ATTACHMENT E

Construction Schedule and Assumptions

HNTB

March 5, 2013

Short Environmental Assessment Form for Hotel Development at Baltimore/Washington International Thurgood Marshall Airport

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INTRODUCTION

These assumptions are based upon information given in the "Terminal Area Hotel Planning Considerations" document; dated May 25, 2012 and crew data from RS Means. In addition, because limited quantities are given, production rates of crews are rough estimates and illustrate what a builder could realize. Likewise this schedule is not to be used as an actual construction schedule; its production is intended only to create a rough estimate of equipment usage during construction.

1 Assumptions

1. The schedule will use days as its unit of time; 10hrs per day; 6 days per week.

2. Production rates were derived utilizing available data from previous airport projects such as Charlotte Douglas and Ellington Field. Other data was sourced from RS Means Productivity Standards for Construction and other web sources.

3. It is assumed that there will be 2 Owner's Representatives on site with Pickups for the duration of the work.

4. Concrete and Dump trucks will travel a max "one-way" distance of 10 miles to their respective concrete plants or materials facilities.

5. No MOT is need as the building is being constructed in an existing parking lot.

6. The "Tower" structure is glass enclosed with the usable space as indicate on page 4 of the above document; labeled "Restaurants / Amenities".

7. Rough estimates for concrete trucks needs are based upon estimates on page 2 of the above mentioned document.

8. All trucks are assumed to have a haul distance of no more than 10 miles one way. With exception of prefabricated pedestrian bridge sections which can be in production up to 100 miles off site. Assume 1 Tractor Trailer truck per week to drop off materials.

9. At least one crane will be in place from beginning to end of building construction to set in place items such as exterior panels/glass, or to lift materials to designated floors.

10. Cast in place concrete, i.e. floor slabs and walls are assumed / estimated to be 9" thick.

    a. Hotel exterior and core support is assumed to be cast in place concrete with interior wood framed buildings.

11. One pedestrian bridge to be set in place from level four to the existing parking garage.

    a. Assume after hours construction. Pedestrian Bridge can be set in place in two consecutive nights. Length of Bride is no more than 80 Feet.

12. Production rates and crew sizes are as follows:

Table 1

Administrative Support Team (ADMIN)

Labor	Equipment
1 – Project Manager	1 – SUV
2 – Field Engineers	2 - Pick-ups
1 – Administrative Assistance	1 – Fuel Truck
1 – General Superintendent	1 – Maintenance Vehicle with Crane
1 – Safety Manager	
1 – Mechanic	
1 – Fuel Truck Operator	

Note: This team will be in place for the duration of the contract and will provide managerial oversight for the project.

Table 2

Pavement Demolition Crew (PVDEM)

Labor	Equipment
1 – Foreman	1 – Pick-up
1 – Operator	1 – Backhoe Loader (48 H.P.)
4 – Laborers	1 – Hydraulic Hammer (1200 lb)
	1 – F.E. Loader (170 H.P.)
2 – Truck Drivers	2 – 16 CY / Dump Trucks

Note: Production rate of pavement demolition is 420 Square Yards per day; 3,780 sqft / day.

Table 3

Grading Crew (GRADE)

Labor	Equipment
1 – Foreman	1 – Pick-up
3 – Operators	1 – 30,000 Lbs Grader
1 – Laborer	1 – Tandem Roller
	1 – 200 H.P. Dozer

Note: Production rate 3,500 S.Y. per day.

Table 4

Utility Installation Crew (UTILI)

Labor	Equipment
1 – Foreman	1 – Pick-up
10 – Operators	2 – Crew Truck
5 - Laborers	1 – Large Excavator
2 – Welders	2 – Front End Loaders
	2 - Low Boys
	1 - Backhoes
	3 – Dump Trucks
	1 – Vibratory Roller
	1 – Compressor
	2 – Arc Welders

Note: Production rate of Trenching is 200 linear feet per day.

Table 5

Pre-Fabricated Structures Placement Crew (PREF)

Labor	Equipment
1 – Superintendent	1 – Aerial Lift Trucks (2 person)
1 – Forman	1 – Crane 150 Ton
4 – Operators	1 – Pickup
2 – Laborers	

Note: This crew will be used to place pre-cast panels for the building and to construct place the illustrated (prefabricated steel) walkway. The production rate for this crew is 10 concrete panels per hour or two walk way sections placed per day.

Table 6

Structural Concrete Placement Crew (SCPC)

Labor	Equipment
1 –Pump Driver	1 – Concrete Pump
13– Concrete Drivers	7 – 10 CY (270 CF) / Ready Mix
1 – Finisher	2 – Vibrating Compactor

Note: This crew will be used to place concrete for floor slabs, support columns, and walls. Output = 130 CY per Day. Assume thickness of 9" Average area to cover per floor = 20,000 square feet or 528 Cubic yards; assuming 5% reinforcement. Each truck makes 2 trips per day of crew usage.

