Attachment B
Existing and Future No-Build Figures

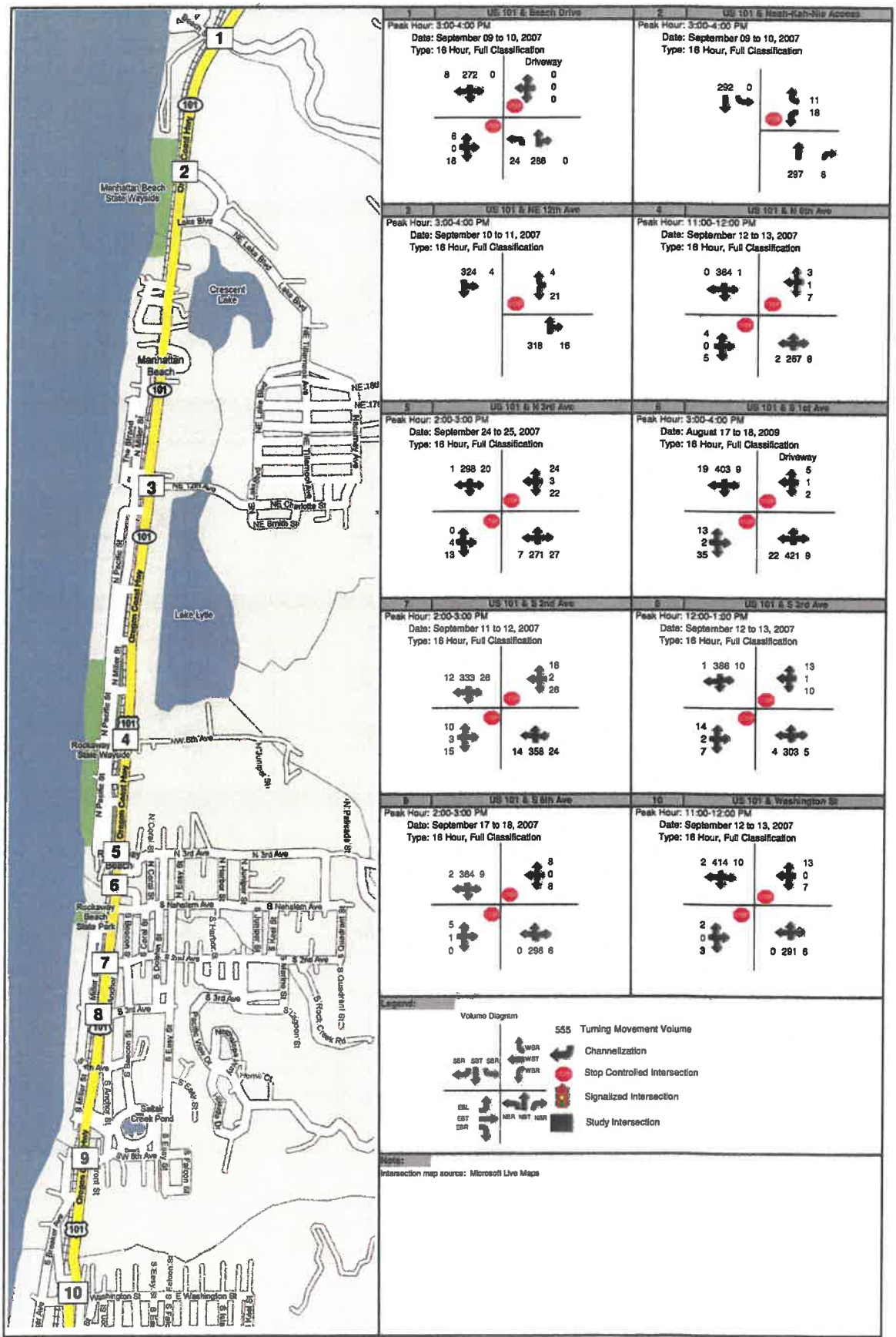

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FIGURE B.1 Raw Count: 2007/2008 Individual Intersection Peak Hour Volumes & Channelization
Rockaway Beach Transportation Plan

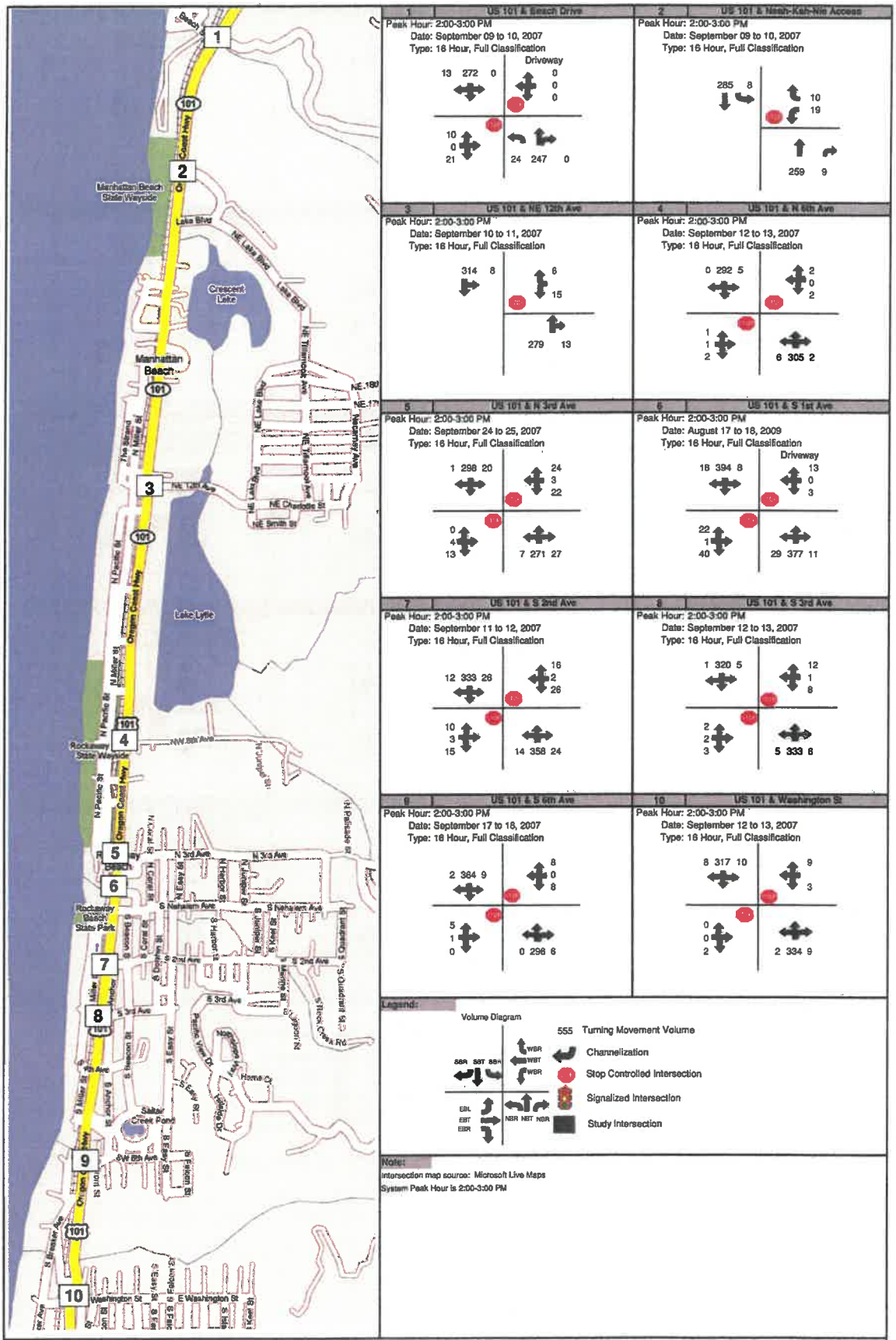

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FIGURE B.2 Raw Count: 2007/2009 System Wide Peak Hour Volumes & Channelization
Rockaway Beach Transportation Plan

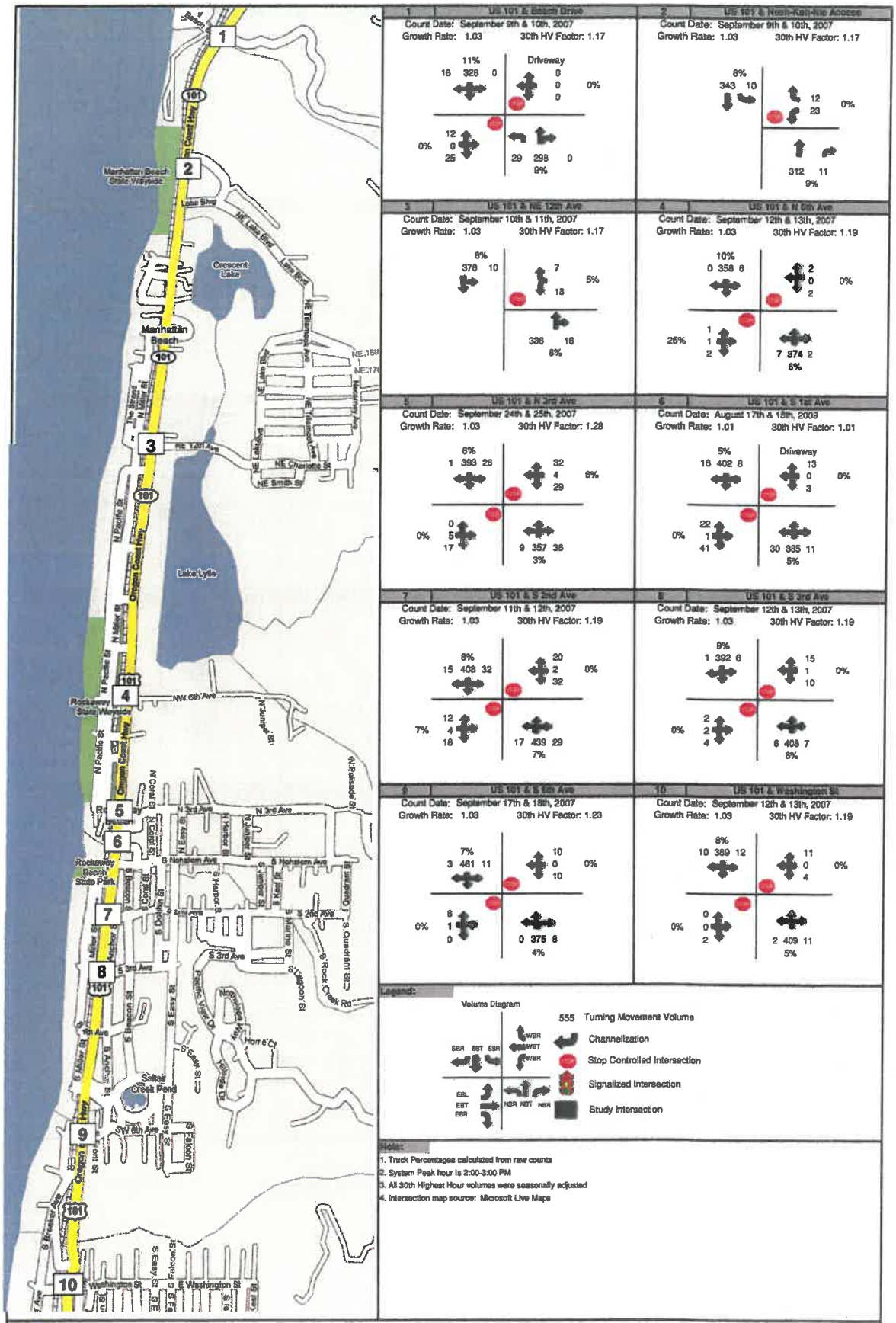

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FIGURE B.3 2010 Existing 30th Highest Hour Volumes: Unbalanced Volumes & Channelization
Rockaway Beach Transportation Plan

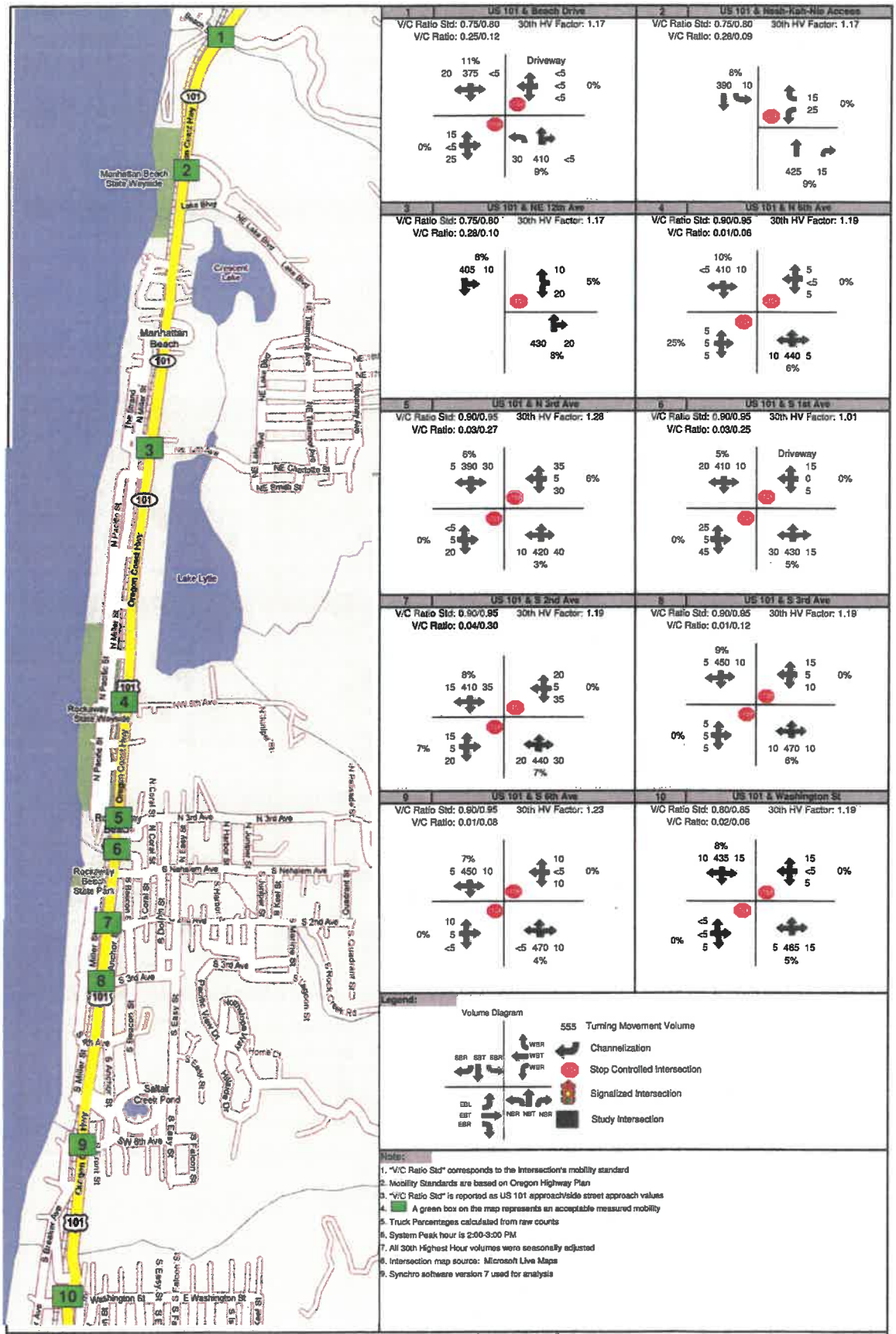

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FIGURE B.4 2010 Existing 30th Highest Hour Volumes: Balanced Volumes & Channelization
Rockaway Beach Transportation Plan

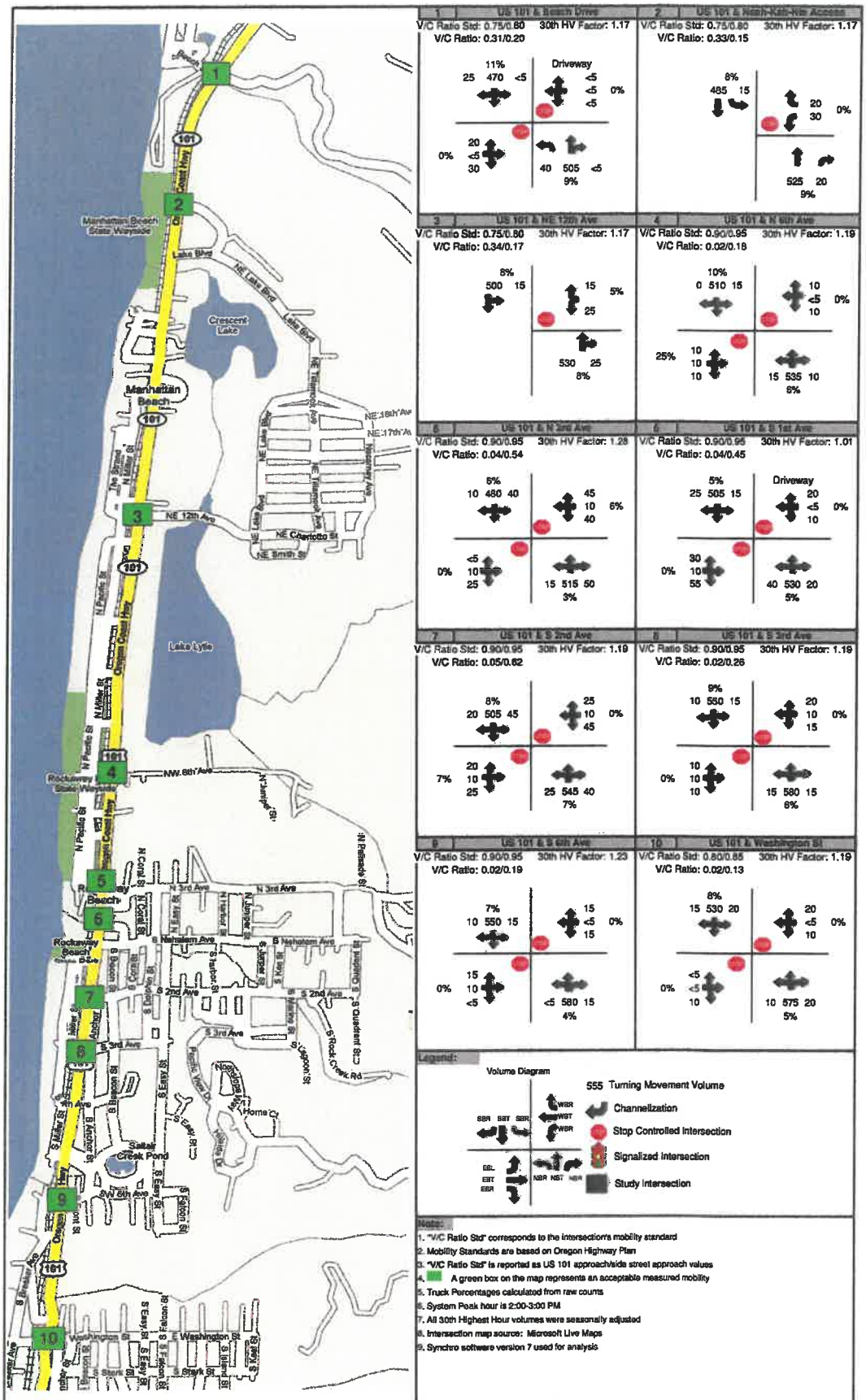

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FIGURE B.5 2030 Future No-Build 30th Highest Hour Volumes: Balanced Volumes & Channelization
Rockaway Beach Transportation Plan

Attachment C
Existing Conditions (2010) Mobility Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	25	0	0	0	30	410	0	0	375	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	0	29	0	0	0	32	432	0	0	395	21
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	906	906	411	935	917	438	419			435		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	906	906	411	935	917	438	419			435		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	93	100	95	100	100	100	97			100		
cM capacity (veh/h)	251	269	642	229	265	620	1101			1076		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	47	0	32	432	416
Volume Left	18	0	32	0	0
Volume Right	29	0	0	0	21
cSH	405	1700	1101	1700	1076
Volume to Capacity	0.12	0.00	0.03	0.25	0.00
Queue Length 95th (ft)	10	0	2	0	0
Control Delay (s)	15.0	0.0	8.4	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	15.0	0.0	0.6		0.0
Approach LOS	C	A			

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	15	425	15	10	390
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	18	447	16	11	411
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	887	454			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	887	454			468	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	91	97			99	
cM capacity (veh/h)	312	606			1058	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	29	18	447	16	11	411
Volume Left	29	0	0	0	11	0
Volume Right	0	18	0	16	0	0
cSH	312	606	1700	1700	1058	1700
Volume to Capacity	0.09	0.03	0.26	0.01	0.01	0.24
Queue Length 95th (ft)	8	2	0	0	1	0
Control Delay (s)	17.7	11.1	0.0	0.0	8.4	0.0
Lane LOS	C	B			A	
Approach Delay (s)	15.3		0.0		0.2	
Approach LOS	C					

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	10	430	20	10	405
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	12	453	21	11	426
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	919	470			479	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	919	470			479	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	92	98			99	
cM capacity (veh/h)	293	584			1049	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	35	474	437
Volume Left	24	0	11
Volume Right	12	21	0
cSH	351	1700	1049
Volume to Capacity	0.10	0.28	0.01
Queue Length 95th (ft)	8	0	1
Control Delay (s)	16.4	0.0	0.3
Lane LOS	C		A
Approach Delay (s)	16.4	0.0	0.3
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	5	0	5	10	440	5	10	415	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	6	6	6	0	6	11	463	5	11	437	0
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	957	953	443	960	951	472	440			471		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957	953	443	960	951	472	440			471		
tC, single (s)	7.4	6.8	6.4	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	97	97	99	97	100	99	99			99		
cM capacity (veh/h)	209	231	566	226	255	593	1096			1047		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	12	479	447
Volume Left	6	6	11	11
Volume Right	6	6	5	0
cSH	276	327	1096	1047
Volume to Capacity	0.06	0.04	0.01	0.01
Queue Length 95th (ft)	5	3	1	1
Control Delay (s)	18.9	16.4	0.3	0.3
Lane LOS	C	C	A	A
Approach Delay (s)	18.9	16.4	0.3	0.3
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	41.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	0	5	20	30	5	35	10	420	40	30	390	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	6	24	35	6	41	11	442	42	32	411	5
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1011	988	419	993	969	469	419			487		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1011	988	419	993	969	469	419			487		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	98	96	82	98	93	99			97		
cM capacity (veh/h)	193	238	635	200	239	583	1132			1053		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	82	495	447
Volume Left	0	35	11	32
Volume Right	24	41	42	5
cSH	476	303	1132	1053
Volume to Capacity	0.06	0.27	0.01	0.03
Queue Length 95th (ft)	5	27	1	2
Control Delay (s)	13.1	21.2	0.3	0.9
Lane LOS	B	C	A	A
Approach Delay (s)	13.1	21.2	0.3	0.9
Approach LOS	B	C		

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	5	45	5	0	15	30	430	15	10	410	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	6	53	6	0	18	32	453	16	11	432	21
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1010	1001	448	1049	1003	467	456			471		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1010	1001	448	1049	1003	467	456			471		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	86	97	91	97	100	97	97			99		
cM capacity (veh/h)	206	234	612	179	233	597	1087			1067		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	88	24	500	463
Volume Left	29	6	32	11
Volume Right	53	18	16	21
cSH	346	377	1087	1067
Volume to Capacity	0.25	0.06	0.03	0.01
Queue Length 95th (ft)	25	5	2	1
Control Delay (s)	18.9	15.2	0.8	0.3
Lane LOS	C	C	A	A
Approach Delay (s)	18.9	15.2	0.8	0.3
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	5	20	35	5	20	20	440	30	35	410	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	6	24	41	6	24	21	463	32	37	432	16
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1067	1056	445	1067	1048	485	450			498		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1067	1056	445	1067	1048	485	450			498		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	90	97	96	77	97	96	98			96		
cM capacity (veh/h)	175	208	599	180	216	583	1081			1033		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	47	71	516	484
Volume Left	18	41	21	37
Volume Right	24	24	32	16
cSH	279	238	1081	1033
Volume to Capacity	0.17	0.30	0.02	0.04
Queue Length 95th (ft)	15	30	1	3
Control Delay (s)	20.5	26.3	0.6	1.0
Lane LOS	C	D	A	A
Approach Delay (s)	20.5	26.3	0.6	1.0
Approach LOS	C	D		

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	52.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	10	5	15	10	470	10	10	450	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	6	6	12	6	18	11	495	11	11	474	5
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1045	1030	482	1033	1027	506	482			508		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1045	1030	482	1033	1027	506	482			508		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	97	97	99	94	97	97	99			99		
cM capacity (veh/h)	193	230	585	201	230	568	1057			1019		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	35	516	489
Volume Left	6	12	11	11
Volume Right	6	18	11	5
cSH	267	307	1057	1019
Volume to Capacity	0.07	0.12	0.01	0.01
Queue Length 95th (ft)	5	10	1	1
Control Delay (s)	19.4	18.3	0.3	0.3
Lane LOS	C	C	A	A
Approach Delay (s)	19.4	18.3	0.3	0.3
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	43.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	0	10	0	10	0	470	10	10	450	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	6	0	12	0	12	0	495	11	11	474	5
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1015	1009	482	1006	1006	506	482			508		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1015	1009	482	1006	1006	506	482			508		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	94	98	100	94	100	98	100			99		
cM capacity (veh/h)	210	239	585	214	239	568	1068			1029		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	18	24	505	489
Volume Left	12	12	0	11
Volume Right	0	12	11	5
cSH	219	311	1068	1029
Volume to Capacity	0.08	0.08	0.00	0.01
Queue Length 95th (ft)	7	6	0	1
Control Delay (s)	22.9	17.5	0.0	0.3
Lane LOS	C	C		A
Approach Delay (s)	22.9	17.5	0.0	0.3
Approach LOS	C	C		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	0	0	5	5	0	15	5	465	15	15	435	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	6	6	0	18	5	489	16	16	458	11
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1026	1017	469	1015	1014	503	471			508		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1026	1017	469	1015	1014	503	471			508		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	100	99	97	100	97	100			98		
cM capacity (veh/h)	203	234	595	211	234	569	1072			1024		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	6	24	511	484
Volume Left	0	6	5	16
Volume Right	6	18	16	11
cSH	595	400	1072	1024
Volume to Capacity	0.01	0.06	0.00	0.02
Queue Length 95th (ft)	1	5	0	1
Control Delay (s)	11.1	14.6	0.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.1	14.6	0.1	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	49.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment D

