

60% DESIGN REPORT
Fitchburg Commuter Rail Line Improvements Project
SOUTH ACTON STATION

SUBMITTED TO:
Massachusetts Bay Transportation Authority

SUBMITTED BY:
HNTB Corporation
in association with
Jacobs Engineering Group Inc.

Bryant Associates
C&C Consulting Engineers, LLC
Epsilon Associates, Inc.
Keville Enterprises, Inc.
Lozano, Baskin, and Associates, Inc.

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HNTB

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I. – OVERVIEW OF REPORT

This current 60% design is a redesign of the station center island concept which was the original layout requested by the MBTA. This 60% Design Report reflects the advancement of the South Acton Station two side platform configuration from the 30% preliminary design to the first stage of final design. The specifications that were developed for the original center island station design submitted in December 2010 will still apply in many cases with the clear exception of the completely new station elements such as the individual side platforms, station head houses and elevators. The next step is to take this 60% design and bring it together with the other previously submitted 60% small starts project design elements to include bridge, culvert, and communications systems and bring all to a 90% design by early December 2010.

A. Intent of Report: The intent of this 60% Design Report is to summarize program changes since the 30% Preliminary Design Report (PDR) and to introduce the 60% contract documents intended for the contract bid package. The 60% contract bid documents are included in this submission as separate exhibits. Detailed descriptions of the Program elements are included in this report particularly as they have been updated from the previously submitted 30% design report. The items that were changed, added, or deleted are summarized in Chapter 1.

B. Project Funding and Schedule: The Project is to be completed by a combination of contractor and force account work. Chapter 3 of this Report contains the cost estimate for work to be done by a contractor at South Acton Station. The track and signal work to be completed by force account is currently being finalized between the MBTA and their Railroad Operator MBCR. The primary reason for this division is that the work will be performed adjacent to an operating railroad with upwards of 40 trains per day. The volume of railroad signal work is significant and complex and utilizes the current operator to perform this work which is deemed critical from an operational, safety, and schedule standpoint. The station design and development of the contract package will be completed at the end of January 2011, with contract notice to proceed anticipated for June of 2011. All station construction work is scheduled to be completed by early January 2013.

As noted in Chapter 3 the current cost estimate indicates a total project cost for the contractor's work at \$10,457,676 which includes a 12% market reduction on unit prices per MBTA direction. This value also includes appropriate project contingencies and escalation factors based on the 60% level of design.

C. Contents of Chapters: The chapters following in this technical Report are summarized as follows:

Chapter 1: South Acton Station Changes

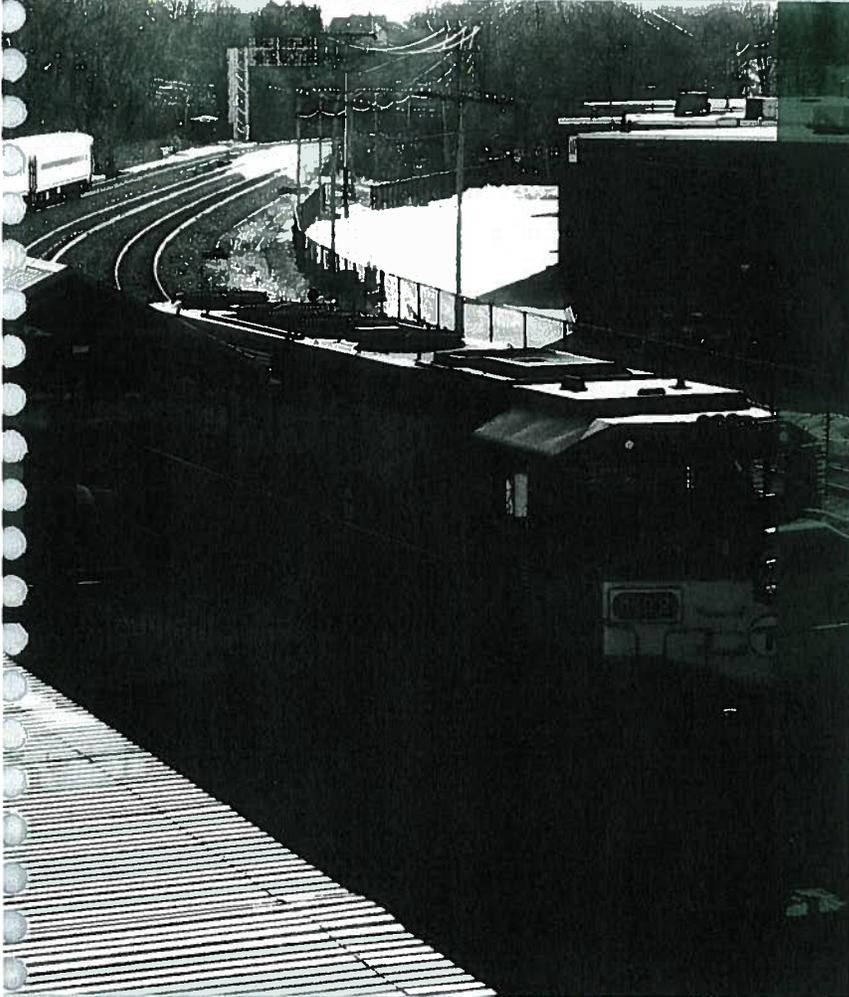
A brief description of the major changes since the 30% Preliminary Engineering submittal.

Chapter 2: South Acton Station Design

A summary of the elements of the proposed South Acton center island platform station design.

Chapter 3: Cost Estimate

A cost estimate summary of the current station design elements.



CHAPTER 1

Changes Since 30% Preliminary Design Report

I. - CHANGES SINCE THE 30% SUBMITTAL

A. Overview: Changes to the South Acton Station design that have taken place since the 30% design submittal include:

B. The Clearance Under the Pedestrian Bridge Increased: The clearance from the top of rail to the bottom of the pedestrian bridge has been increased from 18 feet 3 inches to 20 feet 8 inches. Under the former center island platform configuration, the bridge passed over only one track leaving the other track with unlimited vertical clearance. Now, under the two platform configuration, the bridge between the platforms crosses over both tracks, limiting both tracks to the clearance available under the bridge. Under these circumstances, the MBTA has decided a higher clearance is required. Providing for the higher clearance resulted in adjustments to the stairway system on either side. All adjustments required for the higher clearance are shown on the site drawings and architectural drawings.