Table 7

ACP Paving Crew (ACPC)

Labor	Equipment
1 – Foreman	1 – Asphalt Paver
4 – Equip. Operators	2 – Steel Wheel Rollers
7 – Laborers	1 – Pneumatic Wheel Roller
4 – Truck Drivers	1 – Pickup
	1 – Crew Truck
	4 – 16 CY/ Dump Truck

Note: Production rate of paving is 4,000 S.Y. per day.

Table 8

Curb & Gutter Crew (CNGC)

Labor	Equipment
1 – Foreman	1 – Pick-up
1 – Operators	1 – Crew Truck
1 – Cement Finisher	1 – Curb/Gutter Paver

Note: Production rate 1,000 L.F. per day.

Table 9

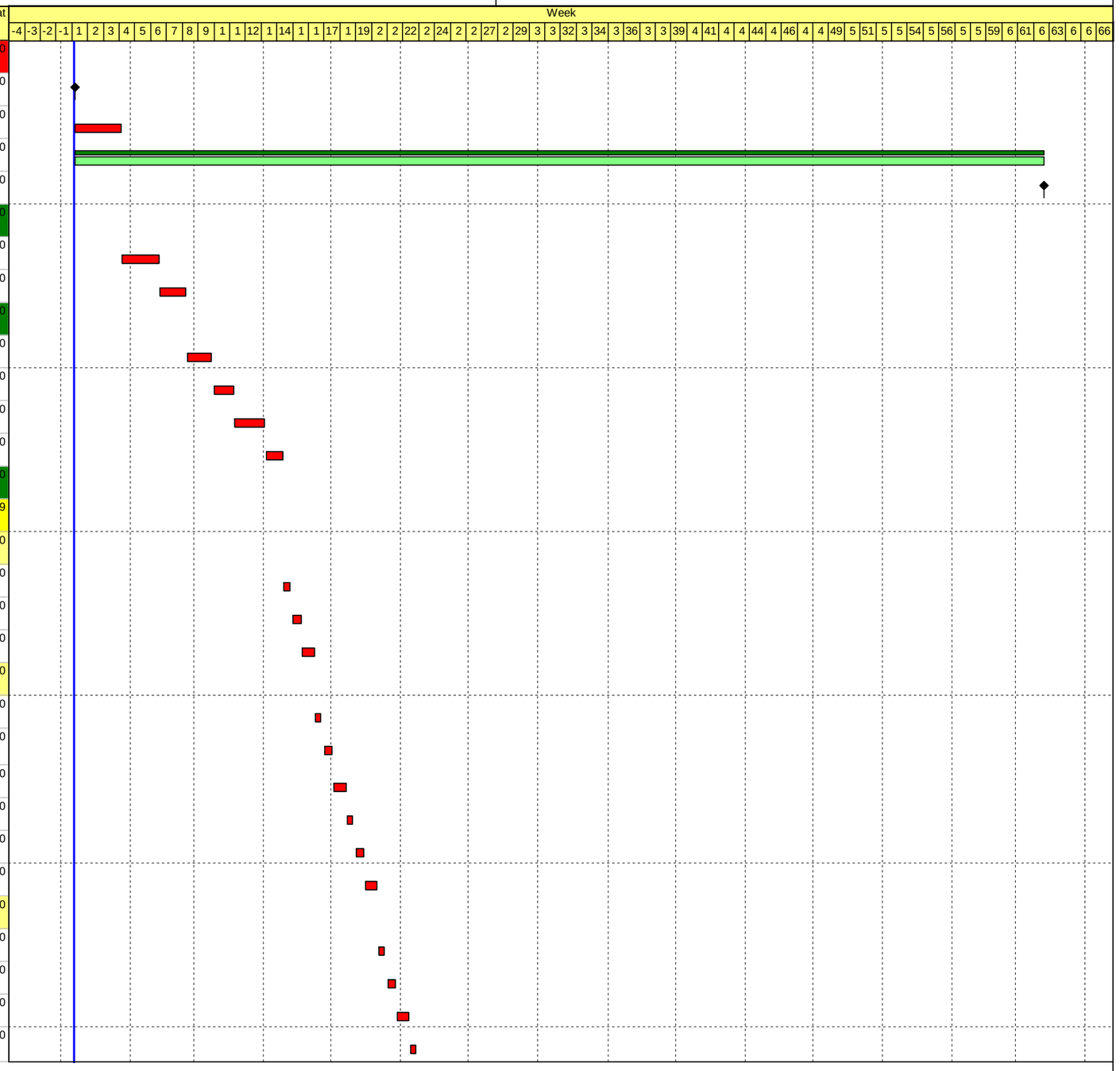
Striping Crew (STRIPE)

Labor	Equipment
1 – Foreman	1 – Paint Striper
3 – Laborer	1 – Flatbed Truck
1 – Truck Driver (light)	1 – Pick-Up Truck

Note: This crew will be used to place striping throughout the project; 8,000 Linear feet per day.

