

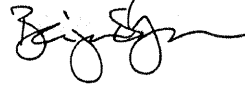
# MEMORANDUM

CITY/BOROUGH OF JUNEAU  
155 South Seward Street, Juneau, Alaska 99801

**DATE:** June 4, 2013

**TO:** Planning Commission

**FROM:** Ben Lyman, Senior Planner  
Community Development Department



**FILE NO.:** CSP2013 0008

**PROPOSAL:** Pavement rehabilitation on Riverside Dr. from Egan Dr. to James Blvd. Sidewalks will be added to both sides from Egan to Mall Rd. Drainage improvements to include installation of curb and gutter. Constructed on behalf of CBJ utilizing FHWA NHS Funds.

## GENERAL INFORMATION

**Applicant:** State of Alaska

**Property Owner:** City and Borough of Juneau

**Property Address:** Riverside Drive, Egan Drive to James Blvd

**Legal Description:** N/A

**Parcel Code No.:** 0

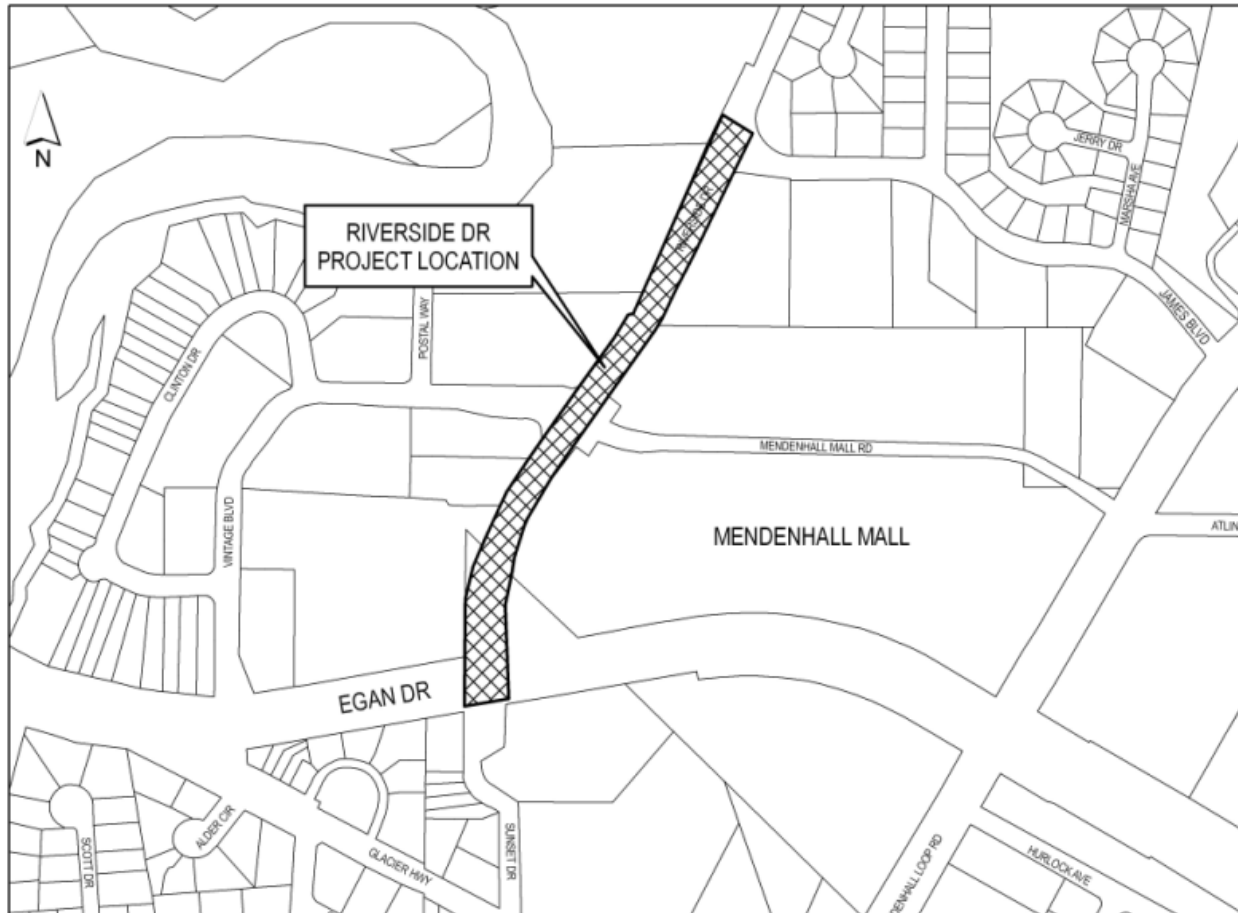
**Site Size:** Length of Project: 0.3 Miles  
Width of Resurfacing: 37 ft. to 100 ft.

**Comprehensive Plan Future  
Land Use Designation:** Mixed Use

**Zoning:** Collector Road  
Adjacent at north end - D18  
Adjacent to remainder - LC

**Existing Land Use:** Collector Road

Surrounding Land Use:      North - Residential  
   South - Residential  
   East - Commercial – Mendenhall Mall  
   West - Commercial – Vintage Business Park



## **ATTACHMENTS**

- Attachment A – Application
- Attachment B – Signing and Striping Plan
- Attachment C – Pages 1-5 of the January 6, 2010 memorandum on USE2009-00051
- Attachment D – Notice of Decision for USE2009-00051
- Attachment E – Rectangular Rapid Flash Beacon (RRFB) Summary by U.S. Department of Transportation, Federal Highway Administration
- Attachment F – American Association of State Highway and Transportation Officials *Guide for the Development of Bicycle Facilities*, 2012, pages 4-24 and 4-25

## **BACKGROUND**

The State of Alaska Department of Transportation and Public Facilities (DOT&PF) proposes to rehabilitate the pavement of the southernmost portion of Riverside Drive, with related improvements to drainage and the addition of sidewalks in part of the project. Riverside Drive is a city street, but is on the National Highway System (NHS), and DOT&PF proposes to use Federal Highway Administration (FHWA) NHS funding for the project. The CBJ is providing a local match for the project. The project area extends from the Riverside Drive intersection with Egan Drive north to include the intersection of Riverside Drive and James Boulevard.

Planning Commission review of Alaska Capital Improvement Projects, and recommendation regarding project consistency with CBJ 49 and adopted plans, is required under CBJ 49.15.580 and AS 35.30.010, which provide for the imposition of conditions on and modifications to such projects.

Riverside Drive, a Collector street, had an average daily traffic (ADT) count of 13,217 in 2011, down 301 trips per day from 2010, between Egan Drive and Mendenhall Mall Access Road/Vintage Boulevard. The traffic load is much lower on the northern portion of the project, from Mendenhall Mall Access Road/Vintage Boulevard to James Boulevard, where the 2011 ADT of 8,912 is down from the 2010 ADT of 9,115.

There is an existing separated path which parallels Riverside Drive behind Safeway at the southwest of the project, and a sidewalk or separated path north of Vintage Boulevard that continues north out of the project area. Pedestrian-activated signals facilitate crossing movements at the Egan Drive and Mendenhall Mall Access Road/Vintage Boulevard intersections with Riverside Drive, but aside from paved shoulders and the aforementioned path behind Safeway, there are no other pedestrian amenities or non-motorized routes in the southern portion of the project, which creates a gap in the non-motorized transportation network.

The proposed project would construct sidewalks on both sides of Riverside Drive from Egan Drive to the Mendenhall Mall Access Road/Vintage Boulevard intersection, and would formalize the designation of the paved shoulders as bicycle lanes. No changes to the Riverside Drive intersection with Egan Drive are proposed as part of this project.

The project area includes the intersection of James Boulevard and Riverside Drive, which is subject to Condition 5 of USE2003-00055 as amended by USE2009-00051. Included with this memorandum as Attachments C and D, the staff report and Notice of Decision on USE2009-00051 require that a "pedestrian-activated crosswalk warning system" be installed at this intersection in conjunction with the proposed project. CBJ Engineering Department and DOT&PF project staff have selected the Rectangular Rapid Flash Beacon (Attachment E) for installation at this location as part of the proposed project; this warning system was selected after the project drawings (Attachment B) were submitted for review, so they do not show the details of this warning system.

According to data collected by the Juneau Police Department, there were two collisions in the project area between motor vehicles and bicycles or pedestrians in the 1999-2011 period. Both of these collisions occurred at the Vintage Boulevard/Mendenhall Mall Road intersection with Riverside Drive, and both resulted in injuries to the bicyclist involved (2000 and 2004).

### **ANALYSIS**

The proposed project would resurface the pavement in the project area, as well as adding sidewalks to both sides of the road from Egan Drive to the Mendenhall Mall Access Road/Vintage Boulevard intersection and making drainage improvements.

Although no bicycles or pedestrians are permitted on Egan Drive to the east of its intersection with Riverside Drive, this intersection is accessed by a foot path from the south that connects from Sunset Drive. The proposed sidewalks will improve the pedestrian connection between the residential area to the south and the commercial area and transit stops to the north.

Bicycle lanes currently exist and are clearly marked with appropriate signage along Riverside Drive north of the project area and along both sides of Riverside Drive between Mendenhall Mall Road and James Boulevard; the proposed project would not modify the bicycle lane width, however, re-striping over the years has resulted in the unintentional and sub-standard width of the painted bicycle lane just north of Vintage Boulevard (west side of Riverside Drive); this painted pinch will be eliminated and the bicycle lane re-striped to meet the minimum five-foot standard width requirement for bicycle lanes set by AASHTO (American Association of State Highway and Transportation Officials)(Attachment B, sheets R2 and R3). Dedicated bicycle route connections to the separated paths running along the north side of Egan Drive would not be provided, but the shoulder of Riverside Drive can be used by bicycles, and bicycles are legally able to ride in traffic on Riverside Drive. Access to the separated paths on the north side of Egan from the shoulders would be through the newly constructed pedestrian ramps at the intersection of Riverside Drive and Egan Drive. As the land on either side of this portion of the corridor is in commercial use, bicycles will be prohibited from riding on the new sidewalks between Egan Drive and Vintage Boulevard/Mendenhall Mall Road (CBJ 72.02.400(f), CBJ 72.02.487(b), and 13 AAC 02.400(g)). The plans submitted for the intersection of Riverside Drive/Mendenhall Mall Road/Vintage Boulevard show pedestrian refuge islands located where they obstruct the through-bicycle lane; in this plan, bicyclists traversing this intersection would either need to ride with traffic or dismount and use crosswalks to navigate the intersection. This intersection treatment is not consistent with the American Association of State Highway and Transportation Officials *Guide for the Development of Bicycle Facilities* (2012), which calls for continuing bicycle lanes through intersections with the right-turn lane on the right of the through-bicycle lane (Attachment F). This inconsistency was brought up with the DOT&PF Project Manager, Keith Karpstein, who agreed that the proposed intersection configuration was not appropriate considering the bicycle lanes to the north and south of the intersection. Mr. Karpstein stated (phone message June 4, 2013) that the configuration shown on the striping plans reflected

existing conditions, and that the configuration of the intersection and its striping plan would be amended to provide for through-bicycle lanes. Since plans showing this modification to the project have not been drafted or submitted for review, staff recommends that a condition be placed on the finding of concurrence requiring that the intersection be revised according to the designs shown in Attachment F.