C. Maple Street Parking Area No Longer Indicated: Additional parking is desirable in the station area and the Town would like to have trailhead parking available on weekends for the future Assabet River Bicycle Trail which will terminate near the station area. For planning purposes, a parking area off Maple Street on the Montouri Realty Company property was shown in previous submittals. This was done to show the relationship of the station elements to a possible future parking lot. At this point, the drawings are construction oriented rather than planning oriented and they show only those features that will be funded and built as part of the current station project. The current station site drawings do not include any additional parking at Maple Street or any other locations.

D. Location of the Drop Off Area on Maple Street Shifted: The location of the entrance to the drop off area off Maple Street has been shifted slightly to the east. The intent of this change in location is to avoid interference with residential driveways which are located on the other side of Maple Street. The site drawings show the drop off area in the revised location.

E. Utility and Storage Space Developed Within the Outbound Headhouse: Space has been provided within the Outbound Headhouse for a Communications Room, an Electric Room, a Salt Storage Area, and an area for Future Fare Vending Equipment. The available space underneath the stairways has been used for these purposes to the extent possible. The architectural drawings indicate these spaces.

F. Gable Roof Configuration Chosen for the Canopies and Bridge Roof: The roof system for the canopies and for the bridge has a great influence on the appearance of the station. After experimenting with designs for both a barrel vault roof configuration and a gable roof configuration, it was found that there was no clear functional or cost advantage of one system over the other. The choice between them was offered to the Town of Acton's Railroad Station Committee which chose the gable roof configuration. They also requested that the ridge line of the gable roof of the two elevator shafts be set parallel to the track to provide the desired appearance when viewed from Main Street. The architectural drawings now show the gable roof configuration and the requested ridge line orientation.

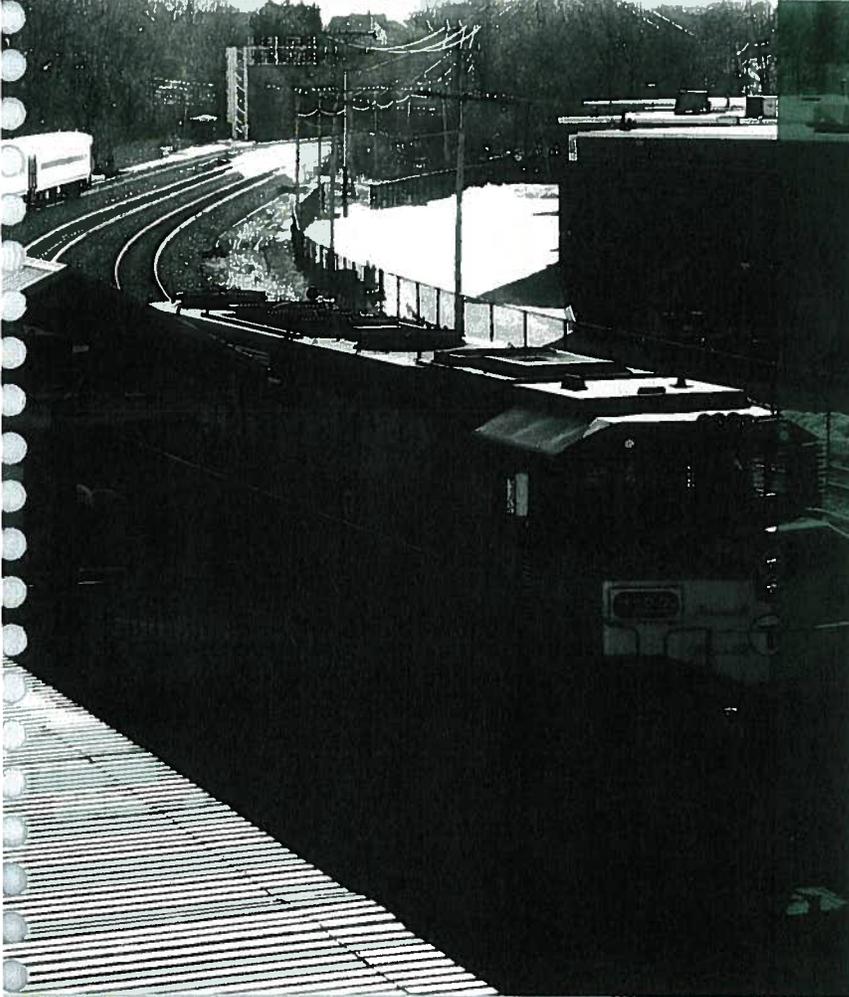
G. Station Maintenance Requirements Provided For: Maintenance of the commuter rail stations is carried out by the Massachusetts Bay Commuter Railroad (MBCR) under contract to the MBTA. MBCR has requested that (1) a reserved parking space be provided for maintenance visits to the station and (2) that an enclosed storage area for salt be provided. These features are shown on the site drawings.

H. Protective Coating for the Platform Slab Dropped: The construction cost estimate had to this point included a payment line item for a protective coating for the platform slab and a specification section for this material was included in the list of specifications. This protective coating was planned in reaction to the possibility of premature wearing of the platform slab due to heavy salting for slip protection. Current MBTA practice does not include providing for such a coating and this item has been dropped. We will continue to work with the MBTA materials laboratory to identify a suitable approach for the protection of the platform slab and other concrete surfaces.

I. Trackway Features Added: The scope of the station work has been slightly altered to include certain trackway elements in the platform area. Trackway elements that are now included are underdrains, the sub-ballast layer, and the initial ballast layer. The final ballast layer, the ties, and the track are part of MBCR's systemwide trackwork and are not included in the contractor's station work.

J. Development of a Lump Sum for Above Ground Station Elements: The construction cost estimate to this point has included line items for individual work items in a narrative format. The estimate is now being refined to correspond to standard MBTA payment items. The approach being taken is to consolidate all elements of above ground construction into a single large lump sum to include all the well defined items of station construction from the platform level and above. The resultant estimate will include one large lump sum item, similar to a building construction estimate, with numerous relatively small individual unit cost items for site work and below ground work.

