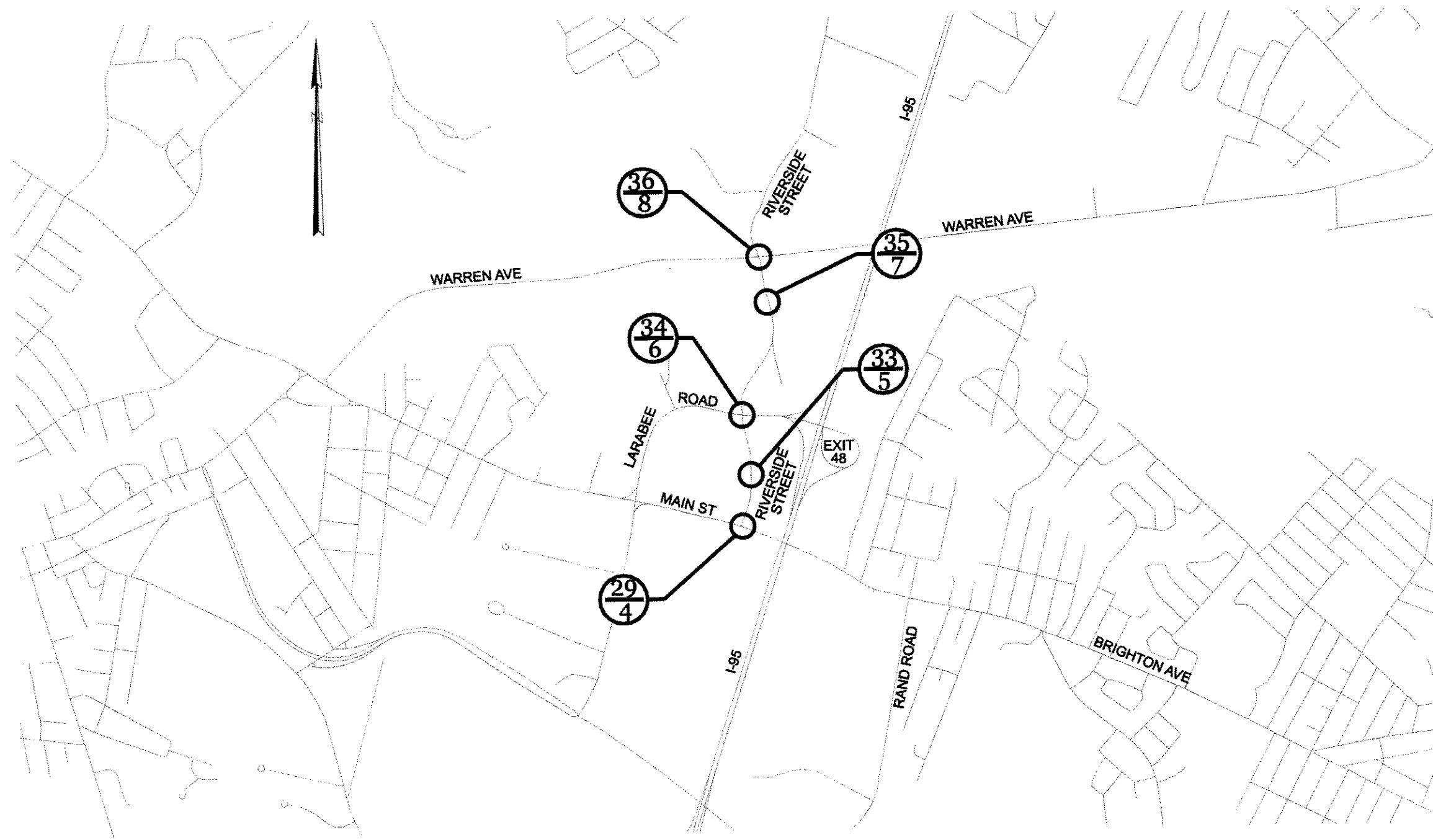


STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

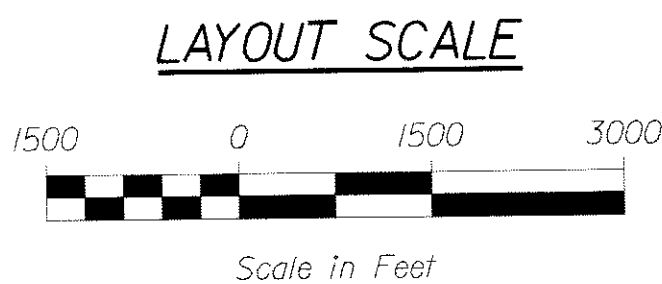


PORTLAND
CUMBERLAND COUNTY
RIVERSIDE STREET
STP-1785(600)X

PROJECT LENGTH : 5 SIGNALS
PACTS RTMS TIER I IMPROVEMENTS



KEY:
 Project Intersection Number
Sheet Number



Vanasse Hangen Brustlin, Inc.

PLAN LEGEND

	Existing	Proposed
Controller with Cabinet		
Vehicular Head		
Video Detection Camera		
Junction Box		
Mast Arm with Steel Pole		
Pedestal Post and Foundation		
Span Wire or Mast Arm Mounted Sign		
Pedestrian Signal Head with Push Button and Informational Sign		
Existing Aerial Copper Interconnect Cable		
Existing Underground Copper Interconnect Cable		
Proposed Underground Conduit		

INDEX OF SHEETS

Description	Sheet No.
Title Sheet	1
General Notes	2
Overall Map	3
Traffic Signal Plans	4-8
Communications Network Diagram	9
Time Space Diagrams	10-11
Bid Alternate No. 1	12

TRAFFIC DATA	RIVERSIDE ST. S/O WARREN	RIVERSIDE ST. N/O WARREN
Current (2010) AADT	29830	19360
Future (2020) AADT	34400	22300
DHV - % of AADT	8%	8%
Design Hour Volume	2890	2010
% Heavy Trucks (AADT)	8%	8%
% Heavy Trucks (DHV)	4%	3%
Directional Distribution (DHV)	50%	56%
18 kip Equivalent P 2.0 (2006)	1135	708
18 kip Equivalent P 2.5 (2006)	1118	697
Design Speed (mph)	30	30
Functional Class:	ARTERIAL	ARTERIAL

PROJECT LOCATION:

In the City of Portland along Riverside Street at 5 existing traffic signals from the intersection of Rte. 25 (Brighton Avenue) northerly to the intersection of Warren Avenue.

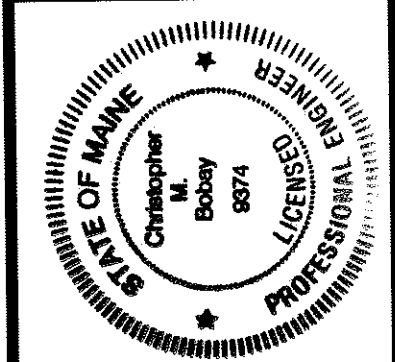
PROGRAM AREA:

Traffic Program

OUTLINE OF WORK:

Traffic Signal Interconnection, Modernization, and other incidental work

STATE OF MAINE DEPARTMENT OF TRANSPORTATION	APPROVED	DATE
COMMISSIONER:		7/26/11
CHIEF ENGINEER:		7/26/11



SIGNATURE	P.E. NUMBER	DATE
	9374	7-20-11

PROJECT INFORMATION	TRAFFIC
PROGRAM	J. MANSIR
PROJECT MANAGER	C. BOBAY
DESIGNER	VHB
CONSULTANT	
PROJECT RESIDENT	
CONTRACTOR	
PROJECT COMPLETION DATE	

PORTLAND RIVERSIDE STREET	TITLE SHEET
------------------------------	-------------

SHEET NUMBER
1
OF 12

WIN 17856.00 STP-1785(600)X

GENERAL NOTES:

1. The Contractor shall meet all utility requirements for new service connections.

2. All splices will be made in the cabinets meeting MaineDOT specifications.

3. For pole mounted signal heads, the bottom of the housing shall be mounted at least 8 feet but not more than 19 feet above the sidewalk, or if there is no sidewalk, above the pavement grade at the high point of the road.

4. Two copies of as-built plans, shall be left in each of the controller cabinets.

5. The Contractor is responsible for finding exact locations of existing utilities prior to construction. The Contractor shall contact Dig-Safe and appropriate authorities prior to any subsurface activities.

6. Traffic signal work shall be completed in a manner and order that will cause the minimum disruption to traffic.

7. The Engineer and MaineDOT shall have the right and authority to determine the acceptability of work and materials in progress or completed and shall have the right to reject any work or materials which do not conform, in its sole opinion, to the plans or specifications.

8. All signing and signal placements shall conform to the MaineDOT standard specifications, supplemental specifications and standard details and with the Federal Highway Administration "Manual on Uniform Traffic Control Devices" (MUTCD) dated 2003, as amended.

9. Any relocations or adjustments of existing utility facilities will be made by the respective utilities in coordination with the work of the Contractor.

10. Contractor shall be responsible for obtaining any necessary street/sidewalk occupancy or opening permits.

11. All existing driveway accesses shall be maintained at all times.

12. The Contractor shall provide the Engineer, MaineDOT, and the City of Portland with a schedule of work and work zone control plans in accordance with the City Code of Ordinance Chapter 25 Article VII for constructing the traffic improvements at least two weeks prior to the commencement of work.

13. All material schedules shown on the plans are for general information only. The Contractor shall prepare his own material schedules based upon his plan review. All schedules shall be verified in the field by the Contractor prior to ordering materials or performing work.

14. All non-paved areas disturbed during construction shall be loamed and seeded, unless otherwise directed by the owner. All paved areas disturbed during construction shall be repaired by the Contractor in accordance with the City Technical Manual. Costs for repair of disturbed areas shall be incidental to other contract items.

15. Equipment

Contractor Furnished Equipment - The traffic signal controllers and various other equipment items shown on the plans shall be furnished and installed by the Contractor. Per the specifications listed in the City of Portland Technical Manual dated 4/21/10, the traffic signal controllers supplied under this contract shall be Naztec NEMA TS-2 and shall have the capability of supporting NTCIP protocols. Traffic signal controllers shall support direct Ethernet communications from the proposed in-cabinet DSL modem to the controller's Ethernet port. The equipment supplied and installed shall be capable of supporting all of the system functionality currently in place between recently supplied and installed Naztec traffic signal controllers operating as on-street closed loop systems and shown as being retained for reprogramming and reuse in this project.

The system shall employ an IP-based communications network to and from the central system control computer. The equipment supplied and installed shall be capable of upload to and download from each of the system's traffic signal controller databases, remotely access local intersection reports, remotely access processed vehicle detector data, and provide real time intersection status to support graphical local and system maps.

The Contractor shall be solely responsible for providing the project with working and fully configured controllers for each intersection, delivery and complete set-up of the central system, installation of the central and local intersection communications interface, and coordination with the information technology (IT) personnel at the City of Portland or other location as directed by the City. The Contractor is further responsible for any local wiring at the City of Portland's system computer location, system Start-up and System Loading, Acceptance Testing, and System Maintenance.

The Contractor shall be solely responsible for furnishing and installing all other equipment to include pedestrian signals, pedestrian push buttons and signs, copper interconnect and connections, field wiring, and all other equipment necessary to provide complete and operational traffic signal systems. The Contractor shall be aware of and conform to all details for the material specifications in Special Provision 718.

16. Start-Up and System Loading

The system supplier shall initiate complete system operation from the controller and system timing schedules shown on the plans or data supplied by the Engineer and shall initiate stop line detectors logging operation at the direction of the Engineer. After the supplier has initiated system operation and detector logging, the system shall be run for a continuous 7-day initial operational testing period. If any major functions of the system fail to operate during this testing period, as determined by the Engineer, the supplier shall correct or repair the system and the continuous 7-day testing period shall be restarted. At the completion of a successful 7-day testing period, the supplier shall advise the Engineer that the system is ready for the Start-up Phase. Within 7 days of completion of the initial testing period the supplier's engineer will begin loading the system for full coordinated operations. After coordination has been initiated and run for approximately two weeks, the Engineer shall evaluate system operation and make adjustments as necessary. The Supplier's engineer does not need to be on-site during this period, but must be available by telephone or by demand on-site as needed. Any major system malfunctions encountered during this testing period shall be corrected by the supplier, and the test restarted. During this period the Engineer may make modifications to the system timing parameters, but this will not cause restarting of the testing period. At the completion of the coordination testing period the system will be deemed ready for final Acceptance Testing as described below. Testing of controllers per section 718.07 is not required.