Existing Conditions (2010) Queuing Report

<Insert from \\rosa\proj\ODOT\392524Rockaway\5 Plan Adoption\Draft Plan\PDFs for VolII\AppendixB>

Intersection: 1: Beach Street & US 101

Movement	EB	NB	NB	SB
Directions Served	LR	L	TR	LTR
Maximum Queue (ft)	63	54	4	23
Average Queue (ft)	26	9	0	1
95th Queue (ft)	53	35	3	10
Link Distance (ft)	422		1411	168
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		210		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Neah-Kah-Nie High School & US 101

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	T	L	T
Maximum Queue (ft)	50	63	12	38	6
Average Queue (ft)	19	17	0	3	0
95th Queue (ft)	49	49	9	19	4
Link Distance (ft)		624	3302		1411
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	30			190	
Storage Blk Time (%)	6	2	0		
Queuing Penalty (veh)	1	1	0		

Intersection: 3: NE 12th Ave & US 101

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	62	7	74
Average Queue (ft)	25	0	6
95th Queue (ft)	54	5	37
Link Distance (ft)	1097	3077	3302
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: N 6th Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	78	44	75	66
Average Queue (ft)	16	10	5	4
95th Queue (ft)	54	36	36	33
Link Distance (ft)	1312	2477	1355	3077
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: N 3rd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	51	99	72	155
Average Queue (ft)	21	42	6	21
95th Queue (ft)	50	77	36	85
Link Distance (ft)	137	787	848	1355
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: S 1st Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	87	40	126	198
Average Queue (ft)	40	17	21	16
95th Queue (ft)	72	45	79	91
Link Distance (ft)	570	381	366	848
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: S 2nd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	105	175	156
Average Queue (ft)	30	44	22	30
95th Queue (ft)	69	86	98	108
Link Distance (ft)	144	1131	570	366
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: S 3rd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	39	58	106	93
Average Queue (ft)	12	22	11	13
95th Queue (ft)	36	52	56	63
Link Distance (ft)	158	376	1694	570
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: S 6th Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	48	55	12	92
Average Queue (ft)	15	14	0	8
95th Queue (ft)	44	43	8	46
Link Distance (ft)	250	328	1631	1694
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Washington St & US 101

Movement	EB	WB	NB	SB
Directions Served	LR	LR	LTR	LTR
Maximum Queue (ft)	37	39	47	117
Average Queue (ft)	5	16	2	13
95th Queue (ft)	24	44	23	65
Link Distance (ft)	260	415	303	1631
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1

Attachment E

Future No-Build (2030) Mobility Report

<Insert from \\rosa\proj\ODOT\392524Rockaway\5 Plan Adoption\Draft Plan\PDFs for VolII\AppendixB>

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	0	30	0	0	0	40	505	0	0	470	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	0	35	0	0	0	42	532	0	0	495	26
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1130	1130	514	1165	1143	538	524			535		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1130	1130	514	1165	1143	538	524			535		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	87	100	94	100	100	100	96			100		
cM capacity (veh/h)	175	196	562	155	192	545	1005			987		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	59	0	42	532	521
Volume Left	24	0	42	0	0
Volume Right	35	0	0	0	26
cSH	298	1700	1005	1700	987
Volume to Capacity	0.20	0.00	0.04	0.31	0.00
Queue Length 95th (ft)	18	0	3	0	0
Control Delay (s)	20.0	0.0	8.7	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	20.0	0.0	0.6		0.0
Approach LOS	C	A			

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	20	525	20	15	485
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	35	24	553	21	16	511
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1103	560			579	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1103	560			579	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	85	96			98	
cM capacity (veh/h)	231	529			962	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	35	24	553	21	16	511
Volume Left	35	0	0	0	16	0
Volume Right	0	24	0	21	0	0
cSH	231	529	1700	1700	962	1700
Volume to Capacity	0.15	0.04	0.33	0.01	0.02	0.30
Queue Length 95th (ft)	13	3	0	0	1	0
Control Delay (s)	23.4	12.1	0.0	0.0	8.8	0.0
Lane LOS	C	B			A	
Approach Delay (s)	18.9		0.0		0.3	
Approach LOS	C					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	15	530	25	15	500
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	18	558	26	16	526
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1137	578			589	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1137	578			589	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	86	97			98	
cM capacity (veh/h)	215	507			953	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	47	584	542
Volume Left	29	0	16
Volume Right	18	26	0
cSH	274	1700	953
Volume to Capacity	0.17	0.34	0.02
Queue Length 95th (ft)	15	0	1
Control Delay (s)	20.8	0.0	0.5
Lane LOS	C		A
Approach Delay (s)	20.8	0.0	0.5
Approach LOS	C		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	10	10	0	10	15	535	10	15	510	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	12	12	12	0	12	16	563	11	16	537	0
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1186	1180	543	1192	1174	574	540			577		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1186	1180	543	1192	1174	574	540			577		
tC, single (s)	7.4	6.8	6.4	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.7	4.2	3.5	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	92	93	98	92	100	98	98			98		
cM capacity (veh/h)	141	166	495	148	186	519	1006			956		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	24	589	553
Volume Left	12	12	16	16
Volume Right	12	12	11	0
cSH	198	230	1006	956
Volume to Capacity	0.18	0.10	0.02	0.02
Queue Length 95th (ft)	16	8	1	1
Control Delay (s)	27.1	22.4	0.4	0.5
Lane LOS	D	C	A	A
Approach Delay (s)	27.1	22.4	0.4	0.5
Approach LOS	D	C		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	0	10	25	40	10	45	15	515	50	40	480	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	12	29	47	12	53	16	542	53	42	505	11
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1260	1227	517	1236	1206	574	519			598		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1260	1227	517	1236	1206	574	519			598		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	93	95	63	93	90	98			96		
cM capacity (veh/h)	120	169	560	128	169	508	1040			957		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	112	611	558
Volume Left	0	47	16	42
Volume Right	29	53	53	11
cSH	337	206	1040	957
Volume to Capacity	0.12	0.54	0.02	0.04
Queue Length 95th (ft)	10	72	1	3
Control Delay (s)	17.2	41.5	0.4	1.2
Lane LOS	C	E	A	A
Approach Delay (s)	17.2	41.5	0.4	1.2
Approach LOS	C	E		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Volume (veh/h)	30	10	55	10	0	20	40	530	20	15	505	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	35	12	65	12	0	24	42	558	21	16	532	26
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1258	1245	551	1306	1248	574	561			582		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1258	1245	551	1306	1248	574	561			582		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	74	93	88	89	100	95	96			98		
cM capacity (veh/h)	135	164	535	109	164	519	993			970		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	112	35	621	574
Volume Left	35	12	42	16
Volume Right	65	24	21	26
cSH	246	230	993	970
Volume to Capacity	0.45	0.15	0.04	0.02
Queue Length 95th (ft)	55	13	3	1
Control Delay (s)	31.3	23.4	1.1	0.4
Lane LOS	D	C	A	A
Approach Delay (s)	31.3	23.4	1.1	0.4
Approach LOS	D	C		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	66.8%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	10	25	45	10	25	25	545	40	45	505	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	12	29	53	12	29	26	574	42	47	532	21
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1326	1311	548	1326	1301	601	556			619		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1326	1311	548	1326	1301	601	556			619		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	78	92	94	52	92	94	97			95		
cM capacity (veh/h)	107	143	524	111	149	502	988			931		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	65	94	642	600
Volume Left	24	53	26	47
Volume Right	29	29	42	21
cSH	180	153	988	931
Volume to Capacity	0.36	0.62	0.03	0.05
Queue Length 95th (ft)	38	83	2	4
Control Delay (s)	35.7	60.4	0.7	1.3
Lane LOS	E	F	A	A
Approach Delay (s)	35.7	60.4	0.7	1.3
Approach LOS	E	F		

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	10	15	10	20	15	580	15	15	550	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	12	12	18	12	24	16	611	16	16	579	11
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1301	1280	590	1289	1277	624	592			629		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1301	1280	590	1289	1277	624	592			629		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	90	93	98	86	93	95	98			98		
cM capacity (veh/h)	121	161	509	126	162	486	962			918		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	53	642	605
Volume Left	12	18	16	16
Volume Right	12	24	16	11
cSH	182	203	962	918
Volume to Capacity	0.19	0.26	0.02	0.02
Queue Length 95th (ft)	17	25	1	1
Control Delay (s)	29.4	28.9	0.4	0.5
Lane LOS	D	D	A	A
Approach Delay (s)	29.4	28.9	0.4	0.5
Approach LOS	D	D		

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	10	0	15	0	15	0	580	15	15	550	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	12	0	18	0	18	0	611	16	16	579	11
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1258	1248	590	1246	1245	624	592			629		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1258	1248	590	1246	1245	624	592			629		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	87	93	100	87	100	96	100			98		
cM capacity (veh/h)	141	171	509	141	172	486	971			927		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	35	626	605
Volume Left	18	18	0	16
Volume Right	0	18	16	11
cSH	151	218	971	927
Volume to Capacity	0.19	0.16	0.00	0.02
Queue Length 95th (ft)	17	14	0	1
Control Delay (s)	34.4	24.6	0.0	0.5
Lane LOS	D	C		A
Approach Delay (s)	34.4	24.6	0.0	0.5
Approach LOS	D	C		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	55.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	10	0	20	10	575	20	20	530	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	12	12	0	24	11	605	21	21	558	16
Pedestrians		3			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1274	1261	572	1263	1259	622	577			629		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1274	1261	572	1263	1259	622	577			629		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	100	98	92	100	95	99			98		
cM capacity (veh/h)	134	165	521	140	166	488	980			922		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	35	637	595
Volume Left	0	12	11	21
Volume Right	12	24	21	16
cSH	521	267	980	922
Volume to Capacity	0.02	0.13	0.01	0.02
Queue Length 95th (ft)	2	11	1	2
Control Delay (s)	12.1	20.5	0.3	0.6
Lane LOS	B	C	A	A
Approach Delay (s)	12.1	20.5	0.3	0.6
Approach LOS	B	C		

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	58.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Attachment F
Future No-Build (2030) Queuing Report

Intersection: 1: Beach Street & US 101

Movement	EB	NB	NB	SB
Directions Served	LR	L	TR	LTR
Maximum Queue (ft)	64	75	5	37
Average Queue (ft)	30	13	0	2
95th Queue (ft)	57	45	0	18
Link Distance (ft)	422		1411	168
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		210		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Neah-Kah-Nie High School & US 101

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	50	60	14	6	40	6
Average Queue (ft)	23	21	0	0	6	0
95th Queue (ft)	52	55	7	4	27	5
Link Distance (ft)		624	3302			1411
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	30			65	190	
Storage Blk Time (%)	9	3				
Queuing Penalty (veh)	2	1				

Intersection: 3: NE 12th Ave & US 101

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	80	7	62
Average Queue (ft)	30	0	8
95th Queue (ft)	64	5	38
Link Distance (ft)	1097	3077	3302
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: N 6th Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	122	59	155	157
Average Queue (ft)	35	16	19	16
95th Queue (ft)	86	47	87	82
Link Distance (ft)	1312	2477	1355	3077
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: N 3rd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	54	158	102	167
Average Queue (ft)	24	56	9	37
95th Queue (ft)	54	107	48	113
Link Distance (ft)	137	787	848	1355
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: S 1st Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	127	73	154	234
Average Queue (ft)	50	24	36	26
95th Queue (ft)	96	58	109	130
Link Distance (ft)	570	381	366	848
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: S 2nd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	136	161	137	325
Average Queue (ft)	40	66	22	55
95th Queue (ft)	87	135	94	192
Link Distance (ft)	144	1131	570	366
Upstream Blk Time (%)	0			0
Queuing Penalty (veh)	0			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: S 3rd Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	45	75	232	106
Average Queue (ft)	21	29	26	13
95th Queue (ft)	47	61	119	61
Link Distance (ft)	158	376	1694	570
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: S 6th Ave & US 101

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	49	68	25	139
Average Queue (ft)	23	23	1	19
95th Queue (ft)	51	56	13	84
Link Distance (ft)	250	328	1631	1694
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Washington St & US 101

Movement	EB	WB	NB	SB
Directions Served	LR	LR	LTR	LTR
Maximum Queue (ft)	39	70	137	155
Average Queue (ft)	11	23	15	21
95th Queue (ft)	37	56	77	84
Link Distance (ft)	260	415	303	1631
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 3

APPENDIX C

ALTERNATIVES DEVELOPMENT AND EVALUATION

Appendix C: Alternative Development and Evaluation

Rockaway Beach Transportation Plan: Concepts Under Consideration

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DATE:	February 12, 2010

This section outlines improvement concepts (concepts) within Rockaway Beach that will be considered by the Rockaway Beach Transportation Plan project team to meet the established project objectives outlined below.

1. Improve north to south connectivity to reduce reliance on US 101
2. Improved pedestrian crossings with US 101
3. Provide parking areas for visitors
4. Provide pedestrian routes to serve residents and the visiting population
5. Identify opportunities to improve and/or consolidate rail crossings
6. Ensure that transportation facilities are adequate to serve residential and commercial lands

The section is organized by project objective. Under each objective, the team describes each concept, identifies its benefits and constraints, and highlights additional information needed prior to evaluation.

These potential concepts were identified from discussions with the Project Advisory Committee (PAC) at its first meeting in October, 2009, and from a work session with the Project Management Team (PMT) in December, 2009. A draft of this memo was discussed with the PMT and the PAC in January 2010 and with the community at an Open House on February 2nd, 2010. This memo describes the universe of concepts that will be considered, and does not attempt to evaluate, prioritize, or make recommendations.

All concepts are illustrated in Figure 1: North End Concepts (Section Line Street to N 7th Avenue), Figure 2: South End Concepts (N 7th Avenue to Washington Street), and Figure 3: Improve Railroad Crossings. These figures are attached at the end of this section.

Objective #1: Improve north-south Connectivity

1a. Extension of Necarney Street

Necarney Street parallels US 101 east of the highway, both in the vicinity of downtown Rockaway Beach and in the northern segment, north of 12th Avenue. The extension of Necarney Street would run from its current southern end (south of NE 12th Avenue) to a new connection with Timberlake Drive and N 3rd Avenue. The facility would provide an alternate, parallel route to US 101 for all road users (autos, bicyclists, and pedestrians) to travel north-south in Rockaway Beach.

Benefits	Constraints
Provides an alternate north-south route to US 101 to serve residents east of the highway	If market conditions are not right, developers may not be in a position to construct until long-term
Developer likely to fund all or major portion	Several creek crossings and potential wetlands impacts
Connects Rockaway Beach neighborhoods with the High and Middle School without requiring access to the highway	
Right-of-way identified	

Information Needed:

- Amount of right-of-way that is available vs. identified
- Environmental information for proposed corridor

1b. Improvements to Miller Street

Miller Street parallels US 101 west of the highway. It is owned in part by the Port of Tillamook Bay Railroad but is used for local access and could serve as an alternate to US 101. Miller Street is not continuous, but is segmented by creek crossings in three locations the segments extend from NW 19th Avenue to S Nehalem Street, South 1st Avenue to South 3rd Avenue, and S 4th Avenue to just north of South 6th Avenue. The southern portion of Miller is completely owned by the Port of Tillamook Bay Railroad, while the northern portions are owned in part by the City and part by the railroad. The proposed improvements would look to make Miller Street continuous from N 19th Street south to Washington Street, and could potentially be extended north to the Manhattan Beach Wayside to provide a continuous pedestrian and bicycle path the length of the City. The existing facility would be improved to better accommodate pedestrians, and bicyclists. . This would turn Miller Street into a bicycle boulevard, where it could accommodate local and through bicycle and pedestrian travel, but only local auto travel.

The improvements to Miller Street could also allow for additional on-street parking near trip generators like restaurants and hotels. Other improvements would include upgrades to the existing pavement, which currently contains sections of gravel, potholes, broken edges, etc. that can make it difficult for all users.

A participant at the February 2nd Open House suggested that the team consider connecting the facility on Miller Street to the High School (this would require a crossing of US 101).

Benefits	Constraints
Attracts pedestrians and bicyclists off of the highway, closer to town and to the ocean, potential safety benefit	Available right of way (ROW) – Miller Street is partly owned by the Port of Tillamook Bay railroad in the north, and fully owned by the railroad south of S 1st Avenue
Better connects neighborhoods with downtown Rockaway Beach	Includes multiple creek crossings
Could provide additional parking	Would require pavement upgrades
Potential use as pedestrian and bicycle boulevard	
Could be considered a tourist amenity	

Information Needed:

- Port of Tillamook Bay Railroad's future plans for Miller Street
- Available ROW in the area
- Feasibility of creek crossings for pedestrians, bicyclists, and/or autos
- Potential cross section designs (shared use path, dedicated lanes, etc).
- Exact ownership of Miller Street throughout the City

1c. Use of Beach

The beach can be used as a north-south pedestrian route for trips throughout Rockaway Beach. This objective may require upgrades to existing beach access points. Several existing beach accesses are difficult, and as more riprap is installed to prevent erosion, existing accesses could become more difficult to use. Improvements are needed at most existing beach access points.

The existing access points with high pedestrian volume include:

- Section Line Street (signed on non-beach side)
- Beach Street (signed on non-beach side)
- Manhattan Beach State Park
- NW 20th Avenue (signed on non-beach side)
- NE 12th Avenue
- N 6th Avenue
- N 3rd Avenue (signed on non-beach side)
- S 1st Avenue (signed on non-beach side)
- S 3rd Avenue (signed on non-beach side)
- S 6th Avenue (signed on non-beach side)
- Washington Street (signed on non-beach side)

It may also be helpful to add signs at both the beach and at beach access points on the street network so pedestrians using the beach as a north-south route will be able to identify appropriate access points to reach their destinations.

Benefits	Constraints
Provides alternate pedestrian route to US 101	Weather conditions will impact use. Pedestrians may be less likely to use during inclement weather and/or night conditions.
Scenic route	Rocks and riprap make routes difficult in places
Minimal cost associated with use	Encouraging the beach as a north-south route could require pedestrians to cross small streams
Upgrades will provide improved access to the beach for all users	Some access points have large elevation changes
	Difficult to maintain any improvements along beach due to erosion and/or climate change
	The beach is not, and will not be ADA compliant, and may not be accessible to some users.

Information Needed:

- Validation of high pedestrian access locations, through PAC and community meetings
- Understanding of location and timing of riprap expansion

1d. Recreational Trails around Lakes

Recreational trails around Crescent Lake and Lake Lytle can provide north-south connectivity for pedestrians and bicyclists. A trail or boardwalk around Lake Lytle would provide connectivity between NE 12th Avenue and N 6th Avenue on the east side of the lake. A path could also be included on the west side of the lake and parallel to US 101 (adjacent to the highway, or located closer to the lake). A boardwalk could provide a recreational loop for residents and visitors alike and provide facilities for bicyclists and pedestrians. Portions might be built by adjacent development, the state, or the city.

A path placed around Crescent Lake would create an even longer north-south connection for pedestrians and bicyclists.

Benefits	Constraints
Provides alternate route for pedestrians and bicyclists from US 101	Would not accommodate auto traffic
Recreational loop for residents and visitors	Presence of wetlands and potentially sensitive habitat surrounding the lakes (Goal 5 wetlands)
Improved access to Lake Lytle and Crescent Lake	Land surrounding lakes is under multiple ownership
US 101 portion provides improved pedestrian environment for pedestrian travel along US 101	Construction cost may be high, especially if a boardwalk is deemed necessary
Potential for developers to contribute to cost of construction	Current 25 foot riparian vegetation setback – could require a goal exception
City owns section of land along Lake Lytle	

Information Needed:

- Extent of natural area - wetlands and location of sensitive habitat
- Plat and plans for development east of the lake
- Ownership of land surrounding lake

1e. Upgraded Connection between Lake Boulevard and Neah-Kah-Nie Middle and High School

This upgraded connection would run between NE Lake Boulevard and the back of Neah-Kah-Nie Middle and High School. It currently exists as a gated roadway open during school hours. This could include removing the gate so the roadway is open at all hours and upgrading the surface so it is suitable for bicyclists and pedestrians. It would provide an alternate route for pedestrians, and bicyclists traveling between nearby neighborhoods and the high school, removing the need for this traffic to access the highway.

Benefits	Constraints
Provides an alternate route to Neah-Kah-Nie High School from US101	Available ROW – Connection is currently a private facility
Provides usable facility at all hours and for all modes	

Information Needed:

- Discussion with school to understand existence of gate and potential for the gate to remain open in the future

1f. New Street – Juniper Street Extension

The extension of Juniper Street would connect north at Easy Street and S 6th Avenue. Linking these facilities will provide a north-south route between Washington Street and S

Nehalem Avenue. This facility could provide the only other parallel route to US 101 for pedestrians, bicyclists, and possibly autos on the east side of the highway.

Benefits	Constraints
Provides alternate north-south connection to US 101 between Washington Street and S 6th Avenue. With this extension, traffic can travel north-south between Washington Street and S 6th Avenue.	Possible wetland and potentially sensitive habitat impacts
Would provide an alternate bicycle and pedestrian connection to US 101	Possible maximum grade issues
	Requires a creek crossing
	City may have vacated some right of way

Information Needed:

- Additional information about elevation change over expected extension path vs. City grade maximums
- Information on wetlands and potentially sensitive habitats
  - Location and extent of the Right-of-Way with respect to the City Limits

Objective #2: Improved Pedestrian Crossings on US 101

The team established a preliminary assessment of priority crossings based on the amount of pedestrian traffic, the number of attractors on both sides of US 101, including the beach, commercial or high density residential/hotel properties, and the proximity of other crossings in the area. A total of seven crossing locations are identified in the sections that follow; five of these are considered "High Priority" locations based on proximity to pedestrian generators, safety, and existence of alternate crossing locations. In addition to improving pedestrian crossings along US 101, an educational campaign would also be beneficial to remind pedestrians that all intersection approaches are legal crosswalks.

Approved and striped crosswalks would need to connect to improved pedestrian facilities on the west side of US 101 and potentially across the railroad tracks. Currently, Rockaway Beach does not have improved sidewalks or paths that connect to the marked crosswalks on US 101, an ODOT requirement for approval of crosswalks is that there is a connected pedestrian facility on both sides of the highway so pedestrians can access destinations.

2a. North Crossings

Possible crosswalk locations in northern Rockaway Beach include:

- US 101 & South of Neah-Kah-Nie School (High Priority)
- US 101 & NE 12 Avenue
- US 101 & NE 6th Avenue

US 101 & South of Neah-Kah-Nie School

An improved crossing South of Neah-Kah-Nie High School would provide safer access to the school for staff, students, and parents attending school events. This proposed crossing location would require a Crossing Order from the ODOT Rail Division since it is not currently a recognized crossing location for the railroad to comply with the requirement of a facility. Several types of improvements are provided for consideration for a crossing of US 101 south of the school:

A. Pedestrian Island – A pedestrian island would facilitate a two-stage crossing of US 101. The ODOT Traffic Manual, prefers pedestrian islands and/or curb bulb-outs be used prior to consideration of a RRFB or HAWK signal. Minimum width requirements are 4 feet, but 8 feet or more is preferable when more hazardous conditions exist, such as inclement weather, and higher speeds and/or traffic volumes (ODOT 2003 Highway Design Manual, Section 11.5).

B. Rapid Rectangular Flashing Beacon (RRFB) – A RRFB is a pedestrian activated flashing light system at both ends of the marked crossing to alert drivers when pedestrians are entering or in the crossing.

C. High-Intensity Activated Crosswalk (HAWK) – A HAWK signal places a signal head at the crossing that stops traffic when pedestrians and/or bicyclists activate the crosswalk, indicating that they are crossing US 101. When no crossings are necessary, the signal head remains dark and traffic flow continues uninterrupted.

D. Overcrossing – An overcrossing would separate pedestrian and bicycle cross traffic from vehicular traffic on US 101. An overcrossing would have to meet ODOT's highway clearance requirements of 17 feet, and the railroad crossing clearance of 23.5 feet and be ADA compliant. Overcrossings were also suggested at the Open House for other locations in Rockaway, most notably in the downtown core between North 3rd Avenue and South 3rd Avenue.

The PAC suggested a possible undercrossing of US 101 for students to use to access the beach, however, the idea was deemed unfeasible due to the potential for flooding.

Any of these options can be supplemented by advanced warning signs upstream from the crossing, alerting drivers that pedestrians may be entering the roadway.

US 101 & NE 11th and NE 6th Avenue

Additional locations for marked crossings may include crossings with US 101 at NE 6th Avenue and NE 11th Avenue. These crossings would be marked crossings only. NE 11th Avenue is close to the primary access to Lake Lytle, and has less of an elevation change between US 101 and the railroad tracks. Additionally, a sidewalk could be provided on the east side between NE 11th and NE 12th Avenues for pedestrians to access Lake Lytle. NE 6th Avenue connects a marked beach access to the west of the highway with a residential area to the east of the highway.

Benefits	Constraints
RRFB or HAWK Signal crossings south of Neah-Kah-Nie School may provide safer crossing for current pedestrian and bicycle traffic.	Safety and justification must be shown to ODOT before approval of crossing is considered.
Crossings at NE 6th Avenue and NE 11th Avenue would promote more east-west connectivity in northern Rockaway Beach	Potential safety issues associated with speed of facility, especially at the north end crossing near the school
RRFB are shown to be an effective way to stop motorists and allow pedestrian and bicycle crossing over extended periods of time.	Any marked crosswalks at unsignalized locations create the potential for false sense of security for pedestrians and bicyclists
Pedestrian islands would allow for a two-stage gap, making it easier for pedestrians to cross when traffic volumes are high.	Cost associated with purchase, installation, and maintenance of equipment for RRFB and HAWK crossings.
An overcrossing option would eliminate pedestrian and bicycle conflicts with motorists and removed delay associated with crossings.	RRFB are approved for use by ODOT, but not by the MUTCD. However, ODOT currently has interim approval for their use at marked crossings.
	HAWK and RRFB would benefit from public education campaigns, however most users are not expected to be local community members as the school is regional.
	Proposed crossing location may not meet minimum ODOT ADT requirements for HAWK or RRFB installation.
	Proposed crossing location has a posted speed of 45 mph. which is the maximum speed allowable for RRFB and HAWK installation.
	Rockaway Beach already has a number of railroad crossings, which may make it difficult to receive approval for an additional crossing south of Neah-Kah-Nie School.
	Pedestrian islands could be inappropriate in higher speed areas during low visibility conditions.