### **CONFORMITY WITH ADOPTED PLANS**

The *Comprehensive Plan of the City and Borough of Juneau*, 2008 Update, contains several Implementing Actions (IAs) that are directly applicable to the proposed project:

8.3.IA11      Require sidewalks and bicycle paths or lanes along newly constructed arterial and collector streets where appropriate, and provide or work with DOT to provide such amenities along existing roads to provide safe and efficient access and recreation and to reduce pedestrian/automobile conflicts.

8.2.IA2      Work with the Alaska Department of Transportation/Public Facilities (DOT) to construct sidewalks and/or separated paths, or where these are not practical, a wide shoulder of at least 36" along roads that lack such improvements, with a priority given to those corridors which have Average Annual Daily Traffic (AADT) of 4000 vehicles or more...

As the project area, a collector street, has average daily traffic counts of between 8,912 and 13,217, and sidewalks are not provided along the busiest (most southerly) portion of the project area, the proposed project is in conformance with these IAs.

The project area is within Subarea 4 of the *Comprehensive Plan*; several Guidelines and Considerations for this subarea apply to the project:

8.      Expand the Mixed Use District in the Mendenhall Mall vicinity that would incorporate general commercial uses, high density residential use and public transit services. Make the most efficient use of parking by incorporating housing over a garage with retail shops wrapping around the ground floor. Student or senior housing within the Mall or over the garage should not be required to provide parking spaces.
9.      Consider the transportation improvements for this subarea discussed in Chapter 8 of this Plan and provide for pedestrian and bicycle access to schools, parks and shopping areas.

...improved capacity of the transportation system will be needed to focus on medium-to-high density residential, commercial and employment centers that can be largely serviced by public transit.

Although the Guidelines and Considerations above mention transit more frequently than walking, it is important to note that walking is the most basic form of transportation that humans engage in, and that all trips begin and end as pedestrians (wheelchair users are also considered pedestrians). Thus, a dense, mixed-use development that is transit-oriented and that has lower parking requirements demands a robust non-motorized transportation network (sidewalks and bicycle lanes) to function. Accordingly, the proposed project is in conformance with these Guidelines and Considerations.

The *Non-Motorized Transportation Plan* does not include any proposed priority improvements within the project area: although the Riverside Drive/Egan Drive intersection is called out as improvement No. 29, the intersection itself is not within the project area.

Policy 6 of the *Non-Motorized Transportation Plan*, Establish a bicycle/pedestrian education and signage program, and its Implementing Action 6D relate to the proposed project:

Select signs that meet applicable standards and consistently install them at intersections, bike lanes, shoulder lanes, separated paths and crosswalks.

The project is not currently proposed to include any bicycle route signage other than pavement markings within the bike lanes north of Vintage Boulevard/Mendenhall Mall Road. Pavement markings become difficult to see if they are not maintained regularly, with snow and gravel removed from them and new paint applied as needed. The *Non-Motorized Transportation Plan* includes Design Standards for paved shoulder lanes (6.3) that state that “where [paved shoulder lanes] are part of the community bike route system, they should have appropriate bike route signage.” Although the project area is not part of the Cross-Juneau Bikeway designated in the *Non-Motorized Transportation Plan*, the short section of the project between Vintage Boulevard/Mendenhall Mall Road and Egan Drive is a critical connection between the designated Cross-Juneau Bikeway along Egan Drive and the existing and proposed bike lanes on Riverside Drive. Bicycle way finding and route signage consistent with the Manual on Uniform Traffic Control Devices, as amended by the DOT&PF, should be installed throughout the project area so as to convey the presence of the shoulders and bike lanes when pavement markings are obscured.

With a condition that appropriate bicycle and pedestrian way finding and route signs are installed throughout the project area, the proposed project is in conformance with the *Non-Motorized Transportation Plan*.

The *Area-Wide Transportation Plan* refers to the Riverside Drive corridor in Priority Solution No. 46, a near-term project, which states in part:

“...Maintain existing bicycle lane striping...Develop strong pedestrian connections from neighborhoods to Dimond Park area and the retail areas to the south...”

The proposed project is in conformance with the *Area-Wide Transportation Plan*.

### **HABITAT**

The proposed project is not anticipated to impact any habitats, as there are no wetland units within or adjacent to the project area mapped in the Juneau Wetlands Management Plan Atlas; nor are there any bald eagle nests within 330' of the project area according to data available to the CBJ.

### **FINDINGS**

The proposed project is largely in conformance with Adopted Plans. Because it is not shown on the project drawings submitted for review, staff recommends that the pedestrian-activated crosswalk warning system required as Condition 5 of USE2003-00055 as amended by USE2009-00051 be made a condition of a finding of conformance. Furthermore, with no bicycle route or way finding signage proposed, the project is not in conformance with the Non-Motorized Transportation Plan Policy 6 and Implementing Action 6D; accordingly, staff recommends a condition that signage consistent with Implementing Action 6D be included in the project, subject to Community Development Department staff review and approval. Finally, staff recommends that a condition be placed on the concurrence finding requiring the intersection of Riverside Drive, Vintage Boulevard, and Mendenhall Mall Road be reconfigured to accommodate through-bicycle lanes consistent with the American Association of State Highway and Transportation Officials *Guide for the Development of Bicycle Facilities* (2012), especially Figure 4-20 in Attachment F.

### **RECOMMENDATION**

That the Planning Commission find that the proposed project, to rehabilitate pavement on Riverside Drive from Egan Drive to James Boulevard, with sidewalks added to both sides from Egan Drive to Mall Road/Vintage Boulevard, and with drainage improvements including installation of curb and gutter, be found to be in conformance with CBJ-adopted plans as required by CBJ 49.15.580 and AS 35.30.010, with three conditions:

1. The pedestrian-activated crosswalk warning system required as Condition 5 of USE2003-00055 as amended by USE2009-00051 must be installed as part of this project.
2. Bicycle route and way finding signs meeting the requirements of the *Manual on Uniform Traffic Control Devices* (MUTCD), as amended and adopted by DOT&PF, shall be installed as specified in the MUTCD throughout the project area. Final sign placement shall be subject to Community Development Department staff review and approval,

consistent with the MUTCD and the *Non-Motorized Transportation Plan*.

3. The intersection of Riverside Drive, Vintage Boulevard, and Mendenhall Mall Road will be reconfigured and striped so as to provide for through-bicycle lanes on Riverside Drive, consistent with the American Association of State Highway and Transportation Officials *Guide for the Development of Bicycle Facilities* (2012), and with particularity Figure 4-20.



# CITY/STATE PROJECT AND LAND ACTION REVIEW APPLICATION

Project Number	Project Name (15 characters)	Case Number CSP 20130008	Date Received 04/18/13
----------------	------------------------------	-----------------------------	---------------------------

**TYPE OF PROJECT REVIEW:**

☐ City Project Review
 ☐ City Land Acquisition /Disposal
 ☒ State Project Review

**DESCRIPTION OF PROJECT**

The proposed project includes pavement rehabilitation on Riverside Drive from Egan Drive to James Boulevard. Sidewalks will also be added on both sides of the road from Egan Drive to Mall Road. Drainage improvements are included to accommodate the installation of curb and gutter. The project is being constructed on behalf of CBJ utilizing FHWA NHS funds.

Please attach a cover letter to fully explain the project if there is not adequate space on this form.

**CURRENT USE OF LAND OR BUILDING(S):**

CBJ roadway.

**PROPOSED USE OF LAND OR BUILDING(S):**

CBJ roadway - urban collector.

**PROJECT NUMBERS ASSOCIATED WITH PROPOSAL:**

Is this project associated with any other Land Use Permits? ☒ No ☐ Yes Case No.: \_\_\_\_\_

Capital Improvement Program # (CIP) \_\_\_\_\_

Local Improvement District # (LID) \_\_\_\_\_

State Project # 69527

**ESTIMATED PROJECT COST:** \$ 1,900,000

For more information <sup>CITY/STATE</sup> regarding the permitting process and the submittals required for a complete application, please see the reverse side.  If you need any assistance filling out this form, please contact the Permit Center at 586-0770.	<b>CITY/STATE PROJECT FEES</b>				
		Fees	Check No.	Receipt	Date
	Application Fees	\$ <u>0</u>	_____	_____	_____
	Total Fee	\$ <u>0</u>	_____	_____	04/18/13

**NOTE: MUST BE ACCOMPANIED BY DEVELOPMENT PERMIT APPLICATION FORM  
&  
EVEN IF THE PROPOSED PROJECT IS ASSOCIATE WITH OTHER LAND USE PERMITS, THIS  
APPLICATION MUST BE FILLED OUT**

# DEVELOPMENT PERMIT APPLICATION

Project Number <b>CSP20130008</b>	<b>CITY and BOROUGH of JUNEAU</b>	Date Received: <b>04/18/13</b>
Project Name (City Staff to Assign Name)		

