shall report by February 1 of each year to the legislative services agency concerning the status of the fund including anticipated expenditures for the following fiscal year.
2. The director may enter into agreements with AMTRAK, other rail operators, local jurisdictions, and other states for the purpose of developing passenger rail service serving Iowa. The agreements may include any of the following:
   a. Cost-sharing agreements associated with initiating service, capital costs, operating subsidies, and other costs necessary to develop and maintain service.
   b. Joint powers agreements and other institutional arrangements associated with the administration, management, and operation of passenger rail service.
3. The director shall enter into discussions with members of Iowa's congressional delegation to foster passenger rail service in this state and the Midwest and to maximize the level of federal funding for the service.

4. The director may provide assistance and enter into agreements with local jurisdictions along the proposed route of the Midwest regional rail system or other passenger rail service operations serving Iowa to ensure that rail stations and terminals are designed and developed in accordance with the following objectives:
   a. To meet safety and efficiency requirements outlined by AMTRAK and the federal railroad administration.
   b. To aid intermodal transportation.
   c. To encourage economic development.
5. The director shall report annually to the general assembly concerning the development and operation of the Midwest regional rail system and the state's passenger rail service.

92 Acts, ch 1210, §4; 2000 Acts, ch 1168, §2; 2003 Acts, ch 35, §45, 49; 2009 Acts, ch 97, §18 Section amended

### 14.4.2 Illinois Enabling Legislation

(20 ILCS 2705/2705 440) (was 20 ILCS 2705/49.25h) Sec. 2705 440. Intercity Rail Service.

a) For the purposes of providing intercity railroad passenger service within this State (or as part of service to cities in adjacent states), the Department is authorized to enter into agreements with units of local government, the Commuter Rail Division of the Regional Transportation Authority (or a public corporation on behalf of that Division), architecture or engineering firms, the National Railroad Passenger Corporation, any carrier, any adjacent state (or political subdivision, corporation, or agency of an adjacent state), or any individual, corporation, partnership, or public or private entity. The cost related to such services shall be borne in such proportion as, by agreement or contract the parties may desire.

b) In providing any intercity railroad passenger service as provided in this Section, the Department shall have the following additional powers:
   1) to enter into trackage use agreements with rail carriers;
   2) to enter into haulage agreements with rail carriers;
   3) to lease or otherwise contract for use, maintenance, servicing, and repair of any needed locomotives, rolling stock, stations, or other facilities, the lease or contract having a term not to exceed 50 years (but any multi year contract shall recite that the contract is subject to termination and cancellation, without any penalty, acceleration payment, or other recoupment mechanism, in any fiscal year for which the General Assembly fails to make an adequate appropriation to cover the contract obligation);
   4) to enter into management agreements;
   5) to include in any contract indemnification of carriers or other parties for any liability with regard to intercity railroad passenger service;
   6) to obtain insurance for any losses or claims with respect to the service;
   7) to promote the use of the service;

8) to make grants to any body politic and corporate, any unit of local government, or the Commuter Rail Division of the Regional Transportation Authority to cover all or any part of any capital or operating costs of the service and to enter into agreements with respect to those grants;
9) to set any fares or make other regulations with respect to the service, consistent with any contracts for the service; and
10) to otherwise enter into any contracts necessary or convenient to provide the service.

c) All service provided under this Section shall be exempt from all regulations by the Illinois Commerce Commission (other than for safety matters). To the extent the service is provided by the Commuter Rail Division of the Regional Transportation Authority (or a public corporation on behalf of that Division), it shall be exempt from safety regulations of the Illinois Commerce Commission to the extent the Commuter Rail Division adopts its own safety regulations.

d) In connection with any powers exercised under this Section, the Department
   1) shall not have the power of eminent domain; and
   2) shall not directly operate any railroad service with its own employees.