Attachment 1

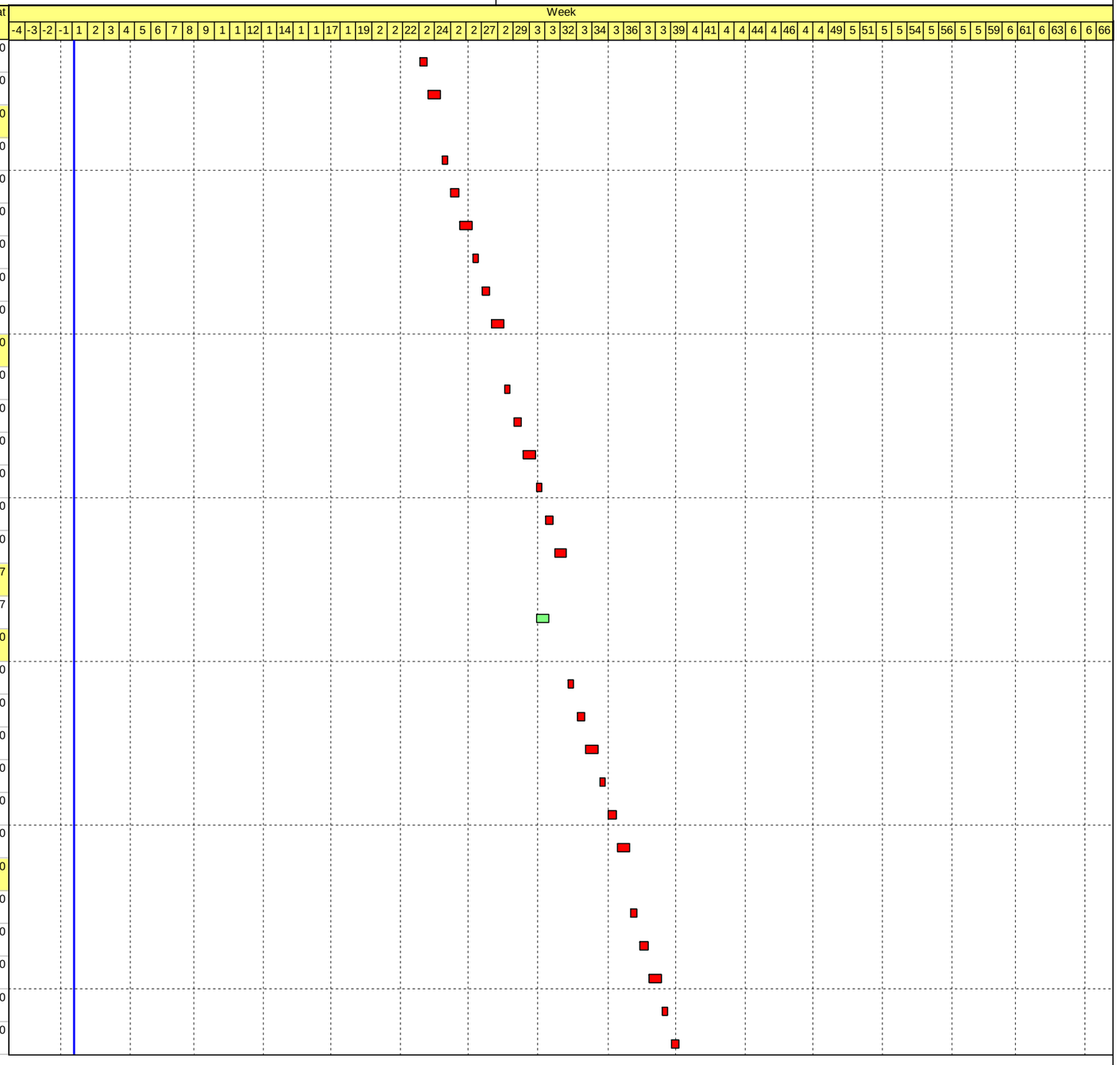
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Hotel Environmental Assessment		370	07-Jan-14	13-Mar-15	0
A1000	NTP	0	07-Jan-14		0
A1020	Mobilization	18	07-Jan-14	27-Jan-14	0
A1070	Project Management	370	07-Jan-14	13-Mar-15	0
A1060	Complete, Ready to Open	0		13-Mar-15	0
Site Preparation		25	28-Jan-14	25-Feb-14	0
A1030	Demolition of Existing Pavement	15	28-Jan-14	13-Feb-14	0
A1050	Connect to exisiting utilities	10	14-Feb-14	25-Feb-14	0
Foundation		37	26-Feb-14	09-Apr-14	0
A2090	Bring Site to Grade	10	26-Feb-14	08-Mar-14	0
A1120	Set Form Work for Foundation	8	10-Mar-14	18-Mar-14	0
A1130	Place Concrete for Foundation	12	19-Mar-14	01-Apr-14	0
A1140	Cure Foundation	7	02-Apr-14	09-Apr-14	0
Hotel Construction		290	10-Apr-14	13-Mar-15	0
Levels		231	10-Apr-14	03-Jan-15	59
Ground Level		12	10-Apr-14	23-Apr-14	0
A1160	Form Walls and Support Columns for Ground Level	3	10-Apr-14	12-Apr-14	0
A1170	Place Concrete for Ground Level	4	14-Apr-14	17-Apr-14	0
A2080	Cure Concrete for Ground Level	5	18-Apr-14	23-Apr-14	0
Level 1		24	24-Apr-14	21-May-14	0
A1950	Form Level 1 Floor	3	24-Apr-14	26-Apr-14	0
A1960	Place Concrete for Level 1 Floor	4	28-Apr-14	01-May-14	0
A1970	Cure Level 1	5	02-May-14	07-May-14	0
A2110	Form Walls and Support Columns for Level 1	3	08-May-14	10-May-14	0
A2120	Place Concrete for Level 1	4	12-May-14	15-May-14	0
A2130	Cure Concrete for Level 1	5	16-May-14	21-May-14	0
Level 2		24	22-May-14	18-Jun-14	0
A1180	Form Level 2 Floor	3	22-May-14	24-May-14	0
A1190	Place Concrete for Level 2 Floor	4	26-May-14	29-May-14	0
A1200	Cure Floor Level 2	5	30-May-14	04-Jun-14	0
A2140	Form Walls and Support Columns for Level 2	3	05-Jun-14	07-Jun-14	0



