

CENTRAL CORRIDOR SERVICE SCHEDULE

This section presents a possible integrated service schedule for the six radial routes comprising the Twin Cities commuter rail network. The six routes are presented in this schedule, since this represents the worst-case integration problem on the common line section. Summary recommendations are provided to increase the likelihood that the approximate service levels inherent in the schedule can be attained as the system matures.

Schedules for eastbound and westbound traffic in the AM and PM peak periods are presented, and service frequency comparisons made with other selected domestic commuter rail operations.

Following are summary recommendations arising out of the Central Corridor scheduling exercise. If followed, these recommendations should serve as the baseline for future capacity modeling, capital program revisions, rolling stock selection and negotiations with the host railroads.

1. Utilize relay crews at the Minneapolis and St. Paul CBD stations in order to shorten the dwell time for those trains requiring a change-of-ends in the station,
2. Assume 45 second dwell times at on-line stations for application during Advanced Corridor Planning,
3. Strive to maintain a "memory timetable" built upon the approximate 40-minute headways inherent in the attached schedules, and
4. Capacity modeling, modification of the capital program, selection of rolling stock and definitive negotiations with the host railroads is required before detailed refinements to these sample schedules can be produced.

The configuration of commuter rail rolling stock can profoundly affect station dwell time requirements. The selection of such equipment should be based upon detailed performance specifications and ultimately determined through the course of a competitive procurement process.

The headway assumptions by corridor, through the CBD stations and across the Central Corridor are educated guesses as to what can reasonably be provided.

The attached schedules are based on all six routes being in service, which represents the most difficult scheduling challenge. The fact that the Dan Patch Corridor would have six trains per peak period, Northstar five trains, and all other corridors four train per peak makes it difficult to provide a consistent headway throughout either period.

Originating/terminating stations and running times are as reflected in the Twin Cities Commuter Rail Feasibility Study. For example the running times for the Northstar Corridor trains are based on originating/terminating at Elk River. It is understood that this corridor's advanced planning process envisions train operation beyond Elk River. The integrated central corridor schedule can be adjusted to reflect the results of these advanced plans and other changes to the corridor service concepts prior to implementation of operations across the common line sections.

Use of a relay crew at the Minneapolis and St. Paul CBD stations is recommended in order to shorten the dwell time for those trains requiring a change-of-ends in the station. The relay crew would board the rear end of an arriving train at the CBD station, and then take that train to the other CBD. The crew that had originated the train would then drop back to take the next train requiring a change-of-ends across the Central Corridor. These relay crews would be an extra, recurring operating expense for the commuter rail owning entity, but may increase the attractiveness of the service by reducing overall travel times.

At this point in the process travel times, dwell times at on-line stations and times of departure/arrival are educated approximations. Capacity modeling, capital program revisions, rolling stock selection and negotiations with the host railroads will be required before any detailed schedules can be developed.

Scheduling Considerations

There is no single, correct, integrated schedule for the Central Corridor – the attached tables are one possible way of coordinating the service of the six corridors between the two Central Business Districts (CBDs).

Dwell times at on-line stations are assumed to be 45 seconds. This time is reasonable for both single and double-deck rolling stock, and should not be revised until equipment selections have been made.

The integrated service schedules presume the use of a relay crew at each of the CBD stations to minimize the time required for changing ends on trains before they can leave that station. The first relay crew would be an extra crew based at the CBD station that would board the rear end of the first arriving train requiring a change-of-ends in the station. This crew would then take the train to the other CBD. The crew that had brought that train into the CBD station would then become the relay crew for the next train changing ends in the station. This method of operation is also called “drop-back” as the crews drop back a train or two from the one they first bring into the station.

The extra crew required in each of the CBD stations will represent an extra, recurring operating expense for the commuter rail sponsor. However, this expenditure may be warranted as the reduction in CBD station dwell times (10 minutes in the Twin Cities Commuter Rail Feasibility Study, now 7 minutes) may increase the attractiveness of the commuter rail service.

Trains on the Bethel and Northstar Corridors would change ends in the Minneapolis Station. By contrast, trains on the Dan Patch and Norwood Corridors could operate through the station and would not require a relay crew. Both Red Rock and Rush Line trains would have to change ends in the St. Paul station.

Corridor Service Headways

For the sample schedule, minimum time between arriving trains at a CBD station is 2 minutes, though the difference in station dwells (5 minutes for through operation, 7 minutes for trains required to change ends) widens the headway between trains across the central corridor to a minimum of 4 minutes.