e) Any contract with the Commuter Rail Division of the Regional Transportation Authority (or a public corporation on behalf of the Division) under this Section shall provide that all costs in excess of revenue received by the Division generated from intercity rail service provided by the Division shall be fully borne by the Department, and no funds for operation of commuter rail service shall be used, directly or indirectly, or for any period of time, to subsidize the intercity rail operation. If at any time the Division does not have sufficient funds available to satisfy the requirements of this Section, the Division shall forthwith terminate the operation of intercity rail service. The payments made by the Department to the Division for the intercity rail passenger service shall not be made in excess of those costs or as a subsidy for costs of commuter rail operations. This shall not prevent the contract from providing for efficient coordination of service and facilities to promote cost effective operations of both intercity rail passenger service and commuter rail services with cost allocations as provided in this paragraph.

(Source: P.A. 94 807, eff. 5 26 06.)

## 14.5 Cost Sharing and Matching Funds Agreements

The States will share the capital costs for the Service and the operating and maintenance costs for the Service according to the method outlined in Section 14.3. Capital costs for fixed infrastructure will be allocated according to the state in which the infrastructure is physically located, with the exception of single-point control systems, such as communications and signal-system central office equipment, the costs of which will be allocated according to the percentage of the system that is located in each state. Capital costs for mobile equipment, such as rolling stock, will be allocated on the train-miles of the Service within each state.

Illinois DOT has AIPs with the cities of Moline and Geneseo that detail that matching funds related to the passenger station improvements will be handled by the cities by providing funds or in-kind services. Iowa DOT has a similar AIP with Iowa City that details the matching funds related to the passenger station improvements will be handled by the city. Iowa DOT will develop AIPs with Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa.

## 14.6 Prior Experience with Rail and with Large Projects

Both Iowa DOT and Illinois DOT have extensive experience in administering similar size transportation project and programs. These projects include both highway and rail projects. Illinois DOT in particular has been a sponsor of passenger rail service within the state since 1971. Projects of comparable size and scope to the Program completed by Iowa DOT include:

- Evaluation of Interstate 80 (ongoing) from the Quad Cities to Omaha, which covers much of the same corridor
- Assessment of flood damages to Iowa's railroads (2009), resulting in $9.6 million in federal grants through FRA's Disaster Assistance Grants
- Completion of the Environmental Impact Statement for the Interstate 74 Corridor Project (2009), with construction costs of nearly $1 billion
- Completion of the Council Bluffs Interstate project (2008), a tiered environmental process with construction costs over $1 billion, including development of a management plan and a financial plan for submittal to FHWA

Iowa is one of the few states to use American Recovery and Reinvestment Act of 2009 (ARRA) highway funding for eligible rail projects. Iowa selected four rail projects for ARRA funding totaling $5 million, including:

- Improvements at the IAIS Intermodal Facility in Council Bluffs
- Construction of a new rail access to an industrial park in Clinton
- Upgrades to the electrical systems on a rail bridge in Keokuk over the Mississippi
- Rehabilitation of nine bridges to upgrade weight capacity on the D&W Railroad Inc. (operated by Iowa Northern Railway Company)

Through these rail projects, Iowa DOT staff demonstrated the ability to develop diverse rail projects from concept, through engineering, letting, and construction in a timely manner. This unique funding source provided many opportunities for Iowa DOT staff and rail project sponsors to work together to implement rail projects that satisfy all federal funding requirements.

Projects of comparable size and scope to the Program completed by the Illinois DOT include:

- Implementation of Illinois DOT's $14.3 billion highway improvement program (2009), including an annual program of $2.4 billion
- Implementation of the Chicago Regional Environmental and Transportation Efficiency Program (CREATE) .The CREATE partners completed the $4.5 million railroad modernization project in 2008; it improved the 40 year-old signal system and helped mitigate conflicting use of tracks among freight trains, Metra, and Amtrak along the Indiana Harbor Belt Corridor

- Administration of five state-supported Amtrak routes (2009) operating throughout the state and managing the Chicago to St. Louis high speed rail corridor

In addition, all Illinois state-sponsored trains continue to post record levels of ridership.