<b>INFORMATION</b>	<b>Project Description</b> The proposed project includes pavement rehabilitation on Riverside Drive from Egan Drive to James Boulevard. Sidewalks will also be added on both sides of the road from Egan Drive to Mall Road. Drainage improvements are included to accommodate the installation of curb and gutter. The project is being constructed on behalf of CBJ utilizing FHWA NHS funds.		
	<b>PROPERTY LOCATION</b>		
	Street Address Riverside Drive	City/Zip 99801	
	Legal Description(s) of Parcel(s) (Subdivision, Survey, Block, Tract, Lot) Tract M-2 of Juneau Plat 84-52 and other city right-of-way (Riverside Drive) to James Boulevard		
	Assessor's Parcel Number(s) N/A		
	<b>LANDOWNER/ LESSEE</b>		
	Property Owner's Name Alaska DOT&PF	Contact Person: Keith Karpstein	Work Phone: 907-465-1796
	Mailing Address 6860 Glacier Highway	Home Phone: 775-772-9742	Fax Number: 907-465-4414
	E-mail Address keith.karpstein@alaska.gov	Other Contact Phone Number(s): Pat Carroll, 907-465-4415	
	<b>LANDOWNER/ LESSEE CONSENT</b> ****Required for Planning Permits, not needed on Building/ Engineering Permits****		
<b>PROJECT / APPLICANT</b>	I am (we are) the owner(s) or lessee(s) of the property subject to this application and I (we) consent as follows: A. This application for a land use or activity review for development on my (our) property is made with my complete understanding and permission. B. I (we) grant permission for officials and employees of the City and Borough of Juneau to inspect my property as needed for purposes of this application.		
	X Landowner/Lessee Signature		4-4-2013 Date
	X _____ Landowner/Lessee Signature		_____ Date
	NOTICE: The City and Borough of Juneau staff may need access to the subject property during regular business hours and will attempt to contact the landowner in addition to the formal consent given above. Further, members of the Planning Commission may visit the property before the scheduled public hearing date.		
	<b>APPLICANT</b> If the same as OWNER, write "SAME" and sign and date at X below		
	Applicant's Name SAME		Contact Person: Work Phone:
	Mailing Address		Home Phone: Fax Number:
	E-mail Address		Other Contact Phone Number(s):
	X _____ Applicant's Signature		_____ Date of Application

<b>STAFF APPROVALS</b>	<b>OFFICE USE ONLY BELOW THIS LINE</b>			
	<input checked="" type="checkbox"/>	Permit Type	***SIGN	Date Received
		Building/Grading Permit		
	<input checked="" type="checkbox"/>	City/State Project Review and City Land Action		04/18/13
		Inquiry Case (Fee In Lieu, Letter of ZC, Use Not Listed)		CSP 20130008
		Mining Case (Small, Large, Rural, Extraction, Exploration)		
		Sign Approval (If more than one, fill in all applicable permit #'s)		
		Subdivision (Minor, Major, PUD, St. Vacation, St. Name Change)		
		Use Approval (Allowable, Conditional, Cottage Housing, Mobile Home Parks, Accessory Apartment)		
		Variance Case (De Minimis and all other Variance case types)		
		Wetlands Permits		
		Zone Change Application		
		Other (Describe)		
	***Public Notice Sign Form filled out and in the file.			
	Comments:			Permit Intake Initials



THE STATE  
of **ALASKA**  
GOVERNOR SEAN PARNELL

**Department of Transportation  
and Public Facilities**

SOUTHEAST REGION  
DESIGN & ENGINEERING SERVICES  
Preconstruction

6860 Glacier Highway  
PO Box 112506  
Juneau, Alaska 99811-2506  
Main: 907.465.4444  
Toll free: 800.575-4540  
Fax: 907.465.4414

April 4, 2013

Mr. Greg Chaney, Planning Manager  
City and Borough of Juneau  
155 South Seward Street  
Juneau, Alaska 99801

RE: Federal Project No. STP-0967(7) - State Project No. 69527  
JNU: Riverside Drive Rehabilitation and Widening, Egan Dr. to James Blvd.

Dear Mr. Chaney:

We are submitting the enclosed plans for your review and comment. In addition to a general review, please specifically review for compliance in accordance with AS 35.30.020.

Under AS 35.30.020, the Department must comply with local planning and zoning ordinances and other regulations in the same manner and to the same extent as other landowners. If you believe that the Department's construction of this project would result in a violation of planning, zoning, or other regulations generally applicable to landowners, please identify the portions of the project that would be in violation, and the specific planning, zoning, or other regulations that you believe would be violated.

If we have not received comments regarding the project's compliance with planning and zoning ordinances within 90 days after submittal of these plans, the Department will proceed with the project as planned. If you have any questions, I can be reached by phone at: (907) 465-1796, or by e-mail at: [keith.karpstein@alaska.gov](mailto:keith.karpstein@alaska.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Keith Karpstein".

Keith Karpstein, P.E.  
DOT&PF Project Manager

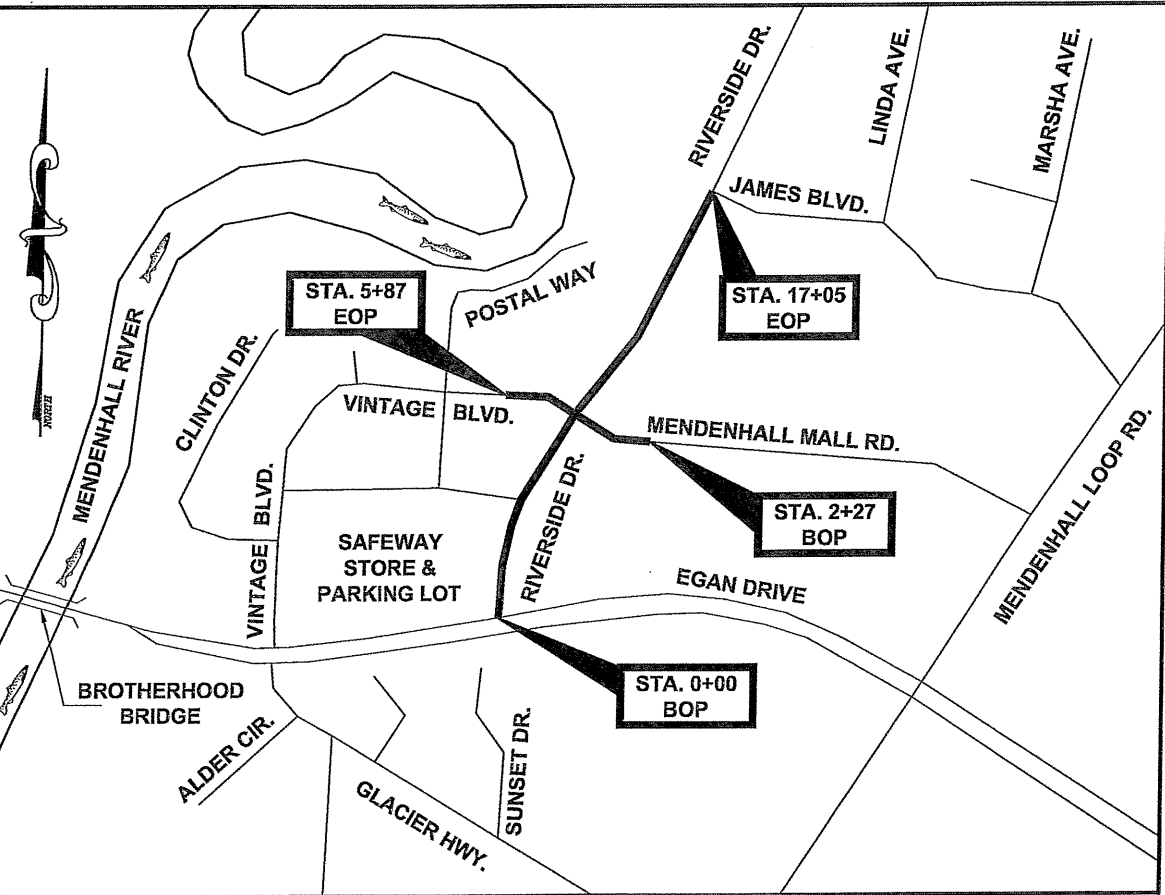
Enc: Preliminary Project Plans

# State of Alaska

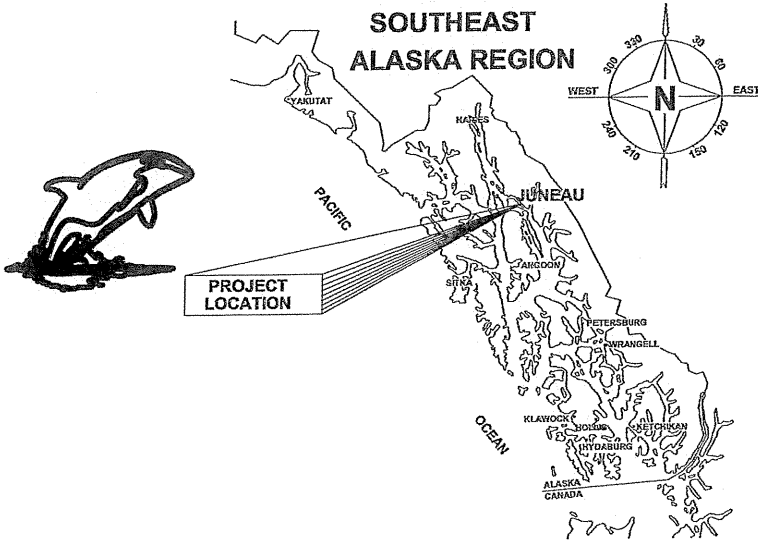
Department of Transportation  
and Public Facilities  
Southeast Region

## JUNEAU, ALASKA RIVERSIDE DRIVE

RIVERSIDE DRIVE REHABILITATION &  
SIDEWALK CONSTRUCTION  
EGAN DRIVE TO JAMES BLVD.  
PROJECT NO. STP-0967(7) ~ 69527



VICINITY MAP



### DESIGN DESIGNATION

A.D.T. 2008	=	10910
A.D.T. 2034	=	12420
D.H.V. 2034	=	1500
% T	=	10.6%
V	=	35 M.P.H.
E.A.L.	=	2,800,000

### PROJECT SUMMARY

LENGTH OF PROJECT	=	.30 MILES
LENGTH OF RESURFACING	=	.30 MILES
WIDTH OF RESURFACING	=	37' TO 100' FT

### THE FOLLOWING STANDARD DRAWINGS APPLY TO THIS PROJECT:

A-1	D-22.01	I-20.13	S-00.10	T-20.02	U-03.00
C-04.12	D-23.01	I-21.01	S-01.00	T-21.02	
C-05.10	D-24.00	M-13.01	S-05.01	T-23.00	
D-01.02	D-26.02	M-16.01	S-30.03		
D-04.20					

### THE FOLLOWING STANDARD CBJ DRAWINGS APPLY TO THIS PROJECT:

403  
414B

### INDEX

SHEET NO.	DESCRIPTION
A1	TITLE SHEET
A2	SURVEY CONTROL PLAN
B1-B2	TYPICAL SECTIONS
C1-C3	ESTIMATE OF QUANTITIES
D1	SIGN SUMMARIES
F1-F6	PLAN SHEETS
G1-G6	GRADING PLANS
J1-J8	MISC DETAILS
P1-P6	EROSION AND SEDIMENT PLANS
P7	EROSION AND SEDIMENT DETAILS
R1-R4	SIGNING & STRIPING PLANS
S1-S2	TRAFFIC CONTROL PLANS