17. Acceptance Testing

Upon completion of the 14-day coordination testing period, the Engineer shall evaluate system operation. It is expected that the complete system shall operate fully functional at the City of Portland and the remote locations for a period of 30 consecutive days without malfunction. Minor malfunctions of inoperability not the fault of the Contractor, as judged by the Engineer, are not included in the 30-day period. If the system fails to operate as intended or the supplier's claims, the malfunction shall be corrected by the Contractor at its cost and a new 30-day testing period shall begin. This process shall continue until a completely operable system is demonstrated for a consecutive 30-day period.

Acceptance testing must demonstrate to the Engineer's reasonable satisfaction that the hardware and licensed software function in accordance with the specifications, requirements, through-puts, functionalities, performance criteria or other benefits stated in documentation, promotional materials, proposals, and/or demonstrations given to MaineDOT and the City of Portland.

18. System Maintenance

The system must come with a minimum five (5) year software maintenance agreement to become effective when the proposed system has been accepted, in writing, by MaineDOT and the City of Portland.

Software updates shall be provided free of charge for five (5) years from date of system acceptance. Software corrections or required modifications for proper system operation per these specifications shall be furnished to MaineDOT and the City of Portland at no additional cost during the warranty period.

Hardware equipment shall be warranted for three (3) years, effective when the installed and functional system has been accepted, in writing, by MaineDOT, the City of Portland.

Third party hardware and software licenses and warranties shall be passed to MaineDOT and the City of Portland.

19. The Contractor shall replace any existing local intersection wire loop detectors that are not functioning at any signalized intersection in the project prior to System Start-up and Loading. The Contractor shall also re-inspect each signalized intersection during the Acceptance Testing period and replace each non-functioning loop detector and certify that all loop detectors are functioning properly before final acceptance is granted. The Contractor shall notify and receive authorization from the Engineer before replacing any malfunctioning loop detector.

20. As payment for work on this project, the Contractor shall submit a lump sum bid per intersection. Any modifications to existing copper interconnect cable (e.g. T-Taps) shall be subsidiary to ITEM 643.81. See Special Provision 643 for additional information.

Any equipment not claimed by the City of Portland for salvage shall be removed from the site by the Contractor and disposed of in a manner acceptable to the Engineer.

22. The Contractor shall be responsible for submitting RED-LINE AS-BUILT drawings of the final work to the Engineer. Those drawings shall be on a clean set of plans showing all changes or modifications to the Bid Plans.

23. The Contractor will be responsible for the relocation of power meters if required. This work will be incidental to item 643.71 as applicable to the location of the work.

24. The Contractor shall perform the work in a manner that will require the least amount of downtime to the traffic signal operations. Any police detail required (as deemed necessary by the Resident Engineer) will be paid for by the Contractor.

25. The Contractor shall remain alert for any evidence of contaminated soils. The Contractor shall employ appropriate health and safety measures to protect its workers against hazards associated with excavating and working near contaminated soils. If the Contractor encounters evidence of soil or groundwater contamination, the Contractor shall secure the excavation, stop work in the contaminated area, and immediately notify the Engineer. The Engineer shall contact the Hydrogeologist in MaineDOT's Environmental Office at 207-624-3100 and the Maine Department of Environmental Protection at 800-482-0777. Work may only continue with authorization from the Engineer.

26. The Contractor is directed to project Special Provision 718 for additional information related to the following:

- 718.12 Traffic signal control system

Special provision 718 expands upon the information found in these general notes. As such, the more restrictive language between these general notes and special provision 718 shall govern the work to be performed under this project.

27. The intersection base plans shown on Sheets 4-8 were digitized by VHB based on aerial photography provided by the City of Portland. Supplemental information was obtained by VHB from field reviews and inventory conducted November 12, 2008 and April 6-9, 2009.

DAILY AND WEEKLY COORDINATION SCHEDULE

WEEK	DAY OF WEEK						
PROG	SUN	MON	TUE	WED	THU	FRI	SAT
JAN-DEC	3	1	1	1	1	1	2

EVENT	TIME			ACTION
	HR	MIN	SEC	
DAY PLAN 1				
1	00	00	00	54
2	06	00	00	1
3	06	45	00	4
4	08	45	00	2
5	10	30	00	3
6	11	45	00	5
7	13	05	00	3
8	14	45	00	5
9	18	00	00	3
10	19	00	00	2
11	20	00	00	54
DAY PLAN 2				
1	00	00	00	54
2	10	00	00	3
3	11	15	00	3
4	15	30	00	3
5	18	00	00	2
6	19	00	00	54
DAY PLAN 3				
1	00	00	00	54
2	10	00	00	2
3	11	15	00	3
4	15	30	00	2
5	18	30	00	54

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
PORTLAND STP-1785(600)X
WIN
17856.00

PROJ. MANAGER

J. MANSIR

DESIGN-DETAILED

M. GRAHAM

CHECKED-REVIEWED

C. BOBBY

DESIGNS-DETAILED

DESIGNS-DETAILED

REVISIONS 1

REVISIONS 2

REVISIONS 3

REVISIONS 4

FIELD CHANGES

DATE

7/15/11

BY

J. ROBERT

DATE

7/18/11

BY

E. DREW

SIGNATURE

P.E. NUMBER

DATE

RIVERSIDE STREET

GENERAL NOTES

SHEET NUMBER

2

OF 12

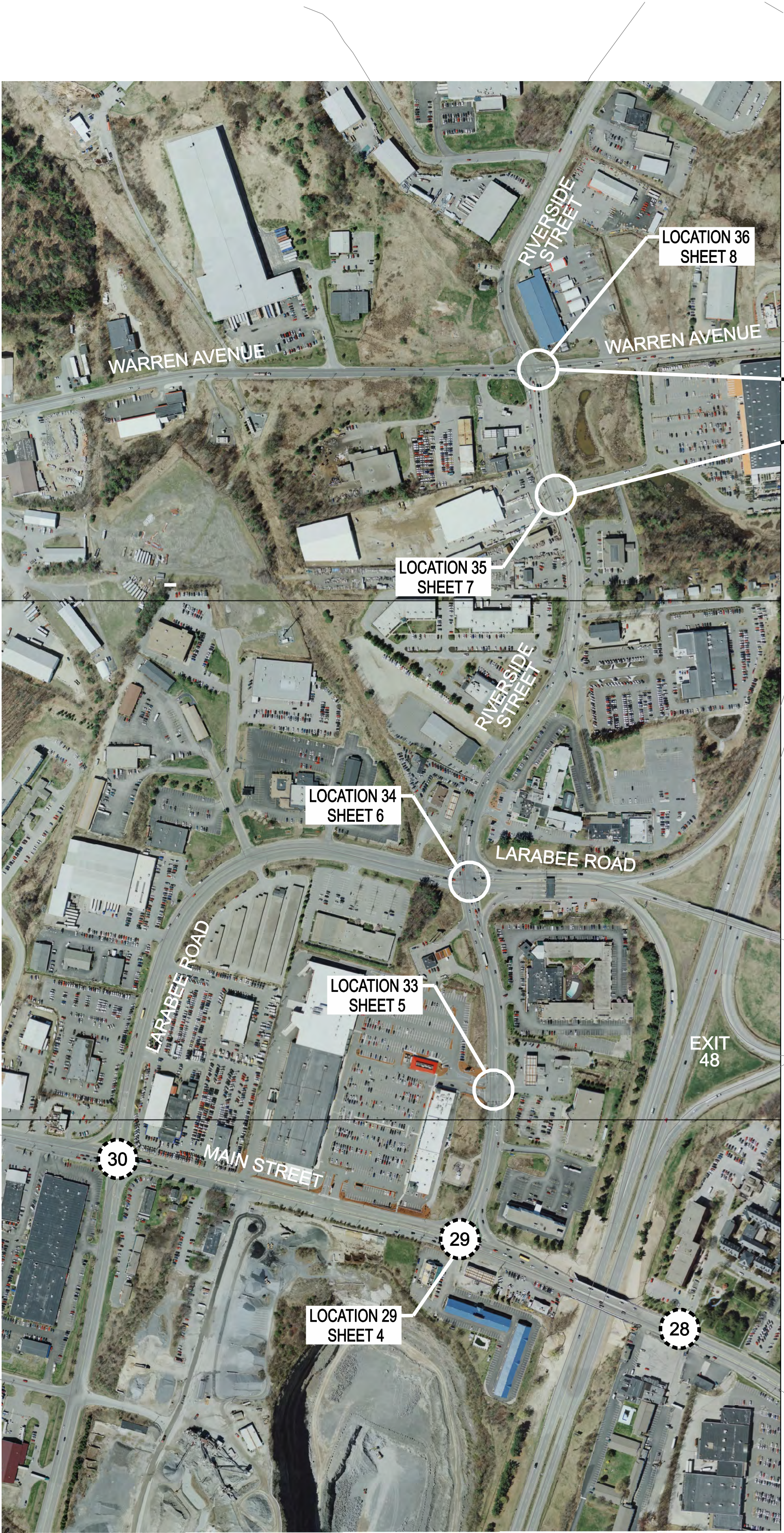
MAP LEGEND

17856.00 PROJECT INTERSECTION
(LOCATION NUMBER IS PROPOSED
PORTLAND TRAFFIC SERVER
STREETWISE DROP NUMBER)

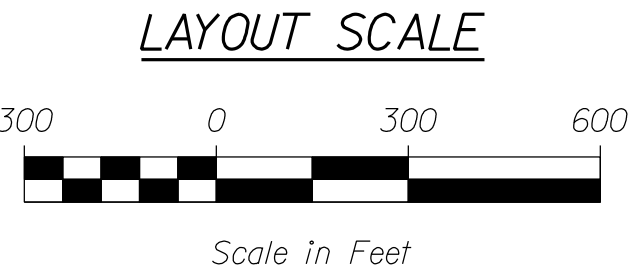
17730.00 EXISTING PORTLAND TRAFFIC
SERVER STREETWISE INTERSECTION

##

17730.00 EXISTING PORTLAND TRAFFIC
SERVER STREETWISE IDENTIFICATION
(DROP) NUMBER



NOTE: INTERSECTIONS AND SIGNALS UNDER
RECONSTRUCTION, MAINEDOT PROJECT 5136.30



STATE OF MAINE		DEPARTMENT OF TRANSPORTATION	
PORTLAND STP-1785(600)X		WIN 17856.00	
RIVERSIDE STREET		SHEET NUMBER	
OVERALL MAP		3	
OF 12		DATE	
BY		SIGNATURE	
J. ROBERT		P.E. NUMBER	
E. DREW		DATE	
J. MANSIR		DATE	
M. GRAHAM		DATE	
C. BOBBY		DATE	
DESIGN DETAILED		DATE	
DESIGN DETAILED		DATE	
REVISIONS 1		DATE	
REVISIONS 2		DATE	
REVISIONS 3		DATE	
REVISIONS 4		DATE	
FIELD CHANGES		DATE	

LIST OF MAJOR ITEMS

EQUIPMENT AND WORK ITEMS 643.71	QUANTITY
ACTELIS ML684 DSL MODEM	1
VERIFY LOCAL AND SYSTEM TIMING	-

THE QUANTITIES LISTED ABOVE ARE APPROXIMATE AND
ARE FURNISHED FOR INFORMATION ONLY.