K. Stand Alone Public Address System Eliminated: The station communications system at the 30% design level had a stand alone public address system. Based on discussions with MBCR, this system will not be required. Instead at each Variable Message Sign location there will be an all-weather loud speaker for audio announcements that correspond to the visual message on the Variable Message Sign.



CHAPTER 2

South Acton Station Design

I. - INTRODUCTION

The Fitchburg Commuter Rail Line is a 50 mile long railroad line that is a part of the Massachusetts Bay Transportation Authority's regional commuter rail system. The rail line extends from North Station in downtown Boston to the northwest to the city of Fitchburg in the North Central Region of the state. There are eighteen station stops along the route. On a typical weekday there are thirteen inbound commuter rail trips that originate from Fitchburg Station and four inbound trips that originate from South Acton Station which is at the halfway point of the line. The average weekday inbound passengers on the line are approximately 5,800 based on observations on February 28, 2008. The size of the trains providing service on the line varies from three cars to five cars. The Fitchburg Line has undergone no major infrastructure upgrades for many years and many elements of the systems and overall infrastructure have outlived their useful life. The Fitchburg Commuter Rail Line systems and infrastructure are now being upgraded to provide a faster trip time and to improve the reliability of service. The Fitchburg Line improvements are being carried out by the Massachusetts Bay Transportation Authority who has been awarded funding from several sources that include the Federal Transit Administration Small Starts Program, the Commonwealth of Massachusetts, and the U.S. Department of Transportation Federal Stimulus Program. Improvements under the project include double tracking from South Acton to Ayer, track geometry modifications, track system upgrades, signal system upgrades, grade crossing warning system improvements, the rehabilitation of several bridges, culvert replacements, and station improvements at South Acton Station and Littleton Station. This project and report focus specifically on South Acton Station which will be advertised for construction in a combined bid along with bridge improvements, replacement of a culvert, and communications system improvements from Boston to South Acton.

A. Station Location: South Acton Station is located in the Town of Acton in the area along the railroad right of way between the Main Street Bridge and the Martin Street Grade Crossing. The area around the station is known as South Acton Village. The station is one of the eighteen station stops along the Fitchburg Line. South Acton Station is just over 25 miles from North Station in Boston. The station receives service from thirteen inbound trains that originate at Fitchburg Station and four trains that originate at South Acton Station itself. The average weekday inbound boardings at South Acton Station are about 885 based on the observations on February 28, 2008. South Acton Station is the most heavily used suburban station on the Fitchburg Line. The station has been in its present location for many years and parking infrastructure and customs of use have built up around it. It is considered an important feature of the South Acton Village area. No alternate station site has been given serious consideration in planning for the area. The main element of the existing station is a 400 foot long low level platform along the north side of the railroad right of way. Planned double tracking through the South Acton Station area has created the need for a completely new station because the new track will occupy the space of the existing station platform. Given that the station must be reconstructed to accommodate the additional track, it must be reconstructed to meet current standards of safety and accessibility.

B. Station Configuration Changes: The improvements proposed to South Acton Station have been part of the Fitchburg Line Improvements Project since its inception and were included as part of the original Small Starts Program that initiated the current project. The initial design concept for South Acton Station included a single center island high level platform located between two divided

tracks with a pedestrian ramp leading from the main parking lot and drop off area to an overhead pedestrian walkway and then to a ramp leading down to the center island platform. The center island platform was favored by the MBTA because it offered the greatest operational flexibility. This operational flexibility was highly desirable for the operation of South Acton Station as the origin of four inbound trips per day. Town of Acton officials and citizens objected to this original design concept because it did not allow access from both sides of the station as had traditionally been available, because the ramp system seemed too long for easy access, and because the size of the ramp system was perceived as being out of scale with its South Acton Village surroundings. The Town proposed an alternate station layout which was comprised of two side platforms rather than a single center island platform. The two side platform configuration allowed for access to the station from both sides. The Town's alternative also included an elevator and stairway set on each of the platforms. The elevators and stairways lead to an overhead pedestrian bridge over the tracks to connect the two platforms. With this configuration ramps were no longer required. The Authority was able to acquiesce to the Town's proposal for a two side platform configuration that included the use of elevators for two reasons. The first reason was that additional double tracking was added to the project through Federal Stimulus Program funding. This additional double tracking work required improvements to Littleton Station just as double tracking through the South Acton Station required improvements to South Acton Station. Littleton Station is the next station stop outbound from South Acton Station and it proved to be an acceptable location for a center island platform and access ramp system. These planned improvements to service on the Fitchburg Line can now allow for the origin of inbound trips from the center island platform at Littleton Station with limited changes in the system schedule. The second reason was that the Town of Acton proposed assuming responsibility for the maintenance of the elevators. The Authority has not had positive experiences with elevator maintenance programs and was extremely reluctant to build and assume responsibility for maintaining elevators. Based on these two developments, the alternative station configuration proposed by the Town was accepted by the Authority and the station layout was progressed to a 15% conceptual design level. This layout was presented to some of the members of the Town's Commuter Rail Committee on May 28, 2010. The members present had no objection to the design concept and the Board of Selectmen issued a letter on June 2, 2010, saying that "The Town of Acton supports the proposed design and overall Fitchburg Commuter Rail Improvement project". One of the implications of the change in the station configuration was that the design of the center island platform station that had been advanced had to be abandoned. The current 60% design is a redesign of the station and supersedes previous design submittals. The specifications that were developed for the previous station design still apply in many cases with the clear exception of completely new station elements such as the elevators.

C. The Elements of the Station: The program for South Acton Station includes two 800 foot long side platforms and a 60 foot long pedestrian bridge spanning between two sets of elevators and stairways. The platforms are accessed over sloped walkways and steps up from ground level. A large town-owned parking lot with a drop off area on the north side of the right of way will continue in use in the same manner it always has. A small Authority owned parking lot on the north side of the right of way off Railroad Street will undergo minor modifications and then continue in use. A new drop off area and an entrance walkway on the south side of the station will be included in the design.

D. The Project Schedule: The design development process is planned to continue through most of January 2011 leading to the development of final contract bid documents and advertisement for bids

starting the end of January 2011. The construction process is expected to begin in June of 2011 and continue for approximately 18 months with the goal of being completed by early January 2013.