CDS MILEPOINT	CDS ROUTE #	START	END
	296500	0.000	0.296

PATH: Q:\JUNI69527\ENIDOU'S PLANSET\A\_TITLE SHT.DWG TAB:A1  
Monday, November 14, 2011 12:56:41 PM  
PLOT: PSPACE OR MSPACE: 1=1(F)

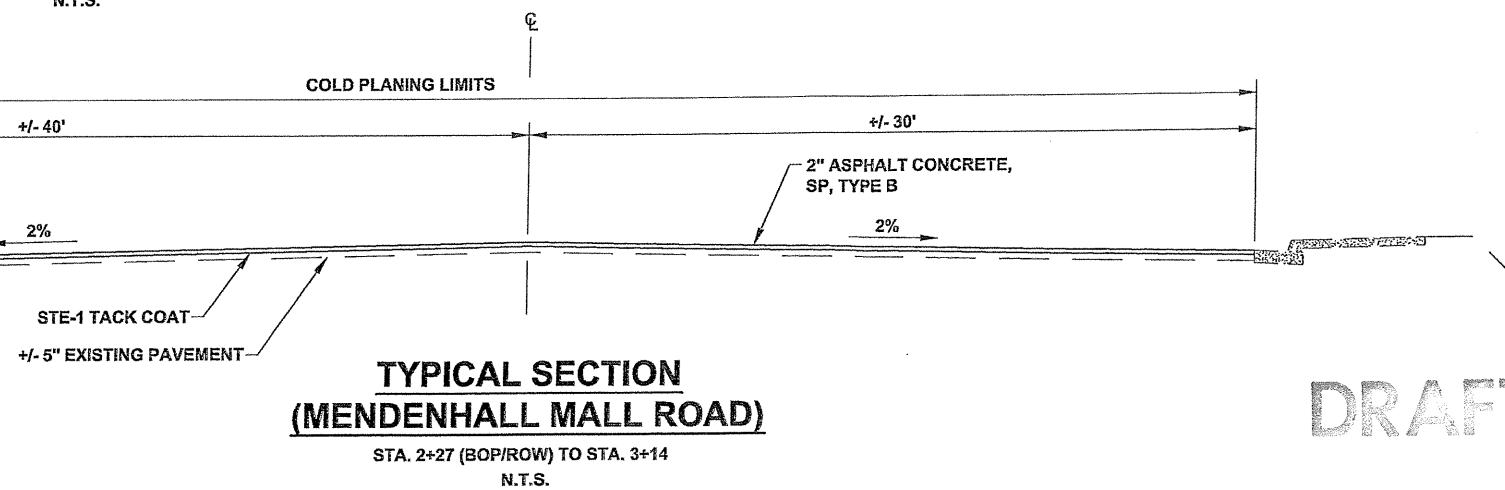
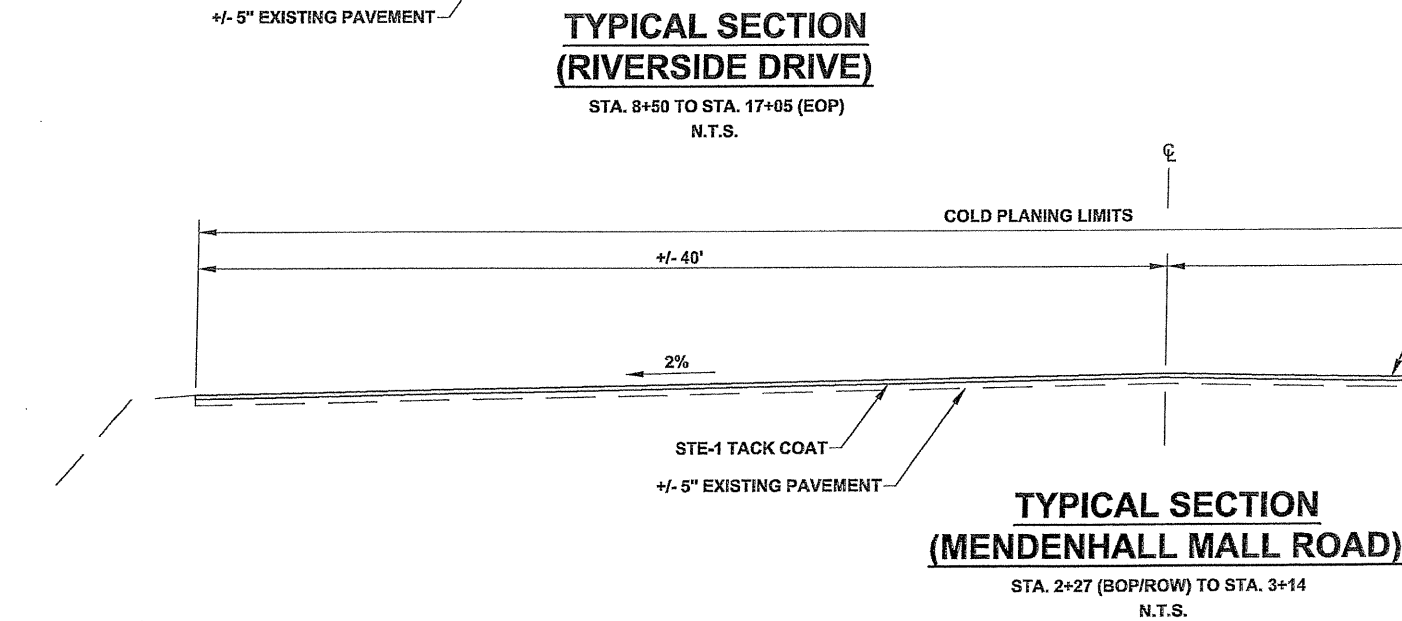
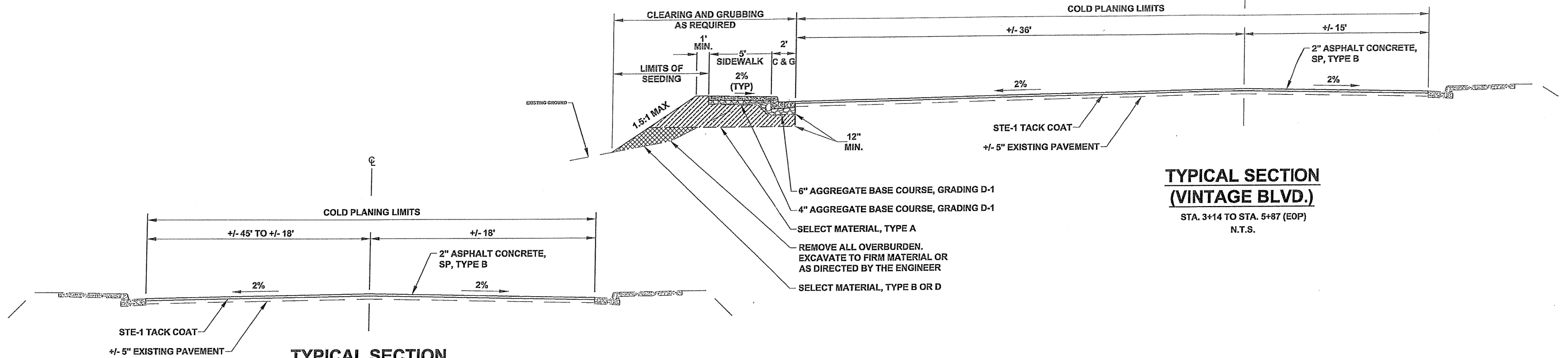
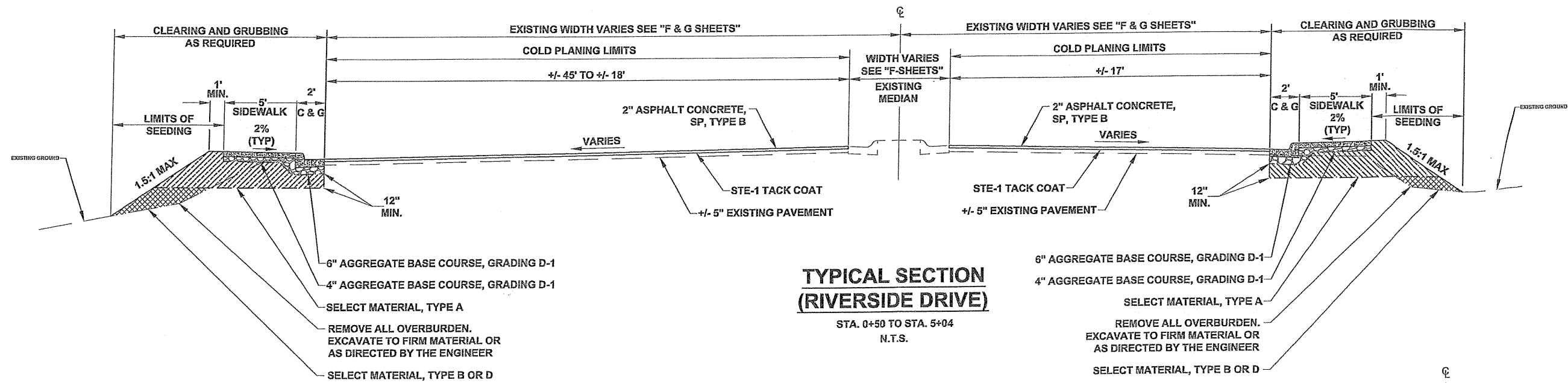
STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
& PUBLIC FACILITIES  
SOUTHEAST REGION



DRAFT

APPROVED:	
REGIONAL PRE-CONSTRUCTION ENGINEER	DATE
CHUCK CORREA, P.E.	
APPROVED:	
DIRECTOR, SOUTHEAST REGION	DATE
ALBERT H. CLOUGH, CPG	
CERTIFIED TRUE & CORRECT AS-BUILT OF ACTUAL FIELD CONDITION:	
CONSTRUCTION PROJECT MANAGER	DATE

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	STP-0967(7) ~ 69527	2013	A1	XX