In most cases, an alternating pattern of through and end-changing trains at the CBD stations was maintained throughout the peak period. There are two periods when two through trains follow each other through the station, necessitated by the varying service patterns for the corridors.

This was one of the fundamental difficulties in establishing an integrated schedule for the corridors. Looking at the AM peak schedule, one sees a repeating pattern of Northstar-Dan Patch-Bethel-Norwood. However, with six Dan Patch Corridor trains per peak period and five trains per peak on the Northstar Corridor, it became necessary to insert extra departures for these lines into the “normal” sequence of train arrivals. These extra insertions were made in the hour between 7 and 8 AM. The sixth Dan Patch train of the AM peak was added after the last of the “normal” sequences.

The resulting schedule provides trains on a 40-minute headway by corridor, with the exception of the Dan Patch and Northstar Corridors, where the extra departures result in a minimum headway of 12 minutes. The 40 minute headway arises from the fact that four routes serve the Minneapolis CBD first, before continuing on to St. Paul. Their arrivals at the Minneapolis CBD station were set up around a 10 minute interval between trains.

A similar approach was taken in laying out the PM peak schedule for the westbound trains (those destined for the Bethel, Dan Patch Northstar and Norwood Corridors).

By contrast developing an integrated schedule for the Red Rock and Rush Corridors was considerably easier. This is due to the fact that both lines provide four trains per peak period. Trains alternate by corridor across the Central Corridor on a 40 minute headway by originating corridor.

The sample schedule does not reflect any deadhead moves to get equipment to/from a central maintenance facility or the like. No presumption is made as to the use or location of a centralized maintenance facility. However, it’s likely that the moves to and from the midday shop/storage location will consume additional timetable paths on the Central Corridor (and on other corridors, depending on the facility’s location).

Capital Program Requirements

CBD station, track and signal layouts are presumed to be capable of supporting the requirements of the six corridors, as is the Central Corridor physical plant.

The current First Tier capital program is assumed to be able to support the operation of three of the six routes, and that further upgrade would be required as additional routes were implemented.

Bus Service Integration

The approximate arrival times at the first of the CBD stations were based on a review of existing express bus arrival times in the CBDs. Routes operated by Metro Transit into Minneapolis and St. Paul, as well as between the two cities, were analyzed. Express bus schedules for routes operated by the Opt-outs were also considered in this context.

Implications for Railroad Negotiations

A typical process in negotiating with the railroads would see the commuter rail sponsor requesting times for departures from the outer terminals and resulting arrival times at the CBD stations. The railroads would then see how they could best meet these requests, but there is no guarantee that these would be met exactly. In this instance the rail carriers would respond with alternative schemes that would minimize the impacts on their time-sensitive freight flows.

Practices of Peer Properties

Comparison with another carrier's service can be dangerous, as the operating conditions and physical plant are not the same between carriers. Certainly, there is a preference to operate the trains on each corridor on a "memory timetable." Ideally, this would have trains operating every 30 minutes or on some other easily remembered interval.

Metra's North Central Service provides trains on an approximate 30-minute headway in the peak, though it is not exact. One of the fundamental factors in this is the need to integrate the North Central trains with the traffic on Metra's Milwaukee West District from Tower B-12 in Franklin Park to Tower A-5 in Chicago. The distance between these towers is just over 7 miles and the physical plant in this section is triple-tracked. Then, these trains must be further integrated with Milwaukee North District and Amtrak trains

from Tower A-5 to Chicago Union Station, a distance of approximately 5 miles. Triple track is provided in this section, as well. There are also freight train flows to be accommodated on these line sections.

On a daily basis, 108 trains (freight and passenger) operate on the section between Franklin Park and the city. From Tower A-5 inward this rises to 141 daily movements. The headway on Metra's Southwest Service varies between trains, although some are close to a 30-minute interval. Integration of these trains with that carrier's Heritage Corridor services, BNSF's Aurora line trains and Amtrak trains using the South Concourse of Chicago Union Station affect the headway that can be offered.

Headways for some commuter rail operators are not on a repeatable or "memory" basis. For example, the Shore Line East (Connecticut DOT) service provides six trains in the peak direction. These operate on varying headways, with the minimum time between trains being 28 minutes and the maximum headway being 70 minutes. Again, the availability of timetable paths at the desired times, as well as being able to make connections to other trains (Metro North New Haven Line trains to New York City, for example) drives the schedule this carrier offers.