E. The Contents of This Chapter: This report describes the major elements of the planned station improvements. An accompanying set of drawings show the existing conditions at the station site and plans of the station improvements. This report, the drawings, the specifications, and the construction cost estimate will be reviewed by the Massachusetts Bay Transportation Authority and other affected parties and will be modified as necessary based on their input. The design will then be developed to a further level leading to a final design and construction.

II - EXISTING CONDITIONS AT SOUTH ACTON STATION

A. Overview: The station is located along the railroad right of way in the South Acton Village area. The existing station platform is between the Main Street Bridge and the Martin Street Grade Crossing. The railroad right of way passes under the Main Street Bridge just to the east of the station site and passes Martin Street at grade just to the west of the station site. To the east of the station the railroad is a two track system. Just before the station platform the railroad transitions down to a one track system and it continues as a one track system to Ayer, nine miles to the west. The streets paralleling the railroad right of way thorough the station area are Central Street to the north and Maple Street to the south. Railroad Street, a short dead end street, extends from Main Street down to the station area. There is a large town owned parking lot and drop off area with access from Central Street on the north side of the right of way. There is a small Authority owned parking lot with access off Railroad Street.

B. The Trackway: There is a double track system to the east of the station platform. There is a single bidirectional track in the station platform area and beyond to the west. There is an at grade rail crossing at Martin Street which is about 1,000 feet to the east of the station area. The single track in the station platform area is located along the south side of the right of way. The right of way is about 60 feet wide in the station area. The right of way is sufficiently wide to accommodate two tracks and, in fact, did so at some point in the history of the line.

C. The Grade Crossing Warning System Equipment: There is a grade crossing warning system currently in place at Martin Street which consists of an active warning system comprised of crossing gates flashing lights and bells warning gates, a few small instrument houses, and cantilever structures. These will all be replaced as part of systemwide signal system improvements work being performed by the operating railroad and should have little affect on the work at the new station. Coordination will take place during construction.

D. Platform: The main features of the existing station are the platform and the drop off area. The platform is a low level bituminous concrete paved platform on the north side of the bi-directional track. The platform is about 400 feet long and ten feet wide. There are two bituminous concrete walkways connecting the drop off area to the platform. There is a bituminous concrete paved walkway that extends from the Railroad Street parking lot along the north side of the right of way to the platform area. Other features in the platform area are passenger shelters, bicycle racks, bicycle lockers, overhead lighting on wood poles, and both informational and advertising signs.

E. Adjoining Land Uses: The railroad right of way and adjoining properties as taken from Town Assessor's Map H2A are shown in the 60% design drawings set as Sheet C3 - South Acton Station Right of Way and Property Plan. The property immediately to the south of the railroad right of way fronts on Maple Street. At the west end of the station area is a row of single family residences. The residences front on Maple Street and back up to the railroad right of way. Further to the east is property of Gordon Richards, a concrete construction contractor. This property fronts on Maple Street and backs up to the right of way. Activities on this property are equipment storage, materials storage, parking, and office space. Further to the east is property of Montouri Realty Company which is cleared and undeveloped. This property fronts on Maple Street in the area where Maple Street slopes down from the Main Street Bridge. The property immediately to the north of the railroad right of way is accessed from Central Street and from Railroad Street. At the west end of the station area are two large Town of Acton owned parcels that are accessed from Central Street. The parcel furthest to the west is a large parcel consisting mainly of wetlands. Further to the east is the main station parking lot which is owned and operated by the Town. This parking lot includes about two hundred parking spaces divided between permit parking and metered parking. There is a drop off lane and sidewalk that allows for direct access to the station platform. Areas to the east of the main parking area are mainly privately owned and are accessed from Railroad Street. At the base of Railroad Street near the railroad right of way are three townhouse style apartment buildings and two multi-family residential condominium complexes. The other land uses fronting on Main Street are small scale commercial operations. There is a free trackside parking area east of the existing platform and within the MBTA's property line that has about twenty five parking spaces. This area is accessed from Railroad Street.

F. Automobile and Truck Traffic: Central Street to the north of the station area and Main Street to the east of the station area are both busy through roadways. The intersection of Central Street and Main Street has difficult geometry. Intersection improvements at these locations are not included in the project. Railroad Street is a short, steep, dead end street that intersects Main Street. The intersection is signalized which allows access out onto heavily travelled Main Street. Maple Street to the south of the station area is a lightly used, one way residential street.

G. Bicycle and Pedestrian Traffic: The station is a major destination for pedestrians and bicycle riders. There are concrete sidewalks along Railroad Street and there is a bituminous concrete walkway along the north side of the right of way from Railroad Street to the station platform. There is a bituminous concrete walkway along the perimeter of the main parking area that leads to the station platform from Central Street. These passageways are all well used for pedestrian and bicycle access. Bicycle racks and bicycle lockers are located adjacent to the platform. There is a great deal of informal pedestrian and bicycle access along and across the railroad right of way from the east from beyond Main Street to the east, from Martin Street to the west, and from Maple Street to the south.

H. Natural Resources: The Flood Insurance Rate Maps of the area show that there are no flood plains in the station area. The large wetlands area immediately to the west of the main parking lot is part of a floodplain but is below the level of the railroad right of way and the station site. The culvert that crosses under the railroad right of way about 300 feet west of the station site is part of the floodway that connects this wetland to the Fort Pond Brook floodway to the south of Maple Street. Impacts on floodplains are not a consideration in the design of the station. The station area does not include any Priority Habitats of Rare Species, Estimated Habitats for Rare Wildlife, or

Certified Vernal Pools. The protection of special habitat areas need not be a consideration in the design of the station. Fort Pond Brook and its tributaries run through the South Acton Village area but there are no perennial streams or riverfront resources in the station area. The protection of riverfront resources is not a consideration in station design. Regulated wetland resources in the station area have been delineated and characterized during recent growing seasons. Flags have been placed to demark the wetland boundaries and these flags have been located by ground survey. There is a large wetlands area to the west of the main parking lot but outside of the railroad right of way. There are two small wetlands pockets immediately beyond the limits of the railroad right of way. One is on the north side of the railroad right of way on the east side of the main parking area; one is on the south side of the railroad right of way on the Gordon Richards property. Areas within 100 feet of these wetlands resources are considered to be in a buffer zone for these resources. Elements of the station fall within the buffer zone so the protection of the adjacent wetland resources will be a consideration in the design and construction of the station. The station work will require the filing of a Notice of Intent with the Acton Conservation Commission to describe potential impacts on wetlands resources and how they have been mitigated.