EXISTING SIGNAL TIMING SCHEDULE

ITEM / PHASE	1	2	3	4	5	6	7	8	9
MINIMUM INITIAL	5	10	7	5	5	10			
PASSAGE TIME	1.5	2.5	3.0	2.0	2.5	3.0			
MAXIMUM 1	12	45	20	18	15	45			
MAXIMUM 2	15	60	30	25	15	70			
YELLOW	3.5	3.5	3.5	3.5	3.5	3.5			
ALL RED	2.5	2.5	2.5	2.5	2.5	2.5			
PEDESTRIAN WALK		5		5		5			
PEDESTRIAN CLEARANCE		15		16		15			
RECALL	O	S	O	O	O	S			
DETECTOR OPERATION	PR	PR	PR	PR	PR	PR			
PREEMPTION PRIORITY									
FLASH	R	R	R	R	R	R			
DUAL ENTRY	OFF	OFF	OFF	OFF	OFF	OFF			

NOTES: S = SOFT RECALL Y = YELLOW
O = RECALL OFF R = RED
PR = PRESENCE D = DARK
MAX2 = UNDER COORDINATION

COORDINATION CYCLE/SPLIT/OFFSET SCHEDULE
ALL ENTRIES IN SECONDS

	PLAN 1	PLAN 2	PLAN 3	PLAN 4	PLAN 5	COORDINATION MODE SET TO FIXED FORCE-OFF
CYCLE LENGTH	80	90	100	110	120	
OFFSET (END Ø6 GRN)	71	80	91	60	70	
YIELD POINT	0	0	0	0	0	
SPLIT TIME Ø1	13	13	13	13	16	
SPLIT TIME Ø2	27	28	38	38	45	
SPLIT TIME Ø3	13	21	21	31	31	
SPLIT TIME Ø4	27	28	28	28	28	
SPLIT TIME Ø5	14	18	21	21	18	
SPLIT TIME Ø6	26	23	30	30	43	
SPLIT TIME Ø7	0	0	0	0	0	
SPLIT TIME Ø8	40	49	49	59	59	

COORDINATION NOTES:

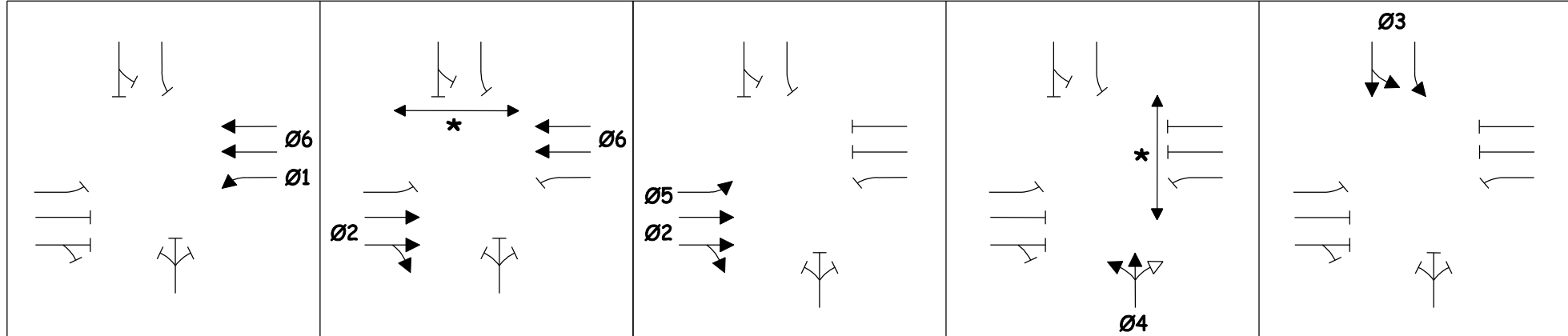
- OFFSET IS REFERENCED TO THE END OF THE COORDINATED PHASE (Ø6 PER NTCIP).
- COORDINATION OPERATES BY TIME-OF-DAY (SEE SHEET 2 FOR DAY PLAN SETTINGS).
- TRAFFIC SIGNAL CONTROLLER SET FOR STOP TIME IN WALK TO ON.
- PHASE 8 IS A DUMMY PHASE SET WITH SPLIT TIMES FOR NTCIP COMPLIANCE.

DETECTOR SCHEDULE

DETECTOR				AMPLIFIER				INDUCTANCE	CONTINUITY	RESISTANCE LOOP TO GROUND
STREET	DIRECTION	LANE	Ø	TYPE	SLOT NO.	DETECTOR NO.	CHANNEL			
BRIGHTON AVE	WESTBOUND	LEFT	1							
BRIGHTON AVE	EASTBOUND	THRU/THRU-RIGHT	2							
RIVERSIDE ST	SOUTHBOUND	LEFT/LEFT-THRU	3							
DRIVEWAY	NORTHBOUND	ALL DEPARTURE	4							
BRIGHTON AVE	EASTBOUND	LEFT	5							
BRIGHTON AVE	WESTBOUND	THROUGHS	6							
RECORD FIELD MEASUREMENTS HERE										

DETECTOR NOTES:
CONTRACTOR SHALL COMPLETE THE DETECTOR SCHEDULE FOR RECORD OF
DETECTOR PROGRAMMING INTO THE TRAFFIC SIGNAL CONTROLLER.

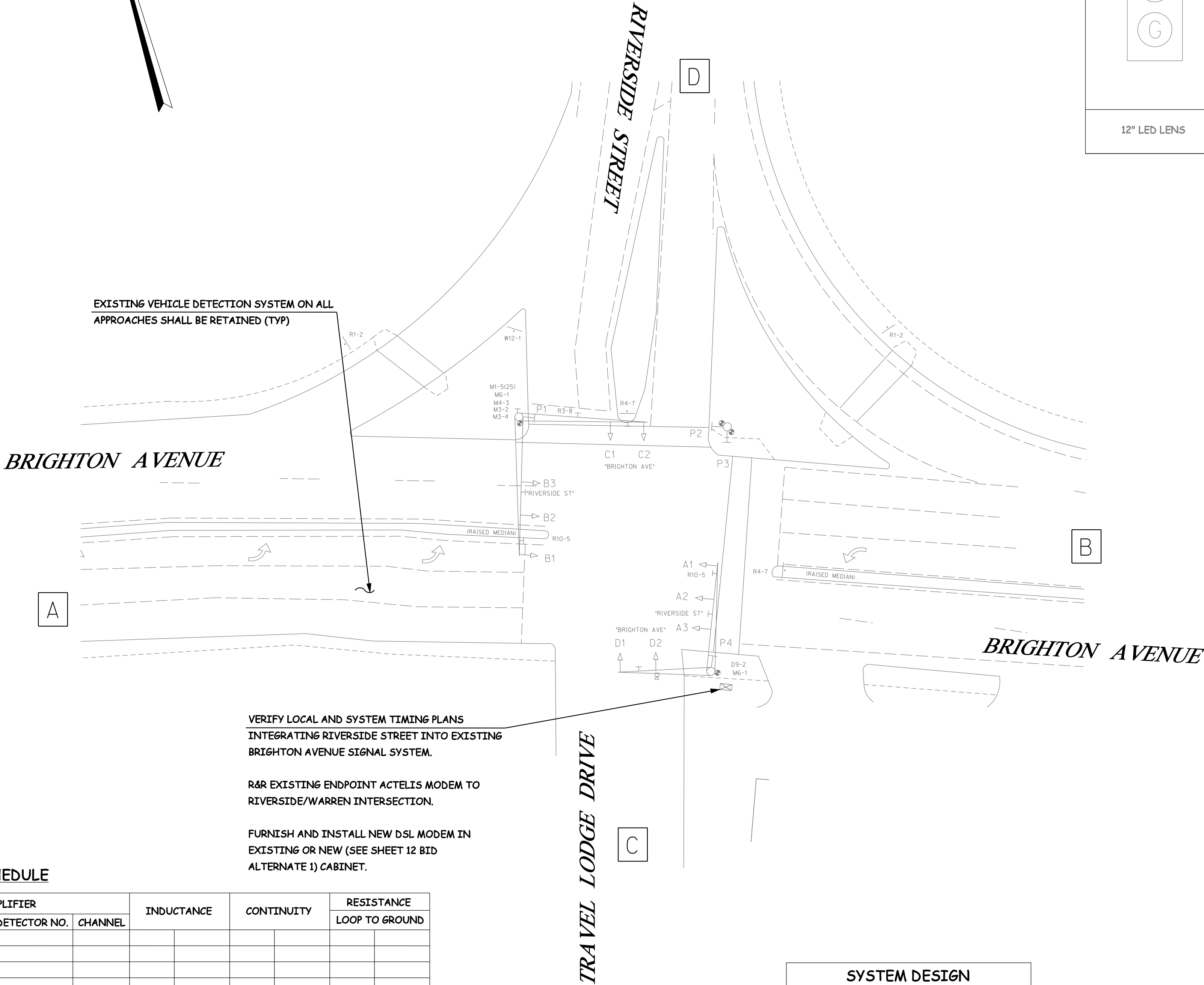
EXISTING PHASING SEQUENCE



* NORMALLY DW, UPON PEDESTRIAN ACTUATION, W/FDW COUNTDOWN

SIGNAL HEAD DATA

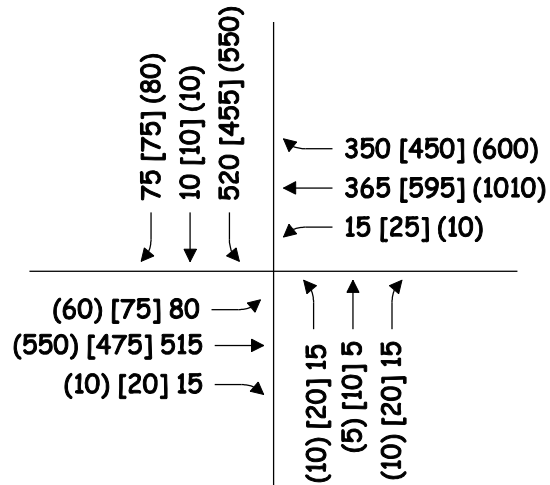
EXISTING			
C1,C2	A3	A2,B2,B3	P1-P4
12" LED LENS	12" LED LENS	12" LED LENS	16" x 18" LED PEDESTRIAN SIGNAL
EXISTING			
D1	A1,B1	D2	
12" LED LENS	12" LED LENS	12" LED LENS	



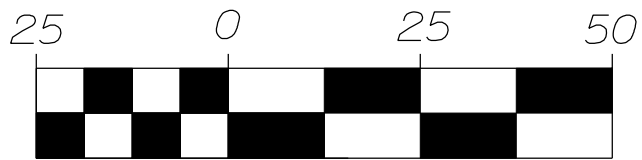
INTERSECTION:
RIVERSIDE ST /
BRIGHTON AVE
SIGNAL GROUP:
2
LOCATION / EXISTING DROP:
29

EXISTING STREETWISE REFERENCE NO. 229

SYSTEM DESIGN
VOLUMES AM [MID] (PM)



PLAN



SCALE

PROJ. MANAGER	DATE	BY	SIGNATURE	P.E. NUMBER	DATE
J. MANSIR	7/15/11	J. ROBERT			
DESIGNED-DETAILED	7/18/11	E. DREW			
CHECKED-REVIEWED					
DESIGNED-DETAILED					
REVISIONS 1					
REVISIONS 2					
REVISIONS 3					
REVISIONS 4					
FIELD CHANGES					

EQUIPMENT AND WORK ITEMS 643.71	QUANTITY
ACTELIS ML684 DSL MODEM	1
NAZTEC ENHANCED MMU WITH ETHERNET PORT	1
BRACKET MOUNTED 16 x 18 INCH COUNTDOWN PEDESTRIAN SIGNAL HEAD PAINTED BLACK. INDICATION SHALL BE ENERGY EFFICIENT, GELCORE GT1 LED OR APPROVED EQUAL	4
ADA COMPLIANT PEDESTRIAN 2-INCH PELCO MUSHROOM TYPE PUSHBUTTON WITH R10-3e SIGN	2
R10-3e SIGN	2
IMPLEMENT LOCAL AND SYSTEM TIMING	-
FURNISH AND INSTALL 8-FOOT PEDESTAL POST (ITEM 643.92)	1
FURNISH AND INSTALL 18-INCH FOUNDATION (ITEM 626.31)	1
FURNISH AND INSTALL PRECAST CONCRETE JUNCTION BOX (ITEM 626.11)	1
FURNISH AND INSTALL 3-INCH PVC SIGNAL CONDUIT (ITEM 626.22)	10 LF

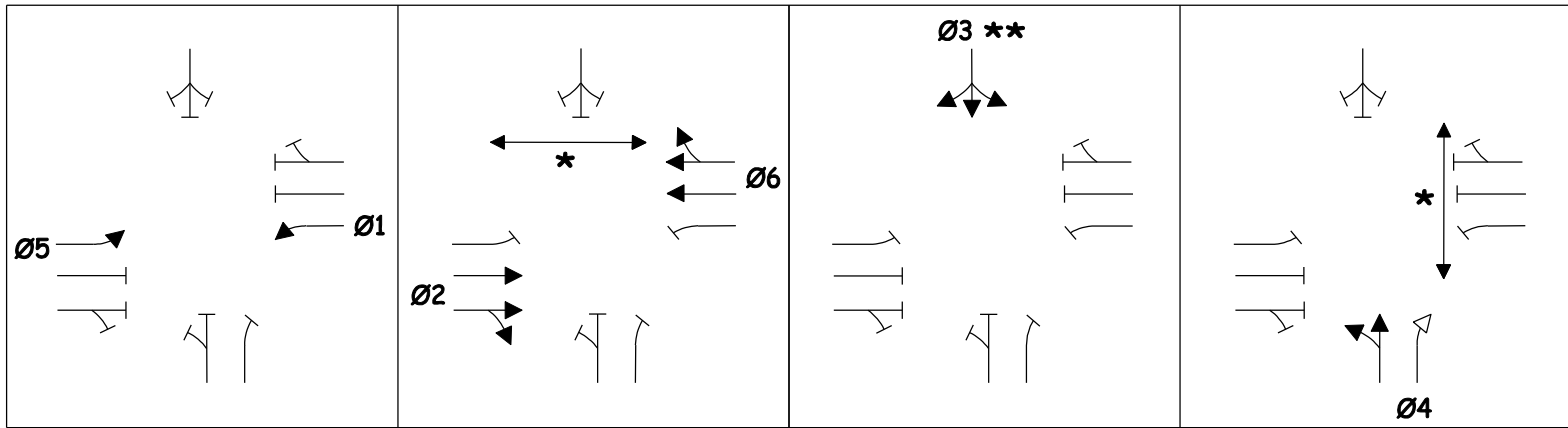
SIGNAL TIMING SCHEDULE

[illegible]

DETECTOR SCHEDULE

DETECTOR				AMPLIFIER				INDUCTANCE	CONTINUITY		RESISTANCE	
STREET	DIRECTION	LANE	Ø	TYPE	SLOT NO.	DETECTOR NO.	CHANNEL				LOOP TO GROUND	
VIP/CITGO DRIVE	WESTBOUND	LEFT-THRU-RIGHT	3		3							
WESTBROOK XING	EASTBOUND	LEFT-THRU	4		3							
								RECORD FIELD MEASUREMENTS HERE				

PROPOSED PHASING SEQUENCE



*** IF FEASIBLE, CONTRACTOR IS ENCOURAGED TO MOVE EXISTING Ø8 LOAD SWITCH AND FIELD TERMINALS TO Ø3 AND REPROGRAM CONTROLLER ACCORDINGLY



R&S EXISTING PEDESTRIAN SIGNAL HEADS AND INFORMATIONAL SIGNS

**F&I (4) NEW COUNTDOWN PEDESTRIAN SIGNAL
HEADS AND R10-3e INFORMATIONAL SIGNS**

FURNISH AND INSTALL (F&I) NEW DSL MODEM IN EXISTING CABINET AND PROVIDE SOFTWARE UPDATE TO EXISTING ETHERNET EQUIPPED TRAFFIC SIGNAL CONTROLLER.