Remaining Level of Effort | Actual Work | Critical Remaining Work
Actual Level of Effort | Remaining Work | Milestone

HNTB

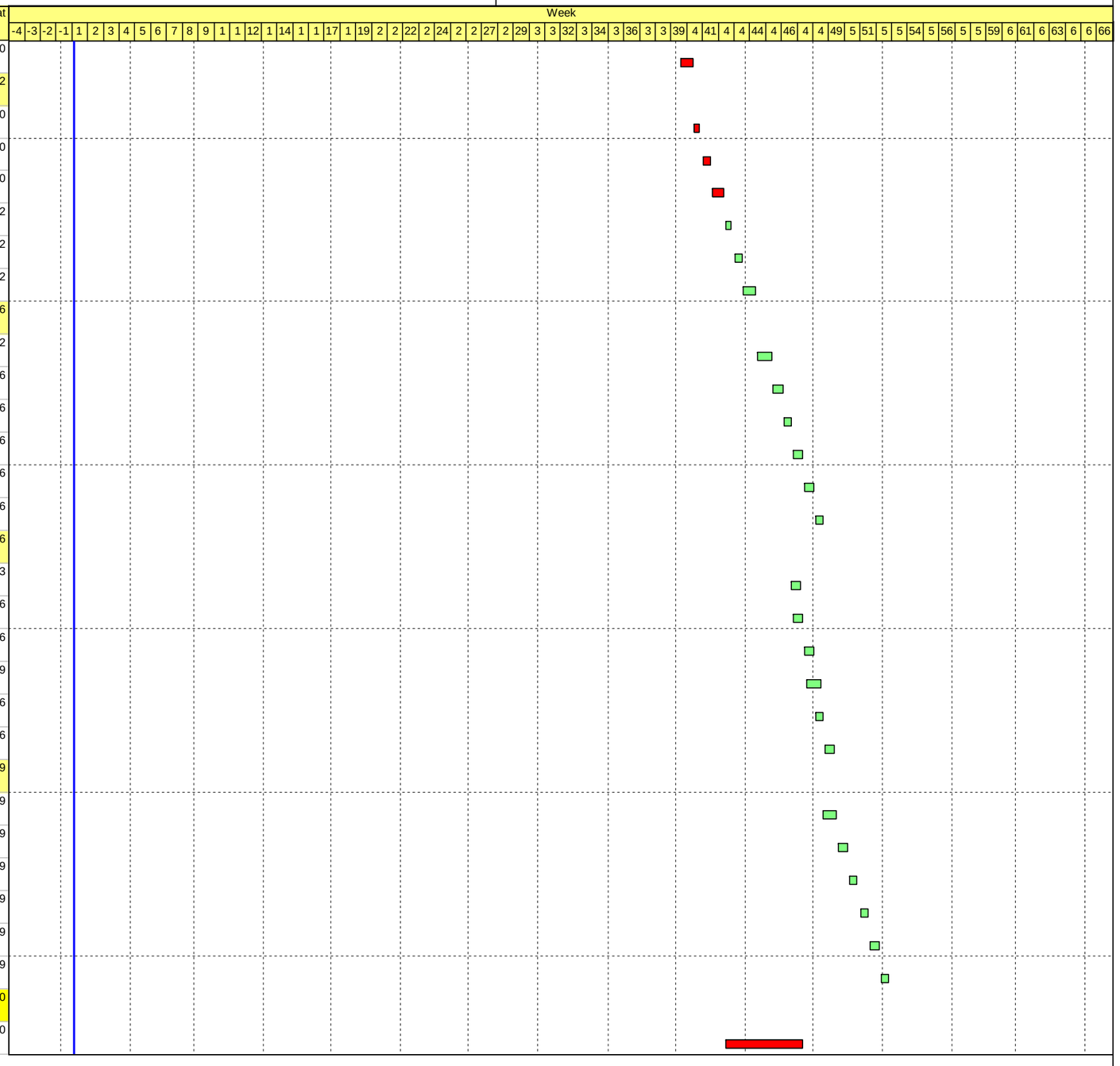
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A2150	Place Concrete for Level 2	4	09-Jun-14	12-Jun-14	0
A2160	Cure Concrete for Level 2	5	13-Jun-14	18-Jun-14	0
Level 3		24	19-Jun-14	16-Jul-14	0
A1240	Form Level 3 Floor	3	19-Jun-14	21-Jun-14	0
A1250	Place Concrete for Level 3 Floor	4	23-Jun-14	26-Jun-14	0
A1260	Cure Floor Level 3	5	27-Jun-14	02-Jul-14	0
A2170	Form Walls and Support Columns for Level 3	3	03-Jul-14	05-Jul-14	0
A2180	Place Concrete for Level 3	4	07-Jul-14	10-Jul-14	0
A2190	Cure Concrete for Level 3	5	11-Jul-14	16-Jul-14	0
Level 4		24	17-Jul-14	13-Aug-14	0
A1300	Form Level 4 Floor	3	17-Jul-14	19-Jul-14	0
A1310	Place Concrete for Level 4 Floor	4	21-Jul-14	24-Jul-14	0
A1320	Cure Floor Level 4	5	25-Jul-14	30-Jul-14	0
A2200	Form Walls and Support Columns for Level 4	3	31-Jul-14	02-Aug-14	0
A2210	Place Concrete for Level 4	4	04-Aug-14	07-Aug-14	0
A2220	Cure Concrete for Level 4	5	08-Aug-14	13-Aug-14	0
Pedestrian Walk Way		5	31-Jul-14	05-Aug-14	7
A2100	Set Prefabricated Pedestrian Walkway in Place	5	31-Jul-14	05-Aug-14	7
Level 5		24	14-Aug-14	10-Sep-14	0
A1360	Form Level 5 Floor	3	14-Aug-14	16-Aug-14	0
A1370	Place Concrete for Level 5 Floor	4	18-Aug-14	21-Aug-14	0
A1380	Cure Floor Level 5	5	22-Aug-14	27-Aug-14	0
A2230	Form Walls and Support Columns for Level 5	3	28-Aug-14	30-Aug-14	0
A2240	Place Concrete for Level 5	4	01-Sep-14	04-Sep-14	0
A2250	Cure Concrete for Level 5	5	05-Sep-14	10-Sep-14	0
Level 6		24	11-Sep-14	08-Oct-14	0
A1420	Form Level Six Floor	3	11-Sep-14	13-Sep-14	0
A1430	Place Concrete for Level Six Floor	4	15-Sep-14	18-Sep-14	0
A1440	Cure Floor Level 6	5	19-Sep-14	24-Sep-14	0
A2260	Form Walls and Support Columns for Level 5	3	25-Sep-14	27-Sep-14	0
A2270	Place Concrete for Level 5	4	29-Sep-14	02-Oct-14	0