I. Subsurface Conditions: A program of subsurface investigation consisting of five borings along and adjacent to the right of way was carried out during November 2008. Subsurface conditions in the project area consist of a layer of fill over medium dense sand deposits over relatively shallow bedrock. Bedrock was encountered at depths ranging from 13 feet to 31 feet below ground surface. Groundwater is within five feet of the top of ballast.

J. Utilities Crossing the Railroad Right of Way: There are several underground utilities that cross the tracks within the limits of the station area. A rather deep, sleeved 8 inch sewer line originating from a manhole at the base of Railroad Street runs perpendicular under the tracks to a manhole on the Montouri property, about 30 feet in from the edge of Maple Street. There is currently a 10 foot wide easement that straddles this sewer line that will be preserved and maintained in place throughout construction and beyond. The manhole is located outside of any permanent station work. The top riser section of this sewer manhole on the Maple Street side of the tracks is slightly raised above grade and will need to be protected during construction. There is also a small 15 inch diameter corrugated metal storm drainage pipe that crosses under the tracks about half way between the Railroad Street parking lot and the main parking lot. On the north side of the tracks this 15 inch pipe ties into a drain manhole that will be relocated slightly north to make way for the proposed Track 1 platform. The pipe will be extended approximately 12 feet to the relocated manhole. This same manhole also accepts two other drainage pipes that parallel the tracks. Both these pipes will be repositioned to tie back into the relocated manhole. The 15 inch pipe crossing the track transitions into a concrete pipe on the south side and traverses the Gordon Richards property and eventually drops into a ditch along Maple Street. No work is planned for this 15 inch pipe on the south side. There is one power line crossing over the tracks within the station area near the Main Street Bridge. This overhead power line is high and connects to poles far outside the limits of construction. This overhead power line over the tracks will need visibility enhancement protection during the construction period.

K. Utilities in Railroad Street: There are numerous underground utilities located within the right of way on Railroad Street adjacent to the proposed station construction area. These utility lines include gas, water, sewer, and storm drainage. Affected utilities include the aforementioned storm drainage line though that work is beyond the Railroad Street right of way. Also affected is a

Railroad Street water line that will be tapped into to connect water service to the platforms. This work will cause temporary disturbances in the immediate area of work.

III – DESIGN CRITERIA

A. Station Elements: The main station elements are the platforms, the pedestrian bridge, the elevators, and stairway systems. At this stage of the design process the requirements that bear on the design of these main station elements have been identified and will be used to guide further design work.

B. The Platform: The floor level of the station platforms will be four feet above the top of rail so that station users can walk directly from the platform level to the floor level of a railroad passenger car. The platforms will be 800 feet long to accommodate nine 85 foot long passenger cars with some allowance for undershoot or overshoot when the train comes to a stop condition at the station. The platforms will each be 12 feet wide which includes a two foot wide tactile warning strip along the track side of the platform. The set back of the platform edge from the centerline of the track is 5 feet 7 inches. The platform surface has a slight slope back from the tracks for drainage. The setback of a platform from a grade crossing is an issue of concern in some cases but not here since the station is well away from any grade crossing. The platforms are accessed by sloped walkways and ramps from the ground level up to the platform level. The platforms are connected by an elevator system and a stairway system up to the pedestrian bridge level. The area of each of the platforms exclusive of the tactile warning strip will be about 8,000 square feet. Allowing seven square feet for each station user gives a theoretical capacity for each platform of about 1,100 station users.

C. The Pedestrian Bridge: The pedestrian bridge crosses over both tracks therefore must be at a level that allows sufficient clearance for both commuter and freight trains to pass below. The Massachusetts General Law requires a vertical clearance of 22 feet 6 inches above the top of rail; however, MBTA Railroad Operations has agreed that this clearance will not be necessary at this location. The vertical clearance to be used will be in accordance with MBTA Standard Drawing No. 1016, which requires a minimum vertical clearance or 20 feet 8 inches for new overhead structures on the Fitchburg Rail Line between Boston and the Willows Interlocking in Ayer. This clearance will be measured from the top of the rail to the underside of the bridge. Appropriate exclusions will be sought by the Authority from the Department of Public Utilities. In the horizontal direction, all supports for the pedestrian bridge will be set back from the track to provide a horizontal clearance of 17 feet 7 inches from the centerline of the nearest track.

D. The Elevator and Stairway Systems: There will be one elevator and one stairway associated with each platform. The elevator and stairway system will provide access from the ground level up to the pedestrian bridge level. The vertical rise of the stairways and elevators is set by the elevation of the floor of the pedestrian bridge. The elevator and stairway will be grouped around a common lobby area. A high level of visibility is necessary for all activities within the lobby, the elevator, and the stairways. The design of the elevator will be based on the latest version of the MBTA's Elevator Design Standards Manual. The plan and agreements for monitoring and maintenance of the elevators is being developed between the Town and the MBTA.

E. The Pedestrian Ramps: The pedestrian ramps from ground level up to the platform level will have a maximum grade of 7.5%, which is a rise of one foot in a run of about thirteen feet. Ramps at a 7.5% grade can continue for only 30 feet between landings. Ramps are required to be protected by a roof.

F. Walkways: Sloped walkways from ground level up to the platform will have a maximum grade of 4.5% which is a rise of one foot in a run of about twenty two feet. Sloped walkways do not require landings or a roof.

IV - SOUTH ACTON STATION LAYOUT

A. Overview: The constraints to the proposed station layout are to limit property taking or easements beyond the right of way, to limit interference with adjacent land uses, and to avoid wetlands impacts. These constraints can be met to a great extent because the majority of the station elements can be accommodated within the existing right of way.