F&I NEW ENHANCED MMU WITH ETHERNET PORT. CONNECT MMU AND EXISTING VIDEO DETECTION TO ACTELIS MODEM FOR COMMUNICATIONS BACK TO TRAFFIC OPERATIONS FACILITIES MANAGEMENT BUILDING AT 65 HANOVER STREET. PROVIDE AND CONFIGURE TRAFICON CONFIGURATION TOOL SOFTWARE AND EXPLORER HYPERLINKS TO VIEW LIVE VIDEO DETECTION RETURNS.

IMPLEMENT LOCAL AND SYSTEM TIMING PLANS

F&I NEW 3-INCH PVC CONDUIT.
PROVIDE JUNCTION BOX IF NEEDED UPON
CONSULTATION WITH RESIDENT ENGINEER
ONCE EXISTING CONDUIT(S) TO TIE INTO
ARE IDENTIFIED.

R&R EXISTING 4-FOOT PEDISTAL POLE ON NEW FOUNDATION
WITH ADA COMPLIANT (2-INCH MUSHROOM TYPE) PUSH
BUTTON AND R10-3e INFORMATIONAL SIGN

F&I NEW 8-FOOT POST ON EXISTING FOUNDATION WITH
COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH ADA
COMPLIANT (2-INCH MUSHROOM TYPE) PUSH BUTTON
AND R10-3e INFORMATIONAL SIGN

EXISTING				PROPOSED
A1,B1	C1,D1	A2,A3,B2,B3,D2	C2	P1-P4
12" LED LENS	12" LED LENS	12" LED LENS	12" LED LENS	16" x 18" LED PEDESTRIAN SIGNAL
WITH 5-INCH LOUVERED BACKPLATES				

COORDINATION CYCLE/SPLIT/OFFSET SCHEDULE

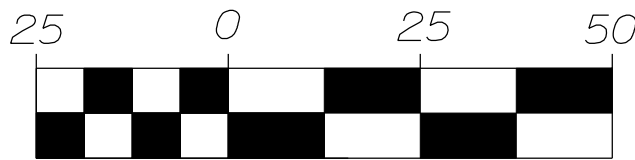
ALL ENTRIES IN SECONDS

	PLAN 1	PLAN 2	PLAN 3	PLAN 4	PLAN 5	COORDINATION MODE SET TO FIXED FORCE-OFF
CYCLE LENGTH	80	90	100	110	120	
OFFSET (END Ø2 GRN)	33	44	51	16	10	
YIELD POINT	0	0	0	0	0	
SPLIT TIME Ø1	14	21	21	21	21	
SPLIT TIME Ø2	27	29	32	42	46	
SPLIT TIME Ø3	15	16	18	21	21	
SPLIT TIME Ø4	24	24	29	26	32	
SPLIT TIME Ø5	14	18	16	16	16	
SPLIT TIME Ø6	27	32	37	47	51	
SPLIT TIME Ø7	24	24	29	26	32	
SPLIT TIME Ø8	15	16	18	21	21	

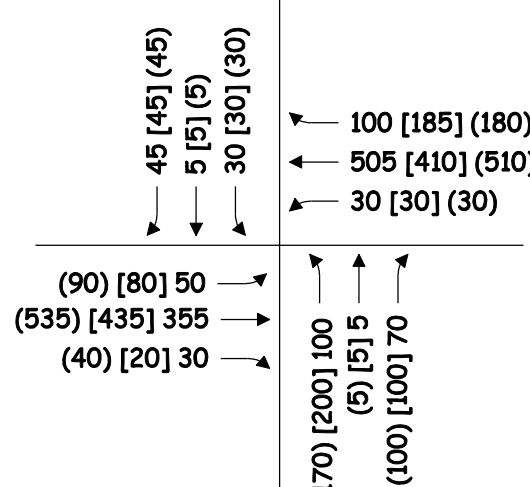
COORDINATION NOTES:

1. OFFSET IS REFERENCED TO THE END OF THE COORDINATED PHASE
(Ø2 PER NTCP).
2. COORDINATION TO OPERATE BY TIME-OF-DAY
(SEE SHEET 2 FOR DAY PLAN SETTINGS).
3. TRAFFIC SIGNAL CONTROLLER SHALL BE SET FOR STOP TIME IN WALK TO ON
4. PHASE 7 AND 8 ARE DUMMY PHASES TO BE SET WITH SPLIT TIMES FOR
NTCP COMPLIANCE.

PLAN



SCALE

SYSTEM DESIGN
VOLUMES AM [MID] (PM)

INTERSECTION:
RIVERSIDE ST / WESTBROOK
CROSSING

SIGNAL GROUP:
2

LOCATION / PROPOSED DROP:
33

EXISTING STREETWISE REFERENCE NO. 1911

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PORTLAND STP-1785(600)X

WIN
17856.00

SIGNATURE _____

P.E. NUMBER

DATE _____

PROJ. MANAGER		J. MANSIR	BY	DATE
DESIGN-DETAILED		M. GRAHAM	J. ROBERT	7/15/11
CHECKED-REVIEWED		C. BOBAY	E. DREW	7/18/11

DESIGN 3-DETAILED3		
REVISIONS 1		

REVISIONS 2	
REVISIONS 3	
REVISIONS 4	

**RIVERSIDE STREET
WESTBROOK CROSSING**

TRAFFIC SIGNAL PLAN

SHEET NUMBER

5

OF 12

LIST OF MAJOR ITEMS

EQUIPMENT AND WORK ITEMS 643.71	QUANTITY
ACTELIS ML684 DSL MODEM	1
NAZTEC TS2 TYPE 1 ETHERNET EQUIPPED TRAFFIC SIGNAL CONTROLLER FACEPLATE AND SOFTWARE UPDATE	1
NAZTEC ENHANCED MMU WITH ETHERNET PORT	1
IMPLEMENT LOCAL AND SYSTEM TIMING	-

THE QUANTITIES LISTED ABOVE ARE APPROXIMATE AND ARE FURNISHED FOR INFORMATION ONLY.

SIGNAL TIMING SCHEDULE

ITEM / PHASE	1	2	3	4	5	6	7	8	9
MINIMUM INITIAL	10	10	5	5			5	5	
PASSAGE TIME	3.0	3.0	3.0	3.0			3.0	3.0	
MAXIMUM 1	30	20	20	20			25	20	
MAXIMUM 2	60	35	20	30			30	20	
YELLOW	3.5	3.5	3.5	3.5			3.5	3.5	
ALL RED	2.5	2.5	2.5	2.5			2.5	2.5	
PEDESTRIAN WALK									
PEDESTRIAN CLEARANCE									
RECALL	S	O	O	O			O	O	
DETECTOR OPERATION	PR	PR	PR	PR			PR	PR	
PREEMPTION PRIORITY									
FLASH	R	R	R	R			R	R	
DUAL ENTRY	OFF	OFF	OFF	OFF			OFF	OFF	

NOTES: S = SOFT RECALL Y = YELLOW
O = RECALL OFF R = RED
PR = PRESENCE D = DARK
MAX2 = UNDER COORDINATION

COORDINATION CYCLE/SPLIT/OFFSET SCHEDULE
ALL ENTRIES IN SECONDS

	PLAN 1	PLAN 2	PLAN 3	PLAN 4	PLAN 5	COORDINATION MODE SET TO FIXED FORCE-OFF
CYCLE LENGTH	80	90	100	110	120	
OFFSET (END Ø1 ØRN)	25	29	37	1	105	
YIELD POINT	0	0	0	0	0	
SPLIT TIME Ø1	23	26	32	36	32	
SPLIT TIME Ø2	20	21	21	22	36	
SPLIT TIME Ø3	16	21	21	21	21	
SPLIT TIME Ø4	21	22	26	31	31	
SPLIT TIME Ø5	20	21	21	22	36	
SPLIT TIME Ø6	23	26	32	36	32	
SPLIT TIME Ø7	21	26	29	31	31	
SPLIT TIME Ø8	16	17	18	21	21	

COORDINATION NOTES:

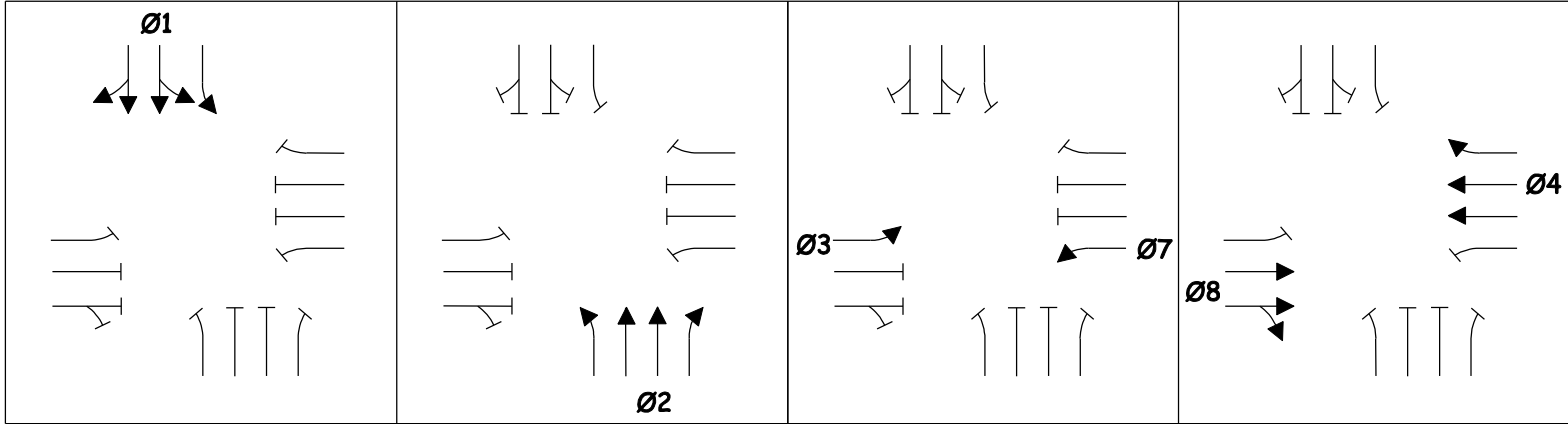
- OFFSET IS REFERENCED TO THE END OF THE COORDINATED PHASE (Ø1 PER NTCIP).
- COORDINATION TO OPERATE BY TIME-OF-DAY (SEE SHEET 2 FOR DAY PLAN SETTINGS).
- PHASE 5 AND 6 ARE DUMMY PHASES TO BE SET WITH SPLIT TIMES FOR NTCIP COMPLIANCE.