Remaining Level of Effort | Actual Work | Critical Remaining Work
Actual Level of Effort | Remaining Work | Milestone

HNTB

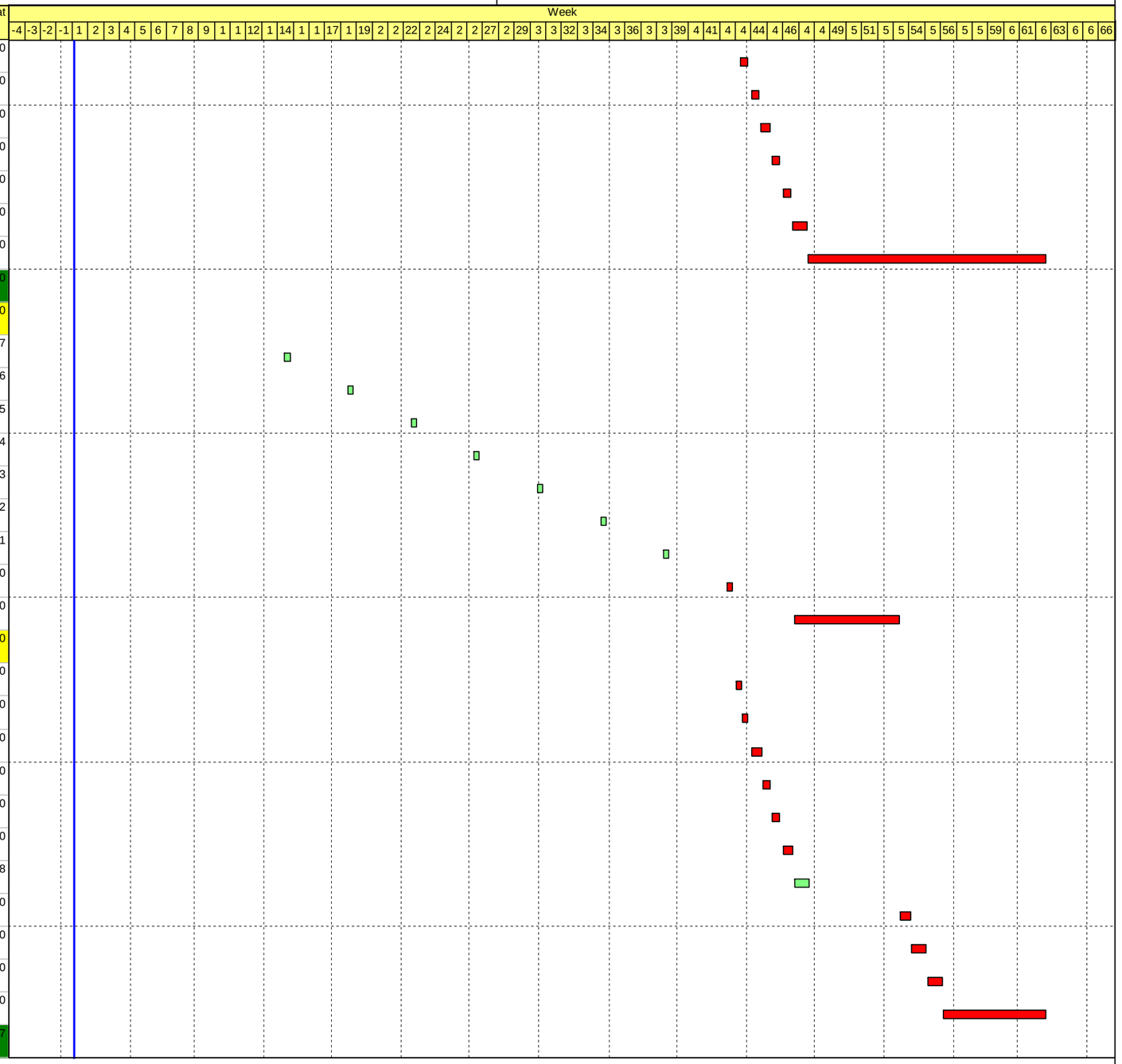
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A2280	Cure Concrete for Level 5	5	03-Oct-14	08-Oct-14	0
Roof Top		24	09-Oct-14	05-Nov-14	72
A1480	Form Roof Slab	3	09-Oct-14	11-Oct-14	0
A1490	Place Concrete for Roof Slab	4	13-Oct-14	16-Oct-14	0
A1500	Cure Roof Slab / Level 7	5	17-Oct-14	22-Oct-14	0
A2290	Form Walls for Level 7 R&A	3	23-Oct-14	25-Oct-14	72
A2300	Place Concrete for Level 7 R&A	4	27-Oct-14	30-Oct-14	72
A2310	Cure Concrete for Level 7	5	31-Oct-14	05-Nov-14	72
Mechanical		26	06-Nov-14	05-Dec-14	76
A1650	Rough in Mechanical 6th & 7th Level	6	06-Nov-14	12-Nov-14	72
A1660	Rough in Mechanical 5th Level	4	13-Nov-14	17-Nov-14	76
A1670	Rough in Mechanical 4th Level	4	18-Nov-14	21-Nov-14	76
A1680	Rough in Mechanical 3rd Level	4	22-Nov-14	26-Nov-14	76
A1690	Rough in mechanical 2nd Level	4	27-Nov-14	01-Dec-14	76