Information Needed:

- Proposed crossing locations would be studied against ODOT criteria to determine whether they qualify for marked crossings.
- Neah-Kah-Nie School crossing would need additional analysis to determine whether it qualifies for use of a HAWK Signal under the Manual on Uniform Traffic-Control Devices (MUTCD).
- Pedestrian counts and locations for US 101 crossing data outside of the study area intersections that were already counted.
- Check proposed crossing locations for required sight distance.

2b. Crossings in Downtown Core

The area between N 3rd Avenue and S 3rd Avenue is a designated Special Transportation Area (STA). This area is considered the downtown core of Rockaway Beach because of its increased pedestrian and bicycle activity, and proximity to shopping, restaurants, beach

access, and parking. Pedestrian generators are located on both the east and the west sides of the highway. Providing safe crossings on US 101 at focused locations will signal to drivers where to anticipate pedestrian and bicycle cross traffic. Their locations were selected to best channel pedestrian movement by providing the most direct route across the highway to pedestrian generators. Because this area is considered high use for pedestrians, sidewalks and illumination should be considered for each side of US 101. Adding sidewalks to the west side of US 101 that cross the railroad and connect to other destinations could provide a pedestrian dwell area, which prevents pedestrians waiting to cross the facility from having to stand in the roadway. To be approved by ODOT for a marked crossing over US 101, the crossings must have a network of pedestrian facilities on the west side of the highway, over the railroad tracks. The facility could be a shared use path or extra width on the side of the street to accommodate pedestrian travel.

Possible crossings in the downtown core include:

- US 101 & N 3rd Avenue (High Priority)
- US 101 & S 1st Avenue (High Priority)
- US 101 & S 2nd Avenue (High Priority)
- US 101 & S 3rd Avenue (High Priority)

The crossing at US 101 & N 3rd Avenue would also be a good location to consider for a bus waiting area (both Tillamook County Transit District and School Buses).

Benefits	Constraints
Provides east-west connections in high pedestrian demand locations	Safety and justification must be shown to ODOT before approval of crossing is considered.
Provides connections between beach access points and local businesses	Any marked crosswalks at unsignalized locations create the potential for false sense of security for pedestrians and bicyclists
Provides clarification for both pedestrians and drivers where crossings should be made	

Information Needed:

- Proposed crossing locations would be studied and evaluated to determine whether they qualify for ODOT marked crossings.
- Validate priority pedestrian crossing locations from discussions with PAC and community
- Check proposed crossing locations for required sight distance.

2c. South Crossing

Two possible crosswalk locations were identified in southern Rockaway Beach:

- US 101 & S 6th Avenue
- US 101 & Washington Street (High Priority)

Washington Street is considered a high priority crossing location in southern Rockaway Beach. A marked crossing here would serve east-west connections, as well as provide a safe crossing location for people accessing the marked Americans with Disabilities Act (ADA) beach access on South 9th Avenue north of Washington Street. This would also be a good candidate for exploring options to improve as a bus waiting area for school children and transit riders. An additional crossing may also be considered at S 6th Avenue, however it is not considered a High Priority crossing. Both of these potential crossings would also require a link to a pedestrian network west of US 101, with improved pedestrian crossings of the railroad tracks at these two locations.

Benefits	Constraints
Provides residential and beach access connection	Requirements for ODOT approval must be met
Provides only southern Rockaway Beach marked crossing	Any marked crosswalks at unsignalized locations create the potential for false sense of security for pedestrians and bicyclists

Information Needed:

- Proposed crossing locations would be studied to determine whether they qualify for ODOT marked crossings.
- Check proposed crossing locations for required sight distance.

2d. Provide Emergency Vehicle Signals

Emergency vehicles responding to coastal, medical, or other emergencies in Rockaway Beach need to be able to cross or turn left onto US 101 safely and quickly. Adding an emergency vehicle signal would allow emergency vehicles to have priority at signalized intersections when maneuvers need to occur. This would enable them to respond quicker to emergencies, and safely stop conflicting vehicles.

The following intersection is considered for an emergency activated traffic signal, due to its location next to the fire station.

- US 101 & S 3rd Avenue

Benefits	Constraints
Decrease incident response times	Potential for through vehicles on US 101 to not anticipate traffic turning from S 3rd Avenue onto or across US 101. This results when the expectation is that side street traffic has a red light when US 101 has a green light, which is not always the case for emergency activated signals.
Promote safety for emergency responders and conflicting traffic on US 101	Cost associated with signal installation and emergency vehicle detectors
	Signal warrant requirements

Information Needed:

- Determining if the location meets emergency vehicle signal warrants

Objective #3: Provide Parking Areas for Visitors

3a. Make Best Use of Existing and Planned Parking Facilities

Adequate parking for visitors could be supplied by making best use of the existing county and city parking lots, encouraging use of the Manhattan Beach Parking Area, and providing shared parking facilities.

- The County's informal parking area near Section Line Street could be formalized and signed on US 101 to promote its use. To make this a viable option, however, the facility will need to be supported with pedestrian routes to the beach and other parts of Rockaway Beach.
- The City could pave and promote its parking lot for visitor parking. This lot could also be evaluated for over-night recreational vehicle parking. Signage could be added to US 101 to direct travelers to the lot.
- Visitors can also use the existing Manhattan Beach parking area. Utilization can be increased by providing signs on US 101 directing vehicles to the lot.
- A parking area for visitors to access the nature reserve is planned just north of Washington Street. Signage and number of spots to be determined.

In addition, existing parking facilities in Rockaway Beach can be advertised for parking during non-service hours. Examples would include church parking lots, retail parking lots, etc.

Benefits	Constraints
Relieves parking congestion	Does not support recreational vehicle parking in three of the four proposed existing facilities
Does not require building new facilities	May redistribute congestion throughout network
Distributes parking options throughout all of Rockaway Beach	Parking lots would need to be supported by beach accesses and pedestrian facilities, which may require upgrading.
	City parking lot use may induce additional pedestrian crossings of US 101

Information Needed:

- Ownership of existing parking facilities
- Discussions with businesses to identify willingness to share parking areas during non-service hours.

3b. Parking behind Businesses

Parking in Rockaway Beach is used by people wishing to access the beach and those stopping in the downtown core. The majority of available parking is located on the west side of US 101, and many of the business are on the east side. This requires pedestrians trying to reach these businesses to cross US 101 to reach their destination, and also requires northbound vehicles to take a left to reach a parking area. Providing additional parking behind business would decrease the amount of pedestrians crossing the highway and provide less congested places for potential customers to park.

Benefits	Constraints
Provides additional parking	Does not work everywhere. Some areas behind business are already developed.
May reduce pedestrian crossing volumes	Places burden of parking facilities on businesses

Information Needed:

- Identify area available for parking development behind businesses
- Locate areas where parking would provide the best access to businesses within the downtown core

3c. City Ordinance Language

Vacation rental homes in Rockaway Beach are not currently required to account for the number of parked vehicles associated with their use. Rental homes may attract several cars which can not fit in the property's garage or driveway. These overflow vehicles park on city streets or in some cases, in public lots. Revising the city ordinance language can place parking minimums and maximums associated with rental properties. Minimums can indicate the minimum number of parking spaces outside of public right-of-way each owner is required to provide, while maximums may limit the amount of vehicles each owner can advertise that their property can support.

Benefits	Constraints
Reduced public parking demand	Would only apply to newly developed or redeveloped properties

Information Needed:

- Review of existing City code related to parking standards and vacation rental properties

3d. Recreational Vehicle Parking at Wayside

The wayside is an existing parking area between US 101 and the coast frontage that provides parking for recreational vehicles (RV) and autos. RV parking is currently limited, and reconfiguration of this lot could provide increased parking opportunities.

Benefits	Constraints
More parking for RVs, encouraging users to stay in Rockaway Beach	Railroad crossing and entry to wayside make it hard to access for RVs
Currently supported by beach access	Several conflict points exist including Miller Street, railroad crossing, and angled parking pod
Wayside is a visible lot, which makes it easier to attract tourist RV traffic.	Redesigning for RV parking may reduce the overall parking capacity of the lot

Information Needed:

- AutoCAD or Microstation drawings of proposed Wayside reconfiguration to ensure adequacy for RV turning movements

3e. Miller Street Improvements

Additional on-street parking could be provided on Miller Street as part of the Miller Street Improvements. This concept is discussed above as Objective 1b.

3f. Extend Downtown Angle Parking Pod

An angle parking pod is currently located in the downtown core, between S Nehalem Avenue and S 2nd Avenue. Additional parking can be provided for visitors by extending the angle parking pod to the north and south.

Benefits	Constraints
Provides additional parking in downtown core	May not be enough available right-of-way to expand parking
Parking is near beach access and businesses	Existing angle parking is near railroad and roadway intersections, which can be difficult for operations and creates conflict points.
Parking lot is highly visible to tourists	

Information Needed:

- Available ROW
- Number of additional spaces received compared to ROW and construction costs.

Objective #4: Provide Pedestrian Routes

4a. Planned Recreational Path Connection

A recreational path is being planned already through the conservancy land north of Washington Street. This path will have access to and from the south. A new pedestrian

connection(s) should be considered to also provide pedestrian access to and from the north. This would provide a pedestrian connection off of the highway between the southern neighborhood in Rockaway Beach and downtown. The new connection would connect from Easy Street into the path area that is planned to start/end at Washington Street. Identified users would be pedestrians only, using the route as:

- Improved access to the natural area trail/boardwalk
- Alternate pedestrian route to downtown Rockaway Beach

Benefits	Constraints
Increased access to natural area for residents and visitors of Rockaway Beach	State has regulations on "transportation" function of trails/boardwalks through natural areas
Increased knowledge and awareness of the surrounding natural area	At the Project Open House, the Nature Conservancy Board expressed concern with the idea of having trails from the north accessing the nature trail, as they are currently planning a trail connecting to a future parking lot off of US 101.
Increased pedestrian attractors south of downtown Rockaway Beach	The Nature Conservancy deed may be restrictive.
Provide an alternative through pedestrian route from the houses located around Washington Street to downtown Rockaway Beach that avoids US 101	
Would allow residents to access the conservancy land without having to use US 101	

Information Needed:

- Details of Nature Conservancy deed
- Extent of natural area – wetlands and potentially sensitive habitat
- Design and alignment of planned boardwalk in natural area
- State regulations/approval for a through pedestrian route

4b. Recreational Trails around Lakes

A combination trail and boardwalk around Lake Lytle and recreational trail around Crescent Lake can provide additional routes for pedestrians and bicyclists. This concept is discussed above as Objective 1d.

4c. Tsunami Evacuation Route Connections

This concept provides connections to higher elevations as part of tsunami evacuation/escape routes. Some locations in town have limited access/egress, and additional pedestrian evacuation routes would improve safety and connectivity. This is critical in the Nedonna Beach area, where the only access is Beach Street. This connection from Nedonna Beach would not end at US 101, but would need to identify where people would go from the highway east in the event of a disaster. Additional coordination with ODOT and the railroad would be required, as any route would cross/utilize US 101 and the

railroad tracks. Once a location is identified, the City, ODOT, and private developers would need to work together to build the appropriate evacuation routes.

Benefits	Constraints
Improved connectivity for residents	Finding appropriate staging areas for evacuees
Improved, increased emergency routes for residents and visitors	Finding appropriate, accessible routes for all pedestrians

Information Needed:

- ODOT and railroad requirements for emergency pedestrian access routes across and adjacent to US 101 and railroad tracks

4d. Provide Additional Sidewalks and Illumination on US 101

Downtown Rockaway Beach currently lacks sidewalks on the west side of the highway. There are a number of parking areas on the west side of the highway and pedestrian attractors both north and south of where visitors tend to park. The lack of sidewalks on the west side compromises pedestrian safety, and makes north-south pedestrian travel difficult. An improved, connected sidewalk network will serve all residents and visitors to Rockaway Beach. However installing sidewalks along both sides of US 101 throughout Rockaway Beach may not be cost effective, at least if done all at one time. Sidewalk prioritization and installation should be focused on areas with the most pedestrian movement - the downtown core. The team has developed a series of evaluation criteria that could be used to prioritize areas for sidewalk investment, shown in the table below.

Potential Evaluation Criteria	Potential Performance Measure
Citizen Requests	Completed forms for specific and documented deficiencies
Access to Public Facilities	Public government or non-profit service facilities as defined previously within 2,000 feet of site or corridor
	Location is within 250 feet of a transit stop, railroad station, bus stop
Public Accommodation Facilities	Public accommodation facilities as defined previously within 2,000 feet of the site or corridor
Coordination with other Improvement Plans	Number of different types of ADA improvements needed at site/corridor
	Opportunity to coordinate with existing or funded/programmed improvement project
Pedestrian Demand and Need	Location is in High Pedestrian Use Zone as identified in the updated TSP
	Location is in the top 20 highest pedestrian collision locations in the City
	Location provides a closure of a gap or barrier between an existing pedestrian network of accessible facilities
	Facility provides a new ADA-compliant facility rather than an alteration of an existing usable but deficient ADA facility

Pedestrians can also benefit from including illumination in conjunction with sidewalk improvements, especially in the area surrounding Neah-Kah-Nie School. This would increase safety for pedestrians heading to/from the school at night for after school activities. More discussion on Illumination improvements are included in Objective 6e.

Benefits	Constraints
Improved pedestrian connectivity in the downtown area	Potential lack of public right-of-way
Improved pedestrian safety in the downtown area	Tackling potential trade-offs with existing on-street parking
Improves ability of city to work with ODOT to stripe approved crosswalks across US 101	
Improved visibility for pedestrians if illumination upgrades are made.	

Information Needed:

- Pedestrian counts
- Coordination with ODOT on marked crossing locations.

4e. Miller Street Improvements

As part of the Miller Street Improvements objective, the facility would undergo improvements for bicycle and pedestrian traffic. This concept is discussed above as Objective 1b.

4f. Use of Beach

The coastal frontage of Rockaway Beach can be used as an existing pedestrian route. For maximum benefits to be received from this option, beach accesses will need to be evaluated for ADA accessibility. This concept is discussed above as Objective 1c.

4g. New Connection between Lake Boulevard and Neah-Kah-Nie School

A new connection between Lake Boulevard and the back of Neah-Kah-Nie School would be open to pedestrians, bicyclists, and autos. This concept is discussed above as Objective 1e.

4h. North Crossings

Three pedestrian crossings are considered for northern Rockaway Beach to improve pedestrian routes throughout the city. This concept is discussed above as Objective 2a.

4i. Crossings in Downtown Core

Three pedestrian crossings are considered for the downtown core of Rockaway Beach to improve pedestrian routes throughout the city. The downtown core is considered to be located between N 3rd Avenue and S 3rd Avenue. This concept is discussed above as Objective 2b.

4j. South Crossings

A pedestrian crossing and US 101 and Washington Street is considered for southern Rockaway Beach to improve pedestrian routes throughout the city. This concept is discussed above as Objective 2c.

4k. Street Standards

Consider updates to Rockaway Beach Street Standards to include language on pedestrian and bicycle facility requirements. Language would include information on required types facilities, design, and location eligibility. This will promote development of additional bicycle and pedestrian routes within Rockaway Beach.

Benefits	Constraints
Would establish bicycle and pedestrian facility guidelines for future development/redevelopment of facilities. Would enable City to require developers to provide facilities at their cost. Promote development of a larger pedestrian and bicycle facility network within Rockaway Beach If alternate routes are available, pedestrians and bicyclists may divert trips from US 101.	Would only be implemented when streets are upgraded or newly constructed – would take some time to be implemented on streets city-wide

Information Needed:

- Further discussion is needed with PMT and key stakeholders on type and location of street standard details.

Objective #5: Identify Opportunities to Improve and/or Consolidate Railroad Crossings

Objective 5 explores ways to improve and/or consolidate existing railroad crossings within Rockaway Beach. Following the first PAC meeting in October, 2009, the project team determined that consolidating rail crossings would not be a focus of the Rockaway Beach Transportation Plan. Rather, the project will focus on "critical" crossing locations that should be improved to better facilitate safe crossings for all users (including autos, bicyclists, pedestrians, and wheelchair users). Crossings are considered "critical" if they meet the following criteria: 1) provide emergency access; 2) highly utilized access point; 3) tsunami evacuation route; 4) provides best access to US 101 and/or east/west streets east of US 101; 5) provides best access to public beach; 6) provides the only access from US 101. Improved crossings will benefit from: 1) upgrades to roadway surface (concrete or new asphalt) to make crossing smoother; 2) level roadway approaches; 3) upgrades to signage. The project team could also consider sidewalks crossing tracks. Crossing consolidations would be considered at a later time once use of the crossings was better determined.

At its work session in December, 2009, the PMT drafted the following process to identify, make improvements to crossings, and monitor their use:

Step 1: Improve "Critical" Crossing

A. Identify critical crossings

B. Identify improvements needed so that critical crossings are adequately smooth for

   i. cars,

   ii. bicycles,

   iii. ADA/Wheelchairs

C. Make improvements to "critical" crossings

Step 2: Monitor Use

A. How well do upgraded crossings work for users?

B. Are unimproved crossings problematic for users?

Step 3: Hold a Public Process to Consider Crossing Consolidations

A. Discuss with community

B. Discuss with railroads and city

C. Consider criteria for consolidating crossings

Several of the existing crossings have been identified as high priority, including:

- Beach Drive
- N 23rd Avenue
- N 21st Avenue
- NE 13th Avenue
- N 11th Avenue
-
- N 6th Avenue
- N 3rd Avenue
- S 1st Avenue
- S 2nd Avenue
- S 3rd Avenue
- S 6th Avenue
- Washington Street

The team developed the following criteria to inform future conversations around consolidating railroad crossings:

A. Alternative crossing locations are located nearby (within two blocks)

B. Traffic volumes at the crossing are low and not expected to increase (due to changes in land use, etc.) in the foreseeable future.

C. Elevation change and/or sight distance make improvements to the crossing difficult

D. The crossing is not required for emergency access

Benefits	Constraints
Targets limited funds to priority crossings	Identifying "critical crossing locations" may not be one that achieves consensus in the community
Establishes a process for considering railroad crossing consolidation in the future	

Information Needed:

- Topography information to study elevation changes in vicinity of railroad crossings
- Sight distance evaluation

- Emergency response routes
- Usage data for all crossing locations

Objective #6: Ensure that Transportation Facilities are Adequate to Serve Residential and Commercial Lands

6a. Local Street Standards

The local street standards can be updated to accommodate multi-modal users, such as pedestrians and bicyclists. This will ensure that the facilities serve all users. This concept is discussed above as Objective 4k.

6b. Provide Bus Stops and/or Pull Outs

Provide bus stops and/or pull outs to better serve transit riders and school bus riders along US 101. Upgrades can include additional bus stops, bus pullouts, bus shelters, sidewalk and illumination upgrades, etc. To discourage recreational vehicles and/or motor vehicles from parking in designated bus pullouts, signage and pavement delineations can be used to clearly mark them as transit facilities. Examples of pavement delineations include textured or colored pavement, which will differentiate it from the street and other parking facilities in Rockaway Beach. Current bus routes travel both north and south along US 101, and would require stops on both sides of the highway. Potential locations for bus stops or pull-outs:

- US 101 & NE 12th Avenue
- US 101 & NE 20th Avenue
- US 101 & Washington Street

Benefits	Constraints
Provides a safe place for transit and school bus riders to wait for bus	Available space for safe stops and/or bus pullouts may be limited
May allow buses to pull out of traffic to pick up riders, which reduces the impact to US 101 operations	Bus pull-outs will need to be at least 40 feet long
Easily identifiable place for riders and drivers	

Information Needed:

- Available ROW information
- Discussion with Tillamook County Transportation District around logical bus pickup locations
- Information on school bus routes and stops

6c. Provide Emergency Vehicle Signals

Installing emergency activated traffic signals at intersections like US 101 & S 3rd Avenue will improve emergency response times. Upgrades to the system like this ensure the facilities serve lands efficiently and safely. This concept is discussed above as Objective 2d.

6d. South Terrace Drive

Improving South Terrace Drive (located east of the Pacific View Estates neighborhood) would provide a secondary emergency access to the neighborhood. This facility would connect Pacific View Estates to existing facilities east of the neighborhood. South Terrace Road can also be used to carry traffic east over the mountains in the event of a tsunami. Improvements would include upgrades to pavement surface and cross section to provide a more traversable route.

Benefits	Constraints
Provides additional emergency access to Pacific View Estates neighborhood	North-south connection is more circuitous route than using US 101
Provides tsunami evacuation route	Part of facility exists outside of city limits
Available for pedestrian, bicycle, and auto use.	

Information Needed:

- Information on road ownership

6e. Illumination Upgrades

Illumination upgrades to Rockaway Beach can be considered to provide improved lighting conditions for motorists, bicyclists, and pedestrians. Upgrades could be done to the US 101 corridor throughout Rockaway Beach, or to targeted areas. Examples of targeted areas might include US 101 near Neah-Kah-Nie School and the downtown core.

Benefits	Constraints
Improved safety for pedestrians crossing US 101	Cost associated with providing illumination upgrades
Better nighttime visibility for Neah-Kah-Nie School visitors go to/from school functions after classes	Illumination upgrades may involve right-of-way (ROW) acquisition for foundation placement.
Improved visibility for pedestrians using the downtown core at night.	

Information Needed:

- Available ROW for foundation placement
- Discussion with City of Rockaway regarding interest in dark skies initiative

6f. Rails-to-Trails

A rails-to-trails transition could be considered if a railroad authority relinquishes rights to its tracks and right-of-way (ROW) to the local jurisdiction. The local jurisdiction would be eligible to transform the railroad into a shared use path. If the Port of the Tillamook Bay were to turn its ROW over to the City of Rockaway at a point in the future, a continuous shared use path between Wheeler and Tillamook could be provided.

Benefits	Constraints
Provides improved north-south connectivity for pedestrians and bicyclists	Dependent on future plans of Port of Tillamook Bay Railroad (beyond control of project).
Could serve as a tourist attraction	Continuous path from Wheeler to Tillamook would require coordination between multiple local jurisdictions.
Would provide increase flexibility for Miller Street and Parking improvements (see Objectives 1b).	

Information Needed:

- Additional information from the Port of Tillamook Bay on long term plans associated with tracks through Rockaway Beach.

Other concepts suggested at the first project Open House February 2, 2010 included:

- Reconfigure streets in downtown Rockaway Beach to make them one way between S 6th Avenue and N 3rd Avenue.
- Consider traffic signals at S 2nd Avenue and N 3rd Avenue to allow residents to turn onto US 101, and provide safe crossings for pedestrians.
- Modify placement of the library signage to encourage patrons to exit the highway at N 3rd Avenue instead of S Nehalem Avenue.

Next Steps

This refined set of concepts will be evaluated by the project team in relation to their ability to meet the project's goals and objectives. Project recommendations will be the focus of Technical Memorandum #3, to be produced in spring 2010.

City of Rockaway Beach and POTB Study

PREPARED FOR: Theresa Carr

PREPARED BY: John Trumbull

COPIES: Terra Lingley

DATE: January 8, 2010

To support the railroad crossing alternatives, further study of the Port of Tillamook Bay Railroad crossing study was completed to support the alternative. The results are below.

A quick survey of 19 at-grade road crossings were completed, and the location of a possible new pedestrian at-grade crossing. Photo documentation of each crossing was collected.

All crossings had no more than one car queuing space between the Railroad and US 101. Most crossings and approaches are degraded, presenting a potential safety issue. Cars turning from US 101 need to proceed very slowly to cross the tracks because of the roadway pothole damage. Possible rear end collision accidents could occur. Train speeds are less than five miles per hour but still present possible train/car collisions due to the queuing space between the tracks and US 101 and the very rough crossing surfaces. Vehicles crossing the tracks may pay more attention to the potholes and less attention to the potential for trains. Most of the crossings need "Do not stop on Tracks" signs. Costs to repair these crossings would be less than $5,000 each. Most all of the existing signage is in good shape.

There are possible crossing closures in this corridor but it will be hard to get the public to buy in according to Police Chief Ed Wortman.

The following are comments regarding the crossings from South to North:

Washington Street - Critical Crossing – Tsunami Route – small beach access – 24' asphalt crossing surface – roadway approaches are very poor with many pot holes. Asphalt crossing surface is in very poor condition. Improvements – remove old asphalt from between tracks and replace with new. Repave roadway approaches.

S 7th Avenue – Small beach access – 24' Asphalt crossing – possible closure, Breaker Drive is a frontage road between Washington and SW 6th Avenue. Improvements would require the replacement of the asphalt crossing surface and re-pavement of the roadway approach surfaces.

S 6th Avenue – Critical Crossing – 30' Asphalt crossing – hotel and beach access – replace asphalt crossing material and perform minor asphalt road approach repair.

S 4th Avenue – 28' Asphalt crossing surface – possible closure, properties could be accessed from S 3rd Avenue. Very poor asphalt crossing and roadway approaches. There is a frontage road on the west side of the tracks that extends to 100' south of S 5th Avenue.

S 3rd Avenue – Critical Crossing – 32' Asphalt crossing – church and beach access – Fire Department and City Hall on the east side of US 101. One way frontage road begins on the

west side of the tracks and goes north. Improvements would require minor asphalt repair to the crossing and approaches.

S 2nd Avenue – Critical Crossing – 42′ Asphalt Crossing - Major business and hotel access – beach access – Miller frontage road continues north on the west side. There is also a frontage road that begins north on the east side. Improvements would require only some minor asphalt repair.