DETECTOR SCHEDULE

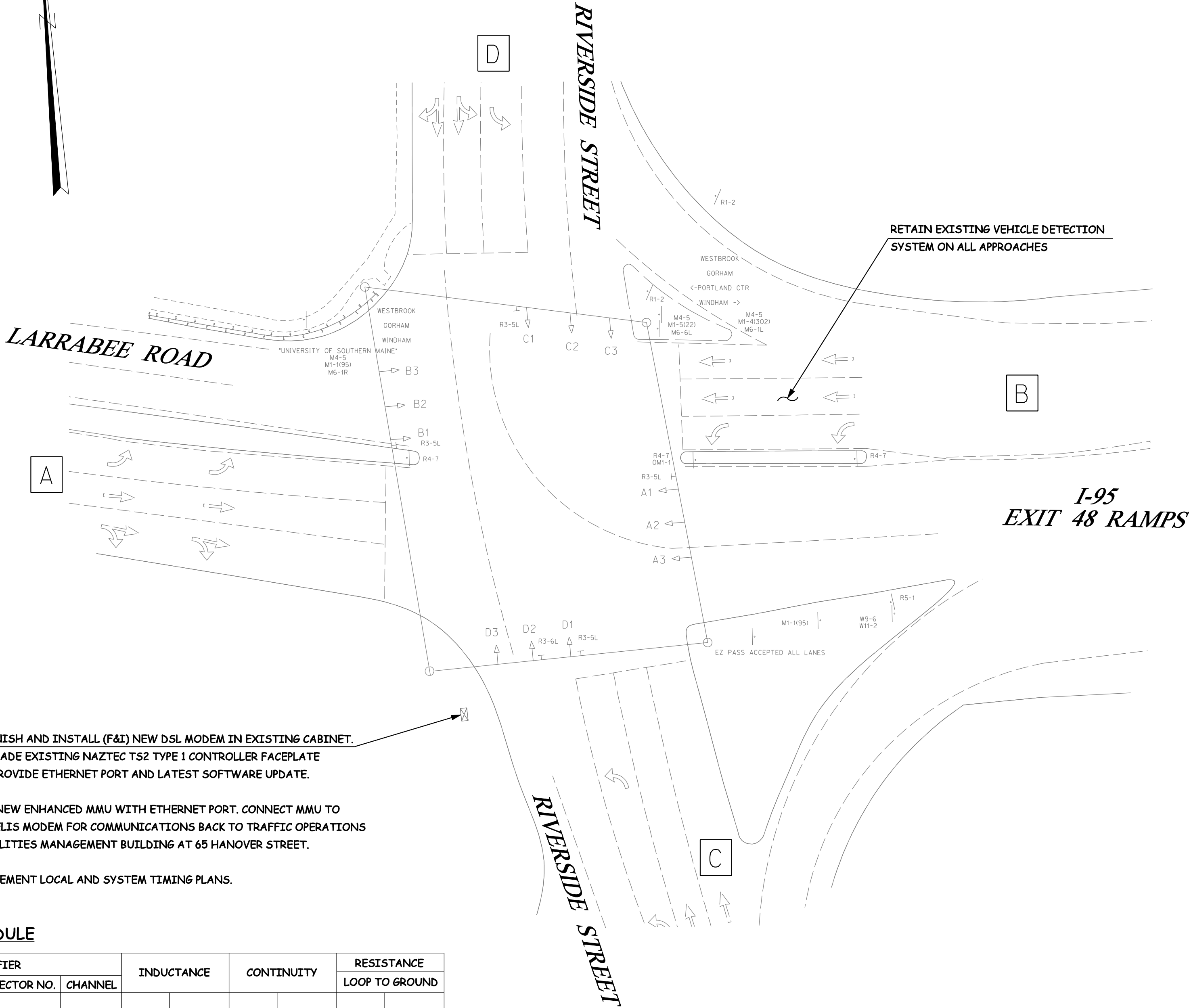
DETECTOR				AMPLIFIER				INDUCTANCE	CONTINUITY	RESISTANCE LOOP TO GROUND
STREET	DIRECTION	LANE	Ø	TYPE	SLOT NO.	DETECTOR NO.	CHANNEL			
RIVERSIDE ST	SOUTHBOUND	LEFT/LEFT-THRU	1		1					
RIVERSIDE ST	SOUTHBOUND	THRU-RIGHT	1		1					
RIVERSIDE ST	NORTHBOUND	LEFT	2		2					
RIVERSIDE ST	NORTHBOUND	THROUGHS	2		2					
EXIT 48 RAMPS	WESTBOUND	LEFT	3		3					
LARRABEE RD	EASTBOUND	THRU/THRU-RIGHT	4		3					
LARRABEE RD	EASTBOUND	LEFT	7		4					
EXIT 48 RAMPS	WESTBOUND	THROUGHS	8		4					
RECORD FIELD MEASUREMENTS HERE										

DETECTOR NOTES:
CONTRACTOR SHALL COMPLETE THE DETECTOR SCHEDULE FOR RECORD OF DETECTOR PROGRAMMING INTO THE TRAFFIC SIGNAL CONTROLLER.

PROPOSED** PHASING SEQUENCE



** EXISTING SIGNAL PHASING SHALL BE MODIFIED SO Ø1 SOUTHBOUND LEADS AND Ø2 NORTHBOUND LAGS



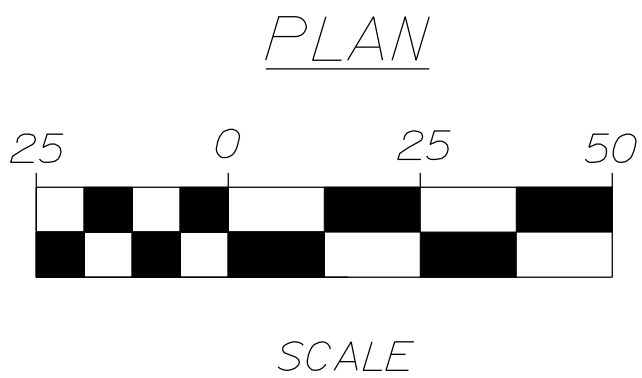
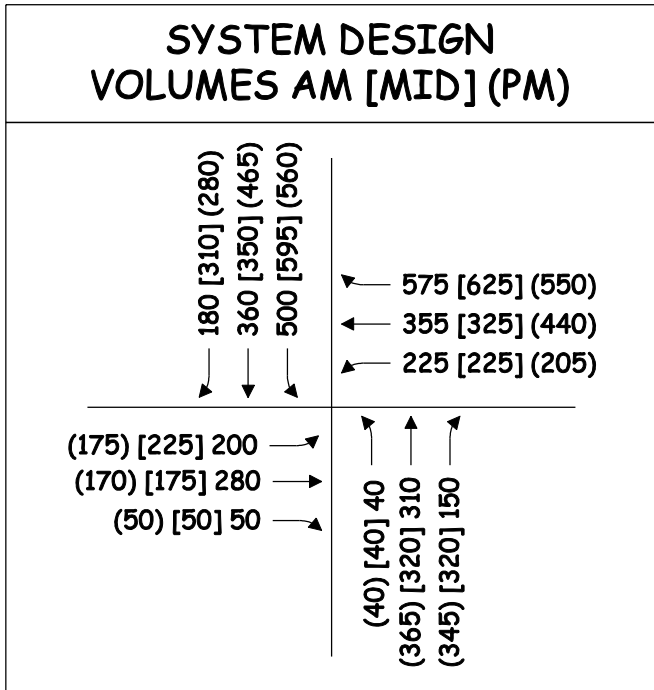
INTERSECTION:
RIVERSIDE ST / LARRABEE RD
SIGNAL GROUP:
2
LOCATION / PROPOSED DROP:
34

EXISTING STREETWISE REFERENCE NO. 1890

SIGNAL HEAD DATA

EXISTING		
A1,B1,C1,D1	D2	A2,A3,B2,B3 C2,C3,D3
12" LED LENS	12" LED LENS	12" LED LENS

PROJ. MANAGER	J. MANSIR	BY	J. ROBERT	DATE	7/15/11
DESIGN-DETAILED	M. GRAHAM	CHECKED	E. DREW	REVIEWED	7/18/11
DESIGN-DETAILED	C. BOBBY	DESIGN-DETAILED		DESIGN-DETAILED	
REVISIONS 1		REVISIONS 2		REVISIONS 3	
REVISIONS 4		REVISIONS 5		REVISIONS 6	
FIELD CHANGES		FIELD CHANGES		FIELD CHANGES	



EQUIPMENT AND WORK ITEMS 643.71	QUANTITY
RESET ACTELIS ENDPOINT MODEM	1
IMPLEMENT LOCAL AND SYSTEM TIMING	-

SIGNAL TIMING SCHEDULE

[illegible]

COORDINATION CYCLE/SPLIT/OFFSET SCHEDULE

ALL ENTRIES IN SECONDS

	PLAN 1	PLAN 2	PLAN 3	PLAN 4	PLAN 5
CYCLE LENGTH	80	90	100	110	120
OFFSET (END Ø2 GRN)	70	86	1	68	61
YIELD POINT	0	0	0	0	0
SPLIT TIME Ø1	13	13	14	15	16
SPLIT TIME Ø2	23	26	29	31	38
SPLIT TIME Ø3	20	21	23	29	30
SPLIT TIME Ø4	21	27	31	32	33
SPLIT TIME Ø5	13	13	16	15	16
SPLIT TIME Ø6	23	26	27	31	38
SPLIT TIME Ø7	21	27	31	32	33
SPLIT TIME Ø8	20	21	23	29	30
SPLIT TIME Ø9	3	3	3	3	3
SPLIT TIME Ø13	3	3	3	3	3

DETECTOR				AMPLIFIER				INDUCTANCE		CONTINUITY		RESISTANCE	
STREET	DIRECTION	LANE	Ø	TYPE	SLOT NO.	DETECTOR NO.	CHANNEL					LOOP TO GROUND	
								RECORD FIELD MEASUREMENTS HERE					

ALL APPROACHES ARE PROPOSED VIDEO-BASED VEHICLE DETECTION UNDER MAINEDOT PROJECT 5136.30.

NOTE: PROPOSED PHASING COINCIDES WITH PROPOSED PHASE ASSIGNMENTS UNDER MAINEDOT PROJECT 5136.30.

WARREN AVENUE

RIVERSIDE STREET

RETAIN VIDEO-BASED VEHICLE DETECTION SYSTEM PROPOSED IN MAINEDOT PROJECT 5136.30 ON ALL APPROACHES

INSTALL ACTELIS ENDPOINT MODEM RELOCATED FROM RIVERSIDE/BRIGHTON CONNECT TO PROPOSED ETHERNET EQUIPPED TS2 TYPE 1 CONTROLLER PROVIDE MAINEDOT PROJECT 5136.30

CONNECT 5136.30 MMU AND VIDEO DETECTION TO ACTELIS MODEM FOR COMM BACK TO TRAFFIC OPERATIONAL FACILITIES MANAGEMENT BUILDING AT 65 HA PROVIDE AND CONFIGURE TRAFICON CONFIGURATION TOOL SOFTWARE AND E TO VIEW LIVE VIDEO DETECTION RETURNS.

IMPLEMENT LOCAL AND SYSTEM TIMING PLANS NOTING THESE TIMINGS SUPER IN MAINEDOT PROJECT 5136.30.

The diagram illustrates the intersection of Warren Avenue and Riverside Street. Warren Avenue runs horizontally across the middle, while Riverside Street runs vertically through the center. The intersection is divided into four quadrants labeled A, B, C, and D. Quadrant A is the northwest, B is the northeast, C is the southwest, and D is the southeast. The diagram shows various traffic lanes, including through lanes, left-turn lanes, and right-turn lanes, with arrows indicating the direction of traffic flow. Several points are marked with circles and labeled: P1, P2, P3, P4, P5, P6, P7, P8, A1, A2, A3, B1, B2, B3, C1, C2, C3, D1, D2, R10-11, and R10-12. These points likely represent specific locations for equipment or traffic signals. A north arrow is located in the top left corner. The diagram also shows the locations of existing and proposed traffic signals and video detection equipment. A callout box in the top right corner states: "RETAIN VIDEO-BASED VEHICLE DETECTION SYSTEM PROPOSED IN MAINEDOT PROJECT 5136.30 ON ALL APPROACHES". Another callout box in the bottom right corner states: "INSTALL ACTELIS ENDPOINT MODEM RELOCATED FROM RIVERSIDE/BRIGHTON CONNECT TO PROPOSED ETHERNET EQUIPPED TS2 TYPE 1 CONTROLLER PROVIDE MAINEDOT PROJECT 5136.30". A third callout box in the bottom right corner states: "CONNECT 5136.30 MMU AND VIDEO DETECTION TO ACTELIS MODEM FOR COMM BACK TO TRAFFIC OPERATIONAL FACILITIES MANAGEMENT BUILDING AT 65 HA PROVIDE AND CONFIGURE TRAFICON CONFIGURATION TOOL SOFTWARE AND E TO VIEW LIVE VIDEO DETECTION RETURNS." A fourth callout box in the bottom right corner states: "IMPLEMENT LOCAL AND SYSTEM TIMING PLANS NOTING THESE TIMINGS SUPER IN MAINEDOT PROJECT 5136.30."