**TYPICAL SECTION  
(VINTAGE BLVD.)**  
STA. 3+14 TO STA. 5+87 (EOP)  
N.T.S.

### TYPICAL SECTION NOTES:

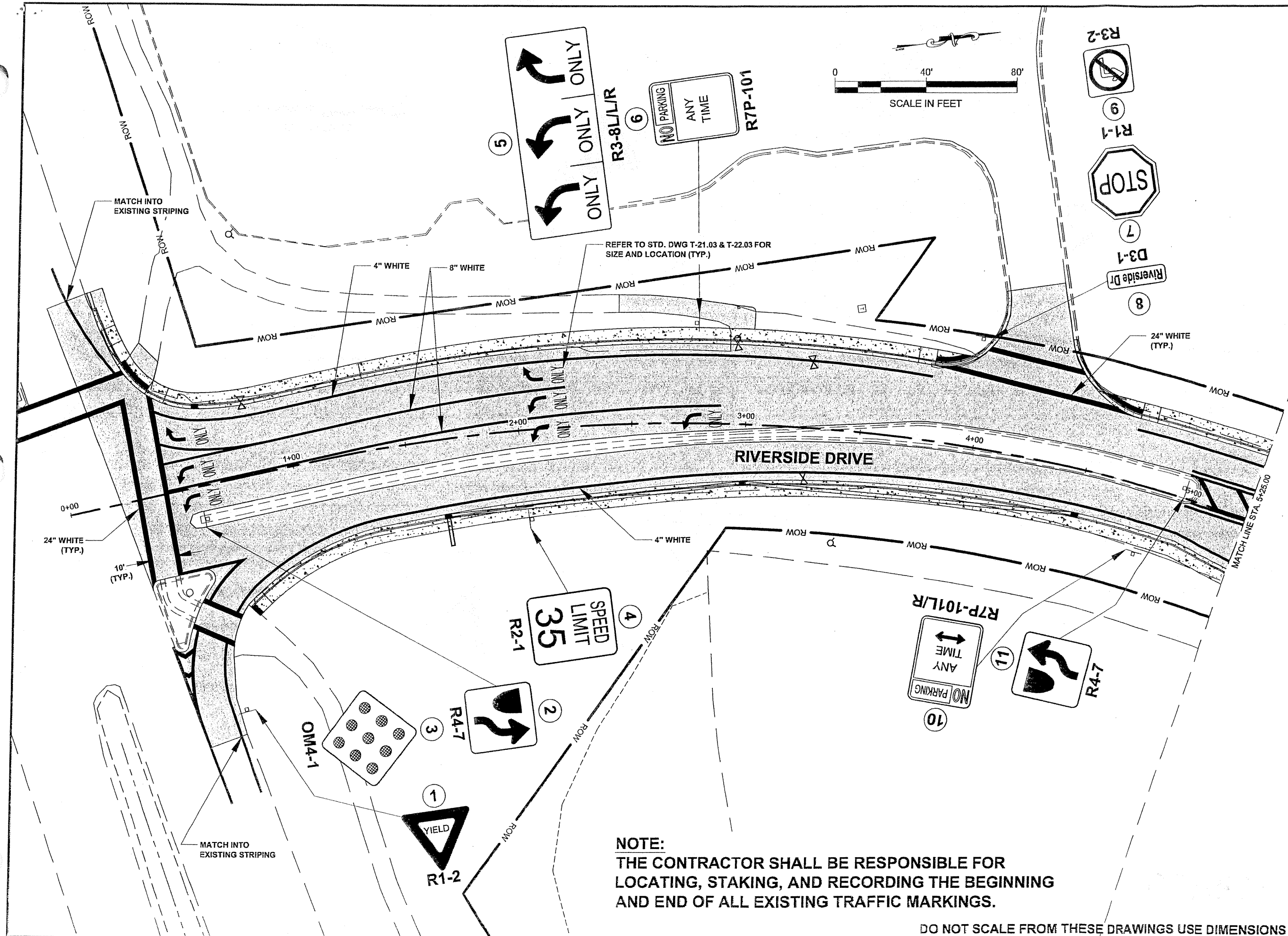
1. SHOULDER EXCAVATION IS ANTICIPATED TO BE A DEPTH OF 12". THE ENGINEER MAY INCREASE OR DECREASE THE DEPTH OF EXCAVATION TO A SUITABLE FOUNDATION MATERIAL.

DO NOT SCALE FROM THESE DRAWINGS USE DIMENSIONS

CHECKED BY: K. KARPSTEIN  DESIGNED BY: D. MULLINER DRAWN BY: D. MULLINER		STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES SOUTHEAST REGION <b>JNU-RIVERSIDE DRIVE          REHABILITATION &amp; SIDEWALK          CONSTRUCTION          EGAN DRIVE TO JAMES BLVD.          PROJECT #69527</b>							
PATH: Q:\JNU\69527\ENR\DOUG'S PLANSET\B_TYPICALS_SHT.DWG TAB: B1 Friday, April 05, 2013 4:47:24 PM MULLINER, DOUGLAS J (DOT)		<b>TYPICAL SECTIONS</b>							
REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION				PROJECT DESIGNATION <b>STP-0967(7)-69527</b>	
NO.	DATE	DESCRIPTION							
YEAR <b>2013</b>		SHEET NO. <b>B1</b>	TOTAL SHEETS <b>XX</b>						

**DRAFT**





**NOTE:**  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR  
 LOCATING, STAKING, AND RECORDING THE BEGINNING  
 AND END OF ALL EXISTING TRAFFIC MARKINGS.

DO NOT SCALE FROM THESE DRAWINGS USE DIMENSIONS

PATH: Q:\JNU\69527\ENDOU'S  
 PLANSET\STRIPING & SIGNS.DWG  
 MULLINER, DOUGLAS J (DOT)  
 TAB: R1      Wednesday, April 03, 2013 3:53:53 PM  
 ADDENDUM NUMBER  
 ATTACHMENT NUMBER  
 RECORD OF REVISIONS  

No.	DATE	DESCRIPTION

**PLAN**

**PLAN LEGEND**

CHECKED BY: D. EPSTEIN

DESIGNED BY: D. MULLINER  
 DRAWN BY: D. MULLINER

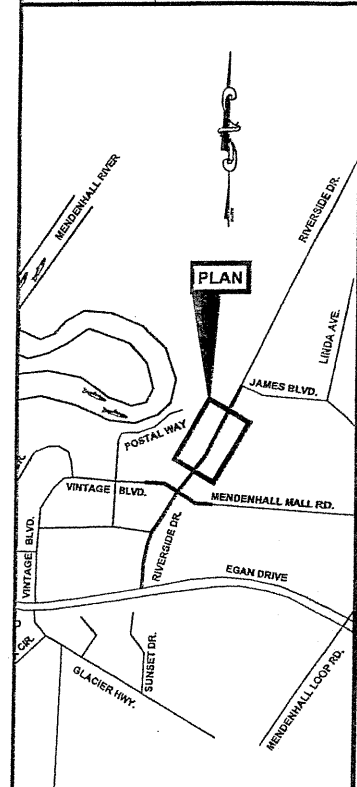
STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION  
 & PUBLIC FACILITIES  
 SOUTHEAST REGION

**JNU-RIVERSIDE DRIVE  
 REHABILITATION & SIDEWALK  
 CONSTRUCTION  
 EGAN DRIVE TO JAMES BLVD.  
 PROJECT #69527  
 SIGNING &  
 STRIPING PLAN**

PROJECT DESIGNATION  
**STP-0967(7) ~ 69527**

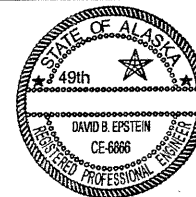
STATE	YEAR
ALASKA	2013

SHEET NUMBER	TOTAL SHEETS
R1	1



# PLAN LEGEND

CHECKED BY: D. EPSTEIN



DESIGNED BY: D. MULLINER

DRAWN BY: D. MULLINER

STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
& PUBLIC FACILITIES  
SOUTHEAST REGION