B. The Trackway and the Platforms: The proposed double track layout through the station area involves centering the two tracks within the right of way to allow space within the right of way for a platform on either side of the tracks. Starting from the east side of the Main Street Bridge going west, the tracks curve under the bridge then straighten out in the area of the existing platform. The new high level platforms are located directly opposite each other somewhat to the east of the existing platform. Ideally the platforms would be located completely within a tangent section of the track alignment and away from a curve. In this case, it was found advisable to move the platform somewhat to the east along the tracks and partially out of the tangent section to avoid having the platform in close proximity to the backyards of single family residences fronting on Maple Street that border the right of way on the south side. As a result, the far eastern ends of both platforms are within the curves. The clearance between the track centerline and the platform edge must be adjusted slightly in these areas to accommodate the train cars as they negotiate the curve. On the north side of the right of way, the connector walkway from Railroad Street to the main station parking area will be eliminated due to space constraints. The new outbound platform will occupy the area of the right of way now occupied by the walkway. Pedestrian traffic that formerly used the connector walkway will need to use the access ramps and the outbound platform as a passageway.

C. The Pedestrian Bridge, the Stairways, the Elevators and the Lobby Area: The elevation of the bottom of the pedestrian bridge is set based on the track elevation and the necessary minimum clearance above the track. The length of the stairways from the platform up to the pedestrian bridge is set by the elevation change necessary. The lobby area, elevators, and stairways, must be set back beyond the back edge of the platform so that the full platform width is available along the entire length of the platform. As a result, the lobby area, elevators, and stairway extend beyond the back edge of the platforms and slightly beyond the limits of the right of way. On the north side at the existing Town of Acton parking lot and drop off area, the lobby area, elevator, and stairway extend into the Town of Acton property requiring a property taking. The drop off area will continue to function in its existing location and there will be convenient access from the drop off area to the new lobby area. On the south side at the Gordon Richards property, the lobby area, elevator, and stairway extend into the Gordon Richards property requiring a property taking. The main goal for the location of the lobby area, elevator, and stairway, on the north side is to establish a logical location with regard to the parking lot and the drop off area. The location of one end of the

pedestrian bridge on the north side necessarily sets the location of the other end of the pedestrian bridge on the south side. The resultant location on the south side works without the necessity of any wetlands impacts or any interference with existing structures on the Gordon Richards property.

D. Access Points: There are three access points to the station platforms. The main access point is at the main parking lot and drop off area on the north side of the right of way and the west end of the platform. This is envisioned as the main area of activity and the main visual focus of the station. The drop off area on the north side of the right of way within the main parking lot will continue to function as it always has. The vertical curb line will be replaced with an accessible slope with a tactile warning strip and a row of bollards. Station users dropped off here can proceed directly to the main station entrance. A second entrance point is located on the north side of the right of way at the east end of the platform. This access point will provide for those who use the Railroad Street parking lot and pedestrians approaching the station from the east. The third entrance point is located on the south side of the right of way at the east end. This access point will provide for pedestrians approaching the station from the south along Maple Street. The drop off area on the south side will be a new feature. A drop off area will be provided off Maple Street in close proximity to the south side of the right of way. Station users dropped off along Maple Street can proceed directly to the east end of the inbound platform.

E. Parking Lots: The configuration of the main parking lot on the north side of the right of way will experience limited permanent changes. The number of parking spaces here will remain the same. The location of accessible parking spaces may be changed to improve their proximity to the new main station entrance. The trackside parking lot off Railroad Street will be affected by the east end of the new inbound and parking spaces will have to be reconfigured. A loss of a few parking spaces in this area is likely. All the satellite parking areas that serve the station will remain unchanged.

F. Property Acquisitions and Easements: The vast majority of the station facilities will be located within the existing railroad right of way. The elevator, stairway, and lobby area on the south side will be located beyond the south edge of the platform and will extend beyond the right of way on the south side on the adjacent property of Gordon Richards. A permanent acquisition will be required here for these permanent structures. There will also be a temporary construction easement extending in from Maple Street in this area to support the construction process. The elevator, stairway, and lobby area on the north side will be located beyond the north edge of the platform and will extend beyond the right of way on the north side onto the adjacent property of the Town of Acton parking area. A permanent acquisition will be required here to provide for these permanent structures. There will also be a temporary construction easement encompassing part of the parking lot to support the construction process. The walkway to the inbound platform from Maple Street and the drop off area on Maple Street will be located on the property of Montouri Realty Company and a part of the Commonwealth of Massachusetts parcel located adjacent to the Main Street Bridge. The entire Montouri Realty Company parcel will be taken since it would be unreasonable to take a portion of it and leave an unusable remnant parcel. The Montouri Realty Company parcel and the part of the Commonwealth of Massachusetts parcel will play a role during the construction period by providing access off Maple Street and a support area for construction activity.

V - SOUTH ACTON STATION SYSTEMS AND ELEMENTS

A. Overview: The station consists of a number of systems and elements. They are described under the following major headings: The Trackway, The Platforms, The Pedestrian Bridge, Elevators, Ramps and Walkways, Lighting, and Other Station Elements.

B. The Trackway: The trackway will consist of an outbound track and an inbound track. Each track consists of rails and ties set within a layer of ballast and supported by a compacted subgrade. The inbound track will be created by the realignment of the existing track through the station area. The outbound track will be new construction. The area of the new outbound track will be prepared with underdrains, the subgrade layer, and an initial layer of ballast. The rail, ties, and final layer of ballast will be furnished and installed either by the operating Railroad MBRC through force account or by contract. This work will be done independently of the station work but on a schedule that is compatible with the station work.

C. The Platform

1. Platform Foundations: The foundation type chosen for the support locations along the platforms is a set of drilled mini-piles with a cast in place concrete pile cap. The drilled mini-pile approach was chosen because it can be used in the area of an active track without the need for excavation and excavation support. The platform is being constructed directly adjacent to a track that will be in continuous service. Being able to proceed with foundation construction without the cost of excavation support and concern for undermining the track is a significant benefit. This is an approach that has been used successfully for other station platform projects. Because of the density of the soil in the area, seismic issues can be accounted for in the design of the platform foundations.

2. Platform Surfaces: The platforms will be constructed of 32 foot long precast concrete double tee sections. This is an approach that has been used successfully for other high level station platform projects. The trackside edges of the platform will have two-foot wide tactile warning strip and a timber edge strip; the back edges of the platform will have a continuous railing.

