



**TABLE 5-15  
CONSTRUCTION ELEMENTS BY ELEVATION**

<b>Construction Location and Activities</b>	<b>Typical Construction Equipment Used *</b>	
<b>At-Grade LRT Construction</b>		
Clearing and grubbing	1,4,5,6	
Storm water and erosion control	6,10,24	
Utility and street relocation	4,6,10,11,13,16	
Demolition of existing facilities	1,4,5,6,17,26	
Drainage and storm water systems	6,10,11,15	
Excavation, embankment and subgrade preparation	1,4,11,23	
Retaining walls and ballast walls	3,10,22,25	
Lime subgrade	4,11,23	
Subballast	4,11	
Chain link fencing	6,22,24	
<b>At-Grade Stations</b>		
Station platform slab and Special Use Platform	3,5,8,11,22,25	
Structural steel canopies and roofing systems	2,12,14,15,20	
Electrical systems	3,10,11,20	
Mechanical systems	3,10,6,12	
Architectural finishes	3,14,18	
Painting	18,19,20	
<b>Street, Driveway and Parking Lot Construction</b>		
Street pavement and LRT street at-crossing headers	3,4,6,11,13,22	
Permanent street signage and pavement markings	12,18,24,27	
<b>Aerial LRT Construction</b>		
Drilled shaft construction	2,8,21,22	
MSE wall construction at bridge approaches	5,6,11,25	
Bridge pier construction	2,3,22	
Bridge deck and parapet	2,3,9,20,22	
Grounding system	3,6	
<b>Aerial Stations</b>		
Station platform	2,20,9,12	
<b>Open - Cut Below Grade</b>		
Street bridging	2,6,11,15,13	
U-structure and Double box tunnel section	3,5,6,11,12	
Backfill and final grading	4,5,11	
<b>*Construction Equipment</b>		
1 Dozer	10 Ditcher/trencher	19 Paint Sprayers
2 Tracked crane	11 Compaction equipment	20 Man lift
3 Rubber tired crane	12 Air compressor	21 Water pump
4 Motor grader	13 Paving machine	22 Concrete vibrators
5 Dump trucks, haul trucks	14 Welding machine	23 Tiller (lime manipulation)
6 Loader/Backhoe	15 Rubber tired loader	24 Tractor with hole auger
7 Water truck	16 Excavator	25 Bucket grading machine
8 Drilled pier rig	17 Jackhammer, ramjack	26 Concrete saw
9 Concrete pump	18 Sand blaster	27 Street sweeper

Source: Chiang, Patel and Yerby, March 2006.

The typical construction scenario would start with utility and storm sewer relocations, followed by construction of permanent and temporary facilities to support rerouting of vehicular and rail traffic. Once the utilities are cleared and the permanent / temporary facilities constructed, the contractors would build long duration construction items such as below-grade (open cut) and bridge sections. For bridge structures, the contractors would first construct the substructure / foundations, bridge piers and abutments. Once these items are complete, the contractor would place beams, pour the bridge deck and install parapet railing. Retained earth embankments can be constructed concurrently with the bridges. At-grade guideway construction can proceed concurrent with tunnel and bridge construction, but would be phased so as not to impede progress on the tunnel and