S. 1st Avenue – Critical Crossing – This is the City's main beach access – 32′ asphalt crossing – end of Miller Road on west side. The frontage road on the east side of the tracks runs another 300′ north. Improvements would require only some minor asphalt repair.

N. 3rd Avenue – Critical Crossing – 24′ asphalt crossing – Police Department and Post Office on east side of US 101. Miller frontage road begins on west side about 300′ south and continues north. Improvements would require only some minor asphalt repair.

N. 5th Avenue – 24′ asphalt crossing – Bad asphalt road approaches – Crossing surface good. Possible crossing closure since Miller Road continues North on the West side.

N. 6th Avenue – Critical Crossing - 32′ asphalt crossing – resort Access – improvements would require the asphalt crossing be replaced. The asphalt approaches are in fair condition. Miller Road continues north.

N. 7th Avenue – 24′ asphalt crossing – Possible closure since Miller Road continues north. There are deep gouges in US 101 from the steep approach on the east side. There is a high potential for high centering vehicles on the east rail. Asphalt approaches and crossing surface in bad repair.

N. 8th Avenue – 24′ asphalt crossing – Improvements would require replacing the asphalt crossing and some asphalt roadway approach repair.

N. 9th Avenue – 24′ asphalt crossing – Critical Crossing – Deep gouges in highway 101 – high center problem on east rail – Improvements would require replacement of the asphalt crossing surface and asphalt approaches.

N. 11th Avenue – 24′ asphalt crossing – Surfside Resort access – Deep gouges in US 101. Improvements would require minor crossing repair. The approaches are in okay condition.

N. 13th Avenue – 24′ asphalt crossing – Critical Crossing - Miller frontage road continues north – crossing surface needs repair.

N. 19th Avenue – 32′ asphalt crossing – crosswalk on US 101 – approaches are in fair condition – asphalt crossing will need to be replaced.

N. 21st Avenue – 20′ asphalt crossing – improvements will require the asphalt crossing to be replaced and the asphalt approaches will need minor repair.

N. 23rd Avenue – 32′ asphalt crossing – Critical Crossing - only access to bank owned condos – approaches and asphalt crossing are almost new.

Beach Drive – Critical Crossing - 32′ rubber crossing – approaches and crossing surface in very good condition – park access.

Rockaway Beach Transportation Plan: Evaluation Framework

PREPARED FOR: Rockaway Beach Transportation Plan Project Management Team

PREPARED BY: Terra Lingley, CH2M HILL

CC: Theresa Carr, CH2M HILL

DATE: February 3, 2010

The purpose of this section is to outline a proposed process and set of criteria to evaluate potential transportation improvements for the Rockaway Beach Transportation Plan. The Rockaway Beach Transportation Plan ("Plan") will analyze concepts such as providing alternate routes to US 101; building and improving sidewalks and bicycle facilities; identifying safe pedestrian crossing locations; identifying opportunities to improve and consolidate railroad crossings; and addressing the needs of current and future resident and visitor populations of the City of Rockaway Beach.

This evaluation framework is based on project goals and objectives as identified in the Plan's scope of work. The evaluation criteria will be used by the technical team to evaluate the performance of each improvement concept against a broad set of evaluation criteria. Draft recommendations that result from this evaluation will be discussed with the Project Management Team (PMT), Project Advisory Committee (PAC), the City of Rockaway Beach Planning Commission and City Council, and the Rockaway Beach community.

The general evaluation rating method is included in the table below.

Rating	
●	The concept/alternative addresses the criterion and/or makes substantial improvements in the criteria category
◑	The concept/alternative partially address the criterion and/or makes some improvements in the criteria category
◌	The concept/alternative neither meets nor does not meet intent of criterion. Alternative has no effect, or criterion does not apply
○	The concept/alternative does not support the intent of and/or negatively impacts the criterion.

Using the above rating method, a set of evaluation criteria was developed, consistent with the project goals and objectives as outlined in the Plan scope of work. These criteria, described in the pages below are intended to address the important elements of this project.

1. Connectivity
2. Safety
3. Mobility/Accessibility
4. Multimodal Solutions
5. Environmental Impacts

Connectivity

Objective: Increase north south connectivity, and provide local alternatives to US 101. The concept or alternative would address these goals by providing direct and efficient access to and between origins and destinations along and off of US 101, including residential areas, places of employment, local businesses, and the regional transportation system. Support improvements that minimize out-of-direction travel, minimize travel times and the need to travel on (or minimize distance needed to travel along) US 101 for local trips.

Criteria	Performance Measure	Rating
Improve street and path connectivity	Out-of-direction travel, access to local and regional destinations	● Provides new connection to local and regional destinations. Allows for local circulation with minimal out of direction travel. ◑ Provides new connection to local and regional destinations. Minor decrease in out of direction travel. ◔ N/A. No effect on trip travel distance. ○ Does not provide new connection and/or reduces connectivity between origins and destinations.
Create an alternate north-south local street system that provides the opportunity for off-highway local circulation.	Change in trip travel distance along US 101, access to local and regional destinations	● Eliminates the need for or greatly reduces the distance system users must use US 101 for local trips. ◑ Minor reduction in the distance system users must use US 101 for local trips ◔ N/A. No effect on the distance system users must use US 101 for local trips. ○ No reduction in the distance system users must use US 101 to access important local destinations, and/or adds new local trips on highway.
Emergency vehicle reliability and timely access	Emergency response times	● Improves emergency response times throughout Rockaway Beach ◑ Improves emergency response times for some areas, but not all of Rockaway Beach ◔ Does not affect emergency response times ○ Increases emergency response times in Rockaway Beach

Criteria	Performance Measure	Rating
Bicycle and pedestrian network	Gaps in the current system between popular origins and destinations	● Addresses multiple gaps and/or creates a continuous path north-south through Rockaway Beach ◑ Addresses some gaps, but does not create a continuous path north-south through the City ◍ Does not affect the bicycle and pedestrian network ○ Increases the gaps between various bicycle and pedestrian facilities through the City

Safety

Objective: Minimize safety conflicts and improve operational safety for all current and future users of the network, including autos, freight, transit, bicyclists, and pedestrians.

Criteria	Performance Measure	Rating
Reduce potential conflicts between vehicles, and between vehicles and bicyclists and/or pedestrians	Number of potential conflict points Qualitative assessment of safety at railroad crossing intersections	● Decreases the number of potential conflict points throughout the study area, or greatly improves clarity of driver expectation at pedestrian crossing areas. Greatly reduces the likelihood of crashes due to cars trying to negotiate railroad crossings. ◑ Provides a minor reduction in the number of potential conflict points in the study area and/or provides some clarity to driver expectation at pedestrian crossing areas. Somewhat reduces the likelihood of crashes due to cars trying to negotiate railroad crossings. ◍ N/A. Criterion does not apply. ○ Increases the number of potential conflict points in the study area and/or increases the likelihood of crashes due to cars trying to negotiate railroad crossings.
Ensure that transportation facilities meet current engineering best practices for safety and design.	Facilities meet ODOT, County and City Traffic engineering standards	● Project meets applicable standards and follows engineering best practices. ◑ Project partially meet applicable standards, with adequate justification for deviation. ◍ N/A criterion does not apply. ○ Project does not meet applicable standards and does not follow engineering best practices.

Mobility/Accessibility

Objective: Provide a viable transportation network that accommodates expected future growth in Rockaway Beach on both local and state roads for residents and visitors. To meet this objective, the alternative should meet appropriate travel mobility standards [measured as a ratio of volume-to-capacity (v/c)], and prevent vehicles from queuing over the railroad tracks while waiting to cross or turn onto US 101.

Criteria	Performance Measure	Rating
Transportation system accommodates growth, meets appropriate mobility standards	Volume-to-capacity, (v/c) Travel delay Number, location of, and diversity in parking areas	● Maintains standard or above standard v/c ratio for all study intersections inside study area and along US 101. Does not substantially impact travel time through Rockaway Beach. Parking areas are located at north and south ends of town, minimizing parking on highway and left turns for visiting traffic. Signage for visitor (including RV) traffic is clearly marked. ◑ Maintains standard or acceptable v/c ratio for over 50 percent of all study intersections inside study area along US 101, OR moderate impacts to travel time through Rockaway Beach. Parking areas are located at north and south ends of town but require left turns and are not easily identifiable for visitor traffic. ◍ N/A. Criterion does not apply. ○ The v/c ratio is below standards for more than 50 percent of study intersections OR substantial travel time impacts for travelers through Rockaway Beach. Adequate parking is not provided.

Environmental Impacts

Objective: To avoid, minimize, and/or mitigate impacts to residences and businesses in Rockaway Beach, and to avoid impacts to environmental resources including wetlands, fish habitat and threatened and endangered species.

Criteria	Performance Measure	Rating
Minimize impacts to natural environmental resources	Impacts to acreage of wetlands, encroachment on known fish habitat and impact to identified threatened and endangered species habitat	● Does not negatively affect any environmental resources and may positively affect some resources. ◑ Minor impacts to some environmental resources, which can be mitigated. ◍ N/A. Criterion does not apply. ○ Negatively impacts environmental resources, which can not be fully mitigated.

Criteria	Performance Measure	Rating
Minimize impacts to built environment resources	Number of businesses and residences impacted and severity of impact, number of homes or businesses displaced, ability to appropriately mitigate impacts	● Does not displace private property. No impacts to businesses through removal of parking, access or drive by traffic. ◑ Less than three displacements to private property. Minor impacts to businesses through removal of parking, access or drive by traffic. ◍ N/A. Criterion does not apply. ○ More than three displacements to private property. Substantial impacts to businesses through removal of parking, access or drive by traffic that can not be fully mitigated.

Multimodal Solutions

Objective: To develop a balanced transportation solution that serves multiple modes of transportation, including drivers (passenger and commercial), bicyclists, transit riders, and pedestrians; and meets the needs of all users, including youth, elderly, and those with physical disabilities.

Criteria	Performance Measure	Rating
Addresses needs of Bicyclists and Pedestrians	Qualitative assessment of alternative's provision of services to users of all modes. Qualitative assessment of improvements to bicycle and pedestrian facilities, and improvements geared toward future transit routes.	● Creates infrastructure for bikes and/or pedestrians, including shared facilities for all modes (e.g., a shared lane on the shoulder) throughout the study area ◑ Creates infrastructure for bikes and/or pedestrians, including shared facilities for all modes in some, but not all of the study area ◍ N/A. Criterion does not apply. ○ Removes existing informal paths currently used by bicyclists and pedestrians.
Addresses needs of Public transit users	Qualitative assessment of alternative's provision of services to users of all modes. Qualitative assessment of improvements to bicycle and pedestrian facilities, and improvements geared toward future transit routes.	● Provides a safe and comfortable location for transit riders to wait for buses (school buses and TCTD buses), which includes both a transit shelter and a bus pull-outs throughout the study area. ◑ Accommodates a safe and comfortable waiting area for transit riders including a transit shelter OR a bus pullout area, through some but not all of the study area. ◍ N/A. Criterion does not apply. ○ Does not accommodate transit service and stops, including narrow shoulders, no shelter, and no area for bus pull-outs.

Next Steps

The framework will be used as the basis for evaluating and prioritizing improvement concepts and alternatives in winter and spring 2010.

Rockaway Beach Transportation Plan: Preliminary Transportation Improvement Recommendations

PREPARED FOR: Rockaway Beach Transportation Plan Project Management Team

PREPARED BY: Terra Lingley, CH2M HILL
Tegan Houghton, CH2M HILL

CC: Theresa Carr, CH2M HILL

DATE: March 22, 2010

This memorandum describes the preliminary transportation improvement recommendations developed for the Rockaway Beach Transportation Plan. These recommendations are based on an analysis of all project concepts described in Technical Memorandum #2 against the overall goals of the project. This memorandum is organized into two sections – the evaluation process (described below), and a description of the recommendations.

These preliminary recommendations will be discussed by a Technical Review Team in late March, 2010; with the Project Advisory Committee (PAC) at a meeting in early April; and presented to the community at a forthcoming Open House in late April.

Recommendations will be revised based on feedback from these groups. A final set of recommendations will be summarized in the Rockaway Beach Transportation Plan, to be developed in May/June, 2010.

Evaluation Process

Each of the transportation improvement concepts were evaluated based on the criteria listed below, using information collected from previous technical analysis, site visits, and public input about the concepts heard at the first project Open House. These evaluation criteria are based on project objectives validated by the PMT and the PAC in fall 2009.

- Connectivity/Accessibility
- Safety
- Mobility
- Multimodal Solutions
- Environmental Impacts

The criteria listed above are not weighted, nor are they presented in any order or priority. Results from the evaluation process are provided on the previous pages.

Preliminary Recommendations

The preliminary recommendations described over the next several pages are illustrated as Figures 1-3 at the end of this memo.

1. Extend Necarney Avenue

Necarney Avenue parallels US 101 east of the highway. This project recommends extending the street southwards from near NE 12th Avenue so that it connects with Timberlake near N 3rd Avenue. Figure 1 illustrates the location of this street extension. Once extended, Necarney Avenue would provide an alternate, parallel north-south route to US 101 for all local vehicle trips, bicyclists and pedestrians.

2. Improve Miller Street

Miller Street parallels US 101 west of the highway and the Port of Tillamook Bay Railroad. At the south end, it is owned by the Port of Tillamook Bay Railroad and at the north it is owned by the City. The recommended improvements to Miller Street would reconstruct the pavement for existing portions of the street to create a smoother surface for local vehicles, bicycles and pedestrians. In addition, it would extend Miller Street across three waterways – one at the north leading into Crescent Lake; another at S. Nehalem Avenue; and a third leading into Clear Lake. At the north end, it would extend north to Manhattan Beach as a pedestrian pathway using existing right of way. At the south end of Rockaway Beach, users would transition from Miller Street to Pacific Street south of S 6th Avenue, and along Breaker Avenue south of S 7th Avenue to S Minehaha Street. Further connections to the south could be possible via Alder Street south of Minehaha Street.

This recommendation would provide a continuous, north-south route for bicyclists and pedestrians throughout Rockaway Beach, from Manhattan Beach at the north end (with pedestrian connections existing between Manhattan Beach and Nedonna Beach) to south of S. Minnehaha, connecting to the Spring Lake Cabins. Because the extensions are for bicycle and pedestrian use only, the finished project would serve as a *slow street* of sorts, providing equal access to autos, bicyclists, and pedestrians through existing sections, and as a *bicycle boulevard* via the new creek crossings, serving local and through bicycle and pedestrian trips.

3. Improve Beach Access

This recommendation adds new signage or upgrades existing signage at official beach access points, and improves key pedestrian access points to the beach in areas that are difficult (especially in areas where rip rap has been added to prevent erosion). This includes signs at key locations on both the beach and City streets. The intent of this recommendation is to make it easier for visitors to understand the connection between areas along the beach and destinations in the downtown are. Distances in Rockaway Beach are fairly short, and instead of entering and exiting the beach at only one point, this project would encourage use of the beach as a scenic north-south travel route, with a guide to show what destinations are associated with each beach access point (e.g., library, Flamingo Jim's, church).

4. Construct Recreational Trails Around Lakes

This improvement would build trails or boardwalks around Lake Lytle and Crescent Lake. The trail around Lake Lytle could be around the west side of the lake only (between the lake and the highway), or around the entire lake (or the trail could be constructed in phases). The purpose of the recommendation is two-fold

1. *Improved north-south pedestrian connectivity* – the trail would provide a dedicated pedestrian facility off of the highway between N 6th Avenue and N 12th Avenue (for Lake Lytle), and between NW 18th Avenue and NW 23rd Avenue (for Crescent Lake). As the northern segment of Rockaway Beach has fewer destinations it is not recommended for dedicated sidewalks along the highway (see recommendation #8).
2. *Recreational benefit* – substantial public input has been received about the importance of safe walking paths for Rockaway Beach residents and visitors. A trail around Lake Lytle and Crescent Lake would provide an option for recreational, scenic walks. By removing some of these trips from US 101, or reducing the length of the walk along the highway, minimizes safety conflicts between autos and pedestrians walking along the fog line or on the shoulder.

Although the primary use of these trails would be for pedestrian use it is also expected that trails could accommodate bicyclists.

5. Improve Priority Highway Crossings

This recommended improvement would stripe new crosswalks or restripe existing crosswalks across US 101 at priority crossing locations. These crossings would be coordinated with approval from the State Highway Engineer, and are targeted at high crossing locations that allow access between pedestrian generators and destinations on either side of the highway. To gain approval from the State Highway Engineer, ODOT requires a pedestrian network to connect to the pedestrian crossings. A sidewalk leading up to and over the railroad crossing to connect to the pedestrian and bicycle boulevard on Miller would constitute an appropriate network connection. The recommended crossings are broken down below from north to south within the City.

Once crossing locations are validated by the PAC and the community, warrants will be required before recommendations are adopted and furthered for implementation.

Along with striped crosswalks, it is recommended that education be provided to drivers (through pamphlets, signage, service announcements, or other avenue) that pedestrians crossing the road have priority at any intersection, regardless of whether the intersection has a striped crosswalk.

North Crossings

Recommended crossings in the north part of town include:

- **US 101 & South of Neah-Kah-Nie School**

  Due to the posted speed of 45 mph at this location it is recommended that a crosswalk be accompanied by a pedestrian crossing treatment such as a Rapid Rectangular Flashing Beacon (RRFB) or a High-intensity Activated crosswalk

(HAWK) signal. In addition to a highway crosswalk warrant, this location would require a new permitted crossing from ODOT Rail for the crossing of the Port of Tillamook Bay Railroad, and connecting facilities on the west side of the highway. A sidewalk on the east side of US 101 between the Neah-Kah-Nie High School and the proposed crosswalk at the vicinity of NE Lake Boulevard is also recommended.

- **US 101 & N 11th Avenue**

  This is considered a high priority crossing location because of its connection to Lake Lytle's primary access point to the east of the highway, and the residential development and hotels on the west side. There is also a beach access in the vicinity of N 11th Avenue. This crossing would require a short sidewalk on the east side to connect with N 12th Avenue and the proposed system around Lake Lytle.

Other locations considered in north Rockaway Beach include US 101 & 19th Avenue and US 101 & N 6th Avenue. US 101 & 19th Avenue was considered due to hotels on the west side of the highway and the lakes on the east side attracting pedestrians. US 101 & N 6th Avenue connects residential areas on the east side of US 101 with a beach access on the west. These locations are not recommended for striped crosswalks at this time. It is however recommended that education be provided to drivers that any pedestrian crossing the road has priority, at all intersections (regardless of whether they are striped for crosswalks).

Crossings in Downtown Core

The area between N 6th Avenue and S 7th Avenue is a designated Special Transportation Area (STA). The STA designation is given by the Oregon Transportation Commission (OTC) to areas where pedestrian activity is high to illustrate that all users of the transportation system (local autos, through trips, freight, bicyclists, and pedestrians) have equal priority. STAs are usually characterized by slow speeds, sidewalks, retail businesses, and high levels of pedestrian activity. This section of Rockaway Beach is considered the downtown core of Rockaway because of its proximity to shopping, restaurants, beach accesses and parking, and the resultant increased pedestrian and bicycle activity. There multiple pedestrian generators on both sides of the highway. The team recommends striped crosswalks at four locations within the downtown core:

- N 3rd Avenue
- S 1st Avenue (NOTE: The Rockaway Beach Transportation Plan Project Advisory Committee noted this to be the highest priority crossing)
- S 2nd Avenue
- S 3rd Avenue

Although this results in striped crossings at roughly every block or every two blocks in the downtown core, the project team has received input that pedestrian activity is sufficiently high in summertime to justify the large number of striped crossings.

One constraint for this recommendation is that striped crosswalks generally require pedestrian treatments on both sides of the road. Throughout the core sidewalks exist or are recommended on the east side of the highway. However there are constraints on the west side of the highway that would make sidewalks difficult. Furthermore, the recommended

improvements to Miller Street make this the most attractive north-south pedestrian treatment on the west side of the highway. Therefore these recommendations within the downtown core include a striped crosswalk and a sidewalk or designated pedestrian area from the highway to Miller Street, across the Port of Tillamook Bay railroad tracks. (See also Recommendation #10).

South Crossings

There are two recommended crosswalks in the south part of Rockaway Beach:

- S 6th Avenue
- Washington Street

Both crossings are identified as high-priority because speeds are higher in the southern end of town, and both locations connect residents east of the highway with marked beach accesses. In addition, the extension of Miller Street (Pacific Avenue and/or S Breaker Avenue in this section of town) provides an excellent north-south pedestrian treatment west of the highway. Providing a safe connection for pedestrians would alleviate the need for some to walk along the fog line or shoulder of US 101 when accessing downtown. Washington Street is also near the only ADA beach access on South 9th Avenue north of Washington. These crossings would require a sidewalk on the east side and a sidewalk or other pedestrian facility over the railroad crossing to Miller Street.

6. Install Signal for Emergency Vehicles

This recommendation adds an emergency-activated traffic signal at S. 3rd Avenue to allow emergency vehicles to turn onto US 101 in the event of an emergency. This location is in the immediate vicinity of the Rockaway Beach Fire Station. By being emergency-activated, the signal would not impact traffic along US 101 or on nearby local streets on a regular basis. Instead, the signal would only be used in the event of an emergency that involved a fire truck and/or ambulance. The signal would be equipped with Opticom or similar technology with a similar device on Rockaway Beach's emergency vehicles and in the fire station itself. The operator of the emergency vehicle would need to activate the emergency signal by communicating the device on their vehicle or in the station, which would then communicate with the signal. Only at this point would the signal turn red for traffic on US 101, giving emergency vehicles the priority.

The project is recommended in that it is expected to decrease emergency response times and allow for a safer entry onto the highway for emergency vehicles. A special warrant would be required before this recommendation is finalized and adopted by the City of Rockaway Beach.

7. Improved Parking

Recommendations related to parking in Rockaway Beach address the need and desire to easily accommodate visitors stopping in the City for a brief visit, for the day, or longer. Due to the linear geography of the City, there are several existing parking areas. This section describes separate recommendations for several of these parking areas. Recommendations are organized into six parts. Common to many of the projects are improved paving and

striping of existing parking areas, better signage, and better accommodation of Recreational Vehicles (RVs).

7a. Section Line Street

This recommendation formalizes the county parking area near Section Line Street in the Nedonna Beach area. This parking area is in need of resurfacing and paving. Currently there is a gravel area for parking, along with a sign announcing the Nehalem Bay South Jetty. There is already a path to the beach and ample room for vehicle parking. Weather conditions would need to be a special consideration for this parking area, as it is located on a flat area directly off of the sand dunes and is vulnerable to wind, rain, and storm damage. However, with proper construction this flat parking area with trail to the beach could also become a secondary ADA beach access point (there is another ADA beach access at S 9th Avenue).

7b. Manhattan Beach

Add signage along US 101 north and south of the Beach Street intersection for the Manhattan Beach Parking area. Simple signage could let more visitors know this parking area is available, and increase its usage. Once Miller Street improvements are made, signage for the Manhattan Beach Parking area could also encourage parking and a trail/walking path to downtown beaches and shops.

7c. Downtown Core

This recommendation extends the existing "parking pod" to the north and south by one block each in the vicinity of the wayside. Parking area would be one way with paved, angle parking, similar to the current parking pod. This would provide additional parking in the downtown core near shops, restaurants and the beach, where most of the demand for visitor parking currently exists. It should be noted that vehicles often park in these areas illegally now, along the shoulder of the highway. These parking pods are not sufficiently wide or long to accommodate RVs.

7d. Pave City Parking Lot

A new City-maintained parking area exists behind and north of City Hall. This recommendation implements the current paving and striping plan for this parking area, with the addition of signage on the highway advertising it as available for use. Due to its location in the downtown core, with proximity to shops, restaurants, and the beach, this parking area could easily accommodate visitor day use. Adequate room exists to accommodate a small number of RV stalls (between one and three). Overnight RV parking could be considered by the City in the future.

7e. Zoning Ordinance

A substantial number of vacation homes and seasonal rental homes are located in Rockaway Beach. No requirements exist in the Rockaway Beach zoning ordinance regarding parking minimums or maximums. As a result, these rental and seasonal properties often accommodate more people (and vehicles) than available parking.

Overflow vehicles are parked in the wayside, other parking lots, or on the street in front of other rental and full-time occupancy homes.

This recommendation would revise the City ordinance to establish minimum and maximum parking requirements for vacation homes, to correspond with home occupancy. In addition, it would establish parking maximums to limit the amount of vehicles property owners can advertise for the property.

7f. Proposed Parking Lot at the Nature Conservancy Trailhead

A volunteer organization is working to improve a nature trail in the conservancy property located at the south end of Rockaway Beach, between S 6th Avenue and Washington Street. This recommendation would work with the nature conservancy organization to construct a parking lot off of US 101 at the south end of the conservancy property for visitors to park while enjoying the trail into the conservancy. As described in the section below (sidewalks), this recommendation would complement another recommendation to extend the sidewalk on the east side of US 101 to the south, connecting to this parking lot location. This would connect the nature conservancy land and parking area with downtown Rockaway Beach.

8. Pedestrian Connectivity

Continuous sidewalks are recommended in the following locations:

8a. Priority 1 – Continuous Sidewalks east of US 101

Within the STA, from N 6th Street to S 7th Street, continuous and improved sidewalks on the east side of the highway are recommended. At priority crossing areas (see Recommendation #5) striped crosswalks across US 101 are recommended with connections to the improved Miller Street north-south connection. Adequate space for sidewalks on the west side of US 101 does not appear to exist.

8b. Priority 2 – Continuous Sidewalks between S 6th Avenue and Washington Street

Between S 6th Avenue and Washington Street, a sidewalk is recommended on the east side of US 101. This would connect pedestrians in the downtown core with the nature conservancy property. A striped crosswalk across US 101 is recommended at Washington Street, providing access to improved Miller Street north-south connection and a public beach access.

8c. Connection to Lake Lytle Trail

North of N 6th Ave, a short connection to the recommended recreational trail around Lake Lytle is proposed. This could be deferred until the recreational trail is built in the future. The dominant pedestrian connection north of N 6th Avenue is expected to be via Miller Street.