3. Canopies: The platform will have canopies at the access points. The covered ramps and pedestrian bridge will also provide a protected environment. The canopies will be made of pre-finished sheet metal with painted galvanized steel supports. The design is reminiscent of historic railroad facilities, is practical and economical, and can be part of an overall station design approach in which the pedestrian bridge, ramps, and canopies all have complementary gable roof designs. The roofs and canopies – although only a relatively small part of the overall station structure – will have a major effect on establishing the unique appearance and character of the station. Three troublesome issues to be dealt with in canopy design are runoff, snow slides, and bird roosting. Runoff will be handled by oversize gutters along the eave line of the canopy. The gutter will direct runoff to downspouts and splash blocks at the crushed stone surfacing beneath the platform. Snow slides will be prevented by snow guards on the roof surface and the oversize gutters. Bird roosting will be reduced because the frame of the canopy system will be tight to the underside of the canopy roof surface and will provide limited room for roosting.

D. The Pedestrian Bridge, Elevators, Stairways, and Ramps and Sloped Walkways

1. The Pedestrian Bridge: The pedestrian bridge will span over the two tracks and the two platforms. The clear span will be about 50 feet. The bridge will consist of a single through truss structure spanning between support columns on either side. The bridge will have a concrete floor surface, a roof, and side panels. The bridge must be high enough to provide 20 feet 8 inches of clearance between the bottom of the bridge structure and the top of rail below. Its width is great enough to provide a generous clearance between the interior side handrails and a space for benches. The truss structure will require only a limited depth of structure for the bottom chord. The limited depth of structure is advantageous in that the floor elevation is only slightly above the bottom of the structure. The top chord and the side chords of the truss will be used to provide support for the roof system and the side paneling system. The roof system will be a pre-formed sheet metal system complementary to that provided for the canopy. Runoff will be directed to oversize gutters along the eave line of the roof. The gutters will direct runoff to downspouts and splash blocks at the ballast stone in the bridge area. There will be area drains within the interior of the bridge to collect any limited runoff on the bridge floor. The side panels of the pedestrian bridge were previously designed for a metal grill on the interior and a layer of glazing on the exterior. The use of the metal grille has been questioned by MBTA Design Group and will need to be further clarified as to its use between now and the 90% design level. There will be ventilation openings at the top and at the bottom of the side panels and at the roof ends to help dissipate heat during the summer. The side panels will function both for station user comfort and to protect the concrete floor from the weather. If only limited amounts of snow and ice accumulate on the floor of the bridge, applications of salt can also be limited. Salt applications are often necessary for station user safety but such applications are harmful to the structure. The pedestrian bridge will be lighted with indirect ceiling lighting.

2. The Elevators: The elevator at the outbound platform will extend from the lobby floor level at the main entrance up to the floor level of the pedestrian bridge. The elevator at the inbound platform will extend from the platform level to the pedestrian bridge level. The elevator shaft will extend up beyond the highest floor level to accommodate the height of the elevator cab. The elevator cabs will be of sufficient size to accommodate a stretcher. The elevators will be of the machine-room-less type, having almost all of its components within the shaftway containing the cab with very limited requirements for space outside of the shaft itself.

3. The Stairways: The stairways will be metal pan systems with concrete treads. They will have roof and side panels. The roof system will be a sheet metal system complementary to that provided for the canopy and pedestrian bridge. Runoff will be directed to oversize gutters along the eave line of the roof. The gutters will direct runoff to downspouts and splash blocks at the ballast stone. The use of grillage on the side panels of the stairways will be decided after the 60% design. The glazing will be similar to the panels provided on the pedestrian bridge. Portions of the area under the stairways will be used for miscellaneous station functions such as utility rooms and storage space.

4. Ramps and Sloped Walkways: The ramps and sloped walkways are at-grade concrete surfaces constructed on a gravel base. Ramps are typically at a grade of 7.5% and require periodic landings and a roof; sloped walkways are typically at a grade of 4.5% and do not require periodic landings or a roof.

E. Drop Off Areas: The existing drop off area at the main station parking lot will continue in use. A new drop off area will be provided on the north side of Maple Street. The drop off area involves a sidewalk and a drop off lane. The sidewalk will be accessible and will be bordered with a tactile surface and a row of bollards.

F. Lighting

1. Electric Service: The electric service for the station will require a connection to the local electric utility system, a transformer specified and located in cooperation with the local electric utility, and an underground conduit and cable connection to electrical panels at the station lobby area. The electric use will be primarily for lighting along the platform, under the canopy, under the bridge and stairway roofs, along other pedestrian pathways, for power outlets to support maintenance activities, and for the communications and future fare collection equipment as required.

2. Light Fixture Characteristics: Light fixtures must be able to function under extreme weather conditions, be vandal resistant, and require limited maintenance. The products that will be specified to meet the MBTA's needs for ease of maintenance and replacement. Product manufactures to choose from will be Kim, Gardco, Lithonia and Insight or approved equals.

3. Platform Lighting: There will be a series of pole mounted light fixtures along the back edge of the platforms. Lighting levels for the open platform must be from 2 to 5 average maintained foot candles. For under the canopy, 5 to 10 average maintained foot candles are expected. Lighting under the canopies can be either direct or indirect.

4. Pedestrian Bridge and Stairways: There will be wall or ceiling mounted lighting fixtures located periodically along the bridge and stairways. Lighting level expectations are 5 to 10 average maintained foot candles. Lighting under the bridge and stairways can be either direct or indirect.

5. Walkway, Parking Lot, and Other Site Lighting: The lighting along sidewalks will be 5 average maintained foot candles. The lighting in parking lots will be from 1 to 2 average maintained foot candles. Pole mounted Archetype fixtures will be used.

G. Other Station Elements

1. Stormwater Management: The stormwater management approach for the station is to provide frequent opportunities for infiltration of runoff into the right of way. The platforms will drain away from the trackway and runoff will fall directly to the crushed stone surfaces below. The canopies, pedestrian bridge roof, and stairway and elevator shaft roofs will drain through gutters, downspouts, and splash blocks down to the ballast lined trackway or to the crushed stone surface beneath and beside the platform.

2. Water Service: The water service for the station consists of a yard hydrant on each platform. This is a freeze proof water supply that will be used for platform wash down and other maintenance activities.

3. Communications Systems: The station communications systems will be integrated into the MBTA's systemwide Commuter Rail communications system infrastructure. The design will provide for communications system elements that are presently MBTA standard for commuter rail stations such as variable message signs with conversion of text to speech at the sign. Equipment and communications provisions for Closed Circuit Television and Automated Fare Collection systems are not included at this time. These could be integrated later in the design if required by the MBTA. Communications control equipment will be located inside a secure communications room located at the east end of the platform under the ramp. The Communications Room will be sized to accommodate an equipment rack and provide working space similar to that presently used at other commuter rail stations. A data communications connection to the existing MBTA Commuter Rail communications system will be provided by the operating railroad. Provision will be made for a connection to the Town's existing fiber optic line that terminates at the station drop off area.