EXISTING		
A1,B1	C1,D1	B2
12" LED LENS	12" LED LENS	12" LED LENS
WITH 5-INCH LOUVERED BACKPLATES		
EXISTING		
A2,A3,A4,C2,D2	C3,B3	P1 - P8
12" LED LENS	12" LED LENS	(WITH AUDIO SIGNAL)
WITH 5-INCH LOUVERED BACKPLATES		16" x 18" LED PEDESTRIAN SIGNAL

PORTLAND STP-1785(600)X

WIN
17856.00

SIGNATURE

P.E. NUMBER

DATE _____

RIVERSIDE STREET

WARREN AVENUE

TRAFFIC SIGNAL PLAN

SHEET NUMBER

8

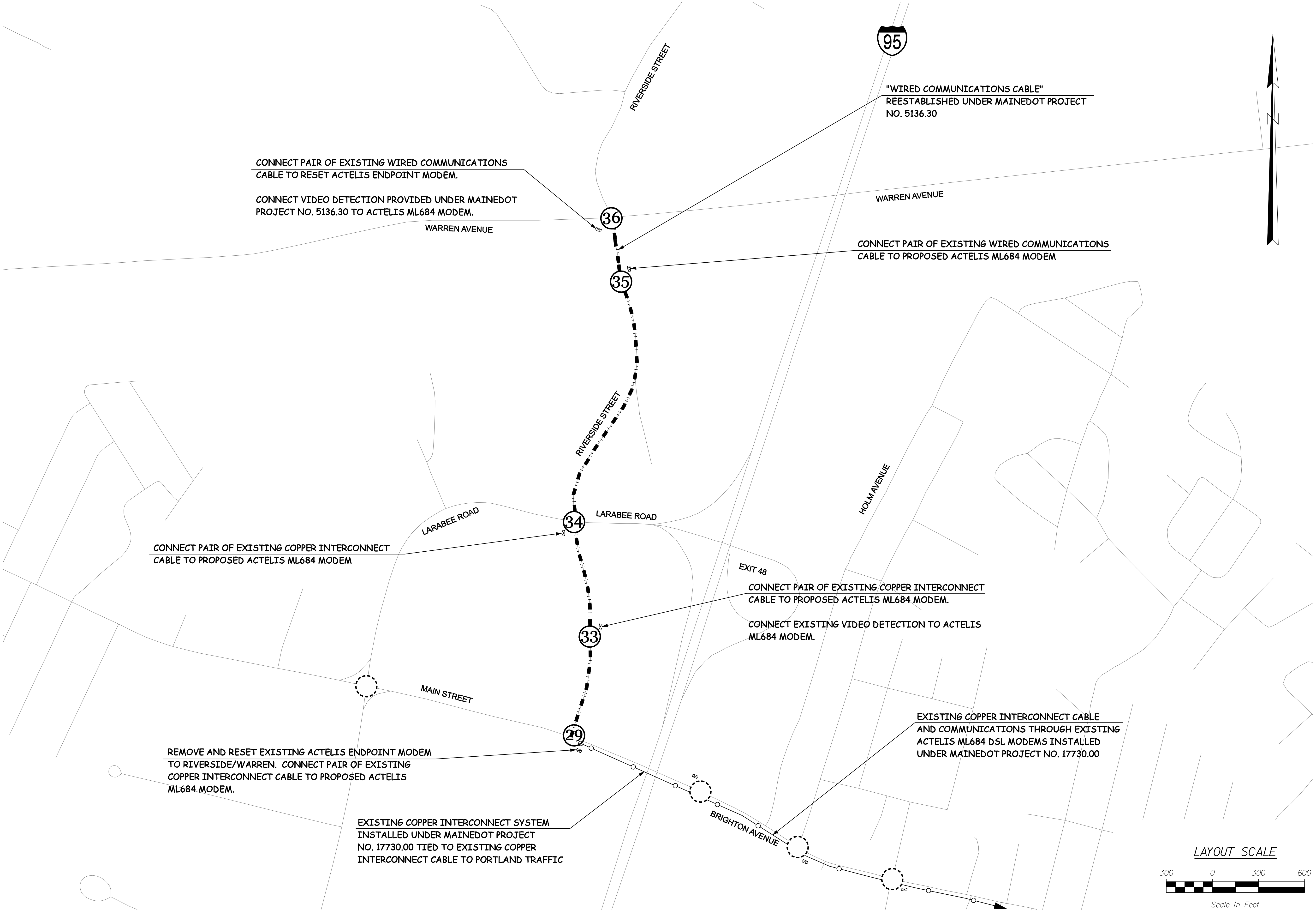
OF 12

Date: 7/19/2011

Username: J ROBERT

Division:

File name: ... \ts\planet\008_5213200SG05.dgn



STATE OF MAINE		DEPARTMENT OF TRANSPORTATION	
PORTLAND STP-1785(600)X		WIN 17856.00	
RIVERSIDE STREET		COMMUNICATIONS NETWORK DIAGRAM	
SHEET NUMBER		9	
OF 12			
PROJ. MANAGER	J. MANSIR	BY	DATE
CHECKED-DETAILED	M. GRAHAM	J. ROBERT	7/15/11
CHECKED-REVIEWED	C. BOBBAY	E. DREW	7/18/11
DESIGNS DETAILED			
DESIGNS DETAILED			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			
SIGNATURE		P.E. NUMBER	
DATE			

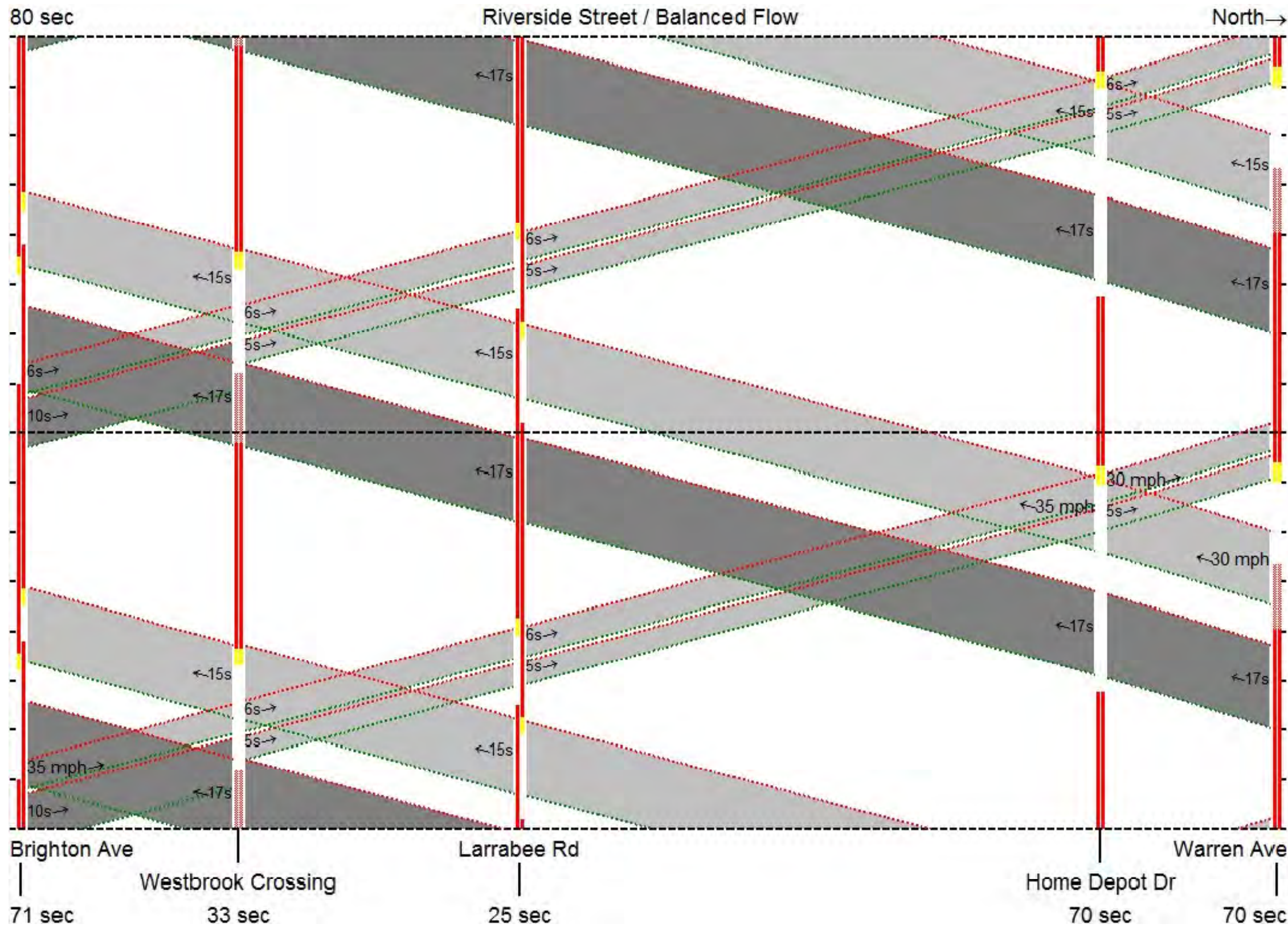
Date:7/19/2011

Username: J ROBERT

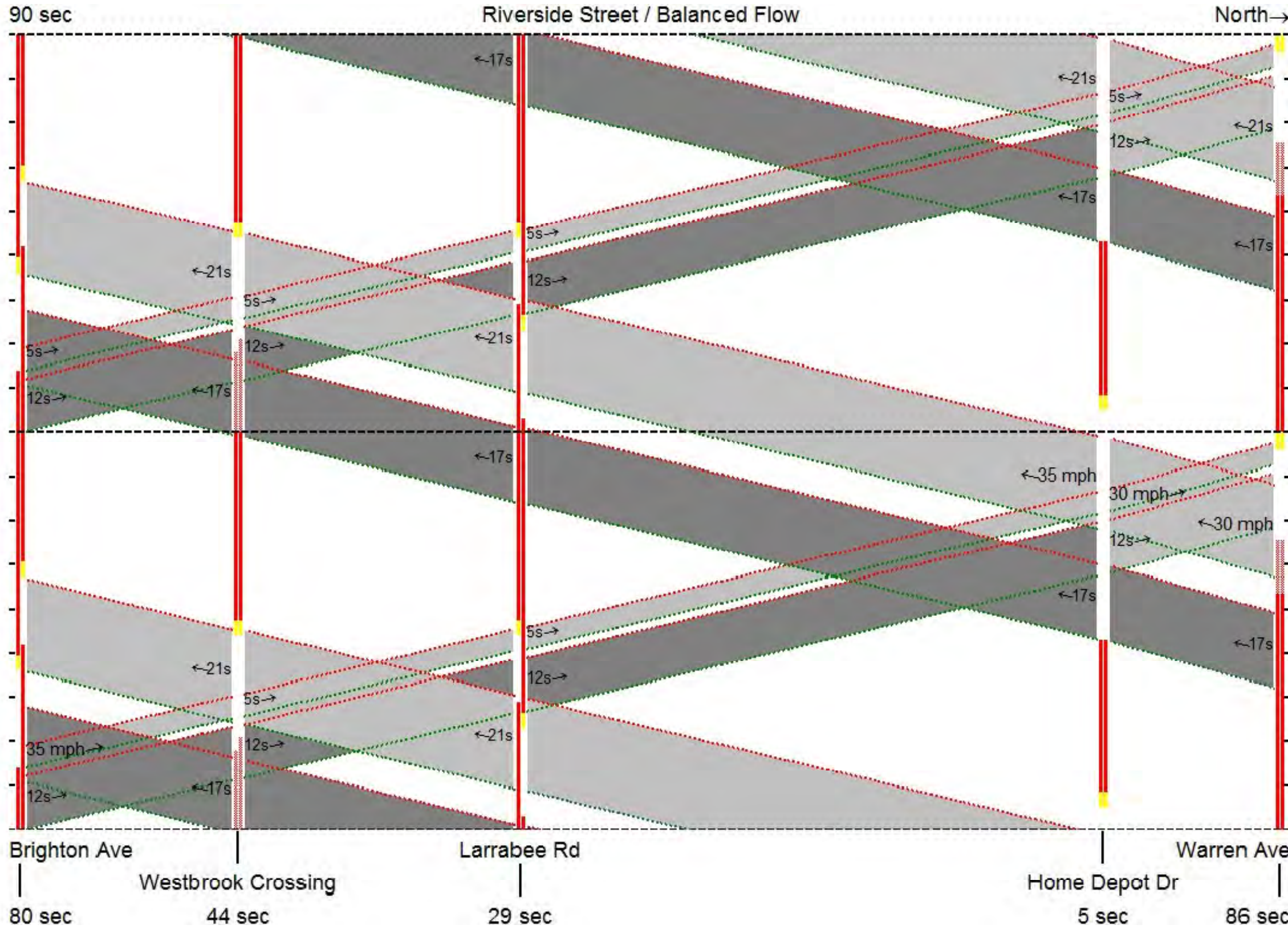
Division:

Filename: ... \ts\planset\010_5213200\TSD1.dgn

PLAN 1
80 SECOND BACKGROUND CYCLE



PLAN 2
90 SECOND BACKGROUND CYCLE



RIVERSIDE STREET				SHEET NUMBER	
TIME SPACE DIAGRAMS				10	
				OF 12	
PROJ. MANAGER		J. MANSIR	BY	DATE	
DESIGN-DETAILED		M. GRAHAM	J. ROBERT	7/15/11	
CHECKED-REVIEWED		C. BOBAY	E. DREW	7/18/11	
DESIGN2-DETAILED2				SIGNATURE	
DESIGN3-DETAILED3				P.E. NUMBER	
REVISIONS 1					
REVISIONS 2					
REVISIONS 3					
REVISIONS 4				DATE	
FIELD CHANGES					
STATE OF MAINE					
DEPARTMENT OF TRANSPORTATION					
PORTLAND STP-1785(600)X					
				WIN	
				17856.00	

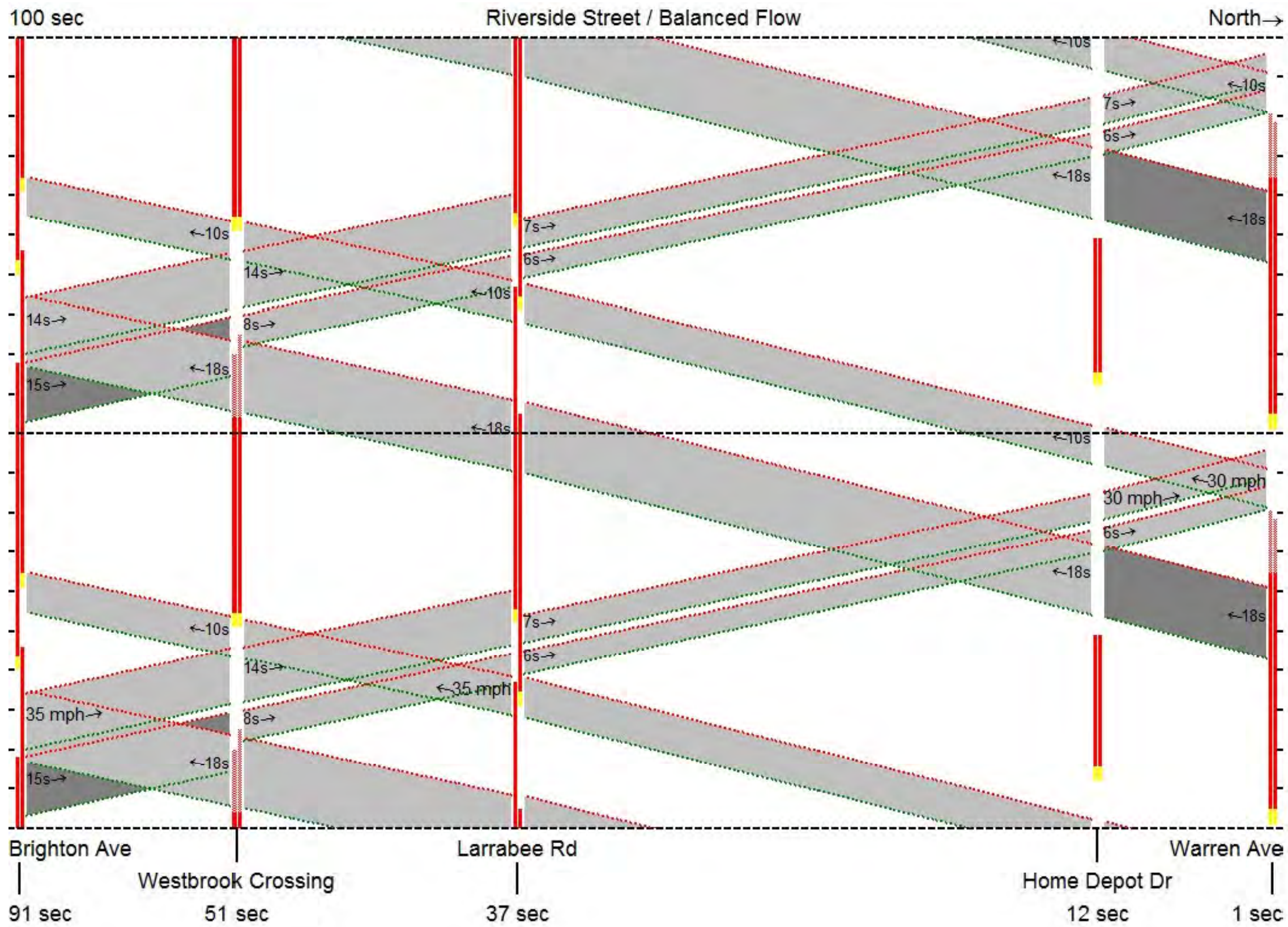
Username: J ROBERT

Date: 7/19/2011

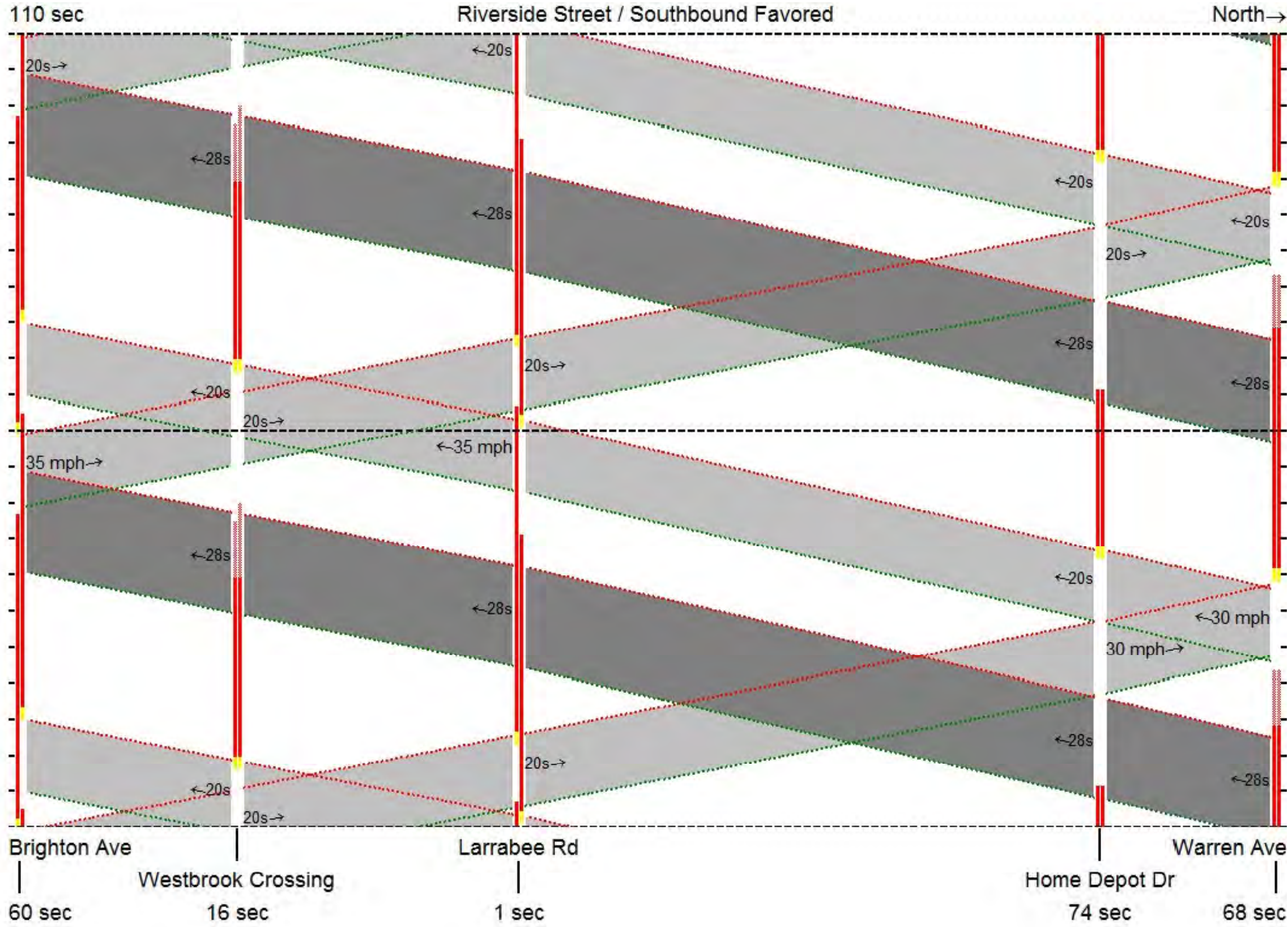
Division:

Filename: ... \1s\planset\011_52132001SD2.dgn

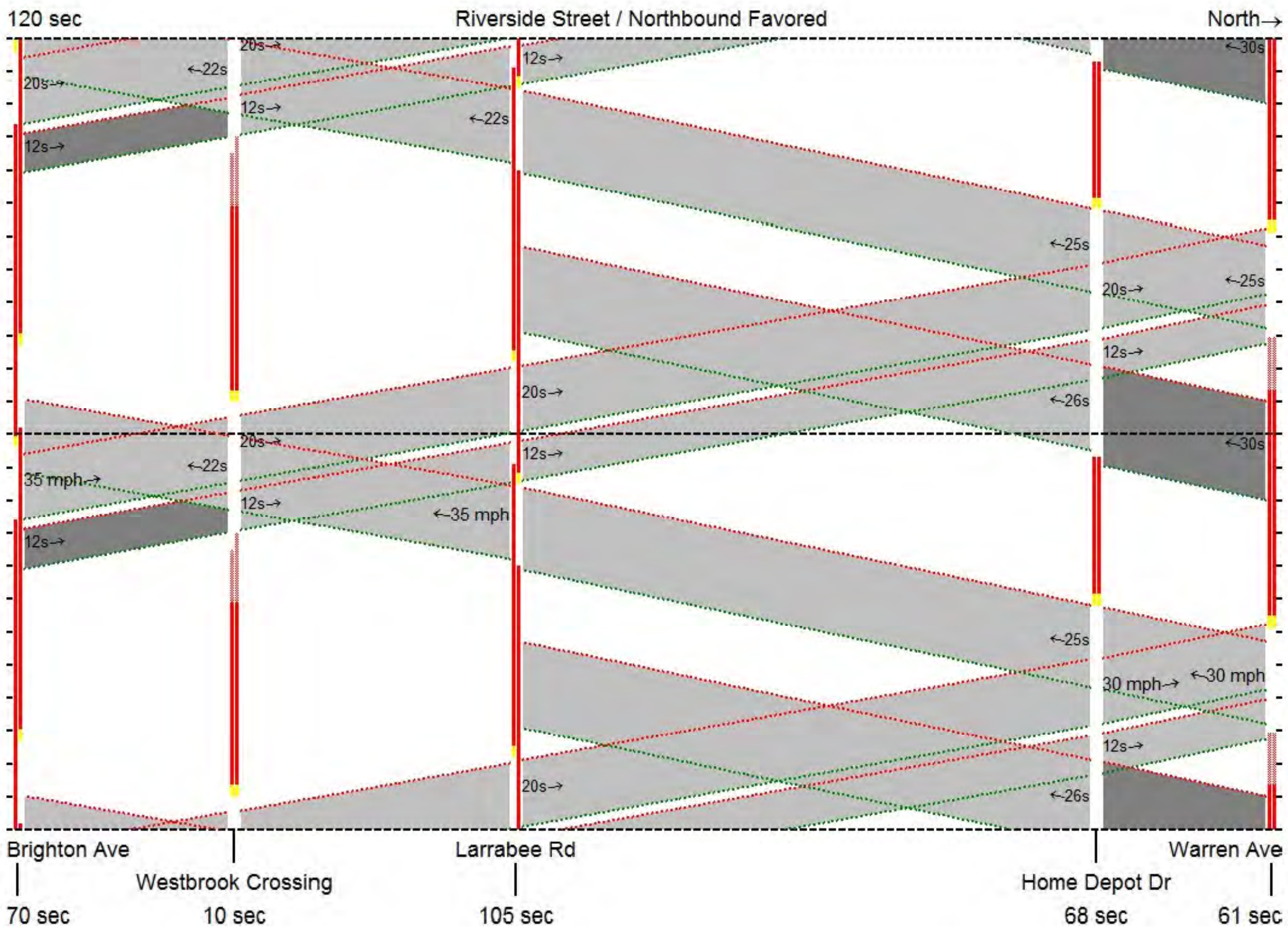
PLAN 3
100 SECOND BACKGROUND CYCLE



PLAN 4
110 SECOND BACKGROUND CYCLE



PLAN 5
120 SECOND BACKGROUND CYCLE



STATE OF MAINE		DEPARTMENT OF TRANSPORTATION		PORTLAND STP-1785(600)X		WIN		17856.00	
RIVERSIDE STREET		DATE		SIGNATURE		P.E. NUMBER		DATE	
		BY		DATE					
		J. ROBERT		7/15/11					
		E. DREW		7/18/11					
TIME SPACE DIAGRAMS		PROJ. MANAGER		DESIGN-DETAILED		DESIGN-DETAILED		REVISIONS 1	
		M. GRAHAM		C. BOBBY				REVISIONS 2	
								REVISIONS 3	
								REVISIONS 4	
SHEET NUMBER									
11									
OF 12									