8d. Potential Pedestrian Connections at the South End

There are two recommendations under consideration that could provide pedestrian connectivity between the southern residential area near Washington Street and downtown Rockaway Beach (see Figure 3):

a) A pedestrian trail connecting Washington Street to the conservancy trail and connecting the conservancy trail to S. 6th Street. This would provide a recreational route connecting the neighborhood around Washington Street and downtown with the Conservancy trail network.
b) A pedestrian trail east of the Conservancy Property, extending north in the vicinity of Juniper Street or Island Street that could be used to connect the neighborhood around Washington Street to downtown, and would provide an emergency access to higher ground. This would be a long-term recommendation.

9. Bus Pull-out Areas

Bus pullouts are short sections of widened roadway at bus stop locations that are sufficiently wide and long for transit vehicles to pull out of the travel lane to serve the bus stop. Providing bus pull-outs would better serve Tillamook County Transportation District and school bus riders along US 101. The pull-outs would allow traffic to safely pass a bus that is picking up and/or dropping off passengers. Pull-out areas would need to be signed for no parking. Recommended bus pull-out locations are:

- US 101 & NE 20th Avenue
- US 101 & NE 12th Avenue
- US 101 & Washington Street

10. Improve Critical Railroad Crossings

Following conversations with key stakeholders and the community, the Rockaway Beach Transportation Plan will not be recommending railroad crossing closures. This is due to the low volume of trains traveling through Rockaway Beach (maximum of six trains daily in August only, maximum two trains daily during other summer months and holiday weekends only), and the low speeds of the trains (maximum speed 15 mph).

Instead, the plan recommends improving critical rail/road crossing locations to improve safety and circulation for autos, RVs, bicyclists, pedestrians, and wheelchair users. Once improvements are made, the plan lays out a process for monitoring how crossings are used to inform future conversations around potential railroad crossing consolidations. Figure 2 provides an overview of this process and the critical crossing locations.

"Critical" crossing locations are defined as locations that meet one or more of the following criteria:

1. Provide emergency access
2. Highly utilized access point to US 101 (such as being the only access to multiple homes or businesses)
3. Tsunami evacuation route
4. Lines up with local streets running east/west east of US 101
5. Provides best access to public beach

Crossing improvements were defined as including:

Upgrades to the roadway surface (concrete or new asphalt) to make the crossing smoother

Level roadway approaches

Upgrades to signage (if needed)

In addition, critical railroad crossing locations that line up with striped crosswalks across the highway would also include a sidewalk crossing the tracks on one or both sides of the local roadway.

Critical railroad crossing locations identified for improvement are listed on the following page:

- Beach Drive
- N 23rd Avenue
- N 21st Avenue
- N 13th Avenue
- N 11th Avenue
- N 6th Avenue
- N 3rd Avenue
- S 1st Avenue
- S 2nd Avenue
- S 3rd Avenue
- S 6th Avenue
- Washington Street

The methodology for improving rail crossings is as follows:

Step 1 – Improve "Critical" Crossings

Step 2 – Monitor Use

a. How well do upgraded crossings work for users?

b. Are unimproved crossings problematic for users?

Step 3 – Hold a public process to consider crossing consolidation

a. Discuss with community

b. Discuss with railroad and City

c. Consider criteria listed below for consolidating crossings

Criteria for Consolidation:

The following criteria have been established to help future consolidation. Consolidation would be considered only if increasing safety to and on the highway becomes an issue.

a. Alternate crossing locations are located nearby (within two blocks)

b. Traffic volumes at the crossings are low and not expected to increase (due to change in land use, etc) in the foreseeable future

c. Elevation change and/or sight distance make improvements to the crossing difficult

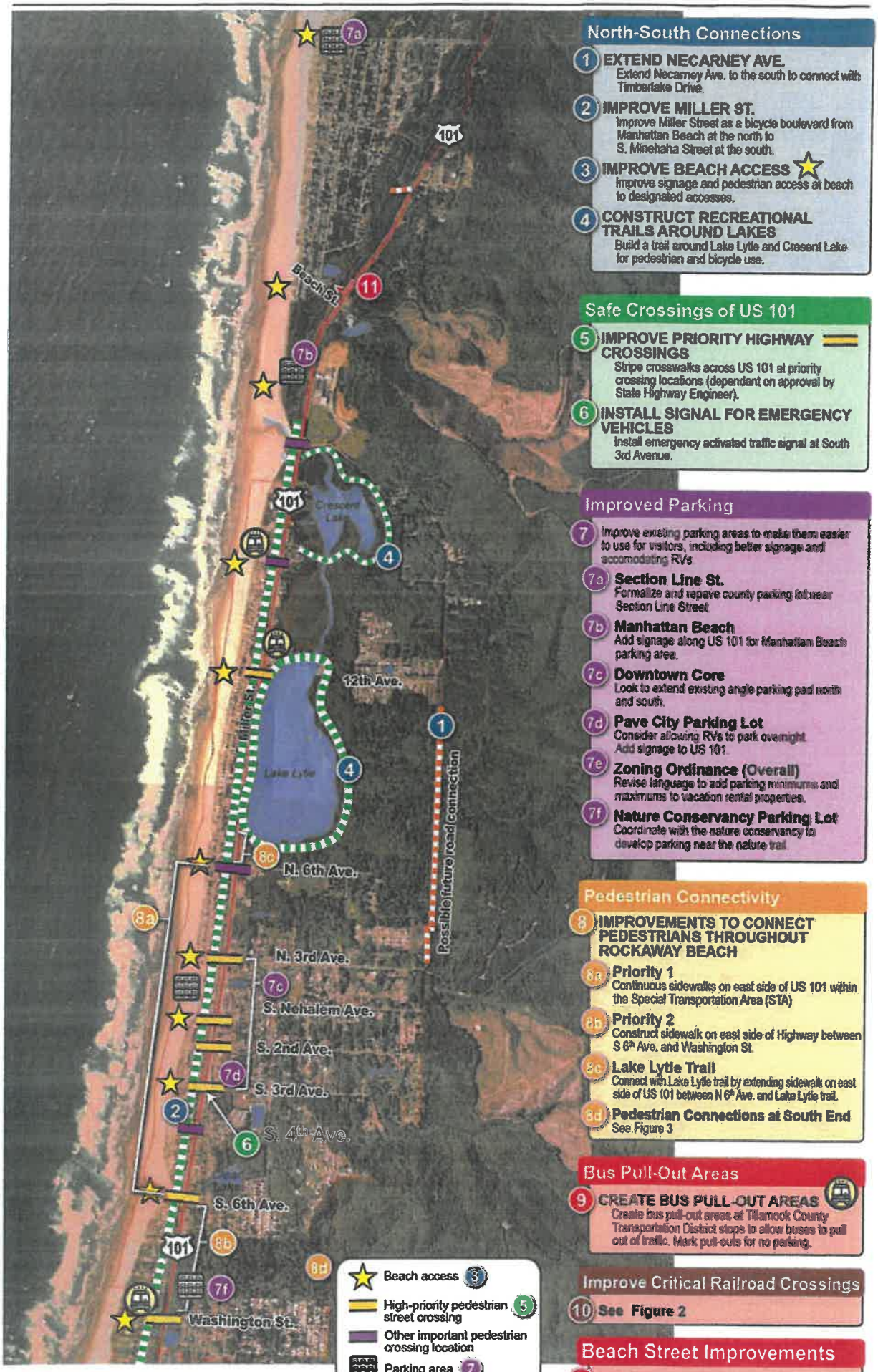
d. The crossing is not required for emergency access

11. Right-Turn Lane at US 101 and Beach Street

A southbound right-turn lane is recommended at US 101 & Beach Street for vehicles turning from the highway into the Nedonna Beach area. This recommendation takes into consideration both the existing homes (year-round and seasonal) in Nedonna Beach, its access to the Manhattan Beach wayside, as well as expectations for future development in the future. A right turn warrant analysis was conducted for this concept, which concluded that the turn lane was warranted due to anticipated future traffic volumes and speeds. This warrant analysis is provided as Attachment B at the end of this memo.

Next Steps

These preliminary recommendations will be discussed with project team members, the PAC, and the community in the months of April and May, 2010. Based on feedback from these groups, refinements may be made to these recommendations before they are finalized. Cost estimates and potential funding sources will be developed for finalized project recommendations. In late May and June 2010 the recommended projects will be considered as the Rockaway Beach Transportation Plan by the Rockaway Beach Planning Commission, and forwarded to the Rockaway Beach City Council for adoption.



North-South Connections

1. **EXTEND NECARNEY AVE.**
   Extend Necarney Ave. to the south to connect with Timberlake Drive.
2. **IMPROVE MILLER ST.**
   Improve Miller Street as a bicycle boulevard from Manhattan Beach at the north to S. Minehaha Street at the south.
3. **IMPROVE BEACH ACCESS**
   Improve signage and pedestrian access at beach to designated accesses.
4. **CONSTRUCT RECREATIONAL TRAILS AROUND LAKES**
   Build a trail around Lake Lytle and Cresent Lake for pedestrian and bicycle use.

Safe Crossings of US 101

5. **IMPROVE PRIORITY HIGHWAY CROSSINGS**
   Stripe crosswalks across US 101 at priority crossing locations (dependant on approval by State Highway Engineer).
6. **INSTALL SIGNAL FOR EMERGENCY VEHICLES**
   Install emergency activated traffic signal at South 3rd Avenue.

Improved Parking

7. Improve existing parking areas to make them easier to use for visitors, including better signage and accomodating RVs
   - 7a **Section Line St.** Formalize and repave county parking lot near Section Line Street.
   - 7b **Manhattan Beach** Add signage along US 101 for Manhattan Beach parking area.
   - 7c **Downtown Core** Look to extend existing angle parking past north and south.
   - 7d **Pave City Parking Lot** Consider allowing RVs to park overnight. Add signage to US 101.
   - 7e **Zoning Ordinance (Overall)** Revise language to add parking minimums and maximums to vacation rental properties.
   - 7f **Nature Conservancy Parking Lot** Coordinate with the nature conservancy to develop parking near the nature trail.

Pedestrian Connectivity

8. **IMPROVEMENTS TO CONNECT PEDESTRIANS THROUGHOUT ROCKAWAY BEACH**
   - 8a **Priority 1** Continuous sidewalks on east side of US 101 within the Special Transportation Area (STA)
   - 8b **Priority 2** Construct sidewalk on east side of Highway between S 6th Ave. and Washington St.
   - 8c **Lake Lytle Trail** Connect with Lake Lytle trail by extending sidewalk on east side of US 101 between N 6th Ave. and Lake Lytle trail.
   - 8d **Pedestrian Connections at South End** See Figure 3

Bus Pull-Out Areas

9. **CREATE BUS PULL-OUT AREAS**
   Create bus pull-out areas at Tillamook County Transportation District stops to allow buses to pull out of traffic. Mark pull-outs for no parking.

Improve Critical Railroad Crossings

10. See Figure 2

Beach Street Improvements

11. Add southbound right turn lane on US 101 at Beach St.

LEGEND

- Pedestrian/Bicycle Routes
- Proposed road extension
- US Highway 101
- City Limits
- Beach access 3
- High-priority pedestrian street crossing 5
- Other important pedestrian crossing location
- Parking area 7
- Bus pull-out areas 9

FIGURE 1

Draft Project Recommendations

ROCKAWAY BEACH TRANSPORTATION PLAN

Attachment B: Right Turn Warrant Analysis for US 101 & Beach Street

Rockaway Beach Transportation Plan: Nedonna Beach Turn Warrant Analysis

PREPARED FOR: Rockaway Beach Project Advisory Committee

PREPARED BY: Tegan Houghton, CH2M HILL

COPIES: Theresa Carr, CH2M HILL
Terra Lingley, CH2M HILL

DATE: May 19, 2010

This memorandum outlines analysis performed to establish whether the intersection of US 101 & Beach Street (access to the Nedonna Beach neighborhood) meets the ODOT right turn lane warrant criteria. This analysis is performed for the southbound right turn volumes.

Nedonna Beach Development

Documents provided by the Oregon Department of Transportation (ODOT) indicate that the Nedonna Beach residential development contains 371 existing homes (combined total within the city and urban growth boundary limits). These homes are considered Recreational Homes (ITE Trip Generation Code # 260). The Rockaway Beach volumes analysis is performed using counts conducted by ODOT in 2007 at the intersection of US 101 & Beach Drive. Beach Drive is currently the only access point in/out of the Nedonna Beach residential development: therefore, it is assumed that any trips associated with existing build-out of the development are represented within these volumes. Full build out of the Nedonna Beach Residential Development is assumed to occur prior to the 2030 analysis year.

Future build-out of the Nedonna Beach residential development is anticipated to be completed by 2030, and would add another 105 homes (combined total within the city and urban growth boundary limits). These homes are considered Single Family Detached Housing (ITE Trip Generation Code # 210). The system peak hour for the Rockaway Beach Transportation Plan study area is 2:00-3:00 PM. This peak hour was used for the turn warrant analysis.

The ITE *Trip Generation*, 8th Edition, was used to develop anticipated trips associated with build-out of the Nedonna Beach residential development. The PM Peak Hour of Adjacent Street Traffic would typically be used, however, it is meant to represent volumes experienced a typical peak commute hour of between 4:00-6:00 PM. As the system peak hour does not fall within these hours, the Weekday, PM Peak Hour of Generator was used instead. This data has an R^2 value of 0.91, so the Fitted Curve Equation was used.

Table 1
Nedonna Beach Residential Development Build-Out

Total Number Dwelling Units	105	
Total Estimated Trips	115[1]	
	Entering (64%)	Exiting (36%)
	74	41

Notes:
Single-Family Detached Housing (ITE Trip Generation, 8th Ed., Code 210)
Fitted Curve Equation: Ln(T)=0.88Ln(X)+0.62, where T is total Trips and X is Dwelling Units
R^2 value of 0.91
[1] Trips rounded up to nearest increment of 5.

Right Turn Lane Criteria

According to the ODOT Analysis Procedures Manual, a right turn lane should be installed if the volume, crash, or special cases criteria are met. These criteria are examined below.

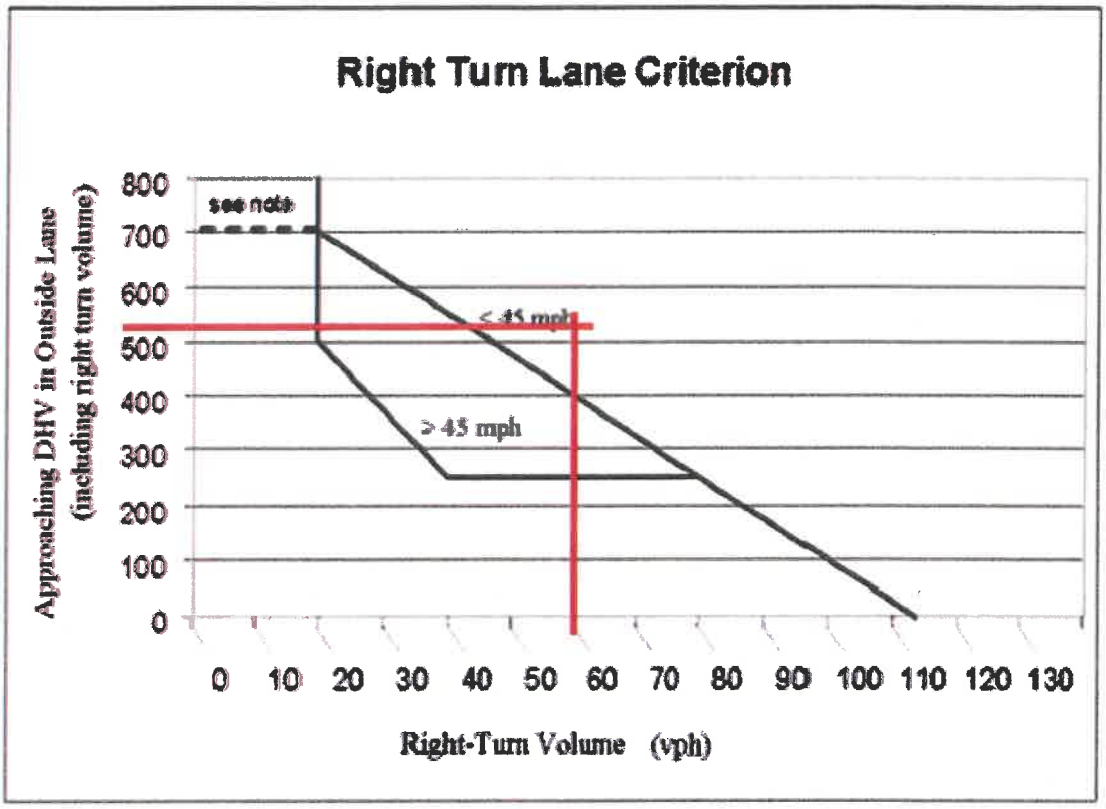
Volume Criteria

The US 101 & Beach Street intersection volumes analysis was performed using counts collected on September 9th and 10th, 2007. These counts were seasonally adjusted using the on-site ATR 29-001 (Rockaway), which yields a seasonal adjustment factor of 1.17. An average annual growth rate of 1.04 percent was derived using the ODOT Growth Rate Tables and used to forecast the volumes to the future year of 2030. These adjustments are consistent with those approved by the ODOT Transportation Planning and Analysis Unit (TPAU) for the Rockaway Beach Transportation Plan. To be consistent, the intersection of US 101 & Beach Street volumes were analyzed using the balanced, system wide peak hour volumes in the Rockaway Beach Transportation Plan Future No-Build analysis (for more information, see the *Rockaway Beach Transportation Plan: Transportation System Conditions, Deficiencies, and Needs Memorandum* Technical Memorandum #1. Figure B-1 provides the 2030 Future No-Build Volumes, Nedonna Beach Development Build Volumes and Total 2030 Future Build Volumes used in the warrant analysis.

Nedonna Beach Residential entering and exiting trip generated volumes are distributed at the intersection of US 101 & Beach Drive based on existing traffic volume distributions. Entering volumes were split 38 percent southbound right, 62 percent northbound left. Exiting volumes are currently split 40 percent eastbound left, 60 percent eastbound right. As shown in Figure B-1, an expected additional 28 southbound right vehicles would enter the Nedonna Beach Residential Development in the future build scenario. This, combined with Future 2030 volumes, would result in 55 southbound right turning vehicles entering the Nedonna Beach Development. These volumes are shown on the next page (taken from **Figure 7-3** of the TPAU Analysis and Procedures Manual).

According to the ODOT Speed Zone Order for US 101 in the project study area, the posted speed at the intersection with Beach Drive is 45 mph.

Figure 1: Right-Turn Lane Criterion from TPAU Analysis and Procedures Manual



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Notes:
The approaching DHV is assumed at 525 vehicles
Right turn volumes are assumed as 55 vehicles per hour
From Figure 7-3 of TPAU Analysis and Procedures Manual

Based on the expected future volumes associated with future development in Nedonna Beach, and speeds at the intersection location, the study intersection would meet the right turn lane warrant volume criteria.

Crash Criteria

Crash data for 2003-2007 were analyzed in the *Rockaway Beach Transportation Plan: Transportation System Conditions, Deficiencies, and Needs Memorandum* (Technical Memorandum #1). Recorded crashes at the intersection of US 101 & Beach Street indicate a crash rate of 0.17. Intersection crash rates typically warrant further safety investigation if they exceed 1.0. This intersection crash rate is below 1.0, so it does not currently indicate a safety deficiency. Based on this, the study intersection does not meet the right turn lane warrant based on crash criteria.

Special Cases Criteria

An intersection can meet the ODOT right turn lane warrant based on special cases, which include railroad crossings, passing lanes, geometric/safety concerns, and other conditions. The

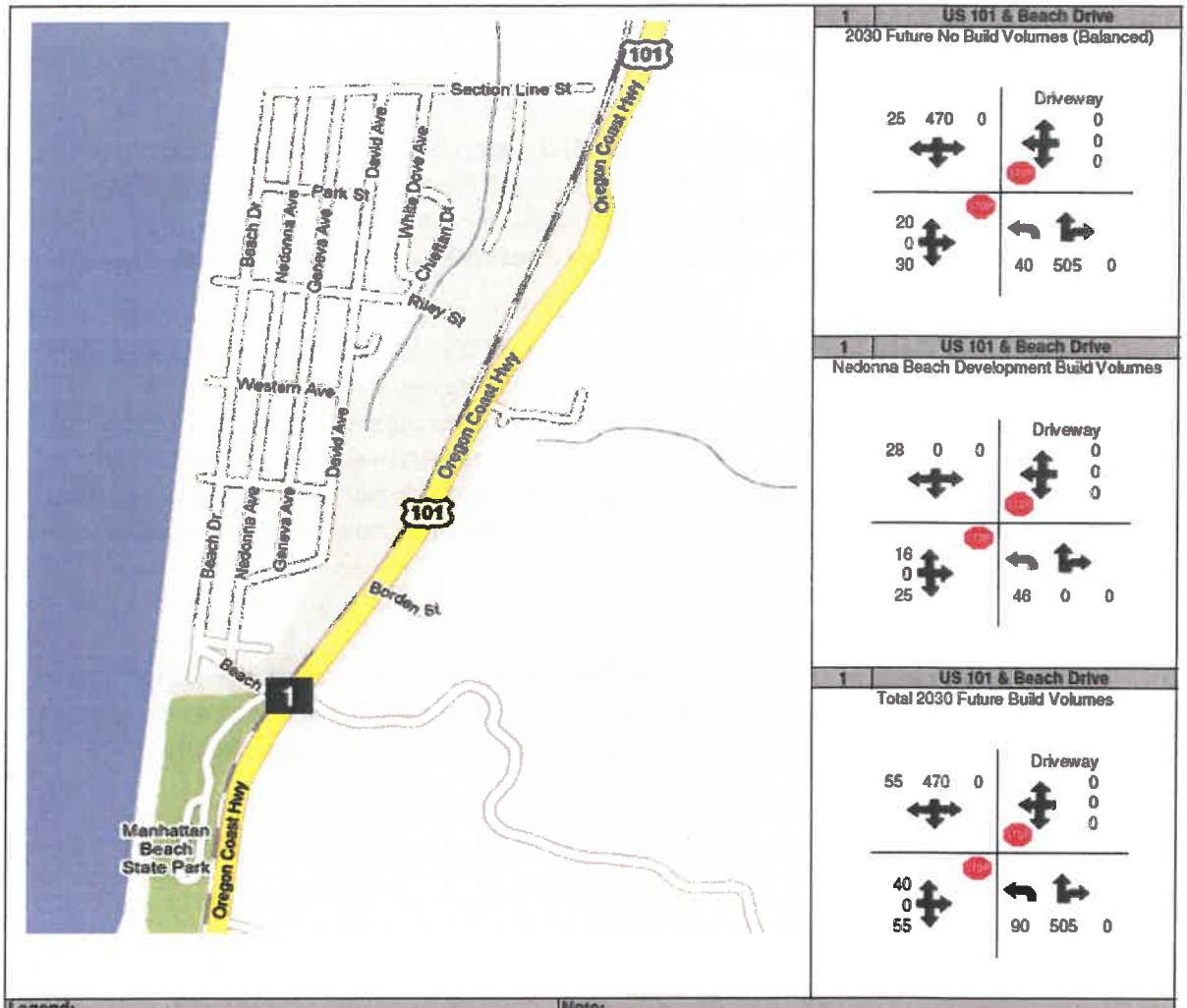
intersection of US 101 & Beach Drive is located approximately 40 feet east of the Port of Tillamook railway tracks. These tracks run parallel to US 101 and are located on the west leg of the study intersection.

The Port of Tillamook train currently operates once daily from May to September and three times daily in August as a tourist train. This level of use and frequency is also assumed in the 2030 future conditions. For more discussion on track uses, see the *Rockaway Beach Transportation Plan: Transportation System Conditions, Deficiencies, and Needs Memorandum* (Technical Memorandum #1).

Based on the location of these tracks, when a train is present it could prevent southbound right turning vehicles from completing their movement. Enough storage is available to allow one vehicle to turn from US 101 and wait on Beach Drive as the train passes. All other southbound right turning vehicles would queue on US 101. While this condition would represent a less desirable situation, the frequency of the Port of Tillamook train it is not anticipated to have a high level of impact on turning operations and is not considered to meet right turn lane warrant criteria based on special cases.

Conclusions

A southbound right-turn lane at US 101 & Beach Street is warranted based on the ODOT Right Turn Lane Criteria (ODOT Analysis and Procedures Manual, Section 7.2.2), Volume Criteria, based on assumptions provided by ODOT on future build-out of the Nedonna Beach Residential Development.



CH2MHILL

FIGURE 1: Nedonna Beach Turn Warrant Analysis Volumes
Rockaway Beach Transportation Plan

Rockaway Beach Transportation Plan: US 101 at Beach Drive Intersection Study

PREPARED FOR: Rockaway Beach Project Advisory Committee

PREPARED BY: Tegan Houghton, CH2M HILL

COPIES: Theresa Carr, CH2M HILL
Terra Lingley, CH2M HILL

DATE: May 19, 2010

This memorandum outlines consideration given to possible intersection improvements at the US 101 and Beach Drive intersection in Rockaway Beach, Oregon. The included improvements are based on comments received during public advisory committee (PAC) meetings for the project. These improvements include a southbound right turn lane and increased turning area for eastbound right turns, which are outlined in the following sections.