4. Fare Collection System: There are plans currently being developed by the MBTA for a future Commuter Rail Fare Collection System. This system is anticipated to be a "Proof of Payment" system which may require media validating equipment to be mounted on the platform canopy structures approximately 50 to 75 feet apart. The design will include additional conduit from the Communications room to the platform dedicated for such future fare collection systems equipment.

5. Benches, Windscreens, and Signage: The platform will have a series of assemblies consisting of benches, windscreens, and signs located periodically along its length. There will be other freestanding benches throughout the site.

6. Storage Shed: A storage shed is needed for the storage of salt and snow blowers. This storage shed will be located so that bags of salt can be unloaded from a truck and readily moved to the storage shed and snow blowers can be moved to the platforms.

7. Landscaping: The majority of the station site will not be vegetated and will consist of ballasted trackways and graded crushed stone areas below and around the platforms. All the un-vegetated areas will be maintained as un-vegetated areas to ensure their continued structural integrity or function. Landscaped areas will be limited to areas at the Railroad Street entrance, at the Maple Street entrance, and behind the platforms. Planted elements will include low maintenance trees and low lying shrubs. Trees will be located well back from the railroad right of way.

VI – PROJECT DEVELOPMENT ISSUES

A. Property Acquisition Requirements: The development of the station requires the acquisition of some areas beyond the existing railroad right of way. Past experience on MBTA projects has shown that the acquisition of property requires six months from the development of drawings ready for filing with the local Registry of Deeds. The development of these drawings is now underway to allow a construction start in the spring of 2011.

B. Hazardous Materials: Due diligence in investigation for the presence of hazardous materials is required as part of the property acquisition process. The property to be acquired or used temporarily is land adjacent to a railroad right of way. It is conceivable that some spills or releases have occurred in years past. The past uses of the properties to be acquired and the history of incidents are now being investigated. A Phase I site assessment is currently underway.

C. Wetlands Permitting Issues: A Massachusetts Wetlands Protection Act Order of Conditions will be needed from the Acton Conservation Commission. There are no direct impacts on wetlands but elements of the project are within the 100 foot wide buffer zone surrounding wetlands resources. A Notice of Intent will be filed with the Commission during the fall of 2010.

D. Utilities Coordination: The utility needs for the station are limited to water supply and electric service. The water supply is planned to be obtained from the water main in Railroad Street owned by the Acton Water District. The water supply needs of the station will be limited consisting only of occasional maintenance use. The electric service needs of the station will be reviewed with the local electric utility. Electric power needs will be mainly for elevator operation and lighting. There are overhead electric power lines in Railroad Street where power will be obtained.

E. Elevator Operation and Maintenance Agreement: An elevator operation and maintenance Memorandum of Understanding (MOU) is being developed between the MBTA and the Town of Acton to provide responsibility for the elevators to the Town once the station goes into operation. The conditions of the agreement may affect the design particularly with regard to the monitoring of these systems.

VII – CONSTRUCTION ISSUES

A. Constructability: The design has been developed with constructability in mind. The design includes no difficult to obtain materials or elements, has no oversize components, and involves approaches that have been used successfully on other commute rail stations in the MBTA system. Operations of note are the erection of the truss elements for the pedestrian bridge and the placement of the platform panels. These are large lifts that will take place adjacent to and over the trackway. Some interruption of service will be required to accomplish the placement of these structural elements. There is limited space in the station area for construction support activities such as employee parking, material laydown, equipment movement and storage, and office trailers. Providing for these functions in the limited available space will increase the coordination requirements of the construction process.

B. Coordination with the Ongoing Railroad Operations: The single bi-directional track through the station area will remain active throughout the construction process. Protection by flagmen is needed for all construction activities throughout the duration of the project.

C. Coordination with Systemwide Trackwork: The adjustments to the inbound track location and the placement of the final layer of ballast, the ties, and the rail for the new outbound track will be done as part of a systemwide trackwork project to be performed by the operating railroad or a contractor. This work will all be coordinated with station construction.

D. Coordination with Systemwide Signal System Work: The grade crossing system at Martin Street to the west of the new station platforms must be converted from a single track system to a double track system and a new track interlocking system must be constructed to the east of the new station platforms. The signal system work associated with these new track configurations must be accomplished while operations continue at the station.

E. Compatibility with Adjacent Land Uses: All activities in the station area will continue throughout the construction process. The traffic activity on adjacent streets will unavoidably increase during the construction period. The services of traffic officers will be used at key points in the construction process as necessary to keep the street system continuously accessible. This is of particular concern at Railroad Street which is a dead end street and the sole means of access to many residential units. The adjacent land uses will be exposed to construction noise. Residences along Maple Street and at the base of Railroad Avenue have sensitivity to nighttime noise. Nighttime noise is expected to be very limited during the construction period.

VIII- NEXT STEPS

A. MBTA Review: This report and the accompanying drawings, estimate, and specification sections will be reviewed by the various MBTA departments to determine if the design is satisfactory and compatible with commuter rail operations and maintenance standards and procedures. Modifications to the design will be made based on review comments received.

B. Town of Acton Coordination: The concept layout of the station has been reviewed with the Town of Acton's Commuter Railroad Advisory Committee. The availability of the 60% submittal provides the opportunity for continued discussions with the Railroad Committee but in greater detail. There can be continued discussions about station appearance. This will also be an appropriate time to continue to discuss station operations and the construction process with the Town's Public Safety Officials. The submittal of a Notice of Intent to the South Acton Conservation Commission regarding wetlands impacts is planned to take place in the fall of 2010.

C. Continue the Property Acquisition Process: Based on the requirements of the review of this submittal, further steps will be taken in the property acquisition process.

D. Further Submittals and Reviews: The design development process will continue on to the 90% submittal where the communications work and bridge work will be combined with the station work in a single construction package. Following the 90% design submittal will be the final design, contract documents, a bidding process, and a start of construction anticipated in the spring of 2011.