JNU-RIVERSIDE DRIVE  
REHABILITATION & SIDEWALK  
CONSTRUCTION  
EGAN DRIVE TO JAMES BLVD.  
PROJECT #69527

## SIGNING & STRIPING PLAN

PROJECT DESIGNATION

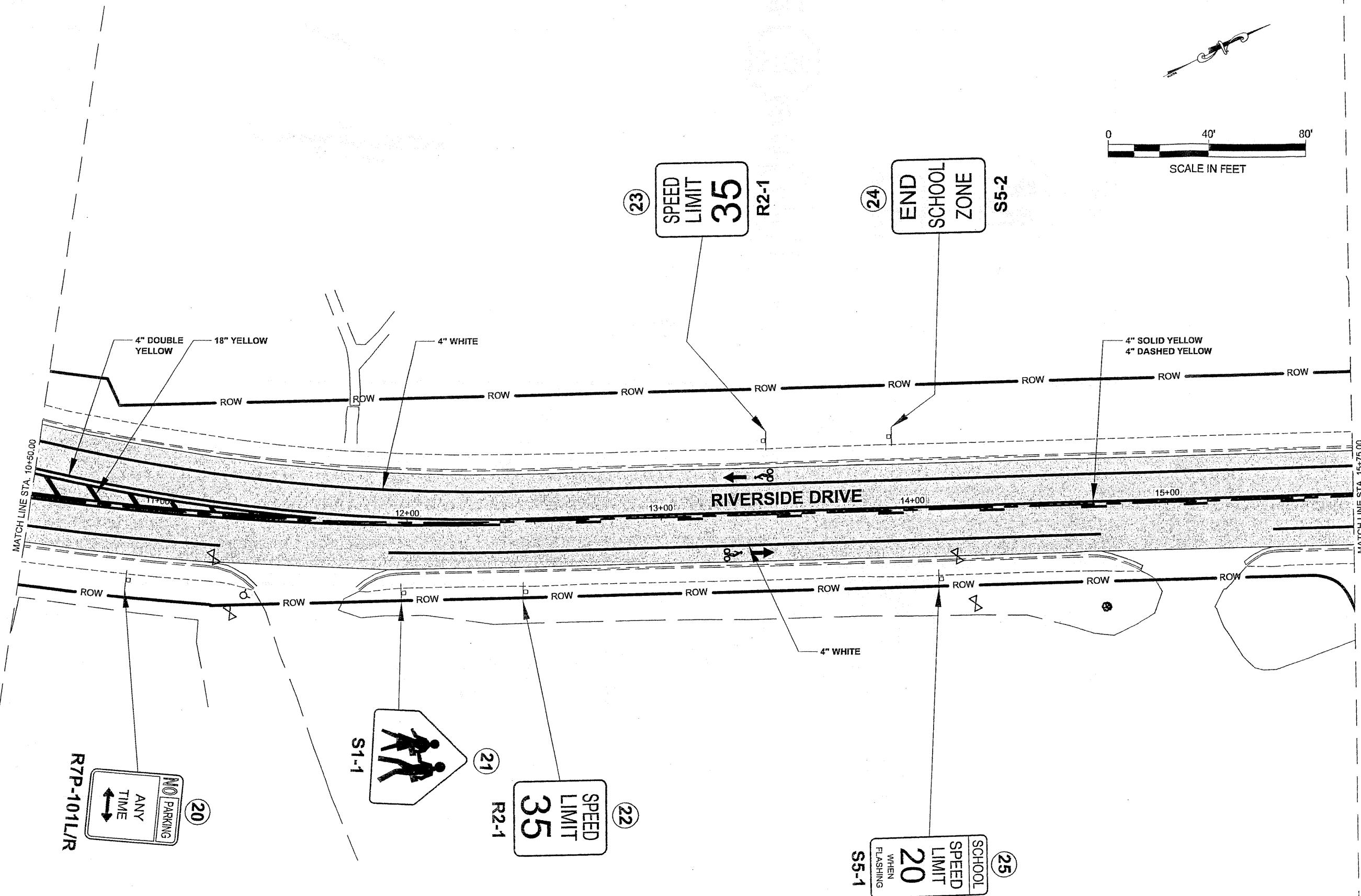
STP-0967(7) ~ 69527

STATE	YEAR
ALASKA	2013

SHEET NUMBER	TOTAL SHEETS
R3	XX

R3

XX



**NOTE:**  
THE CONTRACTOR SHALL BE RESPONSIBLE FOR  
LOCATING, STAKING, AND RECORDING THE BEGINNING  
AND END OF ALL EXISTING TRAFFIC MARKINGS.

DO NOT SCALE FROM THESE DRAWINGS USE DIMENSIONS

# MEMORANDUM

CITY/BOROUGH OF JUNEAU  
155 South Seward Street, Juneau, Alaska 99801

**DATE:** January 6, 2010

**TO:** Planning Commission

**FROM:** Beth McKibben, Planner *BMc*  
Community Development Department

**FILE NO.:** USE2009-00051

**PROPOSAL:** A modification to the Conditional Use permits (USE2003-00055 and USE2008-000037) for Thunder Mountain High School to remove two permit conditions: Condition 5 from USE2003-00055 and Condition 1 from USE2008-00037.

## GENERAL INFORMATION

**Applicant:** Rorie Watt, CBJ Engineering

**Property Owner:** City & Borough of Juneau

**Property Address:** 3101 Riverside Drive

**Legal Description:** Lakeside Tract 1

**Parcel Code Number:** 5-B21-0-108-002-3

**Site Size:** 57.61 acres

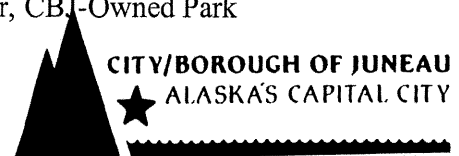
**Zoning:** D5

**Utilities:** CBJ Water and Sewer

**Access:** Riverside Drive

**Existing Land Use:** Dimond Park, Thunder Mountain High School, Dimond Park Field House, Aquatic Center (under construction)

**Surrounding Land Use:** North - (D-5) Single-family Dwellings  
South - (D-18) Riverbend Elementary School, Field House  
East - (D-5) Aquatic Center, Riverside Drive ROW, Single-family Dwellings  
West - (D1(T)D5)Mendenhall River, CBJ-Owned Park





### **PROJECT DESCRIPTION**

The applicant requests a modification to Conditional Use permits USE2003-00055 and USE2008-00037 for the development of a new high school in Juneau. The specific modifications requested would modify condition 1 of USE2008-00037, which modified condition 3 of USE2003-00055 and modification of condition 5 of USE2003-00055.

USE2008-00037 Condition 1 (modification of condition 3 of USE2003-00055) – CBJ Engineering requests this condition be removed:

“Prior to issuance of a Temporary Certificate of Occupancy, the application shall install a sign at the westbound lane of Stephen Richards Drive prohibiting a left turn onto Riverside Drive between the hours of 7:00 AM and 9:00 AM. The applicant shall also provide a crossing guard at this location at the appropriate time. As an alternative to the sign prohibiting left turns at Stephen Richards Drive and a crossing guard, the CBJ Engineering Department may install a four-way stop sign. Prior to a Certificate of Occupancy or within two years by July 22, 2010 a traffic signal or roundabout shall be installed at the intersection of Stephen Richards Drive and Riverside Drive.

The applicant shall install a traffic signal at the intersection of Riverside Drive at Riverwood Drive (main site entrance).”

Staff notes this condition modified condition 3 of USE2003-00055.

USE2003-00055 Condition 5 – CBJ Engineering states this condition has been met and that it be modified as recommended by Transportation Engineering NorthWest, LLC:

“That the applicant install illuminated overhead pedestrian signage above painted and signed crosswalks and evaluate the relocation of the existing crosswalk on Riverside Drive at James Boulevard to the north side of the intersection to reduce pedestrian crossing maneuvers prior to occupancy of the school.”

### **BACKGROUND**

Thunder Mountain High School was permitted by Conditional Use permit USE2003-00055. During the review of this permit, the applicant commissioned Transportation Engineering NorthWest, LLC to conduct a transportation impact study (TIS), which was completed on January 26, 2004. The TIS analyzed traffic to be generated from a full build-out of the Dimond Park campus, including a high school with 1,500 students and a 95,000 square foot community center including an aquatics center, multi-use recreation center, and a public library.

On June 17, 2005 a TIS Addendum was issued by Transportation Engineering NorthWest, LLC revising their original recommendations based on reductions to the size of the high school. The TIS Addendum assumed a high school with a reduced capacity from 1,500 to 1,080 students and a community complex still at 95,000 square feet. The community complex used in conducting the analysis (alternative 2-full build out) contained an aquatic center, gymnasium, climbing wall, aerobic

fitness area, teen room, meeting room, small commercial kitchen, offices, support facilities and a 17,500 square foot library.

In 2008 the CBJ Engineering Department commissioned transportation specialist Richard Purves to summarize the key points of the TIS Addendum and offer conclusions to the Engineering Department. In a memo dated July 11, 2008 Engineering Department Director Rorie Watt stated that subsequent to the TIF Addendum, the size of the school was further reduced from 1,080 students to 850 students and the size of the community complex has been reduced from a 95,000 square foot complex with aquatic center, recreation center, and library, to a 33,000 square foot aquatic center.

In July 2008 the Planning Commission approved USE2008-00037 which modified two conditions of USE2003-00055: installation of a traffic signal or roundabout at Riverside Drive and Stephen Richards Drive; and installation of bus shelters at Riverside Drive. The other conditions of USE2003-00055 remain in effect.

In the summer of 2009 CBJ Engineering commissioned another transportation and planning analysis (TIA) along Riverside Drive between James Boulevard and Division Street. This analysis was completed by Transportation Engineering NorthWest, LLC (TENW). This analysis considered the current conditions of the Dimond Park complex and a future (2015) build-out as follows: Thunder Mountain High School with a maximum of 750 students, 33,000 square foot aquatic center, and the exiting Dimond Park Field House. All of the existing site access points would remain. The updated analysis also takes into consideration the change in school hours. In addition, the analysis forecasts pedestrian and bicycle traffic for the 2015 build out scenario.

The traffic analysis identifies existing and 2015 projected Levels of Service (LOS) at the identified affected intersections in Tables 4 and 5 (pg 10 & 11). The study finds that all the evaluated intersections currently function at or above LOS D, which is the minimum standard allowed by CBJ§49.40.310. Most of the studied intersections function at LOS A and B and will continue to do so in 2015. The four-way stop at Riverside and Steven Richards functions at LOS D and is projected to continue to function at LOS D in 2015.

A signal warrant analysis was also conducted for Riverside Drive and Steven Richards Drive intersection for full build-out in 2015. Eight warrants were evaluated (page 12 TIA). Only warrants 3 and 8 were met during peak hours in 2015 (table 7). TENW concludes that because not enough warrants were met per the requirements of the Alaska Traffic Manual a traffic signal is not warranted or necessary at the Riverside and Steven Richards intersection in 2015.

This results in the request from CBJ Engineering to remove the requirement of condition one of USE2008-37 as follows:

“Prior to a Certificate of Occupancy or within two years by July 22, 2010 a traffic signal or roundabout shall be installed at the intersection of Stephen Richards Drive and Riverside Drive”.

The second request from CBJ Engineering is to find condition 5 of USE2003-0005 is complete.

Condition 5 of USE2003-00055 is as follows:

“That the applicant install illuminated overhead pedestrian signage above painted and signed crosswalks and evaluate the relocation of the existing crosswalk on Riverside Drive at James Boulevard to the north side of the intersection to reduce pedestrian crossing maneuvers prior to occupancy of the school.”

The 2009 TIA evaluates the relocation of the existing sidewalk at Riverside and James Boulevard for both current conditions and for 2015 full build-out. The TIA concludes that relocating this crosswalk will not achieve any efficiency in traffic movement, or increase safety of pedestrians. However, the TIA does make two recommendations for this crosswalk: First, a crossing guard should continue to be provided during arrival/dismissal times at Riverbend Elementary; Second, a pedestrian activated crosswalk warning system be installed at the existing crosswalk. This crosswalk warning system would be similar to the one already installed at the Riverside Drive and Rivercourt Way. TENW suggests that the crosswalk warning system could be integrated into the CBJ/AkDOT project that is already planned along Riverside Drive between James Boulevard and Egan Drive. AkDOT reports that construction is scheduled for 2013. They report acceleration to 2012 might be possible if it is requested by the CBJ. (Attachment A).

Waiting until the AkDOT project will not complete the condition of approval. The condition is two-part: the evaluation of moving the crosswalk is complete; the installation of the pedestrian activated crosswalk warning system has not been completed. Not having met all the conditions results in being unable to obtain the final building certifications. For private developers, the CBJ is able to address such situations by requiring the applicant to provide bonds to ensure completion of the condition. By requiring a developer to post a bond, the CBJ is able to use that money to complete the improvements in the event the applicant does not. For CBJ projects creating a reserve account is equivalent to posting a bond, in that a specific dollar amount is set aside in a “reserve” account to be used only for a specific project. Staff recommends that a reserve account of \$50,000 be created to guarantee the installation of a pedestrian activated crosswalk warning system at the intersection of James Boulevard and Riverside Drive.