BID ALTERNATE NO. 1

EQUIPMENT AND WORK	QUANTITY
INSTALL NEW CONTROLLER CABINET FOUNDATION (ITEM 626.31)	1
FURNISH AND INSTALL NEW NEMA TS2-1 CONTROLLER IN NEW P-TYPE BASE MOUNTED NEMA TS2-1 PORTLAND SPEC CABINET COMPLETE WITH ALL ANCILLARY EQUIPMENT AND WIRING INCLUDING RACK MOUNT VEHICLE DETECTION AND ENHANCED MMU WITH ETHERNET PORT. (ITEM 643.71)	1

SCREENED ITEMS ARE TO BE INCLUDED
IN THE BASE BID, SEE SHEET 4

EXISTING SIGNAL TIMING SCHEDULE

ITEM / PHASE	1	2	3	4	5	6	7	8	9
MINIMUM INITIAL	5	10	7	5	5	10			
PASSAGE TIME	1.5	2.5	3.0	2.0	2.5	3.0			
MAXIMUM 1	12	45	20	18	15	45			
MAXIMUM 2	15	60	30	25	15	70			
YELLOW	3.5	3.5	3.5	3.5	3.5	3.5			
ALL RED	2.5	2.5	2.5	2.5	2.5	2.5			
PEDESTRIAN WALK		5		5		5			
PEDESTRIAN CLEARANCE		15		16		15			
RECALL	O	S	O	O	O	S			
DETECTOR OPERATION	PR	PR	PR	PR	PR	PR			
PREEMPTION PRIORITY									
FLASH	R	Y	R	R	R	Y			
DUAL ENTRY	OFF	OFF	OFF	OFF	OFF	OFF			

NOTES: S = SOFT RECALL Y = YELLOW
O = RECALL OFF R = RED
PR = PRESENCE D = DARK
MAX2 = UNDER COORDINATION

COORDINATION CYCLE/SPLIT/OFFSET SCHEDULE
ALL ENTRIES IN SECONDS

	PLAN 1	PLAN 2	PLAN 3	PLAN 4	PLAN 5	COORDINATION MODE SET TO FIXED FORCE-OFF
CYCLE LENGTH	80	90	100	110	120	
OFFSET (END Ø6 GRN)	71	80	91	60	70	
YIELD POINT	0	0	0	0	0	
SPLIT TIME Ø1	13	13	13	13	16	
SPLIT TIME Ø2	27	28	38	38	45	
SPLIT TIME Ø3	13	21	21	31	31	
SPLIT TIME Ø4	27	28	28	28	28	
SPLIT TIME Ø5	14	18	21	21	18	
SPLIT TIME Ø6	26	23	30	30	43	
SPLIT TIME Ø7	0	0	0	0	0	
SPLIT TIME Ø8	40	49	49	59	59	

COORDINATION NOTES:

- OFFSET IS REFERENCED TO THE END OF THE COORDINATED PHASE (Ø6 PER NTCIP).
- COORDINATION OPERATES BY TIME-OF-DAY (SEE SHEET 2 FOR DAY PLAN SETTINGS).
- TRAFFIC SIGNAL CONTROLLER SET FOR STOP TIME IN WALK TO ON.
- PHASE 8 IS A DUMMY PHASE SET WITH SPLIT TIMES FOR NTCIP COMPLIANCE.

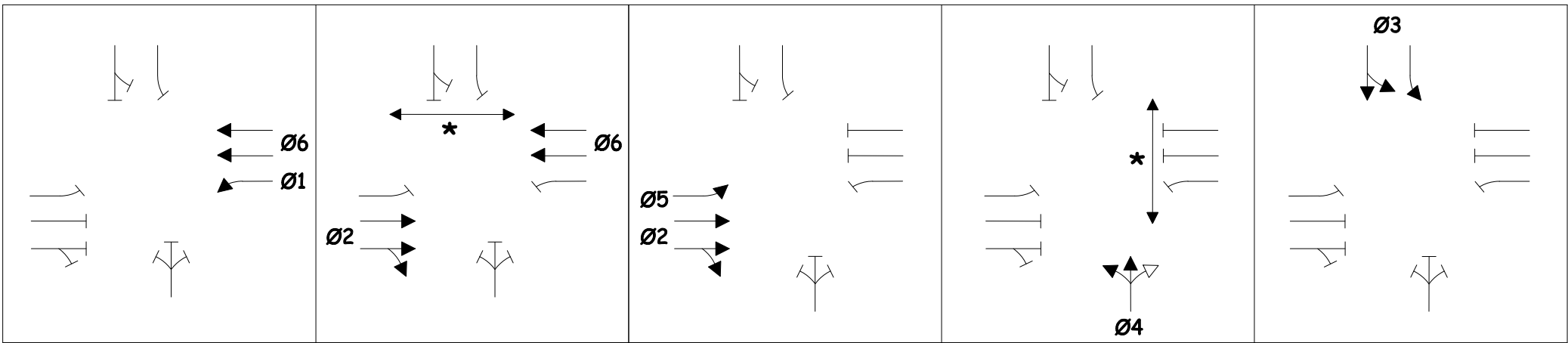
DETECTOR SCHEDULE

DETECTOR			Ø	AMPLIFIER				INDUCTANCE	CONTINUITY	RESISTANCE	
STREET	DIRECTION	LANE		TYPE	SLOT NO.	DETECTOR NO.	CHANNEL			LOOP TO GROUND	
BRIGHTON AVE	WESTBOUND	LEFT	1	SPARE	1	(3)					
				SPARE	2	1	1				
BRIGHTON AVE	EASTBOUND	THRU/THRU-RIGHT	2	PRESENCE	1	(4)					
				PRESENCE	2	2	2	209µh	3.4Ω	130 MΩ	
RIVERSIDE ST	SOUTHBOUND	LEFT/LEFT-THRU	3	PRESENCE	3	(7)					
				PRESENCE	4	5	1	205µh	3.6Ω	125 MΩ	
DRIVEWAY	NORTHBOUND	ALL DEPARTURE	4	PRESENCE	3	(8)					
				PRESENCE	4	6	2	190µh	1.8Ω	∞	
BRIGHTON AVE	EASTBOUND	LEFT	5	PRESENCE	5	(11)					
				PRESENCE	6	9	1	181µh	0.7Ω	∞	
BRIGHTON AVE	WESTBOUND	THROUGHS	6	PRESENCE	5	(12)					
				PRESENCE	6	10	2	413µh	4.8Ω	∞	
RECORD FIELD MEASUREMENTS HERE											

DETECTOR NOTES:

CONTRACTOR SHALL COMPLETE THE DETECTOR SCHEDULE FOR RECORD OF
DETECTOR PROGRAMMING INTO THE TRAFFIC SIGNAL CONTROLLER.

EXISTING PHASING SEQUENCE



* NORMALLY DW, UPON PEDESTRIAN ACTUATION, W/FDW COUNTDOWN

BID ALTERNATE NO. 1
NEW CONTROLLER CABINET

SIGNAL HEAD DATA

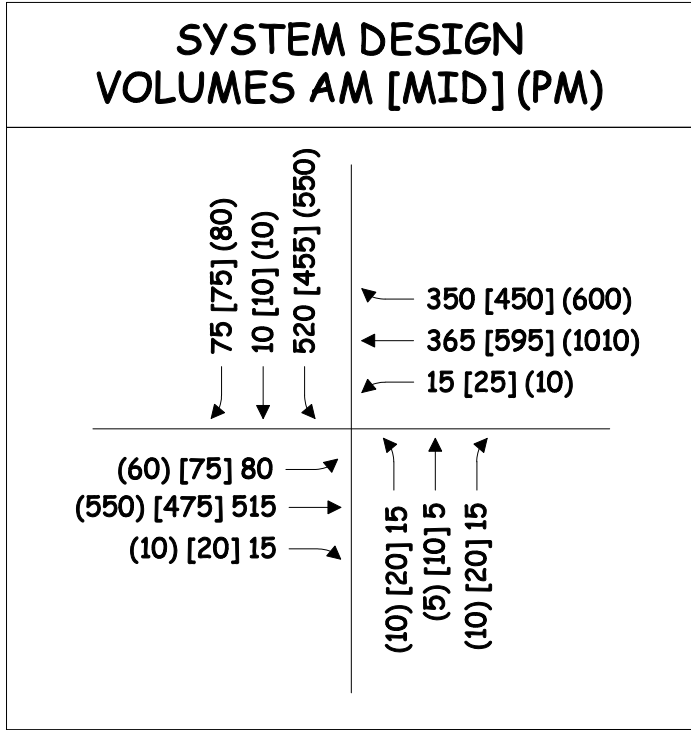
EXISTING			
C1,C2	A3	A2,B2,B3	P1-P4
12" LED LENS	12" LED LENS	12" LED LENS	16" x 18" LED PEDESTRIAN SIGNAL
EXISTING			
D1	A1,B1	D2	
12" LED LENS	12" LED LENS	12" LED LENS	

BRIGHTON AVENUE

RIVERSIDE STREET

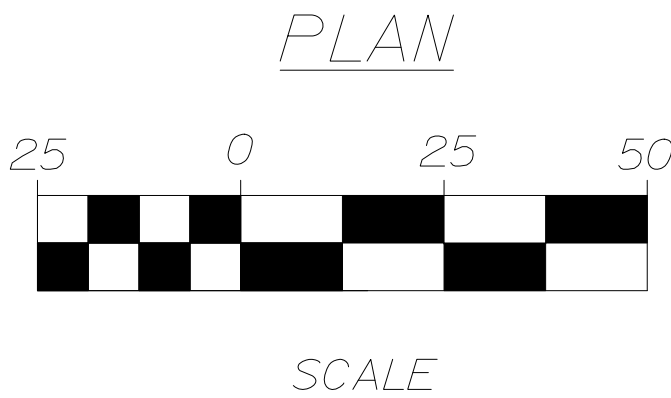
BRIGHTON AVENUE

TRAVEL LODGE DRIVE



INTERSECTION:
RIVERSIDE ST /
BRIGHTON AVE
SIGNAL GROUP:
2
LOCATION / EXISTING DROP:
29

EXISTING STREETWISE REFERENCE NO. 229



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
\$PROJECTNUMBER\$
WIN \$PINUMBER\$

PROJ. MANAGER	\$PROJMANAGER\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN1\$	BY	\$BY\$
CHECKED-REVIEWED	\$CHECKED1\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN2\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED2\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN3\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED3\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN4\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED4\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN5\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED5\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN6\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED6\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN7\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED7\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN8\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED8\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN9\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED9\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN10\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED10\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN11\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED11\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN12\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED12\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN13\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED13\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN14\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED14\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN15\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED15\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN16\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED16\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN17\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED17\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN18\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED18\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN19\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED19\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN20\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED20\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN21\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED21\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN22\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED22\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN23\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED23\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN24\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED24\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN25\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED25\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN26\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED26\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN27\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED27\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN28\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED28\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN29\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED29\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN30\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED30\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN31\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED31\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN32\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED32\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN33\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED33\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN34\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED34\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN35\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED35\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN36\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED36\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN37\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED37\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN38\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED38\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN39\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED39\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN40\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED40\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN41\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED41\$	DATE	\$DATE\$
DESIGN-DETAILED	\$DESIGN42\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED42\$	DATE	\$DATE\$
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DESIGN-DETAILED	\$DESIGN88\$	DATE	\$DATE\$
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DESIGN-DETAILED	\$DESIGN89\$	DATE	\$DATE\$
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DESIGN-DETAILED	\$DESIGN90\$	DATE	\$DATE\$
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DESIGN-DETAILED	\$DESIGN96\$	DATE	\$DATE\$
CHECKED-REVIEWED	\$CHECKED96\$	DATE	\$DATE\$