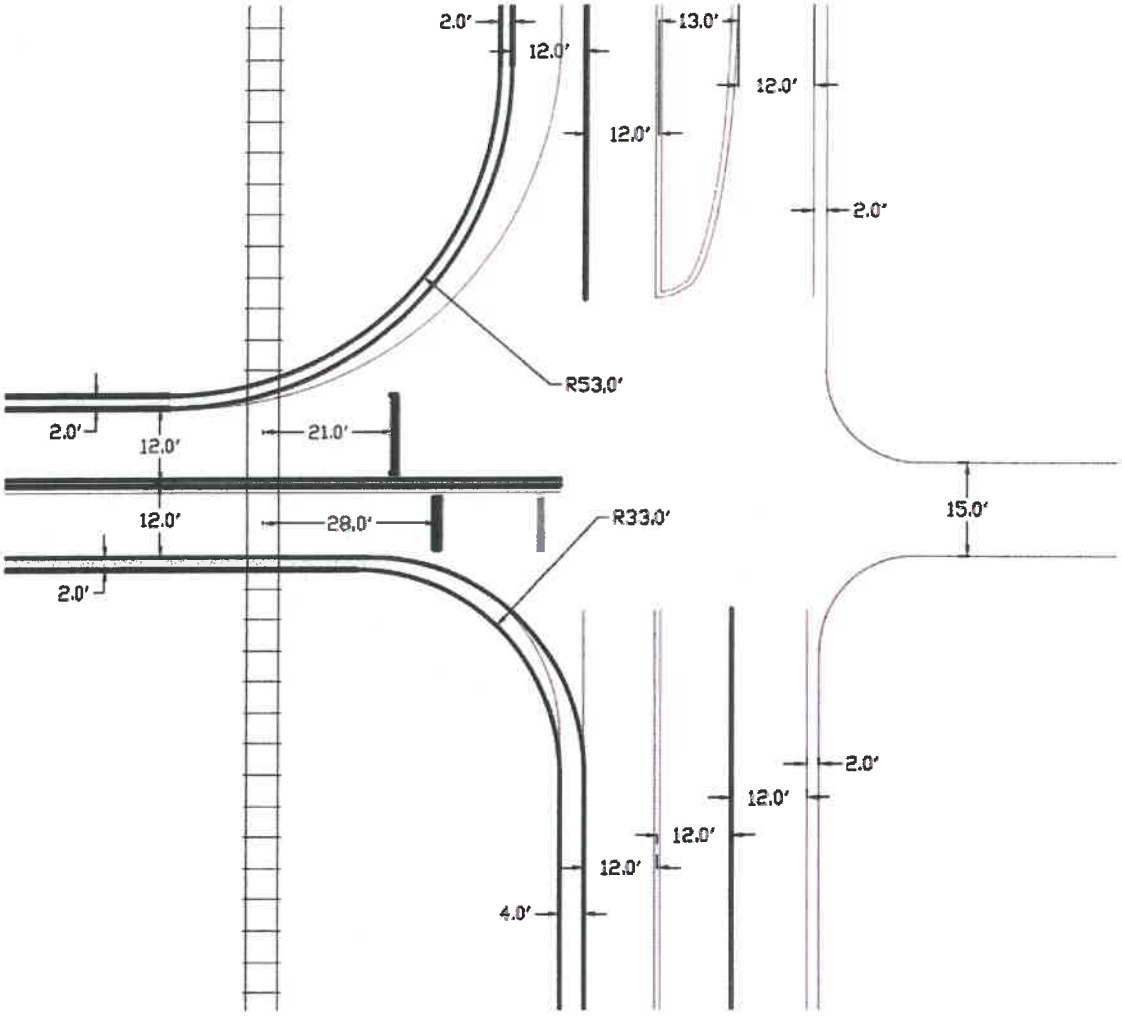
Design Vehicle

As part of the Rockaway Beach Transportation Plan, counts were analyzed at the intersection of US 101 and Beach Drive. These counts were conducted September 9th and 10th, 2007, from 6:00 AM to 10:00 PM and include an FHWA 13 Class Vehicle Classification breakdown. Before designing improvements for the study intersection, vehicle class distributions were reviewed for southbound right (SBR) and eastbound right (EBR) turning movements at the intersection. These revealed that the SBR and EBR turns were completed by the following vehicle types: passenger cars; other two-axle, four-tire, single unit vehicles; two-axle, six-tire, single-unit trucks; four or fewer axle single-trailer trucks, and motor cycles. AutoCAD AutoTurn turning templates were evaluated for these types of vehicles to determine which vehicle would have the most restrictive turning maneuvers. After consideration, a passenger car pulling a trailer was selected as the study design vehicle because it has the largest inner turning radius of the heavy vehicles observed (18.31′ per AASHTO 2004 US standards). The vehicle's length from front to rear is 48′. This vehicle is consistent with the vehicle type described by citizens at the PAC meetings.

US 101 Turn Lane Considerations

During a public advisory committee meeting for the Rockaway Beach Transportation Plan, citizens of the community expressed a desire to see a southbound right turn lane added for vehicles turning from US 101 to Beach Drive. A study was completed an outlined in the technical memorandum *Rockaway Beach Transportation Plan: Nedonna Beach Turn Warrant Analysis* to determine whether a SBR turn lane should be added. This study concluded that the turn lane should be included in any planned improvements to the study intersection.
The turn lane is designed with a 100′ storage length and a radius that allows the design vehicle to complete this movement safely. This is shown in **Figure 1**.

Figure 1: US 101 at Beach Drive Intersection Improvements



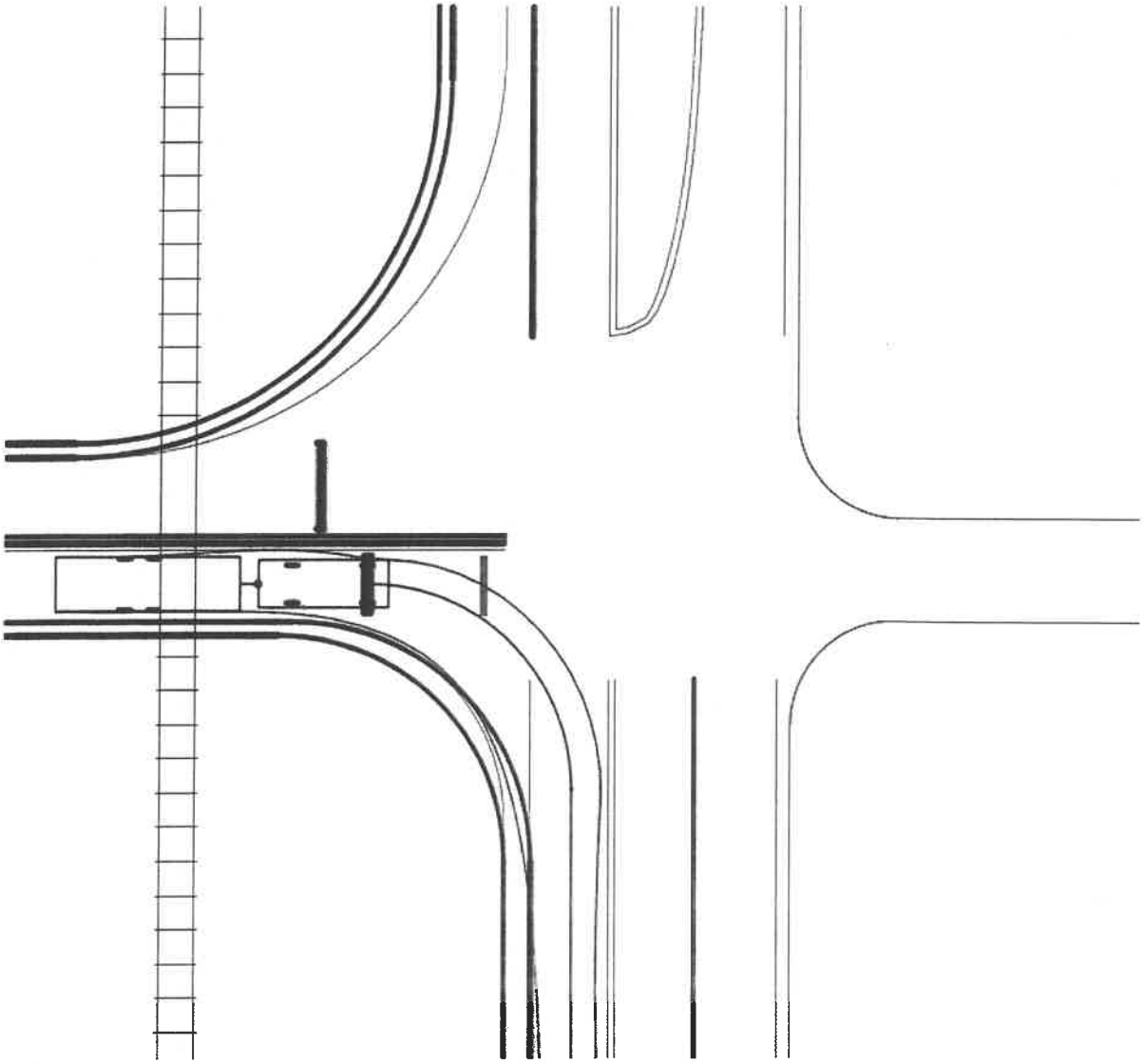
Notes:
Black lines are proposed
Gray lines are existing
Figure is not to scale

The 2030 Future No Build analysis indicated that during the peak hour, approximately 25 vehicles would complete a SBR turn at this intersection. One hundred feet of storage will be able to hold up to five passenger cars at a time. Since the US 101 approaches are uncontrolled (no stop required), storage will only be necessary when trains are using the Beach Drive crossing. The available storage will only be exceeded if a train were using the Beach Drive crossing for longer than 10 minutes at a time (assuming an average of one car arriving every two minutes), which is not anticipated at this point.

Beach Drive Turning Considerations

During the PAC meeting, concern was voiced over the turning radius available for vehicles making EBR turns from Beach Drive. The citizen indicated they have a hard time pulling their boat or trailer with a passenger car and completing the maneuver without dropping a wheel off the edge of pavement or turning into on-coming traffic. **Figure 1** shows that this edge of pavement radius has been increased to 33 feet to provide additional room for the maneuver. **Figure 2** shows the turning movements of the design vehicle making an EBR.

Figure 2: Design Vehicle EBR Turn at US 101 and Beach Drive



Notes:
Black lines are proposed
Gray lines are existing
Figure is not to scale

Improvement of this turn will require extending the edge of pavement out approximately another three feet from the existing edge of pavement. This will provide adequate room for the

design vehicle to complete the maneuver without entering the opposing lane of traffic or leaving the roadway.

APPENDIX D

FINANCIAL PLAN AND COST ESTIMATES

Appendix D: Financial Plan and Cost Estimates

A variety of local and state funding sources can be explored to help fund the recommendations in this plan. Table 10 provides an overview of possible funding sources for each of the recommendations.

TABLE 10
Potential Funding Sources

Concept	Potential Funding Sources	Secondary Funding Sources
1. Extend Necarney Avenue	System Development Charges (SDCs)	Franchise Fee
2. Improve Miller Street	ODOT Bicycle and Pedestrian Program; ODOT Transportation Enhancement (TE); Local Improvement District (LID)	City Budget (local match); Franchise Fee, Levy, Revenue or General Obligation Bond (new)
3. Improve Beach Access	ODOT TE; ODOT Special Transportation Fund (STF); Oregon State Parks Recreational Trails Grant; Rockaway Transient Room Tax; private sponsorship	City Budget (local match)
4. Construct Recreational Trails Around Lakes	Oregon State Parks Recreational Trails Grant; ODOT Bicycle and Pedestrian Program; ODOT TE; ODOT STF; Rockaway Transient Room Tax	City Budget (local match)
5. Improve Priority Highway Crossings	ODOT Bicycle and Pedestrian Program; ODOT TE	Franchise Fee
6. Install Signal for Emergency Vehicles	ODOT Signs, Signals and Illumination Program	
7. Improve Parking	Oregon State Parks Recreational Trails Grant; LID; Rockaway Transient Room Tax	City Budget (local match); Franchise Fee; County Road Fund
8a-c. Pedestrian Connectivity – Priority 1-2 and Connection to Lake Lytle Trail	ODOT STF; ODOT Special City Allotment; ODOT Bicycle and Pedestrian Program; ODOT TE; System Development Charges and Exactions; LID; Rockaway Transient Room Tax	
8d. Pedestrian Connectivity – Pedestrian Connections in the	ODOT TE; Oregon State Parks Recreational Trails Grant	City budget (local match)
9. Bus Pull-out Areas	ODOT Modernization Program; Tillamook County Transportation District	

TABLE 10
Potential Funding Sources

Concept	Potential Funding Sources	Secondary Funding Sources
10. Improve Critical Railroad Crossings	ODOT Bicycle and Pedestrian Program; Port of Tillamook Bay; ODOT Railroad Crossing Safety Program; ODOT TE; ODOT STF; ODOT Immediate Opportunity Fund	City budget (local match); Franchise Fee Increase
11. Improvements at US 101 and Beach Street	ODOT Modernization Program; System Development Charges	Franchise Fee Increase

Other funding sources that could be considered include instituting an Urban Renewal Area and the Federal Emergency Management Act (FEMA) Pre-disaster Mitigation Program. Further research should be conducted to ensure the applicability of these funding sources for the projects recommended in the Rockaway Beach Transportation Plan.

Potential Funding Descriptions

This section provides a brief overview of the funding sources listed in the above table. The sources are organized into four subject areas: Federal, State, County, and Local.

Federal Funding Sources

Federal funding accounts for approximately 20 percent of funding for projects within Oregon. The City of Rockaway Beach is outside a Metropolitan Planning Organization (MPO) boundary; therefore, federal funding is made available predominantly through state or county programs, though some funding is available directly to the City.

FEMA Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation program provides funding to states, communities, universities, territories, and Indian tribal governments for hazard mitigation planning and implementation of mitigation projects prior to a disaster event. An application for this grant program is submitted electronically through an online system and is approved by the Oregon Emergency Management office. The application is then forwarded to FEMA for consideration.

This funding source could provide potential funding for pedestrian connections in the south end of Rockaway Beach (see Recommendation # 8d). FEMA assesses projects based on a variety of criteria including "whether the project protects critical facilities" and "frequency and severity of hazards". The Oregon Emergency Management office is the state coordinating office for this program and should be consulted for further guidance.

State Administered Funding Sources

State Transportation Improvement Program (STIP)

The STIP is the primary programming document that identifies transportation priorities for federal and state funding in Oregon. The STIP provides a schedule and identifies funding for projects throughout the state for a four-year period. Projects that are included in the STIP are considered "regionally significant" and have been given a high priority through planning

efforts and by the relevant area commissions on transportation (ACT). The STIP has five major programs: modernization, safety, preservation, bridge, and operations, and fifteen specific programs under which projects can receive funding. All federally funded transportation projects and programs, and all state and locally funded projects deemed "regionally significant," must be included in the STIP.

Transportation projects in the STIP are generally categorized into the five major programs referenced above, plus a sixth "other," or "special projects" category. Projects identified within the Rockaway Beach Transportation Plan may fall within two categories: Operations Projects and Special Programs. The STIP states that applicable uses under each of these projects are:

- ***Modernization: Capital projects that lead to increased highway system capacity***
- ***Operations:*** System management and improvements that lead to more efficient and safer traffic operations and greater system reliability
- ***Special Programs:*** Bicycle and Pedestrian, Congestion Mitigation and Air Quality Improvement, Federal Lands Highways, Fish Passage and Large Culvert Improvement, Immediate Opportunity Fund, Indian Reservation Roads, Public Transit, Railroad Crossing Safety, Scenic Byways, and Transportation Enhancement

The funding programs under these three categories are described in more detail below.

Modernization

The 2010-2013 Draft STIP projects under modernization are capital highway improvements that lead to increased system capacity. Increased capacity can be accomplished by either adding additional lanes, constructing new highways, or other system improvements. There is strong competition for funding in this program as the need outweighs available funds. Projects are awarded funding through this program by the applicable ODOT region.

Operations

The 2010-2013 Draft STIP projects under operations "improve the efficiency of the transportation system through the replacement of aging infrastructure and the deployment of technology that allows the existing system to meet increased demands." Applicable projects may be listed within four sub-categories: (1) Intelligent Transportation Systems (ITS); (2) Signs, Signals, and Illumination; (3) Slides and Rockfalls and; (4) Transportation Demand Management (TDM).

- ***Signs, Signals and Illumination Program – This program provides funding for equipment replacement that has reached the end of its useful life. This program also provides limited funding for new or upgraded signals at problem intersections.***

Special Programs

ODOT also provides funding for a number of special programs. This section describes the programs that are applicable to projects outlined in the Rockaway Beach Transportation Plan.

- ***ODOT Bicycle and Pedestrian Program –*** This program provides funding to cities, counties and ODOT regional and district offices through a competitive process. Eligible projects are related to the design and construction of pedestrian and bicycle facilities within the public right-of-way. The application process occurs every two years with applications for the 2012-2013 cycle beginning in 2010 and applications for the 2014-15 cycle beginning in 2012. Every

biennium, the program awards approximately $5 million. A local match is expected for projects that receive this grant.

Bicycle and pedestrian recommendations located within the public right-of-way would be eligible for this program. A grant application could be submitted as early as 2010 for receipt of funds in the 2012-2013 funding cycle.

- ***Transportation Enhancement Program*** – The Transportation Enhancement (TE) program provides federal highway funds for projects that strengthen the cultural, aesthetic, or environmental value of the state transportation system. TE activities are funded through a required set-aside from STP funds of 10 percent, or the amount set aside in FY 2005, whichever is greater. Projects fall into four main categories: Bicycle and Pedestrian, Historic Preservation, Landscaping and Scenic Beautification, and Environmental Mitigation. The intent of the program is to fund special or additional activities not normally required on a highway or transportation project.

  Since the project's inception in 1992, 190 projects of approximately $97 million have been funded in Oregon through the TE program. For fiscal years 2008-2011 the Program will have $6.5 million per year for competitive selection, and $2 million per year for the TE Discretionary Account. Awards for the 2012-2013 biennium were approved by the Oregon Transportation Commission in August 2009; applications for the 2014-2015 biennium start in April 2010. The funds are provided through reimbursement, not grants. Participation requires matching funds from the project sponsor, at a minimum of 10.27 percent. All projects must have a direct relationship to surface transportation.

  This is a competitive grant application process facilitated by ODOT that awards funding to local governments on an annual basis. The TE Advisory Committee awards grants based on a project's technical merit and local support. The committee also considers the TE "focus areas" for the year and the connection to other transportation projects.

- ***Immediate Opportunity Fund*** – This fund provides funding for the construction and improvement of streets and roads that are crucial to support site-specific economic development projects. ODOT manages this fund on a case-by-case basis in cooperation with the Oregon Economic and Community Development Department.

  The fund's use is discretionary, and it can only be used when other sources of financial support are unavailable or insufficient. Use is also restricted to circumstances where an actual transportation problem exists and where funds are needed to identify or retain employers that provide primary industry employment in a community. At least a 50 percent match of the total fund requested is expected from applicants.

- ***Railroad Crossing Safety Program*** – This program is administered through the ODOT Rail Division. The division allocates funding by prioritizing projects based on an accident prediction model. There are limited funds for discretionary projects that improve safety at railroad-highway grade crossings.

Special Transportation Fund

The Special Transportation Fund (STF) was created by the Oregon Legislature in 1985, and is funded through a cigarette tax and ODOT Transportation Operating Funds. This fund provides support for special transportation services benefiting seniors and individuals with disabilities.

Seventy-five percent of the funding is allocated to designated counties, transit districts and Indian tribal governments proportional to population. The remaining 25 percent of funds are distributed through a discretionary grant program called the Public Transportation Discretionary Grant Program.

Tillamook County Transportation District has been designated as one of 42 entities statewide to receive funding through STF. STF funds can be used to create, maintain, or expand systems that serve seniors or individuals with disabilities, as well as plan and develop new services for those currently not served. ODOT's STF Guidebook provides a list of TSM and TDM examples of previous fund awards (*http://www.oregon.gov/ODOT/PT/PROGRAMS/stf_program.shtml*).

Special City Allotment Grant

This grant was created by the Oregon Legislature, which mandated a $1 million set-aside for cities with populations less than 5,000. Half of the funds come from the cities' share of the state gas tax and half of the funds come from ODOT's portion of the State Highway Fund. The maximum grant allocation is $25,000. Half of the grant can be allocated to the city up front and the second half is provided when the project is completed.

Oregon State Parks Recreational Trails Grant

The Oregon Parks and Recreation Department administers this annual grant program to provide funding for recreational trail-related projects. Eligible projects include building new trails, building trail bridges, installing wayfinding signage, restoring existing trails, building or rehabilitating trailhead facilities, acquiring land or easements, and water trails. Funding is designated primarily for recreational trail projects, rather than "utilitarian transportation-based projects". The entity receiving the funding is required to provide a 20 percent match.

County Funding Sources

The Road Fund

For Fiscal Year 2009-2010 the proposed budget for the Road Fund is $6,839,500. This fund comes from motor vehicle fees ($1,370,000), the Federal Forest Safety Net ($1,458,000), and other sources such as Federal and State agencies and federal stimulus money. Funds are used for wages, right-of-way, new construction, pavement preservation, and federal match. The County budget has decreased in recent years and is expected to experience further decreases as the Federal Forest Safety Net is reduced annually to zero in 2012.

Local Funding Sources

City Budget

Many of the state and federal grants identified in this funding section require a local match. This is the most appropriate use of city budget funding as it can leverage larger pools of money available for identified projects.

System Development Charges or Exactions

System Development Charges (SDCs) are one-time fee assessed on new development, to compensate for increased traffic associated with its use. It is applied to capital improvement projects that increase transportation system capacity associated with growth. SDCs are structured so that revenues pay for expenditures. When revenues are low in a particular year,

new streets likely were not necessary. The city of Rockaway currently has a $900 system development charge for all new buildings.

With developer exactions, an improvement is paid for or built by the developer to adopted standards and then deeded to the City as a condition of development. Developer exactions and contributions can pay for portions of roads within, adjacent to, or through new developments. The City currently requires that all new subdivisions build sidewalks as a developer exaction. In select locations along US 101, the city has also worked with developers to install sidewalks as part of the development approval process.

Local Improvement District

Local Improvement Districts (LIDs) are created by property owners within a specified area to raise revenues for constructing street improvements within the district. LIDs may be used to assess property owners for improvements that increase property values. The district can be a larger geographic area than the area with the actual street improvements but all landowners will need to understand advantage to entering into the LID. Property owners typically enter into LIDs because they see economic or personal advantages to the improvements.

Assessments are secured by property liens. The formation of LID districts is governed by state law and local jurisdictional development codes. LID revenues are used solely for capital costs.

Urban Renewal Area

Rockaway Beach does not currently have any urban renewal areas. To establish an Urban Renewal Area (URA), the City would need to create an Urban Renewal Agency. Once an agency is formed, it could identify blighted areas within the city for improvement. In the selected area, tax-increment financing (TIF) could be used to generate urban renewal funds. TIF works by 'freezing' property values at the beginning of an urban renewal plan, and assessing a fee only on the incremental growth in property value observed since the beginning of the urban renewal district plan. Revenues generated within an urban renewal area are used to secure bonds to finance projects and programs within that area.

Transient Room Tax

The City of Rockaway has a 7 percent local tax on all rooms rented for less than 30 days within the city, excluding specific situations. Currently approximately 29 percent of the funds collected from this tax go towards city advertising and 71 percent of the revenue supports other city functions such as police, capital improvements, and beautification. In the current budget, $85,000 has been designated for city parking lots and buildings, $35,000 has been designated for roads and streets, and $10,000 has been designated for downtown business improvements. In future years, funds collected from this tax could be designated for projects identified in this plan.

Franchise Fee Increase

The City currently charges all utility companies operating within the city a franchise fee. In previous years, the city passed a 2 percent fee increase. Funds gathered from this increase were set aside for roads and street maintenance. The City could consider extending the franchise fee to other franchises or increasing the current utility franchise fee.

Local Option Levies

In most taxing districts, voters within an established taxing district, such as a city or a fire district can approve levies for operating purposes or capital projects. A levy can either be established as a set percentage rate or a set dollar amount. For capital projects, a levy cannot last longer than 10 years. Levies must be approved at a November election in an even numbered year or by more than 50 percent of eligible voters (double majority). Rockaway Beach has had a road improvement levy in the past. In recent years, voters have not been supported of this type of funding strategy. The city may choose to pursue levies in the future and therefore it is included in this section.

General Obligation Bonds

Bonding allows municipal and county governments to finance construction projects by borrowing money and paying it back over time (with interest). Financing requires smaller regular payments over time compared to paying the full cost at once, but financing increases the total cost by adding interest. General Obligation Bonds are often used to pay for construction of large capital improvements. This method is typically used to fund road improvements that will benefit the entire community. General Obligation Bonds add the cost of the improvement to property taxes over a period of time. Oregon State law states "A city may issue general obligation bonds to finance capital construction or capital improvements upon approval of the electors of the city" (287A.050). Revenue for General Obligation Bonds is collected in property tax billings.

Revenue Bonds

Revenue bonds are paid back with dedicated revenue from a source other than property taxes. Revenues from System Development Charges, Local Improvement Districts, or other reliable revenue streams can be used. Rockaway Beach has not used revenue bonds backed by Systems Development Charges, as this funding source is variable based on the amount of development. Revenue bonds are typically used to fund improvements that primarily benefit the people who provide the revenue through fees and assessments.

Private Sponsorship

Private sponsorship could be used for signage improvements. Companies could pay for all or a portion of the cost for the sign and in return receive space to advertise. The signs would provide a space that for the sponsoring company and could include brief directions to the business (i.e. take the next beach exit). Standards should be established by the city to limit the size of the signs and ensure a common appearance between all sponsored signs.

Tillamook County Transportation District Funds

The Tillamook County Transportation District (TCTD) provides public transportation service to residents throughout Tillamook County. They provide service within the city of Tillamook and intercity transportation throughout the region. Their intercity routes run between Tillamook and Manzanita/Cannon Beach, Tillamook and Oceanside/Netarts, Tillamook and Portland, and Tillamook and Neskowin/Otis. The TCTD could be a funding partner for the bus pull-outs (see Recommendation #9).

Port of Tillamook Bay

The Port of Tillamook Bay owns the railroad tracks that run through Rockaway Beach, as well as other facilities in Tillamook County. The portion of the track that runs through Rockaway Beach is currently leased to the Oregon Coastal Scenic Railroad which runs twice daily trips between May and September, with select special events in other months. The Port of Tillamook Bay could be a funding partner for improving railroad crossings (see Recommendation #10).