A1700	Rough in Mechanical 1st Level	4	02-Dec-14	05-Dec-14	76
Plumbing		17	21-Nov-14	10-Dec-14	76
A1720	Rough in Plumbing 5th Level	4	21-Nov-14	25-Nov-14	73
A1730	Rough in Plumbing 4th Level	4	22-Nov-14	26-Nov-14	76
A1740	Rough in Plumbing 3rd Level	4	27-Nov-14	01-Dec-14	76
A1710	Rough in Plumbing 6th & 7th Level	6	28-Nov-14	04-Dec-14	59
A1750	Rough in Plumbing 2nd Level	4	02-Dec-14	05-Dec-14	76
A1760	Rough in Plumbing 1st Level	4	06-Dec-14	10-Dec-14	76
Electrical		26	05-Dec-14	03-Jan-15	59
A1770	Rough in Electrical 6th & 7th Level	6	05-Dec-14	11-Dec-14	59
A1780	Rough in Electrical 5th Level	4	12-Dec-14	16-Dec-14	59
A1790	Rough in Electrical 4th Level	4	17-Dec-14	20-Dec-14	59
A1800	Rough in Electrical 3rd Level	4	22-Dec-14	25-Dec-14	59
A1810	Rough in Electrical 2nd Level	4	26-Dec-14	30-Dec-14	59
A1820	Rough in Electrical 1st Level	4	31-Dec-14	03-Jan-15	59
Interior		122	23-Oct-14	13-Mar-15	0
A1840	Place Windows	30	23-Oct-14	26-Nov-14	0