Altamont Commuter Express between Stockton and San Jose, California provides two trains per peak period. Southbound in the AM peak these trains are 67 minutes apart, while the northbound trains operate with 90 minutes in between them. Connections to the services of other carriers, as well as available timetable paths on the corridor dictate when the commuter trains can run.

Summary

The attached schedules are one approach to integrating the Central Corridor service. Capacity modeling, revisions to the capital program, selection of rolling stock and negotiations with the host railroads will strongly influence the final, agreed-upon service schedule.

These schedules are based on all six routes being in operation. This situation will not occur overnight, but was presented as the extreme case in terms of accommodating different train movements at the CBD stations and key on-line junctions. In order to

ensure a high degree of compatibility with potential commuter operation in second and third tier corridors, those initially implemented must account for such future needs.

**Twin Cities Commuter Rail – Possible Integrated Schedule
for the Central Corridor
Eastbound Service – AM Peak Period**

Route	Leave Outer Terminal	Arrive Mpls. CBD Sta.	Track/Move in CBD Sta.	Leave Mpls. CBD Sta.	Arrive St. Paul CBD
Northstar	520	610	stub/change ends	617	641
Dan Patch	505	620	Through	625	649
Bethel	536	630	stub/change ends	637	701
Norwood	538	640	Through	645	709
Northstar	600	650	stub/change ends	657	721
Dan Patch	545	700	Through	705	729
Bethel	616	710	stub/change ends	717	741
Norwood	618	720	Through	725	749
Dan Patch	613	728	Through	733	757
Northstar	640	730	stub/change ends	737	801
Dan Patch	625	740	Through	745	809
Northstar	652	742	stub/change ends	749	813
Bethel	656	750	stub/change ends	757	821
Norwood	658	800	Through	805	829
Northstar	720	810	stub/change ends	817	841
Dan Patch	705	820	Through	825	849
Bethel	736	830	stub/change ends	837	901
Norwood	738	840	Through	845	909
Dan Patch	735	850	Through	855	919

Note: Relay crew used in CBD station to expedite turn-around times for trains changing ends

**Twin Cities Commuter Rail – Possible Integrated Schedule
for the Central Control
Westbound Service – PM Peak Period**

ROUTE	LEAVE ST. PAUL CBD	ARRIVE MPLS. CBD STA.	TRACK/MOVE IN CBD STA.	LEAVE MPLS. CBD STA.	ARRIVE OUTER TERMINAL
Northstar	326	350	stub/change ends	357	447
Dan Patch	336	400	through	405	520
Bethel	346	410	stub/change ends	417	511
Norwood	356	420	through	425	527
Northstar	406	430	stub/change ends	437	427
Dan Patch	416	440	through	445	600
Bethel	426	450	stub/change ends	457	551
Norwood	436	500	through	505	607
Dan Patch	444	508	through	513	628
Northstar	446	510	stub/change ends	517	607
Dan Patch	456	520	through	525	640
Northstar	458	522	stub/change ends	529	619
Bethel	506	530	stub/change ends	537	631
Norwood	516	540	through	545	647
Northstar	526	550	stub/change ends	557	647
Dan Patch	536	600	through	605	720
Bethel	546	610	stub/change ends	617	711
Norwood	556	620	through	625	727
Dan Patch	606	630	through	635	750

Note: Relay crew used in CBD station to expedite turn-around times for trains changing ends

**Twin Cities Commuter Rail – Possible Integrated Schedule
for the Central Corridor**

Westbound Service – AM Peak Period (top portion)

Eastbound Service – PM Peak Period (bottom)

Route	Leave Outer Terminal	Arrive St. Paul CBD	Track/Move in CBD Sta.	Leave St. Paul CBD	Arrive Mpls. CBD Sta.
Red Rock	601	630	stub/change ends	637	701
Rush	606	650	stub/change ends	657	721
Red Rock	641	710	stub/change ends	717	741
Rush	646	730	stub/change ends	737	801
Red Rock	721	750	stub/change ends	757	821
Rush	726	810	stub/change ends	817	841
Red Rock	801	830	stub/change ends	837	901
Rush	806	850	stub/change ends	857	921
Red Rock	329	353	stub/change ends	400	429
Rush	349	413	stub/change ends	420	504
Red Rock	409	433	stub/change ends	440	509
Rush	429	453	stub/change ends	500	544
Red Rock	449	513	stub/change ends	520	549
Rush	509	533	stub/change ends	540	624
Red Rock	529	553	stub/change ends	600	629
Rush	549	613	stub/change ends	620	704

Note: Relay crew used in CBD station to expedite turn-around times for trains changing ends.