Phasing

It is not expected that funds to construct all the recommended projects included in this plan would be available at the same time or necessarily in the short-term. To address this, the project team worked with City, the PAC, and the public at the last open house to determine which recommendations should be implemented first. Community members and the PAC agreed that the following three recommendations are important to implement in the short term (0-5 years):

- Improve and Extend Miller Street (Recommendation #2)
- Improve Priority Highway Crossings (Recommendation #5)
- Extend Necarney Street (Recommendation #1)

Bicycle and Pedestrian Cost Estimates

To: Theresa Carr and Terra Lingley, *CH2M Hill*

From: Mike Tresidder and Hannah Kapell, *Alta Planning + Design*

Date: May 18, 2010

Re: Rockaway Beach TSP Bicycle and Pedestrian Project Cost Estimates

Cost Opinions

This section summarizes planning level cost opinions associated with the recommended pedestrian and bicycle improvement projects. Cost opinions were established by similar Bicycle/Pedestrian Master Plans and experience in nearby communities. Table 1 shows cost opinions for elements of both bicycle and pedestrian improvement projects.

Table 1. Summary of Costs for Improvements[1]

Improvement	Unit	Planning-Level Cost Opinion	Notes
High-Visibility Crosswalks	LF	$30	6' wide
ADA-Compliant Curb Ramps	EA	$1,000	
Pedestrian-Actuated Push Buttons	EA	$600	
Curb Extensions	EA	$12,500	
Bicycle/Pedestrian Bridge	SF	$150	All estimates assume 12' bridge ($1,800 LF)
Bicycle Boulevard	LF	$1.33	Includes signage & pavement markings
Shared Use Path	LF	$39.75	Includes demolition, clear & grub, grading, erosion control, aggregate base, asphalt paving, and mechanical seeding for 12' shared use path
Pedestrian Path	LF	$28.13	Includes demolition, clear & grub, grading, erosion control, aggregate base, asphalt paving for 10' path
Sidewalk	LF	$92.78	Includes drainage, and curb & gutter[II]

[1] Complete assumptions and inclusions in cost estimates for all facility types can be found at the end of this document.

[1] **Sidewalk estimates include half the cost of drainage, which consists of a sewer pipe and storm manholes running the length of the roadway in the center.**

The proposed pedestrian improvements in Rockaway Beach, including intersection and sidewalk infill, as well as the pedestrian pathways and soft-surface trails total $1,083,000, while the bicycle improvements on Miller Street total $700,500. Shared use facilities, including bicycle/pedestrian bridges and shared use paths, total $1,683,000. Together, bicycle and pedestrian improvements recommended for Rockaway Beach total $3,466,500.

Individual Project Cost Opinions

Table 2 through Table 8 list the recommended projects by category and include planning-level cost opinions. The cost opinions include engineering/design (13 percent), contingency (40 percent) and construction management (10 percent) costs, which represent a proportion of the original project costs.

Table 2. Proposed Intersection Improvements (Marked Crosswalks)

Project	Length (feet)[2]	Cost Opinion[3]
US 101 at N. 11th Avenue	80	$4,000
US 101 at N. 3rd Avenue	96	$5,000
US 101 at S. 1st Avenue	96	$5,000
US 101 at S. 2nd Avenue	80	$4,000
US 101 at S. 3rd Avenue	72	$4,000
US 101 at S. 6th Avenue	80	$4,000
US 101 at Washington Street	80	$4,000
Total Intersection Improvements:	**584**	**$29,000**

Table 3. Proposed Sidewalk Improvements

Project	From-To	Length (feet)	Cost Opinion[4]
US 101 (east side)	N. 11th Avenue - N. 12th Avenue/Lake Lytle Trail	245	$37,000
US 101 (east side)	N. 6th Avenue - N. 3rd Avenue	1.370	$207,000
US 101 (east side)	S. 3rd Avenue - S. 7th Avenue	2,175	$329,000
US 101 (east side)	S. 7th Avenue - Washington Street	1,250	$189,000
Connection to Lake Lytle Trail	N. 6th Avenue - Lake Lytle Trail	590	$89,000
Total Sidewalk Improvements:		**5,630**	**$851,000**

[2] Intersection improvement lengths are based on roadway widths estimated from GoogleEarth aerials, assuming a crosswalk on both sides of the intersection with the major road.

[3] Planning level costs are rounded to the nearest $1,000.

[4] Planning level costs are rounded to the nearest $1,000.

Table 4. Proposed Pedestrian Pathways

Project	From-To	Length (feet)	Cost Opinion[5]
Miller Street extension to Manhattan Beach	Parking Lot - Miller Street	1,382	$63,000
S. 1st Avenue (south side)	Miller Street - US 101	1,867	$86,000
Total Pedestrian Pathways:		**3,249**	**$149,000**

Table 5. Proposed Soft-Surface Trails

Project	Length (feet)	Cost Opinion[6]
Trail into center of Nature Preserve property	2,925	$24,000
Trails connecting neighborhood to Nature Preserve property	1,926	$16,000
Juniper Street extension	1,732	$14,000
Total Soft-Surface Trail Projects	**6,583**	**$54,000**

Table 6. Miller Street Bicycle Boulevard

Project	From-To	Length (feet)	Cost Opinion
Miller Street	Manhattan Beach - S. Minnehaha St	15,276	$700,500

Table 7. Shared Use Pathways

Project	From-To	Length (feet)	Cost Opinion
Lake Lytle Trail (west side)	N. 12th Avenue - N. 7th Avenue	2,586	$168,000
Lake Lytle Trail (completion of loop)	N. 12th Avenue - N. 6th Avenue	5,033	$326,000
Crescent Lake Trail (boardwalk)	NW. 18th Avenue - NW 23rd Avenue	3,865	$250,000
Total Shared Use Pathways:		**11,484**	**$744,000**

Table 8. Proposed Bicycle/Pedestrian Bridges

Project	Length (feet)	Cost Opinion
Miller Street bridge at Crescent Lake	90	$264,000
Miller Street bridge to S. Nehalem Avenue	130	$381,000
Miller Street bridge to Clear Lake	100	$293,000
Total Bicycle/Pedestrian Bridges:	320	$939,000

[5] Planning level costs are rounded to the nearest $1,000.

[6] Planning level costs are rounded to the nearest $1,000.

Cost Estimates

Table 9. Costs for Sidewalk, Drainage, Curb and Gutter

ITEM DESCRIPTION	UNIT	QTD	UNIT COST	TOTAL	NOTES
Standard Concrete Curb and Gutter	LF	5,280	$18.00	$95,040.00	
Sidewalk	SY	3,520	$45.00	$158,400.00	6' Wide
12 Inch Storm Sewer Pipe, 10' deep	LF	2,640	$70.00	$369,600.00	Storm System Pipe, Including Trenching/Backfill, Assuming Half Roadway
Storm Manhole	EA	9	$2,800.00	$24,640.00	Every 300' Assuming Half Roadway
Standard Catch Basin	EA	18	$1,500.00	$27,000.00	Every 300'
Cost per mile:				$489,880.00	
Construction Cost per LF:				$92.78	

Table 10. Costs for Bicycle Boulevard

ITEM DESCRIPTION	UNIT	QTD	UNIT COST	TOTAL	NOTES
Warning sign	EA	18	$250.00	$4,400.00	Every 600' each direction
Pavement Marking	EA	53	$50.00	$2,640.00	Every 200' each direction
Cost per mile:				$7,040.00	
Construction Cost per LF:				$1.33	

Table 11. Costs for Shared Use Path (12' corridor, 2' shoulders)

ITEM DESCRIPTION	UNIT	QTD	UNIT COST	TOTAL	NOTES
Selective Site Demolition	LF	5,280	$0.66	$3,432.00	assume minor removals
Clearing and Grubbing	Acre	5,280	$3.73	$19,694.40	25' wide corridor
Soil Stripping and Stockpiling	CY	5,280	$1.75	$9,240.00	27' corridor, 12" deep
Fine Grading	SY	15,840	$1.08	$17,107.20	27' corridor
Finish Grading	SY	15,840	$0.20	$3,168.00	27' corridor
Erosion Controls	LF	10,560	$1.25	$13,200.00	both sides, length of project
Sedimentation Controls	LF	100	$7.15	$5,016.00	hay bales
Aggregate Base Courses	SY	9,387	$5.25	$30,782.40	16' wide base course (2' shoulders + 12' tread), 3/4" stone base, 3" deep
Asphalt Paving Wearing Course 4" thick	SY	7040	$15.00	$105,600.00	16' wide base course (2' shoulders + 12' tread)
Mechanical Seeding	SY	5280	$0.50	$2,640.00	9' corridor
Cost per Mile				$209,880.00	
Construction Cost per LF:				$39.75	

Table 12. Costs for Pedestrian Path (10' corridor, 1' shoulders)

ITEM DESCRIPTION	UNIT	QTD	UNIT COST	TOTAL	NOTES
Selective Site Demolition	LF	5,280	$0.66	$3,432.00	assume minor removals
Clearing and Grubbing	Acre	1,320	$3.73	$9,847.20	12' wide corridor
Soil Stripping and Stockpiling	CY	1,320	$1.75	$4,620.00	13' corridor, 12" deep
Fine Grading	SY	3,960	$1.08	$8,553.60	13' corridor
Finish Grading	SY	3,960	$0.20	$1,584.00	13' corridor
Erosion Controls	LF	10,560	$1.25	$13,200.00	both sides, length of project
Sedimentation Controls	LF	100	$7.15	$5,016.00	hay bales
Aggregate Base Courses	SY	7,040	$5.25	$23,086.80	12' wide base course (2' shoulders + 12' tread), 3/4" stone base, 3" deep
Asphalt Paving Wearing Course 4" thick	SY	528000	$15.00	$79,200.00	12' wide base course (1' shoulders + 10' tread)
Cost per Mile				$148,539.60	
Construction Cost per LF:				$28.13	

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT: Extend Necarney Avenue	REFERENCE NAME/PHONE		SHEET
DESIGN LEVEL: Conceptual	503-235-5000		1 of 1
KIND OF WORK: Paving, Striping	LENGTH (MI.): 0.82	DATE 4/30/2010	NAME CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.00	$0
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.00	$0
4	New Roadway: Local Street	Lane-Mi.	$360,000	1.95	$702,000
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.17	$24,310
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.33	$205,260
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0	$0
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$931,570***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$23,300
	TP & DT	3.0-8.0%	8.0%	$74,500
	Mobilization	8.0-10.0%	10.0%	$93,200
	Erosion Control	0.5-2.0%	2.0%	$18,600
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$19,000
	TOTAL CONSTRUCTION COST			***$1,160,170***
	Right-of-Way	LS ALL	1	$0
	Design Engineering		13.0%	$150,800
	Construction Engineering		10.0%	$116,000
	SUBTOTAL			***$1,426,970***
	Contingency Costs			
	Start Up Costs		40%	***$1,997,758***
	Annual Operating Costs		40%	***$0***
	TOTAL PROJECT COST			**$1,998,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, illumination

Overlay of Existing Necarney Ave North Side (3 lane Widths) 300 lineal Feet

New Roadway - 6' Shoulder, 2 x 12' Lane, 6' Bike (3 lane widths) .65 miles

Reconstruction of Existing Palisade St (3 lane widths) .11 miles

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT: Improve Beach Access	REFERENCE NAME/PHONE		SHEET
DESIGN LEVEL: Conceptual	503-235-5000		1 of 1
KIND OF WORK: Signage, Access Improvements	LENGTH (MI.): 0	DATE 3/1/2010	NAME TMH

Start Up Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Signage per Beach Access	EA	$1,344	11	$14,784
2	Sign Post and Installation	EA	$200	44	$8,800
					$0
	SUBTOTAL				***$23,584***

Annual Operating Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
					$0
					$0
	SUBTOTAL				***$0***

Contingency Costs

Start Up Costs			40%	***$33,018***
Annual Operating Costs			40%	***$0***

TOTAL PROJECT COST

START UP COSTS	**$33,018**
ANNUAL OPERATING COSTS	**$0**

Assumptions:

Assumes 1 sign needed on beach side. 2 signs needed on 101 and 1 sign needed on local road per Beach Access. Average Sign size of 3'x3', and one at 5'x3'

Assumes no Existing signs for all accesses.

Does not include costs associated with: ROW purchase, landscaping, illumination or any sign removal

Assume 11 Beach Access points needing upgrades.

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT: Install Signal for Emergency Vehicles		**REFERENCE NAME/PHONE**		**SHEET**
DESIGN LEVEL:	Conceptual	503-235-5000		1 of 1
KIND OF WORK:	Signal Installation, Annual operating costs	**LENGTH (MI.):** 0	**DATE** 4/30/2010	**NAME** CRS

Start Up Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Signal Installation	EA	$300,000	1	$300,000
2	Signing and Striping	EA	$20,000		
	SUBTOTAL				***$300,000***

Annual Operating Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Power Cost	DAY	$2		$2,080
					$0
	SUBTOTAL				***$2,080***

Contingency Costs

Start Up Costs			40%	***$420,000***
Annual Operating Costs			40%	***$2,912***

TOTAL PROJECT COST

START UP COSTS	***$420,000***
ANNUAL OPERATING COSTS	**$2,912**

Assumptions:

Signal Installation

4 Mast arm poles, 2 signal Heads per direction, wiring, pre-emption detection, installed

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improved Parking - Section Line Street	REFERENCE NAME/PHONE		SHEET
DESIGN LEVEL:	Conceptual	503-235-5000		1 of 1
KIND OF WORK:	Paving, Striping	LENGTH (MI.): 0.202	DATE 4/30/2010	NAME CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.00	$0
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.00	$0
4	New Roadway: Local Street	Lane-Mi.	$364,000	0.00	$0
5	Overlay Existing Roadway	Lane-Mi.	$192,000	0.20	$38,784
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.00	$0
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0.40	$12,800
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$51,584***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$1,300
	TP & DT	3.0-8.0%	8.0%	$4,100
	Mobilization	8.0-10.0%	10.0%	$5,200
	Erosion Control	0.5-2.0%	2.0%	$1,000
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$1,000
	TOTAL CONSTRUCTION COST			***$64,184***
	Right-of-Way	LS	ALL	1	$0
	Design Engineering			13.0%	$8,300
	Construction Engineering			10.0%	$6,400
	SUBTOTAL				***$78,884***
	Contingency Costs				
	Start Up Costs			40%	***$110,438***
	Annual Operating Costs			40%	***$0***
	TOTAL PROJECT COST				**$111,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, signing, illumination
Section Line Street -6" Overlay over Existing Aggregate and Striping
Dimensions are 105'x122' = .202 lane-miles
Added .2 miles of striping

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improved Parking - Manhattan beach	REFERENCE NAME/PHONE			SHEET
DESIGN LEVEL:	Conceptual	503-235-5000			1 of 1
KIND OF WORK:	Paving, Striping	LENGTH (MI.):	0	DATE: 4/30/2010	NAME: CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Signage per Beach Access	SF	$32	49.00	$1,568
2	Sign Post and Installation	EA	$200	3.00	$600
	SUBTOTAL				***$2,168***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$100
	TP & DT	3.0-8.0%	8.0%	$200
	Mobilization	8.0-10.0%	10.0%	$200
	Erosion Control	0.5-2.0%	2.0%	$0
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$0
	TOTAL CONSTRUCTION COST			***$2,668***
	Right-of-Way	LS	ALL	1	$0
	Design Engineering			13.0%	$300
	Construction Engineering			10.0%	$300
	SUBTOTAL				***$3,268***
	Contingency Costs				
	Start Up Costs			40%	***$4,575***
	Annual Operating Costs			40%	***$0***
	TOTAL PROJECT COST				**$5,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, illumination

Assumed 2 signs 1 each direction on 101 at 5'x4' and 1 sign on beach 3'x3'

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improved Parking - Downtown Core	REFERENCE NAME/PHONE		SHEET
DESIGN LEVEL:	Conceptual	503-235-5000		1 of 1
KIND OF WORK:	Paving, Striping	LENGTH (MI.): 0.22	DATE 4/30/2010	NAME CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.22	$161,920
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.00	$0
4	New Roadway: Local Street	Lane-Mi.	$349,000	0.33	$115,170
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.00	$0
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.00	$0
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0.20	$6,400
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$283,490***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$7,100
	TP & DT	3.0-8.0%	8.0%	$22,700
	Mobilization	8.0-10.0%	10.0%	$28,300
	Erosion Control	0.5-2.0%	2.0%	$5,700
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$6,000
	TOTAL CONSTRUCTION COST			***$353,290***
	Right-of-Way	LS / ALL	1	$0
	Design Engineering		13.0%	$45,900
	Construction Engineering		10.0%	$35,300
	SUBTOTAL			***$434,490***
	Contingency Costs			
	Start Up Costs		40%	***$608,286***
	Annual Operating Costs		40%	***$0***
	TOTAL PROJECT COST			**$609,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, signing, illumination
Downtown Core -6" AC over 14" Gravel and Striping (Full Pavement)
.12 miles to North and .1 miles to South.
Assume 1.5 lane widths
Added .2 miles of striping

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improved Parking - Pave City Parking Lot	**REFERENCE NAME/PHONE**			**SHEET**
DESIGN LEVEL:	Conceptual	503-235-5000			1 of 1
KIND OF WORK:	Paving, Stiping	**LENGTH (MI.):** 0.49		**DATE** 4/30/2010	**NAME** CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.00	$0
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.00	$0
4	New Roadway: Local Street	Lane-Mi.	$364,000	0.00	$0
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.49	$70,070
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.00	$0
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0.20	$6,400
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$76,470***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$1,900
	TP & DT	3.0-8.0%	8.0%	$6,100
	Mobilization	8.0-10.0%	10.0%	$7,600
	Erosion Control	0.5-2.0%	2.0%	$1,500
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$2,000
	TOTAL CONSTRUCTION COST			***$95,570***
	Right-of-Way	LS	ALL	1	$0
	Design Engineering			13.0%	$12,400
	Construction Engineering			10.0%	$9,600
	SUBTOTAL				***$117,570***
	Contigency Costs				
	Start Up Costs			40%	***$164,598***
	Annual Operating Costs			40%	***$0***
	TOTAL PROJECT COST				**$165,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, signing, illumination

Pave City Parking Lot -2" Overlay for Existing and Striping (Overlay)

Dimensions are 195'x160' = ..492 lane-miles

Added .2 miles of striping

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improved Parking - Proposed Parking Lot at NC Trailhead	REFERENCE NAME/PHONE			SHEET
DESIGN LEVEL:	Conceptual	503-235-5000			1 of 1
KIND OF WORK:	Paving, Striping	LENGTH (MI.):	0.12	DATE: 4/30/2010	NAME: CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.00	$0
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.00	$0
4	New Roadway: Local Street	Lane-Mi.	$364,000	0.12	$43,680
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.00	$0
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.00	$0
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0.1	$3,200
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$46,880***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$1,200
	TP & DT	3.0-8.0%	8.0%	$3,800
	Mobilization	8.0-10.0%	10.0%	$4,700
	Erosion Control	0.5-2.0%	2.0%	$900
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$1,000
	TOTAL CONSTRUCTION COST			***$58,480***
	Right-of-Way	LS	ALL	1	$0
	Design Engineering			13.0%	$7,600
	Construction Engineering			10.0%	$5,800
	SUBTOTAL				***$71,880***
	Contingency Costs				
	Start Up Costs			40%	***$100,632***
	Annual Operating Costs			40%	***$0***
	TOTAL PROJECT COST				**$101,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, signing, illumination

Proposed Parking Lot at the Nature Conservancy Trailhead (Full Pavement)

Assumed parking lot size to accommodate 20 vehicles

Dimensions are 250'x31' = .12 lane-miles

Added .1 miles of striping

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Bus Pull-out Areas	**REFERENCE NAME/PHONE**			**SHEET**
DESIGN LEVEL:	Conceptual	503-235-5000			1 of 1
KIND OF WORK:	Roadway,	**LENGTH (MI.):** 0.034		**DATE** 4/30/2010	**NAME** CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.04	$31,648
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.04	$25,499
4	New Roadway: Local Street	Lane-Mi.	$364,000	0.00	$0
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.00	$0
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.00	$0
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0	$0
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$57,147***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$1,400
	TP & DT	3.0-8.0%	8.0%	$4,600
	Mobilization	8.0-10.0%	10.0%	$5,700
	Erosion Control	0.5-2.0%	2.0%	$1,100
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$1,000
	TOTAL CONSTRUCTION COST			***$70,947***
	Right-of-Way	LS	ALL	1	$0
	Design Engineering			13.0%	$9,200
	Construction Engineering			10.0%	$7,100
	SUBTOTAL				***$87,247***
	Contingency Costs				
	Start Up Costs			40%	***$122,146***
	Annual Operating Costs			40%	***$0***
	TOTAL PROJECT COST				**$123,000**

Assumptions:

Assume bus pullout length of 60 feet each
Does not include costs associated with: ROW purchase, landscaping, signing, illumination
Assumes 15' wide pullout
Assume construction of 3 pullouts along US 101

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT: Improve Critical Railroad Crossings	**REFERENCE NAME/PHONE**		**SHEET**
DESIGN LEVEL: Conceptual	503-235-5000		1 of 1
KIND OF WORK: Striping, Signal, Paving	**LENGTH (MI.):** 0	**DATE** 4/30/2010	**NAME** CRS

Start Up Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Critical RR Crossings	EA	$23,000	10	$230,000
	SUBTOTAL				***$230,000***

Annual Operating Costs

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
	SUBTOTAL				***$0***

Contingency Costs

Start Up Costs			40%	***$322,000***
Annual Operating Costs			40%	***$0***

TOTAL PROJECT COST

START UP COSTS	***$322,000***
ANNUAL OPERATING COSTS	**$0**

Assumptions:

Critical Crossings

Does not include costs associated with: ROW purchase, landscaping, illumination

Beach Crossing - No Improvements Needed

Updating Pavement, Signage and Painting on all other crossings

Pavement update includes a grind and overlay for leveling across tracks and tie in 40' from outer rail each direction (See Tab 10B)

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE

PROJECT:	Improvements at US 101 and Beach Street	**REFERENCE NAME/PHONE**			**SHEET**
DESIGN LEVEL:	Conceptual	503-235-5000			1 of 1
KIND OF WORK:	Roadway, Striping	**LENGTH (MI.):** 0.05		**DATE** 4/30/2010	**NAME** CRS

NO.	ITEM	UNIT	UNIT COST	QUANTITY	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	$736,000	0.00	$0
2	Bike Boulevard	Day	$2,000	0.00	$0
3	New Roadway: Highway	Lane-Mi.	$593,000	0.04	$23,720
4	New Roadway: Local Street	Lane-Mi.	$364,000	0.00	$0
5	Overlay Existing Roadway	Lane-Mi.	$143,000	0.00	$0
6	Reconstruct Existing Roadway	Lane-Mi.	$622,000	0.01	$6,220
7	Embankment	CY	$10	0	$0
8	Restriping Existing Roadway	Lane-Mi.	$32,000	0.02	$640
9	Interconnect Signal	EA	$30,000	0.00	$0
10	New Signal	EA	$300,000	0.00	$0
11	Signal Modifications	EA	$60,000	0.00	$0
12	Transit Enhancements	Mi.	$106,000	0.00	$0
13	Traffic Calming	SF	$0	0%	$0
14	Illumination	Mi.	$286,000	0.00	$0
15	Landscaping	Mi.	$250,000	0.00	$0
16	Bridges	SF	$300	0	$0
17	Seismic Retrofit Bridges	SF	$50	0	$0
18	Walls	SF	$70	0	$0
	SUBTOTAL				***$30,580***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Construction Surveying	1.0-2.5%	2.5%	$800
	TP & DT	3.0-8.0%	8.0%	$2,400
	Mobilization	8.0-10.0%	10.0%	$3,100
	Erosion Control	0.5-2.0%	2.0%	$600
	Contingency		0.0%	$0
	Escalation (per year)		2.0%	
	-Estimate Year		2009	
	-Construction Year		2010	$1,000
	TOTAL CONSTRUCTION COST			***$38,480***
	Right-of-Way	LS / ALL	1	$0
	Design Engineering		13.0%	$5,000
	Construction Engineering		10.0%	$3,800
	SUBTOTAL			***$47,280***
	Contingency Costs			
	Start Up Costs		40%	***$66,192***
	Annual Operating Costs		40%	***$0***
	TOTAL PROJECT COST			**$67,000**

Assumptions:

Does not include costs associated with: ROW purchase, landscaping, signing, illumination or railroad treatment

Assumes 12' wide turn lane

Assume 200' of New roadway for SB

Assumed 50' of reconstruct for EB

APPENDIX E

PLAN AND CODE AMENDMENTS

Appendix E: Plan and Code Amendments

Rockaway Beach Transportation Plan: Findings of Comprehensive Plan Consistency; Recommended Amendments to Comprehensive Plan

PREPARED FOR: Rockaway Beach Transportation Plan Project Management Team

PREPARED BY: Michael Hoffmann, CH2M HILL

COPIES: Theresa Carr, CH2M HILL

DATE: April 5, 2010

This memorandum provides findings regarding the consistency of the Rockaway Beach Transportation Plan recommendations (as presented in *Draft Technical Memorandum 3: Preliminary Transportation Improvement Recommendations)* with the policies of the Rockaway Beach Comprehensive Plan. This memorandum also identifies recommended amendments to the comprehensive plan to support proposed improvements.

This memorandum will be used in a staff report presented in June 2010 to the Rockaway Beach City Council. The staff report will support the adoption of the Rockaway Beach Transportation Plan into the comprehensive plan. This memorandum has been prepared to address Task 4.1.b of the Rockaway Beach Transportation Plan scope of work.

*****

The Rockaway Beach Transportation Plan should be adopted into the comprehensive plan by reference by amending the existing comprehensive plan to add Transportation Element/Circulation Policy 11 as follows:

11. *The Rockaway Beach Transportation Plan is adopted by reference and incorporated into the comprehensive plan* [insert ordinance number and date of adoption into the comprehensive plan].

Findings and Recommendations per Proposed Improvement Concepts

Note: all page numbers referenced below are from the City of Rockaway Beach Comprehensive Plan (as amended by Ordinance 08-01). Recommended amendment language is provided in italics.

Proposed Concept #1: Extend Necarney Avenue

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by existing Economy Policy 3(C) [p.9].

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Circulation Policy 12:

12. Alternate north-south routes to US 101 should be planned and constructed for local vehicle, bicycle, and pedestrian travel.

Proposed Concept #2: Improve Miller Street

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by existing Economy Policy 3(C) [p.9].

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Circulation Policy 12 (described earlier with respect to Proposed Concept #1).