Remaining Level of Effort | Actual Work | Critical Remaining Work
Actual Level of Effort | Remaining Work | Milestone

HNTB

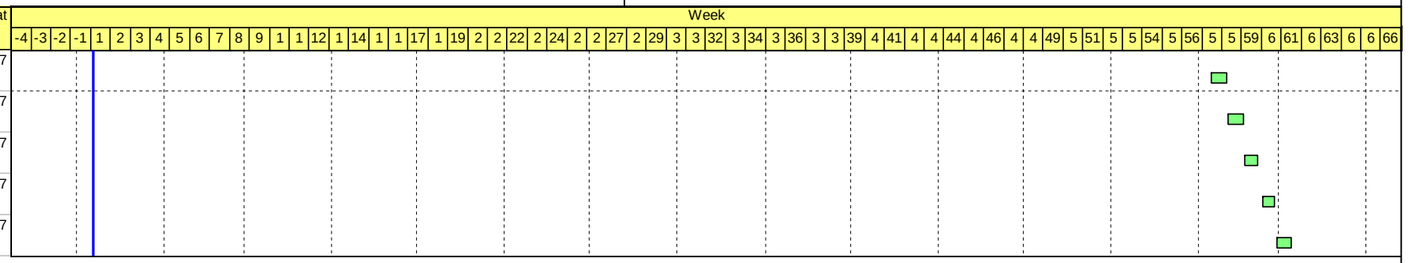
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A1870	Interior Wall Framing Level 1	4	29-Oct-14	01-Nov-14	0
A1880	Interior Wall Framing Level 2	4	03-Nov-14	06-Nov-14	0
A1890	Interior Wall Framing Level 3	4	07-Nov-14	11-Nov-14	0
A1900	Interior Wall Framing Level 4	4	12-Nov-14	15-Nov-14	0
A1910	Interior Wall Framing Level 5	4	17-Nov-14	20-Nov-14	0
A1920	Interior Wall Framing Level 6 and 7	6	21-Nov-14	27-Nov-14	0
A1830	Interior Finishings	91	28-Nov-14	13-Mar-15	0
Tower		290	10-Apr-14	13-Mar-15	0
Exterior Structure		234	10-Apr-14	07-Jan-15	0
A1850	Set Prefabricated Exterior Frame Work Ground Level	3	10-Apr-14	12-Apr-14	147
A2010	Set Prefabricated Exterior Frame Work Level 1	3	08-May-14	10-May-14	126
A2020	Set Prefabricated Exterior Frame Work Level 2	3	05-Jun-14	07-Jun-14	105
A2030	Set Prefabricated Exterior Frame Work Level 3	3	03-Jul-14	05-Jul-14	84
A2040	Set Prefabricated Exterior Frame Work Level 4	3	31-Jul-14	02-Aug-14	63
A2050	Set Prefabricated Exterior Frame Work Level 5	3	28-Aug-14	30-Aug-14	42
A2060	Set Prefabricated Exterior Frame Work Level 6	3	25-Sep-14	27-Sep-14	21
A2070	Set Prefabricated Exterior Frame Work Roof / Level 7	3	23-Oct-14	25-Oct-14	0
A1860	Set Exterior Panels Glass or Otherwise	40	22-Nov-14	07-Jan-15	0
Level 7		119	27-Oct-14	13-Mar-15	0
A1540	Form Level Seven Floor	3	27-Oct-14	29-Oct-14	0
A1550	Place Concrete for Level Seven Floor	3	30-Oct-14	01-Nov-14	0
A1560	Cure Floor	5	03-Nov-14	07-Nov-14	0
A2320	Form Interior Walls and Support Columns for Level 7	3	08-Nov-14	11-Nov-14	0
A2330	Place Concrete for Level 7	4	12-Nov-14	15-Nov-14	0
A2340	Cure Concrete for Level 7	5	17-Nov-14	21-Nov-14	0
A2360	Rough in Mechanical Level 7	6	22-Nov-14	28-Nov-14	38
A2350	Interior Wall Framing Level 7	4	08-Jan-15	12-Jan-15	0
A2370	Rough in Plumbing Level 7	6	13-Jan-15	19-Jan-15	0
A2380	Rough in Electrical Level 7	6	20-Jan-15	26-Jan-15	0
A2390	Interior Finishings	40	27-Jan-15	13-Mar-15	0
Roadway and Parking		25	05-Feb-15	05-Mar-15	7



Remaining Level of Effort | Actual Work | Critical Remaining Work
Actual Level of Effort | Remaining Work | Milestone