The States, the Cities, host railroads BNSF and IAIS, and Amtrak, have a deep understanding of the commitment required for successful implementation of the Service. The States have worked closely with the host railroads and Amtrak in the preparation of this Service Development Plan to evaluate in detail freight operations and identify potential infrastructure improvements to mitigate the passenger rail impacts of the Program. The States have also worked with both Amtrak and the communities served by the Program to identify the minimum requirements for passenger station maintenance needs, platform length, parking, and other station-related infrastructure. Additionally, an Iowa DOT/Illinois DOT AIP was developed to detail the specific responsibilities of the States, including the sharing of risks and benefits. All Project Partners have indicated their commitment to a successful Program implementation through Agreements in Principle or Letters of Support, and will continue to work closely together to successfully implement this service.

## 14.7 Identification of Necessary Agreements

The agreements that are expected to be part of this Program include:

- FRA/Illinois DOT/Iowa DOT Cooperative Agreement– These agreements will cover the terms of the grant of funds from FRA to the DOTs, including the 20 percent match requirements and the requirement that the FRA grant not be used for operating expenses.
- Illinois DOT/Iowa DOT – Illinois DOT and Iowa DOT entered into a Memorandum of Understanding (MOU) in 2009 for the implementation of rail passenger service in their respective states. The states agree to share costs and to support funding applications per the Iowa/Illinois Cost Sharing MOU included in the application. In addition, a subsequent Agreement in Principle has been established between Iowa and Illinois DOTs, included in this application. This will be used as the basis for the Project Sponsor Agreement, which establishes the single grantee for funds from the FRA.
- Iowa DOT/Illinois DOT/IAIS/Amtrak Service Outcomes Agreement – The States will enter into an agreement with Iowa Interstate Railroad for hosting the Service on its trackage and Amtrak for operating the service on BNSF. The SOA will define the Service's schedule and frequency, its on-time performance, and penalties for performance shortfall. The SOA will define the projects that are necessary to implement the Service on IAIS. IAIS will be responsible for obtaining agreements with Union Pacific, BNSF, and Canadian Pacific for joint-facilities portions of its route.
- Iowa DOT/Illinois DOT/BNSF/Amtrak Service Outcomes Agreement – The States will enter into an agreement with BNSF Railway for hosting the Service on its trackage and Amtrak for operating the service on BNSF. The SOA will define the Service's schedule and frequency, its on-time performance, and penalties for performance shortfall. The SOA will define the projects that are necessary to

implement the Service on BNSF. BNSF will be responsible for obtaining agreements with IAIS, Canadian Pacific and other railroads for joint-facilities portions of its route.

- Iowa DOT/Illinois DOT/IAIS Construction and Maintenance Agreement – The States will enter into an agreement with IAIS for the construction and maintenance of capital projects located on IAIS right-of-way, or on trackage controlled by IAIS. Where right-of-way needs to be acquired adjacent to IAIS right-of-way, this agreement will include construction and maintenance of railroad infrastructure or facilities for the Service that are located on that acquired right-of-way.
- Iowa DOT/Illinois DOT/BNSF Construction and Maintenance Agreement – The States will enter into an agreement with BNSF for the construction and maintenance of capital projects located on BNSF right-of-way, or on trackage controlled by BNSF. Where right-of-way needs to be acquired adjacent to BNSF right-of-way, this agreement will include construction and maintenance of railroad infrastructure or facilities for the Service that are located on that acquired right-of-way.
- Amtrak/Iowa DOT/Illinois DOT/Amtrak Operating Agreement – The States and Amtrak will enter into an agreement with Amtrak to operate the service. The States anticipate that Amtrak will maintain the rolling stock for the Service; however, the States may enter into a separate agreement with a different contractor for heavy maintenance of rolling stock.
- Iowa DOT/Municipalities Station Construction and Maintenance Agreements – Each state will respectively enter into agreements for the construction and maintenance of stations within each state.

## 15.0 References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