Proposed Concept #3: Improve Beach Access

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by the following existing policies: Coastal Shorelands Policy 4 [p.19]; Transportation Element/Special Transportation Needs Policy 3 [p.40]; and Parks and Recreation Policies 2 and 3 [p.42].

Recommended Amendment Language to Support/Further Support Proposed Improvement

No amendment language recommended.

Proposed Concept #4: Construct Recreational Trails Around Lakes

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by the following existing policies: Economy Policy 3(C) [p.9]; Parks and Recreation Policies 10 and 11 [p.43].

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Special Area Wetlands Zone Policy 7:

7. Recreational trails/boardwalks should be installed along the perimeter of Lake Lytle to provide recreational benefits for residents and visitors. Trails/boardwalks in wetlands areas should be constructed in accordance with the standards described in the City's Street and Transportation System Standards.

[Note: providing standards for wetland trails/boardwalks is recommended in the *Rockaway Beach Transportation Plan: Subdivision and Zoning Ordinances Assessment* Memorandum].

Proposed Concept #5: Improve Priority Highway Crossings

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by existing Transportation Element/Special Transportation Needs Policy 2 [p.40]

Recommended Amendment Language to Support Proposed Improvement

No amendment language recommended.

Proposed Concept #6: Install Signal for Emergency Vehicles

Finding

- Proposed improvement does not conflict with comprehensive plan; however, it is not explicitly supported by a Transportation Element Policy.

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Circulation Policy 13:

13. The design and construction of modifications to the transportation system should consider the needs of emergency response vehicles

Proposed Concept #7: Improved Parking

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by the following existing policies: Economy Policy 3(B) [p.9]; Land Use/Downtown Commercial Area Policy 1 [p.23]; Transportation Element/Circulation Policy 10(B) [p.40].

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Parking Policy 1:

1. The City should improve, maintain, and extend (as necessary), existing parking lots through the installation of improved pavement, striping, signage and accommodations for recreational vehicles (RV's).

Add Transportation Element/Parking Policy 2:

2. The City's Zoning Ordinance should be amended to establish minimum and maximum off-street parking requirements for vacation dwelling units.

[Note: the City could also consider adding a Policy to each of the residential districts discussed in the comprehensive plan [pp. 21-27] that would read in a manner similar to that which follows:

Minimum and maximum off street parking requirements should be adopted to reduce the presence of overflow vehicles in waysides, parking lots, and public streets.

Alternately, the City could revise comprehensive plan to provide general land use policies, to which the above recommended policy could be added (currently, the land use policies in the comprehensive plan are categorized according to respective zoning districts).

Proposed Concept #8: Pedestrian Connectivity

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by existing Transportation Element/Circulation Policy 1 [p.39].

Recommended Amendment Language to Support/Further Support Proposed Improvement

No amendment language recommended.

Proposed Concept #9: Bus Pull-out Areas

Finding

- Proposed improvement does not conflict with comprehensive plan; however, it is not explicitly supported by a Transportation Element Policy.

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Circulation Policy 14:

14. Install bus pull-out areas along US 101 to both better serve Tillamook County Transportation District and school bus riders and allow traffic to safely pass buses that are picking up/dropping off passengers.

Proposed Concept #10: Improve Critical Railroad Crossings

Finding

- Proposed improvement does not conflict with comprehensive plan; however, it is not explicitly supported by a Transportation Element Policy.

Recommended Amendment Language to Support/Further Support Proposed Improvement

Add Transportation Element/Circulation Policy 15:

15. Improve rail/road crossings at critical crossing locations to improve safety and circulation conditions for vehicles, bicyclists, pedestrians, recreational vehicles (RV's), and wheelchair users.

Proposed Concept #11: Right-Turn Lane at US 101 and Beach Street

Finding

- Proposed improvement does not conflict with comprehensive plan.
- Proposed improvement is supported by existing Transportation Element/Circulation Policy 10 [p.40].

Recommended Amendment Language to Support/Further Support Proposed Improvement

No amendment language recommended.

Rockaway Beach Transportation Plan: Subdivision & Zoning Ordinances Assessment

PREPARED FOR: Rockaway Beach Transportation Plan Project Management Team

PREPARED BY: Michael Hoffmann, CH2M HILL

COPIES: Theresa Carr, CH2M HILL

DATE: April 5, 2010

This memorandum identifies and summarizes recommended code changes to the City of Rockaway Beach Subdivision and Zoning Ordinances to support implementation of preliminary transportation improvement recommendations developed for the Rockaway Beach Transportation Plan (as presented in *Draft Technical Memorandum 3*). Recommended code language was created in accordance with the *Model Development Code & User's Guide for Small Cities*[7].

This memorandum has been prepared to address Task 4.1.b of the Rockaway Beach Transportation Plan scope of work.

Recommendations per Proposed Improvement Concepts

Existing Rockaway Beach code language appears in plain text. Recommended additions to Rockaway Breach code are shown in underline format. Recommended deletions to Rockaway Breach code are shown in ~~strikeout format~~.

Proposed Concept #1: Extend Necarney Avenue

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #2: Improve Miller Street

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

The proposed improvement to Miller Street is intended to result in Miller Street's designation and use as a "bicycle boulevard". Assuming that Miller Street (and potentially other City streets in the future) is designated a "bicycle boulevard" in the City's Transportation Plan, the following is recommended to provide guidance to future development. The below recommendations additionally provide bicycle facility standards for differing general functional classifications.

Revised language is also recommended for the beginning of Section 33.

Section 33 ~~Streets~~ Transportation System.

[7] *Model Development Code & User's Guide for Small Cities, 2nd Edition,* Oregon Department of Land Conservation and Development, 2005

All transportation elements shall be in conformance with Sections 33 through 46 of this ordinance and City Street and Transportation System Standards.

...

(15) Bicycle Facilities. Bicycle facilities shall be installed in conformance with the table below, City Street and Transportation System Standards, applicable provisions of City's Transportation Plan, and the Comprehensive Plan.

Street Type	***Required Bicycle Facility***
Arterials	2 striped bike lanes at 6'
Collectors	2 clear shoulder areas at 6'
Local Streets	none
Bicycle Boulevard	none; consider traffic calming measures'

*****

The City may also consider implementing bicycle parking requirements in its commercial zone.

Recommended Revisions to the Rockaway Beach Zoning Ordinance

Section 4.065. ~~Street~~ Transportation System and Drainage Standards. At the time any new structure is erected, or an owner or developer wishes to develop any platted street in the City, they shall comply with the City's street and drainage standards:

(1) Street and road construction shall provide for drainage and shall not be diverted so as to create a drainage problem for other property owners.

(2) All driveways or entrances must include a culvert at the expense of the owner of sufficient size to handle drainage and storm runoff.

(3) Streets shall be constructed to meet all applicable City standards. (See Figures A, B, and C.)
A)..... Typical cross section for lanes.
B)..... Typical cross section for residential streets.
C)..... Typical cross section for primary collectors.

(4) Bicycle facilities shall be installed in conformance with the table below, City Street and Transportation System Standards, applicable provisions of City's Transportation Plan, and the Comprehensive Plan.

Street Type	***Required Bicycle Facility***
Arterials	2 striped bike lanes at 6'
Collectors	2 clear shoulder areas at 6'

Street Type	***Required Bicycle Facility***
Local Streets	none
Bicycle Boulevard	none; consider traffic calming measures'

~~(4)~~ (5) The Public Works Superintendent may waive or reduce paving requirements where he or she determines that proposed development and future use of a street right of way will be limited by topography, growth potential or other limiting factors.

~~(5)~~ (6) Stormwater drainage shall be directed to a system approved by the City Public Works Supervisor.

~~(6)~~ (7) Any stormwater drainage system shall be designed to prevent erosion of soils and to minimize the impact of stormwater on adjacent properties. Where any stormwater swale is vegetated, landscaping with native vegetation is encouraged.

*****

The City may also consider implementing bicycle parking requirements in its commercial zone.

Proposed Concept #3: Improve Beach Access

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #4: Construct Recreational Trails Around Lakes

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

Section 33 ~~Streets~~ Transportation System.

...

(16) Recreational Trails. The City may require the installation of recreational trails in areas designated for this use in the City's Transportation Plan. In cases where recreational trails are require, they shall be installed in conformance with the City Street and Transportation System Standards, applicable provisions of City's Transportation Plan, and the Comprehensive Plan.

*****

The City could either describe recreational trail/boardwalk standards in the Transportation Plan, the City Street and Transportation System Standards, or both. An example of a wetland boardwalk construction guide, with accompanying design layout from Carlton County, Minnesota, is provided in Attachment A of this memorandum.

Recommended Revisions to the Rockaway Beach Zoning Ordinance

Section 4.065. ~~Street~~ Transportation System and Drainage Standards.

...

(8) The City may require the installation of recreational trails in areas designated for this use in the City's Transportation Plan. In cases where recreational trails are required, they shall be installed in conformance with the City Street and Transportation System Standards, applicable provisions of City's Transportation Plan, and the Comprehensive Plan.

*****

The City could either describe recreational trail/boardwalk standards in the Transportation Plan, the City Street and Transportation System Standards, or both. An example of a wetland boardwalk construction guide, with accompanying design layout, is provided in Attachment A of this memorandum.

Proposed Concept #5: Improve Priority Highway Crossings

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #6: Install Signal for Emergency Vehicles

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #7: Improved Parking

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

No recommended revisions to the Subdivision Ordinance.

Recommended Revisions to the Rockaway Beach Zoning Ordinance

Recommendations to two sections of the Zoning Ordinance are recommended (Section 1.030 – Definitions and Section 4.060 – Off Street Parking and Off-Street Loading Requirements)

Section 1.030. Definitions. As used in this ordinance the following words and phrases shall mean:

...

(66) **Vacation Rental Dwelling.** Residential uses wherein: 1) dwelling is not owner-occupied, and; 2) dwelling is rented to outside parties for short-term, seasonal periods without the performance of a legal lease agreement.

~~(67)~~ (68) **Wetlands**. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.
[Added by Ordinance #277, August 28, 1990]

~~(68)~~ (69) **Yard.** An open space on a lot which is unobstructed from the ground upward except as otherwise provided in this ordinance.

~~(69)~~ (70) **Yard, Front.** A yard between side lot lines and measured horizontally at right angles to the front lot line from the front lot line to the nearest point of a building or other structure. Any yard meeting this definition and abutting a street shall be considered a front yard.

~~(70)~~ (71) **Yard, Rear.** A yard between side lot lines and measured horizontally at right angles to the rear lot line to the nearest point of a building or other structure.

~~(71)~~ (72) **Yard, Side.** A yard between the front and rear yard measured horizontally at right angles from the side lot line to the nearest point of a building or other structure.

~~(72)~~ (73) **Yard, Street Side.** A yard adjacent to a street between the front yard and rear lot line measured horizontally and at right angles from the side lot line to the nearest point of a building or other structure.

*****

Section 4.060. Off-Street Parking and Off-Street Loading Requirements. At the time a new structure is erected, or the use of an existing structure is enlarged, off-street parking spaces, loading spaces, and access thereto shall be provided as set forth in this section, unless greater requirements are otherwise established.

...

(18) Off-Street Parking Space Requirements.

(a) Dwelling..... Two spaces per dwelling unit.

(b) Vacation Rental Dwelling.....Minimum: one space per bedroom.
Maximum: four spaces per dwelling.

~~(b)~~ (c) Motel, hotel, inn..... One and one-quarter spaces for guest cottage,..... each guest accommodation plus or rooming house..... two spaces for any manager's ..... dwelling.

~~(c)~~ (d) Hospital, nursing..... One space for each three beds home..... plus one space for each employee.*

~~(d)~~ (e) Church, club, or..... One space for each six seats, similar place of..... or one space for each 50 sq. assembly..... ft. of floor space.

~~(e)~~ (f) Library..... One space for each 400 sq. ft. 44 ..... of floor area plus one space ..... for each employee.*

~~(f)~~ (g) Dance hall, skating..... One space for each 500 sq. ft. rink or similar use..... of dance floor or skating area ..... plus one space for each employee

~~(g)~~ (h) Bowling alley..... Two spaces for each alley plus ..... one space for each employee.*

~~(h)~~ (i) Retail store,..... One space for each 400 sq. ft. eating or drinking..... of floor area, plus one space establishment..... for each employee.* [Amended by ..... Ordinance #235, June 25, 1985]

~~(i)~~ (j) Service or repair..... One space for each 600 sq. ft. shop, retail store..... of floor area plus one space handling bulky..... for each employee.* merchandise

~~(j)~~ (k) Bank or office..... One space for each 600 sq. ft. (not medical or..... of floor area plus one space dental)..... for each employee.*

~~(k)~~ (l) Medical or dental..... One space for each 300 sq. ft. clinic..... of floor area plus one space ..... for each employee.

~~(l)~~ (m) Schools (grades..... One space per employee plus 1-9)..... adequate parking for busses ..... kept on premises.

~~(m)~~ (n) Schools (grades..... One space for each employee 10-12)..... plus one space for each four ..... students.

~~(n)~~ (o) Manufacturing uses,..... One space for each employee on 45 testing, research,..... largest shift, plus visitor processing, or..... parking as may be determined assembly..... by the Planning Commission.

Proposed Concept #8: Pedestrian Connectivity

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

No recommended revisions to the Subdivision Ordinance.

Recommended Revisions to the Rockaway Beach Zoning Ordinance

Section 4.069. Pedestrian Access and Circulation.

(1) Site Layout and Design. To ensure safe, direct, and convenient pedestrian circulation, all developments, except single-family detached housing (i.e., on individual lots), shall provide a continuous pedestrian system. The pedestrian system shall be based on the standards in subsections (a) through (c), below:

(a) Continuous Walkway System. The pedestrian walkway system shall extend throughout the development site and connect to all future phases of development, and to existing or planned off-site adjacent trails, public parks, and open space areas to the greatest extent practicable.

(b) Safe, Direct, and Convenient. Walkways within developments shall provide safe, reasonably direct, and convenient connections between primary building entrances and all adjacent streets, based on the following definitions:

i. Reasonably direct. A route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.

ii. Safe and convenient. Routes that are reasonably free from hazards and provide a reasonably direct route of travel between destinations.

iii. "Primary entrance" for commercial, industrial, mixed use, public, and institutional buildings is the main public entrance to the building. In the case where no public entrance exists, street connections shall be provided to the main employee entrance.

iv. "Primary entrance" for residential buildings is the front door (i.e., facing the street). For multifamily buildings in which each unit does not have its own exterior entrance, the "primary entrance" may be a lobby, courtyard, or breezeway which serves as a common entrance for more than one dwelling.

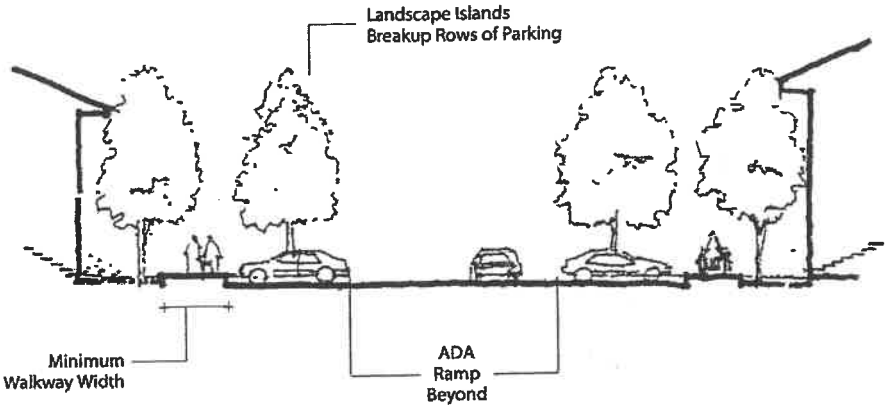
(c) Connections Within Development. Connections within developments shall be provided as required in subsections a-c, below:

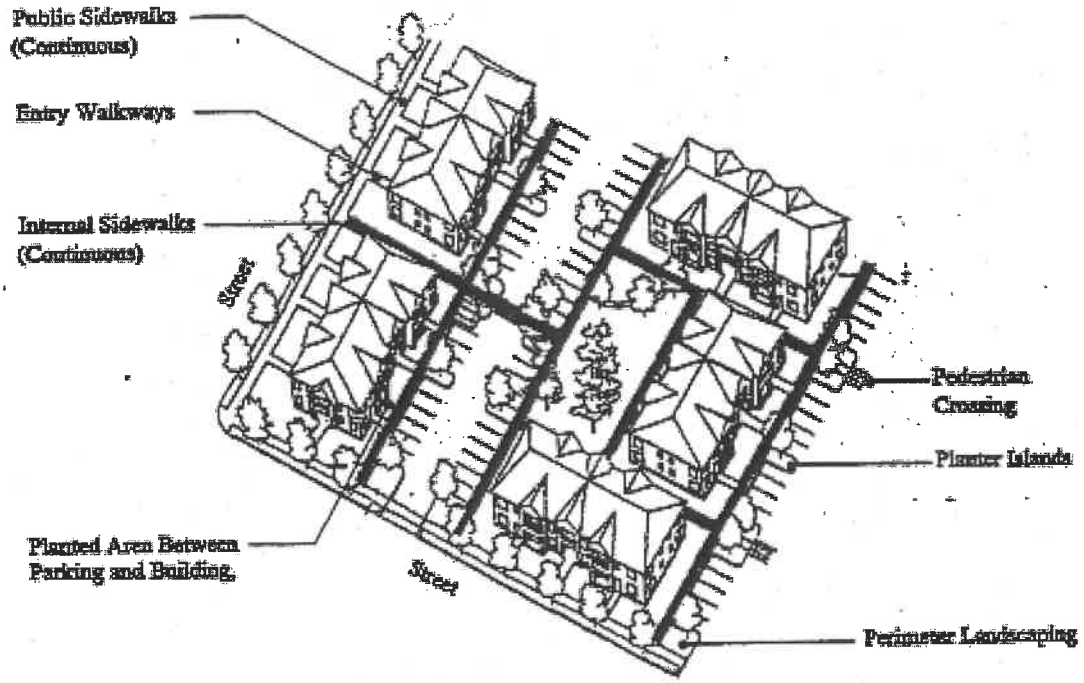
i. Walkways shall connect all building entrances to one another to the extent practicable, as generally shown in Figure 4.069-1;

ii. Walkways shall connect all on-site parking areas, storage areas, recreational facilities and common areas, and shall connect off-site adjacent uses to the site to the extent practicable. Topographic or existing development constraints may be cause for not making certain walkway connections, as generally shown in Figure 4.069-1; and

iii. Large parking areas shall be broken up so that no contiguous parking area exceeds three (3) acres. Parking areas may be broken up with plazas, large landscape areas with pedestrian access ways (*i.e.*, at least 20 feet total width), streets, or driveways with street-like features. Street-like features, for the purpose of this section, means a raised sidewalk of at least 4-feet in width, 6-inch curb, accessible curb ramps, street trees in planter strips or tree wells, and pedestrian-oriented lighting.

Figure 4.069-1 Pedestrian Pathway System (Typical)





(2). Walkway Design and Construction. Walkways, including those provided with pedestrian access ways, shall conform to all of the standards in subsections (a) through (d), as generally illustrated in Figure 4.069-2:

(a) Vehicle/Walkway Separation. Except for crosswalks, where a walkway abuts a driveway or street, it shall be raised 6 inches and curbed along the edge of the driveway/street. Alternatively, the decision body may approve a walkway abutting a driveway at the same grade as the driveway if the walkway is protected from all vehicle maneuvering areas. An example of such protection is a row of decorative metal or concrete bollards designed for withstand a vehicle's impact, with adequate minimum spacing between them to protect pedestrians.

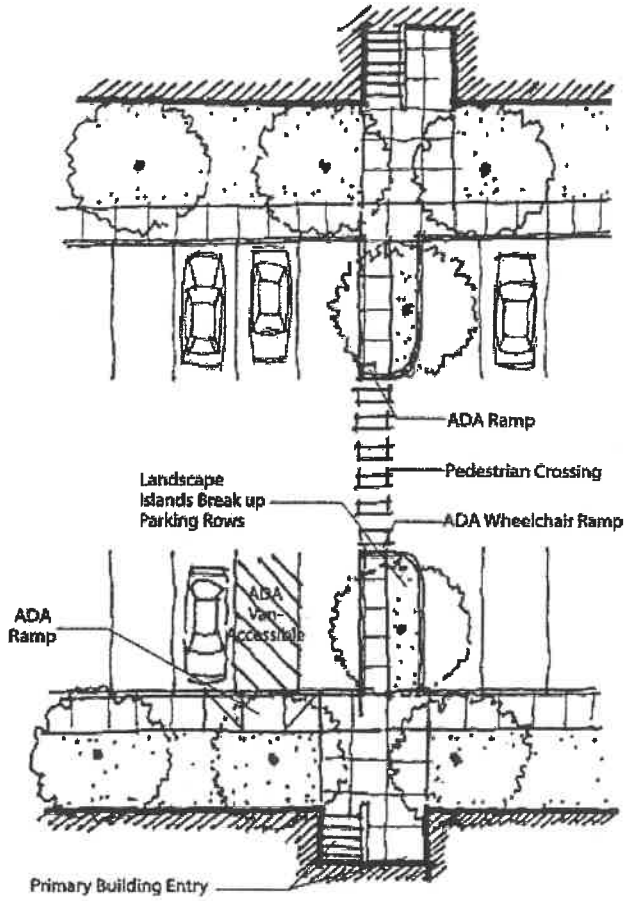
(b) Crosswalks. Where walkways cross a parking area, driveway, or street ("crosswalk"), they shall be clearly marked with contrasting paving materials (*e.g.*, light-color concrete inlay between

asphalt), which may be part of a raised/hump crossing area. Painted or thermo-plastic striping and similar types of non-permanent applications may be approved for crosswalks not exceeding 24 feet in length.

(c) Walkway Width and Surface. Walkway and accessway surfaces shall be concrete, asphalt, brick/masonry pavers, or other durable surface, as approved by the City Engineer, at least six (6) feet wide. Multi-use paths (i.e., for bicycles and pedestrians) shall be concrete or asphalt, at least 10 feet wide.

(d) Accessible routes. Walkways shall comply with applicable Americans with Disabilities Act (ADA) requirements. The ends of all raised walkways, where the walkway intersects a driveway or street shall provide ramps that are ADA accessible, and walkways shall provide direct routes to primary building entrances.

Figure 4.069-2 Pedestrian Walkway Detail (Typical)



Proposed Concept #9: Bus Pull-out Areas

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #10: Improve Critical Railroad Crossings

No recommended revisions to Subdivision or Zoning Ordinance.

Proposed Concept #11: Right-Turn Lane at US 101 and Beach Street

No recommended revisions to Subdivision or Zoning Ordinance.

General Recommendation

For the purpose of having a process for coordinated review of future land use decisions affecting City transportation facilities, the following amendments are recommended.

Recommended Revisions to the Rockaway Beach Subdivision Ordinance

Section 18 Minimum Standards [Major Land Partition]

...

(2) The City shall review the submitted tentative partition plan to determine whether the application is complete. Upon review of tentative partition plan by City staff, the City may require a traffic impact analysis (TIA) prepared by a qualified professional to determine access, circulation, and other

transportation requirements. If determined necessary, the applicant shall submit a TIA as part of the application.

If the application is compete, a public hearing before the Planning Commission shall be scheduled. If the application is incomplete, the applicant will be informed of the additional information that is required. Upon submission of the information, a public hearing shall be scheduled.

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Section 27 Procedure for Review [Minor Land Partition]

(2) The City shall review the submitted tentative partition plan to determine its conformity with the minimum standards of Section 28. The City Recorder shall coordinate his review with county, state, and federal agencies and special districts that may have an interest in the partition.

Upon review of tentative partition plan by City staff, the City may require a traffic impact analysis (TIA) prepared by a qualified professional to determine access, circulation, and other transportation requirements. If determined necessary, the applicant shall submit a TIA as part of the application.

*****

Recommended Revisions to the Rockaway Beach Zoning Ordinance

Section 4.067 Traffic Impact Study Requirements

The City may require a traffic impact analysis (TIA) prepared by a qualified professional to determine access, circulation, and other transportation requirements in conformance with TIA results. TIA's shall be required for all uses that will generate more than 50 AM or PM peak hour trips per day or 300 Average Daily Trips. Trip calculation shall be based upon the most recent edition of *Trip Generation* published by the Institute of Transportation Engineers

(A) *Amendments That Affect Transportation Facilities.* Amendments to the comprehensive plan and land use regulations which significantly affect a transportation facility as determined by City staff upon review of applicant's TIA shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility. This shall be accomplished by one of the following:

(1) Adopting measures that demonstrate that allowed land uses are consistent with the planned function of the transportation facility; or

(2) Amending the Comprehensive Plan to provide transportation facilities, improvements, or services adequate to support the proposed land uses; such amendments shall include a funding plan to ensure the facility, improvement, or service will be provided by the end of the planning period; or,

(3) Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes of transportation; or

(4) Amending the planned function, capacity or performance standards of the transportation facility; or

(5) Providing other measures as a condition of development or through a development agreement or similar funding method, specifying when such measures will be provided.

(B) *Review of Applications for Effect on Transportation Facilities.* When a development application includes a proposed comprehensive plan amendment or land use district change, the proposal shall be reviewed to determine whether it significantly affects a transportation facility. "Significant", as determined by City staff, in coordination with ODOT as necessary, means the proposal would:

(1) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors). This would occur, for example, when a proposal causes future traffic to exceed the levels associated with a "collector" street classification, requiring a change in the classification to an "arterial" street, as identified by Rockaway Beach Transportation System Plan; or

(2) Change the standards implementing a functional classification system; or

(3) Allow types or levels of land use that would result in levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility; or

(4) Reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the City of Rockaway Beach Transportation Plan; or

(5) Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the City of Rockaway Beach Transportation Plan.

Attachments

A. Standards for Wetland Crossing Boardwalks (Carlton County, MN)

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[i] Complete assumptions and inclusions in cost estimates for all facility types can be found at the end of this document.
[ii] Sidewalk estimates include half the cost of drainage, which consists of a sewer pipe and storm manholes running the length of the roadway in the center.