HNTB

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A1600	Rough Grade	5	05-Feb-15	10-Feb-15	7
A1610	Fine Grade	5	11-Feb-15	16-Feb-15	7
A1620	Place Base Course	5	17-Feb-15	21-Feb-15	7
A1630	Place Surface Course	5	23-Feb-15	27-Feb-15	7
A1640	Stripe Roadway and Parking Lot and Place Curbs	5	28-Feb-15	05-Mar-15	7



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

HNTB

Attachment 2

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 1	Week # 2	Week # 3	Week # 4	Week # 5	Week # 6	Week # 7	Week # 8	Week # 9	Week # 10	Week # 11	Week # 12
MAA-CNGC.Curb and Gutter Crew												
MAA-GRADE.Grading Crew								2	4			
MAA-ACPC.Asphaltic Concrete Paving Crew												
MAA-SCPC.Structural Concrete Placement Crew											4	6
MAA-STRIPE.Striping Crew												
MAA-PREF.Pre-Fabricated Structure Placement Crew												
MAA-UTILI.Utility Installation Crew						2	6	2				
MAA-PVDEM.Pavement Demolition Crew				10	12	8						
MAA-ADMIN.Administrative Support Team	5	6	6	6	6	6	6	6	6	6	6	6

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 13	Week # 14	Week # 15	Week # 16	Week # 17	Week # 18	Week # 19	Week # 20	Week # 21	Week # 22	Week # 23	Week # 24
MAA-CNGC.Curb and Gutter Crew												
MAA-GRADE.Grading Crew												
MAA-ACPC.Asphaltic Concrete Paving Crew												
MAA-SCPC.Structural Concrete Placement Crew	2		2		3		2		3		2	
MAA-STRIPE.Striping Crew												
MAA-PREF.Pre-Fabricated Structure Placement Crew		3				3				3		
MAA-UTILI.Utility Installation Crew												
MAA-PVDEM.Pavement Demolition Crew												
MAA-ADMIN.Administrative Support Team	6	6	6	6	6	6	6	6	6	6	6	6

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 25	Week # 26	Week # 27	Week # 28	Week # 29	Week # 30	Week # 31	Week # 32	Week # 33	Week # 34	Week # 35	Week # 36
MAA-CNGC.Curb and Gutter Crew												
MAA-GRADE.Grading Crew												
MAA-ACPC.Asphaltic Concrete Paving Crew												
MAA-SCPC.Structural Concrete Placement Crew	3		2		3		2		5		2	
MAA-STRIPE.Striping Crew												
MAA-PREF.Pre-Fabricated Structure Placement Crew		3				6	2			3		
MAA-UTILI.Utility Installation Crew												
MAA-PVDEM.Pavement Demolition Crew												
MAA-ADMIN.Administrative Support Team	6	6	6	6	6	6	6	6	6	6	6	6

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 37	Week # 38	Week # 39	Week # 40	Week # 41	Week # 42	Week # 43	Week # 44	Week # 45	Week # 46	Week # 47	Week # 48
MAA-CNGC.Curb and Gutter Crew												
MAA-GRADE.Grading Crew												
MAA-ACPC.Asphaltic Concrete Paving Crew												
MAA-SCPC.Structural Concrete Placement Crew	5		2		3		5		2			
MAA-STRIPE.Striping Crew												
MAA-PREF.Pre-Fabricated Structure Placement Crew		3				3				1	4	4
MAA-UTILI.Utility Installation Crew												
MAA-PVDEM.Pavement Demolition Crew												
MAA-ADMIN.Administrative Support Team	6	6	6	6	6	6	6	6	6	6	6	6

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 49	Week # 50	Week # 51	Week # 52	Week # 53	Week # 54	Week # 55	Week # 56	Week # 57	Week # 58	Week # 59	Week # 60
MAA-CNGC.Curb and Gutter Crew												1
MAA-GRADE.Grading Crew									3	6	1	
MAA-ACPC.Asphaltic Concrete Paving Crew											5	5
MAA-SCPC.Structural Concrete Placement Crew												
MAA-STRIPE.Striping Crew												1
MAA-PREF.Pre-Fabricated Structure Placement Crew	4	4	4	4	2							
MAA-UTILI.Utility Installation Crew												
MAA-PVDEM.Pavement Demolition Crew												
MAA-ADMIN.Administrative Support Team	6	6	6	6	6	6	6	6	6	6	6	6

Construction Schedule Assumptions - Crew Usage Per Week

Resource ID Name	Week # 61	Week # 62
MAA-CNGC.Curb and Gutter Crew	4	
MAA-GRADE.Grading Crew		
MAA-ACPC.Asphaltic Concrete Paving Crew		
MAA-SCPC.Structural Concrete Placement Crew		
MAA-STRIPE.Striping Crew	4	
MAA-PREF.Pre-Fabricated Structure Placement Crew		
MAA-UTILI.Utility Installation Crew		
MAA-PVDEM.Pavement Demolition Crew		
MAA-ADMIN.Administrative Support Team	6	5