## **ANALYSIS**

**Project Site** - The requested Conditional Use permit modifications would make no changes to the current four-way stop at the intersection of Stephen Richards Drive and Riverside Drive and would provide overhead illuminated pedestrian signs at James Boulevard in 2013.

**Project Design** - The proposed modifications would result in two project design changes: the omission of a traffic signal or roundabout at Riverside Drive and Stephen Richards Drive and complete the evaluation of relocating the crosswalk at James Boulevard. The TIA recommends the continued use of a crossing guard at the James Boulevard crosswalk during arrival/dismissal times at Riverbend Elementary, and the installation of overhead illuminated pedestrian signs at James

Boulevard when AkDOT completes an upcoming project in 2013 which further completes Condition 5 of USE2003-00055.

**Traffic** - The September 2009 TIA considers impacts to traffic with current conditions at the Dimond Park complex and at a revised full build-out in 2015. The revised full build-out reflects the current development, projected increase in student population, and the completion of the Aquatic Center as designed, which is currently under construction. These conditions are significantly different than those studied in the original traffic study, and even those considered when the Conditional Use was modified in 2008.

The TIA predicts that at full build-out in 2015 all of the affected intersections, including the four way stop at Riverside and Steven Richards will continue to function at LOS which meets the requirements of CBJ§49.40.310 before mitigation is required.

**Parking and Circulation** - No changes to on-site parking or circulation will result from the proposed modifications.

**Noise** - No changes to on-site noise emitted by this development will result from the proposed modification.

**Public Health or Safety** - The proposed modifications to the two conditions could be considered to have an impact on public health and safety. However, the TIA shows that at full build-out in 2015, the minimum required traffic standards will be maintained. Furthermore, the evaluation of moving the James Boulevard crosswalk was completed, and found to not provide any improvements to public health and safety. Installation of overhead lighted pedestrian crossing signs at the James Boulevard crosswalk will be an improvement to public safety.

**Property Value or Neighborhood Harmony** – There is no evidence the modifications to the conditions proposed by the CBJ Engineering Department will affect property value or neighborhood harmony.

**Conformity With Adopted Plans** - The 2008 Comprehensive Plan, Chapter 8 addresses Transportation. On page 108 the plan summarizes the Area-Wide Transportation Plan six top priorities; there are two that are most relevant—developing local street connections/access management, and the enhanced routes to school program, which is funded by AkDOT. The subsection of this chapter addressing the Mendenhall Valley implementing action 8.3.IA13 recommends implementing the subarea improvements identified in the Area-wide Transportation Plan. The AWTP has a “consolidated solution list (Attachment B). Item 46 in this list addresses Riverside Drive Corridor improvements, in part, as follows:

“Evaluate appropriate intersection control at the new Dimond Park intersection with Riverside Drive. Maintain existing bicycle lane striping. Provide bus pullout/shelters. Develop strong pedestrian connections from neighborhoods to Dimond Park area and the retail areas to the south.”



**CITY/BOROUGH OF JUNEAU**  
**ALASKA'S CAPITAL CITY**

**PLANNING COMMISSION**  
**NOTICE OF DECISION**

Date: January 13, 2010

File No.: USE2009-00051

City & Borough of Juneau  
Engineering Department  
Attn.: Rorie Watt  
155 S. Seward St.  
Juneau, AK 99801

Application For: A modification to the Conditional Use permits (USE2003-00055 and USE2008-000037) for Thunder Mountain High School to modify Condition 5 from USE2003-00055 and remove Condition 1 from USE2008-00037.

Legal Description: Lakeside Tract 1

Parcel Code No.: 5-B21-0-108-002-3

Hearing Date: January 12, 2010

The Planning Commission, at its regular public meeting, adopted the analysis and findings listed in the attached memorandum dated January 6, 2010, and approved the modification of condition 5 of USE2003-00055 and removal of condition 1 of USE2008-000037 to be conducted as described in the project description and project drawings submitted with the application as follows:

USE2003-00055, Condition 5:

- Confirm that the evaluation of moving the James Boulevard crosswalk has been completed
- Create a reserve account of \$50,000 to guarantee the installation of the required crosswalk treatment in conjunction with the AkDOT project on Riverside Drive, scheduled for construction in 2013
- Require the continued use of crossing guards at the James Boulevard crosswalk during Riverbend Elementary arrival/dismissal times.

USE2008-00037, Condition 1:

- Remove the requirement to install a traffic signal or roundabout, and allow the continued use of the four-way stop at the intersection of Riverside Drive and Steven Richards Drive.

Attachments: January 6, 2010, memorandum from Beth McKibben, Community Development, to the CBJ Planning Commission regarding USE2009-00051.

CBJ Engineering Dept  
Attn.: Rorie Watt  
File No.: USE2009-00051  
January 13, 2010  
Page 2 of 2

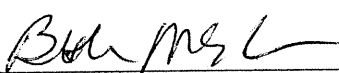
This Notice of Decision does not authorize construction activity. Prior to starting any project, it is the applicant's responsibility to obtain the required building permits.

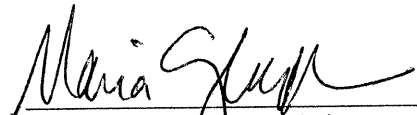
This Notice of Decision constitutes a final decision of the CBJ Planning Commission. Appeals must be brought to the CBJ Assembly in accordance with CBJ §01.50.030. Appeals must be filed by 4:30 P.M. on the day twenty days from the date the decision is filed with the City Clerk, pursuant to CBJ §01.50.030 (c). Any action by the applicant in reliance on the decision of the Planning Commission shall be at the risk that the decision may be reversed on appeal (CBJ §49.20.120).

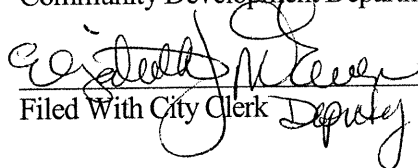
Effective Date: The permit is effective upon approval by the Commission, January 12, 2010.

Expiration Date: The permit will expire 18 months after the effective date, or July 12, 2011, if no Building Permit has been issued and substantial construction progress has not been made in accordance with the plans for which the development permit was authorized. Application for permit extension must be submitted thirty days prior to the expiration date.

Project Planner:

  
Beth McKibben, Planner  
Community Development Department

  
Maria Gladziszewski, Chair  
Planning Commission

  
Filed With City Clerk

  
Date

cc: Plan Review

**NOTE:** The Americans with Disabilities Act (ADA) is a federal civil rights law that may affect this development project. ADA regulations have access requirements above and beyond CBJ-adopted regulations. Owners and designers are responsible for compliance with ADA. Contact an ADA - trained architect or other ADA trained personnel with questions about the ADA: Department of Justice (202) 272-5434, or fax (202) 272-5447, NW Disability Business Technical Center (800) 949-4232, or fax (360) 438-3208.



## Rectangular Rapid Flash Beacon (RRFB)

### Purpose

According to the National Highway Traffic Safety Administration, there were a total of 14,340 pedestrian fatalities and 193,000 pedestrian injuries resulting from pedestrian-vehicle crashes nationwide during the 2004-2006 period. Rectangular Rapid Flash Beacons (RRFB) can enhance safety by reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings by increasing driver awareness of potential pedestrian conflicts.

### Alternative Names

Light Emitting Diode (LED) Rapid-Flash System, Stutter Flash or LED Beacons.

### Operation

- RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system.
- RRFBs use an irregular flash pattern that is similar to emergency flashers on police vehicles.
- RRFBs may be installed on either two-lane or multi-lane roadways.

### Potential Benefits

- RRFBs are a lower cost alternative to traffic signals and hybrid signals that are shown to increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings.
- An official FHWA-sponsored experimental implementation and evaluation conducted in St. Petersburg, Florida found that RRFBs at pedestrian crosswalks are dramatically more effective at increasing driver yielding rates to pedestrians than traditional overhead beacons.
- The novelty and unique nature of the stutter flash may elicit a greater response from drivers than traditional methods.
- The addition of RRFB may also increase the safety effectiveness of other treatments, such as the use of advance yield markings with YIELD (or STOP) HERE FOR PEDESTRIANS signs. These signs and markings are used to reduce the incidence of multiple-threat crashes at crosswalks on multi-lane roads (i.e., crashes where a vehicle in one lane stops to allow a pedestrian to cross the street while a vehicle in an adjacent lane, traveling in the same direction, strikes the pedestrian), but alone they only have a small effect on overall driver yielding rates.



This summary is one in a series describing Innovative Intersection Safety Treatments. The summaries identify new technologies and techniques to improve intersection safety developed since NCHRP Report 500, Volumes 5 and 12, were published in 2003 and 2004, respectively. These treatments show promise for improving safety but comprehensive effectiveness evaluations are not yet available.

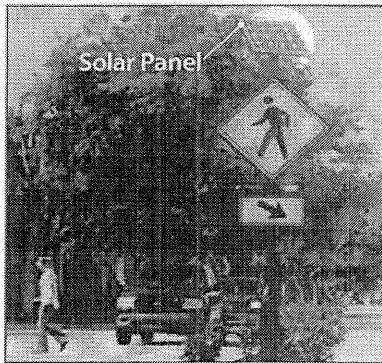


Figure 1: Activated, solar-powered RRFB on a center island at an unsignalized intersection—beacons flash using an irregular flash pattern that is similar to emergency flashers on police vehicles



Figure 2: Activated, solar-powered, roadside RRFB at a mid-block crosswalk

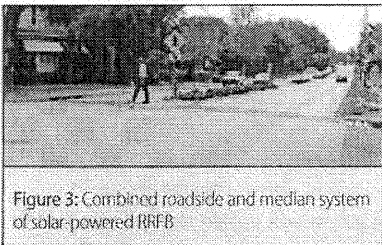


Figure 3: Combined roadside and median system of solar-powered RRFB

## Learn More

**Michael Frederick**, St. Petersburg Neighborhood  
Transportation Manager

727.893.7843

michael.frederick@stpete.org

**Ed Rice**, Intersection Safety Team Leader  
FHWA Office of Safety

202.366.9064

ed.rice@dot.gov

## See Also:

[http://mutcd.fhwa.dot.gov/resources/](http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/stpetersburgpt/intro.htm)

[http://www.stpete.org/pdf/ite\\_paper\\_07.pdf](http://www.stpete.org/pdf/ite_paper_07.pdf)

## Agency Experience

"An Analysis of the Effects of Stutter Flash LED Beacons to Increase Yielding to Pedestrians Using Multilane Crosswalks," along with "The Use of Stutter Flash LED Beacons to Increase Yielding to Pedestrians at Crosswalks," presented at the Transportation Research Board Annual Meeting in 2008, summarized the results of two studies on the effects of RRFBs when used to supplement standard pedestrian crossing warning signs at crosswalks<sup>1</sup>.

The former found that going from a no-beacon arrangement to a two-beacon system, mounted on the supplementary warning sign on the right side of the crossing, increased yielding from 18 percent to 81 percent. There was a further increase in yielding behavior, with a four-beacon system (with two beacons on both the right and left side of the crossing) to 88 percent. "An Analysis of the Effects of Stutter Flash LED Beacons to Increase Yielding to Pedestrians Using Multilane Crosswalks" also evaluated the sites over a 1-year period, and found that there was little to no decrease in yielding behavior over time.

## Implementation Considerations

- Including RRFBs on the roadside increases driver yielding behavior significantly. Including RRFBs on a center island or median as well can further increase driver yielding behavior, although with a lower marginal benefit than roadside beacons.
- RRFBs can use manual push-buttons or automated passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.
- RRFBs typically receive power by standalone solar panel units, but may also be wired to a traditional power source.

## Manual on Uniform Traffic Control Devices (MUTCD) Specifications

- The MUTCD gave interim approval to RRFBs for optional use in limited circumstances in July 2008. The interim approval allows for usage as a warning beacon to supplement standard pedestrian crossing warning signs and markings at either a pedestrian or school crossing; where the crosswalk approach is not controlled by a yield sign, stop sign, or traffic-control signal; or at a crosswalk at a roundabout.
- The MUTCD interim approval memo also contains other provisions for the implementation of the device and should be reviewed ([http://mutcd.fhwa.dot.gov/resources/interim\\_approval/ia11/fhwamemo.htm](http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/fhwamemo.htm)).

## Costs

- Cost is approximately \$10,000 to \$15,000 for purchase and installation of two units (one on either side of a street). This includes solar panels for powering the units, pad lighting, indication units (for both sides of street) with RRFBs in the back and front of each unit, signage on both approaches, all posts, and either passive infrared detection or push buttons with audio instructions.
- Costs would be proportionately higher for additional units placed on a median island, etc.

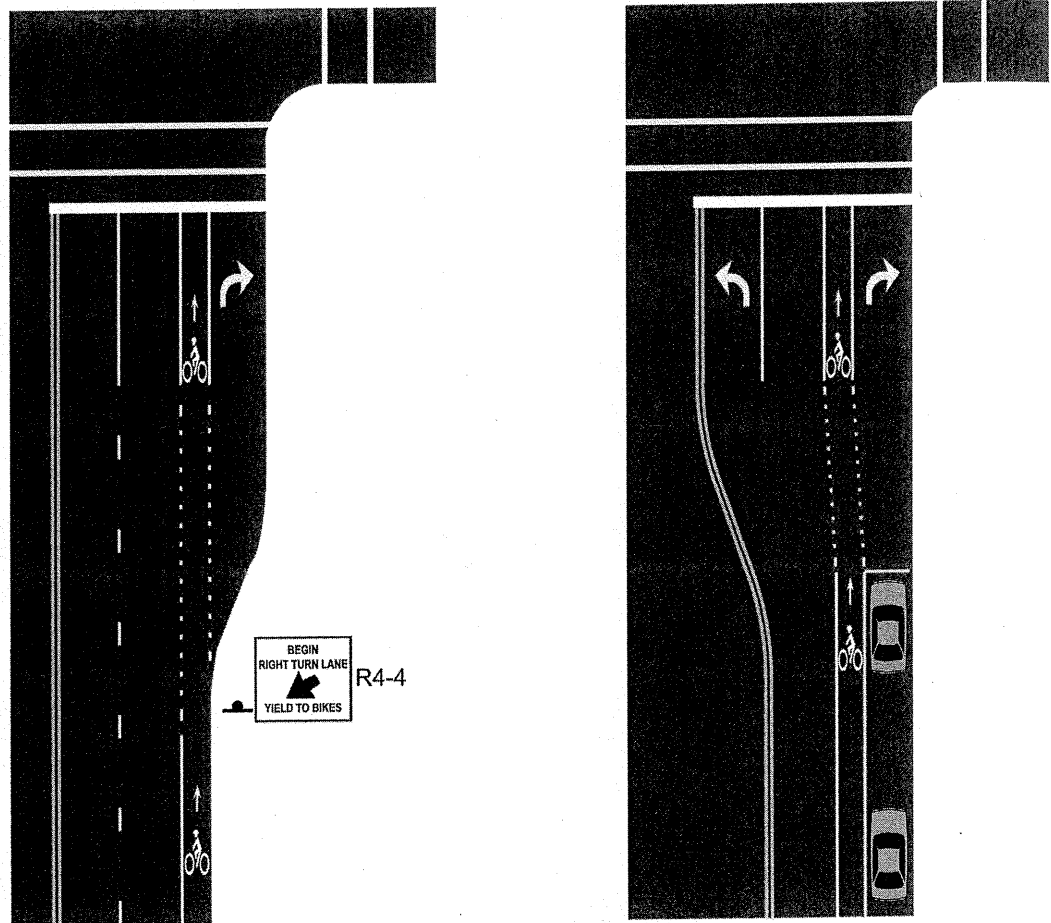
<sup>1</sup>The two known studies of stutter flash were both conducted in Florida—one in Miami Beach and one in St. Petersburg. They are:

Sherburn, J., R. Van Houten, and S. Turner. "An Analysis of the Effects of Stutter Flash LED Beacons to Increase Yielding to Pedestrians Using Multilane Crosswalks." Presented at the Transportation Research Board Annual Meeting, Washington, DC, 2008.

Van Houten, R., R. Ellis, and E. Marmolejo. "The Use of Stutter Flash LED Beacons to Increase Yielding to Pedestrians at Crosswalks." Presented at the Transportation Research Board Annual Meeting, Washington, DC, 2008.



An intersection designed with large corner radii allows motorists to turn at higher speeds, thus making it more difficult for bicyclists to merge left. Corner radii should be as small as practical, but should be large enough to accommodate large vehicles (buses or heavy trucks) that frequently turn right at the intersection.



Note: Use of sign is optional.

Figure 4-20. Examples of Bike Lanes Approaching Right-Turn-Only Lanes (With and Without Parking)

### Right Turn Considerations with Right-Turn-Only Lanes

Right-turn-only lanes are often used where high volumes of right-turning motor vehicle volumes warrant an exclusive right-turn lane to improve traffic flow. The correct placement of a bike lane is on the left of an exclusive right-turn lane, as shown in Figure 4-20. The through bike lane should be a minimum of 4 ft (1.2 m) wide, however 5 ft (1.5 m) is preferable to provide comfortable operating space. Bike lane lines should be used on both sides of the lane, per Section 4.7.2.

Incorporating the bike lane to the left of the right-turn-only lane enables bicyclists and right-turning motorists to sort their paths by destination in advance of the intersection, avoiding last-moment conflicts and providing the following benefits:

- Bicyclists are encouraged to follow the rules of the road: through vehicles (including bicyclists) proceed to the left of right-turning vehicles.
- Merging movements occur away from the intersection, and are often easier to manage for bicyclists and other road users than a turning conflict.

Motorists are required to yield to bicyclists at the entrance to the right-turn-only lane. The “BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4)” sign may be used to remind motorists entering the turn lane of their obligation to yield to bicyclists who are continuing through the intersection in the bike lane (because of the road rule that an operator leaving his lane yields to an operator on a path being entered or crossed).

In situations where a through travel lane becomes a right-turn-only lane (see Figure 4-21), bicyclists need to move laterally to weave across the travel lane. Therefore, the bike lane along the curb should be dropped, and a bike lane should be introduced on the left side of the right-turn lane. The bike lane line should not be striped diagonally across the travel lane, as this inappropriately suggests to bicyclists that they do not need to yield to motorists when moving laterally. This scenario is the least preferred option and should be avoided where practicable. In this situation, the “BEGIN RIGHT TURN LANE YIELD TO BIKES” sign should not be used, since bicyclists are the users who need to yield as they are weaving across the path of motor vehicle traffic.

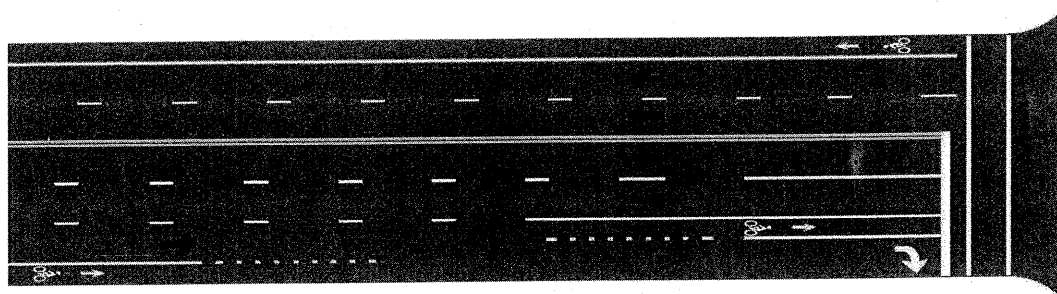


Figure 4-21. Example of Bike Lane with Through Lane Transitioning to Right-Turn-Only Lane

The use of dual right-turn-only lanes should be avoided on streets with bike lanes unless clearly needed to accommodate heavy right-turn volumes. Where there are dual right-turn-only lanes, the bike lane should be placed to the left of both right-turn lanes, in the same manner as where there is just one right-turn-only lane. On one-way streets with dual right-turn lanes, a bike lane on the left-hand side of the road may reduce conflicts and should therefore be considered (see Section 4.6.3).

An optional through right-turn lane next to a right-turn-only lane should not be used where there is a through bike lane. If a capacity analysis indicates the need for an optional through right-turn lane, the bike lane should be discontinued at the intersection approach. It may be possible to eliminate the through right option lane by using other methods of handling the right-turn traffic volume (e.g., two right-turn-only lanes as described above, or signal timing and phasing changes like additional green time or a right-turn overlap). An engineering analysis is needed in order to determine the feasibility of these options. If the lane assignment cannot be changed, shared-lane markings may be placed in the center of the through-right-option lane to provide additional guidance to bicyclists who wish to proceed straight.